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as part of the Swedish Presidency of the European Union*

Organised by:
Swedish National Institute for Working Life
Swedish National Board of Occupational Safety and Health
Swedish National Labour Market Board
Swedish Joint Industrial Safety Council

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Preface

The Work Life 2000 project, organised by the National Institute for Working Life, National Board of Occupational Safety and Health, the National Labour Market Board and the Joint Industrial Safety Council, Sweden, started in 1997. Since then researchers, experts and practitioners from different countries and different disciplines have gathered in international, scientific workshops to illuminate virtually all aspects of modern working life, demonstrating clearly in the process the links between work organisation, labour market issues, work environment and diversity in working life.

The results of the workshops will serve as the basis for the Swedish European Presidency Conference to be held in Malmö in 22–24 January 2001. The aim of this Work Life Conference is to bring the problems and possibilities of modern working life to the fore, and to broaden and deepen the discussion of them. The conference is aimed at decision-makers: representatives of governments, labour market parties, authorities, business organisations, and others.

After these three years of work with Work Life 2000, we can see that a new European process has begun: democratic, participative, diverse, multidisciplinary, dynamic, and founded in practical experience of working life, and we hope it will go on for a long time yet.

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- 1. Legal Dimensions of European Employment Strategy
- 2. Balanced IT in a Fast Changing Industrial Environment and Labour Market
- 3. Discrimination and Affirmative Action on the Labour Market

Introduction to Work Life 2000 Workshops

The pace of the Work Life 2000 project has accelerated in 2000, in the final months before the Swedish Presidency of the European Union, and the Malmö Work Life 2000 conference, and there has been an increased focus in the deliberations. The quality of contributions and chairmanship has been maintained, and the basis for an agenda for European Working Life policy is emerging. The task of the workshops has been to prepare the research foundations for the conference. A by-product of these efforts is a network of 1000 researchers, and a mass of new collaborative work and publications.

The conference programme deals with the workshops in four overall themes, but we have kept to the structure set out in *Yearbook 2*. Conference participants will have guides, cross-referencing the scientific reports, popular summaries and *Yearbook* reports,

Because of the number of workshops in 2000, the length of reports has had to be shortened. As has been the case since the start of the project in December 1997, full summaries were prepared for each workshop, and circulated to participants, but the final text underwent further editing. The reports of the final three workshops of the series, held in October and November 2000, are to be found in the supplementary volume, included with the set of Yearbooks. The full text of all of the workshop reports is available on the enclosed CD-ROM, in PDF format.

The Office of the Swedish Trade Unions in Brussels has hosted the majority of workshops in 2000, and we are grateful for the use of the facilities, and for the support of the staff. We are grateful also to the European Foundation for the Improvement of Living and Working Conditions in Dublin, and to the European Agency for Safety and Health at Work in Bilbao, each of which has hosted several workshops during the series.

Labour Market

1. The Public Employment Service and Transitional Labour Markets

The workshop was led by Günther Schmid, and held at WZB in Berlin, 5 April 2000.

The role of the Public Employment Service (PES) is changing with new labour market dynamics and unemployment. Organisational frameworks seek to implement labour market policies geared towards transitional labour markets, preparing for labour market adjustments aimed at preventing or shortening unemployment.

Theory of Transitional Labour Markets

The changing role of the Public Employment Service from the Transitional Labour Market perspective

Günther Schmid discussed the applicability of the European social model to the new century. The welfare state needs to limit itself in order to survive. We need a universal and non-discriminatory system, in contrast with the trend towards selectivity. Conventional labour market structures had inflows and outflows, and unemployment insurance, with underlying traditional assumptions. The origins of the unemployed have changed; destinations after unemployment are less often conventional employment. New risks in the labour market need to be understood, with changing aspirations of women and men, changing skills linked to technology, ageing workforce, and globalisation. New policies are needed, dealing with income maintenance and employment insurance, part of employment protection. Transitional labour markets can assist in co-ordination, facilitating life-long learning. We can assess transitions, involving risks, combining flexibility and security: enhancing freedom and autonomy, promoting solidarity through inclusiveness, improving effectiveness and efficiency.

From education and training to work and employment. There are benefits from investment in human capital, in the two speed labour market, with investment in new technology, competition between educated people, and lower horizons of

women in the labour market. We need to improve the use of investment, and revise tax regimes. Job rotation and life long learning are important.

Between working time regimes and employment statuses. The transition involves feminisation, flexibilisation, annual hours, result-oriented contracts, outsourcing and removal of employment and social protection. Employment options for the future take account of working time and employment preferences, with interest in new forms of work, including self-employment, part-time and work at home. It is important to facilitate changes over the life cycle. Transitional labour markets encourage rights for part-time workers, including unemployment benefits. Solidarity is extended to the self-employed and civil servants, with social protection. Effectiveness requires a rich network of local services and support, including job pools and temporary agencies, challenging public employment services to develop public private partnerships. Efficiency requires improved bargaining. There is increasing implicit subsidy for layoffs, where workers laid off tend to return to the same employer.

Between private households and the labour market. Roles of women are changing, with implications for tax and career development. Systems of voluntary career breaks could lead to increased employment. There are a number of voluntary measures, and approaches to supporting individualisation. Solidarity means handling parental leave as an issue of income and social protection, changing family roles. Effectiveness requires improved co-ordinated bargaining and community structures. Provision of services is vital, solving problems of small companies, and developing new partnerships. Negotiated agreements would meet the efficiency criterion. Cost benefit analysis shows social benefit from such changes.

Unemployment and employment. Policies need to be improved, and entitlements transformed. All workers need to be included within social insurance, removing tax avoidance. Social protection may shift to new forms of income tax. Employment contracts may resemble sales contracts. Assessment of individual needs and employability is vital, followed by new services. Cost containment is needed through self-regulation and risk sharing.

Work and retirement. Early retirement is a costly and inappropriate substitute for active labour market policies. The trade-off between elderly unemployment and youth employment is hard to demonstrate. New options need to be opened up to meet diverse needs. Financial disincentives for retirement need to be removed, with clearer approaches to protection. Solidarity requires taking account of the changing nature of the workforce, with new risks such as career breaks, and contingent risks linked to education, new technologies and changing life styles. Policies must be structured to support risks arising from change; the best social protection systems are employment policies; effective co-ordination of forms of protection is vital, including employability and real jobs.

Critical Issues of Transitional Labour Markets

Bernard Gazier asked how transitional labour markets can be developed. New patterns of bargaining and negotiation are vital; new circumstances derive from contracts, with a smaller role for public policy. He considered informational and institutional contexts, classical issues of substitution and targeting, and incentives.

With the unemployed, this involves probability of employment, duration and level of payment. In the USA, such criteria are used to organise local bargaining. Key actors include unions, employers, local municipalities, networks of non-profit organisations. Relative strengths of actors vary across Europe.

Using money in one field is at the expense of another. There are limits: with large-scale unemployment, local bargaining transforms the context. There are issues of co-ordination of public employment services. We need to organise free choice between transition options, with competition between agencies. Co-financing offers answers to some moral problems. Part-time early retirement could include a part-time non-profit job. Objects of the bargaining process are sequential positions, including non-irreversibility. Transitional labour markets need to involve structured and nationwide rights, not leaving poor regions to stay poor. This means public transfer policies, and a corrective and redistributive role for government. There are differences between the Blair New Deal and transitional labour markets, which emphasise social protection. OECD argue that we should make work pay, pushing people to work of whatever kind. The key is making transitions pay, through negotiation. He argued for rights and obligations of social actors, emphasising equal opportunities, involving unions. Incentives are needed for firms, encouraging training and skills development. Labour market institutions need systematic financial feedback, enhancing long-term effectiveness of policies. Local bargaining adds new levels of complexity. Common language and knowledge on transition would be helpful.

National/Regional Adaptations

The Reform of Swedish Labour Market Policy and Administration

Fredrik Jansson saw the goals as matching, increasing skills and employability, and supporting hard to place individuals, preserving human capital. The pattern of unemployment changed during the 1990s; unemployment rose from 1% to 9%, with increased expenditure on active policies, keeping up to 6% of the population on training programmes, including vocational training, work experience, computer centres, trainee replacement, recruitment grants, relief work and workplace introduction. There have been displacement effects, with reduced impact on macro level employment, and considerable circular flow between programmes. Active policies enhance employment outcomes; Sweden spent more on such policies than other countries.

The probability of finding a job goes down over the period of unemployment, but does not disappear. He compared figures from 1997, 1998 and 1999; it is getting harder for long-term unemployed to find jobs, although overall numbers are falling. Matching efforts are relatively successful. How are unemployed and firms matched? Informal channels are most important. Forty per cent of unemployed return to their previous employers. There is a lot of information: the qualitative dimension is important. Sweden is developing job banks on the Internet, easing access to information, but lacks a qualitative dimension. Applicants may not have the claimed qualifications. More vacancies are advertised on the Internet than via the employment service. Self-managing applicants can find work themselves. The

Activity Guarantee is offered to registered long-term unemployed, and provides full-time activity until a job or education is found, with continued unemployment benefits. Work is in groups with employment officers, with frequent contact and supervision of active job search, breaking the circular flow between unemployment and programmes.

New Directions of German Labour Market Policy and Its Regional Implementation

Günther Schmid noted that there are still 4.1 million unemployed in Germany. Local services now have more room for manoeuvre and policy development. **Konrad Tack** discussed progress at local level in Berlin-Brandenburg. There has been major industrial change, and over 1 million unemployed. Coal has downsized from 80,000 to 6,000 workers locally, and electricity from 6,000 to 400 workers. On average there are 500,000 unemployed, and major funds available. Programmes include training and publicly funded work; they involve public and private sector partners, and unions. There have been evaluations of labour market policy, particularly with those lacking qualifications or unable to work full-time; monitoring and benchmarking of local employment offices. The unemployed are required to make efforts to find employment. Uncooperative employers can be criticised for poor information. There are measures to avoid unemployment, including consultation with local groups. When companies are undergoing structural change, unable to fund employees, they may be paid to provide training, supported from the European Social Fund. These Social Plan measures are not very successful, as the funding level discourages efforts to find new work. Start-ups are a new focus, with unemployment insurance and social insurance cover.

Public private partnerships bring new people to work, working with third sector intermediary groups. More staff are needed, using Internet. His organisation is co-operative, independent, and works as a federal institution. The two local state governments are poor, seeking to reduce debts and cut expenditure; his organisation can provide effective gearing of local investment. There are problems with local unemployment offices in areas of high unemployment, and debates over allocation of funds between West and East, based on analysis of particular indicators.

Long-term Unemployment and Transitional Labour Markets

Problems of Long-term Unemployment in Sweden

Rune Åberg outlined problems in Sweden in the 1990s, with increased unemployment. Long-term unemployment destroys people, making them less employable, resulting in apathy and a vicious circle of reduced opportunities. People adapt. New jobs are likely to be different, requiring other qualifications and experience. It is important to study the flows, concentrated in younger age groups, such as 20–25. Job protection laws (last in, first out) protect older workers. There is a labour reserve, which responds flexibly and at speed to new opportunities. The composition of the unemployed group is different, dominated by the middle aged,

35–55. He outlined research on a sample of 3500 long-term unemployed: older, more handicapped, more likely to be immigrants, but not very different from short-term unemployed. They appeared to be employable, with few differences in willingness to work, or ambitions to get a job. Long-term unemployment should fall as the economy rose. So it has turned out.

Why is there such enthusiasm to get jobs in Sweden? Active labour market policies keep workers active, with a reasonable level of support. A hard core remains. Skill mismatch led to predictions of ongoing unemployment. Unemployment may not just be due to a lack of matching jobs. The fall in jobs requiring low qualifications was less than anticipated; they are often taken by more qualified workers.

The Public Employment Service and Long-term Unemployment: An Institutional Perspective

Hugh Mosley saw public employment services with competing groups of clients, and a range of policies and implementations. The study concentrated on Germany 1987–98. Resource allocation patterns were important, related to financial and political factors, other than just unemployment levels. Offices have varying levels of resources, and are given varying priorities. There is debate about target groups, such as long term unemployed. The system faces competing claims. Changes in the structure of the system blur lines between labour market, social policy and welfare policy. The response in Germany and Sweden has been to reintegrate; labour market partners are largely concerned with their own clientele. In the Netherlands there is controversy on the focus of the public employment service; the USA and UK concentrate on problem groups.

The Effectiveness of Training Policies and Consequences for Public Employment Service Reform

Klaus Schömann based his account on human capital theory, seeking social integration through transitions and transitional labour markets, with little return on many training investments. The unemployed found benefits once back at work. Educational transitions have implications for other labour markets, and are selective. Retirement pension levels tend to be lower for those with less education, and higher risks of unemployment. Similar arguments arise with women returners to work: the enduring impact of education. Transitions demonstrate the impetus for skills, national influences, and the impact of higher education. Links between working and learning can prevent unemployment. Adult participation in training is highest in Scandinavia. Experience of the dual system in Germany and Austria is linked to later low participation in training. Links to market orientation affect training outcomes, as shown in the Netherlands and Ireland. A great deal of forecasting goes on in the public employment service in Germany and Sweden, linked to prevention of unemployment, with forward planning when mass redundancies can be predicted. Those likely to experience difficulties can often be identified. Selectivity in employment policies is fostered by selection for employment programmes, linked to likely resulting employment. Incentive structures need to change.

Transitional Labour Markets and the European Social Model

Some Thoughts on Public Employment Service Reforms and Transitional Labour Markets

Peter Auer noted the importance of life styles, and altered individual trajectories. More transitions mean more matching periods. He identified major changes, and implications.

- *Decentralisation*: fitting local conditions, new public management, new regional and local dimensions, raises needs for monitoring; local conditions vary, experimentation is more possible.
- *Tripartisation*: involvement of the social partners, “responsibilisation”.
- *Privatisation*: the search for efficiency, new legal forms, allowing private placement, allowing public/private competition, subcontracting and network-ing;
- *Integration*: between welfare and welfare to work logics, combining benefit payments and placements, using one stop shops, assisting activation, passive benefits.
- *Open placement* (self service): ICT raises problems of income protection and training. There is polarisation in access and use, risks of exclusion, questions of assisted and unassisted transitions, interest representation and the public good. The public employment service could be an efficient agent of transition.

The European Commission Guidelines and Objectives Related to Public Employment Services and Transitional Labour Markets

Günther Schmid argued that if functions are outsourced, professional expertise is still needed for monitoring and quality control, in co-operation with the private sector, using available technologies. Improved monitoring is needed, based on flow dynamics. We need better information on people moving between roles and statuses, and on origins and destinations of the unemployed. We need evidence on changes in the labour market.

Workshop Participants

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2. Just in Time Employment: Psychological and Medical Perspectives

The workshop was led by Kerstin Isaksson and Gunnar Aronsson, and held at the European Foundation for the Improvement of Living and Working Conditions in Dublin, 22–23 May 2000.

Overview and Organisational Perspectives

Contingent Work and Organisational Change: An Overview

Chris Brewster considered flexible employment. The growth of flexibility is driven by employers; there can be joint approaches with employees. Jobs have been long-term and full-time; the future is different. In the UK and Ireland we discuss “flexibility”. In the USA the term is “contingent”, and in the European Commission “atypical”. Trade unions discuss “vulnerable” workers, and we debate “work life balance”. Employers derive advantages from flexibility in time, contracts, and tasks. Flexible working hours involve varied situations in terms of working time. There have been major changes over the past 20 years, with shops and banks working in new ways. The extent of part-time work varies, with more in Northern Europe. Part-time work fits the work requirement: for example, Heathrow Airport, where the early morning is busy. Part-time work tends to be more productive per hour, particularly when the work is repetitive, and in practice part-time workers are cheaper. Norway and Sweden have seen reductions in part-time work, with trade union pressure, and a tightening labour market. Similar patterns are seen with job share, shift working, weekend work and annual hours;

flexitime is driven by employee needs, and is not growing to the same extent. The UK leads on overtime, followed by Ireland: the least effective way of using human resources, going up and down with the economic cycle. Early retirement follows shortening periods of work after extended education. The older you are, the harder to find new employment. In Europe, the majority of workers retire before official retirement age.

Contractual flexibility covers temporary (e.g. building workers), fixed term (Cranfield academics) and casual work (agriculture, tourism and child care). The duration of employment is not certain. Employers cannot predict the future, and lack expertise in recruiting. Short term contracts enable workers to show what they can do. There has been a recent increase in fixed-term contracts, except for Norway and Portugal. Direct employment can be avoided, through subcontracting, self-employment, franchising, consultancy (in effect labour only subcontracting), agency and networking. Self-employment is highest in the poorer Southern countries; increases are seen in the North, with young entrepreneurs, or people doing the same jobs as before but operating as freelancers. Contractual flexibility includes the black economy, hard to measure. It involves expert accountants, as well as low-wage sectors.

Flexibility in place of work is increasing, with teleworking and mobile offices. In the UK, about 1% of work is done at home, compared with predictions of 25% by 2000. Teleworking is small scale, but has expanded in Sweden. The best way of managing people is to talk to them. Working at home gets lonely: work is where people meet. It may be different in smaller organisations.

As for *task flexibility*, semi skilled workers are engaged in horizontal, vertical and combination roles. Skilled workers engage in core skills plus, dual skills and multi skills. Clerical workers are given generic job titles. Managers adhere to job descriptions, but favour common conditions, with implications for pay and rewards, union representation, role of management, training and development. There are new mental boundaries in flexible organisations, with network management, knowledge management, loyalty management and identity management.

Cranfield research for the European Commission assumed that flexibility is the way forward, but introducing flexibility in an organisation transfers risks and costs to the individual, to society and the economy. There are threats to training, as employers avoid investing in short-term employees. He argued for a wider perspective, looking at economic assumptions of households led by full-time workers, raising questions of mortgages, bank loans, etc. Fresh thinking is needed. Most part time workers are women; the UK is not flexible, despite deregulation. Child care is important: equality has been seen as women working, as well as handling child care. As with the earlier productivity boom, there is resentment about change that benefits management. Some flexible working benefits employees and employers. Computer software specialists favour short term contracts. Most part-time workers prefer part-time work. The analysis does not cover the black economy. The most flexible employee is the illegal immigrant.

Temporary Employment: A Bridge or a Trap?

Juoko Nätti traced increases of temporary employment in the EU. In Finland, temporary employment, with fixed term contracts, is more significant than part-

time employment. He traced changes in employment in Finland, following employees through cyclical change. More young women have temporary contracts, and younger men are more involved than older men. Levels of education vary: higher in the public sector for women, and private sector for men. He analysed temporary workers. The focus was on job characteristics (such as union density and overlap between temporary and part-time work) and stability of employment (unemployment experience). Job tenure tends to be about one year for temporary employment, compared with twelve years for permanent employment. Motivation of temporary contracts is vital: voluntary or involuntary. Mobility was vital; he analysed transitions to different job statuses (or to unemployment), then unemployment risk. The nature of the employment contract helps predict future unemployment, with previous experience of unemployment. There is a larger core of temporary workers who have experienced unemployment.

Temporary and Permanent Employment and Their Psychological Working Conditions in the Public Labour Market Sector in Finland

Pekka Virtanen considered temporary personnel in the Finnish municipal public sector. He studied employment policies of municipalities, using temporary contracts. Health service research dealt with psycho-social working conditions, using questionnaires and records of sickness absence. In Finland, unemployment was higher in the public sector. Employment policy was described in quantitative terms, covering substitutes for absent staff, fixed term contracts, and subsidised re-employment of the unemployed. The level of permanent employees was constant through the 1990s, with increased employment on temporary contracts since 1993. The largest increase has been of fixed term employment.

Psychosocial working conditions, in terms of job demands and job control (Karasek and Theorell), and workplace relations, were considered. He classified jobs in socio-economic terms, showing varying levels of demand between kinds of temporary work, with subsidised jobs the least demanding. Co-worker support and supervisor support showed less support for permanent workers, more support for temporary workers. Temporary workers often had better conditions than permanent employees. Needs vary over time, relating to health and welfare in the workplace. He considered job insecurity; the trap of permanent employees, faced with no alternative, and the bridge of substitutes and fixed term employees, linking to possible permanence. There is a trap for subsidised employees, seen as a cheap and flexible work force.

Effects of Attachment Style on Preferences for and Satisfaction with Different Employment Contracts: An Exploratory Study

Moshe Krausz described work on early child development, based on the work of Bowlby, dividing cases into *secure*, *anxious ambivalent*, or *avoidant*. Attachment theory has been investigated in terms of links with mothers; the underlying models influence subsequent cognition, affect and behaviour, and provide continuity of feelings and behaviour styles. He linked this with work environment, building on research in the USA looking at adolescents and adults, applied to adult work-related behaviour. This extends arguments on attachment to coping with change

in a changing world. *Secure* individuals are happier in their work. *Anxious* and *ambivalent* people prefer a stable social environment, concerned with how others see them. *Avoidants* showed dissatisfaction with co-workers. Both insecure groups are vulnerable in times of change.

Employment contracts differ in stability, predictability and being external. Research has tried to link attachment types to employment contract types. There can be patterns of separation and re-location, different chances of development, but little likelihood of promotion for those on external contracts. Choices are affected by time perspectives, clarity about duration, and dimensions of control. Previous studies showed acceptance of preferred contracts or schedules is beneficial. The sample was of 194 software employees, mostly men. He linked attachment styles and preferences for contracts. *Anxious* and *ambivalent* favour permanent stable contracts. *Secure* people prefer internal contracts, because of promotion potential. No groups preferred external contracts.

Commitment and Work Satisfaction: Results of the Austrian Climate-of-Work Index

Christoph Hofinger introduced the work climate index, tracking changes in work satisfaction of all Austrian employees, setting standards for work satisfaction, based on quarterly surveys, with 25 variables. One section concerns labour market expectations, by age. Fixed term contracts are still unusual in Austria, a traditionally corporatist country. Apprentices do not see themselves as on fixed term contracts, and were removed from the figures. Fixed term contracts are most likely in blue-collar private sector work, and in education. Age and gender matter, with more women on fixed term contracts. The work climate index is lower with fixed term workers. The hypotheses were that fixed term contracts lead to lower salary (supported); lower work satisfaction (supported); more stress and time pressure (not supported); worse work relationship (not supported); worse career (supported); less commitment (not supported); less satisfied with opportunities for training (not supported); more likely unemployment (supported).

Stress, Health and Safety

Contingent Work: Health and Safety Perspectives

Michael Quinlan reviewed 91 major studies on occupational health and safety impacts of contingent work, largely from refereed journals. Eleven were indeterminate, lacking benchmarks to provide comparison with non-precarious employment. Many had not initially focussed on precarious work, drawn from all over the world, especially the USA, Sweden, UK, Australia and France. There was broad coverage of different industrial sectors, with a few key omissions. The fast food industry is a major employer of young women, but lacks studies. Twenty-nine used secondary sources, 21 used longitudinal designs, 36 used cross-sectional surveys, and 12 were qualitative case studies. Many included discussion of causation, and multiple indices. Thirty-three used objective OHS measures, 46 used subjective measures, 12 used sickness-related absenteeism, and 10 measured OHS knowledge, five dealt with policies. He used categories, such as outsourcing, small business, downsizing, temporary workers, part-time workers. Different

methods were chosen according to topic; each category had a range of methodologies. Findings in over 90% of cases show precarious employment having a detrimental effect on occupational health and safety. The breakdown is thorough, with more studies available on small business, not included. Small business should be regarded as contingent employment, especially in the cases of micro firms. Outsourcing and downsizing had detrimental effects; many studies focus on moderating interventions. Repeated downsizing is the norm, shown to be damaging. More work is needed on temporary workers, especially young workers in new industries. Part-time workers showed improvements; many should not be regarded as precarious. He discussed the explanatory model developed by his team.

- *Economic and reward factors.* He considered risk factors associated with precarious employment. The Siegrist or Karasek–Theorell models could be used; he cited the work of Marmot and colleagues on the Whitehall 2 study. Self-employed sub-contractors lose task control through pressure of circumstances: low budgets despite safety and time constraints; long hours of working, with serious impacts over 49 hours per week; off-loading of high risk activities.
- *Disorganisation through change:* Outsourcing involves hidden organisational changes, and fracturing of OHS knowledge. Management control and training are limited, and externalisation is common.
- *Regulatory failure.* Regulatory systems were not designed for current organisational structures. Minimum standards are removed through deregulation, leading to deterioration in health and safety.

He highlighted gaps in the literature: part-time workers, and potential health issues. Call centre work is not sustainable. Temporary workers are used as rate-busters. We need new forms of intervention in clothing and trucking.

Review of the Literature on Contractual Flexibility and the Quality of Work: Individual Consequences of Contingent Work

Hans de Witte reviewed literature on temporary contracts, analysing objective quality of temporary workers, and potential inherent stressing elements. Quality of temporary work appears lower, and a stressor. His analysis was based on the Karasek and Theorell model, and related work by Weber in Netherlands. Temporary workers tend to have lower autonomy, and less organising tasks. He considered variety, and non-repetitive tasks: most temporary workers are low-skilled. Co-operation and social contacts are important. Working conditions are not always worse; conditions of employment are clearly inferior, with lower pay and benefits, and less training opportunities. Causality is unclear: temporary work may not be worse, but given to temporary workers. The literature is ambiguous on well-being and job satisfaction. He added further variables of voluntariness, job insecurity and the psychological contract (transactional rather than relational), not previously analysed together; this is the focus of current Belgian work.

Working Place Mobility and Health Effects of Job Security in Atypical Work

Kerstin Isaksson noted that atypical workers have poor working situations, often not reported. The research was based on 270 staff working for temporary agencies on extended contracts, and 773 casual workers, seeking short-term employment. The focus is atypical workers, in terms of employment contract characteristics: period covered, hours and workplace mobility. The study compared the groups, looking at recruitment, effects on involvement and work outcomes, and the effect of contract differences on health outcomes. Measures were of job perceptions and perceived social support. The temporaries were older, more female, with children, and less education, with 73% keen on permanent employment. Health was better among the temporary health group. Job perceptions can be linked to contract difference, preference for traditional job, and preferred working hours, seen as underemployment. Negative health effects can be linked to contract difference, relations between job perceptions and distress, and underemployment. Higher actual job security has positive effects on job perceptions and health outcomes, when mobility and demographic aspects are similar.

Forms of Employment, Work Environment and Health in a Centre – Periphery Perspective

Gunnar Aronsson presented a core of permanent positions and a periphery of temporary jobs. Statistics Sweden collect data on job conditions and types of contracts, showing increases in temporary workers. On call jobs are largely held by women; project employment is largely for men. The aim was to compare forms of employment, with respect to influence, social support, skills development, and health. 4000 telephone interviews were conducted, with balanced samples. Educational levels were compared, with higher levels on project work. Training days were more available for permanent employees, little for those on call. The opportunity to learn something new was stronger in project work than for those on call. Involvement in decisions concerning organisation of their work was lower for temporary workers. Health factors showed greater problems for those on call. The model of centre and periphery is borne out. Control within the work, and over one's working situation, are important for learning and development.

Psychological Aspects and Contracts

An Overview of Current Research on Contingent Work and Psychological Contracts

Judi McLean Parks saw some anomalies unravelled with psychological contracts. In the USA, contingent work has been a focus of research, as traditional arrangements have changed. New categories need to be defined. There were no "traditional workers" until after the Depression. There have been studies of temporary work, and issues of identity, dual control, and commitment to temporary agencies. What are the differences between contract workers and others? Some studies find no difference in commitment to stay, but less affective commitment. It is not clear what is being compared. She explored definitions,

including core, floats, networked, in-house temps, direct hires, leased workers, temporary firm workers, subcontracted workers, consultants and independent contractors. With classification by length of employment, subcontractors may not be included; by detachment, they would be included. The answer in the USA is often self-classification. A better classification system could meet the needs of emerging complex work arrangements. The psychological contract can be useful. Research concentrates on breach or violation of the contract, and feelings of need to redress the balance. Studies have considered career advancement, job security, on the job training and education, largely in terms of entitlements, rather than inputs and obligations. The organisation has something in mind, if not a psychological contract.

She discussed assessment items: support for career goals, trust, shared values: not necessarily obligations. Psychological contracts are based on beliefs, perceptions and reciprocal expectations; expectations for one group do not apply in other areas. This contrasts with a social contract, institutionalised, providing rewards and sanctions. It is a matter of third party observations and inferences, with psychological and normative elements. The psychological contract may fall within the social contract. The normative contract is the area of agreement between the parties. The content needs to be measured, including stability of the contract over time. It might be seen as dynamic or static; static contracts are easier to assess for breach. Scope is a matter of boundaries, involving spill-over to home or other clients. Tangibility varies from concrete to amorphous. Time frame covers duration and precision. Particularism concerns general or specialist resources. There can be nested relationships. Volition may vary from voluntary to enforced. She set out four cases: a temporary factory worker, float nurse, consultant and family business employee; dimensions were more accurate than classifications. The approach was generalisable, but does not tell us about content. There is a role for cognitive mapping, on a case basis and comparatively, using network analysis. She set out a person and content element matrix, presenting contrasting network relationships within work groups, with differing perspectives. The approach is time consuming. Respect and trust are critical.

Temporary Employment Contracts, the Psychological Contract, Commitment, Motivation and Satisfaction Among Professional and Knowledge Workers

David Guest considered benefits of temporary contracts, in a world of reduced collective bargaining: temporary knowledge workers benefit in tight labour markets; temporary contracts encourage innovation. Context and climate of security is conducive to innovation; two competing hypotheses. New contracts do not appear to be an employer's innovation, but are primarily reactive. Further research looks at shifts in control, the implications of knowledge work, the employer's side of the psychological contract, the relationship between temporary employment and the psychological contract, varied outcomes and balance of advantage. Interest is in the psychological contract: delivery of the deal, fairness and trust, with antecedents in organisational and individual characteristics, and the nature of the employment contract. There are outcomes in terms of innovation, organisational citizenship and motivation. The samples were from 4

populations of professional knowledge workers, with different kinds of contracts, including varied kinds of temporary work.

There were more positive reports from temporary than permanent contract workers. Contracts are transactional; workers have clear expectations of what they are to do, those in permanent posts suffer the tyranny of organisational citizenship, with long hours and ingratiating. Many permanent employees dislike ambiguous working relationships. In terms of commitment there is modest impact of contract type, including job role and job design, or innovation. Similar results are found for motivation, and for innovative behaviour, with little influence of psychological contract. With job satisfaction, job role and involvement are critical. For public sector professional workers on fixed term contracts, benefits can be found; workers are on the kind of contracts they prefer. Some permanent staff would prefer such contracts. It is a matter of choice, and position in the labour market, control over the job, and confidence in employability.

Contingent Work and Psychological Contracts

René Schalk described call centres in Belgium, high quality but with problems of absenteeism. There was a distinction between three categories of contract, and consideration of psychological contracts. Further work is needed on the relationship between formal and psychological contracts, and relationships with employee attitudes and behaviour.

Inge van der Brande considered Belgian expectations concerning obligations and entitlements. Consultation and negotiation results in collective labour agreements, covering 90% of employees, with impacts on the psychological contract. Standard employment relationships are stable; in Netherlands levels of temporary and part-time work are higher, while shift work is stronger in Belgium. The typical Belgian psychological contract has a long time frame and perceived security. Civil servants have life-time employment. Contracts are usually open-ended. Rules are common, with limited negotiation, and regulation through labour agreements. Stability is high, with little scope for change, and high uncertainty avoidance. The *status quo* is favoured, with consensus approaches; standard employment contracts are preferred. Belgians experience high power distance, with acceptance of authority relationships. Renegotiation of contracts is uncommon. Subordinates expect to be told what to do, to obey, and accept private ownership of companies. There is a combination of individualism and collectivism, a strong need for security and group membership, and collective agreements. Rules are applied flexibly, with scope for negotiation for high status white-collar workers. For temporary workers, the contract is less long term, less stable and more individual. Part-time and flexi-hour workers are more long term, stable and individual. Shift workers are not different from permanent workers.

Effects of the Real and the Psychological Contract on Psychological Health

Paul Jackson compared electronics assembly workers (skilled manual workers employed by an agency), and the emergency services department of a gas transportation company. The electronics assembly workers were 35 permanent and 75 temporary staff. Temporary staff had higher job satisfaction and better

psychological health. In the emergency services department there were 54 permanent and 81 temporary staff, working in call centre and despatch sections, with temporary staff in the job for a mean period of 8 months. Temporary staff had lower job satisfaction and commitment, no difference in psychological health, with higher perceived contract violation. The conclusions were different. The work designs were different; this does not explain the findings. In the first study the threat was to permanent staff, who felt more anxious, with the presence of the temporary staff affecting the permanent staff. In the second study the threat was to temporary staff, who felt they had earned the right to a more relational contract approach. The concept of psychological contract explains the differences between the two cases.

Workshop Participants

Gunnar Aronsson, NIWL, Sweden
Eva Bejerot, NIWL, Sweden
Joan Benach, University Pompeu Fabra, Barcelona, Spain
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Inge van der Brande, Leuven University, Belgium
Chris Brewster, Cranfield University, UK
Richard Ennals, Kingston University, UK
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David Guest, Birkbeck College, London University, UK
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René Schalk, Tilburg University, Netherlands
Lena Skiöld, NIWL, Sweden
Pekka Virtanen, University of Tampere, Finland
Arne Wennberg, NIWL, Sweden
Hans de Witte, University of Ghent, Belgium

3. Enlargement, Globalisation and the New Labour Market: Challenges for Europe

The workshop was led by Lars Magnusson, and held at the Office of the Swedish Trade Unions in Brussels, 7–8 September 2000.

Labour Markets, Social Protection, Tax and Social Competition in the European Union

Jacques Le Cacheux argued that with completion of monetary union, there are pressures on national governments to engage in tax competition. He discussed truck strikes in France, blocking petrol stations, and pressing government to reduce taxes, noting that tax levels in Spain are lower. Discussions on tax competition took place in the 1980s, in the context of the Single European Act. Some harmonisation was agreed, with floor rates set for VAT, and agreement in principle on investment income. Financial capital is becoming more mobile; transaction costs are falling. Tax competition will increase, and European firms are becoming better able to choose locations on cost grounds. There is increasing mobility of skilled workers in certain professions. He noted debate in Denmark since the completion of the bridge to Sweden, as in France and the UK with the Channel Tunnel.

There are incentives on governments to enter tax competition. Local governments within federations, as in the USA and Canada, have competitive approaches, leading to tax externalities and under-provision of public goods. Such reasoning tends to assume smooth taxation arrangements; the distributional aspect exacerbates the problem. Macro-economic arguments assume that, before completion of monetary union, governments competed through competitive devaluation, offering lower inflation rates than rivals. These tools have gone with the single currency, necessitating use of other tools, such as wage policies, tax and social contributions, which substitute for devaluation within monetary union. This is a "beggar your neighbour approach". Consequences of tax competition include inefficiency, with under-provision of public goods. More public goods incur charges for users, with redistributive consequences. Firms are ready to pay the price for relocation, but happier to stay in a supportive environment where someone else pays! Some governments have given way to pressure from companies. There are strategic aspects of tax competition, where firms and taxpayers bargain with governments. Investment projects involve deals on tax relief and grants; companies seek the best deal from a number of governments; decisions are based on windfall gains. There are distributional and life cycle aspects, linked to welfare state and social aspects of public expenditure. Arrangements vary between countries, with different distribution of burdens and social contributions. Organising competition between systems prompts changes towards actuarially fair systems on Anglo-Saxon lines, with low basic provision, and means testing; privatisation is accelerated. There is redistribution over individual life cycles; bachelors with no children may be penalised. Mobile workers choose when to engage in different systems. The UK involves lower

taxation than France for 25-year-old bankers without children; the situation is more favourable for families in France. If everyone became a tax nomad, the system would collapse.

Things could go on as at present; EU summits have found it difficult to reach agreement on tax harmonisation. There has been no co-ordination of tax reforms in Europe; most governments want to retain national control. Harmonisation has been unsuccessful with VAT, where the spectrum of rates has widened. Unanimity could be abandoned in favour of qualified majority voting; this raises issues of democracy. European institutions do not appear sufficiently democratic to take on the role. We must expect tax competition and welfare cuts, curtailing the welfare state.

Anton Hemerijck suggested that nobody wants to pay taxes. Tax competition has been limited; it will grow, with EMU. It is inefficient and will be destabilising, with tax nomadism. Tax competition should be seen as more than just windfall gains for firms: is that all that happened in Ireland? He cast doubt on mobile French bankers, engaging in frequent travel to the UK. He argued for user charges, not simply victimising the socially weak, and for excluding inflation in wage bargaining. Tax competition may increase, with lower rates and a broader base. Governments are not wholly free to engage in tax competition. Even in an unhappy equilibrium, governments are constrained. There is pressure to make tax changes employment friendly. Some people want to pay taxes, and it can be politically popular. This involves structural change.

Jacques Le Cacheux argued that adverse effects of tax competition have been neglected. In Ireland there has been a growth miracle, from a backward position, as in Asia. If all countries lowered taxes, results would be mixed: little research evidence supports tax levels as significant in location decisions. The language problem is vanishing in Europe, with the increased use of English. The mobile group is small: 30,000–50,000 French live in the UK for tax purposes, and are larger taxpayers. Governments prefer to cut taxes rather than reduce debt. Democracy links taxes with the electoral process, governments are under pressure to match lower tax rates in competing countries. This is not leading to closer co-ordination of policy making; bilateral arrangements are developing.

Social and Economic Policy Adjustment in Europe: Sequences of Challenges and Policy Responses

Anton Hemerijck discussed path dependency in social and economic policy. After 30 years of reforms in the welfare state in Europe, it is not like the USA or Europe of the 1970s. There may be policy learning, and régime specific problems, but not easily transferable régime specific solutions. We need to study interesting countries, and learn at the EU level, looking at the future of a social Europe. Policy changes have been massive: from full employment to stability in employment policy, from solidaristic to market-regarding wage policy, and competition oriented industrial relations. Tax policies are broadening the base, social policies are tight, and labour market policies active. Welfare adjustment is difficult, reactive, directed towards better goal attainment. There are questions of policy co-

ordination and issue linkage, within and across countries. A successful strategy involves more than one policy area.

He considered shifting problem constellations: in 1970s stagflation, 1980s inflation, 1990s competition, and in 2000s? Endogenous social changes include age, technology, and service sector development. Political management of efficiency and equity are involved, with policy adjustment seen as a search process, dealing with production and distribution. There are risks in reform, including mismanagement. Governments are voted out if they violate norms of social justice. Political conflict increases as reform moves into redistribution. There has been a sequence of adjustments: in 1970s industrial relations, in 1980s competitive wage bargaining, and in 1990s welfare state design issues, with structural reform of the labour market and welfare state.

There are régime specific problems in the welfare state: Anglo-Saxon (inequality, poverty and low skills), Scandinavian (limits to public sector employment), Continental (welfare without work) and Southern (socially restrictive). Effective adjustment needs to be stability oriented, with responsive wage policies and wage flexibility, employment friendly tax and social policy, efficient financing of the welfare state, labour market de-segmentation, and new emphasis on fighting poverty. Policy co-ordination was best illustrated in the Swedish model, which unravelled. Issue linkage has gathered momentum, with the social wage, flexicurity and competitive solidarity. There are winners and losers in welfare adjustment. Democracy is about legitimation of policy choices. Adjustment impinges on core policy areas, which need to be linked. There are moves from national to EU-level learning, and deviations from the neo-liberal holy grail.

Jacques Le Cacheux saw inflation as a symptom of reluctance to deal with issues of distribution. Once inflation disappears, issues become less avoidable, making politics more conflict-driven. In the last two decades, no French government has been re-elected. There has been a pattern of reforms in the welfare state in the direction of fighting poverty, introducing user charges and an Anglo-Saxon safety net (as opposed to the Continental system focused on the middle classes). The Continental system has implicit redistribution, and there is a call for clearer focus, with dangers of an Anglo-Saxon divided society, with class segregation and a lack of generosity. Reforms are not just problem and failure induced; people ask for more in a period of growth. He highlighted problems of policy learning at European level, with success stories and models.

How Can Trade Unions Gain from the Single European Currency?

Colin Crouch concentrated on the consequences of monetary union, and the removal of the possibility of devaluation of individual currencies. He saw four strategies for managing labour markets: deregulation, deflation, corporatist co-ordination, and currency devaluation. Deflation is negative and painful. Deregulation is seen as an ideal, but rarely achievable under democratic conditions. Co-ordination is difficult, so devaluation has been a common solution, albeit short-term. It externalises domestic political costs of adjustments. Monetary union removes the devaluation option.

There are three stages. The current phase involves the Euro as a weak currency. The whole zone had advantages of devaluation, easing various problems, which worried the Spanish and Italians. The weakness had many causes, but the function for labour market policies of effective devaluation, reducing labour costs. The impact on the UK economy has been marked, with worrying decisions from BMW and Ford, relocating employment. The British had competed on cost, not value; their advantage has been removed. This phase will end as the Euro stabilises, and hidden issues return.

The second stage is full of paradoxes, where the role of EMU is to strengthen the nation state and national institutions. Globalisation seemed to undermine such institutions, but states and populations do not disappear. Most people stay anchored in their nation states, energised by national elections and policy making. National governments find new constructive things to do. What incentives are they given by the removal of the capacity to manage the currency? The intention was further deregulation, enabling deflation. Deflation is painful, and deregulation is conflictual, so there is a case for renewed co-ordination. The incentives are not just economic, and can be purely political. In the new régimes of Eastern Europe, and in EU countries with problems of national integration, political exchange takes place between states and interest groups. The nation state wants legitimacy, achievable through good relations with the social partners, such as the trade unions, also seeking legitimacy. New social pacts can be motivated by other than economic reasons, but with economic outcomes. Only in the UK is social partner agreement not needed for reforms of the welfare state. There will normally be trade-offs.

EMU gives a further incentive to use such methods, reinforcing roles of national level institutions. We expect difficulties in countries without strong social partner capacity, and need among employers to develop negotiation capacity. This is competitive corporatism, designed to reduce wages, and accelerating a downward spiral of wages, with impacts on economies and purchasing power. It requires development of European level structures and co-ordination. European level collective bargaining will be resisted, and trade unions are not able to enforce it. Constant constraints against wage rises need not lead to deflation; space can be created for public spending increases and other forms of growth. He reflected on the success of corporatist economies in the 1950s, such as Sweden, Austria and Germany, which always operated within constraints. In the longer term we expect attempts to solve problems of competition. In some cross-border labour markets we see international co-operation in wage bargaining, such as Belgium, Netherlands and Germany in a real labour market area. There are difficulties, with unions trying to meet at industry level. The Germans are worried and sceptical. The Italians are enthusiastic. When it comes to co-ordination, the Germans worry about competition, and the Italians seek to compete, not collaborate. The dialogue of possibilities has started on the union side. Employers are less enthusiastic, or already linked through hierarchies. There is a lack of symmetry in developments.

The European Commission still lacks legitimacy, seeking to develop links other than through national governments. This explains social partnership, the case for European level meetings, and regional developments. Trade unions see the European Commission as a source of legitimacy, and a means of influencing relations with employers. This level of exchange of legitimacy has an initial false

aspect, but it can be self-fulfilling. It does not have the effect of weakening national levels, but the two levels are mutually reinforcing. He does not envisage a return to strong corporatism; EMU and integration strengthen the social pact tendency at European and national level.

Jan Ottosson emphasised risks for trade unions. Internal tensions between industry and national level organisations must be considered. The role of the state is not always positive; the impact on trade unions can be adverse; attracting inward investment can be at the expense of unions. He asked about the implications of the expansion of the EU. In Eastern Germany he identified an American style labour market, with weak trade unions and high unemployment. What will happen to unions if more countries are added?

Colin Crouch agreed that there are tensions between levels, aggravated by competitive changes. Manufacturing employment is declining. The main partners are unions and employers, representing a shrinking workforce. This explains some of the problems with the Swedish model, as LO no longer represents the majority of workers. Public sector workers are different, with different competition issues. Private services are different again; job growth is in low productivity service areas, not exposed to international competition. Some services sectors such as insurance and banking are internationally traded. New categories and approaches are involved, with diversity linked to background and structure. The state is not always a trustworthy friend, with different experience across Europe. He highlighted the importance of welfare state reform: only in the UK did trade unions withdraw from welfare arrangements in the 1920s, so they are not engaged in pension reform debates. Will enlargement really happen? Will Germany happily admit new members, enabling Slav workers to have free access to Germany? Current leaders are hoping to postpone decisions. The Soviet Union protected us from relations with Slav countries. Underlying racism has emerged. He predicted postponement.

He discussed declining union membership. The structure of unions has changed little, with male manual workers in manufacturing dominant. Challenges of female members, ethnic minorities and service industries have been addressed in the UK, but largely ignored in Germany. Responses to changing employment structures have varied. Scandinavians have pioneered representation of private sector workers. The Dutch have sought to adjust to new requirements, and membership has grown. It remains hard to develop representation among part-time and new economy workers.

Small countries need to be internationally competitive. Economies are more exposed to competition; employment is growing in areas without such pressures. The debate on Fordism predates the new economy; Fordism and Taylorism are only now reaching certain sectors, including universities. The new economy is not so important as a creator of jobs, with high skills but no specific training programmes. Key effects concern use of new technology, affecting roles of supplier networks, enabling co-ordination across space and enterprises, with impacts on trade unions and work practices. The new economy, as phenomenon and mechanism for share purchase from home, enables optimism in the USA, as share values increase although wages decline. This has a Keynesian multiplier effect (though it may mean that the crash, if it comes, may be larger).

Workshop Participants

Kerstin Ahlberg, NIWL, Sweden

Niclas Bruun, NIWL, Sweden

Jacques Le Cacheux, University of Pau, France

Colin Crouch, European University Institute, Florence, Italy

Richard Ennals, Kingston University, UK

Roger Falk, journalist, Sweden

Anton Hemerijck, Erasmus University, Rotterdam, Netherlands

Lars Jonung, Handelshögskolan, Stockholm, Sweden

Karsten Lundeqvist, University of Uppsala, Sweden

Lars Magnusson, NIWL, Sweden

Jan Ottosson, NIWL, Sweden

Sven Svensson, Office of the Swedish Trade Unions, Brussels

Work Organisation

1. Sustainable Workplaces

The workshop was led by Anna Pramborg, and held at the TCO Bergendal Conference Centre, Stockholm, 8–10 May 2000.

Per-Erik Bovie defined sustainable workplaces, on the basis of the Rio Conference and Agenda 21. Joint commitment and involvement of every employee can alter patterns of production and consumption, and new relationships, integrating the workplace with ecology. The TCO label on computer monitors is internationally known. In 1986 TCO produced a screen checker, an ergonomic checklist intended for the workplace user, in nine languages. Starting with the work environment, wider engagement in environmental issues can be developed. Attitudes of manufacturers have been affected; detailed publications have explained risk factors and requirements. TCO members how to make good choices simpler: this resulted in *ecology, energy, emissions, economics*, 4-E, in collaboration with the Swedish Society for Nature Conservation. In 1999, 100 million monitors were produced, TCO worked with global suppliers. A total of 3150 models have been certified. PC World has a test centre in San Francisco, and cites TCO approvals, but PC World do not address ecological issues. We are producers and consumers; improving thinking in the workplace could affect private lives. The TCO 6-E model includes *efficiency* and *ergonomics*; a model for professionals ready to take responsibility, compatible with ISO 14000, and with a range of support materials. Staff in a 6-E company develop cross-border knowledge, with conscious insight, creativity, responsibility, pride, competence, personal satisfaction and competitive advantage. Experience of trade union work internationally in recent years has raised the profile of sustainability, and links between health and safety and the environment.

Denis Gregory characterised sustainable workplaces. They involve time for regeneration, reflection, absorption of new ideas, education, meeting; and “empowerment”, enabling people to act out what they think, with more influence, autonomy or control, and scope for mobilising creativity, human resource development.

Sånga-Säby

Totta Ogander works at a conference centre operated by the Swedish Farmers’ Association; formerly run-down, it is now highly attractive, a sustainable

workplace. There are 134 rooms, with 176 beds and 28 conference rooms, with 42 employees. The association was founded at Sångå-Säby, and was not commercially successful. The new director had to lay off staff, and saw the need to change the culture, developing a new vision, a distinctive environmental emphasis. Staff worked on environmental questions first, with quality benefits as a bonus; first basic economics, then environmental education, in the 4 system conditions. A staff questionnaire was developed, with questions on which the staff work in groups. A bonus system complements wages in a low wage sector, linked to profits and environmental goals. Job rotation was introduced as a means of job retention. Staff are involved in ongoing development processes. Environmental issues include renewable energy, lake water, ecological food products, eco label articles, few chemicals, long-lasting inventory items, renewable energy vehicles, air pollution, sorting waste products to reduce weight of waste per guest, and water pollution. Quality follows, checked with research on customer attitudes, which shows improvements. Staff are interested, customers are satisfied, occupancy is increased, turnover has almost tripled and profits are high. A sustainable company has enough money to pay the staff and make investments. There has been thought about performance measurement, after initial enthusiasm to measure everything, a more selective approach is emerging, based on social factors, quality, environmental factors and economic aspects, within a sound ethical framework.

Economic Aspects

Sören Bergström works with TCO: union structures change, from developing individual services, to product orientation, ensuring the quality of products affecting union members. TCO 6-E addresses how companies are run, with implications for unions: oriented around expertise, seeking acceptance, unusual in emphasising work environment and work orientation. The business community has greened since 1980, when environmental issues were seen as separate. By 1990 the climate changed, impacting the business core. The business community was active at the Rio conference, resulting in Agenda 21. Today, in companies such as Sångå-Säby, the whole business has been redefined through environmental insights. Some plan to move straight from the 1980 to the 2000 mode. TCO Development researched on new economy companies.

Sustainable workplace issues are strategic, important to management, about economising resources. Where conflict is low and relevance is high, attention should be concentrated: provision capacity, motivation, security, labour market attractiveness, consolidation of business opportunities, profitability, wage levels, competence requirements, share holder dividends. TCO analyse the position and attitudes of union members, with issues handled as part of the business. This raises questions of business logic, and resources management. The traditional model adds value by performing operations on resources, described as money, reducing questions to those of finance, presenting problems for those who want to understand the workplace. The deficiency is in the model, not the individual. Most company statements on environmental investments and costs are made up; there are no such investments or costs. The model works at the expense of business logic.

For Adam Smith, economics was not mathematical, but anthropology. He found that the Dutch worked very differently from the Scots. He tried to compare, using

common principles. We should not be impressed by recent lightweight economics. TCO Development considers business logic from a union point of view. Work environment plays an important role. We need to find out about provision capacity, motivation, security and continuity of operations, labour market attractiveness, consolidation of business opportunities, profitability, and capacity to pay wages. These are seen in terms of resource margins, productivity and value creation. We address the issues upstream in the workplace: this appeals to accountants. Value is seen in terms of work atmosphere, job satisfaction, good health, profits and wages. Increasingly companies claim to be good citizens; environmental problems mean bad business. No value creation, inefficiency and weak margins mean diseconomies. There is room to identify coinciding interests, to use business logic; not money language when the issue is not about money. Economic logic can be used to assess results, considering sustainable workplaces.

Francesco Garibaldo discussed Adam Smith: a professor of moral philosophy, working across disciplines; value creation cannot be separated from tools, goals from means. Workplace sustainability involves considering appropriate principles; we need to discard orthodox economics. This means discussing technical tools, for example lead times in production, developing an alternative approach with unions to understand management inefficiencies, and challenging accounts of productivity. Product orientation and innovation make possible process innovation and sustainability, with time critical.

International Views

Lucien Royer concentrated on sustainable workplaces. The work of trade union leaders and workers is fundamental. Agenda 21 makes no reference to workplaces, talking about production and consumption patterns, assuming business as usual, with opaque language. The challenge is to highlight the workplace, defining it to include the worker, and the nature of work and community. He outlined developments from 1993, with enterprise eco-auditing: support for worker participation, building on current models of health and safety, entailing a need for regulations, financial support, and measurements in new workplaces related to employment and employment transitions. In 1992 the discussion on worker participation was vague; drafting benefited from help from industry. Rio produced the Commission on Sustainable Development (CSD); initially there were no trade unionists: the delegation has grown. In 1996 the UN held a day of the workplace, and a dialogue session on implementation. He outlined CSD work on sustainable workplaces, feeding conclusions into thematic reviews covering economic, social and environmental concerns; core labour standards; health and safety linked to sustainable development; ongoing dialogue with trade unions; and a tripartite review of voluntary initiatives by business. The social dimension of sustainable development is linked to minimum access questions, equality of provision and social protection.

Trade unions are engaged in discussions on climate change, considering employment transition. The agenda moves forward on sustainable workplaces and employment. Regulations and industrial relations need attention, in the context of Agenda 21. Climate change gains are inadequate. By 2020 there will be 120 million environmental refugees. There have been periods of retooling since the industrial revolution, eco-efficiency is taking place, but increasing, improving and changing

production has not been addressed. Changing consumption patterns is left to governments. Policies on new agriculture are not linked to policies on consumption. Workers need to be involved. The TCO model is a good start. Real change can be made by trade unions as equal partners in change. There needs to be a new climate of co-operation in the workplace, with enabling mechanisms including core standards, equality provisions, and transition employment mechanism that provide appropriate change. The change must involve the worker as a human being.

KPA

Ola Löhman described the insurance company, owned by local and city councils, managing public sector pensions. The public sector comprises 30% of the workforce; there is a large target market. KPA is concerned with sustainable development, and the development of ethical policies. He defined sustainability in terms of Agenda 21, setting out a triple bottom line (economy, society and environment), defined as “our responsibility” (working for a better future for people and the environment), which could be expressed in terms of values. Typically “value” is seen as “shareholder value”, and return on equity; there are other values. In companies there can be power, prestige. Philip Morris is said to be “value-driven”, making cigarettes. The ambition needs to hold over time. Sustainability over time is a big issue. It is a matter of setting target dates.

Sören Bergström argued that multilevel regulation cannot be organised in one attempt. Starting from the *workplace*, we can find practical examples. At the *middle* level, possibly regional, networking is important, with a process of reaching out. Promotion of sustainability and business orientation are important, with potential conflicts and collective action as consumers. At the *top* level ecological awareness helps reschedule the political agenda; networks, formal and informal. There is no international government, but international institutions can be sustained. Integrity is critical, at each level.

Denis Gregory presented a unifying model, based on economic, social and environmental aspects of sustainability. The workplace must be inclusive, regenerative, opportunistic (innovative and fast-moving, flexible, adaptable or agile), and redistributive, optimising performance, delivering sustainable dividends.

TCO Development: Progress Report

Anna Pramborg reported on TCO Development: one year old, expected to be profitable. The business idea was to develop tools for workplace individuals or organisations, resulting in a better workplace. They should involve all staff, integrate work environment and external environment, with an overall vision of contributing to sustainable development at the workplace. Her responsibility is 6-E, sustainable workplace, seeking common interest between workforce and employers, rather than assuming conflict. The need is to measure the immeasurable, such as solidarity, going beyond TCO-99. 6-E is a competitor with other international standards, including EMAS, ISO 14001 and internal control. The KPA approach may not work with employees as well as management. One key tool is a set of checklists, for psychosocial factors, organisational factors and

physical factors, simplifying while meeting additional needs. TCO-99 is a hard act to follow.

Sustainable Development

Mats Karling demonstrated the WEST (Work Environment Screening Tool) method, which arose from demands of Volvo and Electrolux. It covers nine factors, six physical and three mental, producing a WEST-point. New research looks at costs, and highlights hot-spots, helping prioritise. He outlined life-cycle analysis, and compared different methods. Costs of bad physical work environment tend to be borne by individuals.

Mari Kira discussed driving forces for sustainability, pushing and pulling. Unsustainable workplace conditions, leading to burnout, are a pushing force. Yearning for creativity is a pulling force, combining money and fun. Measurement is important for improvement. International organisations can pull. Trade unions push, rather than pull with vision. They need a new image and agenda. Innovation can be scary and subversive.

Francesco Garibaldo considered power relationships: between equals, non-authoritarian, and authoritarian. He defined a sustainable workshop, in terms of inclusion and autonomy: the driving force is co-operation. There have been periods of co-operation via machines, Taylorism and reformed Taylorism. He presented HRM (opportunistic) and HRD, which can be regenerative and redistributive.

Denis Gregory saw sustainable workplaces as elusive, with economic, social and environmental aspects. TCO have tools and instruments, to be evaluated. He argued for active marketing of existing instruments with the trade union movement, with guidance on implementation. There should be links with consumer groups, concerned over safety of new technologies, and with the education community. We cannot define sustainable workplaces; we can define objectives, and measures of effectiveness.

Workshop Participants

Sören Bergström, Stockholm University, Sweden
 Per-Erik Boivie, Boivie Arbetsplatsutveckling AB, Sweden
 Richard Ennals, Kingston University, UK
 Jonathan Feldman, NIWL, Sweden
 Susanna Frey-Garpås, TCO, Sweden
 Francesco Garibaldo, IPL Bologna, Italy
 Denis Gregory, Ruskin College, Oxford, UK
 Sabine Heegner, Hannover City, Germany
 Peter Herrmann, ESOSC Consultancy, Ireland
 Eckart Hildebrandt, Wissenschaftszentrum für Sozialforschung, Germany
 Clare Hobby, TCO, USA
 Ernst Hollander, University College, Gävle, Sweden
 Mats Karling, IVF, Sweden
 Lars Karlsson, Hippopotamus Education, Austria
 Mari Kira, Royal Institute of Technology, Sweden

Ulrika Lång, TCO, Sweden
Ola Löhman, KPA, Sweden
Totta Ogander, Sänga Säby, Sweden
Anna Pramborg, TCO, Sweden
Lucien Royer, TUAC, Canada
Jan Rudling, TCO, Sweden
Lena Skiöld, NIWL, Sweden
Marianne Welin, TCO, Sweden

2. The 24 Hour Society and the New Millennium

The workshop was led by Torbjörn Åkerstedt and held at the Karolinska Institute in Stockholm, 18–19 June 2000.

Work Hour Legislation in Europe: Present State and Trends

James Mackley noted that the French government and trade unions wanted strong proposals on working time, while the British government of the day opposed regulation. The legal basis of the Directive was in the Maastricht Treaty. The terms included 11 hours rest per day, and a maximum working week of 48 hours. Flexibility was included, allowing for derogations if workers are given a compensatory rest. Night workers should not work more than 8 hours in a period of 24 hours, and are entitled to a free health assessment, safety and health protection. Employers must adapt work to the workers. Certain sectors were excluded, including transport, sea fishing, offshore working and doctors in training. Other relevant measures cover temporary workers, Working Time Directive, young people at work, part-time workers, and fixed term workers. In each member state the effects have been different. There are problems with the individual opt-out provision; ETUC are not happy with derogations. The French debate on working time concerns employment rather than health and safety, with debates on work organisation and the adaptability pillar of the European Employment Strategy. A new EU report on levels of overtime shows higher levels worked by men, especially in Ireland and the UK. Doctors in training are included in a new Directive, which comes into force in four years. The European Commission tries to balance flexibility and security.

Work Hours in the EU Countries

Irja Kandolin reported on labour force surveys, and the second EU survey on working conditions. Night work is in response to need for extended operations and customer orientation. She analysed prevalence in different countries and age groups, highlighting the extent of night and weekend work in the UK. There has been a major increase in night and weekend working. We lack statistics on

individual flexibility, but there is less stress among day workers, and those with control over their own working time arrangements.

The Development of Working Hours: Historical Perspective

Tommy Isidorsson outlined the Swedish situation, reflecting a history of negotiation and reductions in working time, with a similar story in Germany, Denmark and Finland. Changes in the quantity of working time tend to be accompanied by changes in quality. He introduced Kondratieff cycles, expounded by Schumpeter; noting phases of technological innovation and rationalisation, including changes in work organisation. Taylorism and intensive work mean shorter hours, and horizontal divisions of work. The development of IT and new production concepts increased attention on work organisation. The distinction between work and leisure time is less clear, and the emphasis is on performance. Working time changes are driven by production changes; team working gives greater flexibility, but requires increased training. Employers are interested in qualitative change, trading efficiency against working time.

Flexibility

Flexibility in Working Time Compared to Other Strategies for Flexibility

Kristina Håkansson outlined the need for flexibility, responding to varying demand. Flexibility can be achieved in a number of ways: *flexible working hours* make the working day longer, but with days off. *Numerical flexibility* can be increased through temporary employees and agency workers, with dangers of dividing the workforce into core and peripheral groups. Disruption of continuity can impede effectiveness of the work organisation. *Functional flexibility* can cater for the needs of different products. There are different kinds of uncertainty: **when** the work is to be done, *if* there is work, and **where** and **how** the work is to be done. *Flexible working hours* can reduce staff turnover. *Numerical flexibility* can increase segregation, and *functional flexibility* can increase multiskilling.

Working Time Policy in Europe: Towards the Emergence of Negotiated Flexibility

Dominique Anxo considered flexibility, differentiation and individualisation. Firm-based surveys show an increase in new working time arrangements, such as part-time and weekends, with changing individual preferences, and the importance of knowledge-based information technology. He outlined strategies: *state regulated flexibility* (France, Spain), *negotiated flexibility* (Nordic countries, Netherlands and Germany), and *individual flexibility* (UK), affected by labour market and social dialogue contexts at national level. He highlighted long working hours in the UK, particularly among men. Reductions in working time should increase favoured transitional flows. In Netherlands and France there has been influence on the labour market, increasing part-time and female working, and raising issues of child care. Employment life cycles can be reduced with early

retirement, as in Netherlands, but this is costly. Negotiated flexibility and legal rights to meet family commitments can make an effective contribution.

New Trends in Working Time: Pros and Cons

Peter Knauth emphasised that not all working time changes should be seen as innovative. Workers should receive proper compensation or other benefits in return for change. He identified dimensions of profitability and humanity, with a further dimension for society; negative and positive effects, concentrating on win-win outcomes. Shift systems were compared with day work, and shift systems designed on ergonomic principles. Production quality on successive night shifts shows adaptation followed by tiredness. Rotating systems were considered, noting the importance of rest periods. Certain patterns of shift change, on ergonomic principles, seem healthier. There are negative aspects of flexible hours set by the employer, including loss of family and leisure time, and possibilities of “moonlighting”. Accident data shows increasing risk over time on shifts, with health effects of certain shift arrangements. Flexible arrangements with high autonomy or self-selection offer benefits.

Flexible Work Hours and Health

Giovanni Costa concentrated on good practice, with flexibility in time and shift cycles. Employers and employees have different interests. Unemployment is high among young people; there is an increase in long and irregular hours, with variations across sectors. Many self-employed people work at night, without fixed starting and finishing times each day. Some receive extra payments or compensation for additional hours. Flexibility has various meanings, from the employer’s and quality of life perspectives. Work can be organised at the level of days, weeks, years and life, with varying impacts. We know some health impacts of shift work, raising issues of fitness to work. Proper organisation of arrangements, on ergonomic lines, is important. Compressed work weeks can meet the needs of women and young people; older people may prefer other patterns of flexibility. *The Italian cotton industry* moved from day working to shiftwork, adding to overall production time, then extended to continuous working, with reduced individual working hours. *A metallurgical company* gave reduced individual working hours, and consideration for women and families. *Electrolux Zanussi* enabled the worker to choose which shift scheme to follow, with ingenious ways of enabling rotation, using a “bank of hours”. The “*Rose at Work*” project offers flexibility for women, including part-time and weekend working, shifts and reduced working hours.

Working Time, Flexibility and Work Conditions

Matthieu de Nanteuil reported qualitative research in seven EU member states on flexibility and working conditions. Each member state provided public and private sector case studies. He considered employment status options, and outcomes in terms of working conditions: stress has changed little, but fatigue has increased. Flexible strategies are needed, including quantitative and qualitative flexibility, which may include outsourcing, numerical, functional and financial flexibility. Strategies may be complementary or exclusive, and lack coherence. He identified

scenarios where conditions of work and conditions of employment are deteriorating, where only conditions of employment are affected, and transversal, with no specific differentiation, mixing of working time patterns, working time, duration of time and pace of work. Subcontracting and numerical flexibility are explicit flexibility strategies; there is unequal access to OHS training, core populations play a role in transferring difficult conditions of work to peripheral populations. This is a complex social process, with new combinations of psychosocial factors and exposures to risk, due to general working conditions, the quality of OHS policies, and the type of flexibility. Differentiation is due to job insecurity, unequal access to training, lack of career prospects, pay gaps and gender segmentation. The transversal approach offers no specific differentiation, but functional flexibility. Impacts are limited in terms of job monotony and intensification. Social partner involvement helps develop flexibility: flexibility appears to worsen working conditions. We need more knowledge, with OHS evaluation processes in a flexible environment, redesigned access to training, and more appropriate and stimulating negotiation frameworks, with an emphasis on institutional co-operation.

Self-determined Work Hours

Arne Lowden was concerned with individualised work hours and freedom. Flexitime is widespread, with practical benefits for public transport; implications for job satisfaction and productivity are less clear. There are benefits at individual and company level, including adaptation to one's own rhythm and way of life. At company level, accidents and support costs are reduced; productivity may increase. There can be tensions within the workforce, and initial costs. Shiftwork with flexitime requires training. He compared four schedules: traditional, time bank, flexitime and self-determined. Satisfaction is greater when schedules are self-determined. In a retail business, staff set their own schedules, aided by a system. Health did not improve, but time for family and friends improved. Work stress did not change, manpower fit was seen by personnel as worse, influence on schedules increased. Staff liked the possibility of longer leave periods, and forward planning. Fatigue after work increased, due to increased demands. Perceived control is vital for satisfaction with shift schedules. Individual differences can be observed; associated problems of guilt, with respect to family relationships, are experienced by women with flexible schedules. Fixed and flexible shifts can be combined in a single system; flexibility can be linked to salary.

Influence on Working Times: A Study in a Nursing Home

Julie Ng-A-Tham noted that in the Netherlands operating hours have increased, working hours have fallen, opening opportunities for choice. Control can mean choice of shift system, influence on schedule, and participation in the decision process, avoiding stressors. Schedules were seen in the context of organisation policy and nurse preferences. Breaks, need for recovery and free time were important. Lengths of shifts varied in three homes. Staff experienced less control than they wanted. Need for recovery, age, and having a partner, were significant. Influence affected satisfaction, health and absenteeism. Part-time workers did not want full-time work.

Night and Early Morning Work

Night Work and Health

Anders Knutsson dealt with minor disease, mortality and major disease. *Minor disease* may impact on quality of life, and result in short term sickness absence. Sickness, headache, constipation, palpitations are common symptoms. Sleep debt seems more important than stress. *Mortality* is an issue for night workers: we conclude that shift work does not affect survival; Norwegian data from the 1940s tells us nothing about mortality. A 1972 study in the UK followed a large number of workers, and compared expected numbers of deaths with actual figures. Shift workers and ex-shift workers had higher than expected numbers of deaths; the figures are not comparable. When considering *major diseases*, evidence suggests correlation with coronary heart disease. Is smoking to be regarded as an effect of shift work? Breast cancer in women over 50 has been linked with shift work. Blind people have less cancer than the visually impaired, raising questions about melatonin and cancer. More studies are needed on hormone-dependent cancers. Diabetes increases with years of shiftwork. Gastro-intestinal disease has been studied, suggesting correlation with past shiftwork experience; there are similar conclusions about peptic ulcers; but no evidence for correlating depression with shiftwork. Reproductive disturbances have been studied, with probable associations with miscarriages. Should shift work be seen as an independent risk factor, or in combination with other factors?

Night Work, Sleepiness and Safety

Torbjörn Åkerstedt noted that disasters such as *Exxon Valdez*, Bhopal, Three Mile Island and Chernobyl all took place at night. Industrial data from Sweden were plotted by hour, showing night-time and early morning as key danger points. EEG printouts show micro-sleep patterns of nocturnal train drivers. Gasworks data have been plotted by time, showing the emerging standard pattern. WOLF study data was used to study nodding off at work and in leisure time, with shift work shown as significant, as it is with falling asleep at work. Correlating the effects of alcohol with performance levels shows dramatic effects. The length of time awake affects levels of alertness.

Recovery Time: Days and Hours Between Work Bouts

Torbjörn Åkerstedt discussed recovery, referring to high levels of alertness, restedness on awakening, and coming from sleep, rest and relaxation, diversions and hobbies. He presented the “Karolinska Sleepiness Scale”, applied to simulated driving accidents, comparing day workers with students. Using with data on sleep and sleepiness among train drivers, he considered the problem of passing signals at red. Eight- and 12-hour shifts have different patterns, during shifts and recoveries. He compared fatigued and alert groups; families could be seen as a burden. Some night workers adjust well; returning to normal life after extended night work is difficult.

Early Morning Work and Adjustment to Night Work

Mats Gillberg talked about sleepiness: how night work can be manned, if it is obliged to continue; he considered permanent and rotating shift patterns. Some work has to be done at night, such as printing and distributing newspapers, hospitals, and bakeries. Other work is continuous for economic reasons. Biological adaptation to rotation is not possible; maybe permanent night shifts are the answer. Night workers can be satisfied, and find a way of maintaining a day-oriented rhythm: this works best when self-selected rather than rotated, especially when rotated fast. Night work offshore presents particular problems. He considered 12-hour permanent nightwork. Early morning work presents the greatest problems, and is most disliked. He considered early morning newspaper delivery, and different sleep strategies, often affected by other jobs. Changing start times can affect sleep duration. Cabin attendants were studied: their sleep may be impaired by fear of missing their flight; 12-hour shifts may trigger the negative effects of early starts, so sleep may be short and disturbed. There may be optimal shift changeovers; 7 am may be ideal. Advancing shift times can be bad, compared with permanent night work. It is hard to persuade shift workers to start later. Changeovers are often set to please night workers, seen as making the clearest sacrifice.

Individual and Clinical Aspects of Adaptation to Shiftwork and Fitness for Duty

Mikko Härmä discussed individual differences, causes and differences, and occupational health services. Individual differences are hard to identify and control. Field studies show larger inter-individual differences than laboratory studies. He postulated morning and evening types. Ageing can be relevant to sleep quality and length, not necessarily to sleepiness during shifts. Subjective health of shift workers can be partially explained in terms of fatigue and sleep quality; not an effective screening approach. Smoking can be linked to increased alertness. Concerning occupational health services, he considered prevention, counselling and treatment, raising issues of surveillance, and the appropriate scheduling of health check-ups. There are conditions under which night work is not advisable, including sleep disorders, gastro-intestinal diseases, ischaemic heart disease, insulin-dependent diabetes, etc. We should screen for sleep disorders of shift workers in cases where safety issues arise, including professional drivers and process operators.

Long Hours

Long Work Shifts: Are They Tolerable?

Roger Rosa considered tolerability. Measures may come from safety, physical health, well-being, productivity, fatigue, morale, satisfaction, domestic harmony. It can be affected by the work schedule and organisation, and the nature of job tasks, workload and control. Individual factors have an influence: age, gender, health and personality, as well as competing responsibilities. Environmental factors and exposures at work may be significant. There have been reviews of the effects of 8- and 12-hour shifts, and the effects of additional hours on health, and health and

safety problems. The main concerns are with excessive fatigue, and with life away from the job, meaning concern for safe and efficient work, and long-term health effects. Fatigue increases with additional hours, and interacts with other factors. Sleepiness increases with longer shifts; timing of the shift is significant, and the number of consecutive shifts. Laboratory tests explored musculoskeletal pain and fatigue, and showed least work by the end of the shift. There is increased fatigue after increased shift length. Increased shift length for drivers (during the shift, or to and from work) means more frequent lapses, falling asleep, near misses and accidents. Rest after two 12-hour shifts is better than rest after four; consecutive long shifts can be dangerous. It is important to have fun off the job, and maintain family and social relations, involving trade-offs and sacrifices. Sleep hours were monitored with workers at case study sites: long work shifts can be manageable, if home life can be adjusted. The best avenue is via employee involvement. More research is needed on musculoskeletal impacts. Many chemical and physical agents have 8-hour shift-based exposure limits; changing exposures for 12-hour shifts may not be simple. Work, fun, relationships and rest need to be reviewed, and any shift changes need to be evaluated.

Working Hours and Employment Contracts on a Household Level

Jouko Nätti is concerned with the family and social dimension, rather than the workplace, using data from labour force surveys and a household, work and well-being survey. The key change in Finland in the 1990s was an increase in unemployment, accompanied by an increase in temporary contracts. Regular daytime work is decreasing, other forms increasing. Working hours can be defined differently, depending on whether work at home and overtime are included. Labour market status is important: self-employed work long hours. Commercial work and transport are areas of long hours, increasing fatigue and diminishing well-being. Long hours are more common when children are of school age; men have more stable working time careers. Long hours can be linked to work-family conflict; women seem more sensitive to these problems.

Mia Väisänen discussed unsocial working hours. Shift work is common in Finland; often both spouses work, both may work unsocial hours. Irregular working hours are linked to economic stress and work-family conflict. The nature of employment contracts has a domestic impact, with crossover effects: temporary contracts among women are prevalent, and traditional male-female role differentiation continues. Why should labour market positions be studied at the household level? New class divisions could result. The impacts of flexible employment need to be studied, including positive effects.

Extended Working Hours and Accident Risk

Friedhelm Nachreiner noted that we lack evidence of adverse effects of long shifts. If working days are extended, we can expect declining performance and increasing accidents. He compared predicted and actual accident timing patterns, and the influence of time of day. Is a scheduled 12-hour shift the same as a normal day with overtime? Selective results have limited value, the rarity of accidents makes them hard to handle statistically. One approach is to combine data from different

settings, highlighting exponential increase in risk at the end of the shift, but in Germany there is an absence of exposure data. Fatigue does not seem to have dramatic impacts at the end of a shift, so is accident risk independent of sleepiness? Jobs vary in the impact of sleepiness. It could be better to focus on the sleepiest workers. When there is an accident in a chemical plant at the end of a 12-hour shift, the impact can be serious, as staff are too tired to respond well.

Overtime Work and Cardiovascular Disease

Töres Theorell has long been concerned with long working hours. Research in the 1950s in the USA and Finland linked long hours with heart attacks. Research at Bell Telephones made the links, blamed on evening study by young workers. He outlined a major epidemiological study, using hospital registers and the census. Occupations were grouped according to common characteristics. Women complain of being tired during the day; suffering from their double roles. Stockholm research in the SHEEP study failed to show clear links between long hours and myocardial infarction; recent research in Japan showed the impact of excessive working hours, across economic sectors, but with a limited control group. A number of issues need to be clarified, including: changing society, the difference between pleasant and unpleasant work, the extent to which overtime is forced, interactions between work and home, and the importance of direct contact with third parties. The Stockholm WOLF study is investigating the financial circumstances of participating sites. Overtime is highest in stable companies. More insights come from analysis of job strain, the lack of control, and a poor balance between effort and reward. We cannot generalise about the effect of long working hours on illness risk. Discussing long hours is not enough.

Factors that Moderate the Impact of Longer Shifts

Philip Tucker drew on a cross-sectional survey of male shift workers in manufacturing. 267 were on 8-hour shifts, and 591 on 12-hour shifts. There are problems with the healthy worker effect, and the temptation to assume causation. He listed standard predictors and outcomes and analysed the data in terms of shift system and predictors. He considered attitudes to shift systems, and the extent to which the worker controlled his own work. Self-pacing was a predictor of psychological well-being. Self-reported alertness was almost predicted by self-pacing in 12-hour shifts. Perceived workload predicts musculoskeletal pain in 12-hour shifts, but not in 8-hour shifts. Age was not an effective predictor. Period of working on a particular shift system may be significant; there was no simple correlation of the period with success in adaptation. "Morningness" and sleep flexibility were explored in association with shift patterns and alertness, and interactions emerged, linked to neuroticism. The less flexible the sleeper, the more disrupted the health of the worker. The picture regarding domestic circumstances is not consistent, for example in studies of nursing staff. He considered shift system, marital status and dependents, and the impact on life outside work. Single carers face disruption, but there is less disruption for those without dependents. There are similar results on attitudes to shifts, and sleep between shifts.

Workweek of 84 hours: Morning Blood Levels of Melatonin and Stress Biomarkers: Attention and Reaction Time across the Work Week

Palle Örbaek described a bridge building project, where 43 workers followed an 84-hour work week, followed by a week off. Blood, serum and heart rates were monitored, with performance tests and interviews. A control group worked in concrete construction, with normal hours. Tiredness increases over the week, with little sleep, and recovery takes some time; performance was good at the end of the week. The first day was the most stressful, phase shifting could be difficult. Working hours were equivalent for the two groups, and management did not follow 12-hour shifts. The bridge was completed one year ahead of schedule. Would the findings hold for night shift patterns?

Göran Kecklund discussed flexibility and increases in long shifts. Fears of serious adverse effects were not borne out. He reported on 16-hour shifts in week on, week off patterns in construction, measuring fatigue, and showing limited effects. He considered recent findings on overtime and well-being; relaxation was reduced, particularly for females and white-collar workers. Overtime meant less exhaustion and fatigue. Stress, overtime and gender had little influence on well-being. Overall, there are no negative effects of long work shifts. Long work shifts are preferred by male workers, when they can influence the schedule.

Short Hours

Quality of Life and Health of Workers on the French 35-hour Work Week

Charles Gadbois considered the effect of the 35-hour working week in France; government supported early negotiated implementation, with a demonstrated 10% reduction in hours and a 6% increase in employment. Agreements were slow, covering 2.5 million out of 12 million, so conditions on employment creation were relaxed. Hours over 35 are regarded as overtime. Employees should in principle benefit, but increased flexibility to correspond to reduced working hours can have varied outcomes. Effects on health have been neglected, in a political decision to create jobs and reduce unemployment. There is some survey evidence. Forty-seven per cent have fewer working days; 40% have shorter days. Some change the length of days week to week, including using annualisation, and some add to the number of days off. Companies tend to disrupt sleep-wake patterns, as they want to make more effective use of equipment, extending opening hours. Changing work organisation results, and workload often increases, with intensification of work. Workers do as much as before, many stay late to finish work. Time worked no longer matches operating time of companies; replacement of absent staff is harder. Many agreements include job rotation, and covering for absent colleagues. Raising productivity involves changing work organisation and equipment; changes often fail to take into account the arduousness of the task. Health is affected by work in ways beyond the number of hours: work provides the basis of self-image, changes in working hours can appear to devalue the worker. Once work is seen as a burden, attendance is for as few days as possible. Surveys and consultancy reports

suggest that fatigue is reduced and outside free time is increased. It is a matter of how work and changes are organised.

Flexibility Through 6-hour Shifts

Timo Anttila evaluated Finnish experiments in private sector firms and municipal organisations in the late 1990s, where hours were reduced to 30 hours. The project was introduced after major unemployment, shortening working hours while increasing operating hours. Firms moved to two 6-hour shifts instead of one 8-hour shift, or four in place of three shifts. Participants were small companies, extending production hours and preserving wage levels. Municipal organisations introduced shorter shifts, employed additional workers from the unemployed list, and reduced salaries for staff by 7–10%. Government supported half of the costs of municipal changes. Private firms cut overtime, removed centrally negotiated days off, termination could be enforced at short notice, participation was reluctant, and bonuses were paid for extra production. Municipal working hours were reduced, with changes based on social and health care workers, participating voluntarily.

Results included reduced private sector production costs, reduced overtime, improved contentment, and increased productivity. In the municipal sector it helped to combine work and family, through work sharing, reduction of exhaustion, no large extension of service hours, and one new worker recruited for each three participants. In the public sector, the more services are offered, the more they are required, and resources are limited. Radical reorganisation of working hours was not popular with women. Increased costs in the public sector cannot be recovered from customers. Evaluation research reported exhaustion and overwork, showing reductions after the changes. Work and family life balance changed: there is little part-time working in Finland. Leisure time was spent on rest, recreation, domestic work and keep fit. He emphasised time, timing and organisation of working time. Positive results depend on voluntary participation and agreement.

Experiments with Shortened Work Hours: Effects on Health and Well-being

Birgitta Olsson described two experiments on shortening working hours, at Södertälje Hospital and Stockholm city. She concentrated on the employee, the employer and society. Issues include health, family, work group and children. Employers are concerned with operation time and quality, as well as cost-benefits. At the society level, financial details and alternative use of resources need to be considered. At the hospital the experiment reduced hours, with the same pay, and with before and after research. In Stockholm there was a shorter day with the same pay.

In the hospital, reduced hours meant less stress. Autonomy increased, and reduced stress. The balance between work and leisure improved, a better ecology of working life. Employers found the process met patients' needs better, with improved quality and lower costs. The experiment was conducted within the previous budget. Work organisation improved, and there was greater flexibility in staffing, as well as more learning. At societal level a more holistic view was

required. Health of people depends on links between work and leisure. Solutions can be more creative when people are empowered.

In Stockholm City, there was improvement in social life. Sleeping quality improved. Children and their parents benefited. There was increased leisure time, with more energy and better results for children in schools. Men spent more time at home. Women had more time for children and social life. Employers recruited new staff, and former part-time workers became full-time. Absenteeism decreased. Service quality improved. Operating hours are not the same as working hours. Production costs per unit can be reduced. Shorter depreciation periods make it necessary to extend operating hours. Reduced working hours can mean better staffing and production. Staff can be happier.

Workshop Participants

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 Torbjörn Akerstedt, Karolinska Institute and National Institute for Psychosocial Factors and Health, Sweden
 Imo Anttila, University of Jyväskylä, Finland
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 Linnéa Arvius, National Labour Market Board, Sweden
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3. The New Economy, New Jobs and Regional Development

The workshop was led by Casten von Otter and Göran Brulin, and held at the Strand Hotel, Stockholm, on 24 September 2000.

Regional Development: Is There a Problem?

György Szell linked innovation, culture, work and organisation, considering particular regions with distinct characteristics. Regional development has been a key process over the past century. Globalisation increases pressure on performance, emphasising shareholder value. There is a need to clarify the nature of regional development: people want to retrieve their roots; the New Economy is seen by some as a threat to local culture.

Gerhard Fuchs considered sub-sectors of IT, increasingly concentrated in few places. Hard core IT presents a problem for regional development. The industry can be location specific, addressing local cultures and expertise. Multimedia and software industries have different needs, both tend to link with clusters. Only most highly qualified activities are centralised, while less specialist activities can be devolved and outsourced. This benefits medium scale centres, offering key levels of resources and facilities. Regional and global networks link and balance each other.

Dominic Power saw a problem with the region as a unit, when considering technology heavy or knowledge based industry; sectors and industries may be better units of analysis. He suggested dynamic regions, not linked to cultural or political regions. **Anders Malmberg** understands a region in spatial terms. The people within the territory may have a shared problem, such as poverty, or environmental degradation. There are particular regional problems in Sweden, with areas, typically in the forests, where people do not want to live and work. Regional problems tend to be linked to sector problems, raising issues of changing

divisions of labour. Regional specialisation is stable and inert, with less change than we might think. Exporting patterns for the 1960s give an indication of patterns today; there can be discontinuities.

Jonathan Feldman wanted a definition of ICT. Saab and BAe use ICT, and we might regard aircraft as flying systems. Healthcare is increasingly linked to ICT. Where are the lines to be drawn? What happens when a region linked to an old sector tries to develop a new ICT-related cluster? Clusters depend on other phenomena; he studied science park developments, with strong path dependence. Comparative advantage is often based on agglomeration, with its own trajectory. He illustrated the strategic disadvantage faced by Linköping, compared with Stockholm and Gothenburg. In the health industries they built up employees, with companies such as Saab seeking a new platform for a new culture after previous experience of defence. Sometimes companies face organisational difficulties in making a change between sectors and cultures.

Peter Totterdill argued that new economy rhetoric can be dangerous for discussions on regional development. There is a shift of interest in levers of economic development, from a “built to last” company, to “wired world”, with portfolio working and networks. Public agencies have favoured “built to last”, as a more understood phenomena. Many of those companies have become volatile; whole divisions can close at short notice, due to remote decisions. He described re-localised activities, citing experience in Nottingham over the last 20 years. Key decision-makers have changed; sectors are less significant, and are converging. The key feature is simultaneous local and global networking, for example in Soho creative industries, and Nottingham fashion. Traditional institutions do not understand how to work in this way: this presents problems for government agencies and social partners.

György Szell saw the problem in terms of unemployment, and efforts to preserve or create jobs, with the objective of social cohesion. Relational problems are spatial. Mobility between regions is hard to perform in Europe. Workforces are not as fluid as was thought in the 1960s. The impact of world wars has been marked, but social structures go back centuries. This leaves limited scope for action and decision making.

Casten van Otter noted that the same products can be produced with smaller workforces, concentrating work and problems. Communities can be in severe imbalance. Generations are missing, who should now be having children in the regions. There is social class imbalance, with the absence of a middle class, and a cultural imbalance, as different media gain prominence: this is a segregation effect. The Swedish kind of problem may be repeated in former Eastern Europe countries. He saw analogies with the urban renewal literature, with a social focus. **Dominic Power** argued that there do not have to be winners and losers. In some sectors regions are seeking gains, such as in new media. Ireland has repatriated intellectual capital, targeting promising areas. Cities are building info-structures for new economy companies. Regions can compete in such areas.

Anders Malmberg summarised views of economists regarding competitiveness and location: ability to learn and innovate is more important than cost advantage; innovation is not just high tech; innovations emerge through interactions within “industrial systems”; spatial proximity matters; industrial systems are locally

embedded; local knowledge is more important than natural resources; industries are agglomerated; patterns of regional specialisation are stable. The key resource is people, and regions will compete for people. He reflected on why people provide so much free of charge on the Internet.

Jonathan Feldman considered centrifugal and centripetal tendencies. What are the advantages and disadvantages of the periphery? It is not just a matter of cheap labour. Reflectivity may be enhanced by peripheral location, and is a key variable to drive creativity and learning. He considered network firms, which often have a service function, and may have branches in each region; he emphasised learning by using. He cited Amazon.com, with variants across Europe. He saw culture as a dependent variable, not independent. The role of Chinese and Indian migrants at present is important in Silicon Valley. He suggested scales of regions: municipality, region, nation, etc.

Mia Gray took up competition between regions for people, which may mean increased homogeneity. Her research suggests that companies see their regions as offering advantages, whether old or new economy. Self-image is important. She discussed peripheral location, and Glaxo's preference to base their research away from the industrial cluster. Such locations can be advantageous. She reflected on trust and face to face contact: the situation is not clear. Proximity still matters. **Dominic Power** outlined choices to be made, and moves between regions, as if there was a fixed sum. He discussed innovation and entrepreneurial spirit: origins, and how it could be enabled. There is debate about start-up firms in the new economy, but there can be high levels of innovation within large firms.

György Szell favoured discussion of regional developments. He argued for differentiation, and the context of Europe and working life. The dominant force is finance capital. Decisions derive from an unequal power game. Less than 3% of the European workforce is mobile, perhaps 5% in science. He cited problems in e-commerce when logistics are not taken into account. He discussed trans-border regions, and the new region by the bridge near Malmö. **Casten von Otter** argued that money in the new economy in Sweden is being made by players in the old economy. Are we discussing different developmental phases? Is this the start of a new "long wave"? Power and social connections may be different.

The New Economy: What Do We Make of It?

What Are the Consequences for Jobs of IT and the New Economy?

Mia Gray considered the low end of the service sector, and development phases, where most new technology companies are in a pre-profit stage. She expected market concentration, and imperfect markets giving rise to oligopolies. Location is important for that first phase. Regional image, and an impression of success, are important. **Dominic Power** noted that there are many different types of investors in the new economy. In Silicon Valley 85% of start-ups are backed by "Angel" investors, family or friends. He differentiated between types of new technology firms, with different requirements and profiles. He identified new media companies working within the finance sector, rather than just designing web

sites. **Björn Asheim** is sceptical about the new economy, and argued that ICT as a new technological paradigm is more important. In Norway, fish farming is the continuing focus of the future. **Jonathan Feldman** cited the case of Saab as they moved into IT, taking over companies now worth more than the core company. They acquired international connections with GE, and regional links in a number of fields. There were problems of managerial competence and cultural difference; division of labour between innovators and entrepreneurs remains critical.

Crucial Issues for Research

György Szell discussed industrial districts. Relational networks need to link to political and economic structures. 95% of companies are SMEs, including start-ups. The region remains important. Research should not just focus on global players. Diversification strategies in the 1970s and 1980s, most of which failed, have meant *restructuring* of core businesses. New insights into competence have arisen, with a regional dimension. Regional structures have taken new forms, with impacts on enterprises of different sizes.

Björn Asheim emphasised *contextualised knowledge*. Europe should not seek to replicate American approaches in Silicon Valley, where the negative aspects of environmental pollution are serious. We should build on the frameworks we have. He argued for functional flexibility, a development coalition approach, involvement of social partners, and participation. Nordic and European models are more appropriate than simple emulation of the USA, and emphasise learning. Context is vital for the understanding of consequences. **Anders Malmberg** returned to “*best practice*” regions, and took a labour market region as the basis for a definition. A well-functioning region has jobs, innovation, and entrepreneurship. It may not be in a new economy set of activities. We can recognise success and failure, but not always explain or predict. Hypotheses suggest that many small firms are better than a few large firms. He considered *relational and spatial clusters*, not necessarily industrial districts.

Peter Totterdill discussed *social capital* as created by previous structures; who is creating the social capital needed to sustain the new economy? State bureaucracies, national institutes and universities do not seem to be the answer. **György Szell** reflected on knowledge transfer policies, and failures to copy precise forms of capitalism. Diversity and adaptation will continue. Discussion tends to be product focused, while process is fundamental. *Sustainable development* is a core perspective, with a strong practical regional focus, where water is found and waste is deposited.

Göran Brulin referred to action research programmes, and talked of participation, distant research, consultancy, and relative “*actionability*” of theory. The role of language and conceptualisation are important. **Peter Totterdill** reflected on *knowledge production* and distribution. **Casten von Otter** recalled that regions are comprised of people: this involves education and training, dealing with skills, attitudes and culture. **Anders Malmberg** talked of strategies for *human and social capital development*.

Casten von Otter addressed the *spatial consequences of the technology*, a means of production which affects the delivery of services. Post offices and banks are undergoing transformation. He considered implications for social structure in small communities, leaving the big city as the norm for policy. **György Szell** emphasised new challenges from the new economy. New networks and institutions are needed. **Björn Asheim** identified low technology industries and their future development needs. Fish farming is worth continuing and improving; knowledge intensity of the end product is not the only question. He argued for a value chain perspective, in which fish farming is highly knowledge intensive, linked to biotechnology understanding. Knowledge-based society is about all technology, not just high technology. Regulation needs to be developed. **Gerhard Fuchs** saw future shrinking in key German economic activities, posing threats to regions. Alternatives must be explored.

Policy

Peter Totterdill argued that traditional regional policy has focused on tangibles; in the new economy the key is intangibles. This raises questions for auditors. They want to see outputs; motorways are easier to see than networks. He referred to work in Nottingham, allowing people to take time away from normal working in order to network. The objective was to develop cumulative effects of funding support, building bidding consortia for particular kinds of funding; government has now recognised the importance of such intermediate structures. **Anders Malmberg** sees the issue as redistribution of resources, mostly handled by welfare state arrangements. Stimulating growth and renewal is harder. In Sweden the view is that policy should be run from the regions. As a taxpayer, he favours tangibles such as a bridge. There are problems in formulating regional policies of learning and development. **Peter Totterdill** distinguished strategies based on inward investment from those based on local mobilisation of resources. Regional development agencies in the UK have begun to get people to talk, converging on ideas of a good region in the long term.

Workshop Participants

Bjorn Asheim, University of Oslo, Norway
 Göran Brulin, NIWL, Sweden
 Richard Ennals, Kingston University, UK
 Jonathan Feldman, NIWL, Sweden
 Gerhard Fuchs, Centre for Technology Assessment, Stuttgart, Germany
 Mia Gray, Department of Geography, Cambridge University, UK
 Anders Malmberg, Uppsala University, Sweden
 Dominic Power, Uppsala University, Sweden
 Anna Seth, NIWL, Sweden
 Lena Skiöld, NIWL, Sweden
 Lennart Svensson, NIWL, Sweden
 György Szell, University of Osnabrück, Germany
 Volker Telljohann, Institute for Labour, Bologna, Italy
 Peter Totterdill, Nottingham Trent University
 Casten von Otter, NIWL, Sweden

Work Environment

1. The High Prevalence of Airway Allergy: Implications for Working Life

The workshop was led by Per Malmberg, and held at the Office of the Swedish Trade Unions in Brussels on 6–7 March 2000.

Per Malmberg argued that work is temporary, uncertain and stressful. Classic health risks need less attention. Resources are shifting from classical to organisational issues. The workplace has become safer; both asbestosis and chemical problems have decreased, due to improvements in the workplace. Increased prevalence of allergies in society has implications for working life. In Stockholm children aged 10–13 have increasing diagnoses of asthma, currently about 10%, taking medication. Asthma is worsening, raising questions for future working life.

The focus was on asthma related to work, 10% of the total. The scale of the problem justifies concern, with possible interactions between sensitivity and chemical allergens. General asthma has impacts for working life. There is limited interest in occupational asthma among epidemiologists. Young people start work with allergies, facing problems finding jobs. There can be relapses and remissions; work can increase the frequency of asthma. We cannot ban occupational allergens. Crises in the work environment can complicate basic sensitisation. Work should be adapted to man, not man adapted to work. We need simpler ethical and financial arguments, in order to convince politicians. Asthma is hard to prevent; there are differences across Europe, by country and sector, often compounded by issues of stress.

High-risk Occupations

Medical Issues

Sherwood Burge noted that regular assessments are not undertaken in the UK, but a workplace risk assessment will determine whether particular screening is needed. If allergies are detected, workers concerned should be employed away from risk. Exclusion from employment would be on the grounds of prior sensitisation.

Cinzia di Pede discussed actions to be taken to improve the work environment, in line with European Directives. Investment is needed in risk assessment, based on research on prior sensitisation to particular allergens. Age is important, given the growth of child allergy and the duration of vocational education and training. **Henrik Nordman** is against pre-employment screening, and wants to consider assessment. Personal risk assessment is needed in order to advise those with pre-existing asthma. Higher risks should mean more precautions being taken. There are problems in taking into account family histories. Pre-existing asthma presents problems, as diagnoses vary. The worker must be capable of doing the job, with medication, and high-risk employment is not acceptable. **Cinzia di Pede** discussed Directive 94-33, concerning protection of young people, and employment in workplaces with dangerous exposures and sensitisation agents. Legally these young people undergo continuing further education, in practice they work alongside other workers, and on dirty jobs.

Reducing Exposure at the Workplace

Dick Heederik discussed adult asthma attributed to occupational exposure. Studies fail to distinguish aggravation and new onset, some take account of the role of child asthma, few look at work related sensitisation. Reference categories present problems: samples may not be large enough for reliable estimates for particular causes; incidence data have been lacking; data sources vary in their outcomes; there can be under-registration, or an emphasis on specific sensitisation; compensation criteria may affect data recording; the healthy worker effect can be misleading. It may not be worth seeking compensation, as loss of employment is worse. Systems vary across Europe. General population studies should focus on occupational exposure. Asthma will continue to rise: research will consider how those with respiratory allergies survive in industry. Pre-employment testing should not be used for selection, given low predictive value of most tests.

Antti Karjalainen reported on a comparative statistical exercise together with EUROSTAT and member states, with heterogeneous incidence rates and data, but no core category of occupational asthma. Occupational asthma is consistently highest in food manufacturing, due to bakeries. The industry varies greatly, with industrial bakers in the UK, contrasting with Dutch bakers and Belgium in between.

Medical Issues

Christina Mapp outlined issues concerning vocational advice, protecting young people at work. Monitoring should use questionnaires, skin-prick tests, and a further battery of tests if needed. If there is sensitisation and disease, the exposure should be removed; if necessary, educate or move the worker. Evaluating workplace exposure is important. Diagnosis can be difficult, and requires specialised centres to be established.

Clinical Group

Sherwood Burge raised consistency in laboratory practices across Europe, as occupational asthma is a difficult diagnosis, and a cultural issue. Drugs can limit the symptoms, regardless of cause. Occupational medicine should form a

compulsory part of medical education. In the UK, occupational health is largely a preventive discipline, compensation is not linked to medical diagnosis, and does not address issues of retraining and placing in appropriate work. Challenge tests are research tools, not for diagnosis.

Politicians are happy if the workplace is as safe as the world outside. The nature of work is changing, less distinct from the outside world. European Directives are applied with varying strictness in the member states. It is a basic right for workers to have such matters investigated. Given the extent of employment in small enterprises, it is not safe to rely on the company. There is a need for training of general practitioners in occupational asthma.

Political Messages

Medical ignorance is likely to lead to under-diagnosis. Symptoms need to be linked to occupational origin. Occupational medicine is not being addressed properly at primary or continuing level; we need better accounts of the occupational dimension. Work can be an important factor in disease; there should be a list of high-risk occupations. A key screening question is whether patients feel better away from work. This gives indications as to possible occupational asthma, and reference to a specialist.

Little information is provided on compensation cases. Information should be public and rapid, to aid research. Compensation cases take time. Informal communication is needed between specialist researchers. Workplace monitoring is a diagnostic aid, with immediate action required; help is needed from epidemiologists on workplace exposure trials. In environmental monitoring, diagnostic benefits have been derived. The workplace should help confirm diagnoses, with provocations and measurements of response to exposure. The key is a phase of standardisation, going beyond research into industry. Commercial interest may be limited. Regulatory change could add to commercial interest.

Low-risk Environments

Per Malmberg discussed environments suitable for asthmatics. Children were asked if they had cats, those with more cats were at greater risk of exposure. Daily health record sheets were kept, and the problems were worse if the classroom was shared with many cat owners. Indirect exposure to allergens occurs to a level that produces symptoms in asthmatics. **Sherwood Burge** noted a range of problems in the workplace, often linked with ventilation, cleaning materials, photocopier toner, etc. Measures can be taken to make the workplaces safer. How much do we know about offices that are not sick, but are uncomfortable for asthmatics? He cited damp housing and schools.

Workshop Participants

Josep Anto, Department of Public Health Epidemiology, Barcelona, Spain
Frederic de Blay, Civil Hospital, Strasbourg, France

Sherwood Burge, Birmingham Heartlands Hospital, UK
 Paul Cullinan, Royal Brompton Hospital, London, UK
 Richard Ennals, Kingston University, UK
 Roger Falk, journalist, Sweden
 Dick Heederik, University of Utrecht, Netherlands
 Antti Karjalainen, Institute for Occupational Health, Helsinki, Finland
 Francine Kauffmann, Institute of Epidemiology, Villejuif, France
 Per Malmberg, NIWL, Stockholm, Sweden
 Christina Mapp, Institute of Occupational Medicine, Padua, Italy
 Ben Nemery, Catholic University of Louvain, Belgium
 Henrik Nordman, Institute for Occupational Health, Helsinki, Finland
 Cinzia di Pede, Unit for Occupational Health and Hygiene, Pisa, Italy
 Katja Radon, Institute for Occupational and Environmental Medicine, Munich, Germany
 Giovanni Viegi, Institute of Clinical Physiology, Pisa, Italy
 Maud Werner, NIWL, Stockholm, Sweden

2. Does Recycling Lead to New Problems in the Working Environment?

The workshop was led by Birgitta Melin and Jan Olof Norén, and held at the Office of the Swedish Trade Unions in Brussels, on 20–22 March 2000.

Birgitta Melin introduced the National Board for Occupational Safety and Health, interested in recycling and the work environment. The workshop concentrated on jobs in the ecocyclic society in Europe, discussing problems, methods of solving them, research needs and small and medium-sized enterprises. Jobs created as a result of the ecocyclic adjustment of society ought to be beneficial to the people who have to perform them.

The Ecocyclic Society: Background and Future Development

Friedrich Schmidt-Bleek was formerly responsible for chemicals control at OECD, who thought it impossible to develop a general model for sustainability, based on current knowledge. We cannot know the full ecological significance of current chemicals. Emissions and workplaces must be improved; this does not provide full sustainability. Without environmental improvements, life on earth is under threat. The developing world is seeking to emulate the lifestyle of the developed world. Fifty years ago material streams of 50% less resources were moved. The West uses 80% of resources with 20% of the population; environmental space must be made available for developing countries. This means reducing by a factor of 10, not merely four, taking decades. The first steps pay for themselves.

He introduced the ecological rucksack. Some materials require considerable overburden for their production: how much do you have to turn over to gain a kilogram? Recycled materials are less burdensome: the rucksacks of material must

be in use in society. Intelligent selection of material can produce a major shift. We derive utility from bottles; cars at the side of the road produce little utility.

Greater gains could derive from sensible management than from recycling. The longer something lasts, the more utility is derived. Profits come from short product lifetimes; the economy could be organised differently. In Germany, Mercedes sell transportation services, rather than trucks. Market forces are subverted and distorted by subsidies. Taxes should be based on resources, for ecological reasons.

Resource intensity of products and services must be tackled. We are not using available solar energy in a dematerialised way; our solar cells are inefficient. The key is dematerialisation, and use of less energy, meaning increased service intensity. Recycling must go beyond dismantling computers: building to last, and with less resources. Leasing of equipment, instead of sales, might reduce the pace of obsolescence. A more modular design can be used, as in copiers and aircraft. A different life cycle can be introduced, with re-use and recycling. The environmental space we use is not available to developing countries. Recycling is not necessarily ecologically correct; recycling PVC is more environmentally intensive than initial manufacture. There are issues of collection and transportation intensity, for example in recycling bottles. The more paper is recycled, the more it may develop dangerous properties.

Sustainability is a matter of technology, management, and signals to the market. Radical change is required, with world trade implications. People need to understand calculations in favour of taxis over personal ownership of cars. Labour hours intensity means intensity of material destruction; conventional labour is intensive in use of resources and technology. He set out an overall model, Factor 10, which offers a route to sustainability, and recalled the time taken to respond to Rachel Carson's "Silent Spring". Changes need to go beyond hygiene and simple recycling. Recycling is important; the real problem is the input side.

What Has Recycling To Do with Production, Environment and Working Environment?

Ann-Beth Antonsson argued that recycling is popular as a strategy to reduce environmental impact, including approaches to recycling of materials and chemicals, making recycling easier and more environmentally adapted in practice. Her institute concentrates on process integrated measures, rather than simply end of pipe controls. Approaches include in-company measures to reduce the use of toxic materials and chemicals, phasing out lead and mercury; minimise waste, through internal recycling of materials, reducing contamination of materials to improve quality in recycled material, reducing wastage and increased use of closed systems, and conversion to products and packages with reduced weight; use waste as raw material; facilitate reuse and repair of products through design; facilitate reuse of material through labelling of plastics, avoiding combined materials, and design for disassembly.

Many companies are involved in activities required by recycling, such as collection of waste, sorting of waste, and handling of different fractions of waste to make the materials possible to use again. Recycling affects the environment and the working

environment, with problems: premises not adapted to the processes involved in recycling; ergonomically unsound manual handling and sorting of materials; handling and dismantling of dirty products; and exposures to high concentrations of micro-organisms, which find recycled materials a good place to live and breed. Recycling means new processes, which need to be planned, and preventive measures are required. It is more of a problem in small companies. It is a matter of routines in enterprises, such as risk assessment. Employees need to fight for better conditions; many find it hard to speak out. Authorities concentrate on recycling rather than work environment.

Solutions to working environment problems in recycling are to a large extent dependent on two factors: the *economics of recycling*: if recycled material is paid poorly in relation to the amount of work put in, there will not be major investment in improving working conditions, or contracts will go to those with poor conditions; the *technology of recycling*: current technology is poor, with low technology background; improved technology would solve many of the present work environment problems.

Val Herman argued that recycling is not a core concern for manufacturers of long-lasting consumer electronic products. Design for assembly and design for disassembly are different and disconnected. End-of-life problems are outsourced to others, where the processes tend not to be automated. How can society be persuaded to invest in advanced technology recycling processes, while the investment is not required by EU Directives? What can be done to change the mentality of producers, and at societal level?

The Ecocycle and the Working Environment in Sweden from an Authority's Point of View

Jan Olof Norén compared work environments in recycling, with a history of public administration since the Thirty Years War. The indoor working environment of those working to create a sustainable economy has been overlooked in developing new approaches to recycling; there is a lack of knowledge of the hazards. Old hazards have been transferred to new working contexts; the loss of personnel in occupational health and safety services has made the problem worse. NBOSH sets out rules and guidelines for employers: length of hours, narrower sorting belts, ventilation, protective equipment, audits of accidents, improving procedures and reducing noise. Jobs have not been adapted to the abilities of the workers, including disabled workers, and statutory requirements for the work environment have not been observed, despite detailed legislation.

NBOSH is concerned at the expansion of ecocyclic employment without due provision for a good working environment. Suggestions include the work environment as part of the process of ecologically sustainability; improving competence in work environment, with training and information; the environment concept covering outdoor environment and working environment; work environment requirements set out in public procurement, ecocertification, and environmental policy documents; a network with representatives of national authorities, research community and business interests; research initiated into work environmental hazards involved in new materials and processes in the ecocyclic society, with support for technical development.

Waste and Recycling from a Trade Union Perspective

Björn Erikson declared that many workers earn a living in waste and recycling, and want an influence on job content and development, with the same level of labour inspection as in other jobs. Attitudes of parents are changed via their children. Pressure for recycling comes from environmental groups, paying little attention to the work environment, expecting others to sacrifice health and safety. Banning a chemical can mean a return to the use of previously banned substances. He gave examples from the Montreal Protocol on global warming, and fluoride reduction from aluminium plants. Ministries of Labour and the Environment take different perspectives. Work with risk is preferable to unemployment, and investments are devoted to meeting environmental criteria, rather than labour inspection requirements. Newspapers are more concerned with environmentalists than trade unionists. Under pressure for a ban on the import and sale of asbestos, government respond that their concern is for consumers, rather than workers. Standardisation is a matter for the Department of Trade and Industry, with electrical equipment handled by the Ministry of Labour. Similar problems arise at municipal level. We need investigation of the effects on the workplace of central or local separation of waste, ergonomics, dangers of micro-organisms, secure employment, and the influence of new machinery. Environmentalists are accepted, but workers are criticised when they protest about poor working conditions. Jobs in the environmental area should be as good and safe as in other sectors.

Recycling and the Work Environment in Sweden from a Labour Inspectorate Perspective

Billy Karlsson described problems seen by NBOSH, as the ecocyclic adjustment of society gathered speed in the 1990s. A nationwide network of inspectors and experts was established, capable of rapid and effective action, to ensure that recycling jobs are beneficial for the workers. The Labour Inspectorate seeks to inspect all recycling workplaces. Inspections reveal a lack of knowledge in enterprises concerning the working environment and risks from hazardous substances. Protection of the external environment has priority over the working environment; internal control systems fail to work effectively. Numerous shortcomings are revealed, such as wrongly designed conveyor belts, and hazardous machines. Accidents are common, and musculoskeletal disorders widespread, due to repetitive restrictive work using poorly designed equipment. Inspectors have developed knowledge of risks, shortcomings and problems of recycling, where accidents and illnesses are likely, but tend not to be notified of new operations.

Health and Safety in the Waste Management Industry: The German Experience

Hanskarl Willms was concerned with airborne germs, which cause problems in waste sorting and treatment plants and composting systems; they affect a person's respiratory tract, and lead to allergies. Not all germs are damaging, many are essential, such as yeast, cheese mould and penicillin; there are also many pathogens. Individual health varies; those with poor immune systems complain more of sickness. Immune systems seem to suffer from work in waste management

sorting plants; control groups can be less healthy: correlations on exposure have yet to be established. Systems should be cleaned, with improved fresh air and extraction, and removal of unhealthy draughts. There are similar problems at compost plants, when wind is involved, and in enclosed compost halls, where concentrations are at similar levels to farms and bakeries. Some hospitals aspire to germ levels of waste management plants. The waste management industry has done much to minimise hazards and protect the workforce, using mechanical devices for opening bags of waste, and improved ventilation. There are dangers from splinters, syringes, aerosol cans, and fork lift trucks. Hazards can be managed; regulations should not be excessive, strengthening employer responsibility. We need to protect people at work, not from work.

Ecocycling Within the EU and a Vision of Future Ecocyclic Development

Ludwig Krämer works for the European Commission, and welcomed the interest of trade unions in the environment and waste management. Waste has not been fashionable. Products should be handled at European level when useful, and at national level when waste. Most waste has been a product, and has had economic value: waste management brings this value back into play. Since 1973 there has been concern for waste management in Europe. EU legislation on waste management started in 1975, concerning used oils, followed by general directives on waste. Waste specialists at the EU were asked for advice, rather than being a separate source of legislation. There was no general interest in waste with respect to agriculture or the single market. In 1987 treaty amendment allowed legislation, and progressively environment policy has been recognised as a natural development. Since 1975 there has been legislation concerning hazardous waste, shipment of waste, incineration, landfills, and specific waste streams.

With recycling, the context is in the 1975 Framework Directive. The first priority is to *prevent waste creation*. Humans need to be buried. Products require disposal. The second priority is *recovery of waste*, with material recovery, and energy recovery from incineration. Recycling enables individual citizens to be actively involved. It is more reasonable to recycle components than just to dispose of scrap. The third issue concerns *energy consumption*, greater through incineration, so material recycling is emphasised. There are business, technical and environmental dimensions. The population opposes incinerators. Modern well-run incinerators present no threat; many under-perform, and are not welcome. Incinerators tend to be cited close to low cost housing. Immense investment costs are involved, amortised over many years, while the incinerator is fed with waste, rather than other methods being used. Finance is more readily available for incineration than for composting schemes. There is no EU provision obliging member states to incinerate rather than using other methods, and no incinerators in Ireland or Greece. Industrial waste is more hazardous, and more expensive to materially recycle, leading to a preference for incinerators.

The EU strategy on waste management dates from the 1996 Directive, with targets for material recycling of packaging, glass, cardboard, plastic and metal by 2001. The packaging industry resists regulation, favouring market freedom. In 1997 there were proposals for end of life vehicles, with targets, following adoption, and enshrined in national laws, to be met in 2015. Eight million cars per year in the EU

are affected. The Directive is due to be adopted in 2000, with debate about transition period handling of current cars. There will be a proposal for electrical and electronic products, requesting manufacturers to consider waste issues at the design stage. This is a matter of producer responsibility, rather than liability.

Waste prevention involves producer responsibility. Hazardous substances should be reduced, in light of the waste stage of the product lifecycle. There are substances identified in cars, electrical and electronic products, which involve battles with major manufacturers, for example over car batteries.

There are plans for a Directive on composting, dealing with biodegradable waste, to be reduced in landfill. It does not burn well; composting is an obvious route, supported by regulation. This process can be discredited if badly conducted. There is consideration of paper and used tyres, and other waste streams where EU level rules could be helpful in stimulating the market for recycling. Between the strong and the weak, freedom suffers, and regulation offers an answer. The recycling industry in the EU needs to develop, with appropriate regulation and procurement. Future themes will include *integrated product policies*; waste regulations impact on design. A systematic approach can be developed, replacing harmful products where possible, on a cradle to grave basis. The other theme is *resource management*. Rank XEROX produced computers based on 100% recycling; it was not successful. There is a communication gap.

Trade unions and consumers have lacked interest in waste issues. There are a number of recycling associations, but little consideration of work environment issues and social aspects. He called on trade unions to come together at European level in debates on the environment and waste management; national legislation is affected by EU changes and decisions. Workers' aspects have become marginal, posing problems for social movements in Europe. All new members have to take on all EU legislation as a condition of entrance. There will never be enough resources to address these matters.

Björn Erikson argued that most Northern European trade unions are concerned with environmental issues. It is a matter of dealing with the international agenda, seeking a common policy and common initiatives. Trade unionists may be engaged in environmental organisations, using other channels to express their views. Health and safety for the worker is linked to environmental concerns; a common strategy is needed.

Birgitta Melin discussed the gap in communication between EU DGs. All interested departments need to agree before Directives are produced.

Producers' Liability and the Recycling of Electronics in Europe

Val Herman described the anticipated impact of the proposed EU directive on Waste Electrical and Electronic Equipment (WEEE), in terms of the industries concerned, related industries such as waste collection, recycling and metals and plastics processing, and effects on the work environment. The Directive covers a range of goods, given the vast range and volume of equipment in use in homes and in industry, which will reach the end of use and require disposal. The Directive sets out proposals to improve recycling, defines systems to be established for collection and processing, and information to be produced. The principle is

“polluter pays”, and covers products through the life cycle from design and manufacture, through to use and disposal. Prices of products will increase to meet the costs.

The Commission sets out a model of extended producer responsibility, placing liabilities and costs on producers. Dangerous substances are to be reduced, common components be used, plastics labelled, and collection and processing costs met. Producers argue, citing proportionality, subsidiarity, sustainability and the development of the internal market, for sharing responsibility between the actors. Producers are responsible for manufacture, but there are then marketing responsibilities by distributors, use and proper disposal by consumers, collection by municipal authorities, and public information by government. Computers are not hazardous in use, but may be hazardous during disposal processes. Governments have a responsibility for protecting the workforce at the end of life stage. He contrasted individual and collective responsibility, and prospective versus historic or retroactive responsibility. The Directive will assign responsibility for equipment sold in the past when the responsibility did not apply, requiring funding provision for such responsibilities, which could make companies technically bankrupt. Companies would be asked to deal with activities beyond their core expertise. Phasing out hazardous substances is not straightforward.

The recycling industry is unevenly spread across Europe, with a range of technical solutions. There is a need for investment in infrastructure development and improved recycling technologies. Effects on the work environment will be considerable: recycling infrastructures, technologies, techniques, and health and safety issues with new substances, production techniques and products; and effects on employment, as jobs are lost in manufacturing.

The Swedish Recycling Industries

Jan Bruzelius represents the Swedish Recycling Industries' Association, established in 1998, with 27 members, representing most of the Swedish recycling industry. Members are engaged in collection, processing, coping with industry residues, and as environmental consultants, helping in design of new products. IL Recycling collects, sorts, processes and markets waste. It began with waste paper, and handles plastics, metal, glass, electronics and wood. There are 250 employees, at 12 recycling plants. Members are committed to environmental and ethical standards, and implement ISO 14001 and EMAS. Their view of the environment encompasses work environment. We should avoid building in work environment problems in a new industry. They have made voluntary commitments covering outdoor and work environments, in association with NBOSH, and emphasising protection of the outdoor environment and benefiting those carrying out the work. Each member provides company health care. He saw two categories of problems in recycling:

- manual handling and sorting, handling of dirty products, and monotonous work (this is being addressed by members)
- exposure to chemicals, requiring clear information and declarations of contents; with particular concern over brominated flame retardants, when dismantling electronic components, with worrying health implications, and a

need for clear EU directions on declarations of contents. Practical measures can be taken, reducing dust, cleaning floors, and avoiding skin contact, by using gloves and long sleeves.

He considered issues in the paper recycling industry. His company had been involved in a recent tragic accident involving children. Monotonous work is not new; job rotation is promoted where possible. New machinery pre-sorts material before manual sorting; automation will continue. Many problems, and jobs, will be removed. Safety systems protect equipment, but require employees to wear special belts concerned. Microbes are not a major problem in Sweden, due to source separation of waste, meaning a better working environment and lower sorting costs. We need balance in discussions of work environment. There is industry commitment to good relations with government.

Recycling of Paper in Europe

Heikki Melajärvi reported that old newspapers and old corrugated containers are the biggest grades of waste paper in Europe, with long traditions of recycling. Growth since 1944 has been spectacular, but is slowing. The amount of paper recycled has increased dramatically; the EU is now self-sufficient. Fibres can be used between three and five times. Machine speeds and widths have increased in the cause of higher productivity and efficiency. Quality requirements on recovered paper have tightened. Newspapers and magazines are used for newsprint, and cardboard is used for packaging. Collecting systems vary from mixed waste collection (with lower collection costs but higher sorting costs) to strict source separation. Producers have an increasing role; charities and municipalities are less significant. Sorting tends to be manual, with problems of dust particles, musculoskeletal disorders, and expense.

Plastic Recycling in Europe and the Working Environment

Neil Mayne declared that modern life without plastics is unthinkable; it offers tailor made solutions to challenges of a wide range of different applications; not originally including recycling. Plastics save more resources than needed for their manufacture, and material and energy are possible at end of life. Working environment aspects of the manufacture of the raw materials and their processing into plastic articles are well understood and monitored. Chemical industry accidents are below industry averages. Polymerisation of basic chemical units is carried out by a few high technology producers, and processed using sophisticated machines. Basic polymers pose no threat; there can be concerns about residual monomers or additives. Limits can be imposed, risks assessed, and operating conditions monitored. This is harder with recycled material that is mixed and contaminated. Problems increase post-consumer.

The growing use of plastics, substituting for other materials, has increased pressure for recycling. Minimisation of plastic use in packaging has been considerable. Plastics are not compatible, and cannot be indefinitely recycled. Closed-loop recycling is limited. The presentation concentrated on packaging; there are also developments in automobile and electronics sectors. Production of plastic articles has always involved reworking of production scrap; key issues are machine safety and noise. Increased recovery and recycling of waste presents

problems with plastics, which cannot simply be melted down to produce quality products. The critical stage is sorting, and the avoidance of contamination and unintended contents. There is no uniform approach to the recycling of plastics in the EU; working environments differ greatly.

- *Protective measures:* Worker protection is needed during collection, sorting and treatment. Exposure limits are needed for certain micro-organisms. Sorting does not seem to offer sustainable long-term employment opportunities.
- *Automation:* Progress is being made with new technology, with improvements to the work environment, but manual sorting continues.
- *Focus on specific recycling streams:* The cleaner and more homogeneous the waste streams, the less the adverse impact on the working environment. A general hierarchy of attractiveness can be agreed, suggesting a case for focus on particular streams.
- *Optimum combination of recovery options:* There is no natural hierarchy for recovery options in terms of environmental impact, but options requiring less manual sorting have less adverse effects on the working environment. Different streams were studied by TNO, and analysed, taking into account local circumstances, and costs of collection, as well as eco-profiles with the costs of washing. Optimise, rather than maximise. It is a waste to use plastics for landfill.

He presented a league table of plastics recovery, with the UK low on the table. The difference often comes from energy recovery, not mechanical recycling. He compared packaging for price, weight and recyclability. Recycled virgin materials can be of high quality. The problem is contamination, impacting on manual sorting. Optimising recycling, with other measures, offers benefits for working conditions.

Changes in Refuse Collecting Methods: What Is the Effect of Two-wheeled Containers per Gathering Point on the Work Efficiency and Energetic Workload?

Monique Frings-Dresson observed that refuse collecting is a physically demanding job, associated with a high prevalence rate of musculoskeletal disorders and a high sickness rate. Collection can be done in bags, or with two or four wheeled containers. Problems can be mapped against methods of collection. Two wheeled containers present problems for wrist and elbow; bags cause problems with low back. Guidelines were developed concerning collecting hours or collected refuse, meaning task analysis at the workplace, following the refuse collectors, and recording data on the computer and calculator. The guidelines were accepted and enforced, with the objective of changing work organisation and reducing occupational illness. In the Netherlands, working conditions have been improved by the use of two-wheeled containers. Households could pay by volume of waste. A study was conducted to establish the effect of the size of the gathering point on the work efficiency and energetic workload. Two, 16 or 32 containers made no significant difference for heartrate or perceived exertion. Collecting two takes much longer than 16 or 32 per gathering point. Payment comes from the

housewife changing patterns of leaving refuse. Increasing work efficiency does not directly imply increasing workload; changes in work organisation are not always improvements.

A Background to the Ergonomics of the CORE Research Programme in Denmark

Bente Schibye considered physiological aspects of the CORE programme, which measured loads when collecting household waste, and focused on changes in load when new equipment and working methods were used. Equipment was important, and used differently by collectors. Lifting positions were studied, and pulmonary ventilation was measured. Age was considered. The work is intensive, but with short working time, often empty-handed. The results showed lower aerobic power among elderly workers; if the job demand is not reduced, relative work load would be higher, while it should be at the same level for young and elderly workers. Solutions include decreasing the total amount of work, decreasing time taken to perform the same amount of work, making the work more varied, even if less effective, changing work organisation to cater for age, and health promotion to improve aerobic power.

The CORE Research Programme in Denmark

Otto M Poulsen considered the international dimension of recycling; German plastic waste is burnt in Danish power plants, substituting for oil, and causing complications for Danish refuse collectors. He described a Danish programme, CORE, on health problems and their solutions in household waste and recycling, conducted in 1993–97, a joint initiative by the Danish Ministries of Labour and Environment. The focus was on the current work environment, and data that could provide a basis for regulation and guidelines. Research focused on exposure to dust, viable and total micro-organisms, endotoxin and gases, as well as the mechanical and physiological load on the body during collection and recycling of household waste. Exposure to fungal spores was correlated with high frequencies of reported gastro-intestinal problems and airway symptoms, particularly bronchitis, as well as high levels of reported accidents. Waste collectors often change jobs, due to fear of health problems, and little opportunity for development. In recycling composting plants there are occupational accidents, gastro-intestinal problems and airway symptoms.

Recycling of the Road Surface

Igor Burstyn discussed reclaimed materials and recycling in the asphalt industry. Typically, asphalt is a mixture of inorganic filler (sand, gravel, limestone) and bitumen as an organic, petroleum derived binder. In an increasing number of countries, old asphalt or demolition waste is being used to produce new asphalt, a product that is 100% recyclable. Over 10,000 companies are involved in production or laying of asphalt in Europe, with 4,000 production sites and hundreds of thousands of workers. In the USA there are 500,000 current or former pavers. Ninety per cent of formal roads are asphalt, all recyclable. There is US data on cancer risk from Crumb-Rubber Modified asphalt. Reclaimed materials, such as old road surfaces, demolition waste and rubber tyres are used in making

asphalt. In 1991 the US Congress required a minimum crumb rubber content in federally funded paving, due to problems with malaria mosquitos; implementation halted due to concern over health effects. Exposure levels to bitumen are high in some countries, and known carcinogens are involved. Tar containing asphalt is now rare (except in the Netherlands and Eastern Europe). Recycling asphalt is a specialised operation, with little overall impact on the industry as long as re-paving is infrequent. Recycling can increase exposure of asphalt workers; this needs careful study. We would like benefits of recycling asphalt without endangering health of workers.

What Kind of Research and Technical Development is Needed?

Björn Erikson argued for a more holistic approach, in which occupational health issues can be addressed, with environmental and consumer concerns. Fridges are good examples; nobody considered occupational health and safety when agreeing the Montreal Protocol. The starting point tends to be an environmental law or restriction. Why is health and safety squeezed out of consideration? He discussed the removal of lead from petrol, and the problems of benzine. The ministry could only cope with one problem at a time. He considered Halon fire extinguishers, and the dangers of using carbon dioxide instead. In the plastic foam industry, toxic technical alternatives were offered to carcinogens. In each case it was seen as an environmental question, with the work environment only considered later. Industry wants cost-effective proof, taking power away from the politicians. There is no room for a political decision. He considered common interests at plant level, absent at ministry level. Trade unions are committed to improving conditions for those who are working, and with consideration for the unemployed.

Workshop Participants

Ann-Beth Antonsson, Swedish Environmental Research Institute, Sweden
 Monica Attebrant, NIWL, Sweden
 Jan Bruzelius, Swedish Recycling Industries' Association, Sweden
 Igor Burstyn, International Agency for Research on Cancer, France
 Richard Ennals, Kingston University, UK
 Björn Erikson, Norwegian Confederation of Trade Unions, Norway
 Monique Frings-Dresson, Coronel Institute, Netherlands
 Valentine Herman, ICL, Europe
 Billy Karlsson, Labour Inspectorate, Sweden
 Ludwig Krämer, European Commission DG-XI, Brussels
 Per Malmros, Danish Working Environment Service, Denmark
 Heiki Malajärvi, Paperinkeräys OY, Finland
 Neil Mayne, Association of Plastic Manufacturers in Europe, Europe
 Birgitta Melin, National Board of Occupational Safety and Health, Sweden
 Jan Olof Norén, National Board of Occupational Safety and Health, Sweden
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 Bente Schibye, National Institute of Occupational Health, Denmark
 Friedrich Schmidt-Bleek, Factor 10 Institute, France
 Lena Skiöld, NIWL, Sweden
 Arne Wennberg, NIWL, Sweden
 Hanskarl Willms, Association for the Waste Management Industry, Germany

3. Strategies for Occupational Health Research in a Changing Europe

The workshop was led by Peter Westerholm and Staffan Marklund, and held at the office of the Swedish Trade Unions in Brussels, 10–11 January 2000.

Peter Westerholm described globalisation of economies of nations and enterprises, and new technology transforming life at work and the workplace physical and organisational setting, affecting hundreds of millions of people. The workshop addressed implications for researchers and research institutions, regarding roles and orientation, and how young researchers look at the world and the new occupational health horizon. Most participants represented state institutions and state interests. Globalisation makes borders of national states more permeable, and traditional notions of sovereignty less sure. The State is still arguably the most important concept in modern political theory; the forces of modernity put new burdens on national states to support needy citizens, unable to cope with the speed of development. The recent conference of the World Trade Organization in Seattle (US) gave a sobering reminder of the problems we face. The summit conference was convened to strengthen networks of international trade and financial transactions. During the ministerial meeting there were protests, and feelings of malaise in the streets. There is a perception of a lack of transparency, closedness of societies and enterprises, and uncertainty of sense of direction. The world was given food for thought. Computers and enterprises are not seen as capable of running the world independently from societies and people. The role of the State is changing. Earlier, the prime concern of states was to raise money for warfare in trying to keep peace. Now, collaborative strategies are sought, and regional integration at the expense of nationhood. New alliances are being formed.

Where and how does Occupational Health Research fit into this new reality? Occupational health research institutions are guardians of academic traditions in the service of humanity. Pope John Paul II recently visited Uppsala University in Sweden, founded by a papal decree from Pope Sixtus VI in 1477. In recalling this important event in the country Sweden–Finland, the present Pope elaborated in his speech on the responsibilities of academic institutions in upholding our European cultural heritage of respecting humanity and human beings in the spirit of rationalism and justice. Human dignity does not depend on political and ideological systems. The institutions of academic knowledge have responsibilities to defend human dignity, and seek solutions to issues arising in world development. Pope John Paul II had a previous distinguished track record as a worklife researcher. This adds a special dimension, a note of scientific authority, to the views of the Pope.

Summary of Proceedings

Although the forces of globalisation and technical change, and the scientific foundations of occupational health and safety, are international, the contexts in which the various occupational health research institutes operate are diverse.

Whereas in Nordic countries, as presented by **Tage Kristensen**, **Jorma Rantanen** and **Christer Hogstedt**, the tradition has been for strong government support for specialist institutes, in the UK, as explained by **Malcolm Harrington**, there is no national institute for occupational health, and work is conducted in universities. In Italy, **Antonio Grieco** reported that it is hard to sustain research programmes in universities, which largely depend on external funds, and **Sergio Iavicoli** described efforts to classify priorities for research. In France, INRS, with research director **Jean-Claude André**, has to operate in a context of market forces and the social insurance industry, and in the Netherlands TNO, reported **Frank Pot**, is heavily engaged in contract research.

The role of European institutions has increased. The European approach has been to facilitate networking between member countries, aiding comparison and collaboration, but not addressing basic research, left to national level activity in most scientific areas. European projects are normally only part-funded, posing problems for nationally based groups. Collaboration is made more complex by the inconsistency and incompleteness of basic statistical information, and frequent under-reporting, sometimes due to administrative changes in compensation systems.

This raises questions about the role of national governments in the area of occupational health, concerned for the good of the population. Although large businesses may be expected to pay for their research needs, most employers are SMEs who are not equipped for such challenges, but may be vulnerable to particular exposures, about which they have little or no prior knowledge. If governments abandon research funding to Europe or the private sector, the future of the economy will suffer. Research in occupational health has an instrumental and a cultural dimension. If the research is privatised, the cultural dimension may suffer, weakening the social dimension of the working environment, and threatening human rights. Understanding of political processes is vital for research managers. It is not enough to rely on GOBSAT (good old boys sitting around the table), as argued by **Ib Andersen**.

There is often a missing link between theory and practice, the research laboratory and the single workplace, which can be provided by intermediate structures, by enterprises working together in networks and development coalitions, formed to address common practical problems, growing as the culture of collaboration has taken hold. In the Netherlands the link can also be through TNO consultancy activities, as presented by **Frank Pot**, which may be cost-effectively delivered via networks. Networks can operate at a regional level, between regions in a given country, or even across Europe. Localisation and regionalisation is a natural complement of globalisation, with variety between and within countries.

Networking was also presented as an answer to the question of the future of occupational health research institutions, large and small, which cannot cover all topics of concern. Not all EU member states have national institutes, though centres of excellence can be identified. Where, as in the UK, occupational health research is largely conducted in universities, multidisciplinary links are provided and sustained by networking within and between institutions. There are issues of intellectual culture and; it is hard to change career directions of specialist scientists.

From outside occupational health research, as suggested by **Tage Kristensen**, how would one assess the case for future funding? If the research were to succeed, current problems and many associated projects would wither away, but new technological and social changes bring associated problems. Training new scientists takes many years; there is a need to sustain the research culture in transition. In Sweden new doctoral programmes were established. Inequities can be analysed by work area, and by social class, raising broader policy questions. Both natural science and social science are needed, as stress is linked to uncertainty, and families themselves are identified as a source of pressure.

Occupational health research scientists need to be able to address a number of distinct audiences apart from their professional colleagues. In an age of media and communications, **Frank Pot** argued that scientists need to identify the appropriate message that will capture the attention of the decision-makers, and the means of delivering practical solutions to problems that are already on the agendas of the potential funder. Having interested the financier and “spin doctor”, the solution needs to work at work place level, as part of a developmental process characterised by involvement and participation in a learning organisation, as emphasised by **Peter Westerholm**.

The agenda is ambitious, and reminiscent of Machiavelli's *The Prince*. The modern government, company and research laboratory need access to the latest technologies, while respecting Machiavelli's insights into the dynamics of power relationships in organisations and states. Dissemination is an intervention to affect the health of the occupational culture, and requires understanding of the articulation of the parts of the system. This involves experienced research managers, with expertise in communication. Change is easier when accompanied by increased funding, but even if job losses are avoided, reorientation is difficult, requiring constant evaluation.

Occupational health research institutes had been surveyed to assess the priorities that they accorded to different areas of research. In general, reported **Staffan Marklund**, their responses regarding current practice and future plans could be regarded as relatively conservative, when measured in terms of financial and human resource allocations, concentrated as they are on the measurement of exposures in the workplace. Long established programmes on chemical health hazards continue, with increasing popularity for psychological and social work factors, followed by work place ergonomics, work organisation and management, and physical health hazards. These priorities reflect traditional sources of funding and lines of government reporting.

Areas of occupational health research with a broader social context might attract support from politicians; this would require a change of perspective from research managers, although **Jorma Rantanen** emphasised the growing inequity in working conditions, safety and health between North and South. The International Commission on Occupational Health has set tackling HIV/AIDS as one of the four key priorities, but this was not included in the European survey. Bottom of the list of stated priorities from respondents were ethnicity and cross-cultural occupational health, unemployment and labour research, young workers and labour market entrance, rehabilitation and vocational training, and environmental health issues. In the middle ground we find work place health promotion, work place

accidents, health economics, ageing and disability, and health services research, seen by politicians as worthy, but raising little excitement.

Individual researchers tend to be conservative, as their training and experience have equipped them for particular lines of work, and it is difficult to venture outside a specialist discipline. **Amanda Griffiths** noted that career progression is not helped by pursuing work that does not command respect. Successful multidisciplinary activity is harder to achieve than to outline; it runs counter to traditional scientific training. She considered European working life in transition, and questioned the adequacy of the dominant research paradigm to address all the challenges. Many current occupational health problems concern employee reactions to the way work is organised and managed. The quantitative methods of the natural sciences paradigm are necessary but not sufficient. Qualitative methods may have a useful complementary role. Changes in work have implications for the education and training of occupational health personnel.

Christer Hogstedt commented on change in institutional structures for occupational health research in Sweden. Research has been brought together at NIWL, from previously separate institutes, providing greater coherence but with a reduced proportion of the budget for OHS. He set a course for 2000 and the future, drawing on the new, more integrated approach, and addressing the political agenda. Discussion considered the process of change and reform, and implications for the orientation of the work, including professional ethics, and the new Third Task for universities. New methods are best implemented by those experienced in traditional approaches to scientific research.

Sweden is not alone in changing research management approaches in recent years. Netherlands and Denmark have preferred evolution to top-down revolutionary change. Germany has addressed the challenges of reunification by fusing previously separate institutes. Problem orientation brings together previously separate disciplines, and changes the focus, for example, of surveillance and risk assessment. As in Finland, the resulting focus is on promoting healthy work. The contrast between the institutions is marked. Small Norway enjoys 90% government funding for the national institute, employing over 100 people, while the United Kingdom has no national institute at all, and research is conducted by university staff on short-term contracts. Given this diversity, and the mix of professional backgrounds and scientific emphases, it would be surprising if there was full agreement in an initial formulation of a European position. Many of the member states represented at the workshop are recent members of the EU, and the infrastructure of support for research networks and information sharing is both in the process of maturing, and relatively unfamiliar to researchers. There are benefits from effective collaboration, including cost benefits of sharing expertise, saving each institute from having to be universal in coverage.

Conclusions from Working Groups

Staffan Marklund summarised conclusions from the first workshop session.

- Recent trends show new problem areas, and new causes behind work-related health hazards. Some old hazards continue, and traditional exposures have

not been sufficiently researched. A number of new substances have not been well studied.

- In a number of European nations there are growing health problems related to mental stress and an increasing intensity of work. There are large numbers of people deprived of work due to unemployment and social exclusion.
- We need a wider definition of outcomes, not restricted to diagnosed diseases and illnesses, but also covering sickness absenteeism, general well-being and self-reported ill-health.
- Specific attention should be directed towards groups that are exposed to multiple hazards, such as a combination of physical and mental strain, and groups that during their occupational career are exposed to long-term problems.
- Increased emphasis is needed on early retirement, and measures to improve working conditions among older workers.
- An important effect of new trends in working life is that the line between work and private life is less clear cut. Our research focus has to become wider, and include more general aspects of living conditions.
- Much research knowledge is not used in the work environment. Activities should be stimulated to improve the practical application of research knowledge, ranging from improved skills in “translating” research into practical knowledge, and using more time in communicating with stakeholders and clients. This could include a shift from an academic research career towards a consultancy career for our research staff.
- There is a need in all countries to increase research into solutions and applications, meaning greater emphasis on implementation research and evaluation of specific programmes. There is a need to improve the quality of implementation research.

Peter Westerholm summarised conclusions. Reorganisations of research institutes should be planned and implemented with care, taking into account their role in producing new knowledge and crystallised understanding, and their intellectual and creative nature. In Europe we see examples of reorganisations and restructuring of enterprises, corporations and public sector organisations that have not been well planned and carried through, with disastrous results for the organisations concerned.

Researchers rarely embark on change without being given valid and strong reasons for doing so. When considering the need for change, principles of “learning organisations” should be followed, implying analysis of such questions as “What is expected and required of us?”, and “How can we continuously improve our performance?”. Strategies of learning organisations operate to achieve explicitly set objectives, and to give a clear sense of direction to all concerned. All staff should have an opportunity to define their own position, and are given feedback all along, in order to achieve the learning effects of mistakes and omissions. A learning organisation should not be taken by surprise by external events. His group identified some key issues:

- Occupational health in a world of change implies a requirement for a research organisation with the capabilities and competencies to meet new demands.
- Market mechanisms in Europe constitute a new context for research institutes. To the extent that they are dependent on external funding, the implications include adaptation to the priorities and policy objectives of such external funding agencies, and competition for research funding.
- Stakeholders in European societies are increasingly aware of the need to use research findings, and the competence of research institute staff. This implies development of customer, client, and stakeholder awareness, and knowledge of current issues.
- The changing conceptualisation of “occupational health”, developing from the absence and prevention of occupational disease in the conventional sense, towards the promotion of quality of life and the development potential of individuals and groups, implies a need to develop and exploit new development strategies.
- Evaluation is critical. All actions and interventions must be assessed for their effects, as required in a new dimension of occupational health research. This implies new challenges for occupational health researchers in seeking strategies and methods in both self-evaluations, and in having their own research and development programmes assessed by external reviewers in a structured and pertinent manner, contributing to continuous quality improvement.

Staffan Marklund added further conclusions from the other working group.

- More systematic cooperation between European OH research institutes is needed, using IT to create information banks of research results and ongoing projects.
- IT should provide stakeholders with information to create change and initiate interventions.
- OH research institutes should respond to growing demands from practitioners at different levels. It can partly be met by using IT and partly by systematic surveys.
- More emphasis must be placed on measuring the economic cost of occupational disorders. A recent WHO report shows that in the USA the direct and indirect costs of work related injuries and disorders are larger than those for AIDS, and on a par with those of cancer and heart disease.
- Research should be timely, relevant, well-grounded, and appropriate for application by experts and laymen in the European Union. OH is a shared responsibility between states, employers and workers at all levels in the EU.
- Existing networks between research institutes and departments should be institutionalised at the European level, as part of a European strategy to strengthen the social dimension. Attempts to create academies for joint training in ergonomics, organisational psychology etc should be supported.

Conclusions from the Workshop

Occupational health is culturally situated, and relates to a moral infrastructure as well as to employment relations. The conclusions seek to represent a European position.

1. “Healthy work” involves healthy and employable workers, a healthy working environment, healthy work organisation, and competence development at work. This requires support from ongoing research, and effective use of the knowledge we already have. Addressing changing patterns of work, in a context of globalisation and pressure for flexibility and competitiveness, involves consideration of public health issues and the work-family interface.
2. Occupational Health is a matter of social and economic concern, as well as affecting the lives of individual working people and their families. It impacts on policy for health, employment, and the costs of social security. It involves a number of stakeholders and social actors, including employers, employees, government and individual workers. In order to address problems of Occupational Health, we need a body of knowledge that is actual, appropriate and accessible. This goes beyond the responsibility of individual companies, and is a matter for public concern. Occupational Health Institutes are instruments for public policy conducive to healthy work. They should be primarily funded through public sources, which does not preclude funding from other sources.
3. Occupational Health Institutes undertake research and development programmes, generating scientific knowledge, applying and disseminating the knowledge. They are resource centres for Education and Training Programmes addressing needs of diverse target groups in society, including vulnerable segments such as immigrants, those at risk of marginalisation due to gender, age or disability, workers in precarious work, and the unemployed.
4. Occupational Health Institutes need to strengthen their networking with multiple stakeholders over the process of needs analysis, priority setting and implementation of research and development. They need multidisciplinary competence in analysing Occupational Health problems, implementing research and development, and overcoming obstacles to healthy work. They need improved capacity and skill in monitoring important trends and developments at a societal, sectoral, enterprise and individual level.
5. The transfer of scientific knowledge for practical use is vital, involving Occupational Health Institutes in working with the responsible public and private sector bodies. Particular attention should be paid to the needs of SMEs, who may best be helped through networks and intermediate structures.
6. The European Union should designate particular funds for Occupational Health in Framework Programmes. Occupational Health Institutes make important contributions to development aid programmes to countries outside the European Union and Europe.

Reflections from European Organisations

Pascal Paoli presented the Dublin Foundation as a go-between, working with national research institutes and others, and argued that the issues had not changed

greatly. Old problems of occupational health continue; despite years of research; we have to ask whether information from research is being effectively transmitted to where it is needed. The way in which the issues are addressed has changed. The complexity and inter-relatedness of issues such as work and family, work and environment, work and labour market, work and policies for employment and productivity are such that integrated approaches are required. We are expected to do more, faster, better and with less resources, often frustrated by the lack of interest shown by key bodies who assign a low priority to occupational health. We are under pressure to deliver the goods, and get the message through, which means finding simple, usable, short, practical, but sound, formulations, which combine being forward looking with responsiveness to fast-changing political agendas. We need to develop improved indicators, and secure closer involvement of stakeholders.

Markku Aaltonen noted that the Agency in Bilbao collects, evaluates and disseminates information; it is then a question of both the quality of the information and how it is used. He emphasised the use of the Internet, with nationally based networks of focal points and European topic centres. State of the art reports on work related upper limb disorder, and on stress at work, are recent products.

Workshop Participants

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 Ib Andersen, National Institute for Occupational Health, Copenhagen, Denmark
 Jean-Claude André, INRS, Nancy, France
 Richard Ennals, Kingston University, UK
 Daniela Fano, Milan University, Italy
 Antonio Grieco, Milan University, Italy
 Amanda Griffiths, I-WHO, Nottingham University, UK
 Malcolm Harrington, Birmingham University, UK
 Christer Hogstedt, NIWL, Stockholm, Sweden
 Sergio Iavicoli, ISPESL, Italy
 Tage Kristensen, National Institute for Occupational Health, Copenhagen, Denmark
 Gunilla Linder, NIWL, Stockholm, Sweden
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 Pascal Paoli, European Foundation, Dublin, Ireland
 Frank Pot, TNO, Hoofddorp, Netherlands
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 Jorma Rantanen, Finnish Institute for Occupational Health, Helsingfors, Finland
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 Arne Wennberg, NIWL, Stockholm, Sweden
 Peter Westerholm, NIWL, Stockholm, Sweden
 Stuart Whittaker, Birmingham University, UK

4. Neuromuscular Mechanisms Behind Work-related Myalgia

The workshop was led by Håkan Johansson, and held at the Office of the Swedish Trade Unions in Brussels on 7–9 February 2000.

Håkan Johansson argued that the study of mechanisms behind work related myalgia has reached a stage of integrating findings, and promoting dialogue with other fields. The level of investment in the field has been low relative to cost. Knowledge has advanced relatively little, and rehabilitation is relatively primitive. Basic research into underlying mechanisms has been neglected. Basic and applied research need to be linked. He concentrated on strain-related chronic muscular pain syndromes.

Historical Overview of Work-related Myalgia

Sidney Blair gave an overview of the views of physicians on work-related myalgia over 300 years, and their ideas on the mechanisms responsible. Bernardo Ramazzini (1633–1714), in his book *de Morbis Artificum (Diseases of Workers)* described “diseases of scribes and notaries”, based on the strain of writing, described in terms of muscles and tendons. In the 18th and 19th centuries there were terms such as “Scrivener’s Palsy” (1864), writer’s cramp (1879), occupational neurosis (1911), and telegraphist’s cramp in the medical journals. Blame was sometimes put on steel pens! Research considered nerves and muscles. William Gowers wrote about fibrositis and muscle spindles in 1860.

From the 1950s there were increased reports of disorders, in Japan (occupational cervico-brachial disorder), Australia (repetitive strain injury), the United States (cumulative trauma disorder) and Scandinavia (cervico-brachial disorder and tension myalgia). Work-related musculoskeletal disorders meets WHO concepts of work-related disease. The debate has been whether the problem was work related or psychological. Cases continue to require treatment. Muscles tend not to be emphasised. UK work on upper limb disorders followed work in Australia. Muscular rheumatism became fibrositis, with trigger points and regional tender points. For over a century physicians have hypothesised mechanisms responsible for the symptoms and signs of pain, muscle tenderness and swelling. Concepts of fibrositis, myofascial pain syndrome and fibromyalgia have developed, with reflex sympathetic dystrophy or complex regional pain syndrome. Clinical signs and symptoms include local muscle pain that becomes diffuse, fluctuating according to activity, posture and weather changes. Allodynia and hyperalgesia are seen, as well as vasomotor and submotor changes. There is a tendency toward bilaterality. Managing the cases requires a comprehensive team approach. There has been a lack of physical findings, as physicians do not know how to examine patients.

Physical and Psychosocial Risk Factors for Work-related Myalgia

Laura Punnett discussed psychosocial stress. Research has addressed work organisation, with the combination of physical load and psychosocial stress. She

discussed musculoskeletal disorders: including tension neck syndrome, cervical syndrome, rotator cuff tendinitis, epicondylitis, peridentinitis, carpal tunnel syndrome (CTS), sciatica and osteoarthritis. Nerve compression disorders receive much attention in the USA, but represent a small proportion of upper limb MSDs in occupational settings, rare in the general population. Statistics are problematic: the same patients may be counted several times with different areas of pain. Wrists and hands are most affected in the USA, neck and shoulder more pronounced in Europe and Japan. In the USA there is cost-driven emphasis on carpal tunnel syndrome. Studies can be self-fulfilling. In many occupational studies, up to 50% of the morbidity cannot be attributed to specific diagnoses, but assumed to be muscle problems, described as non-specific, despite the level of pain.

She considered psychosocial factors, using the Karasek–Theorell model. Psychosocial factors seem linked to muscle disorders, with causal relationships between back and upper extremity MSDs and occupational ergonomic stressors such as repetitive and stereotyped motions, forceful exertions, non-neutral postures, and vibration. There is no one-to-one mapping; disorders and risk factors are found across industry sectors, features interact to cause multiple types of disorder. Constant organisational change makes research difficult. Disorders arise at low exposure. Standardised symptom taxonomies are needed. Laboratory studies need to simulate real occupational conditions.

Biomechanical Aspects of Work-related Myalgia

Jaap van Dieen related work-related myalgia, affecting neck and shoulder muscles, to low-intensity manual exertions. Sustained low-level isometric contractions of muscles may help cause these complaints, with fatigue related changes of intramuscular electrolyte and metabolite concentrations. Preventive actions might be based on avoidance of sustained isotonic contractions. Though myalgia appears to involve neck and shoulder muscles, only limited data is available; he drew on data from other muscle–joint systems. He discussed biomechanical analysis of muscles and moments, and introduced ideas of moment equilibrium, illustrated with data on arm support in a typing task. He introduced stability and stiffness, involving close muscle control, in order to perform tasks. Reduced activity in one muscle needs to be compensated by other muscles. In back muscles, alternating of muscle activity reduces fatigue development. Model simulations suggest this holds for neck and shoulder muscles. Epidemiological studies imply that subjects showing time varying recruitment of neck and shoulder muscles during a repetitive task may be less likely to develop myalgia. Given the “opportunity of choice” provided by “redundant” motor-units crossing each joint, and the beneficial effects of temporally varying activation, it might be expected that prolonged (isotonic) contractions would be unlikely to occur. Precision demands could pose such constraints that sustained recruitment of the same population of motor-units will result. Precision demands are more constraining in tasks typically associated with myalgia.

Muscle Morphology in Painful Muscles, Effects of Training, Effects of Load Exposure. Morphological Differences Between Muscles, Receptors and Muscle Fibre Types

Lars Erik Thornell described the human body as consisting of over 300 muscles. At the microscopic level, muscle fibres have myofibrils, a sarcotubular system and mitochondria arranged in a similar way. Each muscle, activated by nerves, is unique. The molecular heterogeneity of most proteins building up the muscle fibres leads to a continuum of physiological properties for individual fibres as well as muscles. Muscle spindles have a unique myosin composition, not seen in the extrafusal fibres; the complexity of the muscle spindles is muscle related. Almost all components of the muscle have an impact. He outlined eight different myosins, suited for particular outcomes. Such generalisations apply to all muscles.

Myalgic muscles often show disturbed capillary supply, and signs of disorganisation or pathological alteration of energy producing mitochondria. In studies of myalgic females, positive effect from 10 weeks training of different kinds was found; patients had less pain. He argued for more physical education for young people, to prevent later work-related disorders.

Neck-Shoulder Pain in Relation to Blood Microcirculation and EMG, Psychophysiological Stress

Sven-Erik Larsson reported on mechanisms underlying chronic neuromuscular pain syndromes in working life, in patients with long-lasting work absence. Chronic neck pain is a major problem. Pain is a perception of signals from nerve cells, transmitted by synapses, reaching the brain. Signal intensity is modified in the communication process, with a key role for intermediate cells, influencing projectory cells.

He discussed ragged red or moth-eaten fibres, studied in a large group of patients. Chronic neck pain is caused by lower microcirculation in the trapezius muscles of the neck, measured during standardised fatiguing static work. Chronic neckpain causes inhibited microcirculation, and reduced blood flow. Study is needed of interplays between psychogenic factors, work stress and susceptibility to chronic neck pain.

Motor Unit Recruitment in Relation to Genesis of Muscle Pain (Cinderella Hypothesis)

Nils Fallentin introduced occupational static workload as a major ergonomic risk factor. Preventive measures have reduced exposure to awkward or static work postures, and established threshold limit values differentiating levels of exposure, with limited success. Reductions in exposure have marginal influence on frequency of work related musculoskeletal disorders. The Cinderella hypothesis, suggested in 1989, implies that remaining muscle work is performed by a limited fraction of muscle motor units or muscle fibres. The load on these limited number of Cinderella fibres, working while the majority of fibres are resting, will be heavy; if the contraction is prolonged, the expected end result is overload, energy crisis, and eventual destruction and pain in a sub-fraction of the muscle. The Cinderella

hypothesis stresses that reduced levels of static exposure would be inefficient, as a number of Cinderella fibres would still be doing a heavy and demanding job. Priority should be given to reducing exposure duration, by the introduction of breaks and alternative work activities, relieving the burden on the Cinderella fibres. The challenge to this hypothesis is the lack of “muscular wisdom”, associated with a recruitment pattern allowing overload and destruction of single muscle fibres.

Important clues to why protective mechanisms can fail came with the “vicious circle” model of Johansson and Sojka, drawing attention to reflexes originating in working muscles affecting recruitment and activation of muscle fibres. The model suggests that the Cinderella hypothesis can be explained as “system failure”, related to inadequate activation of key elements. Reflex mechanisms in the sympathetic nervous system exert a protective influence, inhibiting damage. The direct nature of system failure remains speculative; mental stress or psychosocial workplace exposure may be the final element eliciting collapse of protective systems in susceptible individuals. The Cinderella hypothesis concerns system failure, dealing with prolonged exposure to low level static contractions, combined with a stressful environment or poorly organised work, creating an environment where there is a risk of potentially catastrophic events, leading to musculoskeletal disorders.

Release of Metabolites (Including Inflammatory and Algesic Agents), Muscle Fatigue, Muscle Metabolism, Fibromyalgia. Shear Phenomenon

Nina Völlestad reported on responses to mechanical aspects of work, drawing on models of responses of work, related to pain, and responses to work from those with pain, compared with those without pain. As muscle work and activation may aggravate pain, better understanding of muscular responses to work might reveal important mechanisms.

Numerous factors stimulate or sensitise nociceptors located in the muscle. By identifying muscular responses to muscle activation, one may reduce factors linking muscle work and pain. Nociceptors are located between muscle fibres, agents acting on the nociceptors exert effects outside muscle fibres. This limits interesting muscle responses: either chemical or mechanical. She was concerned with chemical changes, including intra-cellular responses releasing calcium. Most changes are within the cell. Inflammatory agents are activated, affecting afferent nerves. She considered mechanical behaviour of muscles in submaximal contractions. Muscle activation is associated with propagation of action potentials along muscle fibres. Metabolic responses in terms of oxygen utilisation increase over the period of work. Regarding sympathetic activity, repetitive contractions rise through exercise before normal levels are restored. Mechanical changes include gradual prolonged fatigue, contrasting with no change in conventional measures of fatigue. Does pain cause inhibition of maximal muscle activation and force output? Does pain cause more fatigue? What if work is undertaken while pain continues, and further pain is encountered? Experience of chronic pain changes experience of pain induced by contractions. Localised pain may inhibit maximal force. Fatigue is similar for those with and without pain.

Muscle Pain, Muscle Spindle System, Muscle Receptors Groups III and IV (Peripheral Sensitisation)

Mikael Bergenheim talked about his patho-physiological model behind chronic myalgia. During muscle work or muscle inflammation the chemical environment in the muscle changes, leading to activation of pain receptors in the muscle, which activate a type of neurone in the spinal cord (the fusimotor neurone) leading to an increased sensitivity of the muscle spindle, a complex structure. Muscle spindles are important for posture and balance, and for controlling muscle stiffness. When the sensitivity of the muscle spindle increases, the tension in the muscle builds up and the chemical environment changes even more. This might constitute a vicious circle; change in chemical environment (due to inflammation of muscle work), increased sensitivity of the muscle spindles, muscle tension build up, and a further increase in the chemical environment.

Effects of the Sympathetic System on Peripheral Receptors. Sympathetic Effects on the Alpha-mono-neuronal Terminal

Magda Passatore discussed the sympathetic system and motor control. When we start exercise, there is an action from the sympathetic and vegetative functions. Action can apply at central or peripheral level: we do not know when and how it is activated. We need to understand impacts on reflex actions. She considered vasoconstriction exercised on arterioles and precapillary sphincters. This provides perfusion pressure for organs in which sympathetic innervation is scarce, such as the heart, and perfusion in organs with sympathetically innervated arterioles in muscles, linking sympathetic activity with fibrogenesis, antagonised by local dilatation. What is the sympathetic activity meant for, and how does it operate? Sympathetic activation can be seen as the result of evolution selecting individuals able to develop rapid aggressive and defensive responses. Such adjustments may be a disadvantage in civilised man, and possibly a cofactor for pathological states.

Effects of Group III and IV Muscle Afferents on Spinal Interneurons, Central Sensitisation. Schmidt's Model. Reflexes onto Alpha and Gamma Motoneurons from Groups III and IV Muscle Afferents

Uwe Windhorst discussed links by interneurons, an intermediate stage of processing. We need to be aware of the complexity of the spinal cord. Pain is a subjective experience involving awareness, memory and affect, a warning sensation signalling impending or actual tissue damage ("noxes"). Stimuli leading to pain sensation exert other effects. One group of effects concerns changes in blood pressure, heart rate, respiration depth and rate, etc. Noxious stimuli influence the motor system underlying movement and posture. In most cases, the signals about noxes originate in specialised nervous damage receptors ("nociceptors"), the peripheral endings of sensory nerve fibres referred to as group III-IV fibres; they originate in the body periphery and enter the spinal cord and brainstem. They contact other nerve cells via contacts called "synapses". The activation of the "presynaptic" fibres is transmitted to the "postsynaptic" cells by special chemical substances called "neurotransmitters". Nerve cells ("neurons")

connect to more or less long chains or networks. Such networks connect the sensory nerve fibres to “motoneurons” that innervate and make contract muscle fibres. All intermittent nerve cells involved in the connections are “interneurons”, accounting for much of the signal and information processing in the central nervous system. The networks are complex, with many parallel chains and cross-connections, rendering the system adaptable to various situations, but providing the possibility for pathological deviations.

Pathophysiological Model Behind Chronic Myalgia. Influence from Joint Receptors

Mikael Bergenheim discussed the Johansson-Soyka model. Tensions occur in muscles and spread in a puzzling manner, prompting the new explanatory model. The sympathetic nervous system can have negative effects on the working of muscles. There can be apparent inhibition of muscle spindles, resembling increased static sensitivity. This may constitute another vicious circle. It is important to see connections between the systems, offering possible links with psychosocial factors.

Models for Experimental Muscle Pain in Humans. Pain Adaptation Model

Lars Arendt-Nielsen described work with rats, and issues of co-ordination. Muscle pain in humans can be endogenous (ischaemia or exercise) or exogenous (electrical, mechanical or chemical) in origin. Whiplash patients seem to acquire generally raised sensitivity. There are stages in the transition from muscle pain to motor control. He highlighted a vicious cycle of muscle pain and hyperactivity. Muscle pain can be induced and observed, or we can work from exercise to induce particular muscle pain. He discussed resting, static activity and dynamic activity. Little changes in resting if pain is imposed on a healthy muscle. Changes are transient. In static cases, during maximal contraction we see inhibition, while in sub-maximal contractions there are changes in endurance time. In dynamic cases, we may contrast agonist (reduced) and antagonist (increased) muscles.

Human H and Stretch Reflex in Experimental Muscle Pain

Dagfinn Matre noted that the vicious circle model has given a neurophysiological explanation of how certain kinds of muscle activation may lead to pain, and spread of pain. The model suggests that the release of muscle metabolites during work activates muscle nociceptive afferents, which, via an increased γ -motoneuron activity, increases muscle spindle sensitivity and muscle stiffness. Increased stiffness leads to increased production of metabolites, and a vicious circle may be initiated. Animal studies have given support to the model by showing increased γ -muscle-spindle activity during group III and IV afferent stimulations (chemical and electrical). No controlled human studies have so far supported the vicious circle model. An elevated gain of the stretch reflex loop would be indirect evidence of the mechanism in humans. Studies tried to determine whether homonymous and heteronymous muscle pain modulates the stretch- and H-reflex amplitudes. H-reflexes (the electrical analogue to the stretch reflex) were measured to determine whether changes had occurred at the pre-

synaptic level. Measurements were done in relaxed muscles, and motor tasks of increasing complexity (static isometric contractions and walking). The unchanged H-reflex indicates that motoneuron excitability was not changed by pain. The increased stretch reflex supports the case for the mechanism in the vicious circle model.

Effects of Muscle Load on Proprioception

Mats Djupsjöbacka reported that in a prospective study of workers in the electronics manufacturing industry, factors related to motor-control and posture were risk factors for developing myalgia. In particular, a “good posture” and a “relaxed working technique” reduce the risk. Movement co-ordination and control of precision movements are highly dependent on proprioception; deficits in proprioception may give rise to an increased muscular co-activation. A reduced acuity in proprioception has consequences for the risk of developing musculoskeletal disorders. Sufferers from chronic musculoskeletal pain exhibit deficits in proprioception and motor control, such as an inability to relax painful muscles when they act as antagonists and reduced control of head-trunk position. As to the cause, the patho-physiological model of the genesis, perpetuation and spread of muscle pain suggested by Johansson and Sojka provides a conceivable explanation.

To investigate the effect of accumulation of muscle metabolites on the quality of the proprioceptive information conveyed by muscle spindles, experiments in an acute animal model were made. Muscle fatigue induced a large reduction in the quality of the proprioceptive information. This resulted from reflex effects onto gamma motoneurons from small fibre muscle afferents.

Occupational work tasks such as working with a visual display unit or light assembly work are associated with risk for development of musculoskeletal disorders. We should consider the effects of muscle fatigue on proprioception when discussing mechanisms behind work related myalgia. There are many studies investigating the effect on proprioception from high intensity work to fatigue in humans. Fatigue decreases proprioceptive acuity. There is a lack of studies on the effect of low intensity work, similar to occupational conditions; recently he performed a study where the subjects performed repetitive low-intensity arm work to subjective fatigue. The results revealed a significant reduction in position sense.

Dizziness and the Contribution of the Human Neck to Postural Control

Måns Magnusson argued that human postural control is maintained by sensory feedback control of motor command. Movements of the head in space are recognised by the vestibular, visual receptors and proprioception. Mechanoreceptors detect relative movement of body segments and the interaction between the body and the support surface. To utilise the information from visual and vestibular receptors in postural control, the upright human being must get information about the position of the head relative to the torso and other body segments. This information should be more or less dependent on proprioceptive influx from the cervical segment.

The theory of the cause of the sensation of dizziness or vertigo in humans is based on sensory mismatch: when afferent simultaneous information about movements from the different sensory systems are incongruent, i.e. mismatch, this leads to the sensation of spatial disorientation and dizziness. If the mismatch is prominent, there is malaise, and vegetative signs well known from motion sickness. If orientation reflexes are dependent on information from the cervical segment about the position of the head in space, disturbances of such information should cause a sensory mismatch between vestibular and visual information relative to proprioception. This would cause inappropriate reflexive responses to visually or vestibularly perceived motion: a cervical lesion should be able to cause dizziness. If there was such a thing as cervical induced dizziness, then one should have evidence that disturbances of cervical input would cause disturbance of vestibular reflexes and postural control. On healthy subjects wearing a stiff neck collar for 5 days impaired both orientation reflexes reflected by voluntary eye movements, and postural control. One should be able to show interaction between vestibular and cervical reflexes. In studies of patients with either musculo-fascial cervical pain and dizziness or cervical disk herniation, they differed from healthy individuals as well as from patients with other disorders with dizziness. Treating the musculo-fascial pain or disk herniation would reduce objective impairment of postural control.

Motor–Neurovegetative System Interaction

Magda Passatore was concerned with major monoaminergic systems in the brain stem, including noradrenergic and dopaminergic cell groups. Sympathetically maintained pain is a symptom of many diseases; links are described in many different ways, involving receptor terminals, nerve fibres, and dorsal root ganglia. There is a possible link between sympathetic systems and immune functions. Nerve growth factor can play a critical role.

Stress Orchestration of Autonomic Responses. Environmental Maladaptation Syndrome

Eugene Lyskov observed that muscle pain, stiffness and discomfort are common symptoms in persons with different forms of environmental maladaptation syndrome (EMS) like electromagnetic hypersensitivity, sick-building syndrome, multiple chemical sensitivity, fibromyalgia, etc. These labels are increasingly assigned to patients with a variety of common neurasthenic and somatic symptoms attributed to various environmental factors, typically women, aged 30–60, office workers. Provocation studies failed to find particular physical or chemical factors that evoke specific reactions, worsening of symptoms or subjective detection of the exposure in laboratory conditions. On the other hand, epidemiological investigations indicate correlation between severity of symptoms and psychosocial stress factors. The accepted role of stress in the genesis of EMS supposes further practical steps in definition and laboratory standardisation of stress factors, measurable characteristics of stress sensitivity, responsivity and coping, to clarify mechanisms of this disorder. There is growing environmental illness, in office work, with no single cause. Stress has to be seen as a multiple neuroendocrine response, mediated by the central nervous system. Stress-induced generalisation of autonomous response, displaying as enhanced and simplified reactions to external and internal signals, actualises response stereotypes and

leads to progradient worsening of symptoms. Physiological methods are a way of examining these pathogenetic mechanisms. Special attention is focused on development of integrative stress profiles based on a continuum of autonomous processes and a combination of appropriate laboratory stressors. Individuals with one problem tend to return with other work-related problems.

Reflex Sympathetic Dystrophy Syndrome

Sidney Blair characterised the syndrome in terms of pain, tenderness, swelling, dystrophic skin changes, as well as vasomotor and sudomotor changes. The sympathetic nervous system may play a role in the associated pain. He provided an overview of the history of the field, which drawing on experience of war injuries. He considered the signs and symptoms, and approaches to diagnosis, before discussing pathophysiology. He explored the idea that RSD is a form of neurogenic inflammation, involving long-term sensitisations of the wide range neurons in the dorsal horn. Others argue that the motor disorders are due to the sympathetic effects on the muscle and their intrafusal spindles.

There have been generalisations about the kind of individuals claiming the problem, grossly stereotyping. He outlined the changing theories and levels of knowledge in the field, seeing the condition as an inflammatory disorder. The model is less illuminating than hoped.

Cortical Plasticity in Chronic Pain Tested with Transcranial Magnetic Stimulation

Milos Ljubisavljevic noted increasing interest in brain plasticity, the ability of the brain to change. Cortical plasticity encompasses a wide variety of phenomena and mechanisms. In recent years interest has been prompted by several important discoveries (NGF, sprouting in CNS, etc.) and non-invasive techniques (fMRI, PET, TMS) that became available to study these issues in humans. Transcranial magnetic stimulation has been used since 1912 to stimulate the motor cortex. Although chronic muscle pain has profound functional and socio-economic implications, our knowledge of basic aspects of muscle pain is limited. The majority of hypotheses have targeted the peripheral and segmental spinal mechanisms, and their involvement in the generation of the chronic pain state. Functional implications of muscle pain on motor performance have been implicated, raising the question whether chronic muscle pain is the result, or the cause, of the abnormal muscle activity. Cortical changes may play a role in precipitating or sustaining chronic pain states. He described how transcranial magnetic stimulation (TMS) can be used to study patterns of brain reorganisation, and some of the mechanisms behind these changes in chronic muscle pain. The importance of identifying situations, whether plasticity plays a beneficial role or is maladaptive in terms of functional compensation, was stressed.

Concluding Remarks

Jason Devereux compared the demands of action and intellect. He discussed bio-mechanical mechanisms, physiological mechanisms, neurological mechanisms and their interactions with central systems, with both normal and pathological activation. In the context of working life, he highlighted the timeline problem,

following a worker from contracting of signs or symptoms, taking time off work, and then returning; but with progressive symptoms, becoming a patient and possibly changing belief models about their health, becoming unable to work, disabled, and then becoming legal cases.

Workshop Participants

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 Mikael Bergenheim, NIWL, Sweden
 Sidney Blair, Loyola University, USA
 Jason Devereux, Surrey University, UK
 Jaap van Dieen, Free University of Amsterdam, Netherlands
 Mats Djupsjöbacka, NIWL, Umeå, Sweden
 Richard Ennals, Kingston University, UK
 Nils Fallentin, National Institute for Occupational Health, Denmark
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 Uwe Windhorst, University of Göttingen, Germany; NIWL, Umeå, Sweden

5. Governmental Actions as a Means of Improving the Working Environment

The workshop was led by Pia Zätterström, and held at the Office of the Swedish Trade Unions in Brussels, 17–18 April 2000.

Pia Zätterström argued that the need to prevent ill health and improve the work environment has not decreased. The 1990s were a silent decade due to recession and unemployment; in recent years there has been an increase in reported work-related illnesses, including stress, and increased sick leave. This results from change in working life, new technology and man-machine interaction, and short-term employment contracts. Musculoskeletal disorders and hypersensitivity, with

dangerous machinery, continue. Environmental concerns include work environment. The rest of life is affected by the quality and management of working life.

Steering by Rules: New Trends in Legislation and Supervision

Bertil Remaeus noted that the worst situation is silence. During years of economic difficulty, debate on work environment was suspended; government had to recognise the importance of production and added value. Expected survival levels of children and gross domestic product demonstrate the link between economic activity and human survival. Some production is essential. The balance of work is shifting, from production to service and knowledge, challenging authorities. It is less a matter of limit values, more of work organisation and burnout; old problems also continue. He illustrated human involvement in building nuclear storage facilities, combining low and high technology. The age of employees is increasing; fewer youngsters join the workforce, and older workers carry out particular tasks. With organisational change, industrial employment is declining, but production is increasing. There is a rapid increase in reported stress related diseases.

Steering by rules is difficult without monitoring. The social insurance system affects the levels of diseases reported, but is one of few sources of data. There have been changes: from detailed regulation to framework, from large companies to SMEs, worker protection to working conditions, long term employment to project work, worksite conditions to life conditions, from detailed supervision to a holistic approach, from accident statistics to surveys. Working conditions need to have a base of society's rules of what is acceptable, rather than simply a matter for the market. He considered voluntariness and regulations, and argued that a voluntary approach is no problem for companies that wish to comply, but must be underpinned by standards. Regulations affect the economy at the level of individuals, companies and society. Efficient regulation requires political support, efficient supervision, a legal system dealing with consequences, and acceptance of legal limitations. Productivity and occupational health need to be combined, in an ideal world, where legal limitations are accepted. He considered a study of fatal injuries on tractors without rollover protection and safety systems, showing technical improvements and acceptance that measures were needed, in a context of a series of government regulations. Additional investment cost money, but was socially endorsed. He considered asbestos, and the impact of regulations from the 1970s, which in Sweden appear to have greatly reduced the incidence of asbestosis, but the delayed effects of exposure continued for 30 years, causing mesothelioma. Rules are essential in the process of change.

Efficient regulations provide a neutral competition environment for companies, with regulations as a driving force for technical development, an information channel, and can constitute barriers to free trade. He outlined a regulation model, based on functional requirements, creating increased need for information, leading to increased problems controlling compliance, and changed roles of different players. He discussed the trend to deregulation, reducing standards (the Machinery Directive requires 700 standards). ISO 9000 has led to variations in different sectors to meet specialist needs. Regulation will continue, but with less rules. There needs to be better early warning. A holistic view is needed; rules should have "best before" dates. Developing and issuing rules has an effect on the

working environment, but the rule may not need to be retained after an initial period. It is important to engage management in work environment issues.

Four Years of Dutch Experience with Obligatory Occupational Health and Safety Services

Paul Huijzendveld outlined Dutch experience in changing approaches to health and safety services. Social security costs are an enormous cost. The system lacked incentives, as employers simply transferred costs of sickness and disability to the public insurance system, providing little motivation for prevention and health care. It was important to increase responsibility of employers: facing the financial consequences of sick leave, paying salaries for a year, providing counselling, and paying disablement benefit insurance contributions in full, with levels of obligations linked to levels of disability in their workforce. Sick rate remains high, second only to Sweden.

Employers are obliged to reach tripartite covenants with trade unions and the government department concerned. Concrete results are sought, regarding noise, lifting, RSI and work stress, where large numbers are exposed and major reductions are sought over prescribed periods. Noise exposure numbers would be halved in 3 years, lifting was to be reduced by 30% in 7 years, while fast growing areas of RSI and work stress were set 10% reductions over 2 and 4 years, with new funds allocated. There were new fiscal advantages for purchase of worker-friendly equipment, such as lifting equipment, ergonomic equipment etc. This works well.

Employers are obliged to conclude contracts with a certified private occupational health and safety advisory service. This new system replaced previous complex arrangements. The change followed the European Framework Directive, and is now incorporated in legislation. Coverage is now almost complete, with a slight shortfall in small companies (with 92% having contracts), covering 94% of workers. This was a unique approach to the Framework Directive, with high standards, and the withdrawal of government from service provision. The "arbodienst" has an advisory role, while the labour inspectorate has an enforcing role. Certification is by institutes, a role initially undertaken by the ministry, but then taken to the market. In turn institutes are certified by the Dutch Board of Accreditation. Standards are set by the ministry, through law and ISO standards. Responsibility remains with employers. The expertise of the arbodienst is set out in law, with specified expertise from an industrial medical officer, safety engineer, occupational hygienist and labour management consultant. In each case there are detailed certifications required. Time spent is not specified, but quality is required. Preventive work is a matter for current concern, given market competition on cost. Tasks have been set out: assessment and approval, action planning, sick leave policy, industrial examination, consulting hour service, and restricted pre-appointment medical examinations (for example train drivers). Employers face obligations; for employees the system offers rights, enshrined in contracts.

In the Netherlands since 1998 all employers have been required to have contracts with arbodiensts. One hundred and twenty arbodiensts have been certified, with an increasing number of employees, now over 10,000 (including nurses, safety engineers at all levels, ergonomists and administrative staff). This compares with 300 labour inspectors nationally. He analysed outcomes in companies, in terms of

contracts, by size and required function. Risk assessments by the end of 1999 were still rare (32%) in small enterprises, and only 78% of them have action plans. Sick leave counselling has reached 61% in small enterprises. Medical examinations have reached 30% overall, representing progress from a 0% start. Companies tend to resist unnecessary expenditure, and seek minimum contracts, amounting to 100 euros per employee per year. The market for *arbodiensts* is dynamic, as small firms are being taken over by larger ones, and then by insurance companies, including *arbodienst* services in their portfolios. Occupational disability rates are still high, with 900,000 disabled and return to work is slow, yet unemployment is low and vacancy levels are high. New measures are proposed to stimulate a return to work without loss of benefits.

Steering by Self-Regulation

Jacques Busson described a voluntary initiative of the chemical industry, “responsible care”. The chemical industry provides a large proportion of the EU economy and employment. CEFIC, the Council of the Chemical Industry, is committed to enhancing competitiveness and responsible care, contributing to sustainable development. Members are national, corporate, and affiliates. Responsible care is a commitment to continuous improvement in environmental health and safety, responsive to concerns of the public. It is a behavioural step change in industry and perceptions by the public, in a context where the chemical industry has been ranked with the nuclear industry as an object of criticism. The traditional approach has been to meet the requirements of regulations, but this has led to problems and poor performance. A responsible approach needed to generate ownership and enthusiasm, finding wider solutions, and “doing the right thing”.

He set out a shift to the new ethic. From doing the minimum, there is a concern to do the right thing, with a higher profile. Product obligations are accepted over the lifecycle. Public concerns are identified and addressed. Product innocence is not assumed. There is a right to know information, and experience should be shared. Responsible care is a continuing process, with companies as actors. National associations monitor and promote initiatives, with ICCA and CEFIC checking global consistency, over 45 countries. Fundamental features include commitment to guiding principles (such as lifecycle stewardship), public input and communication, codes of best practices, performance reporting, mutual assistance and experience sharing (a change from previous competitive behaviour), mutual encouragement, logo protection and verification (ranging from self-assessment to second or third party verification). He listed codes of best practice, or guidance documents, covering responsible research and development, activities inside plants (process safety, health and safety, environment protection, waste reduction), in and around plant (community awareness, emergency response, safe distribution, safe transport and emergency response), and about products (product stewardship).

He considered performance indicators, and an implementation timetable concerning key issues from 1998, covering energy, fatalities, lost time injury and absences, heavy metals, waste, and occupational illness. Figures do not include sub-contractors. Responsible care emphasises reporting. Future developments include better involvement of employees, sharing best practice, and widening use in companies, countries and down the supply chain, improving communication with stakeholders.

Governmental Authorities and Efficiency

Sven Ove Hansson declared that the basic issue is whether various forms of regulation and enforcement activities have the desired effects. Effectiveness is the degree to which the objective of the measure is achieved, such as risk reduction. Cost-efficiency concerns the scale of the costs in proportion to the gain. Little is known about the efficiency of various types of measures in this area; we have only fragmentary knowledge about the effects of enforcement on compliance behaviour. He considered development of an evaluation culture, for example in medicine, and changes in treatment as a result of clinical trials. Other policy areas with a tradition of evaluation are advertising and traffic safety. Occupational health and safety has lacked such a culture. Regulation should be in terms of standards setting. Who regulates what, and how? The delegation of regulation to the local level can lead to shopping around; this needs more study. There are political and administrative level issues, with varying degrees of independence. Regulations are often heavy and detailed. There need to be studies across countries and traditions. He considered three principles of priority setting: worst things first, making best use of agency resources and best use of total social resources. Regulations can be flexible, specific, undergo periodic review, adopt positive or negative listing, and round or triangular methods, using warnings. Similar questions can be asked about enforcement: at what level, and with what degree of control? Should there be self-reporting and self-inspection? What is enforced, and how? Swedish inspectorates tend to be stringent, but it is not clear how effective they are.

The presentation summarised how inspections affect compliance with regulations and how they affect final outcomes that these regulations aim at influencing. American studies suggest that first inspections have substantial effects; this does not apply to all companies, and Europe is different. Companies with severe problems fail to respond adequately. There is an urgent need to investigate empirically the effects of various enforcement measures, including different inspection methods and styles. This offers excellent scope for European co-operation.

The Role of the European Union in the Improvement in the Working Environment from a European Trade Union Point of View

Marc Sapir argued for the key role of public authorities in health and safety, both at European and national level. Historically health and safety has been based on protection against diseases and accidents. Intervention has been challenged by companies, on economic grounds in terms of unfair international competition. The case for a tripartite approach is strong: social partnership and good health is good business. Many companies make good business out of bad health of workers. Interventions by public authorities have introduced rights through rules, bringing enforcement, social insurance, public health and experts. He discussed approaches to occupational illness in the Netherlands. There can be worker participation even without trade unions, for example in SMEs. Instruments include support, promotion, research, information and incentives. Health is a moving target, varying between countries, and over time. Working conditions are covered by collective agreements, at enterprise and sector level, and by law. Working time covers definitions of working time and maximum hours. Labour contracts cover

indefinite terms, limited contracts, and dismissal. There is a health and safety dimension. In the European Union, considering articles 100, 118A and 137, he argued that Directives are major achievements, but vague, based on process, and undertaken without a wider European debate. Countries vary in their adoption of radical changes in their transposition of directives, some have made no changes, avoiding local public debate. There has been no integration of health and safety in other policy areas such as employment, women, equality and public health. Interpretation has been left to the Court of Justice.

There is a decline in accidents, but concern in the psychosocial area. How can the law be enforced in the cases of SMEs? How can we respond to the labour market situation and changes in work organisation? Are we reaching the limits of productivity increases? How can we deal with temporary contracts, sub-contracting and the rhythm of work? How can we integrate precarious workers? How can we evaluate present policies?

UNICE have argued for deregulation; another option is self-regulation, with or without standards. There is a growing European Social Dialogue, and a need to discuss collaboration between European states after policies have been agreed. He discussed self-regulation, and debates in ISO. He was concerned about social dialogue only at enterprise level, and argued for sectoral, national and European levels. He considered systematic management, such as through ISO 9000, based on products, and the requirement for continuous improvement and human resource management. Workers should not just be seen as a human resource, but as active participants, with rights to information and consultation. Are standards just there for public declaration? What is the impact of systematic management systems on health and safety and industrial relations? Should they be prescriptive about participation? How can we measure continuous improvement and measure health, for example in the case of asbestos? Surely only workers are the only reliable source of information on health. It is vital to integrate sub-contracting companies, dealing with their liabilities, and to integrate health and safety in the management line.

Future European policy needs to be comprehensive and coherent, linking Directorates-General, Dublin Foundation and Bilbao Agency. Existing directives must be enforced and improved. A European strategy must be supported by national plans on health and safety. We need common indicators, including objective and subjective data. Social dialogue must be recognised as important, with a focus on principles and procedures. European Directives provide the context in health and safety. ETUC are discussing with UNICE representation of workers in SMEs, provision of training for workers and their representatives, and to define priorities for developments in the work environment.

Short Presentations and Reflections

José Ramon Biosca de Sagastuy discussed the philosophy of prevention, based on integration of health and safety in the overall management of the organisation. There is a legal obligation to perform risk evaluation and form a prevention policy for the organisation. Continuous improvement concerns well-being of the worker. Accidents happen, typically, because legislation is not applied. We can consider cases of irresponsible non-care. Why is legislation not applied? Perhaps there is a lack of infrastructure, for example for training workers and managers of SMEs.

There is a need for technical assistance, if legislation is to be performed successfully. Prevention services may be absent in particular countries. Perhaps the Commission should play a catalytic role, showing what can be done, for example through Safety Checks for SMEs. There needs to be a safety culture, with social partners working together, and agreeing not to cross red lights. This needs to start in schools and universities.

Evaluation of legislation is important, but in many cases has not been done by member states. This takes time. Measurement is very difficult. One planned action 2001–5 will be to develop an improved monitoring system, with member states, the Dublin Foundation and the Bilbao Agency. This needs to include prevention education, advertising, and raising awareness of health and safety.

David Gold reflected from an ILO and developing countries perspective. Agriculture, fishing, construction and mining are most hazardous. It is not clear that self-regulation works in such cases. There needs to be a safety culture, but more than just self-regulation. Not all basic ILO occupational safety and health conventions have been ratified in European countries. There are three important ILO Occupational Safety and Health related Conventions. Convention 155 of 1981 covers health and safety at work. Convention 161 covers occupational health services. In the chemical industry, where small mistakes can have major impacts, there may be a case for continuing self-regulation. He stressed the importance of networking, and comparable statistics. He cited the WISE approach with SMEs. ILO has now reorganised the Occupational Safety and Health Branch into the In Focus programme on “safe work”, which now includes both drugs and alcohol and inspection. Intervention needs to be accompanied by culture change, with awareness of criteria for improvement.

Jacques Busson does not see voluntarism as a substitute for regulation. Not everybody volunteers; there needs to be a foundation of minimum performance, exceeded on a voluntary basis. After an accident there will always be a regulation that has been ignored, but this does not help. We need more than regulations: practical applicability and awareness among workers.

Marc Sapir asked about government roles with SMEs. Labour inspectors need to make their inspections effective. He raised the issue of subcontracting, for example, temporary relationships in construction, and permanent outsourcing, for example in the automobile industry. How can these areas be regulated, when small players depend on relations with large companies? Jobs are at risk if health and safety is to be improved. What is meant by efficiency in these small companies, dependent on services provided by others?

Eva-Elisabeth Szymanski saw regulations as essential. Labour inspectors now give free advice to small companies, with positive results. This makes implementation of regulations faster and easier, and is preferable to traditional punishments. **Ivar Levernaas** asked which regulations should be broken, as we cannot obey them all? There is a case for simplification, allowing people to live within the law. Monitoring, co-operation, control and participation are necessary, and underpin the system of internal control, used in Norway and Sweden. Internal control has to be implemented at plant level, often lacking trade union representatives. Without representatives, it is a matter of co-operation between managers and individual workers; there needs to be continuous development of the working environment.

He described Norwegian research on attitudes and regulations, and the need for a combination of both.

Jens Jensen outlined Danish priorities in work environment, emphasising enterprise responsibility for the work environment, a demand for written workplace assessment in all workplaces, and safety organisations in all companies employing five or more workers, meaning commitment to training. Action plans in 1999 concentrated on 10 hazardous jobs. He sketched the position of enterprises whose work environment was poor, and split them into three groups, for the Working Environment Authority: “those who want and are able to” WEA guides, advises and monitors, “those who want to, and need support” WEA guides; “those who do nothing” WEA makes traditional demands. The idea is to target resources on demanding enterprises and important work environment problems, and promote enterprise initiatives, enabling systematic working. The approach is adapted supervision, which helps prioritise, using data from accident records and sector profiles. Lessons have been learned from Dutch experience.

Bertil Remaeus argued for better statistics Europe-wide, providing better tools to enable us to learn from each other. Figures ought to be comparable, supporting a new level of discussion. If management systems are not mandatory, how do we advise those who choose not to adopt them? **Jacques Busson** opposes mandatory systems, and cited the variety of systems and enterprises. There is basic consensus about the elements of a system: planning, policy, organisation, resources, performance indicators, awareness, training, auditing, review for continuous improvement. Trying to go beyond that takes us into company culture and regulatory differences, and involves bureaucracy. This raises issues of control and advice, regarded as separate by managers, involving different attitudes. Management systems need to be owned by industry, possibly certified by ISO or EMAS. German companies implementing EMAS had hoped for less demanding inspection as a result. **Paul Huijzendveld** noted that in the Netherlands fines apply only to companies without management systems.

José Ramon Biosca de Sagastuy saw the case for a Commission Communication. Management systems are the responsibility of employers. ILO guidelines are welcome. The work of the Bilbao Agency needs methodological enhancement. The Commission may regulate accident reporting by member state governments. **Marc Sapir** specified the section of the Framework Directive concerning a management system, not a system of worker supervision, or shifting responsibility to the worker. Participation is important, but not always present. There are questions about certification, when used for marketing purposes. Health and safety is a matter of people, not products.

Summary and Reflections

Pia Zätterström noted agreement on the importance of legislation, with something beyond, tripartite co-operation and workers participation. Advice and enforcement are needed, can be combined, and should be organised. Regarding management systems, legislation sets minimum standards to be met, with additional voluntary commitments. She referred to the mandatory arbodienst system in the Netherlands.

José Ramon Biosca de Sagastuy saw regulations as indicating society's view of what is acceptable; social actors need the necessary tools in order to exercise responsibilities. **Sven Ove Hansson** noted issues with new member states. Enforcement at the European level is tested when materials cross borders. He cited trade in chemicals, where levels of product information varies widely. Voluntary measures can raise standards. Problems may arise in the importing country, and the solution in the exporting country.

Jacques Busson discussed the role of enforcement, to stop free-riders who damage the reputation of an industry. Improvement comes through communication, changing behaviour, work organisation and housekeeping, changing the ambience in the plant. Regulation alone cannot be enough.

Workshop Participants

José Ramon Biosca de Sagastuy, European Commission Employment and Social Affairs
 Jacques Busson, Responsible Care, European Chemical Industry, France
 Richard Ennals, Kingston University, UK
 Ove Eriksson, NBOSH, Sweden
 Roger Falk, journalist, Sweden
 David Gold, International Labour Office, Geneva
 Sven Ove Hansson, Royal Institute of Technology, Sweden
 Paul Huijzendveld, Ministry of Social Affairs and Labour, Netherlands
 Jens Jensen, Working Environment Authority, Denmark
 Jukka Kallio, Ministry of Social Affairs and Health, Finland
 Ivar Leveraas, Labour Inspection Directorate, Norway
 Bertil Remaeus, NBOSH, Sweden
 Marc Sapir, TUTB, European Trade Union Confederation, Brussels
 Brigitte Steck, Ministry of Work and Social Affairs, Germany
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 Maud Werner, NIWL, Sweden
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6. Normative Actions for Prevention of Musculoskeletal Disorders

The workshop was led by Mats Bjurvald, and held at the Brussels Office of the Swedish Trade Unions, 2–4 May 2000.

Australian Comments

David Caple considered experience of musculoskeletal disorders in Australia. There is a federal model, but different approaches to OHS in each state. In the

1980s political and economic environments were changing, with aggressive industrial relations. There was an RSI epidemic, and worries by US employers about introducing standards. There was aggressive debate among the medical experts, on diagnosis, terminology and treatment, to the detriment of workers. Early reporting was encouraged, with media coverage, increasing the number of patients seeking help, providing extra work for doctors, who recommended time off work. Rehabilitation was left to medical experts. Australian Telecom had a major peak of problems in the mid-1980s, and a decline prior to the introduction of legislation in 1988. Why did RSI disappear? There was improved knowledge of what was going on, with improved occupational health and safety in general, and a shift of responsibility to the employer and supervisor. Doctors became more conservative in their practice, reducing premature operations. RSI ceased to be a diagnosis in the late 1980s, replaced by “occupational overuse syndrome”. Umbrella terms were replaced by more specific terminology. New guidelines were introduced on prevention. Those who returned to work adopted strategies to keep pain under control. Some saw the answer as ergonomics, others job rotation or passive exercises: the key was a feeling of control.

Manual Handling Legislation was introduced in 1988 by the State of Victoria, based on a Swedish model. Previously there had been simple weight limits and training requirements: the shift was from prescription to performance. Subsequently a Federal framework document, or Standard, was produced as the basis for state laws. With evaluation, it was simplified. Codes of practice and guidelines were introduced. The 1999 legislation and code of practice were available, linking occupational overuse with manual handling. Legislation has to be complied with, and the code of practice suggests how, with details of risk control strategies. Responsibility lies with managers, not health professionals, and must involve consultation with workers. The *performance based process* involves:

- *Identification of hazards*, through injury reports, workplace audits or inspections, new or altered workplaces, or reports by workers. Responsibility can be shared by designers of equipment.
- *Risk assessment*, based on severity of injuries, exposure of the workforce, and probability of injury. Risk factors include forces, postures, actions and movements, vibration exposure, environmental factors, and work organisation. Why is the problem arising now and here? What is different in particular cases? Governments find work organisation and psychosocial areas hard to deal with, and often seek to exclude them from legislation. The workers involved as health and safety representatives have had some training. Employers are required to document the risk assessment, and justify the strategies adopted.
- *Risk control*, based on a hierarchy of control, with the manager seeking to eliminate or engineer out hazards, in order to reduce exposure, then change work organisation or administration, training. Short and long term strategies are available, and finally there is a “practicability test”, vital for prosecutions. What is the severity and frequency of the injury? What are the alternative ways in which the job could be done? Which would work in the workplace concerned? What is the cost?

In Australia 93% of employers have less than 20 employees, while 7% employ 80% of workers. In Victoria, there has been a reduction in lost days, and in claims. Longer claims incur the majority of costs. The number of workers has increased, and injuries are declining. Employers have to pay for the first 5 or 10 days of occupational illness, and there are disincentives against reporting, with penalties to insurers. Doctors, general practitioners remote from the workplace, are now required to certify how significant occupational causation is for the illness.

He outlined the results of a survey evaluating legislation on manual handling, with greater attention in larger companies. Some take an integrated quality assurance approach, instead of the specialist code of practice. The legislation assumed that employers would follow the process and complete implementation; in practice workers are disillusioned. Smaller employers tend to be reactive, after injuries have occurred. Most employers prefer the quick fix. There is a triangle of safety, quality and productivity; employers are happy to spend nothing, or, if spending, want productivity benefits. Many manufacturing companies have implemented risk control in physical handling. Maintenance and support involve unchanged risks. Commitment of senior management is critical. Low cost strategies are often most effective. Most innovative solutions come from workers. Practicability is important.

He saw future challenges with repetitious static work. There is increasing use of contingent workers, who tend not to be covered by legislation, for heavy and repetitive tasks. Many workers are now unwilling to report symptoms, even when receiving private medical treatment, due to fear of damage to their careers. The legislation covers hazard reporting, and does not depend on injuries. There are compounding influences from public health issues, such as fitness for work and stressors. There is continued scepticism in SMEs: government information is treated as junk mail. Research is needed to validate controlled ergonomic interventions. The recession changed approaches to workers compensation; political change has reduced entitlements. Statistics suggest that the legislation has been effective, but there have been numerous confounding factors.

American Comments

Barbara Silverstein was concerned with the role of regulation, given the extent and pace of change. She considered policy challenges on musculoskeletal disorders, voluntary and regulatory incentives, and the proposed OSHA programme standard. Washington State has taken a different approach from OSHA; she outlined responses from industry and organised labour. The overall context is globalisation. While the EU is harmonising, we need to consider standards between continents. Manufacturing and service industries focus on short-term benefits, as managers focus on quarterly figures. Factories can be closed by multinational fund managers, with dramatic impacts on the work environment.

Demographic factors need attention. The ageing workforce poses new challenges: fewer workers support more people in retirement. This involves elder care, and care for dependents. Workforces are becoming more diverse, with English not necessarily spoken, and literacy levels low. The contingent workforce is growing, but hard to monitor. The skill base is changing: old and new technology skills are needed, for example in construction. In the USA a 12-hour day is now common.

She addressed work related musculoskeletal disorders. Industry asks about adverse health effects? Is it just fatigue and soreness? They cite problems of subjective complaints by workers against the employer. Ageing is said to be normal, and brings discomfort. Each state has a different workers' compensation system, all adversarial. The problem is broad, with 21 million working days lost per year in Washington State. Musculoskeletal problems in upper extremities have continued or increased; research is needed to explain the differences. Attribution is complex, with approaches of clinicians and epidemiologists varying. In the USA, it is taboo to link problems with psychosocial factors. It is preferred to assess the work ethic, belief in a level of pain being associated with a good day's work.

Risk factors are everywhere; what is the responsibility of the employer? Research is now quantifying exposure. There is concern in the USA about dealing with work organisation, as employers do not like governments interfering: they worry about the use of regulations to lock in control strategies. Not all industries can be handled; OSHA excludes construction and agriculture. Can there be a regulation that addresses companies of all sizes? In Washington State the answer is *yes*. Belief systems in small firms are different. Who is to be protected, and to what level? Can business operate with 100% coverage? If acceptable lifts are set so that 75% of women can do the job, does it present problems? What should employers use? Will women be excluded from non-traditional jobs?

In the USA there are conflicting interests, with organised labour generally weak. There is a particular role for professional associations, among the professions associated with medicine. It was hard to separate professional territory from consideration of the common good. The research community have competing claims, and want to retain flows of research funding. Equipment vendors have separate interests, confusing customers regarding ergonomic and musculoskeletal factors.

There is ongoing debate in health management. Is it acceptable to rely on voluntary standards? ISO 6385 on ergonomic principles in the design of work systems has existed since 1981. ANSI has been working on upper extremity standards since 1990. The principle is that if mandatory standards are threatened, industry backs ANSI. Industrial hygienists have been setting voluntary threshold limit values for hand activity level and hand force. Voluntary consensus standards may be most effective when there are economic or political consequences for non-compliance.

How can compliance be achieved? Employers prefer a voluntary approach, but want bad performers to be caught. There are strong incentives for short-term disobedience, but in the long-term it is good to be seen as a good citizen. If there is a lack of incentives for voluntary compliance, co-operative enforcement is not effective. If the agency fails to detect and punish violators, conformism will decline. There needs to be a mixture of co-operation and punishment. Regulation in the USA is not backed by tripartism, so workers have little chance to participate.

Trade associations derive benefits if workers' compensation claims are reduced. Nursing homes experience considerable musculoskeletal problems, and discounts on equipment purchases are offered in support of "zero lift" policies. Washington State's Ergonomics Standard is linked to OSHA definitions of material impairment of health. OSHA has to demonstrate feasibility of the standards in each industry to

which it is applied, and the substantial reduction of risk, with quantitative assessment to the extent feasible. The focus is on general industry, and areas where problems have been reported. Workers need to be trained and involved; job analysis is not needed until injury is reported. Hazard information and analysis, job hazard analysis and control are required, with programme evaluation and record keeping, but there are challenges on constitutional grounds. Work organisation issues are not addressed. The most contentious issues are in medical management, with employer payment of income above worker compensation levels.

The regulation applies to all workplaces with “caution zone jobs” covering duration, frequency and magnitude of exposure. “Grandfather clauses” offer exemption if measures are already in place. There is a requirement for awareness education. There is a choice of general or specific hazard identification methods, catering for the concerns of small employers, who want to know what they have to do to comply. Washington State requires health and safety management committees, and follows patterns in British Columbia.

Voluntary efforts are necessary but not sufficient.

The Role of European Harmonised Standards

Paul Makin works for the European Standards Agency CEN/CENELEC, developing standards, after previous careers in mechanical engineering and the Health and Safety Executive. In 1984 the EEC started work on the single market, based on freedom of trade and freedom of labour. This required a common approach in areas where different local practices constituted barriers to trade, such as machinery: thus the need for a Machinery Directive. SMEs presented particular problems. The answer seemed to be a set of European standards to allow people to achieve conformity without going through intermediate legal stages. It was realised in some countries that ways of dealing with machinery safety did not reflect modern trends. In the UK, the same basic laws had been in place for decades, and did not relate to the circumstances of modern robots. A group of experts, starting in 1985, have been involved in both the Machinery Directive and safety standards, resulting in a coherent body of legislation and standards.

Annex 1 of the Machinery Directive contains safety information, setting out principles for the design of safe machinery. Essential Safety Requirements define legal requirements, which the standard gives the means of meeting. ESR 1.1.2(a) calls for safety integration, covering fitting for function without risk *under conditions foreseen by the manufacturer*. This covers all phases of the life cycle of the machine. There is always a residual risk, so all risks should be eliminated wherever possible, otherwise state of the art, technical and economic considerations have to be taken into account. In some cases, therefore, a complete solution will not be possible. The requirements on the supplier of the machine are onerous. Under ESR 1.1.2(b) Suppliers were given strategies: eliminate or reduce risks, take protective measures, inform user of residual risks and any training or protection that should be provided. He presented a logic tree, going from hazard identification to risk assessment (based on judgement), and an action plan to minimise or eliminate by design, provide protection (against hazards and risks of

all kinds) and provide information (compulsory). Information is a key feature in all phases.

The Commission determined that a set of standards was needed in support of the Machinery Directive, involving European experts. He was determined to defend UK standards against dilution, but found that other national representatives had corresponding commitments. There was a danger of proliferation of standards, and it was agreed to develop a programme of 250 standards (now 800). There needed to be general principles, information, hardware, and machine specific. The resulting standards have ISO recognition, and adapted versions have been used for financial risk management. He addressed issues of terminology, vital in the EU with 11 languages. The set of standards represent the building blocks for all aspects of machinery, reflecting the attempt to deal with all known hazards and risks. Within the coverage of hardware, all machines need coverage, ranging from hand-held tools to industrial plant. The task is half completed.

In order to achieve a successful harmonised standard, you need to understand directives, have knowledge of machine design, have access to information on machine use, accident data (often anecdotal, with inconsistent statistics), and knowledge of how standards are made. Typically manufacturers know little about how machines are used, so users and trade unions need to be consulted. The CEN standard constitutes a statement of the state of the art, but has yet to be tested in law. The hardest problem is deciding where to draw the line, possibly with a regulation or law, but at a possibly higher level the “tolerable risk” (which society is prepared to live with).

There are legal problems in Europe. He outlined legal requirements for machine use, combining the requirements of the Machinery Directive, and minimum requirements on use, involving a wholly different régime, with a different DG, based in Luxembourg. Although intentions are good, systems and philosophies are different. He considered the design process: the performance requirements of the machine, how the machine will be used, what legislation will apply, what safety information is available, and where.

Dutch Comments

Aleid Ringelberg outlined the Dutch situation. In 1985 there was no legislation on musculoskeletal disorders, manual handling and lifting, while other countries had laws. In the European context it was important to develop policy, standards and legislation. In 1988 the Dutch government and standards institute began work, in association with other countries. A policy was developed, with associated research 1988–1993, raising awareness of risks. TNO have undertaken longitudinal work on effects of loading, following 2,500 people. Political priorities have changed, but there is now research on the effectiveness of interventions. School textbooks are beginning to take account of ergonomics and the importance of posture.

In 1992 working conditions legislation was introduced. In 1994–8 this was linked to social security, with an obligation on employers to contract occupational health and safety services. Deregulation was seen as important; in 1996 working conditions were evaluated, with little deregulation. Stress at work remained part of legislation, inspectors can charge on the spot fines. Employers welcome punishment of those employers who fail to meet their obligations with respect

to matters such as asbestos. There has been a search for commitment from social partners, and sectoral declarations have been prepared, regarding preventive measures on lifting, RSI, reintegration and rehabilitation. Quantitative formulations are required, with monitoring of progress, leading to agreements. Voluntary agreements are favoured where possible, with the capacity to fine employers as a fallback provision. There are obligations for workers: to inform themselves, and co-operate with employers on working conditions policy. Musculoskeletal disorders are seen as a political issue, comprising 30% of the 900,000 disabled people. There are attempts to address the 30% with psychological disability, and there can be overlaps of diagnosis. Disability pensions are not linked to work. There is concern for the elderly and young workers. Legislation is based on broadening the Manual Handling Directive, without enforcement measures.

She discussed European standards development on machinery safety, and problems in linking machinery safety and ergonomics. She described progress on standards on manual handling, and the application of ergonomic standards, using work done by TUTB.

TUTB Comments

Marc Sapir introduced the work of TUTB and ETUC. Musculoskeletal disorders form part of the core agenda. From an historical perspective, health and safety has been based on protection from accidents, there is now a broader view, encompassing healthy work, and mental well-being. It is a moving target, involving external input into the workplace, complementing the contract, with a role for public authorities and social insurance, and expert interventions. He was concerned about the role of workers in consultation, both victims and essential actors. Public authorities need to enforce legislation and provide support for improvements in the working environment. The role of regulations in the context of international competition has been critical, with a search for social compromise: the basis of social dialogue in Europe. In the UK it is argued that good health is good business, but others make money with bad working conditions.

The EU is a public authority, with treaty articles on trade and social harmonisation. Trade unions want a common social background across Europe; the separation of trade and social rules involves a grey zone. WTO is currently debating French and European approaches to banning asbestos, with decisions due in July 2000. In the EU Directives are sent to member states; what happens next? It is hard for social partners to discuss problems at national level. The Framework Directive has recognised many of the problems of design; more work is to be done. It is hard to collect comparable statistics, but there is a decline in accidents, with some exceptions. It is hard to address and measure levels of worker satisfaction.

Changes in the labour market, and deregulation, have increased exposures to risk. Jobs and contracts can depend on an absence of complaints. SMEs are widespread and fast-changing. It is hard to develop long-term approaches to investment and training. Technology does not bring automatic improvements. UNICE seek further deregulation, and favour self-regulation.

After 10 years of the Framework Directive, we need a higher profile from public authorities on work environment. We now need a European Commission programme on working environment, involving the Dublin Foundation and the Bilbao Agency. There need to be national programmes. The Commission needs to enforce the present Directives. Guidance is needed on transposition of Directives into legislation. The ergonomic field is new, and needs national level instruments in addition to law. More progress has been made with the Machinery Directive, with sets of questions and answers, helping feedback. There need to be common indicators.

ETUC has a campaign on musculoskeletal disorders at European level, which has been intellectually challenging. It is hard to establish that pain is work-related; raising awareness is important. Musculoskeletal disorders are at the borderline between traditional and new areas, including stress. TUTB has published work on women at work, and wants experience of applying current Directives, taking account of repetitive aspects. There is knowledge on which to build. There is more to be said about technical standards, in terms of the workers' experience, an essential component of ergonomics.

British Comments

Malcolm Darvill and **Claire Dickinson** of HSE reviewed the situation in the UK. HSE provide regulations, advice and enforcement, with an emphasis on prevention, rehabilitation and research. There have been changes under the new government, with integration of public and occupational health. The shift has been towards evaluation, partnerships and a holistic approach: Tony Blair sees improving health as everybody's business. HSE works with the UNISON trade union on musculoskeletal disorders among cleaners. The TUC have been working with Backcare in providing union safety representatives with a body map approach. The insurance industry is working with employers, developing a code of practice. HSE and the Department of Health have worked together on Back in Work and linking with medical practitioners in addressing standards of medical management. The holistic approach goes beyond prevention, to diagnosis, treatment and rehabilitation, with improved and faster delivery.

He highlighted the significance of RSI, and media obsession with keyboard problems, while manufacturing industry faces many other sources of difficulty. He emphasised the need for partnership and collaboration, and noted that cleaners had not previously been studied. The new government agenda emphasised inequality. There are political and economic drivers for policy development, and increased awareness of problems such as back pain. 40% of adults experience back pain for more than 1 day, and 5% of these had experienced work loss in the previous month, amounting to 11 million working days lost, costing £5 billion. A central concern is sickness absence, mirroring Dutch experience. The law changed in 1994, moving responsibility to employers for the first 28 weeks. In the public sector there are targets for reductions in sickness absence. There is usually an underlying health reason. A new concern is the cost of early retirement in the public sector: musculoskeletal disorders and psychosocial problems are key reasons.

The UK record on safety is good; the record on health is harder to defend. In the early 1990s HSE conducted a health risk review, and concluded that musculoskeletal disorders and mental health were among key issues that needed to be addressed. There are different definitions of occupational health, including getting the disabled back into work. A new national occupational health strategy is based on five key programmes. The first programme concerns *compliance* with key requirements of Directives. There needs to be *continuous improvement*, integrating prevention, diagnosis, treatment and rehabilitation. A programme of *knowledge* is needed, for government and small businesses, and a standardised approach to collecting data. *Skills* are needed by stakeholders, with suitable *support systems*.

Lessons have been learned from Australia and New Zealand, where there had been a rise in problems. The USA General Accounting Office, at the time of the failed OSHA Regulation, produced recommendations on what was needed to effect change. Government published inputs, for example on manual handling in different sectors, are important. SMEs will read little more than free leaflets. He outlined a pilot continuous improvement, healthy workplace programme "Back in Work", run with the Department of Health, aimed at reducing back pain in the workplace, irrespective of cause. A simpler title was needed than "musculoskeletal disorders". There is a separate programme for Scotland. Awareness is to be raised, developing good practice, improving access, and encouraging early return to work. Projects are state funded and will lead to preparation of good practice guidance on back disorders.

She discussed clinical guidelines, from the Royal College of General Practitioners, with further guidelines for the Faculty of Occupational Health and the Insurance Industry. Instead of bed rest, sufferers from back pain should be advised to stay active, and be referred to particular specialists. Psychosocial issues are to be considered. GPs have been issued with "The Back Book", by Kim Burton, Gordon Waddell and colleagues. There is debate about the effectiveness of following guidelines, and using advice literature. Success depends on agreement of stakeholders to the conclusions.

For the past 5 years, HSE has been promoting the economic benefits of tackling musculoskeletal disorders through its "Good health is good business" campaign. Prevention of musculoskeletal disorders is part of the programme. Use is made of media and TV, but conveying the concept of musculoskeletal disorders in TV advertisements proved difficult. The next phase of the campaign is "making it happen", following the information with more enforcement. There is a need for commitment and action under "Working well together", another promotional campaign for the construction industry, seeking corporate commitment, making use of websites and other technology. Companies develop action plans, and there is publicity, sharing knowledge.

He discussed regulations, implementing Directives and remedying previous deficiencies. The key need is for enforcement. The previous government was Eurosceptic and in favour of deregulation. Devious practice was common, for example in rail companies, blaming European regulations for problems caused by staff shortages. Inspectors held back, in line with the political atmosphere. He presented an evaluation of the manual handling regulations, showing that large

companies complied, with employee consultation in the best cases, but less awareness among SMEs. The ergonomic approach to risk management was progressing. There was less sickness absence, less product damage, and improved consultation.

She discussed compliance and enforcement, with examples from HSE open learning material and voluntary sector projects, notably the Chemical Industry Forum, with benchmarking, sector participatory initiatives, enforcement notices and prosecutions. Few prosecutions take place, but are increasing. A recent prosecution for upper limb disorders arose from safety boots manufacture, with numerous psychosocial problems, matching problems noted with supermarket operators some years before. It was difficult to convey the problems in comprehensible language. Current legislation is adequate for taking such cases, but organisation and psychosocial issues are less easily addressed. She considered current research initiatives, and a national research programme across the field. They want a push-pull assessment tool; NIOSH and CEN/ISO evaluation; psychosocial factors; carers case studies; medical assessment tools; impact of civil court judgements; review of insurance claims; exposure tool evaluation (at the Robens Institute).

Companies see tackling musculoskeletal disorders as a burden. Partnership and measures to improve awareness are needed. The targets are ambitious. HSE do a great deal with a small number of staff. The UK approach for tackling musculoskeletal disorders is moving beyond work-related musculoskeletal disorders and prevention, seeking to tackle musculoskeletal disorders in the workplace by a wider holistic approach including rehabilitation and treatment.

Nordic Comments

Vibeke Andersen reported on the Danish situation, and work on musculoskeletal disorders since 1975, with a series of regulations and campaigns. The basis is now EU Directives. In some cases, Danish regulations were stronger. She circulated illustrated material, and outlined ten-year plans. Targets include reduction of musculoskeletal disorders, but after considerable efforts it is hard to see improvements in practice. There are problems with pressure for increased productivity, inducing stress. Forty-eight guidelines have been developed, one for each sector, incorporating musculoskeletal disorders, emphasising participative design. It is a matter of making knowledge usable at the enterprise level. Enterprises value receiving a good evaluation of their performance in safety and its management, with an initial traffic light division into three categories, and enforcement concentrated on worst performers. The Danish approach is tripartite, which helps at implementation stage. EU Directives are more detailed in their requirements than NIOSH. Employers recognise that there is a problem, and have accepted action plans concerned with repetitive work. Research concerns work cycles, and political judgements are made regarding the length of exposure to be tackled, taking into account issues of self-control over the pace of work, and involvement. Employers welcome active inspection. There may be a resulting regulation on repetitive work; an EU lead would be followed.

Lisbet Samdal-Høiden described the situation in Norway, from a perspective of the labour inspectorate. Funds are declining, and pressure is increasing, for her

group which includes psychosocial work environment. 400 inspectors in 13 districts deal with 240,000 enterprises. Co-operation is essential. The goals are a sound and healthy work environment for all; safe, sound and meaningful work. Labour inspectors are proactive in encouraging enterprises to work towards achieving improved standards. There are 60 work-related deaths, 35,000 injuries and 3,500 disease cases each year. Musculoskeletal disorders are a large part of the problem. Ergonomic factors are a major problem, with agreed problem definitions. Over half of sick leave in institutions for the sick and elderly is due to musculoskeletal factors. The main regulations are the Work Environment Act and the full contents of the Manual Handling Directive, implemented in 1995. Heavy and repetitive or monotonous work are defined, but without quantification. There is a code of practice, with preventive measures and risk assessment, using the traffic-light approach. The focus has been prevention, which represents a change of perspective for some inspectors. Campaigns are followed up by inspection and enforcement, in a context of international standards and regulation. Short-term absences are reducing, but longer term absences are increasing. Norwegian development measures came from agreements between employers and workers, and are incorporated into regulations, covering training, rotation and organisation of working groups. Risk assessment is tightened through internal control, with legal requirements to assess tasks, loads and individual abilities. Organisation of work tasks is vital, covering production methods, task distribution, etc. Monotonous work is tackled by job enlargement, technical aids and variation, with more rest and increased degrees of freedom. An evaluation was conducted in 1996, assessing knowledge levels, showing 80% familiarity among the occupational health services with the Directive on Manual Handling, with 41% using them and finding them useful. There is a national project to reduce regulations, so any regulation needs to be clearly justified.

Hannu Stålhammar spoke from Finland, where he has worked on musculoskeletal factors and ergonomics at the Institute for Occupational Health, before moving to the Ministry of Social Affairs and Health, a Bilbao focal point. The department of occupational safety and health works with employers and trade unions, with 82 staff, 11 inspectorates with 450 staff, and 30,000 annual site inspections. Occupational diseases are falling. Demography is critical, with an ageing population, declining numbers of children, and decreasing working population. The strategy is to promote work ability of workers, promote mental well-being, prevent occupational diseases (especially musculoskeletal disorders), and prevent occupational accidents. This requires good management, good safety culture, and co-operation between employers and employees.

Ageing and occupational health and safety are both important in the context of musculoskeletal disorders. He outlined the Work Ability model, as presented at an earlier workshop by Juhani Ilmarinen. He linked health, physical work environment, psychosocial work environment and professional competence. Inspectors have an average age of 53, and need to be sustained. He saw EU Directives dealing with high levels of safety in the future, with real implementation in the member states. Accidents and diseases should reach zero level, with attention to safety culture at work, mental well-being, occupational health and safety management, and market control of new products.

Karin Hedén reported professional and personal experience from Sweden, stating a preference for voluntary approaches, but argued the case for regulations. Standards are almost rules. In Sweden there has been emphasis on controls. Sweden had rules on musculoskeletal disorders in 1983, revised in 1998 in the light of new knowledge, and a demand for more quantitative guidance. She provided examples of particular areas, including VDUs, checkouts and private homes. Working life from primary school to the grave is covered, though some clauses do not apply to children. More was needed on variation, job decision latitude and organisation of work. Repetitive work is not allowed. There are further non-employer responsibilities, covering employees, manufacturers, building commissioners, site managers, partners and contractors. The first regulations increased reported levels of diseases. In 1998 new regulations were introduced, and figures are rising. The trade union campaign for reporting produced increased figures before the social insurance legislation changed. The general underlying pattern is similar to that in Finland. There are regional variations in diagnosis. There are particular increases in health services and schools, linked to restructuring and stress. The European Commission had felt too much was voluntary, and not enough obligatory, so there is now an additional regulation in 2000, which satisfies the Commission. She described the situation with physically monotonous work, which appears to have changed little, according to the labour force study. Heavy lifting has declined, except for women in health care.

So, what is the power of legislation compared with market forces? The inspectorate have moved to surveillance of internal control, functional requirements, but new regulations are clearer in what is required. Campaigns have been used. Projects have dealt with specialist topics. It is hard for inspectors to focus on both stress and musculoskeletal disorder. She considered appeals over space for toilets in health care, beds against walls in health care, stairs as transport routes, and work in checkouts. How can market surveillance and understanding be improved?

German and French Comments

Jean-Pierre Meyer outlined changes in working conditions in France, based on a survey of 20,000 workers. The clearest increase was in pressure to work fast due to external demands. He regarded this as important for musculoskeletal disorders and risk at work. Quality is seen as a threat, obliging people to work faster through psychic repression. Some re-engineering for quality has been a focus in 80% of factories, with an increase in work and a decrease in salaries as a proportion of the cost of goods. The ageing population presents further challenges, with an increased group aged 40–50 working through, with both men and women.

He outlined the system of tables covering key diseases, which have to be agreed by specialists, covering musculoskeletal disorders: vibration, white fingers, osteoarthritis and back pain. These involve expert agreement, compensation by the employer, and treatment by individual occupational physicians, covering all employees, including temporary workers. The tables cover different illnesses over time, as they are accepted, with a particular increase in specific named illnesses from 1991, covering movement repetitiveness. He demonstrated the musculoskeletal disease table, working from declarations within 7 days of exposure. Overall diseases per year were 11,500 compensated cases per year, with about 6,500 in upper limb musculoskeletal disorders. There is a huge problem of asbestos in

France. He compared incidence levels across the country. Analysing different body areas, the wrist and hand were the most common, with different ratios wrist/shoulder according to industrial sector. Injuries run at 673,000 per year, with 713 deaths and 25.6 million days lost in 1997, compared with 1.37 million days, and 92 deaths, for diseases. Prevention is largely technical, against injuries. The number of days per case can be large in compensated cases. Trade unions are campaigning for more declarations of illnesses, previously unpublished.

The tables are almost unknown by the public, and physicians question the links with work, so declarations by physicians have little value. Often workers do not ask for compensation, as this may cause risks to their work. Assessment is not easy for inspectors. There are large surveys covering musculoskeletal disorders, but different tools for assessing risks. Ergonomic guides focus on organisational aspects, with few guides dealing with physical aspects. The objective of simple guides is to influence work allocation, giving heavy work to young people. The power of knowledge has yet to be applied; too many tools are too complicated. Both drafts and guidelines are needed.

Ulf Steinberg, from Germany, works with the Ministry of the Interior, having previously worked on musculoskeletal disorders. There are 37 million employees, 4 million unemployed. Many workers are in SMEs, and many handle heavy loads. Responsibilities are divided between federal and state levels, with 16 ministries and 40 departments of work safety, concerned with workplace supervision. There is accident insurance, covering industry, agriculture, and civil service. These cover compensation, prevention, and making new laws. Health insurance covers treatment, continued payment of wages, and prevention of work-related diseases. Social partners are involved, and with different perspectives. Employers and workers are interested in money, while trade unions want improved standards. There are then researchers and standards organisations.

In the past decade German ergonomic standards have been improved, but the number of cases has stayed about the same, according to major surveys by insurance companies. Major costs are caused by musculoskeletal disorders. Classifications do not pick up details of musculoskeletal disorders. Accident and health insurance systems are different. A quarter of early retirements are due to musculoskeletal disorders. Regulations vary across Germany, with a proliferation of laws, decrees, regulations and standards. There are obligations to evaluate and document risk, reduce risk and consider the aptitude of the employee. Percentages and rates of compensation vary according to the disorder. Legislation can influence working conditions, and not the level of illness itself. There can be many reasons for health problems, including lack of exercise. Problems can arise either at work or in leisure time. There are particular problems with SMEs, which may require changes in regulations. Employers and employees need more knowledge, rather than just legislation. The aim of changing legislation needs to be optimal loading. A new approach is possible, if we switch focus from disease to health.

Concluding Discussions

Per Langaa Jensen discussed how to influence working life through governmental intervention, to reduce musculoskeletal disorders. The market is the primary regulatory mechanism. In recent years contracts have taken on new significance,

with new power relations in the workplace. Employers are buying muscle and knowledge. The idea of regulation is that a firm consists of actors in an organisational structure, dealing with inspectors, occupational health services and insurance. Decisions are made about productivity and working conditions, in the context of the market and budget inputs. The traditional approach is command and control, establishing rules and a state agency, with sanctions against non-compliance. Parliament sets out a general programme in terms of good working conditions, and monitoring procedures. Assessment is needed, and strategies for enforcement. In capitalist countries the move has been from detailed specification to performance specification and system specification. Performance specification will relate to functions in production, without too much advice. The Framework Directive constitutes system specification, targeting management approaches. Examples are internal control in Norway and Sweden, and workplace assessment in Denmark. The question is what comes next. Should the advisory services be voluntary, as in Sweden, when it does not necessarily work, or should there be a mandatory element?

What are the emerging requirements to address musculoskeletal disorders? He considered implementation processes, and the context of policy formulation. He noted the importance of conflict, causal theories, symbolic actions by politicians, and the amount of attention given to the issue. There are battles between organisations concerned with implementation. Often street-level bureaucrats continue as before. The target group is important, and the more the legislation relates to the target group, the more likely it is to succeed. So what are the processes in each country?

Newer approaches use economic incentives, mutual adjustment, knowledge, values and norms. It is assumed that the possibility of profit drives managers, without transaction costs. Benefits may be in terms of reduced insurance rates for “good guys”, which can mean income for safety managers for keeping sick people at work. State support is another possibility, restricted by European law. Fines tend to be low. Mutual adjustment can involve third-party audit and common conditions, with a stakeholder orientation. Knowledge is seen as important by universities, affecting behaviour and actions more than economics: there can be campaigns to address the good in people. Values and norms were stressed, involving issues of social responsibility of enterprises, often not including occupational health and safety. There is a regulatory field, with different available approaches; no one approach is ideal. He returned to the model of the firm. Small firms are not a new development: regulators have the problem of meeting their circumstances. Harder problems include contingent working, part-time working, and subcontractors. Does the old picture work, or do we need a new one?

Paul Makin tested the understanding of “normative organisations”. What is the role of government legislation, including guidelines, to counteract musculoskeletal disorders?

What is the role of government legislation to improve musculoskeletal health? What is the role of European harmonised standards when preventing musculoskeletal disorders? What is the role of ISO standards when preventing musculoskeletal disorders? Are new regulations or standards, either on European or national level, a productive way to deal with the problems? Can an enforced

European or national activity, targeted on the adverse effect of the ergonomic risk factors, make a substantial contribution to the reduction of the musculoskeletal problems? Which are the major obstacles for governmental intervention actions to be successful? Which are the essential elements of an effective regulatory and supervisory approach to improve musculoskeletal health? What can be done, both at national and European level, concerning new regulations, standards, official guidelines and supervisory activities? Should musculoskeletal issues be addressed specifically or as part of a more general approach, like the internal control concept? What is the role of normative and mandatory actions compared to voluntary actions, like guidelines? Is it possible to initiate and stimulate positive change processes within organisations by force, e.g. by normative actions? Is it possible to use information as the only means to solve the musculoskeletal disorders problems? Are there positive examples of successful normative actions: regulations, standards, supervisory approaches, campaigns, etc.?

Mats Bjurvald presented a summary of the discussions. A report is needed on the implementation and enforcement of the Manual Handling Directive and monotonous and repetitive work. He asked whether there is a need for more regulations, or are there enough? Should there be a Directive on Repetitive Work, for example? Can we expect common weight limits? There needs to be a systematic approach, but live rather than just based on publications. Worker participation is essential. Tripartism is recommended. Command and control has to be balanced with alternative approaches to regulation. How do we know whether our efforts are effective? Better evaluation is needed. At the design phase, there are issues with CEN standards; and a shift to a more global approach, with a different perspective on ergonomics in market surveillance; and increased importance of consumer influence. These conclusions depend on increased knowledge and awareness. Education and training are vital, and non-experts need to be addressed. Senior engineering company directors lack a background in ergonomics. There are problem areas: SMEs, contractors, contingent workers, globalisation and ageing.

Workshop Participants

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David Caple, David Caple & Associates, Victoria, Australia
Malcolm Darvill, HSE Policy Unit, UK
Claire Dickinson, HSE, UK
Anders Englund, NBOSH, Sweden
Richard Ennals, Kingston University, UK
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Hannu Stålhammar, Ministry of Social Affairs and Health, Finland
Maud Werner, NIWL, Sweden

7. Rehabilitation in Coronary Heart Disease

The workshop was led by Åke Nygren, and held at the Office of the Swedish Trade Unions in Brussels, on 3–4 July 2000.

Åke Nygren works with large international epidemiological databases, and started with insurance data on absences due to heart disease among blue-collar workers in Sweden, showing a marked increase in all areas, including stress, since 1997.

Risk Factors for Coronary Heart Disease: Implications for Rehabilitation

Risk for Coronary Heart Disease: A Developmental Perspective

Liisa Keltikangas-Järvinen reviewed prospective cohort studies, 1966–97, taking a developmental perspective. Hostility has been identified as early as subjects can describe themselves. Depression can be traced from one year old. She reported on a study of 3596 young Finns, followed for 20 years. There is no solid evidence regarding childhood depression as linked to coronary heart disease (CHD). Correlations of risk factors in healthy children are different from work with adults. She identified a range of correlations between Type A behaviour and various measures, including waist-hip circumference ratios in boys. Numerous links were explored, with few clear conclusions with respect to prevention. Follow-up work has been used to predict Type A behaviour in adulthood, and temperaments were studied. Hostile child-rearing practices were studied, where the child was seen as a burden, there was emotional rejection, and strict disciplinary style. Family atmosphere was also studied. Type A behaviour in boys was predicted in the mother's involvement in work, satisfaction with work but dissatisfaction with maternal role, while for girls the last factor was vital. In girls, hostile attitudes resulted from earlier hostile child-rearing and perceived difficult temperament (anger, hostile activity and lack of co-operation). Regression analysis established strong links for boys with job involvement and role dissatisfaction by parents. Depression at adulthood in girls and boys was similarly studied, again showing more links with job involvement in the case of boys. For girls, social support was important.

In general, there are gender-related risks in the experience of young people. For boys, the child-rearing attitudes of mothers were centrally important. Boys appear

more vulnerable, more sensitive to a negative environment. Family cohesion was important; both parents are relevant. Type A people are likely to marry those with similar characteristics. She cited previous literature in support of these findings. Hostile child-rearing practices present a range of risks. What are the particular risks of cardiac disorder? How significant is the inherited temperament, the child's characteristic response to environmental stress? The Swedish longitudinal study linked childhood behaviour with adult health. Finnish work on impatience, mental vitality and negative emotionality has provided more data. More research is needed on other characteristics that could help understand childhood stress and subsequent cardio-vascular disorder.

Person Characteristics: Vital Exhaustion, Depression, Hostility

Ad Appels discussed research over the past decade, linking depression with myocardial infarction: often labelled as burnout or exhaustion. An endocrinological approach can be helpful, linking depressive symptomatology and exhaustion to heart attacks, and might be used for cardiac rehabilitation. Long-lasting stress can lead to hyper-activation and hypo-activation of the adrenal axis. There is increased activity from melancholic depression and chronic stress, suppressing immune mediated inflammatory reactions. Atypical depression, chronic fatigue, post-traumatic stress disorder, and nicotine withdrawal are associated with decreased activity. Most coronary patients have mental states reflecting hypo-activity. He presented clinical and empirical evidence, and explored the implications for rehabilitation. With "I want, but I can't" the patient lacks the energy to carry out his plans. Mood disturbances are not present most of the time; distorted depressive cognitions are usually absent. "Loss of energy" is related to effort.

Depressive symptoms are not predictive of CHD when controlled for exhaustion. Exhausted subjects have particular endocrinological characteristics. Epidemiological studies show vital exhaustion as preceding CHD. He cited evidence from the Rotterdam Civil Servants study, with myocardial infarction (MI), and both fatigue and depression preceding MI. The factor with highest predictive power is fatigue. He analysed figures of salivary cortisol, blood coagulation and fibrinolysis. CHD is an early morning occurrence, and blood coagulation is higher in the mornings. Exhaustion is subjectively defined: as with pain, it defies objective measurement. Comparisons were made between exhausted and not-exhausted patients, correlating endocrinology with mental states.

There are implications for cardiac rehabilitation. Cognitive and behavioural therapy should address the causes of exhaustion, and not distorted cognitions. This means dealing with hostility, loss of control, self-imposed demands, and time pathology. It means stimulating rest, accepting and coping with tiredness. To what extent could these characteristics be seen as distorted cognitions? Angry people tend to exhaust themselves. Research has explored heart rate variability, showing increases in power in the intervention group, compared with the control. The importance of prolonged stress is seen as critical, both to the heart attack and rehabilitation.

There have been studies of Baltic States inhabitants, compared with Scandinavians, where depressed cortisol levels were significant; the key difference was exhaustion. Reactivity during experimental tests was inhibited, suggesting depression and exhaustion among Lithuanians. The two groups need to be separated; hard for a cardiologist, but possible with circadian rhythm, using saliva cortisol.

Working Life

Töres Theorell noted that working life is an important part of the life cycle; work helps define identity, is decisive for many aspects of life, but does not explain everything. His work included 11 years in cardiology, before moving to psychological medicine. Work environment, coping behaviour, genetic background, previous experiences and reactions are all linked. He cited Finnish work on feelings of mastery, linked to a good work environment. His work with older people demonstrates that childhood experience is not the only factor. He considered locus of control, based on adult experiences. He showed ECG readings from conversations with myocardial infarction (MI) patients; topics associated with work could have marked effects.

He described two widely used models used in work environment work, together with physical factors such as carbon monoxide exposure, and other chemical compounds. He had conducted a literature review of the significance of work environment in cardiac rehabilitation. There are limits to what the cardiologist can do to change the work environment. He described follow-up studies on MI patients who returned to jobs with demand and little control. He presented the demand control model, highlighting decision latitude. Job strain has been related to ischemic heart problems. High decision latitude protects against further MI. He gave a critique of a series of studies, including from the Czech Republic, Sweden (including the SHEEP and WOLF studies), and the UK Whitehall Study. Demand seems to be important only when decision latitude is low, and in several studies it was of no observable importance.

He showed a graph of changing decision latitude, with age. He considered effects of loss of control, using data from several studies. He discussed relevant mechanisms, suggesting important physiological pathways. Job strain is hard to correlate directly with blood pressure measurements. Ambulatory measures are needed, linked to family histories and other characteristics. Sleep disturbance increases with job strain, linked to declining testosterone, and aspects of the immune system. He considered the significance of low decision latitude. The material is complex, and data is acquired through subjective and imputed measures, taking occupation, age, gender and length of work experience. Sending patients back to a bad work environment can be dangerous. He cited German studies of benefits of continued activity, and the significance of socio-economic status.

He gave an overview of the effort reward model, which also takes into account individual factors. Rewards include prospects for promotion, and self-esteem. This model has been related to heart disease, with bad balance between effort and reward predicting increased risk. He described an intervention study of bosses in the insurance industry, who tend to know little about psychosocial factors, but

whose knowledge can be improved, which was associated with increased decision latitude and decreased plasma cortisol among employees in the experimental department. He estimated that 7% of male, and 13% female MI could be prevented or postponed through appropriate measures in the work environment, less than the corresponding effect of smoking cessation, but comparable to lowering of high cholesterol and lowering of blood pressure.

Psychosocial Predictors of Return to Work After Myocardial Infarction

Juhani Julkunen noted that return to work is tricky, and can be traumatic. Risk of CHD and work stress are linked in several complicated ways. The decision regarding return to work can be hard. There is a lack of reliable studies on the prognosis for those who return, but in general returners have a better medical and psychosocial future. The kind of work can be relevant. Wives of MI patients linked the heart attacks with job strain. Work resumption has not been a popular recent research topic, possible due to older patients, still many patients were actively working when they fell sick. Characteristics of the work may be relevant: shifts, physical strenuousness, etc. Reviewing studies was difficult, with situations in different countries varying, including rates of return to work. Patient populations, social security systems and unemployment rates complicate the picture. In Finland rates of return have been increasing, but are lower than in other countries. After angioplasty, return to work is higher than after bypass operations, but with variations.

He considered factors associated with return to work in previous research: age, education, social class, quality of the work, physical fitness of the patient, and psychological factors. Gender was not significant in two Finnish studies, in contrast to what has been reported from other countries. Medical factors including past record of CHD, left ventricular failure and exercise testing were considered. Psychological factors were considered to calculate a risk index, highlighting self-reported work stress, anxiety, depression, resignation and denial. Considering fitness and optimistic coping together, both factors had a significant impact on return to work. Subjective predictions of return to work are critical: he discussed examples of optimistic persistence, resignation and avoidance. He outlined a current major follow-up study, covering 302 subjects. Sixty-nine per cent of them were able to work a year after MI, including those in work and seeking jobs.

A theoretical model included personality, emotional reactions, coping style, expectations, leading to work resumption. Factors to be controlled included demographic, work-related and medical. Those unable to work were older, more anxious, less trustful, more stressed, more pessimistic. The model fitted the data well. The simplest link is between cynicism and not returning to work. Exposure to a stressful work environment may lead to cynicism. Medical factors are not strongly linked to return to work. Few in the survey had strenuous work. The model explained 22% of the variance in returning to work.

Work and family stress affect attitudes to return. Long waiting for treatment, as in the UK, can make a difference. The psychological impact of being on the waiting list is adverse, and makes the patient accustomed to being off work. The costs of retirement are not argued, but society accepts the costs of waiting lists. Work

stress and return to work should be discussed with patients. Younger people may take a different view of the value of work; they can afford to wait, and make choices, but they become more like their parents as they grow older. Working hours are important, with risks for those with less than 7 hours or more than 11 hours per day, according to Japanese data: this showed the complexity of the issues.

The Design and Effects of Behavioural Intervention

Modifying Lifestyle Factors

Jan Lisspers discussed a particular intervention on lifestyle behaviour, based on work at Östersund and the Karolinska Institute. He set out the principles, described the programme, and outlined results. Smoking, hypertension, and obesity all contribute to heart disease. He was concerned with everyday behaviour, including psychosocial aspects, anxiety, depression and isolation. He asked whether lifestyle change could be important: is it worth the trouble of changing lifestyle, and do we really make people change their lifestyle? Lifestyle behaviours influence the progress of heart disease, and the pace of the progress. Given that these processes are slow, effects can be slow to appear. Research has shown that lifestyle changes do reduce risks of CHD, and slow the progress of disease, but it is not easy to change and maintain changes in lifestyle. The plan was to develop a new intervention, based on behavioural and psychological analysis, using basic learning principles. People are motivated by effects of previous behaviours, with immediate consequences as the most influential, compared with long-term future health. New behaviours rarely have positive short-term effects, and often involve loss of time on other activities. “Not smoking” is a complicated behaviour, and must involve other behaviours, where alternatives had not previously been considered. The problem is to identify the goal behaviours, and then to bridge the gap between the new behaviour and the positive consequences of that behaviour. He set out practical principles, focusing on individual responsibility, providing information and knowledge, developing practical behaviour and skills, continuing training into new habits over time, supporting generalisation of the new behaviours in real life, and maintenance of the effects, preparing to resist relapses.

The programme concerns in-patients, and lasts a year, starting with a 4-week residential retreat in a rural area outside Östersund in Northern Sweden, where intervention begins, followed by structured maintenance. The programme covers stress management, exercise, diet and smoking, and involves the family, with special activities for women, in gender mixed groups. There are a series of closed groups, at different stages in the programme. Relatives can be involved. Group and individual processes are used, with explicit intervention and coaching. Subjects are discussed, and handled with training, at group and individual level, resulting in specific goal-planning. Simple integrated models are used to describe the activities, moving from decision to change and then maintenance. The behaviours to be changed are dealt with explicitly and individually. The focus is on action, rather than discussion, developing responsibility in practice, rather than theory.

He described results from the first 3 years of the study, evaluating the effects of the lifestyle change programme, based on patients recruited at the Karolinska

Hospital, being treated for coronary artery disease, engaged in working life, without severe associated co-morbidity, who are randomly given either pilot or standard care. The evaluation team is separate from the clinical team. He presented self-reported diet change and exercise frequency, with clear differences between the groups. Smoking went well at first, but with relapses over time. Stress management shows better results for the treatment group. Physical fitness was better in the treatment group, among both men and women. Chest pain during exercise tests was greater in the control group, and faster progress of stenosis. The lifestyle changes had a clear beneficial effect. In terms of work resumption and sick leave, the benefits increased in the second year, with less hospital readmissions. There are significant differences in further cardiac events and deaths, with benefits clearest after 3–6 years. There can be substantial changes; long-term maintenance of changes is good, with effects more pronounced over time, and the progress of the disease is slowed. Diet factors are seen as of reduced importance, but part of lifestyle change.

Modifying Coronary Prone Behaviour and Stress

Örjan Sundin considered links between psychological factors and coronary problems. Depression represents risks, and mechanisms have been explored. Reducing Type A behaviour can help, while particular behaviours (impatience, competitiveness and hostility) present problems, doubling risk of CHD and insensitivity to one's condition. He considered possible mechanisms, including low compliance, association with known risk factors, altered autonomic tone, and increased sympathetic nervous system activity. Treatment was focused on life style factors. Intervention studies have been conducted, including the Uppsala heart and lifestyle study. Patients were selected as being high on Type A behaviour, and were followed for 2 years. A new life style trial followed 252 patients with Type A behaviour. A third was conducted in Sandvik, also with Type A behaviour, over 7 years. A fourth was at Karolinska, with employed workers with emphasis on Type A behaviour modification. The studies had some differences in format and emphasis, with group sessions and varying emphasis on stress management.

Type A treatment included education in self-control, and the nature of the disease, with a view to changing behaviour and cognitive restructuring and relaxation procedures. The goals were reduction of urgent behaviour, less display of aggressive behaviour, change of hostile attitudes, improved relaxation, improved social skills and promotion of self-enhancing and self-reinforcing thoughts. The drill book sets out particular daily activities, such as walking slower, smiling, standing in a line, writing to a friend, listening to other people. In the area of cognitive change, they work on through patterns (mind reading, magnifying and forecasting), talking to oneself (life guide), hostility and attention seeking. In general, the context of existential growth is explored, with the task of writing their own obituaries and life goals.

The results of the studies show reductions in Type A behaviour in the treatment group compared with the control group. Anger changed little over 24 months. Exercise tests showed treatment patients tolerating higher work loads. Heart rates slowed in the control group, whose coronary events were less than in the control group. Minor depressive symptoms were less in the treatment group. Mortality was lower in the early years. Type A behaviour was less for the first 2 years, and

there was more exercise, better workload, and a higher rate of return to work. He analysed factors linked to, and predicting, survival. He considered coronary events, adrenaline and exercise levels across both groups. He noted compliance with general advice and support for lifestyle change.

Effects of Rehabilitation on Medical Endpoints: The Role of Physical Activity

Agneta Ståhle considered the importance of physical activity, related to health, linked with reduced CHD and other diseases. Physical inactivity is a primary risk factor for cardiovascular disease, as common as smoking, hyperlipidaemia and hypertension. Regular physical activity is associated with reduced cardiovascular morbidity and mortality: there is a dose-dependent relationship. Exercise is a planned, structured, repetitive and purposeful activity, leading to increased endurance, lower heart rate, and increased capillary density. For CHD patients, exercise improves symptoms of angina and congestive heart failure. Regular physical training reduces blood pressure and blood cholesterol, improves glucose tolerance and quality of life. The more physically active, the higher the self-rated health. Cardiac rehabilitation programmes started in the mid-1960s, based on lowering mortality, with less recruitment of elderly patients and females.

There are few randomised control studies, setting the context for studies at the Karolinska Hospital, following through an elderly group of patients, 80% male. Willingness to change is greatest soon after the event, so it is important to start the programme early. A symptom limited bicycle test was used after 3 and 12 months. The training programme consists of 50 minutes of aerobic group training, three times a week, during 3 months, including warm up and warm down. There was good compliance in the group. Forty-seven out of 50 chose to continue training for another period of 3 months training once a week, and the training group continued to be more physically active. Quality of life improved markedly. The full range of benefits does not persist over time. She concentrated on changes while the patients are within the programme; they tend to slip back after the programme. Physical activity should be prescribed as individually as pharmacological treatment, meaning that patient histories are required, considered in the context of risk. Long-term programmes are needed. She outlined the basic recommended régime, with at least 30 minutes of physical activity per day. There are implications for schools and employers.

Biobehavioural Mediators Between Behavioural Changes and Coronary Heart Disease

Andrew Steptoe was concerned with links between behavioural and psycho-biological processes in CHD, the value of non-invasive indices, and strategies for assessing psycho-biological processes. The literature separates these issues. Psycho-social factors can be linked with lifestyle factors, not mediated through physical processes. Different sorts of mechanisms are linked in parallel, with physical, behavioural and mood aspects. Changes in behaviour alter other processes; behaviour changes may be efforts to cope with stress, so theoretically and empirically we should not separate lifestyle from physiology. Long-term aetiology of CHD is related to socio-economic position and job strain.

Non-invasive indices were considered in the context of prevention. Hard endpoints such as myocardial infarction and sudden death provide the best evidence for prevention and intervention, but require large samples to establish convincing effects. He recommended various non-invasive measures, with respect to psychosocial factors and prevention. He raised questions about emotional stress, and the extent to which laboratory tests carry over into ordinary life. Stress-induced ischaemia was linked to cardiac events. Can stress-related behaviour be modified? He reported a comparative study of exercise, stress management and a control, showing reductions in the stress management group.

He considered alternative strategies, bringing together many studies to consider mechanisms and responses: epidemiological studies, with large samples, but out of the psychosocial context; experimental studies, rather artificial; and naturalistic or ambulatory studies, but with limited biological factors and numerous confounding factors. We should consider ways of covering the whole day and night. He illustrated the point with day and evening blood pressure; those with less job strain showed a greater change in blood pressure at the end of the day. Cortisol measures show a link between work stress and early morning cortisol. Analysis continues with the Whitehall cohort.

Programme and Implementation of Coronary Prevention from a European Perspective

Lars Rydén reported on the work of a task force of the European Society of Cardiology, identifying ischaemic heart diseases as the major reason for mortality and serious morbidity; the field was not included in the European Sixth Framework programme. Perhaps cardiologists had been too confident, so politicians did not feel the need to provide more funds. Mortality has continued to increase since 1950, especially among the elderly, while younger people, aged 55–64, have survived better, though still ill. The European Society of Cardiology, of which he is President, is dedicated to improving quality of life by preventing, curing and comforting people. Preservation of health is the key: physicians are too illness oriented, sometimes for financial reasons.

He considered the global context, measured in disability adjusted life years, with ischemic heart disease as the leading illness, and cerebrovascular disease in fourth place. Cardiovascular mortality is increasing by 16.2% 1990–2002, with a 28.2% increase in developing countries. He identified demographic, epidemiologic and social aspects of the transition, with considerable inequality. Key trends in developing countries involve increased risk behaviour, as they want to be more like developed countries.

In Europe he considered age standardised mortality from IHD, geographically distinct, and much lower in the Mediterranean area, rising in the Former Soviet Union. Finland has demonstrated a major change, but Scotland remains bad. There is a lack of data to demonstrate lifestyle; behaviour changes are worth the investment. The focus must be on health, retaining the ability to cure illness. The Dutch and Swedes have explored cost-effectiveness. Physicians must be involved in such processes. The role for societies is to take a lead, promote research, issue guidelines and study implementation. Governments should listen.

Physicians are attracted by the glamour of emergency medicine, not prevention. The European Society of Cardiology has members and products, but needs policy, supported by public relations and fund-raising: thus the emphasis on preventive measures. The ESC has guidelines. There are strategies for prevention at societal level, and medical strategies for individuals. Risks are concentrated on particular individuals, identifiable in terms of blood pressure. He presented coronary risk charts for men and women, comparing smokers and non-smokers: the risk is much greater for smokers. The charts can be used to predict future CHD, with high risk individuals predicted as suffering within 10 years. Simpler versions of the chart, with posters, have been produced. The task force is international, and developing in effectiveness.

A European Forum for the prevention of CHD in clinical practice was founded, with 162 delegates from 41 nations in February 1999. The objectives are to develop or revise guidance, with numerous translations. The Euro Heart Survey uses experts through working groups, and patient samples from hospitals, with a schedule of work. Medicine and politics should not be kept apart. Data was assembled on the health of MEPs, and published. "Winning Hearts for a Healthier Europe" encouraged physical activity, healthy diet, reduction of fatty foods, increased health promotion, and anti-smoking measures. Every child has the right to live to 65 without suffering from avoidable CHD.

Concluding Discussion

Lars Rydén highlighted the distinctive discourse on scientific matters with politicians, compared with exchanges with fellow scientists. Normal expressions of diffidence and uncertainty should be avoided; decision-makers exploit apparent divisions of opinion in order to avoid expenditure. There are straightforward messages to be presented, which do not depend on complex technical detail. Experts are unanimous against smoking, and in favour of improved diet and exercise. Major funding is needed for real action in face of this proven major threat to health, and not just for "more research". Messages need to be tailored to the target audience, with a clear statement, aimed at the target audience, arguing for what we believe in today. Typically core conclusions do not concern medical technicalities, but address fundamental issues of life style, cutting across the areas of responsibilities of specialist government departments, and requiring a combination of political and scientific insight if the argument is to prevail.

Consensus Statement

We need to develop integrated policies and practices, which take into account the needs of the human heart, seen at the individual and societal level. Coronary heart disease is the major global threat to health over the next 20 years. Many of the problems are wholly avoidable, and linked to life style choices. Smoking massively increases the risk of heart disease. The reduction of heart disease would reduce both individual suffering and public expenditure. There are strong socio-economic factors involved in coronary heart disease, linked to social deprivation. Politics and medicine are closely linked. The alleviation of poverty would reduce heart disease. Psycho-social factors at work can be measured, and linked to heart disease and other occupational diseases. The key messages recommended for

politicians are based on common sense advice on lifestyle, supported by the vast weight of international scientific research data.

- *Preventive policies need to begin in schools.* Teaching is vital, and the importance of childhood stress should be noted, as a predictor for future vital exhaustion and CHD. There are issues of temperament, and appropriate school organisation. The resource implications must be acknowledged, as we recall that teachers are themselves victims of job strain and exhaustion.
- *Psycho-education is needed for teachers and politicians,* as a precursor to change in the classroom. Studies of children and their interactions with adults suggest that if a child is supported in stressful situations, that may protect them from such situations in future.
- *Schools are neglecting the importance of physical exercise.* There has been a reduction in physical activity in schools across Europe. In school lessons involving physical exercise, children engage in little intensive physical activity. In Finland students can choose the content and timing of their sports courses, with unbalanced outcomes. There is an emphasis on professional sport, rather than on universal participation. Many patients resist involvement in exercise based treatment.
- *Exercise is fundamental to human physical health,* based on our genetic makeup, way of life and evolution. There are problems for people who do not take exercise.
- *There are particular issues for women.* Women often have unpaid extra jobs, or care for relatives, forming part of their working life, and is a stressor. This is relevant for the consideration of diversity in the workforce.
- *There are strong economic arguments for large scale intervention,* and extensive international research data. Scientists have tended to seek funds for continuing research, rather than addressing practical issues at a co-ordinated level, using their current knowledge. They need to engage more in the political process, making their expertise available, and designing major change programmes.
- *We need to create awareness of links between work and leisure aspects of life,* which are affected by changes in technology and work organisation, and raise general understanding of the impacts of exercise.
- *There needs to be a pan-European approach,* as with the European Society of Cardiology. Complex political battles are involved, across the spectrum of policies.
- *Agricultural politics is relevant,* with dangers of cross-border dumping of unhealthy food. Encouraging eating fruit and vegetables would work if they were cheaper than fats, such as dairy products; otherwise politicians face economic opposition. It could mean working on reform of the Common Agricultural Policy, making health issues a priority.
- *There needs to be a high profile campaign against smoking.* This could be reinforced by incentives for preventive activities by doctors, as with other targeted programmes. Hospitals could have specialists on this campaign,

commensurate with the scale of the threat. At present, prevention does not pay. Anti-smoking programmes could be required at workplace level.

- *Health promotion needs improving*, which means allocation of serious levels of financial and human resources.
- *The issue needs to be raised with the social partners*, and brought to the centre of the European Social Dialogue, rather than left as a fringe campaign. There may be a case for new Directives, developed through the European Social Dialogue with active involvement of occupational health experts.

Workshop Participants

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8. Control of Risks in the Workplace: Application of International Standards

The workshop was led by Ingvar Holmér, and held at the Office of the Swedish Trade Unions in Brussels, 25–26 September 2000.

Introduction

Ingvar Holmér introduced the Framework Directive, which places obligations on employers in the control and management of risks. Adaptation of work, and provision of protective clothing, is linked to specific requirements, test methods and standards, harmonised across Europe. Standards provide relevant and valid methods; based on practice and research; meeting the state of the art; accepting

necessary compromises; requiring conformity. Harmonisation processes agreed across Europe support the development of free trade; industry are now accustomed to standards. Many methods have been proposed for evaluating thermal environment and heat stress: two have been standardised, easing the task of the company safety officer.

European Directives and Standardisation

Eero Korhonen introduced the European Single Act of 1986. Harmonisation has been developed to enhance both free trade and work environment. Increased protection and safeguards are needed in Europe, in line with ISO and ILO standards. Directives cover a range of products, limited to essential requirements, resulting in standards whose application is voluntary. Updating is a problem: standards are not legislation, in some countries translations are not available to companies, with problems for small enterprises. There needs to be global harmonisation of conformity assessment practices.

Personal Protective Equipment is required, to remove barriers to trade, and maintain protection for health and safety of users. With free trade now in place, why improve health and safety? Revision of standards is about every 20 years; certificates remain valid when standards change. Harmonised European standards come from CEN / CENELEC, approved by the Commission. Products meeting these standards meet safety requirements. Standards presume conformity, but are open to different interpretations. It is unclear which requirements remain to be met, not covered by standards. Standards are developed by technical committees and working groups, with open participation, decision by votes, and implementation as national standards, in principle in identical ways. There is then a grey area, with legal sale but not use of the product at work. Risk analysis is needed; standardisation is difficult. Some argue that work environment is a national issue, not a concern of the EU. Limit values are resisted: it would be useful to have standards on risk control and management, and on quality and environmental protection. Practice varies in member states. The gap between product and use should be filled, which means knowing about risks, foreseeable risk conditions, basic requirements and limit values, and test methods. Defining risks before product standardisation would help users select and use products correctly. Standardisation of the working environment is difficult; working conditions need to be taken into account. Risk assessment guidelines have been developed for firefighters: wider development is difficult if member states retain control.

Overview of Standards on Personal Protective Clothing

Traugott Zimmerli discussed stages of standardisation. His experience worked from test methods, to performance standards, with little emphasis on risks. The aim can be to give the highest possible protection, with little discussion of ergonomics or comfort. Deaths of firemen in the USA tended to be due to heat stress, through over protection. Protection should be "as much as necessary", with ergonomics and comfort "as much as possible". ISO TC 94 was founded in 1964, with specialist committees, covering areas such as head protection and protective clothing, in turn forming working groups. Consensus was the basis of ISO working

methods: today formulations are more quantitative and negotiated. CEN TC 162 addressed protective clothing, involving a set of working groups, facing tight time pressures. In 1991 ISO and CEN agreed parallel development methods. National positions were in conflict; co-operation has developed. ASTM is North American in origin, starting in 1977 with work on protective clothing. Co-operation was inhibited by the lack of links with ASTM; observer status is recent. ISO has been predominantly European in work on protective clothing. CEN obliged ASTM to increase co-operation; there are regular meetings of the three chairmen. With protective clothing for firefighters, ISO cite CEN and ASTM. Input from all three organisations is important. Comparable results need to be achieved, catering for different contexts and methods of use. A single global standard would be preferable.

Overview of Standards on Ergonomics

Ken Parsons outlined the history of ergonomics standardisation, based from 1975 on ISO TC 159, concentrating on the physical environment. CEN TC 122 addresses ergonomics, linked to the Machinery Directive. He is concerned with surface temperatures and thermal environments; it was easier to develop standards for high than for low temperatures. There have been joint working groups on protective clothing. ISO TC 159 concerns ergonomics of the physical environment. In thermal environments, about 20 standards have been produced: attention is given to hot, cold, moderate environments, and contact with surfaces at different temperatures. Each area is covered by standards, including approaches to subjective measurement, and selection of appropriate clothing. Using standards requires supporting standards, including standards on clothing selection, specification of measurement instruments, subjective screening, and definitions. Standards are being developed on risk assessment, disabilities and the aged. With hot environments, minor deviation between ISO and CEN is to be resolved. Personal monitoring systems are important. He explained technical details of the environmental monitoring standard, the calculations involved, and noted problems if the user was wearing protective clothing. Specifications for instruments are needed. In the UK there can be research funding when gaps in standards are identified, as with standards for cold working. Humans do not remain passive in the face of problems: we need adaptive standardisation. He introduced a set of future standards, covering clothing, instruments, metabolic rate, vocabulary and symbols, special requirements, vehicles and combined effects. Hot environments coverage needs to be improved, with practical guidance and specification of available instruments, as well as risk assessment. We need valid and usable standards, with scope for practical application. A standard is a product.

New Approach to European Ergonomics Standardisation

Dorit Zimmerman argued for enhanced harmonisation and standardisation. She noted the foundations of *free movement of products*, where transposition into national law is obligatory, and *improved health and safety*, as component parts of new obligatory standards. Directives based on improving health and safety at work specify minimum requirements to be transposed, with freedom to define more

stringent requirements. Limit values cannot be included, and may conflict with national law. Ergonomic standards need to take account of the legal situation.

The new concept is intended to influence future approaches, enabling existing standards to be modified at revision stage. She distinguished *basic*, *generic* and *product* standards. *Basic* standards need principles and methods to cover human factors, such as terminology, human characteristics, measuring and evaluation, and general design. *Generic* standards can cover product groups or the work system. They address quantitative and qualitative requirements, measuring and test methods, and may include guidance. When applied to work systems, they need to be relevant to context, and qualitative, avoiding conflict with national law. *Product* standards should not derive from ergonomic technical committees, but link with work of specialist TCs in that product area. Ergonomic expertise needs to be available, reducing unproductive overlap of efforts. Standards organisations have an important monitoring role. Existing standards can remain as a base; a new structure needs to be put in place, enhancing co-operation and guidelines linking *generic* and *product* standards. This would give practical benefits for new standards in personal protective equipment.

Use and Impact of Standards

Indoor Environment ISO 7730

Jörn Toftum discussed moderate thermal environments, comparing standards from the USA and Denmark. ISO 7730 is the core for associated standards and guidelines, with wider scope. The American approach emphasises approaches to compliance; the Danish standard includes elements of building design. The core idea is whole body thermal comfort or discomfort. CEN 1752 incorporates quality categories. He outlined practical use of the ISO 7730 standard, with a summary of temperature requirements, and considered humidity. Analytical methods can be used to consider effects on clothing. He illustrated the ASHRAE thermal comfort tool, indicating whether particular conditions met the standard. Modern buildings are designed with simulations of the environment, enabling prediction of problems. Adaptive models are appropriate for naturally ventilated buildings, linking outdoor and indoor temperatures.

Researchers' Perspectives

Håkan Nilsson discussed the use of thermal manikins in standards, how thermal models work, the effect of wind on protective clothing, climate assessment in vehicles, effects on comfort of special glazing, and climate assessment in the office environment. The idea was to mimic the human being. Thermal manikins are used to test thermal insulation; values can be adjusted for circumstances such as wind effects. Measurements are made from a moving manikin; much could be done with a standing manikin. Validation is needed. Revised methods are used by police on the new Öresund bridge near Malmö, based on local weather data. Clothing design has limited impact, given similar design. Local cooling will be handled in revised

standards. The same approach can be used inside vehicles, assisting in design of ventilated seats, crane cabins and special glazing. This work interests companies. Similar approaches are applied to healthy buildings, and the office environment.

Randi Eilsmo Reinertsen, of SINTEF Unimed, Norway discussed work and survival at sea, covering critical factors for work offshore. This covers fishermen, aqua culture, military activity, platform work and helicopter transportation. Risk factors need to be identified, including human and environmental factors. Individuals vary: human characteristics include age, body dimensions and fitness; sustained heat production; body temperatures (core and periphery); physical performance; cognitive performance and subjective evaluation of comfort. Environmental factors include ambient temperature of the medium; radiation; wind; precipitation; humidity; sea/waves; dark/light (rescue); and combinations.

She outlined standards for life saving suits, discussing constant wear suits, and variations for helicopter integrated immersion suits. There are national user group standards in Norway, adding more layers of protection: environmental conditions differ from those of the standards; use of the PPE differs from the intended use, and international standardisation work may be time consuming. Oil companies in the North Sea had their own standards, presenting difficulties for manufacturers. In the more hostile environment of the Northern North Sea, different requirements had to be met depending on individual tasks. Water transmits heat faster than air, causing problems for those wearing suits routinely. Different circumstances and exposures justified developing new standards. Test procedures under existing standards did not distinguish good and bad clothing. Intended use on the Norwegian coast is different, with survival suits worn during over sea flights. Rescue helicopter flights may last 8 hours, with correlation between thermal stress and pilot errors. The time aspect of development of international standards strengthens the case for requirements for specific user groups, using new safety devices, such as spray hoods, underwater escape breathing devices, and thermal lifejackets. There was a problem of choosing particular models, incorporating them into standards. When standards are not followed, or there are extra requirements, this presents problems for manufacturers. Users can be confused, requirements less predictable, and the market may narrow. With test equipment and procedures, accuracy is important. Methods of measurement vary. Practice varies between countries and authorities, with different test results. Research needs to address total use of the equipment; specifying test protocols and selection of test subjects, and addressing varying climatic conditions across Europe.

Test Houses and Government Institutions

Spain

José Bahima noted that Directives are intended to help free movement of goods, with Notified Bodies providing services for conformity assessment. Risk assessment is needed first. Requirements do not specify technical solutions: that is a matter for standards, through CEN. Harmonised standards are used by manufacturers to verify compliance with essential requirements. Using these

standards is not always easy. Requirements are not always clear, for example “as light as possible”, or “shall not have an adverse effect on the health”. A test method and performance level are needed if requirements are to be verified. Test methods in standards are not checked for repeatability and reproducibility. For some tests, interlaboratory trials show great variations. Harmonised standards do not cover all essential requirements. Not all Notified Bodies work in the same way. Close co-operation is needed for coherent application of conformity.

Switzerland

Traugott Zimmerli discussed use and impact of standards on personal protective clothing in Switzerland. Switzerland chose to follow EU Manufacturer Directives, despite not joining the EU. They wish to avoid technical barriers to trade, to raise the quality of production and the market in Switzerland. User Directives have not been implemented, due to adequate insurance and legislation, setting out obligations of employers on prevention and participation, and obligations of employees to co-operate and comply. An incremental process is set out for employers, requiring provision of protective equipment.

Poland

Anna Marszalek spoke from Poland, applying for EU membership. She described the application of international standards for risk control of workplaces. A new law underpins a new voluntary standardisation process. The former central committee for standardisation, measures and control was divided into three new organisations. In 1996 a committee on integration with the EU was established, co-ordinating the entry process and conformity with EU law. Standardisation work is linked with integration policy, and builds on long-standing technical work in ISO. Since 1991 Poland has been actively engaged in CEN and CENELEC, and in numerous ISO committees and subcommittees.

The Central Institute for Labour Protection is involved in 29 committees of CEN, and there is a clear set of national institutional responsibilities. A programme of prevention and research in occupational health and safety meets the demands of the workplace. She outlined the computer system for hazard registration and risk assessment, with a set of databases drawing on data from enterprises concerning aspects of health and safety. Risk assessment shows as high, medium or low. System functions are agreed with national bodies. She discussed barriers to use of international standards, such as thermal insulation of clothing and classification of workload. Thermal manikins are in use, developed with Danish partners. Harmonisation of Polish and EU standards will bring advantages for design. Workload regulations for Polish women, covering weight and energy expenditure, are more restrictive than EU provisions, affecting ISO standards on heat stress. **Ingvar Holmér** noted that current standards are based on healthy men, poorly adapted to needs of women. He recommended a gender sensitive approach to standards.

Sweden

Jan Westman described standardisation at NBOSH, based on the Work Environment Act, for example “Internal Control of the Working Environment”.

Standards provide support; EU Directives are followed. NBOSH are concerned that standards meet demands, and do not violate Swedish law and regulations. NBOSH provide a counter-balance to manufacturers. They work in ISO and CEN. He discussed “work in intense heat”, closely linked to standards, and noted problems with a mandatory approach.

Finland

Eero Korhonen outlined testing and control functions of the Institute of Occupational Health, requiring a quality control system. They have tested 1500 personal protective equipment items, in a large establishment with a continuing agenda. They are involved in numerous standardisation activities. Manufacturers do not understand why more than the standards is required, in order to meet Directives. There should be access to working knowledge of experts. There is good co-operation with manufacturers and authorities. European unification is a slow process.

Industry and Organisations

Martti Humppila spoke as a service provider providing products that meet requirements. He is subject to law and market controls, and a customer of Notified Bodies, as well as a user of standards. Standardisation is there to help, solving problems of compliance with EU Directives. The standard should be clear in specifying examples, with methods and classifications, giving confidence that standards guarantee safety levels and a level playing field, at minimum cost. Standards should help product development, help selection of products for specific user situations. Classifications and marking should be consistent. Testing should increase comfort, enhance comparability, increase information, and not raise prices unduly. Manufacturers are positive towards standards; the key aspect is customer expectation of safety using the product within standards. Standards should be functional requirements, giving scope for product development, not technical properties. Manufacturers tend not to be well represented in standards activities; users are also neglected. The personal protective equipment sector is organised, covering 500 companies with 30,000 employees, but few are involved in standardisation. Standards should be based on parts of the body, not particular types of risks, but a risk assessment is needed. He considered quality control, with safety critical products needing quality control and homogeneity of production.

Standards need to be valid and usable. High workload means standards cannot be applied as they are written. It is necessary to follow recommendations from co-operation with Notified Bodies; information is hard to obtain. Standards do not always help product selection; protection classes and standards do not fit; test methods are not reliable enough; standards are expensive for manufacturers. Information should be given out in a cheaper way, with EU subsidy. Standards should only be updated to include recommendations. Product classes should be specified, linked to risks in the work place. Guidance documents should be developed for personal protective equipment.

Olle Norén discussed tractors and machinery for agriculture and forestry, with many accidents. During the period of “tractorisation”, many tractors reared or fell

over sideways in 1956-1958. New safety frames were developed and tractors tested, according to a new standard. All new tractors were required to have safety frames, and the number of deaths fell. The standard is now used in Europe and the USA. He gave examples of standards in use: operator enclosure environments, air filter element test methods, etc. Others concern the operator's workplace, seating and controls, including symbols and guards. Many accidents occur on entry and exit from tractors; standards are needed for couplers. There are standards for general safety, and for equipment such as winches and saws, with safety dimensions. Current work concerns agricultural cabs, environmental air quality, and whole body vibration of the operator. Not all in the industry use standards. Research needs to play a bigger role, making knowledge on safety available.

Dorit Zimmerman noted that safe products and equipment are key elements of prevention; harmonised standards can make a difference, supplementing requirements of Directives, and providing preconditions for the effective European single market. In Germany KAN was founded as a national forum for the state, social partners, accident insurance institutions, and standards organisation DIN, dealing with occupational health and safety and standardisation. The focus is on European standards, influencing practice at national level. European procedures combine open markets and safety, using standards, implemented faster than laws to keep up with technology change. Standardisation is important for harmonisation of working conditions and consumer protection, harder to achieve than technical harmonisation. Germany has decided not to initiate standards in the area of occupational health and safety, but to follow European standards, exceeding them where appropriate; confusion over standards should not complicate local decision-making. Globalisation increases the importance of these issues. ISO and IEC seek to develop standards that can be implemented unchanged at national level, involving national bodies from the start of the process. KAN is committed to the European safety philosophy, with systematic identification of hazards and consideration of ergonomic issues. International standards should operate at a high level, not infringing national jurisdiction over the workplace.

Practical Use of Standards for Workplace Risk Assessment and Design

Jacques Malchaire discussed internal occupational health services, comparing them to external occupational health services. Links between these systems should be improved. Workers know about the workplace despite lack of knowledge on occupational health and safety, while experts have the opposite situation. We need valid and usable standards with scope for practical application, meaning co-ordinating actors. Evaluation and measurement are not the same: quantification is not always necessary, qualitative approaches are harder to define. Risk management, not just risk assessment, is the objective. Methods must be applicable to SMEs. He set out a proposed standard strategy: *screening, observation, analysis* and *expertise*, with roles assigned, and different balances between workplace and ergonomic expertise. Expertise should only be needed in special cases. Methods need to be developed for each level of expertise, costed appropriately. He linked ISO and CEN standards, noting different levels of sophistication of target

audiences. Few people understand and use technical accounts, unless this level of detail is hidden. It is not necessary to standardise at the expert level. The philosophy is to develop levels of strategy, for practical implementation.

Juhani Hassi described the use of standards for risk assessment and design, based on work in thermal environment, with particular reference to cold environments. He considered occupational health and safety at levels of risk assessment, management and control, health care, and information and training. A new standard should use existing standards, and address specific cold-related risks. He reviewed existing ISO thermal standards, methods for testing, and current work. He discussed work at national level in Finland, researching the cold environment, and symptoms suffered. Individual health risks need to be assessed. He described a series of questionnaires, tested widely, and producing details of cold symptoms. After interviews with an occupational health nurse, different cases were classified. Risk assessments were made in workplaces, testing methods for coverage, usability and training. He followed **Jacques Malchaire's** levels, going from observation and analysis to expertise. He outlined risk checks and health checks, in a process with several levels of expertise.

Jörn Toftum considered use of a standard as a design instrument in buildings; CEN Report 1752 deals with ventilation for buildings, covering thermal and acoustic conditions, seeking to integrate indoor design issues. The emphasis is design and evaluation, with guideline values presented in the core document and methods in the annex. Ventilation rates have normally been calculated on the basis of humans as the source of pollution; other factors are taken into account, including pollutants produced by the building. The thermal state of the body as a whole is considered. There should be no health risk from breathing the air, perceived to be fresh. Different indicators are used if only human pollution is considered. Overall individual comfort, not a generalised outcome, was sought.

How Should Standards Look in 5 or 10 Years?

Ken Parsons argued that environmental ergonomics needs a rational approach. Standardisation is moving towards quality management and business planning. He argued for simple usable methods, for users: workers, safety officers, ergonomists, designers, academics, students, consumers. Each needs training. Standards need usability testing. Users can be involved through formal processes, with new work items, and committee voting procedures, with representation of consumer groups, unions and manufacturers. Feedback is important. Standards need to be valid, usable and practical.

José Bahima discussed harmonised standards. Conformity confers a presumption of conformity with the Directives; the truth is more complex. Optional requirements present a problem if products must meet essential requirements to be sold. With numerous performance standards applicable; there is a need for optimal standards. Essential requirements are mandatory. Requirements are linked to risks: risk analysis is needed, leading to check list, review of test method, and identification of levels. Harmonisation of methods is needed across technical committees.

Martti Humppila predicted that over 10 years ISO may prevail over CEN. There are problems for manufacturers in moving to international standards. Negotiation should maintain current European approaches. Presumption of conformity with EU Directives raises questions for standards. In the PPE field, few groups of products need standardisation; revisions will be important. We should keep things simple. **Eero Korhonen** discussed improving procedures of CEN. Working groups and management centres will use electronic formats. Translation problems will be addressed; in some cases only English will be used if French and German versions have not been produced in a set time. In areas such as clothing, testing should be improved, with a better structure for standards development. The aim is to remove dangerous products from the market.

Workshop Participants

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Jörn Toftum, Technical University of Denmark, Denmark
Jan Westman, NBOSH, Sweden
Traugott Zimmerli, EMPA, Switzerland
Dorit Zimmerman, KAN, Germany

Gender

1. Gender Differences in Working Conditions and Health: Implications for OSH policy in EU

The workshop was led by Anders Englund, and held at the Office of the Swedish Trade Unions in Brussels, 26–28 June 2000.

Anders Englund argued that working conditions are to be adjusted to the potential and needs of different people; women are now active in sectors formerly dominated by men. The intention is to provide equal opportunities, to achieve good working environments. Men and women may need different working conditions. The workshop considered both gender perspectives, starting from risk. Is there a need to bridge particular obstacles?

The Role of Directive 76/207/EEC: Gender Issues in Working Life

Perspectives from Legislative and Inspection Authorities

Sylvia Wood introduced risk assessment, as required in the Framework Directive, which provides the setting for considering gender issues, i.e. people themselves as well as physical, chemical, and psychosocial factors, the new questions that are raised, and where the cost should be borne. There is current demand for women to return to the workplace, which means that changes are required. Perceived risk raises issues; insurance companies are reluctant to carry risk, increasing premiums in cases of doubt. Data is essential if risks are to be quantified and costs attributed. If changes are to be made to accommodate women, this is difficult in small enterprises. Pressures of demand for female workers have raised the level of interest. The key tool is risk assessment, looking at the needs of people; it is hard to ensure that assessments are undertaken as required.

Anders Englund reflected on the development of ergonomics in Sweden, stimulated by manpower shortages. One approach was to reduce heavy duties, making jobs more tolerable for all. Equal opportunity meant an equal chance of not destroying the body.

Perspectives from Trade Unions

Laurent Vogel outlined the state of the art on equality and the working environment, from a trade union perspective. Do we need a bridge between equality policies and occupational health? There can be problems. He outlined an example dispute on wage equality, and arguments about women working as machines. Other background issues of age and immigration, and the nature of work and career development, can be raised in disputes. There have been Directives on equality since 1976, and Directives on the working environment, such as the 1989 Framework Directive. There is no link between the two areas; working conditions are considered in different ways. The measures are seen as gender neutral, but affect women. He highlighted repetitive stress, and the impact of the Manual Handling Directive, which helped men in particular, in industries such as construction. Over 25 years of equality legislation and improvements, participation by women has increased, but in Sweden and Finland, where women have increased activities in the workplace, we find the highest levels of sex segregation.

The 1976 Directive concerns vocational training, and covers fairness of treatment. Legislation is protective and ambiguous. The court of justice has avoided changing the overall division of work; global aspects of division of labour are not being addressed. Proposals for amending the 1976 Directive have been published, covering sexual harassment and provision for positive action under the Treaty of Amsterdam, helping under-represented groups. "Equal opportunities" is not enough. Segregation is not merely about paid work, but also unpaid work. Hierarchical principles are important, with a strong impact on working conditions. The nature of women's work, and workload, can be different. He addressed equal opportunities and segregation, seeing the Directives as helping individuals rather than collective groups. Judicial remedies are accompanied by preventive measures. Equal access is not the same as equality. Men and women do not earn the same wages, or experience the same conditions. Blair and Schröder are concerned with equal access, not equality.

He discussed mechanisms of invisibility; occupational injuries give only a partial view. Male diseases have priority. In Sweden, the pattern of accident figures changed when the law changed, making it harder to prove that illnesses are due to work. This results in higher figures for men, and changes in the research agenda. Preventive action has been seen as expensive, saving life and money. Particular sectors such as building and fishing have been problems. Collective representation is a problem for trade unions, where officers are mainly men. European trade unions tend to deal with equality, health and safety separately. Strategy issues are set out in collective agreements where women are less active. Casualisation has a gender dimension, with issues concerning employment contracts, part-time working, and the reduction of the public sector. There is a broad agenda; bridges need to be established between levels of policy activity.

Statistical and Other Reports on Gender Differences at Work

Second European Survey

Kaisa Kauppinen wrote the "Gender and Working Conditions in the European Union" survey report, for the European Foundation: a person is not a machine. The second survey included gender questions, and covered new member countries of the EU. Gender segregation was a major issue; her research concerned crossing gender barriers. Her Nordic background gave her assumptions about women in the labour market; she encountered different traditions elsewhere in Europe. Working time is gender sensitive: Finnish women tend not to work part-time, there are similar figures in Portugal. There is less self-employment in the Nordic countries than in the Mediterranean countries, linked to the large public sector, meaning diversity of employment patterns across Europe. Temporary jobs for women are increasing. In general, women work shorter hours than men, but with variation across the EU, and no common pattern. Family situations are critical, and overall patterns are gender-shaped. In most countries, women regulate their own health and well-being by working shorter hours: it is important whether part-time work is voluntary. There are difficult questions on day care for children.

Well-being, satisfaction and stress are linked. The third survey will include coverage of pay and bonuses. Women encounter a "glass ceiling", finding it hard to reach senior levels. She considered workplace dynamics, and differences between Northern and Southern business cultures. Differences were linked to the gender of senior managers, with less authoritarian culture under female management. She considered information on sexual harassment, and links with employment status and condition of health.

Activity rates for women are increasing; gender segregation continues. Women are often part-time workers, with an increase in temporary work. There are problems in balancing work and family life, with increasingly hectic lifestyles. Men and women understand their work environments differently. Women face physical danger, sexual harassment, negative work stress, glass ceiling and lack of participation. There is increased negative stress, with problems of decision latitude and control. Considering social support and work related rewards, she identified money, esteem and status control. Often there is poor status control, with low promotion prospects, forced job changes, job instability and job insecurity. The new European Commissioner for Employment and Social Affairs has argued the importance of outlawing sexual harassment, to produce a healthier atmosphere in the workplace, for the benefit of business, and the self-confidence of the workforce. Increasing gender sensitivity is a matter of image, economics, and (e)quality, and adds richness to workplace activity and policies.

At the 1999 Finnish Equality conference, organised during the Finnish EU Presidency in 1999, a study was presented on measuring equality in working life, with questions about healthy organisations. Eight different criteria were presented, concerning: fairness, salaries, career opportunities, opportunities for influence, work atmosphere, information flow, working conditions (including age and work ability), and reconciling work and family. Evidence suggests increasing overwork; women should be encouraged to join high technology firms. What are the

implications of men taking parental leave? Equality is seen as an integrative feature of personnel management policy, offering increased profitability and well-being.

Sylvia Wood discussed reduction of working hours to look after children; children should be taken into account in risk assessments. In principle, women should be able to look after children at work, especially in family friendly small units. We should take a total view, from cradle to grave, with work as a source of satisfaction and income, balanced by negative aspects. If we took a citizen-oriented view, there could be a more satisfying outcome. We should not compartmentalise people, and consider occupational health to the exclusion of life away from work.

HSE UK

John Osman noted the lack of UK data from insurance systems, explaining the tradition of seeking diverse data on work-related illness. He discussed data sources, concentrating on population-based surveys, covering self-reported work-related illness and self-reported working conditions. Self-reported work-related illness surveys in 1990 and 1995 are not directly comparable, but provide a similar picture. Analyses of the data by gender started recently: patterns rather than statistical differences were shown. Men bear the brunt of work-related illness as measured. He considered two major disease groups. Self-reported stress, anxiety and depression diseases such as hypertension attributed to work stress and musculoskeletal disorders, were considered. There was debate about the changing gender balance of stress at different age levels. Women face more problems with upper limb and neck. Headache and eyestrain is a further problem for women.

He looked at links with occupations, to see if there were specific concerns for women. This identified repetitive assembly and processing, security, teaching, nursing and cleaning, catering and hairdressing, science and engineering, and selling occupations as in need of consideration. Self-reported working conditions were surveyed separately in 1995, in non-specialist terms. Men reported most adverse working conditions; gender differences were less pronounced than expected. Similar exposures have different implications for women and men; such as the impact of violence and threatened violence.

He considered work-related skin disease, reported by hospital and occupational health physicians. Musculoskeletal disorders were in line with self-reported surveys. Similar early mental health data were shown. Mesothelioma is suffered more by men, noticeably among end users in recent years. If women increasingly take up these end user occupations they will need equal protection from the associated risks.

Accident data in the UK is not compensation-related, but report based. He considered reports on compensation for hand cramp and tenosynovitis, based on judgements of lay officials, where males are reported more than women. Men face more occupational health problems than women, there are some situations that are adverse for women, and industry-based or occupation-based approaches may generally be more appropriate than purely gender-based approaches. He cited Michael Marmot's work on psychosocial factors, the workplace and cardiovascular mortality, with major implications.

Men and Women at Work: Toxic Risks to Health

Carme Valls Llobet described relations between men and women at work, citing a report by Kaisa Kauppinen and Elisabeth Lagerlöf for OECD. Household management and work represent an unequal burden for women's health. She considered the cultural context and external demands. Morbidity varies between women and men; she discussed invisible morbidity, for example linked to the menstrual cycle. New shift patterns can have major impacts. Biological differences are often significant, and can compound the different risks of occupations. Illegal conditions of work can be a source of illness.

She identified increasing problems for women, including breast cancer and menorrhagia, caused by xenoestrogens, linked to plastics. There are also adverse effects on men. There are problems with pesticides. In the case of thyroid problems, exposure has delayed effects. There can be effects on growth hormones. Organophosphates have been damaging immune systems, linked to work conditions. The analysis of effects on menstrual cycles and thyroid is more complex. Mesothelioma is linked to work; women living in the area suffer the effects of exposure, in particular wives of asbestos workers.

She cited the Karasek approach to demand and control. She compared stress levels at different times of day between men and women, as measured by different tests of hormones and muscles. Women suffer these problems more than men; they should be studied in toxicity cases, and taken as the gold standard. Women retain the toxicity longer than men, with long term implications, given that patterns of work organisation disregard reproduction. She argued for a gender approach, relating diseases to working conditions.

NIWL Sweden: The MOA Study

Annika Härenstam presented the results of the MOA study, concerning modern working and living conditions for women and men. Standard questionnaire methods were based on industrial work, and had not been validated for women and modern working conditions. Items had been developed in the 1960s and 1970s, and needed adjusting. New kinds of methods needed to be tested, with a person-centred approach, to complement traditional approaches. The methodology needed to deal with flexible fast-changing patterns of working life. She presented person-oriented approaches and organisational data. The team comprised 25 researchers. She outlined the strategies: comprehensive, gender-oriented, structural, multilevel, multidisciplinary, with strategic sampling, field studies, triangulation of theory and methods to build up pictures of the perceptions of study subjects, multivariate person-oriented approaches, and both qualitative and quantitative analysis. Data collection was 1995–7, with 800 days of field studies, 200 tests of physical function, four questionnaires, 1000 hours of interviews with study persons, 100 hours of interviews with managers, 30 hours with representatives of trades and branches. Sampling was successive, theoretical and strategic, seeking large variation. Eighty-one work places were chosen in five counties, 66% private sector, 34% public sector. There were 220 individuals, equal numbers of women and men, paired in occupational areas.

The main objects concerned method; the results are interesting, and can be generalised. Individuals were chosen as representative of work and age structures,

with gender balances distorted for comparative purposes. Cluster analysis was used to group people with similar conditions, using internal and external data. Thirty-two variables regarding paid work and the private sphere were studied, including exposures, supporting and restraining psychosocial factors, working conditions, work-life balance, work location and changes in conditions. Clusters were identified and analysed, assessing the importance of particular data. Clusters were compared with respect to trade, branches, type and organisation gender segregation, as well as health, quality of life, and income. Eight clusters were identified: *boundaryless*, *locked*, *exposed*, *heavy monotonous*, *changed*, *decent*, *mobile*, and *restrained*. Each could be characterised in terms of the cluster analysis.

- The *decent* group were found in the private sector, with gender mixed stable workplaces, white collar, with varied educational backgrounds and qualifications; the group included no parents of children under the age of 7.
- The *boundaryless* group had few limits to their work, with work and private spheres merging, and little relaxation. They work with symbols, in the professions such as IT, law and the media. Few had children, and partners worked full-time. Gender segregation continued outside work. Psychological well-being was decreasing, with high levels of sick leave for women. All have high levels of control, and have chosen their working and living conditions. The group may be a transition phenomenon.
- The *locked* group cause worry, with irregular work hours, low support, imbalance between work and private spheres. They are typically in private sector jobs, for example bus driving and call centres, with low education and experience of unemployment. They sit behind a wheel or a screen, unable to take a break when they choose. Many are parents, with women working part-time. Physical conditions are bad, and sleeping problems are common. Psychological conditions are declining.
- The *exposed* group are in physically demanding work, time bound and with bad chemical and physical conditions. They are often single, with low standards of living and high levels of smoking. Health is bad, sick leave rates are high, they face physical overloads and low incomes.
- The *heavy monotonous* group have demanding work, solitary and insecure, with passive leisure time. They work in the private sector, often parents with families and low standards of living, low income.
- The *changed* group have more work tasks, with increased responsibilities and demands. They work in private and public sector, with lean production and decreased staff sizes. Jobs are blue and white collar, with people over 45, as younger workers had been dismissed. Psychological problems are increasing, especially among women, with high sick leave rates.
- The *mobile* group have physically demanding work, with low mental demands and active leisure time. They work in small male-dominated enterprises, are in good physical condition, and have few work problems.
- The *restrained* group have high psychological demands, time pressure and obstacles at work, deteriorating work conditions, with few hours of relaxation.

They work in public sector jobs, such as teachers, social workers and nurses, where they face increased work monitoring. They are well educated, in poor physical condition, suffer from physical overload and health problems, receiving low income.

New ways of working do not carry over to the private sphere, where gender differentiation continues. New categorisations were suggested for the workforce, labour intensive as well as high technology and knowledge intensive. Service, welfare and high technology were the largest sectors, organised differently, with more training, flexibility and individualised reward systems in high technology areas. Monitoring is increasing in service and welfare areas. Immigrants were most to be found in service areas. Gender segregation and male domination were found in high technology.

Patterns vary across Europe, with different perceptions of gender segregation and gender roles at home. Self-reported changes of control have little gender influence, but in welfare areas workload has increased while control has decreased. Externally assessed working conditions are similar for both genders. Mental overload is more prevalent in women in welfare areas, together with physical overloading. Problems in combining work and family hinder women from involvement in high technology and knowledge based work. New good working conditions are found in high technology workplaces, offered largely to men. The greatest demand is faced in welfare occupations, with decreasing resources and increasing pressure.

Developments in Barcelona

Izabella Rohlfs reported on a survey of public health in Barcelona, based on interviews. The principal variable was self-perceived health status, taking personal perceptions rather than health risk factors, which tend to emphasise the male perspective, and neglect aspects such as household work. Health problems of women were linked with numbers of people at home. The health situations of men and women can be linked to marital status. Women with paid employment have better health than those who work only at home. Social class is critical, for both women in employment and at home: it is hard for lower class women to go to the doctor. Poor health linked to domestic workload, among women with paid work, suggests the need for increasing community resources for caring for children, and greater involvement of men in domestic work. More attention should be given to reproductive work, productive work, social class, social support, quality of life, mental health, and chronic conditions.

Psychosocial Work Factors

Richard Peter outlined changes in working life, associated with increases in stress. Work remains important: it guarantees income, is an important aim of socialisation processes, is important for social status, social identity and skills, and involves exposures to stresses and other exposures. It is hard to measure work stress, so theoretical models are required, reducing complex reality to meaningful components of work stress, offering testable explanations, covering many occupations, and transcending times and places.

He considered the demand-control model developed by Karasek. Job strain and coronary heart disease have been studied, with numerous medical measures. The model suggests that control is the important dimension; a better predictor for men than for women in blue collar, than in white collar workers.

The effort-reward imbalance model developed by Siegrist and colleagues (including **Richard Peter**), distinguishes intrinsic and extrinsic dimensions. The intrinsic component involves coping, the extrinsic involves structure, and can be measured. The imbalance between effort and reward is seen as leading to stress. People can be defined as unexposed or exposed, with respect to the two kinds of stress. About 18 studies have been conducted; the model has been tested on cardiovascular disease, psychiatric disorders and measures of well-being, involving 45,000 subjects worldwide, with prospective studies, and cross-sectional studies.

He applied the effort-reward model to gender issues, considering ways in which work and family life might balance each other. Men place greater emphasis on occupational status than do women. This affects extrinsic aspects of the effort-reward model when considering men, especially middle aged men. Men appear to have fewer options, and are less skilled in work compensation. Women deploy more effort to achieve similar occupational outcomes to men. The extrinsic dimension is more important for men, and the intrinsic dimension is more important for women. The hypotheses were tested in the Swedish SHEEP study of 1800 subjects, considering myocardial infarction, with variations not explained by traditional factors. The Swedish WOLF study carries the analysis further, with cardiovascular risk factors.

He compared the two models, identifying areas of overlap, concerning effort. Job strain does not include personal aspects and coping behaviour. Stress reward imbalance gives broader insights into the labour market context. Work has combined both models, using the SHEEP study and gender differences, taking extrinsic and intrinsic elements separately, for women and for men. The risk increases dramatically. The predictive elements have gender differences.

He reached two conclusions. We can prove the validity of the models, showing gender differences which are not simply a matter of levels of exposure. In the case of hypertension, when studied with the SHEEP study, the conclusions were borne out.

There are practical implications, given effort-reward imbalance and job strain. Different levels of intervention can be envisaged, helping individuals, dealing with interpersonal relations, and addressing structural issues regarding participation and changing job tasks. He described work with 50 male bus drivers, reducing their levels of over-commitment.

Maternity Protection in Belgium

Karel van Damme considered the role for occupational physicians, noting that arrangements vary in different countries. He described a shift in approach to occupational health in the EU, and implications for maternity protection. Policies have to address the health needs of employees, and allow employment. He considered the relations between working conditions, susceptibility and health

status. Occupational medicine has three tools: pre-placement examinations, advantageous and improving working conditions, and periodic surveillance; we seek to employ all, in a context of total health. There is a new European tendency to standardisation, involving screening and exclusion, reduced to compliance and limit values, with standards, simplifying the complex workplace issues. Fitness testing can be simplified to susceptibility testing. Biological limit values can replace global health assessment. The link between the physician and the workplace is being broken. The “standardised” physical employee is now the basis for planning, disregarding individual differences and needs, but is nonsense in human and even scientific terms. In France it was argued by employers that occupational health should be handled by general practitioners, as detailed knowledge of the workplace is not needed. In Denmark there are few specialists in occupational health; Denmark vetoed health surveillance as part of preventive services within the Framework Directive.

He considered pregnancy, which affects the physical fitness of women, listing known effects and implications for work. Respiration is faster, meaning faster absorption of toxic substances in ambient air: there are EU regulations. Labour regulations do not deal with foetuses, regarded as organs of the mother. The evidence is clear regarding dangers for foetuses from pesticides. He considered relevant prohibited substances, and the duty of the employer to conduct risk assessments and take appropriate measures, including informing women, adapting the workplace if necessary, or giving an entitlement to maternity leave, in that order. Once it has been determined that a particular substance may cause cancer, this has to be announced across Europe, and pregnant or breast-feeding women are not to be exposed.

Is it appropriate to leave the decision to employers? The Directive does not state a prohibition, indicates that women cannot be obliged to work in such conditions, and cites limit values. The European tendency is to give responsibility to the employer for matters they know nothing about; this requires a consistent and impartial occupational health service to provide expertise and support. How can schemes in terms of tabulated risk be applied in standard practice? He presented an approach linking limit values and consequences, generating conclusions without requiring the involvement of physicians. This might be acceptable if all hazards of chemicals had been assessed correctly, and all limit values dealt with all possible health effects; such decision making processes give rise to concern. He outlined EU risk assessment processes, applied to potentially hazardous substances, arriving at official conclusions. The system is not completely reliable, with respect to pregnant women and their foetuses. When it comes to dose-response relationships, the problem is worse; it is a matter of adding safety factors. Limit values are presented as protective, but often are not. How are we to define adverse health effects? Where do we draw the line? He listed numerous reproductive outcomes associated with women’s exposure to workplace hazards. Who decides? Upon what? For whom? How? Which decision? Why? On which grounds? Are decision-making processes in line with ethical values? He considered women, employers, occupational health physicians, member states, and the EU; then individual and collective decisions with respect to workers and job applicants. If there is no integral occupational physician involvement, enterprises may not be covered by preventive services. Physicians may intervene to exclude some pregnant women, but in Denmark most pregnant women take at least 8

weeks sickness absence: pregnancy becomes a disease. The social partners have regarded occupational physicians as unnecessary, thus removing their vital preventive role. For most there is no risk assessment; they are victims of the standardisation approach. Informed consent is an unreliable approach to protection: he illustrated pressures on individual nurses to work despite possible risks. To leave decisions to individuals helps meet the needs of employers; societal problems remain.

Sylvia Wood noted that these are not new dilemmas. Occupational physicians have been their own worst enemies, explaining why they are being excluded from this work. It is for each EU member state to improve on the basis set by a Directive. Health criteria are not the only criteria used in judgements regarding the workplace. A level of wealth is needed to keep a level of health. She cited problems raised by the decreasing workforce, and the role of the occupational physician in matching workers and work.

Interventions in Italy: Women, Health and Work

Marina Fardi described an initiative of three trade unions, public health services specialists, and the Ministry of Health and Labour Inspectorate, with concern for risks to which women are exposed. Private services are available in every workplace, following the Framework Directive. In the past, work was on biological differences, and they needed to take account of equal opportunities, drawing on experience elsewhere in the EU and OECD. Risk assessment had to take account of particular exposures to risk, and often only the workplace was considered, rather than the people concerned. The subjects of risk are not neutral with respect to gender. Accurate assessment is needed in areas where women are particularly prevalent. An integrated approach is needed, but far from easy. Some see new technology and communications as more important than human health and safety.

The challenge was to develop a strategy for action. Positive actions were conducted on pregnancy, accidents (in particular biological risks), and working hours (in particular night work). New initiatives were needed on stress and the ergonomic implications in the workplace. The normal approach of women has been to take sick leave where necessary, but this is less common in contexts such as hospitals. Health and safety policies tend to take little account of women. The debate has been re-opened with the implementation of parental leave. The list of limited exposures is being reviewed. Small accidents may be important, as women in general incur less accidents, thus measures tend to be based on the experience of men. Bargaining strategies were modified to meet the needs of women; experience in the Milan region has been used as a guide elsewhere.

She outlined a survey and intervention concerning musculoskeletal disorders; there was no specific legislation, but an epidemic situation. The response was effective from trade unions, particularly when representatives were women. There were worries about the attitudes of employers, but nine enterprises joined the project (two laundries, two food factories, one toy maker, two assembly plants and two data entry companies), together with representatives of workers. They did not want to dismantle existing systems in the firms, deciding when to develop extensions. Workers were surveyed regarding their health and work organisation.

An introductory video launched the project, followed by discussion with experts regarding the need for further analysis, and with employers. At the enterprise level the project involved occupational health experts. New work organisation design involved increased consultation, and teamworking, men and women working together. It is a question of whether the changes are sufficient, for example in laundries, where the workforce are largely women. New risk assessment approaches have been developed.

There are still open questions, given that the project covered only nine enterprises at first. Trade unions are more accustomed to criticising the activities of others, rather than taking an active partnership role. They need to improve their knowledge base, or their efforts can be counter-productive. Some trade unions are reluctant to take a lead, and prefer to use project data in their own work. Women's questions are not given a central place in occupational health and safety; data collection on a gender basis has begun, with links between data sources developing.

Gender Perspectives in Ergonomic Standards

Aleid Ringelberg summarised standardisation in Europe, based on consensus development by interested parties, including social partners, and health and safety specialists. It is not an easy process, and can take a long time, with original aims hard to meet. She is concerned with gender perspectives, rather than just differences.

She took the draft European standard on manual handling, for which she convenes European and international groups. Interest is increasing from industry, from companies such as Fiat and Whirlpool. The Machinery Directive provides a methodological context, at first not taking account of gender differences, but recognising cultural differences in approaches. Scandinavians tend to consider all workers, rather than starting with gender. The NIOSH standards provided another starting point. The draft standard has been completed, but not yet approved. The user of the standard, conducting the risk assessment, can choose the nature of the population for which risk is to be assessed. Machinery is not itself gender specific, but designers and manufacturers need to take gender differences into account.

She considered gender differences, and debates on the nature of ergonomics: adjusting machine and man. A single risk assessment improves operations for all, not just concentrating on the weakest. It is important to clarify the aims of the activity, including protection or participation in the labour market, looking at the wider agenda of diversity. There is no single solution; much depends on designers of machinery. The standardisation group cannot decide, but make data available for risk assessment.

She discussed mainstreaming, showing more respect for a diversity of workers. There is knowledge to support inclusion and improved risk assessment. Other strategies are needed to take account of gender issues. The recent draft standard repetitive handling at high frequency has no separate provision for gender.

Sylvia Wood declared that workplace risk assessment is person based: it makes sense, with equipment, to identify risks for all intended users. An alternative

would be to require gender sensitivity in design, but that would be a political decision.

How to Implement the “Mainstream” Concept to Improve the State of OSH

Karel van Damme addressed education and responsibility, worried about increasing responsibility for individuals, noting problems for the unskilled, facing increased power inequality. He saw problems based on outsourcing, with risks passed to subcontractors, resulting in a situation where preventive health and safety does not work. Preventive services have been introduced at a time when organisations have fragmented; we are drifting away from the goal of protection. In Belgium occupational health physicians are covered by detailed legislation, and keep detailed medical records throughout working life. The alternative is general protection, and then monitoring of labels, etc. at workplace level; this is not enough. He discussed the Privacy Regulation, restricting access to data for academics, not to employers or doctors. This restricts the potential for large-scale surveys of an academic nature, rather than by companies. We need to take account of the needs of the most vulnerable.

Annika Härenstam agreed with the analysis, borne out in the MOA study. These are issues of power: individuals feel under pressure by employers regarding trade union membership and access to occupational health services. These are European wide issues, in the context of management strategies and the global economy. There must be other ways of presenting data, which could help in communication at a political level.

Richard Peter noted that problems, such as with gender, can be similar in different countries. Monitoring of working conditions and exposures is needed, particularly with the unskilled. Often risks are associated with occupational position, not just location, and psychosocial factors are ignored. There is experience in Germany of collecting such data; collaboration with health insurance is helpful: the insurance organisations collect data together with companies. Concentration on highest risk employees needs to include job enrichment and job training, or the result can be job overload.

Sylvia Wood felt we have sufficient data; what is lacking is commitment by those in power. The discussion on fragmentation needs to be broadened to cover small enterprises, who need a universal system; nobody has moved towards a solution. Solutions are available, and if the politicians were committed, it could happen. It has not been a priority for voters, so the key is to raise the profile of the issues, pointing out that people have been deprived of knowledge and assistance. Lives can be improved if we use the knowledge we have. We know how to improve jobs, and problems with VDUs, yet we allow problems to happen. Why can we not use the data to move forward?

Aleid Ringelberg favours strengthening workers' and civil rights. Why do we accept the present situation? Why is there insufficient awareness and prevention? Within the EU, with privacy laws, it is harder to gather data on individuals, but cluster analysis can be effective. Women are aware of health issues affecting them

and their families: we need a new movement from workers and individuals, and media attention.

Anders Englund took the model presented by Karel van Damme, and saw how the labour market in general is following the lead taken by the construction industry. Often the subcontractor is a single person. He recalled leftist debates on employment in the 1960s, in terms of purchasing and sale of labour. Now we find the purchase of hours from subcontractors, and a new market situation, where the weakest, with the least education and least permanence of employment, are the losers. This makes co-operation on the lines of the Swedish model much harder.

More information is needed on gender differences and inequalities in the four dimensions of biological, physical, psychological and social influences on health. Existing data should be explored for this purpose; new sources are also needed, designed to address gender sensitive issues, such as work in the home, unpaid work and contractual basis for employment. New surveys need to be inclusive of vulnerable groups, and general population based surveys will be important. Cross-country comparisons will be important because differences exist across Europe, e.g. in the extent of inequalities in health. Comparison will help identify poor performers but also present opportunities to identify positive factors and good practices. Cross-country comparisons mean a need for comparable data. It will be necessary to ensure that EU wide data concerning gender perspectives are relevant to national needs and take account of cultural differences. Information will be needed on trends, and EUROSTAT needs to consider how best it can obtain such data in the context of rapidly changing labour markets, working and living conditions, and cultural, diversity of EU countries.

Market forces are creating an invisible, mobile, vulnerable, changing group of workers, which is getting larger. The role of governments is to ensure that all workplaces are accessible, safe and healthy for all workers. This requires EU wide action, creating a level playing field. There needs to be national legislation, including prevention of discrimination in employment policies. Public awareness and support need to be increased. All workers need access to expert occupational health help and advice. The government has to ensure that skilling and training takes place, with support, and is available lifelong. Standards are useful in marketing, for advice and guidance, but their impact should not be such as to exclude people.

European Trade Union Perspective

Laurent Vogel saw the perspectives of employers and trade unions as separate. The issues are difficult for trade unions, given their role in the labour market and their view on changes needed in society, increasing equality. There can be tensions between these priorities: in negotiations wider societal issues may be disregarded, and occupational health and equality may not be priorities. Unions need to recognise their limits, and what has to be addressed at the public level. The definition of standards and rules is not a matter for daily negotiation. Basic objectives must be taken into account in daily negotiations, but this is not easy. Effective collective bargaining can produce results that are bad for equality.

He cited an Italian case, where moves to flexibility preserved jobs at the expense of women. In a Belgian case where factory closure was threatened, the result was

part-time work for women. Women argued that the choice should be individual, and not gender based. There is no magic solution. One route is through the internal organisation of unions, getting better at listening to the voices of women, and seeing themselves from a critical point of view. Unions need to see that they have several partners, not just employers, but also government, parliament, women's organisations, environmental groups, etc. There needs to be a bridge with other agendas in society. The intervention of public authorities is fundamental for health, including issues of families, education and qualifications, which cannot just be handled at the workplace. In society, dialogue needs to be developed to stimulate public authority functions.

We are speaking about boys and girls, improving working conditions for all workers. There are gender dimensions in the building industry, with denial of risks based on models of virility, which exclude not only women but also many men, who do not respect that approach. He considered the position of men in mixed workplaces, where there have been traditions of separate working. Transformation of society depends on people being able to work together, in work and outside. This is a field for trade union action, though trade unions are not the main actors.

What can trade unions do regarding health and safety? The concept of risk assessment and workplace assessment needs to incorporate gender perspectives, and the experience of the workers themselves. This will provide a better basis for negotiation. He cited a Spanish case, where moves to flexibility had been disadvantageous to women, and the gender dimension justified renegotiation. Lessons had been learned from trade union experience in Canada.

There needs to be a bridge between the Directives of 1976 and 1989, clarifying responsibility of employers for health and safety and affirmative action. The Framework Directive had excluded groups including domestic working. The Manual Handling Directive is not enough to cover the needs of women. Reproductive risks need to be addressed. The gender neutral approach is not enough: Directives may need to be revised in light of evidence on gender aspects of health and safety.

Regulatory Agency Perspective

Sylvia Wood is a member of the regulatory authority and an occupational physician, trying to persuade governments, but then representing them. Should government lead or follow? Does it recognise the need for change without being pressed by popular demand? There is a need to raise awareness. In the market economy, creation of employment is the priority, rather than health and safety. What is the concern within the government of the day, at national or EU level? Solutions need to match perceived concerns. This means presenting the case as an employment issue, creating sustainable jobs. Creating wealth should involve healthy working conditions, as an integral part. Governments should empower people. Should equality be linked to occupational health? It depends whether that is the issue of the day. The gender dimension includes consideration of the best conditions for the nurture of children, and working women. There may be future problems arising from current practices. At present the economy needs female

workers, but if unemployment rises, the debate on the role of women in the workplace will return.

She considered the role of regulation, and started from a medical model, where regulations set a baseline standard, framing an agenda by which the issue will be addressed. In health and safety, where the regulation could not be enforced, it may not be established. There is an inspection and enforcement model, rather than prevention.

She addressed linkage of the 1976 and 1989 Directives. Work on health and safety dates back to concerns for working hours, which are now dealt with elsewhere, with new more physical hazards as the focus. She favours a holistic approach, rather than compartmentalisation. She reflected on 1991 Irish guidelines for risk assessment, covering the range of hazards and considering the real person. Are there enough trained people? Are there people able to adapt workplaces? What are the financial consequences? Why was this not part of the Framework Directive? The Pregnancy Directive could usefully have addressed the wider field of reproductive risks, recognising the normal nature of the process.

There is a lack of public demand to address gender issues at present. She asked whether there was social partner demand for a separate consideration of women, rather than vulnerable workers. There needs to be a 10-year agenda for the world of work, and rights for the population as a whole. Legislators do not seem to be addressing these issues, preferring to compartmentalise. The focus of attention needs to be real people. Why has the Framework Directive not been used to address these issues more effectively? Government departments separate the consideration of health and labour market issues, with a pattern of compartmentalisation. Links and bridges are needed, under the general heading of working conditions.

Workshop Participants

Karel van Damme, Inspectorate of Health and Safety, Louvain, Belgium
Anders Englund, NBOSH, Stockholm, Sweden
Richard Ennals, Kingston University, UK
Roger Falk, journalist, Sweden
Marina Finardi, trade unionist, Milan, Italy
Annika Härenstam, NIWL, Stockholm, Sweden
Kaisa Kauppinen, Institute of Occupational Health, Helsinki, Finland
Carme Valls Llobet, Centre for Analysis and Health Programmes, Barcelona, Spain
John Osman, HSE, Merseyside, UK
Richard Peter, University of Ulm, Germany
Aleid Ringelberg, consultant ergonomist, Hillegem, Netherlands
Izabella Rohlf, physician and epidemiologist, Barcelona, Spain
Laurent Vogel, TUTB, Brussels
Arne Wennberg, NIWL, Sweden
Sylvia Wood, Health and Safety Authority, Dublin, Ireland

2. Gender Aspects of Workplace Health Promotion in a European Perspective

The workshop was led by Ewa Menckel, and held at the Office of the Swedish Trade Unions in Brussels, 11–13 September 2000.

Gender Aspects and Policies: Is There a Need for a Gender-Specific or Gender Sensitive Approach in Europe?

Equal Opportunities

Gisela Lange, from the European Commission DG Employment and Social Affairs, specialises in equal opportunities, after working in public health. She introduced European Commission policies on gender, taking account of differences between men and women. Only women can give birth, and require provision in support of maternity, including possible changes in workplace conditions, and paid leave. Sweden considered that women have the individual human right to work; ILO mandatory leave provisions prevailed. Maternity protection gives insight into sex and gender, as parenting is learned behaviour, socially determined. Ninety per cent of those taking parental leave in the EU are women.

Equal opportunities principles mean equal choice for men and women. Since 1957 a legal framework for equality has developed, covering equal pay, equal access to work, social security and equal treatment for self-employed, parental leave and part-time working. Women need support to compete on equal terms; inequality continues, with job segregation and lower pay. Few women are in senior decision-making positions. The focus switched to society, and mainstreaming, covering active strategies to promote equality, through positive actions and general policies. Mainstreaming is concerned with “the direction of the big river”, mobilising, raising awareness, assessing gender impacts, gender proofing and monitoring. Ninety per cent of part-time workers are women: this needs to be considered in regulations. Analysis precedes determination of need for action under a gender heading. Mainstreaming is based on diversity, affecting men and women. The Amsterdam Treaty recognises mainstreaming: gender mainstreaming is an obligation and a task at EU level. Promotion of health and consideration of gender perspective are obligatory. Restriction in freedom of choice leads to negative stress, with hectic work a problem for men more than for women. She gave examples of factory closures, and implications for company and community. Textile closures receive less publicity, as women workers are primarily affected. If a bus route closes, serving a factory with women workers, implications can be drastic for the women, without the family car. Analysis of impacts is necessary; social situations of men and women are not the same.

Sexual harassment is a problem for lower paid young women, with male superiors. It is widespread, with 40–50% of women complaining of the problem. Clear definitions are lacking, together with awareness and legislation. Agreement at social partners was sought at European level. A draft Directive has been adopted by the Commission: sexual harassment deprives victims of the right to equal treatment.

Women have problems reconciling private and work life, dependent on child care, which has received increasing attention, in the context of EU employment policies, based on the four pillars of employability, adaptability, entrepreneurship and equal opportunities. Good affordable child care is social justice and economic policy: practical mainstreaming.

The ILO Perspective

Jo-Jo Dy-Hammar highlighted ILO recognition of the interlinked nature of workplace, health promotion and gender. Women and economic empowerment, nutritional status, working time, social protection, and maternity protection are related to questions of gender and workplace health promotion. ILO's integrating theme is decent work: promotion of rights at work; employment; social protection; and social dialogue. ILO strives to promote opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity. The four dimensions of decent work reinforce each other. Gender equality is implicit in the concept of decent work that enables men and women to provide a decent standard of living for their families. International labour standards are directly relevant.

She discussed small and medium sized enterprises, linking working conditions and productivity, emphasising positive results. Case material comes from participating enterprises, emphasising low cost, learning by doing, and feedback. This reaches small farmers and community enterprises, impacting on employment generation. She considered stress and work organisation, with pressures of new technology and organisational change. Employability can be at the expense of security, with different life cycle patterns not properly supported by benefits. Insecurity among the elderly in an ageing society presents problems; social security systems need to be strengthened.

Migration is a major policy concern, together with home working, teleworking, and subcontracting. She considered gender sensitive labour market information, ways of dis-aggregating information concerning men and women.

Equal: a New Opportunity for Promoting Equal Opportunity Between Women and Men

Eva-Maria Forsberg gave an account of the European Social Fund, and gender. In recent years employment issues have had priority in the EU. ESF is the major tool for implementation, concentrating on human resource development, work organisation and labour market improvements, offering an integrated approach, enabling development of enterprises and individuals. Active involvement is important, backed by support and incentives, helping health and well-being. She

highlighted funding from the Equal Initiative 2000-2007, linked to the four pillars of European Employment Strategy. The programme will include positive actions, and requires co-operation between member states. It supports testing, development and dissemination of new ways of tackling discrimination and inequality, covering gender, age, ethnicity and disability. Each member state chooses themes. There is a partnership approach, with regional development partnerships with a common purpose, including government, NGOs, social partners, SMEs. Empowerment is a key feature: all partners should participate in decisions and implementation. Transnationality is a vital dimension.

The Swedish strategy promotes workplace diversity, facilitating access and return to the labour market for those who have difficulty in being integrated. Utilising and developing people's ability and competence is a precondition for growth and development. Exclusion from the labour market leads to inequality and instability. Society needs to recognise responsibility, mainstreaming diversity. Networking and regional partnership are vital. The Equal partnership approach raises challenges; actions are required. Sweden has chosen to reduce gender gaps and reduce gender segregation in the labour market. Gender segregation is bound up with internal processes in organisation at the workplace, and employers' recruitment policies. Education and segregation in the labour market are linked. Men are over-represented in IT; organisational issues must be addressed. Evaluations of development projects show a balance of resource allocation, but little impact on power balance. Women and men must be able to participate on an equal basis, taking account of gender differences and supported by senior management. Integration is the most effective way forward, applying available knowledge.

Gender Issues in Working Life

Raili Perimäki-Dietrich emphasised stress, repetitive work, problems of Taylorism and time pressure, as experienced by women. Workplaces in Scandinavia are generally gender segregated. Workplace health promotion is important; there are not enough women in key positions. A survey of immediate superiors showed an average of 23% women. She is the first woman to hold such a senior position in the Finnish trade unions and as a representative at the Bilbao Agency. Occupational health policy in Europe has been made by men; discussions of stress are dominated by employers and men; the female perspective is neglected. At European, national and company level, there is a need for women to be involved, including as social partner representatives. Discrimination at work is linked to the family situation, or working time, as women are more likely to work part-time. In Finland there is discrimination regarding political and trade union activity. Young men are favoured, while women do not benefit from having better qualifications. Men have more accidents, and take more risks.

National Legislation and Ways of Organising Enterprises Are Inappropriate to Women's Needs in Working Life

Odd Bjørnstad noted that legislation has developed where women are in a minority, such as mechanical engineering, mining, oil and offshore. In Norway

there are no restrictions on women participating, but legislation is more suitable for men. There is gender segregation in professional life and career opportunities: more than half of women work in professions where they represent 70% of employees. In nursing and health care 93% are women, and in hotels and restaurants 82%. Working environments where women are in the majority have received less attention, but often involve heavy loads and monotonous work. Inappropriate working conditions may be linked to work related musculoskeletal disorders. The working environment may be the cause, not biological factors. Men who work in female-dominated work tend to have higher rates of disease and sick leave. WHP interventions should be in women dominated areas which enforce conditions more obvious in men's work, such as control, variation, reasonable work loads, and developing gender specific analyses requiring promotion and intervention. This means a focus on structural issues, rather than biological factors.

Gisela Lange noted that the Commission applies mainstreaming to its own work. It is a question of checking national employment plans, recommending whether they complied with EU policy. This is being accepted slowly. Mainstreaming was often absent, and gender aspects should be stressed in each pillar. We should target and exploit diversity.

Jo-Jo Dy-Hammar noted that effective workplace health promotion calls for policy makers and practitioners to go beyond narrow specialisation and a narrow vision of prevention of accidents and illness, towards more comprehensive strategies for improving working conditions and improving workers' health, ("wellness" of work). Working conditions need to be interpreted in a wide sense, to include hours of work, the intensity of work, maternity leave, paternity or other family-related leaves, work organisation etc. We need an approach which fuses equality, employment and health concerns; there are many areas in which the knowledge base is weak, and communication channels are poor.

Taking into Account Gender Aspects in EU Member States

Need for Non-smoking Policies in the Workplace to Improve Women's Health

Sibylle Fleitmann wants action against smoking in Europe, with support from WHO and the European Commission, as well as national groups. Smoking-related deaths among women have increased more than 10-fold in the EU over the period 1955–1995, with lung cancer rising more rapidly among women than men. Awareness has increased over the past decade, as gender aspects have become better understood, and networking has developed. Smoking related deaths in the EU exceed AIDS, suicides and accidents combined. Smoking rates among women are increasing in six EU countries, with the highest rates in Denmark. The initial expansion in women's smoking seems linked to emancipation. There are problems in Central and Eastern Europe. Numerous diseases are now linked to smoking,

including male impotence. Stopping smoking will significantly reduce lung cancer in the long term. Smoking rates are highest among low income populations, with women working in service jobs at particular risk.

There are additional risks for women, linked to reproduction and infant health. They become addicted faster than men, and use smoking to control stress and weight. Passive smoking, or environmental tobacco smoke (ETS), is a major pollutant, worse than car exhaust fumes. At an EU level, 77% of women occupy low income jobs. Exposure to ETS in bars and restaurants jeopardises the health of women, especially during pregnancy. Women are more exposed to smoking in terms of age, employment sector, employment level, and exposure to ETS. There has been litigation in the UK, over the impact of ETS on the health of the unborn child of an exposed worker, and there are cases in Ireland, Netherlands and Italy. EU legislation requires rest areas preventing discomfort for non-smokers, and protection for pregnant or breast-feeding women.

It is important to adopt smoke-free workplace policies in Europe, taking into account gender specific aspects. Research in the USA suggests that female workers can be predictors for smoke-free workplace policies. They have superior olfactory function, find it harder to quit, and are more accepting of preventive measures. Smoke free policies can prevent a major health risk, reduce dangers in the workplace, and reduce litigation. Women can be involved in effecting change: workplace health policies on tobacco can affect wider issues of public health.

Development of the Gender Equality Act in Iceland

Dagrun Thordardottir described the 1976 Gender Equality Act, covering equal opportunities in employment, education and society in general, making discrimination by sex illegal. Labour market status, salaries, training and working conditions of the genders were to be equalised as far as possible. The Act was reviewed in 1985, 1991 and 2000, covering international obligations, adding special measures to improve the status of women. Equal pay legislation has been enhanced, with proof of non-discrimination required. Equal representation is sought, and improved statistical reporting. Progress is slow, and women have few senior positions in Icelandic companies. An Act on Maternity/Paternity Leave and Parental Leave will come into force from 2000, giving children access to both parents, enabling women and men to co-ordinate family life and work, covering 80% of salary. All parents will have the same rights, with a total of 9 months, 3 months each and 3 months to be divided: the right is not assignable. This means a major advance for gender equality in the workplace; employers are taking similar risks when employing men and women, with respect to absence at childbirth.

She described models of good practice, based on awards from the Equal Status Council, and highlighted the Icelandic Shipping Company Eimskip. Gender aspects have been linked to strategic planning, on culture, management and image. Women managers have increased by 10% per year, with the target of equality, and an improved working environment for those with children. Women were offered demanding projects, and new staff were recruited, with increased management development training. Gender balance and human relations have improved.

Women at Work: The Spanish State of the Art

Maria Dolores Solé reported that women represent 37.12% of the working population, including 48% of the service sector. Spain has low female employment, and rates of unemployment higher than for men, with lower average salaries. Women are more sedentary, and drink and smoke less. Most women are salaried workers. Employment conditions and job content are different. Illness patterns are different, as are biological and reproductive aspects. Women have low paid jobs, averaging 75% of male incomes, are more affected by domestic tasks, and more likely to have part-time or temporary contracts. They dominate clerical and shop work; few are managers or senior crafts workers. There is lower pay for the same work in each category. Women have less autonomy, work lower in the hierarchy, with less motivation and self-esteem, and are subject to violence and mental illness. They spend twice as much time as men on domestic work, due to allocation of family roles. This has impacts for employment, health and absenteeism, including work overload, conflicts with family obligations, delayed childbirth, and health effects such as breast cancer. Analysing job content, requirements of men and women are different, even within the same jobs, such as cleaning. Women tend to have repetitive tasks, long periods without breaks, fixed positions, the requirement for agility and visual acuity. Women have more fatigue, aches, pains and heart problems, while men have accidents. This arises from pressure of work, and discrimination. Women are required to be caring, with social skills and managed feelings, in service jobs with overlapping tasks, sexist stereotypes, and lack of respect. Effects are clear, though statistics are limited. Different jobs lead to different risks and damage, the same jobs can lead to different tasks and damage.

Knowledge of health profiles is important to develop programmes and plans. She provided an analysis based on life expectancy (higher for women), self-rated health, general mortality, mortality from cardiovascular disease (45%), mortality from cancer (21%), and disability from musculoskeletal disease (63.9%), mental health (20%) and occupational injuries (15.7%). Women are not necessarily safer; their patterns of problems are different from men. Turning to biological aspects, there is need for particular research and in company guidelines for women during pregnancy, lactation and menstruation, communicated to stake-holders, and leading to constructive interventions. In Spain, this means musculoskeletal disorders, reproductive issues and mental health.

Equality and Gender Specificity in Working Conditions. Gender Approaches to WHP in Spain

Immaculada Adarves Yorno saw no contradiction between gender equality and gender specificity. For women and work, the need is for *equality*; for women and health, *specificity*; and for work and health, *diversity*. Gender analysis is needed, with more knowledge. Action is needed for equality at work, improving working conditions. We need to analyse gender specificity. Differences should be made visible. Current scientific knowledge is not enough; there are different accounts of symptoms for the same illnesses, such as breast cancer or the same kinds of illnesses, such as with heart attacks, and ways of expressing or feeling the same symptoms, as with AIDS. She discussed social (double burdens of work and family

roles), psychological (depression and stress) and biological levels (hormones, iron level etc). She argued for new training materials, developing interdisciplinary teams, to promote change. Professionals need to reflect on their work with women, meaning research on occupational health with a gender perspective, increasing involvement and networking by women, addressing the needs of women, with more qualitative studies, in addition to quantitative studies.

Differences in the State of Health Between the Genders in Germany. Should WHP Tackle this Issue?

Karin Kunkel gave an overview of the social situation of working women in Germany, who they fall behind in status and income, despite better education. Child care is poor, and gender segregation of family roles is rigid. Most carers are women. There are biological differences, different professional and familial constellations, and different ways of coping with pressures, such as responsibility for family health.

Benefit claims show details of illnesses linked to sick leave, within the German system managed by insurance companies. She analysed sick leave data from BKK, evaluated by gender, industry sector, professional status and vocation. The data cover illness and accidents, analysed on socio-demographic lines. Until the 1990s women had lower sick leave than men. BKK membership has changed in gender balance. More women than men are white collar, and illness is more common among blue collar workers, where men predominate. Women have higher rates of sick leave. The distribution of illnesses is different, with musculoskeletal disorders most common in both cases. Accidents are important for men, and psychiatric illnesses are more significant for women. Musculoskeletal disorders were broken down by status and sector, with more cases among blue collar workers, in particular cleaners, rubber producers and rail vehicle drivers. Psychiatric diseases are highest among the unemployed, who often have long-term health problems. Figures for hospital treatment suggest that having a paid job is good for women's health.

She described training courses for hospital cleaners in Hamburg; largely women, many migrants, with pressures of family and work. Musculoskeletal disorders were common, with a high sick leave rate, poor management, a lack of training, and lack of technical support for women. Shifts were understaffed, with time pressure, high responsibility, poor clothing and protection, and unhealthy postures. The targets were improved cleanliness, reduced consumption of materials and reduced strain. Work organisation was changed, with mixed working concepts, team working and autonomous planning of timing of work. New clothes and gloves were introduced, with training, supported by a manual, and including relaxation. Training included videos and models, dealing with migrant workers. WHP should focus on target groups and their living conditions, and be gender sensitive. Family friendly approaches can help. Companies and society should help women to work, with flexible working hours and protection against discrimination. WHP cannot solve social problems: that is a matter for politicians.

Regulations Concerning Women at Work in Austria

Gabriele Schauer described the legal framework in Austria regarding gender issues, covering pregnancy, night work, maternity leave, and gender discrimination. The Spagat project focuses on the working and living conditions of women, emphasising the role of shop stewards and managers in WHP. Spagat works with working women, helping them use their skills and knowledge, drawing on different areas of their lives. The project is running in 2000 and 2001, in 8 companies, concerning cleaners and telecom staff. The health circle method was discussed, involving shop stewards. The project involves researchers from occupational health, and trainers. Spagat is concerned with the social context of illness, and strains faced by women. Women face different stresses, and respond in different ways, given that they have responsibility for health in their families.

Gender Sensitivity and Instruments: Questionnaire for Self-assessment

Volker Grässle reported on the self-assessment process developed within the European Network for Workplace Health Promotion, based on the European model of Quality Management. The need was to develop tools for a continuous improvement process, enabling companies to be more effective. The results could be in terms of an image, satisfaction by workers and customers, and economic benefits. The package included work organisation, social responsibility, and workplace health promotion planning: the key is implementation. Different internal organisational groups need separate assessments, and overall reporting structures. He discussed tension between shareholder and stakeholder values. A gender specific checklist will be included.

Models of Good Practices and Gender Sensitivity

The EU Network Workplace Health Promotion (WHP), the Luxembourg Declaration and the Project “Models of Good Practice”, with Examples from Germany

Karl Kuhn addressed practicalities of developing the gender perspective, dealing with SMEs, as well as the mass of poor companies, despite strong legislation. The best performance model shows how effective companies are operating, including a number of success factors; the objective is to include gender from the outside, and in the daily routines of prevention services. Success depends on involving workers, securing co-operation within and between companies, a strong analysis of the initial situation, setting priorities and goals, health related communication, identifying and overcoming obstacles, and observation and analysis of measures taken. Data is not yet interpreted in a gender sensitive manner. Italian work on medicine has provided lessons on communication on health problems, and the principle of health circles. There are problems of male domination, to be overcome

through discussion, including use of female moderators. Evaluation needs to be improved, with a fresh look at success factors.

Gender Approaches in the EU Network WHP. Analysis of the 66 Models of Good Practice in the Network

Ewa Menckel analysed gender approaches in the EU Network “Workplace Health Promotion”, which ran to 1998, with each country choosing models of good practice. A fuller account was given by Elisabeth Lagerlöf at the workshop “Women’s Condition in the Workplace”, in this yearbook.

Health – Working Life – Women’s Life. Health Promotion Measures for Women Working in the Health Care Sector in Sweden

Monica Stenberg described a project carried out by the Swedish National Institute of Public Health and five counties, with numerous workplace projects, targeting nurse assistants and nurses’ aides. The five counties have separate projects but consistent principles, including active participation by the women, and the development of networks to spread knowledge. Many women at work face risks, linked to stress, which has risen markedly in recent years. She considered the Theorell and Karasek account of decision latitude and job strain. The gender perspective was important, with research on women’s life conditions and life style. She considered Antonovsky’s account of coherence and meaningfulness, and the importance of Rappaport’s account of empowerment, the possibility of taking part in decision making with equitable distribution of power. From knowledge, we need to move to emotion and then volition.

The key level was the local workplace, with a regional level in counties, and a national level. Many different methods are used; the project is process oriented, with active participation fundamental. Methods include mentorship, problem based learning groups, study groups, counselling dialogue, lectures, learning observation and physical activities (including African dance and horseback riding). The women move from passive workers to active players. Indignation is a powerful tool, and needs means of expression. The project narrows gaps between individuals, professions and units. Endorsement is vital, from politicians, and management structures at all level, with support for project leaders, and regular meetings; learning processes take time. External evaluation is concerned with backing for survival, and the effects of health promotion. The underlying ideas are reconstructed, effectiveness assessed, progress observed and reported. Interim conclusions concern involvement of all levels, finding the inner strength of individuals, putting it to good use. More gender research is needed on women and men, and legislation. Methods are important, concerning transfer and dissemination of knowledge.

TUC Gender Agenda

Jane Paul argued that health and safety should link with the equality agenda, mainstreaming health and safety. UK legislation stresses the rights of all workers to workplace health and safety, and a preventive approach; getting equal rights is problematic if women have less power. Why are women agents of change in public health but not the workplace? When women work together, they can be stronger. TUC policy is “no more men only health and safety”, based on commitment to equality, fairness at work and the right to representation, gender sensitive approaches, and a combination of best practice and legal compliance. There are national government targets for improvements in occupational health and rehabilitation, but policies for future government services, affecting women’s jobs, neglect health and safety. Gender mainstreaming is under way; we need to mainstream workplace health as well. Women in the UK are half the workforce, often in precarious transient jobs, doing several part-time jobs, but under-represented in decisions. Few TUC Safety Representatives have been asked about female health and safety, few employers deal with pregnancy or gender specific issues. Women are less likely to be taken seriously on health concerns, less likely to be consulted; more emphasis is given to safety than to health. TUC health and safety strategy is based on partnership, with real employee involvement, making major differences to accident figures. The problem is sustaining improvements. The gender dimension includes women in the participation process, listening to and believing women. The TUC wants more women safety representatives in the workplace. Health concerns are less well-reported than safety issues; policies focus on control of sickness absence, and women under-report health problems. The TUC campaigns around work-related health issues, such as musculoskeletal disorders, and stress, using union surveys, and adding to the bargaining agenda, developing action plans, working for continuous improvement. **Gisela Lange** reported on a Swedish trade union complaint that their national system of invalidity benefits is seen as discriminatory. The system of reporting accidents is clear, whereas reporting of illnesses is less clear, effectively discriminating against women. She recommended that the issue should be taken up, as an example of a structural issue often not considered in the context of discrimination. This is better pursued through political routes, rather than through legal actions.

Workshop Participants

Immaculada Adarves Yorno, Madrid, Spain

Odd Bjørnstad, National Institute of Occupational Health, Oslo, Norway

Jo-Jo Dy-Hammar, ILO, Geneva

Richard Ennals, Kingston University, UK

Roger Falk, journalist, Sweden

Sibylle Fleitmann, European Network for Smoking Prevention, Brussels

Eva-Maria Forsberg, Swedish ESF Council, Stockholm, Sweden

Karin Grahm, NIWL, Sweden

Volker Grässle, SUVA, Luzern, Switzerland

Karl Kuhn, Federal Institute for Occupational Safety and Health, Dortmund, Germany

Karin Kunkel, BKK Bundesverband, Essen, Germany

Gisela Lange, EU Commission, DG Employment and Social Affairs, Brussels

Ewa Menckel, NIWL, Sweden

Jane Paul, TUC, UK

Raili Perimäki-Dietrich, Central Organisation of Finnish Trade Unions, Helsinki, Finland

Gabriele Schauer, Austria

Maria Dolores Solé, INSHT-CNCT, Barcelona, Spain

Monica Stenberg, National Institute of Public Health, Stockholm, Sweden

Dagrun Thorardottir, Administration of Occupational Safety and Health, Reykjavik, Iceland

3. Women's Condition in Working Life

The workshop was led by Carina Bildt, and held at the Office of the Swedish Trade Unions in Brussels on 18–20 September 2000.

Labour Market and the Economy: Gender Segregation

Pamela Meadows reported that in the UK, the national minimum wage has been introduced without problems; the EU Working Time Directive has been less successful. Regulations are to improve the working of the market, where there are deficiencies, or to produce fairer outcomes. Some regulations are intended to produce fairer outcomes for women, but may be offset by the effects of other regulations. Labour market regulation is discussed as if it had the same effects for men and women. Analysis of the gender dimension of the labour market assumes that regulation on gender equality or family friendly working policies has a positive outcome for women. Neither assumption is proven. She considered gender impacts of regulation dealing with employment protection, equal opportunities and part-time work, within the four pillars of European Employment Strategy. Women play an increasing role in the labour market; employment relationships are changing. Unemployment figures for the 15 EU member states show higher unemployment for women. Men and women had similar circumstances in UK, Ireland, Denmark and Austria. In Spain the level for women is double that of men, the difference in Italy and Greece is marked. Regulations are based on full-time permanent employment, typically male in manufacturing. Women are more likely to be in temporary jobs, self-employed or part-time. Pressure for labour market regulation was to support male breadwinners, protecting them from competition and the employer. Differentials continue after decades of equal opportunities legislation. Employment protection legislation works for men but not women. OECD assumes flexibility is a good thing, protection a bad thing. Employment regulation may conflict with equal opportunities. High female labour force participation is associated with a more women working part time; restrictions on part-time work may militate against female employment. Part-time work is popular, more full-time workers would prefer to work part-time. The more women work part-time, the more likely it is to be voluntary (except in Sweden, where many part-time female workers would

prefer to work full-time). Women do better in part-time pay, as a proportion of full-time pay, due to the groups of men concerned (often students or close to retirement). In Greece, part-timers earn more per hour than full-timers, numbers are small. Conclusions on the impact of regulations are difficult.

The New Economy and Work Life Balance: Conceptual Exploration and Case Studies

Diane Perrons noted low unemployment but long hours of work in the UK, especially among parents; increasing inequality, and social exclusion. Government has been encouraging women to get involved in the “New Economy”: this term is widely used to characterise the outcomes of contemporary restructuring processes, but in different ways: globalisation, increasing use of computing and information technologies, employment polarisation, feminisation and new patterns and hours of work. These different dimensions are connected, as the “e” economy consists of highly paid “self programmable knowledge workers” and low cost “generic” labour. The division may be structured, but not determined, by gender and ethnicity, overlooked by advocates of the new economy and a more effective work/life balance. For women, the new economy offers opportunities and risks, not necessarily “the end of patriarchy” or “the corrosion of character”. Changes and divisions are not derived simply from the new economy, but from individual and social factors. One concern is job insecurity; claims are made about “wired people”; the evidence is less clear. There have been European studies of attitudes of young people, concerning jobs and relationships, episodic and insecure. In the UK low levels of child care support pose problems. Few new jobs are full-time and permanent, with a growth of “perma-tempers”, employed by temporary agencies. In the UK, there has been a marginal fall in job duration.

She discussed the 24/7 society, with long hours by parents, and new styles of family life. Divorce rates are higher among night workers, although incomes can be increased, and employers retain control over flexibility. Collective rhythms in society disappear, and expectation of working long hours creates problems for employees with commitments outside work. ICT facilitates increases in work intensity, and enables work to be managed so that work is constant, as in call centres. The UK government argues that the new economy offers scope for women; there are constraints, partly due to under-representation in the IT skills sector. The new economy is developing differentially, as illustrated in Brighton and Hove, full of creative people and social division. Three hundred small firms operate in the new media sector. Individuals work at home in the global economy, designing and managing websites. Are these opportunities for women, or do the old problems of home working continue?

The Links Between Male Violence, Women’s Education, and Work

Patrizia Romito emphasised the scale of the problem. Most working women have had experience of harassment; 50% of high school students and college students in the USA claim to have been harassed, not conducive to academic success. In

industrialised countries 50% of women claim harassment at work, with impacts on health and well-being. Rape in the workplace is extreme sexual harassment. Migrants, unemployed women, and women in informal employment, are more vulnerable. Rape is frequent; most occur under the age of 18, with consequences for health, life-style, education, work and well-being. The risk of sexual and physical assault is increased by poverty; assault increases the risk of poverty and unemployment. Links between domestic violence and work have been studied. Paid work of women concerned is often for financial autonomy, and at stake in domestic violence. Levels of domestic violence frequency vary; 5–15% cite rape in the previous year, with consequences for physical and psychological work; fear, shame and restrictions in everyday life, and for paid work. Research from the USA suggests that battered women experienced harassment in their work from their abusive partner, lost working days; many lost or had to leave their jobs because of abuse. She cited research in Italy on physical and sexual violence by partners and ex-partners. Precarious work covered 48.3% of those subjected to domestic violence. There was no association between violence, education and children. Case histories show pressure on women to leave their jobs, sometimes due to the violence of the partner. This can derail career plans, or force a move into less well-paid work. The dangers are greatest for poor and vulnerable women. In North America women on welfare who are victims of domestic violence find it impossible to complete government training programmes, a requirement for welfare payments. Male violence, women's education and work are linked through health effects of violence, affecting work and education, with ongoing impacts on health. Migrant women in illegal employment face increased risk of violence. Job content can be violent, as with prostitution or pornography, sources of employment.

Gender Equality, Work Organisation and Well-being: Equality Standards for a Good Workplace

Kaisa Kauppinen was concerned with equality, well-being and work organisation. Only in Finland and Portugal, within the EU, do women normally work full-time. Gender segregation is increasing: women are largely in healthcare, social work and teaching; men have greater variety, and dominate ICT. Women are increasingly employed on temporary contracts; child bearing patterns impact on career patterns, with greatest strain on those in their 30s. It is hard for women to find permanent work, even with good education. She described an action programme in Finland involving trade unions and employers. There could be some form of equality symbol awarded to successful organisations. The research team combined gender and life-long learning, with well-being as a focus. They worked with nine organisations across economic sectors, using quantitative and qualitative methods. No men worked as secretaries; qualitative accounts of jobs suggested ongoing gender segregation: women's lower salaries were an important factor. Women were more age-sensitive than men, especially around the age of 50; women under 35 felt not taken seriously. She described 8 new standards, with circle diagrams capturing different factors determining equality in the workplace: the level of equality, salary and remuneration, career opportunities, common goals, work atmosphere, culture and information flows, working conditions, and

reconciling family life. The work was set in a context of diversity, not simply of gender, but of age, ethnicity and cultural background.

Measuring Health: Indicators for Working Women?

Kristina Alexanderson argued that the male is the norm in medical science. Women's symptoms are taken less seriously than those of men. She considered health from a public health perspective, where data on ill health, risk factors and care utilisation are collected, covering mortality and morbidity. Life expectancy has risen; women live longer. More attention has been given to causes of male deaths. The problem may be why women die so soon, not why they die later than men. Ill health in a population can be measured in terms of self-reported illness, medically diagnosed disease, or sickness (the social role taken or given in society when having illness or disease). Gender perspectives are needed on different measures. There is more knowledge on male symptoms and diseases; women more often experience a lack of diagnosis for symptoms they present. Disease data covers ill health less for women than for men, so illness data are important, including illness actually experienced by women. Some diagnoses are more stigmatising, and subject to gender difference. We talk about health; it is often ill health that we measure. The concept of health is given different meanings: health and ill health are either opposites, on a continuum, or as different dimensions. Health is defined as *well-being*, as *capacity to act* or *to experience meaning*. Accounts of risk factors need to be gender sensitive, include sexual harassment, and operate at national, community, workplace and individual levels, with perspectives of professionals and patients seen in a gender context.

Sickness Absence and Disability Pension

Data on sickness absence and disability pension can be used as a measure of sickness in the working population, as data on social consequences of ill health, and as a risk factor. Women have higher illness, disease and sickness: overlap between categories is different for women and men. Swedish figures show higher sickness cash benefits and disability pensions for women. Days of sickness absence increase with age. There has been little research, considering the cost; it is unevenly distributed in the population with regard to gender, age, occupation, and socio-economic status. With teachers, women have more complaints, but sickness absence levels are not high. In metal working, levels for women are higher than for men; in wood working, men have higher levels. Women have higher overall rates of sickness absence and disability pension, as well as with musculoskeletal and psychiatric diagnoses; the largest diagnostic groups involved in sick leave and disability pension, followed by injuries and upper respiratory infections. Segregated workforces have higher sick leave rates. Men are more often given permanent disability pensions; women are given such pensions on a temporary basis. Mechanisms need to be investigated; few studies are longitudinal. Factors behind sickness absence, and the consequences, are little studied. Sickness absence during pregnancy is separately administered. At an individual level, women are more often ill, a major reason behind sick leave, have different life situations, including unpaid work, abuse and economic circumstances, experi-

ences, different illness behaviour. At work place level, men have been taken as the norm, but demands and attitudes are different.

Gender Assessment of the EU Network for Workplace Health Promotion's Project "Models of Good Practice"

Elisabeth Lagerlöf noted that in 1996 a European Network for Workplace Health Promotion was set up. In 1997 a project to identify and disseminate Models of Good Practices (MOGP) was started. Each member state had to identify four Models; additional challenge was to incorporate equal opportunities elements as a mainstream feature. The Good Models were presented in Bonn May 1999. The European Community pledged to incorporate equality between men and women in policies, actions and programmes. Mainstreaming implies gender-oriented assessment of legislation, directives, action programme, and statistics. A gender sensitive approach to workplace health promotion is needed, because of: the gender segregated labour market; different health outcomes at work among women and men; women's subordinate positions at work, with less decision-making and control over work; less participation in decision-making at work; and division of work between work and family life. Women have a double burden of responsibilities. Training methods and methods for workplace change should be approached differently, for women and men to have equal possibilities in their work. Type of jobs, work content, decision possibilities, division between job and family life are different. Gender has to be considered, and methods chosen to achieve improved work organisation and equal rights to health at work. Women's experiences are seldom heard. The written documentation was analysed. No particular emphasis was put on gender, although the questionnaire asked for the number of female employees, and what was done to reconcile family life with working life. Measures with a gender-specific impact on health and working conditions were analysed, with the approach to workplace health promotion used to achieve the results, based on representative participation and/or direct participation. The results were scrutinised for gender specific outcomes. In 22 companies measures of gender specific actions were mentioned. Only 14 gave information on how many women they employed. Many companies were in male dominated sectors. Few special measures were mentioned particular to women's health. Most gender specific actions concern coping with the double burden of work and family life through flexible working hours or part-time. These actions are often related to women, and mostly found in female dominated sectors. Only 2 of the 66 enterprises had preventive actions against harassment at work. Most chose a direct participation model. None mentions the need for gender specific methods in workplace health promotion. No results are presented divided by sex. Gender has been neglected; chosen models mirror the male norm of working life, working conditions and health matters. The EU policy of mainstreaming underestimates problems in overcoming gender differences at work, and the need for a systematic gender assessment of existing European standards, norms and projects within health and safety.

Linking Equality and Occupational Health Agendas: A Challenge for Trade Unions and Preventative Systems

Laurent Vogel reported discussions linking equality and occupational health. Listening to workers and their experience raises new questions concerning division of labour and core policies. The same issue can be described from numerous perspectives, without recognising that the same people were involved, at the same time. The match girls suffered serious disease from white phosphorus. The case is cited in trade union history, with a marginal role, while the women could not separate issues of work and health. In the EU social policy and work environment policy have been handled separately, and “working conditions” has different meanings. There is little willingness to resolve the issue; “mainstreaming” is used as a cosmetic cover for inactivity. Improvements in terms of discrimination can be combined with a high level of gender segregation, as in Sweden. This can mean separate occupational health policies, not equality of access, merely adaptation of old systems to cater for women. He discussed mechanisms of invisibility. Occupational injuries are a concept developed for compensation purposes, not covering all injuries, but only those specified, starting with accidents and then adding particular diseases. The process is biased, and suggests that women are less at risk than men. Insurance companies record what they pay for. In Sweden, for budgetary reasons, there were cuts in compensation; automatically the level of recognition of injuries fell. Preventive action often deals with a recognised problem, typically affecting more men than women. Equality is not recognised as an objective in itself, but as a response to particular problems. A healthy workplace is accessible through working life, for men and women: this changes the nature of preventive action, and makes call centres unacceptable, as a modern form of torture. Representation is important; trade unions have a tradition of collective representation, meaning male domination in selection of strategic issues. He discussed experience of female workers in Italy through the process of modernisation and exclusion, and saw problems inherent in collective representation.

Practical experience is important. He is sceptical about “good practice”: a means of avoiding political questions, and presenting misleading pictures. Change is achieved through difficulty and conflict. He learned from experience in Quebec, linking debates in equality and occupational health. An analysis of obstacles is needed; experience shows how politics and practicality can be combined, as with agreements on working time in the Spanish metal sector. In Europe health and safety is a common area for representation at workplace level; there are no local permanent mechanisms on equality. It is important to use what exists. Safety representatives need the message that a healthy workplace is based on equal opportunities. Working in a given sector develops its own mode of representation; in building men tend to develop acceptance of risk. Jobs for men tend to be for only certain men. Critical views need to be developed, in the context of risk assessment, encompassing considerations of equality. This uses legally required processes to enable facilitation of workplace change.

Paid and Unpaid Work in Relation to Health

Lesley Doyal discussed defining work: formal paid, informal sector and unpaid care work. Issues are different for women in developing countries, with mixed patterns of work, and different consequences for health. In the private sector the distinction is between formal paid, and informal paid and unpaid work. In the public sector, all work is formal and paid. The NGO sector includes formal paid and volunteer work, much done by women. In addition, there is unpaid care work. Volunteer and unpaid work is not included in GNP. There are increasing variations of work: the formal sector is male intensive and best researched; the informal sector is female intensive, with little information available; unpaid care work is predominantly done by women, and least researched. There has been an increase in women's participation in waged work. Work has informalised, especially for women. Public sector employment and provision has declined, with intensification of women's unpaid caring work. In developed countries, women and men work between 35 and 50 hours per week, with women working 2 hours more, spending twice as much time on unpaid work, and 50–70% of time men do on paid work. This emphasises the importance of unpaid work for women.

Research is needed on occupational hazards in the informal sector, and health implications of unpaid caring responsibilities. Key areas in the informal sector include sex work, home-based work, paid domestic work and agriculture. In developed countries these tend to involve migrant and poor women. Key themes include measuring and mapping work, identifying physical risks, psychological risks, gender violence and abuse, and the nature of rewards received and resources available. This raises questions of what is meant by health, and work. More interdisciplinary research is needed; the analysis needs to cross social, psychological, and biological boundaries; techniques are needed to measure the impact of different kinds of work. She has studied women's work in Asia, finding creative approaches to organisation in the absence of trade unions. NGOs have done pioneering work on hazards. There are potential benefits of globalisation for occupational health for women, including linking women's NGOs. Networking is now possible in a new way. Changes in work can leave men unable to work, and women as breadwinners, changing gender divisions in the household. It is an age of household gender anxiety, with old ideas undermined by the reality of social change.

Action-oriented Research on Women's Occupational Health

Karen Messing considered women's occupational exposures, related to risks of heart disease, cancer, musculoskeletal disorders, psychological problems, skin disease, respiratory problems, and problems relating to the reproductive system. Information is lacking on exposures found in jobs held by women, and their dangers. Prevention may be inadequate; it is hard for women to change working conditions, due to discrimination, relative lack of unions, and isolation in small workplaces. Québec working women collaborated with researchers in a union-university partnership aimed at diminishing risks of jobs in traditionally female sectors, a collaboration between Québec University and three trade unions,

represented by women's committees. The partnership, "l'Invisible qui fait mal" (Invisible injuries), has four goals: identify health risks in women's work; make appropriate changes in the workplace; identify discrimination against women in occupational health practices; change public policy. Collaboration between unions and university is realised through joint overseer committees, at local and national levels. Needs of unions must be understood by researchers, and vice versa.

When balancing job demands, success depends on decision latitude. Analysis of work activity, based on French research approaches, balances capacities, constraints, health and requirements, arriving at strategies. Research needs indicators to monitor, leading to practical solutions. The work yields results, as dynamics are revealed, the scale is adjustable, the worker feels understood. It is not quantitative and does not look objective. The programme has produced analyses of the legal context of women's occupational health, and ergonomic analyses of specific jobs such as cleaners, bank tellers, hospital orderlies, receptionists, teachers, nurses, and office workers. She emphasised the physical nature of women's work, even in advanced countries. In Québec bank tellers stand, and research investigated prolonged standing. Ergonomic analysis of the teller, stool and cash drawer suggested ways of improving design. Many women felt pain each day: effects of consistent standing have not been researched. Constraint makes a difference, as reported by workers, but with limited supporting science. Research in Sweden has given a fuller picture, increasing understanding of pain. Research and sales staff compared experience of pain in the feet, and different thresholds of pain and coping behaviour, such as leaning. One outcome is work on a sit/stand chair. Trade unions and researchers in Canada have been impressed by results; joint action plans have resulted. The focus is on ergonomic norms, biological specificity, research methodologies, support for injured women workers and legislative change. Validation meetings are held; the real validation is seen in subsequent changes.

Gender Differences in Work-related Neck and Upper Limb Disorders

Lena Karlqvist dealt with work-related neck and upper limb disorders: women report more symptoms, in the gender segregated labour market, with different work tasks. More attention has been given to physical exposures faced by male workers, engaged in overall exertion rather than repetitive stress. Men are less likely to sit for long periods. She considered the fish industry in Sweden, where men and women have the same job titles. Roles are segregated; payment of women is by piecework. Research considered use of the knife; new models were designed for special roles, fitting the size of hand and needs of the task. The workload decreased, and women preferred the new knives. Work organisation was not considered. Jobs requiring high static loading of the neck and shoulders, with repetitive use of small muscle groups, involves a high risk of upper extremity disorders. During dynamic low-load manual work, the higher the speed of motion and/or the higher the precision demands are, an average in measured muscular forces relative to their capacity are found. The jobs are regarded as less strenuous than those of men, as they are differently strenuous; the levels of cases of occupational illness in upper extremities is high.

Symptoms are more frequent for women, based on reports from Statistics Sweden. The MOA study has recently finished. Men had more paid work, less unpaid work, and more recreation. Women were exposed to time pressures, VDU work, repetitive motions, physically demanding work, and strenuous working postures, as well as demands of domestic work. For men, exposure was to monotonous work, little social support, general physical load and strenuous working postures. Physical loads involved repetition, work pace, muscular force, non-neutral postures, stress, lack of recovery time, and vibrating tools. Work organisation covers organisation, allocation and supervision of production and service activities. Psychosocial work demands come from monotony and pace. The MUSIC-Norrtälje study showed the impact of piece work. With men, vibrating tools and low demands for competence were linked to increased risks of neck and shoulder disorders. Men faced less risks with time pressure and mental demands. With women risk increased with repetition, constraint and solitariness, job strain, time pressure, and limited opportunities to learn. Women are concentrated in particular jobs, and with particular physical requirements. Men and women differ in stature, body segment length, flexibility and muscle strength: this can cause problems with workstations and tools, due to poor fit.

She discussed non-keyboard input devices, which can add to shoulder strain; there have been few studies on differences in work technique. There is evidence linking musculoskeletal disorders and ergonomics: the best approach seems to be ergonomic redesign. Action oriented research has evaluated VDU work tables as supportive of varied postures. Knowledge and attitudes of manufacturers and employers can be improved. Women have higher background risk, but less specific risk; they may be more vulnerable to job strain, due to household responsibilities.

Health Consequences of Unemployment – a Gender Perspective

Anne Hammarström reported that most research about health consequences of unemployment has been performed on white, middle-aged men in blue-collar occupations, not taking women's perspectives into account. Leading researchers in the 70s and in the 80s claimed that unemployment is not as destructive for women: they compensate for negative effects of unemployment by returning to positions as housewives, which can provide compensation for paid work. Men, even in countries with high female employment rate as in Sweden, are regarded as breadwinners. Paid work is assumed to be less important for women. Studies of women show them to have been greatly affected by unemployment, with effects as serious as for men. She presented figures for unemployment in Sweden 1981-1996, and followed a cohort of school leavers during the boom and recession years, with a control group from boom years. Almost all unemployment research has focused at individual level, although effects at societal as well as group level indicate important gendered consequences such as wife and children battering, prostitution and rape. Such violence can be correlated with unemployment. She demonstrated the importance of gender order, structural organised relationships between men and women in society, in relation to distribution of work, resources and power. Those with worse health are more likely to become unemployed: to see

the effects of unemployment on health, longitudinal studies are needed, showing dose response correlation. Long term unemployment increases risk of ill health (somatic and psychological) as well as mortality, with no gender difference. She considered sexual risk taking, correlated with length of unemployment for men, but not women. Alcohol consumption is higher with unemployed men, over time. The pattern was different with women, due to having children. For men, having children does not affect alcohol consumption. The longer young women are unemployed, the more likely they are to become mothers. She discussed research in Northern Sweden, where the prognosis for young women is better. She presented a circle of experience, with 49% of early unemployed women, and 70% of men still unemployed after 5 years. Women seemed more able to relate to the concerns of others at their unemployment, take any job, and stop drinking as a responsible decision. She described qualitative work with cohorts of young unemployed, one group since 1981 and one since 1989. The women lived in a context of gender inequality, limited by relations to others. This meant taking boring and dangerous jobs, rather than educating oneself, to provide an income. Their lives, and femininity, were constructed through relations with others. Development is easier with choice. She discussed the construction of femininity in working class women in the context of subordination. Long term unemployed working class men constructed masculinity around compensating behaviour, taking risks. Gender order covers distribution of power, money and resources. Why were women employees more affected? One explanation is in terms of gender rationalisation, and gender distribution of jobs.

Childbirth and Work

Patrizia Romito interviewed a group of women in three countries, studying health at work after the birth of a child. The study covered those in paid employment during pregnancy, including in the illegal economy. In Italy and France the return rate was high; much lower in Spain. Resumption was slower in Italy. Factors influencing return were studied, including professional sector and type of contract. Those with secure jobs, with good regulations on pregnancy, returned soonest. Lower salaries meant less likelihood to return. There was some information on circumstances of partners in Spain, but not in France or Italy. Those whose job is most affected by childbirth are most in need of employment. Hospitalisation of babies delayed return, with different regulations. Often protection is limited to those with men in the regular labour market.

Women's Working Conditions Within the European Union

Kaisa Kauppinen outlined the impact of the recession on working conditions. It has taken time for the public sector to find new balance; many organisations are still anorexic, with impacts of burnout and dissatisfaction. There are differences between Northern and Southern Europe. Levels of female participation, and patterns of welfare provision, vary greatly. School systems are origins of some gender segregation, through early socialisation. The Second European Survey in 1996 was designed with gender specific issues in mind, and revealed differences

between working conditions of women and men. Male workers were more exposed to physical/chemical constraints. Women had less autonomy, and more frequently carry out short repetitive tasks. Women had more part time work. Women's participation in the work force has grown throughout the European Union over the last ten to twenty years, due to recognition of women's high level of education, their wish for autonomy, and necessity for two family incomes. Women make up 42% of the EU work force. In Denmark, Finland, Portugal and Sweden, every second employee is female, while women's participation is still lower in some countries, like Greece, Luxembourg and Spain. About 80% of European working women are employees, one in ten is self-employed, about 4% are in paid work at family firms.

Structural changes are occurring: the shift from rural to urban economy, from production of goods to services, adding to labour market competition, raising competence and skill requirements. Gender segregation in the labour market is strong, both vertical and horizontal, forcing women into service, health care and clerical jobs. There is segregation within occupations, resulting in task differentiation between women and men. Men are more evenly distributed across occupations, although craft and trade workers or plant and machine operators are male-dominated occupations. In the EU, work has become more people-oriented, especially in women's work with caring, nurturing and supportive roles, while men monopolise "heavy" manual, technical and managerial tasks. Precarious work is more common among female than male workers. In some countries (Belgium, Denmark, Finland, Ireland and Sweden) more women than men are found in these jobs. Insecure employment is common in Spain, with every third employed woman temporary.

Women work fewer hours per week than men; there is wide variation across the EU. One in four European women works fewer than 30 hours a week compared to 5% of men. In male-dominated occupations, most women work full-time; part-time solutions are more frequent among women employed in sales and service jobs, transport, and health care. Women's working time is largely determined by family situation. One woman in three with one child, and almost one woman in two with two children or more, work less than 35 hours per week. In the Netherlands and the UK, part-time employment is most common. Reduced work hours are found in Austria, Belgium and Sweden. Long work hours for working mothers are linked to increased stress and lower job satisfaction. Women regulate health and well-being by working shorter hours (voluntarily or otherwise) to balance the demands of work and career with family responsibilities. Women find it hard to fit into male work schedules. Women's part-time work and their dual burden is not only a work-load problem, or a stress problem, but also an obstacle to competence development and career opportunities. Part time work is involuntary when the worker has not managed to find full time employment; part-timing is regarded as voluntary when it is taken up as a preferred alternative. Involuntary part time work is more strongly associated with job dissatisfaction and ill-health than voluntary part-timing. The gender wage gap is still wide. Female manual workers earn between 65% and 90% of men's average wages. The wage gap is smallest in countries like Denmark, Finland and Sweden, and widest in Austria, Luxembourg, the UK and Ireland. Across the EU, few women are found in top positions, especially in the private sector. Senior management and line management are largely male preserves. Seventeen per cent of women and 33% of

men were in supervisory positions. Women's supervisory roles are limited to middle management positions: few have broken through the "glass ceiling".

Sexual harassment is a serious problem for many women in the EU. The European Survey reported that 3% (2 million) of women had been sexually harassed at work during the previous 12 months. Women with precarious employment were more often subjected to sexual harassment. The survey indicated differences across the EU in workplace interaction dynamics. The best opportunities for decision making, participation and consultation were in the Nordic Member States, the Netherlands, Italy and the UK. Less opportunities for participation and communication were found in Belgium, Germany, Greece, Portugal and Spain. Regarding organisational issues, differences between northern and southern workplace cultures were pronounced. Gender differences were persistent: women reported fewer learning opportunities, and less involvement in workplace decision-making. There was more communication, participation and less immediate managerial control in female-supervised than in male-supervised workplaces. Women supervisors rely more on team-work rather than on rigid authority.

Women's jobs are often "high demand-low control" jobs. Four in ten women had such working conditions compared to one in three men. Women less often had active "high demand-high control" tasks; they reported fewer possibilities to manage their time, such as days off and breaks at work. Literature on work stress has shown that jobs with little opportunity for decision-making, close supervision, and under-utilisation of skills and abilities, have negative effects on health at work. Women's working conditions involve less exposure to physical and chemical risk factors. In some sectors women are more exposed to ergonomically bad working conditions, and more exposed to monotonous, repetitive work. Many women suffer from musculoskeletal disorders associated with heavy lifting, awkward postures, monotonous and repetitive tasks and improper work organisation. Changes in working conditions affect women and men; women are particularly vulnerable. Preventive measures and greater gender sensitivity are needed to counterbalance these tendencies. Trends towards flexibility in location of work and working times should be monitored from a health and safety and equality perspective.

Equality planning was introduced as a strategy by which workplaces and work organisations can promote gender equality. Equality plans can both men and women, if they describe job differentiation and health and safety risks. Sexual harassment, bullying and intimidation are growing problems; new action models should be devised. Management commitment is essential.

Modern Living and Working Conditions Among Women and Men

Lena Karlqvist reported on the MOA study, now reported in academic papers in English. She worked on the project as a specialist ergonomist. The study was reported by Annika Härenstam, in this yearbook. On this occasion there was spirited discussion of the research methods, and how the results have been reported.

Women's Mental Health and Working Conditions

Carina Bildt reported that effects on women's mental health from gainful employment have been studied, indicating positive effects. Women's working conditions and living conditions differ from men's. Due to gender segregation and inequality in the labour market and at the workplace, women often perform work tasks with poor developmental possibilities, high demands and low decision latitude, high levels of stress, monotonous and repetitive work, low salaries and low status. Low status is correlated with high job stress, and women are often occupied in female dominated low status sectors of the labour market or possess low status positions within the organisations or companies, which might be one explanation for high levels of job stress among gainfully employed women. Since women have poorer developmental possibilities, they stay on in demanding working conditions for many years. This, plus women's double burden of both paid and unpaid work, (enhanced by inequality in the family) is a threat to women's health, both mental and physical. Several occupational risk factors for poor mental health (mainly sub-clinical depression and reduced mental wellbeing) have been identified. Time pressure and piecework is related to poor mental health among women, as are heavy work, high mental demands, high levels of job stress and sexual harassment.

A longitudinal, population based, Swedish study of working conditions and mental health among women correlated patterns of work, including shiftwork, with particular psychiatric diagnoses, including depression. A number of risk factors were identified, in line with earlier cross-sectional studies and studies of particular occupational groups. Preventive action is needed, in light of increased demands for flexibility, and psychosocial pressures on female employees.

The Portuguese Situation

Maria Antonia Linge reported that in some ways the Portuguese labour market resembles that of Northern Europe, with high levels of unemployment, particularly among women. Women work throughout their adult lives, typically full time, not leaving work for childbirth. There is gender segregation. Wages are low, and public child care services are poor. The priorities of government are reconciliation of family and working life, for both men and women, with a commitment to supporting children under the age of three. There is an attempt to encourage men to be more active in care for families. Parental leave has been introduced, covering two weeks paid leave for men after childbirth. The second priority is to build equality into the culture of the organisation, taking a mainstreaming approach. There is work in partnership with governmental bodies such as the labour inspectorate, who work with workplaces, and are in a good position to aid preventive measures, and to recommend improvements, regarding ergonomics, exposures and work organisation. They protect the rights of women to breast feed at work, and have an important informative mission.

Workshop Participants

Kristina Alexanderson, University of Linköping, Sweden,
Jetor Bernado, Labour Inspector, Portugal
Carina Bildt, Gender and Work, NIWL, Sweden
Lesley Doyal, University of Bristol, UK
Richard Ennals, Kingston University, UK
Roger Falk, journalist, Sweden
Lena Karlqvist, Gender and Work, NIWL, Sweden
Anne Hammarström, University of Umeå, Sweden
Kaisa Kauppinen, Finnish Institute of Occupational Health, Finland
Elisabeth Lagerlöf, NIVA, Finland
Maria Antonia Linge, Ministry of Labour, Portugal
Pamela Meadows, National Institute of Economic and Social Research, UK
Karen Messing, University of Québec, Montreal, Canada
Teresa Pargana, Labour Inspector, Portugal
Diane Perrons, London School of Economics, UK
Cunha Rego, Portuguese Commission for Equality, Portugal
Patrizia Romito, University of Trieste, Italy
Laurent Vogel, TUTB, Brussels

Multicultural Society

1. Workplace Diversity: A Research Perspective on Policy and Practice

The workshop was led by Lois Wise and Gabriella Fägerlind, and held at Novotel in Brussels 13–15 June 2000.

Kenneth Abrahamsson outlined current research work on diversity financed by the Swedish Council for Work Life Research. He highlighted work life and ICT, flexible work contracts, job creation, gender equity, discrimination and diversity. Work on diversity management compares the situation internationally, exploring the extent to which diversity pays; discrimination is costly. Research reviews found a shortage of good solid empirical research. Most knowledge in the field tends to be built on anecdotal evidence based on “best practices”, from large corporations. The challenge is to involve workplace diversity in the next phase of the organisation of work.

Policies and Practices

Paving the Way for Managing Diversity Training in the UK and Other European Countries

John Wrench starts from an interest in ethnic minorities, and discrimination in employment. He outlined work with ILO, culminating in diversity management. The ILO work on discrimination against immigrant workers lasted 7 years. A typology of roles was devised, based on content and strategy. The outcome was *information training* (the most common); *cultural awareness training* (engaging trainees in exercises to change attitudes); *racism awareness training* (to be exorcised from white people, an approach originating from the USA); *equal opportunities training* (changing behaviour); *anti-racism training* (changing attitudes, behaviour and organisations); and *diversity training* (the next logical step after barriers have been broken down, and aimed at managers). He reviewed progress in different EU countries, such as the UK, Netherlands, and Spain under these headings. The legal frameworks are very different, reflecting different patterns of immigrant workers. Progress in the UK and Netherlands was different. In the UK there had been historical progression through the six stages, while in

Netherlands an emphasis on information and cultural awareness training was now beginning to change directly towards diversity training.

In the European context, he considered the spread of American ideas when considering policies on discrimination against migrant workers. There is resistance to affirmative action; diversity management is seen as appealing, based on the business case. He outlined new diversity management initiatives in the UK and Scandinavia. Can we assume that American ideas will translate to Europe? Are the economic imperatives culture-free? Are there problems with using labels for ethnic identity in issues of diversity? These are linked to different histories of immigration and race relations: the guest worker approach, the assimilation approach, and the multicultural approach, with varying emphases across Europe. In the USA citizenship is acquired through birth; in Europe it can be more complex, so it is premature to talk of diversity management. In some countries there is resistance to using ethnic categories; French traditions contrasting with Anglo-Saxon approaches. Applying diversity policies can be difficult. Legislative frameworks vary, as do organisational frameworks for tackling discrimination.

Comparison of Affirmative Action Policies and Effects in the US and Sweden

Hans Ingvar Roth referred to affirmative action approaches to minority problems in a multicultural society. There are problems of integration and exclusion, as well as preservation of traditional culture. Affirmative action is mainly intended to help integration of disempowered groups.

Comparative studies can be helpful when the countries are similar, but Sweden and the USA are not: we can learn from differences. Criteria need to be chosen, drawing on history of discrimination, and inter-community relations. Such a comparison with South Africa, rectifying injustices to the majority, would now be helpful in aiding inward investment. Typically minorities are the focus of affirmative action. In the USA, race is the key problematic feature. In Europe culture is more the issue. National identity and belonging vary. Value communities vary in their extent. Black Americans want to take part in the American dream, but feel excluded. In Sweden there are various groups with cultural differences. Political cultures vary. The USA lacks a welfare state, but social engineering of race relations and affirmative action has been ambitious. Gunnar Myrdal discussed affirmative action in the early 1960s, described it precisely and sceptically, and showed ambivalence towards it. The situation is still ambivalent, but less debated. The American economy is going well, and the Supreme Court has been passive in recent years. In Sweden the issue involves strong opinions. Many weak forms of affirmative action have been implemented in Sweden; it has been a matter of defining disadvantaged categories, within assumed cultural homogeneity.

Kenneth Abrahamsson saw affirmative action as linked to social commitment. He considered the contexts of modern sectors of society, and community groups. There are issues for the corporate sector, the third sector and the social economy, in the context of the European Union.

Hans Ingvar Roth considered the recent debate in the USA; African Americans have a long way to go. The focus is on public agencies, and civil society activities with high public significance. Affirmative action is justified with reference to democratic accountability of the institutions. In Sweden the Social Democrats take a pragmatic approach, avoiding ideology to stay in power, and adjusting to the rhetoric of the market. Instead of social justice, diversity pays. Justice cannot be sold. What can be exported? Aspects of affirmative action are not best exported, but derive from the particular history of the country. There are issues of determining appropriate labels. Sweden has a different situation, as a new multicultural society, and the starting point is merit.

Men Are Always Suitable?

Elisabeth Sundin asked what is new about diversity: there have always been women, and disabled, old and young. In Sweden ethnicity and race are not new: the name of the concept is new. She works in gender studies, modernised as diversity studies. There has always been a gender division of labour, at all levels, and over time and space, but it is always changing. Gender segregation continues, but in different ways. We need to consider the practicalities of the real world, and what is happening in organisations. Her examples came from retail, with many people and a lot of money: it is sex segregated. Butchers tend to be men, and cashiers women, while men dominate management.

She referred to research on a training programme, concerned with competence for recruitment, in a company that has favoured working from the bottom up. Having appointed equal numbers of men and women, they found wage gaps and differences in fringe benefits, and new gender segregation, but on a higher level. The outcome was due to resistance at middle management level. Balanced recruitment of middle managers is difficult. If you remove ethnicity, women, old, young and disabled, few men are left. This company wanted more men, and offer higher salaries and promotion routes as attractions. There were no more men, and the imbalance of recruitment was not due to resistance from anyone other than men. She considered a retailer with a healthy country image, seeking higher prices linked to a quality profile for products and the workforce, with staff rotating roles. Butchering and cashier roles were excluded from rotation. Whose resistance was involved?

Why do managers not insist? In the training case, they did not know until it was shown. In the middle manager case, the men would not come in. In the rotation case, it was a matter of organisational culture. It is easy to underestimate resistance. Support of top management is necessary, but not sufficient. She asked about different types of diversity, different histories. Professions and occupational groups tend to operate in closed ways.

Diversity and Innovation

Gabriella Fägerlind noted the contribution of feminist research to work on diversity. She asked how well diversity management travels, for example, from the USA to Europe. American multinationals, implementing diversity management across their global operations, do not necessarily involve national specific factors

and issues. Swedish unions, with expectations of participation, presented complications for the simple transfer of American management ideas.

Multiculturalism and Innovation in the Global Market

Michael Frybourg concentrated on knowledge workers, and issues of qualifications and experience in the context of the Internet. Globalisation does not mean uniformity, and is not inconsistent with strong local activity. Global firms cover large areas, including people with different cultures. He is a transportation engineer, working on the Trans European Network, as proposed at Maastricht, covering transport, telecommunications and energy. Infrastructure takes time to develop. How can the network be used efficiently? New organisations seek to take advantage of existing structures. The Pan European Network includes Eastern Europe, with new patterns of interaction, conflict and co-operation between global and local activities.

The issue is the management of knowledge in an inter-connected world. In order to find particular information, you need to know what you are looking for, and have the right tools. Knowledge management is a major industry. Knowledge comes in different forms: through interaction, doing, understanding, and access to data and information. Many new billionaires in the USA are immigrants or children of immigrants. Culture means cohesiveness: shared context, ideas and language. Innovation comes from the right combination of cohesiveness and diversity. The more distant a culture, the more homogeneous it appears: thus Europe seems a unit to Americans.

He illustrated three different levels (local, intermediate and global) at which democracy and communication systems work, with different techniques. He distinguished explicit and tacit knowledge, argued that cultures vary in which approaches they typically use, and discussed the knowledge-creating company, combining conceptual and operational knowledge into systematic knowledge. Formal explicit knowledge operates more at the global level, and informal tacit knowledge at the local level. Standardisation is a global requirement, and innovation tends to be local. He distinguished the lawyer from the lover, the clone from the clown, the world product from the trademark, economy of scale and scope. Ethnographic study is applied to local culture and activity, with firms as tribes; he considered difficulties of language, law, technology and social organisation. Innovation is at the crossing point between local and global.

Lois Wise considered approaches to knowledge and ways of thinking, and consequences for technology, linked to social distance. Americans are more fact-based in their approaches, while Europeans seek to use intuitive approaches. There can be different perceptions of what constitute problems, and even whether a problem exists.

Exploring the Relations Between Workforce Diversity and the Implementation of Innovative Forms of Work Organisation

Gillian Shapiro is a researcher and consultant in a business school that is primarily concerned with the management of innovation, not of diversity; she considers issues of gender equality in relation to core business issues. She is

concerned with diversity and innovation (or organisational change), the impact of change on diversity, and the potential contributions of different groups to innovation. Diversity is important in successful knowledge management; there is a danger that knowledge management is sustaining inequalities in the labour market. Men and women have access to different networks. It is becoming harder to ignore these inequalities.

At policy and organisation levels, diversity and innovation tend to be considered and acted on separately; strategy is separate from human resources. Firms compete on soft factors, becoming more reliant on people. This is reflected in flattening hierarchies, teamworking, empowerment, and greater flexibility. Diversity becomes highlighted; international cultural diversity secures attention. Flexibility was introduced to cut costs and cut workers, but is now more about multitasking and variety of contractual forms. Firms are more affected by demographic and social change. There are more women in the labour market, and more dual career couples, with a search for better balance in work life. This can meet demands of both employees and employers.

She considered self-managing teams in a case study insurance company and a call centre, and the impact of innovative work organisation, finding the impact of gender, and positive motivation. The call centre has a technologically controlled environment, removing power from individuals. The innovation released the power of diverse groups.

Kenneth Abrahamsson pointed to the Green Paper “Partnership for a New Organisation of Work”, and the Four Pillars of Employment Strategy. Not all of the concepts are found in practice in the workplace. He considered “flexicurity” and “glocalism”. He saw innovation as a higher level concept.

Gillian Shapiro explained that her interpretation of equality is concerned with achieving a level playing field for all groups, generally in the context of the dominant group, with minorities being asked to change to fit in. Conversely, diversity magnifies a range of individual differences and focuses on the need for the organisation, rather than individuals only, to change.

Culture, Entrepreneurship and Diversity

Geerd Hofstede discussed multidisciplinary, and the division of labour in the social sciences, viewed horizontally or vertically. To understand complex issues, several perspectives are required. As a mechanical engineer, he considered entrepreneurship, with aspects of economics, management (typically undeveloped, as entrepreneurs tend not to apply theory), psychology, sociology and anthropology. Self-employment is not the same, but a good approximation. If you work for someone else, there is dependency. Definitions tend to be circular, defying easy quantification.

Cultural difference is important, and nationality is significant, with different paradigms of organisation theory. In the USA, in the beginning was the *market*, with markets used to explain religion and marriage. In France, in the beginning was the *power*. In Germany, in the beginning was *order*. In Poland, in the beginning was *efficiency*. In the Netherlands, in the beginning was *consensus* (the Polder model). In Nordic countries, in the beginning was *equality*. In the UK, in

the beginning was *system*. In China, in the beginning was the *family*. In Japan, in the beginning was *Japan*. Nationality constrains rationality.

The EIM database on entrepreneurship showed 24% of differences by country between entrepreneurs explained in these terms. Cultural indexes were considered, pooling data from the two research programmes. National differences can be seen in terms of inequality (power distance), uncertainty avoidance (fight or accept), relationships (loose or tight), gender roles (different or similar), and need gratification (later or now). Countries with strong uncertainty avoidance have more entrepreneurs. The key was dissatisfaction with quality of life, and the way their democracy worked.

Sander Wennekers considered entrepreneurship or waged employment. In the 1950s in Netherlands paid employment was the norm. There are now two options. He concentrated on business ownership (excluding agriculture) as a synonym for self-employment, with differences across nations. Figures are higher in Mediterranean countries than in the UK, USA and Netherlands, which are higher than Scandinavia. In Portugal there has been continuous increase, but decline elsewhere, with the USA setting the trend for increase. Japan and France show continued decline in self-employment. How can the movements be explained? He presented a conceptual model, including the carrying capacity of the market, occupational choice (with push and pull features), and the role of values and institutions. He concentrated on indirect influences on entrepreneurship. The key value is uncertainty avoidance, the mechanisms are the pull of good jobs with varying impact, and the pull of profits, stimulating entrepreneurship in low uncertainty avoidance countries. Entrepreneurship is important, and has an intrinsic contribution to diversity. The flow of women into entrepreneurship is increasing, and job satisfaction comes from doing one's own thing. Longitudinal studies showed that entrepreneurs were more satisfied with life.

Diversity, Innovation and Entrepreneurship

David Audretsch noted varieties of entrepreneurship across countries and over time, and highlighted the homogeneity of traditional IBM management. National policies tend to reduce diversity, with pressures to conform. He located policies in their contexts, and argued that the world has changed. Globalisation has hit national economies; western countries have lost competitive advantage in traditional processes. It is important that ideas are taken and new business formed. Entrepreneurship is important. What about diversity? Under Fordism workers did not need to think, but conform; homogeneity was efficient. Diversity was a political goal, associated with economic loss. In the knowledge economy, individual evaluations are important, and diversity broadens the range of outcomes. IBM changed, after experience of failure with personal computers. Diversity gives a wider range of ideas, important for competitive advantage.

Roy Thurik entrepreneurship as concerned with diversity, which might contribute to economic growth. Stability, continuity and homogeneity led to wealth, but not diversity of demand. The revival of business ownership came with new technology, and the network economy, accompanied by deregulation and variety of demand, with uncertainty and socio-cultural multipliers. New entrepreneurs are creating new activity, linked to growth, with dual causality: growth provides new

technology, demand and uncertainty; entrepreneurship increases competition, variety and innovation.

Gillian Shapiro saw links between entrepreneurship and diversity, clearer at the micro level. In the UK there is an increase in women entrepreneurs, and Asian shopkeepers as entrepreneurs, seeking to determine their own future. Educational failures are often involved in IT start-ups. Self-employment gives more control. The knowledge economy draws on diversity to be successful, but diversity is not always acknowledged or acted on by firms. With support for start-up companies in the UK, there is more rhetoric than effective support.

Diversity and Group Processes

Male Leadership and Gender Equality: Work in Local Government

Ingrid Pincus considered institutionalisation in three authorities, concentrating on resistance from men at élite level, and proposed a model, based on power and non-implementation. Gender equality plans and committees are supposed to be in place. Little feminist research has considered these issues, but work in Norway and the UK points to structural, organisational and cultural factors, and lack of understanding and knowledge. Leadership disinterest is highlighted. Men still dominate the highest levels in organisations. She distinguished categories of active and passive resistance, and considered a political approach to investigating the implementation process: the key is power struggles. She took the power model from American analyses of ethnic issues in Baltimore, including mobilisation of bias, and exercise of power to prevent change by those with privilege. Barriers are raised against challenges to the *status quo*. Political correctness was invoked in favour of gender equality, meaning that obstruction is covert, based on non-decision making. There is a series of barriers, covering inactivity, withholding resources, withholding legitimacy, questioning legitimacy of particular measures. Changes need to be seen more clearly. Those for and against change can be creative in their strategies. Male dominated groups confirm their masculinity.

New Insights into the Mechanisms Leading to Positive and Negative Effects of Diversity in Work Groups: Empirical Evidence for the Perceived Dissimilarity Openness Moderator Model

Charmine Härtel sees diversity in terms of people. Economic reasons for diversity are highlighted because business publication norms include linking research questions to the bottom line. It should be questioned whether diversity is best analysed in economic terms. Workforces are more diverse than in the past; global contacts mean organisations deal with diverse customers. Research gives mixed findings on effects of diversity in work groups. She argued for studying how diversity is perceived.

She presented the perceived dissimilarity openness moderator model, covering social categories, values and beliefs, skills and knowledge, organisational cohort

and verbal/non-verbal types of diversity. Outcomes can be affective, cognitive, and behavioural. She depicted perceived dissimilarity, rather than actual dissimilarities, as the crucial factor underlying potential problems in work groups. The openness to dissimilarity of individuals, groups and organisations, is the key factor determining whether perceived dissimilarity leads to negative or positive results. She considered negative and positive outcomes of diversity. High diversity can accelerate turnover and absenteeism rates, when openness to perceived dissimilarity is low. Perceived dissimilarity is a key concept; perception may be different from apparent dissimilarity. She looks at human resource practices in terms of diversity openness.

Increasing Workforce Diversity, Decreasing Attitudinal Differences: Exploring Alternative Explanations for Increased Homogeneity of Work Climate Perceptions and Levels of Job Satisfaction in an Increasingly Heterogeneous Workforce

Nadia Rubaii-Barrett posed central questions.

- To what extent do methods used in diversity research influence outcomes in ways that the researchers themselves do not fully understand? We may draw conclusions, and assume outcomes based on diversity that may be functions of our methods.
- We may observe the expected differences, and stop looking for alternative explanations, while if the results were unexpected we might dig deeper. Should we dig deeper in both cases?
- How often do we develop generalisations and recommendations based on single observation studies?
- Can we handle it if we find no difference?

Her work was on job satisfaction levels and perceptions of the work environment. She considered ethnicity, age, gender, language, education, job type, work group heterogeneity, and generation of family's immigration. The research was in local government, with a diverse population. The study was undertaken in 1991, with differences based on ethnicity; the differences were opposite to expectations. The literature suggested more satisfaction by Hispanics, and the results were reversed. In the particular work context, Hispanics were the majority, and behaved as such. The study was repeated in 1998, and did not yield the expected results, as there were no differences. She noted problems with use of the Likert scale and the way questions were being asked. Hispanics chose extreme options, with Anglos choosing mid points, which suggests the need for a variety of quantitative and qualitative methods.

Gillian Shapiro suggested that our methods become less adequate as problems become more complex. This means unexpected outcomes, such as on satisfaction levels by Eastern European respondents. Her research explored features of the workplace, and appropriate questions are hard to frame. The organisation had problems of people management, as shown in responses.

Hans Ingvar Roth returned to comparative studies. The USA is a special case, generally based on race divisions and a melting-pot society. He considered interdisciplinary studies, where it is hard to be expert in all dimensions. Diversity among scholars is important: it can be a camouflage for identity politics. In Sweden, “diversity” researchers tend to come from the groups they study.

What Diversity Research Can Tell Us About Heterogeneity and Work Performance

Mary Tschirhart described a study reviewing the empirical hypothesis testing literature, and the outcome in terms of work performance. The focus was on the impacts of diversity on performance. Studies drew on different theoretical foundations. The prevailing model in the 1980s and 1990s assumed a simplistic link between diversity and performance. The models tend to assume generalisability from one type of diversity to another. The review was based on 33 English language articles, largely US-based, screened from an initial 10,000. There was a quantitative analysis of the overall results, suggesting that diversity sometimes made a positive difference. What conclusions should be drawn?

Michel Frybourg was surprised at the approach to managing diversity, assuming the existing workforce. In the context of globalisation, the problem is more dynamic, and firms operate at national and global level. The battle is for survival, the issue is multicultural Europe, where people have to work together in a context of disappearing nationality. There is as yet no such thing as a “European” firm. **Alizera Bethoui** talked about European workplaces that are segregated locally, horizontally and vertically. Managers should address these questions, as part of good management.

John Wrench argued that diversity management does not stand or fall simply on whether direct beneficial outcomes can be proved. Fair employment policies should be introduced for social or moral reasons, not simply business advantage. **Lois Wise** argued that meaningful diversity, in contrast to affirmative action, is not social, but justified in business terms.

Conclusions

It was difficult for American researchers to contribute directly to a European agenda. It was hard to define “diversity”, across cultural contexts. The value of the term was that speakers were able to use it in different ways, while still communicating, and learning from each other. In dialogue, it was possible to learn from the insights of others with different backgrounds. Equal opportunity, valuing diversity, and managing for diversity are different, involving different types of organisational change, at different levels. The core problem had been monocultural organisations that were not using the full extent of resources available for the workforce. We cannot rely on US cases, perspectives and models: each context is unique. Limited quantitative data can suggest the direction of effects. It is hard to address problems while defining the categories.

Human diversity pertains to issues related to respecting, valuing and utilising skills and competencies of individuals and groups in the workplace, in a context reflecting power structures, and social, political, institutional and organisational

factors. There was little consideration of education, a critical area of public policy, involved in current diversity debates in Sweden, with its own body of research literature. Diversity in Sweden is a positive concept, with issues of fairness and business. A variety of approaches, paradigms and stages were encouraged in studying workplace diversity, with a need for replication. It needs to occur within national boundaries and in a global context. Most North American research comes from a positivist approach; wider perspectives are needed, especially in Europe.

There are practical approaches at the labour market and researcher levels. Trade unions seek to protect their members, in a changing environment. There can be dilemmas over inability to demonstrate that diversity pays. Workplace diversity covers more profound divisions and issues in society, including sexual orientation and class distribution. It would be interesting to evaluate new workplace diversity policies. Politicians avoid value conflicts, linking justice and diversity to give efficiency. Researchers may start with goals set by politicians, showing how they can be achieved, which may mean investigation of the contexts, posing new questions, to inform policy making. Critical analysis is needed of the politics of diversity management in organisations. Why do British trade unions oppose diversity management, while Dutch trade unions are supportive? Insights can be gained from comparative work. More longitudinal work is needed. Practice needs to be addressed at organisational level, and in the workplace, including trade unions.

The European Union comprises 15 members, with the objective of increasing this number dramatically. How can such a union can be managed efficiently? At a business level, can we envisage a “European firm”? The Trans European Network was a step towards a Pan European Network, covering telecommunications, transport and energy. There have been European Union programmes addressing a variety of separate minority groups, now reorganised into the new EQUAL programme. National governments have developed programmes, and alternative approaches are being explored. This is a context for workplace diversity. More research is needed on differences between the USA and Europe, and agendas within the European Union. Much can be learned from gender research. There are problems in implementation, as little is changing. There are different values involved, between fairness and business.

Economic gaps need to be addressed. National policies are contradicted by outsourcing policies of transnational companies. Researchers do not resist discussion of class, though policy makers are more reluctant. Different areas of diversity are not separate, but interact. Organisations are constructed by, and continue to construct, diversity. Resistance is taking place at organisational and public policy levels, which have to be understood and handled. The fifth pillar of European Employment Strategy could be workforce diversity, possibly even replacing the other four pillars.

Workshop participants

Kenneth Abrahamsson, Swedish Council for Worklife Research, Sweden
David Audretsch, Indiana University, USA

Alireza Bethoui, Ministry of Industry, Employment and Communications, Sweden
 Richard Ennals, Kingston University, UK
 Gabriella Fägerlind, Swedish Council for Worklife Research, Sweden
 Michel Frybourg, ENOES, France
 Charmine Härtel, University of Queensland, Australia
 Geert Hofstede, IRIC, Netherlands
 Adam Lederer, Indiana University, USA
 Ingrid Pincus, University of Orebrö, Sweden
 Hans Invar Roth, Uppsala University, Sweden
 Nadia Rubaii-Barrett, New Mexico State University, USA
 Gillian Shapiro, Brighton University, UK
 Lena Skiöld, NIWL, Sweden
 Elisabeth Sundin, Jönköping University, Sweden
 Roy Thurik, Erasmus University, Netherlands
 Mary Tschirhart, Indiana University, USA
 Ingrid Verheul, Erasmus University, Netherlands
 Sander Wennekers, EIM, Netherlands
 Lois Wise, Indiana University, USA
 John Wrench, University of Southern Denmark, Denmark

2. Work Force Diversity in Europe

The workshop was led by Rolf Ohlsson, and held in the Old Brewery, Ystad on 2–3 October 2000.

Opportunities and Risks of Diversity in the Workplace: Some Lessons from the Anglo-American Literature

Benny Carlson discussed the role of immigration in addressing labour shortages, and problems of previous immigrants who are not in the labour market. One approach has been to learn from overseas experience, from the USA and UK, identifying *opportunities* and *risks* associated with diversity. The USA are more enthusiastic, and the UK cautious. The Swedish environment is different; the approach has been to avoid rhetoric. *Opportunities* include: access to a larger potential workforce; diminished turnover; pressure for flexibility towards employees; increased creativity and willingness to change; increased openness to exchange of ideas; increased critical scrutiny of organisational self-image; increased transfer of knowledge; better customer and client service; increased market knowledge and contacts; and greater community goodwill. *Risks* include: communication problems; ethnocentrism and stereotyping; social stratification with an ethnic dimension; culture clash; more elaborate tests and stress; reduced security and openness, with less trust; division into “organisation cogs” and

“market links”; loss of old customers and clients; “badwill” from the community entering the organisation, where there are local problems.

There is no single road, but many long and winding roads to diversity. Should people be treated alike or differently? Goals and visions need to be identified. Can current employees set the goals for a firm? What about the wider political context? Should we study differences, or does that exacerbate them?

Diversity in Private and Public Organisations

Per Broomé found it hard to apply diversity in Sweden. One approach is to distinguish public and private sectors, with a model of transformation. Increased demands for communication skills make it harder for immigrants to participate in the labour market. He identified situational and institutional factors, and emphasised supply side measures, making the immigrant more able to work. There is a cultural dimension of “Swedishness”. There is low labour force participation by immigrants, even with current changes and skills shortages. Those with jobs are not using their full range of skills. When comparing public and private sector, the concept of boundary control is important. Even with an excess supply of immigrants, Swedish organisations keep to traditional recruitment routes, with inertia. In the public sector, there is an absence of policy on diversity, but a loose framework of law. There is resistance from public sector managers, who imitate the private sector, and ignore diversity as a priority. Organisational ruthlessness is common: immigrants are regarded as clients in the public sector system.

Public sector inefficiency continues, with an absence of competitive drive. Employing immigrants, and making the organisation ethnically diverse, brings opportunities and threats. Changing work organisation has decentralised, with increased need for communication, thus excluding immigrants. There are issues of Swedish, body language, and “how things are done”. Diversity can be a source of development and growth. Private sector organisations are driven by market forces, and see immigrants as a market, or a new set of segments. He discussed labour shortages, and weak discrimination laws.

The Performance of Bulgarian Immigrants in the Greek Labour Market

Eugenia Markova reported two recent surveys among legal and illegal Bulgarian immigrants in Greece, in 1996 and 1999. They are the second largest migrant community in Greece, following Albanians. Before 1989 emigration was limited by the Bulgarian government, and was linked to political agreements. There were waves of emigration from 1989, the first largely to Turkey, the second, largely labour migration, in 1990, was a brain drain, principally to Germany, and the third in 1992, of less highly skilled workers, to Greece. Greece has increased in immigrant workers, and initial responses were restrictive on admission and employment of illegal aliens. In 1997 there was an amnesty, with stages of

legalisation, through a series of documents, enabling successful applicants to achieve legal status, and social security stamps.

Data was collected in the Athens area and on Crete, with 100 and 153 migrants in the two surveys. It is hard to give reliable estimates on numbers of immigrants, so the sampling frame is unclear. There is no information on location and other characteristics; major concentrations were identified, and core groups interviewed. Trust was needed between interviewer and interviewee, using a native Bulgarian interviewer (herself), and a familiarisation process. Samples were of Bulgarians aged over 18 who had worked in Greece on their most recent visits. The results concern Bulgarian performance in the workplace, and experiences of integration. 75% were female in the first sample, 66% in the second sample, reflecting demand for housekeepers and babysitters. Albanian men had lower costs, arriving on foot over the mountains in large groups, and sleeping rough. Bulgarian immigrants were well-educated, former public employees in urban areas, often as teachers or engineers. Professional experience was transferable. Most were employed, few were seeking work. Women held stable jobs, men moving more often, with sporadic employment and language problems. Many women were resident at their employment, with self-employed cleaners and hairdressers. There is a discrepancy between job and skill levels: many were employed in the care sector. The procedures for job-hunting by illegal Bulgarians were explained, often helped by local recruitment offices offering jobs and accommodation, thus removing part of the bargaining process. Friends and contacts were also used, with newspapers least often used. Legalisation has removed the discrepancy between job and skill levels, opening up new opportunities; this has helped women more than men. Low wage levels have been reported, with payments in kind. Legalisation increased wages, and meant social insurance coverage, by law paid by employer and employee, often paid in full by the immigrant to secure legal status. Language and economic problems weakened initial bargaining. Bulgarians accepted lower wages than Greeks, as rates were much higher than in Bulgaria. Half of the Bulgarians were engaged in work in competition with Greeks; those living in and available for the employer faced less competition.

Ninety per cent of the migrants sent money home to Bulgaria, though with Greek bank accounts they built up savings. Police were tolerant, even friendly with illegal immigrants, though normally expulsion occurred. Places of residence were in areas abandoned by Greeks, for example near railway stations. Divorced women found it easier to leave Bulgaria for work; many of the women are divorcees. Migration could lead to divorce. There was discussion of illegal migration, tacitly tolerated at all levels. Local labour unions fought for legalisation, a result of EC pressure; legalised workers are not entitled to work across the EU, but have temporary residence rights. Citizenship can be applied for; 10 years of legal residence is required, with another five years for approval.

Self-employed Immigrants in Denmark: the Working Poor?

Kraen Blume reported that immigrants have increased in Denmark; less come from developed countries. Refugees have increased as a proportion, with

restrictions on economic migrants. Immigrants have a higher chance of unemployment. Some immigrant groups have large and increasing shares of self-employment; Danish self-employment has declined. He discussed previous studies of immigrant self-employment, suggesting small businesses in the suburbs, and production. Some groups have sector loyalty, such as Vietnamese in the restaurant business. Few see self-employment as a last resort. Self-employment is a stepping stone to the ordinary labour market, and a generator for unemployment benefits, as employment experience is a pre-requisite for receiving benefits in Denmark. There are push-and-pull factors, including social networks and living in ethnic enclaves.

He considered register-based data on Danes, and information on immigrants to Denmark, concentrating on males. Public self-employment subsidy rights are important to determine self-employment patterns, and benefit rights. He considered profit levels, unemployment rates, immigrant concentration, immigration cohort, labour market experience, age in immigration years, and owners of real estate. Using detailed figures, he traced flows into self-employment, showing immigrants are more likely to return to unemployment. Sector analysis highlights differences between native and immigrant groups. Trade and restaurants are big for immigrants, with agriculture as big for native Danes. Immigrants earn less than Danes. He discussed the minimum wage, and the impossibility of immigrants attaining that in employment. He discussed competing risk duration models. Risk of terminating self-employment diminishes over time; linked to the reason for self-employment in the first place. High local unemployment increases the likelihood of termination. The picture for Danes and immigrants is different, affected by external circumstances.

Analysis of the different countries reveals few differences; in Denmark successive cohorts of immigrants are important. Most recent cohorts are most likely to have actively chosen self-employment. Termination of self-employment, and moving to normal waged employment, is more likely with close working with Danes. The study only covered men, but generalisations covered immigrants as a whole. Women were excluded due to a low participating rate among female immigrants.

Determinants of the Chinese Immigrants' and Their Children's Economic Success in Britain

Soojin Yu is Korean-Canadian. She tried to incorporate first and second generation immigrant information; the second generation tend to be too young for occupational analysis. China is a growing nation, with a long history of migration to Europe. She studied integration of six major minority populations in the UK, and was struck by the Chinese group, different from the others. UK Chinese were Conservative voters, with higher education but low levels of religion. They performed well on the labour market. She reviewed the literature on their economic success, and considered key characteristics: individual, group and structural. Unemployment is low, for both males and females, a lower proportion are in manual employment, with mean weekly earnings on a par with whites (for men), ahead of all other groups (for women). Chinese are heterogeneous; in the UK the largest group is from Hong Kong, working in take-away restaurants, with

their children as the core of the second generation. Chinese fled Indo-China in the 1970s, and more have come from SE Asia, including Malaysia and Singapore, to study. A final group came from the mainland in recent years.

Why do some succeed, and others not? *Individual* characteristics concern human capital, starting with host language skill. Foreign-born Chinese speakers score higher than other Asian ethnic minorities; British born Chinese have no language problems. Education is important; foreign born Chinese have the highest percentage with high qualifications, and lowest proportion with low qualifications. British born Chinese are educationally strong.

She considered *group* characteristics. Concentration in inner cities does not help; the Chinese are widespread. Community organisation is important, with social networks used to find jobs. Their networks are relatively weak. Ethnic enclaves have been discussed, and impacts seem mixed. Involvement in the take-away business reduces relative unemployment; this can lower the percentage of manual workers, and reduce chances of reaching top occupational levels. *Structurally*, minorities can be hit harder in hard times. The Chinese came to meet particular needs, and were immune to cyclical change. Hong Kong Chinese were Commonwealth citizens under the 1948 Act. This was abolished in 1962, where a specific employer had to be named in order to gain entry; this could be resolved. Racism is hard to measure, and the Chinese were seen as living on relatively equal terms.

The Chinese are heterogeneous, with ambiguous outcomes. Involvement in an economic enclave gave benefits; they had been welcomed. The success was explicable, given their favourable characteristics. She needs to quantify the relative explanatory power of different variables. She discussed the second generation, doing well economically, with high levels of education, good languages, and work in a wide range of sectors. Young Chinese are in junior management positions.

Spanish Elderly Migrants in Europe: Employment Leading to Exclusion

Ubaldo Martinez Veiga followed Spanish elderly migrants in six countries in Europe, in Spain studying returning migrants. Qualitative studies traced individuals, and three major firms in Europe, tracing life histories of Spanish migrants. Spanish migrants started work at an average of 14.4 years, 22% below the age of 10. The current situation is different: working life starts at around 22, but with more unemployment. Half were no longer working at retirement age, due to unemployment, illness, and other explanations. Often retirement through illness is a method of retrenchment by employers. Women often indicate that they are female domestic workers in their own homes (an answer given in Netherlands). They tend to have broken work histories; human capital of women was higher. Gender discrimination was important. Levels of work at retirement age varied across Europe, linked to externalisation and sub-contracting (cleaning and catering). Migrants and older workers tend to be dismissed first. Early entry into the labour market was linked to lack of human capital, with poor literacy; some gained later qualifications. Most initial jobs were in the informal sector, with small firms and industries in the service sector. It was hard to use these years for pension purposes, so years of work in Spain were a blank. Spain is seen as a place

for holidays, and little else. Most Spanish migrants to Europe have returned, and the study was on those who stayed away. It is difficult or impossible to buy or rent a house in Spain, making it hard to return.

He discussed network relationships, cited in migration theory. He saw two ties, weak (friends) and strong (children and parents). Weak ties are linked to those who still live in Spain, while strong ties are in their country of residence. They make little use of local public and social services. The resources with which they retired were limited: they had low incomes, and often continue work after retirement in order to survive. The key factor seems to be the early retirement plan in the different countries. The last years of work are most important in calculating the pension.

Intertemporal Impacts of Immigration to Germany: an Assessment with Generational Accounts

Holger Bonin took a macro-economic perspective. He addressed demographic ageing in Germany; public finances are ill-prepared, as social welfare schemes work on a “pay as you go” basis. Could immigration help? The labour force needs to be enlarged, by increased female participation or later retirement. Demographic studies do not capture links between fiscal and demographic variables; age-weighting does not distinguish natives and immigrants. Cross-sectional studies of immigrants neglect ageing of immigrants, do not discount future payments, and neglect claims of current fiscal policy on future budgets. He combined both approaches.

He explained generational accounting, based on age-specific tax payments and survival rates, assuming constant policy, which enables testing of sustainability of policy. Fiscal policies must satisfy the intertemporal constraint of the public sector, supporting planning of policy changes. Immigrants affect the intertemporal budget constraint through paying taxes, increasing the size of future generations, as well as government consumption, for example on education. He gave population projections, showing rapid increase in average age, and added different immigration levels, leading to a reduced average age. One projection assumed a constant population of 84 million, and an increase in immigrants to a third of the population. Regarding tax income, he used panel data to estimate generational accounts. Overall, the balance is positive, in a context of close tax-benefit linkage in Germany. Migrants stay longer in the labour force due to financial pressures. Immigrants under 55 help the local population. Government consumption is assigned to generational cohorts, showing expenses for those aged 18 to 45, and a reduction of the burden on the native population. With no immigration, taxes would have to rise, as current policies are not sustainable. Immigrants could cause costs, such as for integration, and still be beneficial. This assumes no integration effects.

Ethnic Minorities in the UK: Burden or Benefit?

Aslan Zorlan was concerned with the demand side of the labour market, addressing fears of the man on the street, the effect of immigrants on the wages of

native workers. Research covers four EU countries. Immigration has effects on distribution of domestic income, affecting native groups differently in the labour market. Analysis can be by education level and ethnic origin, with gender not so significant. He disaggregated the native labour force by skill, and the immigrants by ethnic origin. He considered direct effects, and interaction effects, and estimated earning functions. Unemployment rates, weekly wages and skill vary by ethnic background. Immigrants are concentrated in particular areas, and particular industrial sectors, with geography apparently more significant. Black immigrants can reduce wage levels at unskilled manual level, while Chinese are linked with increases. Indian immigrants have a positive effect on skilled manual wages. Overall, effects are not uniform. American studies suggest that the worst effects are on other immigrant groups, but in the UK the effects are varied. Low skilled immigrants should complement high skilled white workers. He presented production functions, enabling calculation of technology coefficients, and elasticity of complementarity. He highlighted the impact of low skilled immigrants on medium and low skilled non-manual white workers. Levels of qualification vary by ethnic background, with black and Pakistani immigrants affecting low and medium skill non-manual wages.

The Times They Are A-changing: Organisational Change and Immigrant Employment Opportunities in Scandinavia

Michael Rosholm noted that Denmark has a poor and worsening record of integrating immigrants into the labour market. Sweden is similar. It is argued that the new economy is bad for immigrants. The study tested and rejected the hypothesis that the macroeconomic performance of the country explained this record. Nordic welfare models, central negotiation, and advancing of technology, are similar. The differences have been in unemployment rates, typically higher in Denmark. In Sweden there has been analysis of the poor position of immigrants: is this a cyclical effect? In Denmark there has been little analysis, but consistent unemployment. If the problem in Sweden was cyclical, we would expect a different picture in Denmark, but structural changes in the labour market have particular impacts on immigrants. Organisational structures have flattened, services have expanded, and teamworking has developed. This requires cultural and linguistic capital, weaker in immigrants; statistical discrimination by employers is unsurprising. Integration should mean shorter periods to settle after arrival.

For Denmark and Sweden, data was collected on native workers, and immigrants from Norway, Poland, Turkey and Iran, concentrating on men under 59 and excluding self-employed. Employment meant earning 1 krone, with explanatory variables of age, years since migration, education post-migration, civil status, children, earnings and area of residence. Employment of Turks and Iranians has fallen. Pre-immigration education was omitted. He discussed employment profiles, comparing experience of Iranian and other immigrants. He studied differences between 1995 and 1985, correcting for native differences. Employment probabilities have fallen, in both countries, except for Iranians in Sweden. Organisational change in the labour market was the favoured explanation.

Discrimination and Racism: Troublesome Concepts in the “Discrimination” Debate

Ann-Katrin Bäcklund was concerned with what triggers problems for non-Swedes or Danes. Immigrants face discrimination. Personnel managers deny excluding applicants based on name or background; choices and criteria lead to systematic exclusion of immigrants. Many vacant jobs are not advertised, but mediated through contacts. It is hard to re-enter the labour market after long-term unemployment. Residence permits can take years, so immigrants are away from work for years. Companies may not appoint if they only have unemployed applicants. Changing demands for communication and self-organised work in old and new economies mean increased demands, such as for language skills, which need to be developed in an authentic situation. She discussed systemic discrimination: actions of managers may be discriminatory, but indirect, institutional and unintended. There may have been a lack of previous experience in the limited world of the manager. She wanted to go beyond the simple conclusion of discrimination. Perceptions of foreigners may be affected by unemployment. There can be an accusation of hiding discrimination. Labour unions feel that teamworking and decentralisation are under attack. The connections are threatening. It is important to take a wider perspective, and see how perceptions interact with structural changes.

There are policy implications. Immigrants lack human capital; there can be negative attitudes in the majority population; job structures and recruitment are defective. Eurostat statistics for non-EU men working in EU countries show lowest participation in Sweden. Sweden has the highest rate of foreign unemployed, higher than general levels in the population. Discrimination may be unintended, seen as racist, resulting in lack of employment. Concepts are confused: discrimination can be socially constructed. In the USA and the UK individuals state ethnic background, resisted in Europe. Xenophobia, in the clinical sense, is not something for which one can be held responsible.

Conclusions

Kenneth Abrahamsson emphasised the importance of the Employment Strategy of the European Union, and the fourth pillar of equal opportunities. He would like a better overview of mobility in Europe, in the context of enlargement, and continuing illegal employment in some countries. Concepts of immigrants and immigration are socially constructed, and vary across Europe, affected by culture and experience. It is important to include a gender perspective in discussions of diversity. He welcomes evidence on changing skill requirements in the old and new economies, and the impact on immigrants.

Workshop Participants

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Small and Medium Sized Enterprises

1. Work and Health in Small Enterprises

The workshop was led by Gunnar Ahlborg, and held on 24–26 January 2000 at the Office of the Swedish Trade Unions in Brussels.

Global Overview of the Current Situation Concerning Work and Health in Small Enterprises

Future Challenges in Occupational Health and Safety in Small-scale Industries

Jerry Jeyeratnam asked what has been done for Small Scale Enterprises (SSEs) in OHS. The weakest area is occupational health services; dealing with more than occupational diseases; he prefers a comprehensive approach to health at work. WHO and ILO recognise this approach, preventing duplication between occupational and general health. Workers who are sick for whatever reason are sick; this impacts on work. Often there are associated factors linked to ill health at work, not causes in the conventional sense of occupational medicine. The service should be part of the national health care system. There is need for such services in small-scale industries. ILO talk of the “informal” sector, while WHO addresses “small-scale industries”; the target audience are often the same, with a cut-off number of employees normally 50. In many cases privatised industries are not covered by legislation for state sector enterprises, and employ large workforces. SSEs employ the majority of workers in Pacific Rim countries, contributing a large proportion of national wealth. They lack basic occupational health provision, and face many hazards. Supportive legislation should not exclude small industries. It is hard for governments to accept full responsibility for health care; if the private sector are involved, how should payments be made? Health care for workers needs to be covered, possibly involving insurance; additional to public provision, not a substitute. There are issues of legal status and accountability. An overall policy framework would be useful. Schemes need to address a broad risk pool, with a range of members, and a qualifying period before eligibility for benefits. Schemes should provide treatment and prevention, with discounts for actions taken. Small scale and informal sector workers need an occupational health service, integral to the national system.

Training Needs for Improving Health and Safety: Inter-country Networking in Asia

Kazu Kogi saw problems as similar in developing and developed countries; intervention and network-based action training are vital. Gaps exist in making effective interventions adjusted to varying local conditions in small enterprises and in technology transfer. Recent international experiences in action training for small enterprises demonstrate the need to take into account flexibility and other advantages, and to enhance enterprise level capacity for work improvement. Types of support that can promote concrete action were discussed, based on inter-country networking experiences in Japan and several Asian countries. Typical examples were given by Work Improvement in Small Enterprises (WISE) projects. It is effective to develop a change strategy emphasising:

- Enabling methods relying on participatory steps that can lead to immediate action in multiple aspects of work. This conclusion comes from Asian experience in Japan, Thailand, Malaysia and Vietnam, but is echoed by experience in Europe.
- Utilising flexible group working tools, and
- Training of facilitators for step-wise action.

The WISE principles are:

- Build on local practice.
- Focus on achievement, not criticism.
- Link working conditions with management goals.
- Learning by doing.
- Exchange of experience.
- Involve workers.

He took a practical approach to low-cost improvements. He outlined the results of work in the Philippines, showing improvements from WISE courses 1994–6. Numerous improvements were proposed, most of which were implemented, covering multiple areas, including machine safety, lighting, and work organisation. A similar report was given of work in Japan, in 47 die-casting enterprises. Improvements are more sustainable if locally chosen, small and low cost, aimed at combined benefits. Productivity has been emphasised from the outset. The process is facilitated, rather than based on teaching.

Group work tools, adjusted to local socio-cultural conditions, were useful, such as local good examples (using photographs on site), action checklists listing potential simple improvements, and action manuals. A focus is needed on low-cost solutions, achievable in a short period, improving working conditions and productivity. It is important to build local advisory networks for promoting action training with follow-up activities. There is a common pattern, going from checklists to workshops and then practical implementation: learning, checking, planning and sharing improvements. The emphasis is on action, not just description, going from training features to group work tools. This is learning by

doing, with group work as a core concept. Local examples are powerful in helping understanding and motivating new action, with clear illustrations in manuals. Improvement continued. He gave examples of productivity related improvements, for materials handling, workstation design, environment and teamwork. Before and after illustrations showed practical physical changes in the workplace. Facilitators need to be trained in stepwise intervention. They recruit participants, collect local examples, provide advice, focus on low-cost improvements, stress stepwise activities and emphasise follow-up. There are links between action steps and facilitation. Local networking is important, involving industrial sectors with active roles for trade unions and municipalities, addressing needs of small workplaces. By training more facilitators, the WISE methodology spreads rapidly, with multiplier effects.

Present Situation in EU Countries Concerning Occupational Health and Safety in Small Enterprises

Occupational Health Care in Small and Medium Sized Enterprises – How Many Doctors Do We Need and How Do We Ensure Good Care?

Brigitte Froneberg noted that translation of the 1989 Framework directive into national law aims at occupational protection and health care for all employees of large, medium and small sized enterprises, depending on assessed exposure. Prior incomplete protection of the German workforce, with a bias against SSEs, requires an assessment of present occupational health care practice and future need. Quality assurance, new training for health professionals, and capacity planning for delivery are needed. SSEs have been increasing, as large companies have been declining. They have central economic importance, but have not addressed occupational safety and health. There are new challenges from stress, a changing workforce and changing workplaces. Unemployment is on average 11%, but in the East as high as 22%. There are discussions on the costs and benefits of occupational health care: it is a matter of priorities. Occupational health professionals must meet new quality standards; company doctors have changing roles, with new demands such as teamworking and customer orientation. Management and co-operative skills are needed, with workplace health promotion. The Federal Institute for Occupational Safety and Health evaluated the state of occupational health care in four regions. Occupational health care coverage and future demand for adequately trained occupational physicians were estimated using a statistical method allowing for modifying variables (economic development, demographic change, etc.). Expected results are estimated numbers of occupational physicians that have to be trained to meet future demand. There was detailed investigation of the approaches of accident insurance funds. Since there may be difficulties in training and employing the required number of specialists, there are alternative strategies to ensure adequate care, including opening the occupational health care team to other professions, such as occupational health nurses and industrial hygienists, restructuring the system of periodic health examinations and surveillance, and alternative strategies to initiate preventive care. German regulations

require full coverage of the workforce; some insurance companies have succeeded already. The programme calls for progress by 2001 and full coverage by 2004.

She outlined three scenarios: progressive, restrictive and likely, with increased needs. A progressive approach requires less health examinations and doctors due to safer workplaces. Using assistant personnel saves on numbers of doctors. More working hours are needed due to implementation of preventive programmes. She identified a major deficit (about 5,000) of occupational physicians; duties are not being fulfilled. Many thousands more will be needed, as well as using retired and overseas doctors. Each year some doctors change professions or retire. Over the next 5 years another 2400 doctors per year would be required; this is not feasible. Alternative approaches include OHMS, the employer model of responsibility.

Another study looked at approaches to OHMS in SSEs, considering quality management approaches and labour inspection models (like Scandinavian internal control). The results are promising for SSEs as long as there is a 1-3-year introduction period, further funding and encouragement.

Promotion of Health and Safety in SSEs in Italy

Fabio Strambi noted that SSEs are a major sector in Italy, the foundation of the success of the Italian economy. Since 1994, when the 1989 Framework Directive was incorporated into Italian law, there has been increased interest in health and safety in the workplace by social partners and public institutions, accelerated by Italian participation in the European Monetary Union and the single market. The Machines Directive became operative in 1996. The biggest problems have come in SSEs: there are 3.5 million enterprises, 95% of which have less than 10 employees. Commitment has been given by public institutions and social partners; there is simplified provision for SSEs with less than 10 employees, with less bureaucratic complication. Employers associations and trade unions have reached agreements on health and safety improvements, workers' rights and training. For SSEs, workers' representatives can act on behalf of more than one company. While new technology is being introduced, manufacturing is declining, the service sector is growing, and there is a growing proportion of black market immigrant workers, for whom protection of health and safety is almost non-existent.

Public authorities are involved in regulation; control through inspection alone would be impractical. There is a network of multidisciplinary public services, organised and co-ordinated by regional authorities, improving health and safety by giving information, training, assistance, supervision, and checking the application of laws. The support system for SSEs has regional variations. In Tuscany there is a network of prevention services, with work programmes for specific sectors, studying problems in occupational health, hygiene, safety and ergonomics. Individual solutions are developed for use in SSEs, with an information service on prevention.

In December 1999 government, institutions, local administration and social partners pledged improvements in health and safety in all Italian work places. Commitments cover simplification of the law, improving prevention, facilitating insurance and training, and increasing the role of public services in promoting hygiene, health and safety conditions in the workplace. Prevention incentives for SSEs are being set up at local and national level, with a concern for political, economic and technical integration, based on pilot studies. We need to understand

work as well as risks, and to identify practical attainable solutions, improving safety, use of machinery and tools, and personal protective equipment. Pilot studies in the wood industry in Siena have led to suggestions for improvements, and to the establishment of “observation committees”, including social partners, experts and public services technicians, monitoring safety and health. This enables networking of experience, understanding problems, applying solutions and verifying their usefulness. Observation committees across Europe have a role in addressing and defining standards. There could be links across industry sectors and countries, comparing approaches and improving understanding of work. This should enrich and enhance both public and private sector initiatives.

Occupational Health and Safety in Small Enterprises: Present Situation in Sweden

Carl-Göran Ohlson introduced the legal framework in the Swedish Work Environment Act of 1978. The employer is responsible for supplying OHS, with a focus on prevention, describing associations between work environment and organisation, productivity and health, and not dealing with medical care in general. Employees are supposed to participate and be empowered. Internal Control, with legislation in 1992, is based on a British model, also used in Norway. The Labour Inspectorate supervises safety and health at work, supporting and encouraging. The emphasis is on supervision, checking the efficiency of company systems for internal control. The number of inspectors is equivalent to that in Italy. 380 labour inspectors visit 40,000 of 260,000 Swedish workplaces each year. 45% result in written orders for improvements, 450 go on to prohibitions and 20 cases lead to law suits. There are also programmes run by the National Institute for Working Life, and Occupational Medicine Clinics. The Joint Industrial Safety Council brings the actors together, and the social partners are actively involved. In 1992 state subsidies were withdrawn during the recession; the occupational health service is now dependent on a commercial market, and most staff in SSEs have no access to OHS. The coverage level is similar to that in Germany, around 67%. Many public bodies cut their OHS budgets.

There are three types of OHS: traditional built-in units in companies (largely in medium sized and large companies); joint Occupational Health Centres (offering non-profit services to members), and branch services (covering agriculture, forestry and construction). There are some 6000 registered OHS specialists, and no community-based facilities for SSEs, though check-ups are available from clinics. Quality assurance and ethics guidelines have been developed. Empirical data is scarce; sick leave was high in the late 1980s, around 8–12%. Terms of sick leave have changed 1989–98 (making comparisons difficult), and unemployment increased considerably. Sick leave now appears lower in small firms, where owners give priority to problems concerning staff, economy and planning than to work environment, but is increasing. Reporting rates and death rates vary according to company size, suggesting under-reporting in SSEs. Rehabilitation is needed; about one third of sick leave is work related. The legal framework is well developed, the occupational service is under strain and neglected.

Health and Safety in Small Enterprises in Europe: The Identification, Significance and Sustainability of Intermediaries in Different European National Settings

David Walters is interested in participative approaches to health and safety, working with trade unions and European partners in the SALTSA programme. Workplace health and safety in SSEs has a broader policy and economic context. Poor health and safety of SSEs is a significant problem for regulation in all European countries. The Framework Directive encounters problems in the cases of SSEs; preventive strategies are an important target. He concentrated on intermediaries, including trade unions and employers' organisations, and took a broad view of operational actors. The project collects case studies from across the EU. A common feature of successful initiatives is the pivotal role of intermediaries, acting as bearers of health and safety messages to SSEs, amplifying and reinforcing positive and sustainable interventions. Intermediaries include OHS prevention services, regulatory agency inspectors, trade union representatives, contracts with larger organisations, insurance associations, trade associations and training bodies. He reported on the SALTSA study, investigating the role of intermediaries in health and safety initiatives in SSEs, in a framework of environmental, organisational, economic structure and process factors which support or constrain their success. He presented findings from UK, France, Italy, Greece and Sweden, concentrating on features contributing to the success of intermediaries in national settings. Legislative backgrounds and cultures of co-operation vary across countries and across sectors; there are different business dependencies. He considered infrastructure supports and constraints, and discussed a European typology of intermediaries. There are programmes to change the approaches of intermediaries, facing different forms of representation. Regulatory agencies are training for new modes of communication and organisational change. He addressed sensitisation to needs of SSEs; raising awareness of intermediaries to benefits to be derived from health and safety involvement; and resource implications.

Future Needs and Approaches Concerning Risk Assessment and Promotion of Occupational Health and Safety in Small Enterprises

Occupational Health Approaches for Small-scale Enterprises

Gerry Eijkemans works in occupational and environmental health at WHO. Each year 1.1 million people are killed from work-related diseases, comparable to malaria. A key dimension is networking, between countries and continents. The final focus is on prevention and promotion. SSEs contribute to national economies in developed and undeveloped countries, employing about one billion people. In South America 85% of new jobs are in the informal vulnerable sector. Intervention and collaboration are needed. There is little or no protection of workers' health and of the environment from the hazards associated with SSEs. The situation has long been known, but solutions have yet to be sought and applied. The inability to protect workers in SSEs can be due to not recognising that there are health hazards

which can be prevented; dealing with consequences of exposures, not prevention; and recommending preventive measures which are not applicable to SSEs. If prevention does not work in SSEs, we need to know why, analyse the processes, and move from awareness to action. Promotion and prevention need to fit the circumstances, and follow stakeholder analysis. Sustainability is complex. OHS needs to fit within national services; how do we raise the necessary interest? Occupational health and safety practice has to address the reality of SSEs, meaning non-classical approaches to risk assessment, using qualitative approaches. Prevention is often ineffective, as measures are not adapted to the context.

In Africa and South America, unions are less effective; people organise in different ways. WHO has to learn from previous experiences, for example with ILO, Finnish Institute, and UNEP. We need to network and build on experiences. The PACE initiative is aimed at triggering political will and promoting solutions. Publications have addressed noise and dust control. In Peru there is joint work with ILO and a Dutch union, linking with Peruvian unions in construction, agriculture, mining and manual transport. Similar ideas are proposed for Africa, with four projects in four cities, concentrating on primary prevention and hazard control, on a network basis. Ingredients include health promotion and protection. There have been many approaches, including health promotion, enabling the worker to identify risks and intervene. AIDS is relevant, but not the key focus. The Healthy Cities initiative in Africa is the starting point in public health. Poverty reduction is closely linked. ILO is a major partner. The current challenge is to collaborate and co-operate with European countries.

Job Quality and Small Enterprise Development: The ILO Approach to Promoting Occupational Health and Safety in Micro and Small Enterprises

Rie Veys-Laursen introduced ILO work on Job Quality, based on seven core ILO standards applicable to all levels of economic development. International labour standards have been adopted internationally, regarding forced labour, freedom of association, and child labour. Job quality involves a starting point of standards, and an emphasis on productivity and competitiveness. Relativism is needed, combined with pragmatism. In South America half of the population have no access to health services.

Typical problems of micro and small enterprises provide a context for understanding opportunities and barriers to OHS, such as credit, market access, product quality, production inputs, and access to knowledge. There are opportunities for the owner as sole decision-maker, practical and action-oriented, with low labour productivity, and access to peer advice. The entrepreneur takes pride in his business, and is close to the shop-floor. There can be barriers, as the entrepreneur does not seek help for OHS. Owners are short-termist, self-made, lacking skills, and see workers as raw materials, to be changed if not satisfactory. The starting point is the operation of the business, using a non-regulatory approach. ILO sees promotion and improvement of OHS as sustainable, if linked to the productivity and competitiveness of the enterprise. The business case for a solution must be sold. Working conditions are presented as a vehicle to productivity and competitiveness, with pragmatic translation of theory into practical solutions, as with

WISE. An incremental approach is needed, with basic respect for ILO basic standards.

WISE was the first intervention; after 10 years the IWEB programme was introduced, to reach micro businesses, informal and formal. The key is the size and behaviour of the enterprise. WISE principles carry through to IWEB. Future challenges include a medium and long-term impact, hard to study with SSEs. SSE development is different from conventional business development. Coverage needs to expand, justifying efforts and expenditure. If success is not proven, nobody will pay. The link with productivity needs to be made, with more case studies and networking. The final need is for more "how to do" tools. Businesses need to survive; someone has to pay for the solutions. In some cases the link is easy to prove, as the starting point is so low and the evidence is clear. So much productivity is lost through bad health and safety.

Occupational Health and Safety: The Role of Expert Organisations

The Danish Experience with the Occupational Health Service as Change Agents in Small Enterprises

Peter Hasle is research director of the Centre for Alternative Social Analysis, concerned with consultancy methods with SSEs. The ideas derived from work with WISE in Asia; adaptation was needed for local circumstances in Denmark. Danish owners resist ideas from outsiders, after experience of numerous consultants. There are important issues for health and safety professionals, whose services have been little used by SSEs, though they have formally been members of appropriate associations. Special conditions and peculiarities of small enterprises have been the point of departure for the development of specific methods in the Danish Occupational Health Service. He distinguished between two phases: a dialogue-based contact phase and a more professional advisory phase.

His model was based on dialogue, initiated through personal contact, adopting a positive approach and using local experience, respecting the fight for survival, and linked to other management goals. From dialogue, assistance emerges, with tailored methods and exchange of experience, resulting in an improved working environment.

Professionals start with a bias against SSEs, based on limited knowledge and experience, and operate with flawed assumptions, and an attitude of superiority. It is important to work with the professionals to reflect on their assumptions. It is assumed that SSEs are unsystematic, do not care about working environment, and seek to be big businesses.

The objective has been to develop services for SSEs, based on personal consultancy in OHS, with regular visits and simple approaches to assessment. Successful cases are used as showcases. Duty professionals offer rapid response. Fees for SSEs and large firms are handled separately, ensuring value for money. SSEs need a problem-based approach, with solutions in the short term. It has proved possible to develop regular contact between OHS and SSEs, but it is necessary to take a

long-term view. It can be difficult for OHS professionals to adjust to the special demands from SSEs; co-operation with larger enterprises brings higher status. He presented “*11 Commandments*”: personal contact; do not talk about work environment problems; show respect; compliment measures taken; don’t blame others; propose a here and now solution where possible; be available; accept responsibility for contact; ask the owner for ideas; be critical once trust has been established; involve workers.

Working Together to Promote Health and Safety in Small Firms

Andie Michael noted the absence of a statutory occupational health service in the UK. HSE is an agency working to a strategy set by the Health and Safety Commission, appointed by ministers. Her task is to improve health and safety in small firms, by gaining better understanding of, and promoting, mechanisms for influencing change. In the UK there are 3.7 million businesses, and 99% have less than 50 employees. Almost 50% work in firms with less than 100 employees. One in eight are self-employed. Small firms create most jobs. Health and safety is part of the dynamic nature of business; more people recognise that it influences economic success. Recent statistical data confirm that small workplaces (with less than 50 employees), particularly in manufacturing, are more dangerous than larger ones, and under-report accidents.

The UK government is keen to promote health and safety in small firms through the HSE. HSE recognise that it is impossible for it to undertake the task alone. Working with others (such as social partners, charities, government departments and experts) is vital, collecting and disseminating information, raising awareness, influencing through the supply chain, and getting health and safety into management training and education systems, through National Vocational Qualifications and the school curriculum. Approaches include:

- Establishing “good neighbour forums”, inviting firms to demonstrate their expertise and extend it to neighbours, customers or suppliers, extracting commitment from large firms and appreciation from small firms, changing practice. The appeal for large firms is based on legal compliance under the Health and Safety at Work Act 1974, elaborated in management regulations of 1992, which cover shared workplaces. There are also moral/ethical/cultural factors, and in particular loss control and business loss reduction, reputation, quality management and customer pressure.
- Encouraging “passport” schemes through supply chains, where contractors have to meet standards, taking particular courses. The scheme offers savings in subsequent induction, reduced accidents, less training confusion, enhanced employability for the contractor, and enhanced safety assurance. Disadvantages include the argument over whether the passport implies competence, the variability of course contents and standards, lack of recognition between schemes, potential restrictions on business flexibility, and training costs are passed on to contractors. An evaluation of the scheme in the petrochemical industry suggests that benefits outweigh costs.

HSE has a long way to go, and seeks advice on ways of influencing small firms; communicating with small firms; experience of “passport” schemes; and research into attitudes and perceptions on health and safety in SSEs. The new HSE strategy has much in common with the accounts from ILO and WHO. Priorities are awareness raising, provision of information and support, and the development of partnerships and close working relationships. SSEs tend to complain about short time to adjust to new regulations, and early involvement is needed. The law and compliance need to improve.

How Can the General Health Care System Support Occupational Safety and Health in Small Enterprises?

Gunnar Ahlborg switched outlined the system in Sweden. OHS services are provided by private sector companies, and are not mandatory. People working in SSEs often have less favourable working conditions than in larger companies, face more work-related health problems, yet lack practical access to occupational health services. They may be over-represented among patients seeking general health care for work-related diseases. This is the situation in Sweden. Eleven to sixteen per cent of visits to primary care physicians are work-related (where evidence can be brought to bear, not by reference to a list), with employees of SMEs counting for half. Measures are rarely taken to improve the workplace situation.

It is important that the physician recognises work aspects, in decisions on sick leave and to promote rehabilitation and prevention. Doctors need to know more about workplace hazards and strains, should be able to contact the employer, and link with OHS expertise. There should be support for primary health care in dealing with work-related health problems, ideally with full co-operation between primary health care and a well-functioning occupational health service, meeting the needs of patients in small and larger companies. Public and private finance is involved; only one county council has to date agreed to pay for private OHS services. There is secrecy, debate over competence in primary care to recognise occupational health problems, a question of motivation, and politics. In Sweden there is a department of occupational and environmental medicine at the university hospital in each of the larger regions: multidisciplinary competence centres, offering consulting and information services, working with health care providers and companies directly. The scale of activities is increasing.

Risk Assessment, Intervention and Action at the Workplace Level

Kazu Kogi saw barriers faced by SMEs and experts, and a vital role for low-cost improvement, linking health and safety with productivity and competitiveness, as a way of breaking through constraints. There is renewed interest in low-cost improvements in the workplace, particularly in SMEs. This is seen from improvements undertaken through action-oriented programmes for SMEs in different countries in WISE. Multiple improvements are made in each company, taking advantage of simplicity and low cost. Experience in Japan, Philippines and Thailand suggests that a no-cost or low-cost approach can lead to workplace

changes with combined effects; visible and immediate measurable benefits in productivity and safety; and production of locally adjusted training tools, such as checklists and good practice databases. Benefits often include safer worksites, reduced musculoskeletal loads, and improved work flow. Low-cost approaches should be used to facilitate action training and the exchange of results, leading to new training tools. Action-facilitating roles and sustained impacts may mean going beyond short-term low-cost approaches.

Characteristics of Swedish Small Companies and the Implications for the Working Environment

Ann-Beth Antonsson reflected on lack of success in facilitating changes in SMEs, after years of effort. Actions normally follow the identification of obvious practical problems, and preventive work is neglected. SMEs know that improvements should be profitable; why do they not act? Arguments have been deployed, and quality measures can be integrated with work environment changes, but arguments rarely work. Knowledge and awareness of the working environment is limited. About 80–90% consider their own working environment good, not needing improvement. She made the comparison with car driving. We should distinguish micro companies (1–5), with little division of labour and a family approach; small companies (6–20), with distinct but overlapping roles and a patriarchal style, overloading the owner/manager; and large small companies (21–50), with clearer division of labour and varying modes of operation.

Time and motivation to work on work environment are limited, as is knowledge. A major source is past experience of work in larger companies. Typically employees have a limited grasp of the present and future of the company; the manager is in control. This presents problems in discussing participation, as employees lack experience of practical involvement. Action can be triggered by external pressure from labour inspectors, or internal pressure from problems; there is little preventive work. Swedish legislation requires regular and systematic work on work environment; SMEs often do not comply. Internal control rarely works as it should. Money and new approaches to support for SMEs are needed. We see some new approaches, such as market pressure, good neighbour schemes, good tools for small businesses, and new kinds of work organisation that reduce load on owners and activate employees. Patriarchal organisation presents formidable obstacles. There are business and work environment motivations for change.

Workplace Health Promotion (WHP) in Small and Medium Sized Enterprises: Interim Results of the European Network for Workplace Health Promotion

Gregor Breucker reported on the European network for workplace health promotion. Sweden is represented by NIWL, with the overall theme of healthy employees in healthy organisations, consensus building and disseminating good practice. Workplace health promotion has developed, and has been disseminated. The intention is to develop a European model of workplace for health, based on EFQM TQM approaches, setting out business success factors for workplace health promotion initiatives. Studies have been made of Finnish Work Ability and German approaches, and quality requirements have been developed. Little

emphasis has been given to SMEs; larger companies were better able to take a lead, with professional human resource management, internal resources for OHS, and employee representatives.

WHP comprises joint measures by the social partners and society to improve the health and well-being of people at work, covering different approaches to workplace health in the EU, from individual lifestyle to work organisation and work environment. The following are essential: interdisciplinary effort, participation and co-operation of all players, and comprehensive approach, covering individual and organisational levels. Most work has been in large firms; there are particular problems to be addressed in SMEs, including lack of time and resources, and a non-participative working climate. Different approaches to WHP delivery and implementation are needed. Key points are higher risk of accidents in SMEs, bigger impact of illness-related absence on work processes, and less coverage by formal health and safety provisions. A pan-European initiative on WHP in SMEs has been taken by the European Network, which has existed since 1996, supported by DG Health and Consumer Protection. A new model is under development, reflecting the different circumstances, looking at management and intermediaries. The model is now being tested in practice.

Local Working Environment Activities at Small-scale Enterprises and the Need for a New Approach

Sten Bornberger-Dankvardt concentrated on the local working environment, and motivating owners; 99.3% of enterprises are small (less than 50 employees), similar to the UK. Problems vary across sectors, associated with initiating systematic work environment activities in SMEs, including lack of awareness of health risks, and lack of time, know-how, expertise and resources. Many standard problems, such as noise and heavy lifting, have not been addressed in SMEs. SME managers hate paperwork, preferring to be active. Employees are seen as both members of the family, and disposable. They identify problems of finance, staffing and planning, and rarely see the links to work environment. It is vital to motivate the owner, requiring trust, involvement, follow-up work, patience, and giving credit for improvements in the work environment.

In Sweden there have been three main players with SMEs, and recent changes have made their tasks harder. *The Labour Inspectorate* previously offered consultative assistance, but now supervises systems. Since 1996 Internal Control requires a systematic approach, but is seen by SMEs as bureaucratic and impractical. Authorities and businesses have different approaches. *OHS units* think SMEs are poor customers, and the smallest are not viable as customers since the ending of subsidies. SMEs are vulnerable to sick leave, so want rapid access to medical care, while remaining ignorant of the wider OHS services. *Regional safety delegates* are important, but declining in number, and SMEs find it hard to appoint representatives. Safety committees hardly exist in SMEs.

Few external actors are willing to help, SMEs feel unable to pay the market price, and few make regular use of consultants; they are only motivated by crisis. A new approach is needed. In Örebro there is a special unit for SMEs, unique in Sweden, taking a multidisciplinary pragmatic approach. Surveys are conducted, and the relationship between illness and factors in the work environment is a matter of

great concern. A holistic approach is needed, with state subsidy support, and recognition of market forces.

Toward Good Practice in Health, Environment and Safety Management in Enterprises (GP HESME)

Boguslaw Baranski of WHO Europe advises governments on good occupational health policies. He faced the argument that other national measures were available. He gained from the work of the European Network. HESME includes occupational health and safety; workplace health promotion; environmental management; and social capital and community development. There are different patterns in each country in Europe, reflecting territorial interests of government departments. Despite the problems, a holistic approach is the way forward, involving all stakeholders. The aim is to improve both health and the environment, through a mixture of legislation and voluntary agreements. The Finnish Work Ability model links research to practice in the workplace, with a pivotal role for education in the context of employability.

Major changes in the global economy, and the revolutionary restructuring of production and service organisations, coupled with the subsequent changes in working life and in the responsibilities of employees, create a need to strengthen and adapt tools and methods, to ensure that health, environment and safety are protected and promoted at enterprise level. The high rate and early onset of chronic diseases contribute to high expenditure of national care systems, and high demands for disability pensions and compensation from social insurance funds. Enterprises that lack adequate prevention and control measures contribute to environmental pollution, posing risks to health of the population.

Comprehensive occupational health (COH) is much broader than traditional prevention of occupational accidents, injuries and diseases. It may be defined as a long-term maintenance of working capacity of employees taking into account occupational, environmental, social and lifestyle determinants of health. COH is a result of positive interaction between the governmental and local authorities, social partners and the occupational health professionals. It is always multi-disciplinary activity guided by competent occupational health professionals aiming to improve the health and well-being of people at work, the work organisation and working environment, promotion of active employee participation in health activities, and encouraging personal development of employees. COH and environmental management in enterprises have been recognised as important tools to reach the public health objectives defined in the new global and European WHO strategies. They are a driving force for continuous improvement of health, environment and safety management in enterprises (HESME), requiring political support from government sectors responsible for health, environment, labour and social policy, different in each country.

The HESME programme of WHO, EU, ILO and UNEP is in line with EU activities in public health, environment and consumer rights. It covers technical, economic and managerial methods for achieving good practice, based on non-legislative and legislative tools. The purpose is to initiate the voluntary movement of enterprises and local communities to increase their self-regulatory contribution towards sustainable development. The programme aims to assist EU member states and

candidate countries in bringing together international organisations such as ILO and WHO; organising national workshops with stakeholders; adopting criteria and indicators of good performance; involving businesses; preparing national performance reviews; evaluating quality and effectiveness of prevention services; collecting and disseminating examples of good practice; training employers and employees in implementation; initiating benchmarking between enterprises, good neighbour schemes; encouraging networks; national evaluations by the ministers concerned; national reviews of performance (as in Scandinavia through SALTSA); and developing glossaries.

Concluding Statement

1. Characteristics of Small-scale Enterprises (SSEs)

SSEs, with less than 50 employees, have central economic importance in Europe, and are a considerable vehicle for creating employment. Enterprises employing less than 20 employees can be most precarious, but the sector is heterogeneous, ranging from small, high technology enterprises seeking growth, to family businesses content with their current size. The distinctive characteristics of SSEs, including their involvement in new forms of work organisation and atypical work, offer considerable opportunities for successful development. Globalisation and deregulation of markets is accelerating change, and regions have distinctive characteristics, in terms of geography, economic activity, and approaches to social partnership.

SSEs differ from large enterprises, in economic, staff and other infrastructure characteristics. Usually there is little knowledge of OHS, employers take little interest, beyond those statutory requirements of which they are aware; and employee involvement, for example through trade unions, is limited. Finance, time, and organisational resources are limited, interventions can inhibit workflow, and interdisciplinary support is difficult, meaning that SSEs are underserved. They are flexible, informal, and often have short lifespans. Work in SSEs is precarious and insecure from the perspective of the employee, and there can be risks to health and safety.

SSEs constitute 92% of workplaces, and employ about 40% of the workforce in Europe. A healthy and motivated workforce is a precondition for a competitive industry. Very often, improvements of working conditions go hand in hand with improvements in productivity. Unfortunately many SSEs lack basic occupational health provision, and face many hazards. There is a growing proportion of black market immigrant workers, for whom protection of health and safety is almost non-existent. SSEs in applicant states may benefit from past experience in member states, which work with common Framework Directives, translated into separate national legislation, with different patterns of exemptions for SSEs with respect to safety organisations, while standards are the same.

SSEs are a vulnerable and underserved category of enterprises, with common problems across sectors, regardless of technical skills and exposures. Problems are similar in developing and developed countries in Europe, but there can be great differences between sectors. It is probably more dangerous to work in a small company than in a larger company, but the evidence is poor. Accident rates and

some exposures seem to be higher, e.g. amputations in small UK manufacturing firms are twice as high as in large firms, and fatality rates are three times higher in Swedish enterprises in companies with five to 19 workers, than in large enterprises. In Germany, most accidents occur in small construction firms.

2. Motivators/Incentives

Drivers and incentives are competitiveness (increased productivity and quality), lower insurance costs and also customer satisfaction, image, reputation, personal relations and moral considerations. Pressures are legal requirements, labour requirements, labour inspectors and customer demands, together with conditions on finance from public authorities.

3. Approaches

Personal contact, local training and participation of both owner and employees are vital, with interventions tailored to needs and building on models of good practice. External know-how needs to be linked with local practice, acknowledging multiple pathways, and requiring analysis. This means multichannel actions, self-help activities, and learning by doing, with group work as a core concept. A holistic view is required, incorporating business, environmental and public health issues. Health and safety criteria can be included in external finance arrangements and tendering procedures for contracts.

There are general political and social frameworks (including relations with the social partners), as well as professional and technical institutions for occupational health and safety, which impact on SSEs. There are institutional and operational intermediaries, with diverse roles in varying structures across Europe. Operational intermediaries include Labour Inspectorates, Occupational Health Service, Chambers of Commerce, occupational health clinics, larger organisations, insurance associations, branch (or trade) organisations and in some countries regional safety representatives. Universities are stake-holders, but not necessarily intermediaries. Intermediaries are often stakeholders, depending on regulatory frameworks. The role of intermediaries is crucial to success: they should be change agents rather than problem-solvers. Experts must be open-minded and able to promote self-help activities, more partners than teachers. Local networking is a prerequisite, e.g. “Good Neighbour programmes” and local Models of Good Practice. Local networking and intermediary co-operation is important, involving industrial sectors with active roles for trade unions and municipalities, addressing needs for small workplaces. Low-cost practical improvements are needed. Solutions cannot just be left to market forces. Cost benefits can be seen in terms of productivity gains. We must take account of women, older workers and child labour. Improved understanding depends on improved information. The Internet provides the potential for new approaches.

The *regional* level could have centres of competence with educators, trainers and insurers. Occupational health clinics are useful. The *national* level should represent a governmental standpoint, with a stated policy. National institutes must be supported. National Health Service and education must be addressed together with research institutes. Subsidies are helpful in some cases, but may be not recommendable in other circumstances. The *international* level is vital for

policy making and the Bilbao Agency networking can be used. A European Network is needed on occupational health and safety in SSEs. Health and safety is central to the European Employment Strategy, and in particular the employability pillar, as being pursued by the Dublin Foundation.

4. Needs for Future Research and Development

Actions are required in assembling and disseminating good practice, with action research on intermediaries, and associated contextual issues of roles and actors. This should take into account current developments and future trends, and link to developmental research.

There is need for properly conducted studies and relevant statistics: Applied research, feasibility studies, well co-ordinated case studies of good studies, assessments of costs of ill-health, and measures of impact and effects of interventions are needed. Reliable data will be best gained by use of standard methods used in epidemiology.

There are differences in health and hazards between SSEs and larger companies. There is a lack of firm evidence to support new programmes. Official statistics are biased and incomplete, e.g. by underreporting in SSEs.

There are differences in health and hazards between SSEs in different countries. Lack of comparable data due to different sampling and criteria, e.g. for the concept of occupational disease. Validity and comparability of the current labour market statistics. Underreporting, change of criteria, change of insurance requirements and differences in the definitions of company size make comparisons between countries hard to interpret.

Workshop Participants

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 Maud Werner, NIWL, Sweden

2. Methods for Small Companies to Improve Their Own Working Environment

The workshop was led by Ann-Beth Antonsson, and held at the Office of the Swedish Trade Unions in Brussels 21–22 February 2000.

Ann-Beth Antonsson addressed practicalities of working with small companies to improve their work environment. The first theme is intermediaries, without which small companies cannot meet their potential. Who are these intermediaries, and how do they work? The second theme is the use of tools, often left by intermediaries for continued use by companies.

How to Reach and Support Small Companies: Available Infrastructure and How to Use It to Reach Small Companies

Health and Safety in Small Enterprises in Europe: The Significance of Intermediaries in Preventive Health and Safety in Different European National Settings

David Walters leads the SALTSA project concerned with intermediaries, part of the Joint Programme for Working Life Research in Europe, arising from research in the role of regional trade union representatives, where the Swedish model is being imitated around Europe. The Programme was set up in 1997 to initiate R&D on labour market and employment, work organisation and work environment, against the background of Sweden's new situation as a member of the European Union. The Programme involves the Swedish Confederation of Trade Unions, Professional Associations and Professional Employees and the National Institute for Working Life.

A common feature of successful promotion of initiatives on health and safety management in European small enterprises is the role of intermediaries, acting as bearers of health and safety messages, and contributing to the process of amplification and reinforcement, promoting positive and sustainable interventions in health and safety management. "Intermediary" covers a range of actors. What determines the role of intermediaries, their effectiveness and sustainability in influencing health and safety performance in small enterprises? He reported on a current European study investigating the role of intermediaries in successful health and safety initiatives in small enterprises. Attention was paid to the framework of environmental, organisational, economic structural and process factors, which support or constrain the success of intermediaries in a variety of national contexts in European countries. The study looked at economic and regulatory background to national experiences; indicators of health and safety performance in small enterprises; and selected experiences of successful preventive health and safety initiatives involving intermediaries and small enterprises.

The countries chosen were Denmark, France, Italy, Greece, Spain, Sweden and the United Kingdom. The choice reflected different economic and labour market indices, national styles of regulation, and employment relations. Subjective indicators were important. There was useful information concerning the use of intermediaries in different social and economic contexts, identifying important gaps in our understanding of what constrains or supports these kinds of interventions, as a means to aid and sustain improvement in health and safety performance in the European Union. Co-operative and support cultures vary, with differing emphases on business, as opposed to health and safety. Intermediaries can be more effective, for example using training of representatives within and outside particular firms. There are issues for National Labour Inspectorates with regard to their approaches to intermediaries. There are resource implications. In the UK a recent Parliamentary Select Committee report recommended support by HSE for intermediaries supporting small enterprises. Intermediaries vary considerably; some are in contact with SMEs but not concerned with the work environment. Tax advisors lack knowledge of the work environment. Experts can be contrasted with change agents.

Supporting Entrepreneurs' and Workers' Own Activity to Improve Working Environment: Multiprofessional Aspects

Saija Hiisijärvi introduced the project *Ability, Courage and Know-How for Small and Medium-Size Enterprises* and the project *Lets Net: Well-Being for SMEs*, co-ordinated by the R&D Centre for OHS, as part of a set of comprehensive experiments. They were collaborative and co-funded, for example by the European Social Fund. She set out key principles: long working periods with entrepreneurs are required; flexible and simple methods are involved; channels need to be found to the heart of enterprises; workplace health promotion is a key, broadly based, concept; actions need to be integrated, involving individual, organisational and enterprise resources and abilities; and supporting parties need to be identified and co-ordinated.

In Finland, since 1979, all employers have to provide OHS for their employees. Among others, OH-nurses, OH- physicians, physiotherapists, and psychologists are included in occupational health staff. OHS is a natural partner for SMEs in developing workplace health promotion (WHP) in Finland, a broadly based concept. OHS staff obtain information on working conditions, by visiting company health and safety committees, and undertaking physical checks and medical calls. Traditionally OHS experts have recommended work environmental and organisational improvements, advised customers to maintain working capacity, and supported disabled workers in coping with their work.

Recently, a need for a revised perspective has emerged within SMEs, due to structural and technical changes in working life. The project extended the domain of WHP by including development, training, and education matters. An important aim has been to study the role of OHS and other parties in supporting the own activity of participants in WHP: using action oriented experiment with a case study design. In 1996–1998, ten OHS units with multiprofessional experts (supporting parties) implemented comprehensive WHP in 57 enterprises with 1000 workers and managers. SMEs need economical and developmental support from outside. During the WHP-projects, interaction between the OHS units and

customer enterprises increased. Some OHS units developed new models and measures for WHP. Supporting parties had to take into account that, in small companies, the manager tends to be the key person. OHS could take a major supporting role, particularly in small-scale enterprises, but co-operation with other SME experts was needed. The target is the entire enterprise rather than an individual. OHS and other specialists should be broadminded, and use proper consultant expertise. In small-scale enterprises there is a need for multi-professional support to plan the development and implementation of WHP. In Finland OHS units are increasingly able to take the role of co-ordinating agent in projects for WHP in developing micro-enterprises. These experiences have been tested in the *Let's Net – Well-Being for SMEs* project. The objective of the project is to produce regional and local networks that plan and start co-operation, then develop projects for SMEs. The project has been successful: co-operating parties have found each other easily, and found co-operation very fruitful and important. Interaction between entrepreneurs and supporting parties has produced common understanding on well-being in SMEs and how to maintain it.

Supportive Structures for OHS in Small Companies

Gerard Zwetsloot reported on current research on supportive structures for OHS management by micro and small enterprises, carried out by TNO Work and Employment for the Dutch Ministry of Social Affairs and Employment, since 1999. TNO includes change agents and occupational health and safety experts. The aim is to identify factors for success and failure in the design and implementation of supportive structures for OHSM in SMEs. First, OHS management was conceptualised in small companies, based on the risk assessment cycle: risk assessment, action plan, implementation, evaluation, and risk assessment. This fits Dutch guidelines and the EU Framework Directive. Certain conditions need to be present: easy to use information and tools, competence development, examples of good practice, external support, and incentives. The next concept is of the OHS knowledge infrastructure, where supportive activities are generated. There are four levels: associations of companies, service providers, research and development bodies, and national policy bodies. OHS is not the only relevant framework, if there is a context of entrepreneurship. Contracts tend to cover a range of activities. The literature on supportive structures was analysed. Most support was for risk assessment; there were no cases of support for continuity in the risk assessment cycle. Literature reviews do not reveal innovation: networks should be used, drawing on the knowledge infrastructure.

Companies follow three different approaches. "We do OHSM ourselves"; "We follow good OHSM practices developed for our sector"; or "OHSM is not our core business, and this is contracted out." However, the contracting out, or outsourcing, also needs to be managed.

There are examples supporting the first two approaches; employers favour the third approach, contracting out to the OHS services. It is found more in rehabilitation than in core OHS, but is now advocated by employers' organisations. It can be attractive to unions where they do not trust employers. He distinguished activities that implicitly and explicitly determine OHS. Business processes are of fundamental importance, probably more important than OHS

management per se. Some 80% of occupational health and safety may be seen as determined by business processes.

Thinking and Behaving in Small and Micro Businesses: Why Theory of the Firm Is a Strategic Necessity for Answering Questions Arising from OHS Servicing

Reinhard Paulesich concentrated on developing OSH strategies, in the context of business development. OSH service needs more information about SMEs. He works with transaction costs and theory of social systems. OSH offers comparative advantage. Theory reduces uncertainty. OHS core competences are specific know-how. OHS services are required under EU framework legislation. Managers talk of knowledge management, and management of change: old ideas under new names. Research with SMEs was supposed to cover gaps in services and demand. SMEs find it hard to develop and follow strategy and planning. He projected development of demand and supply, identifying the level at which SMEs could enter. The market oriented legal framework imposes requirements on balance sheet information. The point of entry is changing, with OHS as a dynamic element in encouraging new coalitions. OHS is at the intersection of law, the economy and science. This means understanding complexity, helping to understand the different logics and interfaces between discipline areas. What is the comparative advantage of OHS services?

SMEs lack time, expertise and personnel to select information coming in. They do not recognise offers needed to strengthen competitiveness and sustainability in terms of societal, market and environmental requirements. Small business leaders spend about 70% of their time on communication, but staff want more information. We can distinguish staff members and stakeholders; the pressures can pull the organisation apart. Lean small business prefers a spontaneous approach to management. Outside communication lacks contacts with competitors and collaborators, and networking tends to be poor. Networking can concentrate on narrow market segments, meaning that in recruitment costs are greater for SMEs. Competence is often concentrated in the owner, forming an information bottleneck. OHS and the market are competing change agents, but SMEs and OHS institutions appear not to realise this. How can OHS services succeed in this context? In changing SMEs, why not change support systems? Is information, communication and persuasive argument a tool for OHS services? We need a model of SME thinking and behaviour.

Systematic HES Work in Small Companies: Methods and Influence on Insurance Rates

Kåre Askvik described a 1990 law in Norway: every employer should take out insurance on all his employees in case of injuries or diseases related to their work ("in work – at the working place – during working hours"). Five years later the Government asked whether the law was working as intended. Two different groups were set up to evaluate the law. The law on worker's compensation had two main intentions. All employees shall be secured a fair compensation in case of injury or disease related to their work. The law was meant to stimulate all enterprises to work preventively to avoid injuries and diseases. Factories which work system-

atically to improve their working environment and can show documentation on this work, should come out with a lower insurance rate than those factories who do nothing: "The good guys should come out better than the bad guys".

The project involved The Ministry of Local and Regional Development, The Ministry of Finance, The Ministry of Trade and Industry, The Ministry of Health and National Affairs, The Association of Norwegian Insurance Companies, The Confederation of Norwegian Business and Industry, The Norwegian Confederation of Trade Unions and The Norwegian Labour Inspection Authority. The Norwegian Labour Inspection runs the project, which includes five out of 19 Norwegian counties. The project focuses on small factories (up to 20 employees) which fabricate metal products, machinery and equipment. They represent high-risk industry, and many challenges within their work environment.

A special checklist was drawn up, used *unchanged* during the whole project period. A survey was made of Systematic Health, Environmental and Safety (HES) activities in 600 enterprises. The enterprises were divided into two equal groups, one reference-group which was "to live their own life", and a target -group. The researchers contact the target-group twice each year to provide information and guidance with their HES-work. At the end of the project-period there will be a new survey of the same 600 enterprises, and a comparison will be made between the development of the working environment in the two groups, to see what influence their HES-work has had on their insurance rates.

Three main routes towards the goal were defined: teach/help the enterprises to run systematic HES-work within their own factory; teach and help them to show documentation on their HES-activities; and teach and help them how to use this documentation in dialogue with, for instance, the insurance companies when the insurance rate is to be set.

Focus-areas brought up when discussing insurance with the enterprises include consciousness about risks within their own factory (to be able to reduce the risks you have to be aware of them); to make plans showing what they are going to do to improve their working environment, in the context of legislation, including training, and when; close co-operation between the employer and his/her employees.

The project information is stored in a database, with positive co-operation with the insurance companies. The objective has been to help companies in risk analysis, with tabulation of company performance, to enable good practice to be rewarded with lower insurance rates. There has been positive development in HES-work within the target-group, but with complications. The best enterprises tend to have the lowest insurance rates in the smallest companies, with bad companies charged less in larger companies. In principle, good practice companies should be rewarded through lower insurance rates, but in practice small companies are charged higher rates than large companies, covering workplace accidents and illnesses. In the autumn of 2000 all the 600 enterprises will be surveyed, answering the main questions in the project. Have the enterprises in the target-group reached a higher and satisfactory level in their systematic HES-work? How is the level on the systematic HES-work in the target-group, compared to the reference-group? Do the "good guys" come out better than the "bad guys",

when it comes to their insurance rate? Do the insurance companies take into consideration HES-work in the enterprises when the insurance rate is being set?

When the main part of the project is over, experiences and new knowledge will be disseminated to anyone for whom it may be useful: insurance companies, trade unions, confederations within business and industry, Norwegian Labour Inspection etc.

How Can an SSE Unit Support Small-scale Enterprises and Help Them Improve Their Working Environment?

Sten Bornberger-Dankvardt discussed problems associated with initiating systematic working environment activities at small enterprises. Obstacles include lack of awareness of the health risks at work, lack of time and lack of know-how, expertise and resources. In Sweden, there are three main players (*Labour Inspectorate, Occupational Health Service Units and Regional Safety Delegates*). Changes have made it more difficult for these players to take action. There is a need for other solutions. A regional group of consultants specialising in environmental services for small-scale enterprises (SSE) could be a solution, as tested in the County of Örebro since 1980. To encourage interest in occupational health and safety in small enterprises, the County Council in Örebro finances a special unit for small-scale enterprises (SSE unit since 1980) at the Department of Occupational and Environmental Medicine, Örebro Medical Centre Hospital. The unit adopts a multidisciplinary, pragmatic, down-to-earth approach. Working environment surveys (including exposure assessments, health examinations, information and training) are undertaken by the unit to promote a good working environment and health for people at small workplaces. The relationship between illness and different factors in the working environment is a matter of great concern. The unit trains the companies to examine the working environment, identify the problems, draw up an action plan and take action. After a year, there is a follow-up visit to the company; and after five years a new survey is offered, including health examinations and training.

One of the first questions asked on meeting the owner/manager of a small company is: What are your customer needs and requirements? How can you make your customers more satisfied? An explanation follows on how improved health and safety at work leads to better business, and helps the company to compete more successfully. To motivate the small company owner/manager to take an active interest in working environment issues, the discussion must extend to: (1) include not only working environmental issues. He needs to (2) identify the working environment problems that exist at the company. He must (3) be aware of the problem, (4) accept that it is a problem and (5) understand that "he owns the problem and can solve it". This means starting with a pilot project, developing a common language, involving the company in learning by doing, supported by follow up studies. Patience is required, with a series of small steps. Credit must be given to the company for improvements.

He outlined a programme with dry cleaners, using postal communications, encouraging measurements of solvents in the air. The result was increased compliance, with particular improvements in smaller laundries with less than five employees. The second example was of hairdressing, with a range of potential

exposures. Individuals develop symptoms; diagnosis may be too late. Questionnaires are used with groups of hairdressers to enable action to be taken. The work is undertaken at the workplace, with nurses and engineers working in teams, using an established series of questionnaires. Reports are disseminated to participating and associated hairdressers, newspapers and libraries.

The Good Neighbour Scheme and Mentoring: Building a Better Future

Pat O'Halloran introduced the *Good Neighbour Scheme*, an initiative by the Irish Health and Safety Authority, aimed at promoting workplace health and safety. The objective was to bring large and small companies together, to promote greater awareness of workplace health and safety issues. Many smaller companies could not afford to commit significant resources to workplace health and safety issues. Larger companies tend to have the necessary infrastructural and specialist arrangements to deal with a range of issues including health and safety. The scheme aims to marry the two together, with the larger companies offering a helping hand to smaller companies. The idea of a Good Neighbour Scheme was conceived in Waterford, involving small local companies in their activities to promote greater awareness and understanding of workplace health and safety issues. The scheme prospered largely through the commitment and vision displayed by Bausch & Lomb. The scheme is simple: there is no cost, form filling or bureaucracy. In 1996 the Authority invited fifty large well-organised companies, from a health and safety viewpoint, to participate. Last year the number of participating companies rose to 75 and the following year 100 companies were invited to participate. In 1999 there were 130 companies involved. The companies were chosen following agreement with the Authority's Inspectorate, who had experience of safety management systems in practice, in each of the selected companies. The participating companies were drawn from a wide cross-section of industrial sectors, and a good geographic spread. The principal aim of the Good Neighbour Scheme is to get large companies to provide a level of support and assistance, in relation to workplace health and safety issues, to those smaller companies with whom they have a business relationship, such as their suppliers, contractors, service providers, or those in their physical neighbourhood. The type and level of support is left up to the larger company. The Authority remains available to provide assistance if required.

Examples of activities include safety quiz; worker health seminars; training courses – manual handling; first-aid; fire; chemical handling, etc.; Safety Poster Competition/Campaigns; Safety Inspections; Toolbox talks on health and safety; Simulated Disaster Exercise; Safety Newsletter; Safety talk, etc.; Talks to students at second-level colleges; transport safety. Both the Good Neighbour and beneficiary companies participated in the activities. Feedback received by the Authority from both parties has been encouraging.

Larger companies found their participation in the Scheme worthwhile, as it provided an opportunity to discuss workplace health and safety issues with some smaller companies with whom they may enjoy a business or contractual relationship, and to highlight their expectations in relation to the health and safety standards to be adopted in the company in a user friendly, non-confrontational way. For smaller beneficiary companies, they found the

information, training and advice invaluable in coming to grips with workplace health and safety issues. The Scheme has provided them with an ongoing opportunity to discuss any concerns, problems etc they may have in relation to health and safety issues with relevant personnel who have the requisite knowledge and expertise to advise and assist them.

The Scheme does not seek to substitute or undermine the legal responsibilities of individual employers. The Scheme seeks to promote greater awareness of workplace health and safety issues through pooling of information and knowledge between larger and smaller companies. In many cases the contact and support continues.

Mentoring

This scheme involves the local County Enterprise Boards, which encourage local enterprise and assist SMEs at start up, and provide advice and encouragement to existing SMEs. The Authority works with the Enterprise Board to draw up a training course for participating companies. These courses are of 18 hours duration, held over 6 weeks. Participants receive homework over the period, which cumulates in a written safety statement, based on hazard identification and risk assessment, which relates to their particular type of business. Before starting the course the companies are visited by a professional safety consultant who carries out an audit of the premises and makes recommendations. This safety professional also carries out the training. During the proceedings the local inspector takes a period of class time to explain his role and the follow up from the Authority. The function is to answer questions from the participants on risk assessment and the approach of the enforcing Authority. After completion of the course the area inspector visits the premises of participants in a non-confrontational manner. Issues raised by the inspector with the company are handled by an advice letter. For companies who complete the course, the audit and inspection, a certificate is issued.

The scheme is funded by the European Social Fund and the County Enterprise Boards, with each participating company contributing 10% of costs. The Authority is in negotiation with insurance companies to allow premium reductions to companies who complete the course. About 35 companies have participated in the pilot project; the response is encouraging. Most good neighbouring is on the premises of the large company. It is a matter of ideas, not imposition. Large companies are keen. Small contracting companies secure training opportunities. The scheme is voluntary, and inspections continue. New variants in partnership are under exploration.

Preliminary Results from a Project on Working Environment Tools for Small Companies

Ann-Beth Antonsson reported that personal support is preferable, but many companies are hard to reach, so tools are needed, often introduced via intermediaries. A tool has a specific aim, helping with problem identification and solution, involved in the decision process. Tools are distinguished from information and education. Many tools are developed to support the control and improvement of the working environment, and developed for use within small

companies. Marketing is extremely important. Purchase does not necessarily lead to use. An evaluation of several tools shows several key factors.

Lena Birgersdotter reported on evaluation of several tools. It helps if the prospective user can be given an overview of the tool in use. She presented examples from different industry sectors, comparing their structures and apparent strengths.

Ann-Beth Antonsson noted that evaluation tends to focus on tools, not needs or marketing. There are often language problems, and excessive information. Tools may be too advanced. It is unusual for effects of tools to be evaluated systematically. There are few evaluations of tools; information is mainly concerned with sales. Sometimes tools are developed that are not seen as needed by target companies. Marketing is often insufficient. Publishing is important; joint arrangements can give respectability. The design of tools is often poorly adapted to the needs of small companies.

Discussion

Per Langaa Jensen argued for a reflexive approach to organisational change in terms of health and safety, enabling a number of roles to be considered. OHS professionals are not paid to develop competitiveness. Companies tend not to like OHS, but they are under pressure to take action. The main problem is sustainability.

Fabio Strambi discussed developing a healthy workplace: all must comply. If we leave it to the market and neglect the law, there are problems. We need to find linkages between training, information and control. It is not possible to continue with diverse standards in the same market. Individual understanding needs to be improved, as part of continuous improvement. European Law covers us all.

Per Langaa Jensen noted that market failures stimulate new initiatives. He emphasised the ideological role of inspection, and the need to comply with legislation. It is not a question of constructing an overall system, but of fighting a running battle.

Tools Developed to Support Small Companies in Their Improvement of the Working Environment

The Method Behind the Safety Checks Project: The Community Approach

André Lommel gave an account of the Safety Checks project, with a need for a clear message, a clear target group, and appropriate language. How can a successful project be built at European level, using tools tailored to local circumstances? There are linguistic and cultural differences to be addressed. The project began in 1992. Pilot work involved the German Safety Institute, working with new problems in the new reunited Germany. One objective was to produce a short practical package, compatible with continuing successful business. Typically SMEs have managers in practice, rather than by training, who do not use the Internet as an information source, but regard the computer as an accounting tool. The expert's approach must be brought down to earth, including important issues

without being comprehensive. The tool should be more than a checklist, and should offer solutions, proposing deadlines. The expert should put himself in the position of the SME, posing simple questions.

Safety Checks are practical tools designed to help the small employer to fulfil his duties in carrying out risk assessments, tailored to each profession, and to the particular situation and customs of each Member State or region. It has been a good illustration of how the European Community can provide added value. Under the co-ordination of the Commission, several European institutes pooled resources and shared tasks, and after a pilot phase, tested in German language versions in Luxembourg, Germany and German-speaking areas of France, each institute developed a series of Safety Check versions related to a certain number of professions. An exchange of the Safety Checks was organised, so that each institute could benefit from the efforts of the others and complete its own version, making adjustments to fit their own situation. Various ingredients were essential to bring such a project to fruition. First, the clear definition of subject-matter posing a problem with real needs must exist, with a duty to assess the occupational risks. Secondly, a target group must be identified, and then, the required expertise must be identified, which came from the safety institutes. A process of confidence building must be initiated. Resources must be made available. There are now versions in a number of languages, adapted to national and professional situations. The Safety Check has been translated, implemented, and used to stimulate new developments. In the UK there is a preference for locally invented methods, with obvious immediate value. It was important to involve inspectors, securing their interest and support. HSE decided to integrate the Safety Check into their own materials, while the French have yet to implement. The Italians failed to attend the meetings in the first phase, but are now engaged in dissemination. The key is marketing, and involvement of intermediaries.

Workplace Assessment Methods for Small Enterprises

Peter Hasle described how workplace assessment was introduced in Denmark in the early nineties. It is compulsory for all employers to carry out workplace assessment, including small enterprises, with employee involvement and a choice of methods. There must be four phases: identification, analysis, action planning and follow-up with documentation. The labour inspectorate, occupational health service, employers' associations, and labour unions have developed different workplace assessment methods. Some of these methods are tailored to small enterprises; they have been evaluated during the project. Fifty-eight methods have been included, from OHS services and employers' associations. Effectiveness of implementation has not been evaluated, other than by the users, who have usually worked with the OHS service. They can be grouped in six groups:

- simple workplace assessment based on a checklist: staff meetings have been used to introduce checklists or other procedures, and to agree action plans;
- simple workplace assessment based on open forms: health and safety problems are redefined as specific tasks to be carried out, with action plans, following brainstorming, which are then filed and monitored;
- simple workplace assessment without a form (based on flip charts or similar): facilitation is helpful;

- integrated workplace assessment (integrating environment, quality and productivity): a holistic approach, organised by the OHS service and management consultants, with a series of workshops and analysis at the workplace, presenting plans for improvement;
- training and networking methods;
- traditional workplace assessment (as for large companies).

There are constraints in small enterprises, with survival as first priority. The owner is involved in everything, pressed for time. Accidents and diseases are rare. Criticisms are taken in personal terms. The principles of workplace assessments in small enterprises are: methods should be easy and quick to grasp, with minimal written requirements, meaningful language, few problems (tasks are more welcome), minimal time requirements, and a routine for follow-up. Follow-up every three years, as legally required, may be too long, and regular staff meetings may be the right approach.

Andie Michael noted that the UK situation is different, with no mandatory requirement on employers to link to OHS, and an exemption from written assessments for small enterprises, leaving it to dialogue with the inspector.

Conceptual Models for Developing Working Environment Activities based on Danish Experiences with Workplace Assessment

Per Langa Jensen asked if the health and safety approach is too academic? OHS tends to be given low priority in businesses. Work environment activities in small enterprises must be understood as part of a web of enterprises and actors, rather than as independent entities. A work environment agent has to be introduced, able to interpret external demands and facilitate processes concerning work environment. There are now more case studies, showing that new problem solving procedures focussed on work environment can be a success. If external consultants and researchers develop trust, they can enable new procedures to be adopted, which may not survive the withdrawal of the consultant. Integration with other enterprise and local activities is important.

He outlined phases in the Danish response to the requirement for workplace assessment: transposition 1990–97; implementation 1993–99; evaluation 1996–99; development 1998–.

This has been successful in larger firms, but no smaller firms have complied, though it could be done. Danish work has highlighted five important dimensions:

- The vitality of the activities: much has been gained through workplace assessment, in terms of raising the priority of health and safety issues. It should be a matter of local participative processes, rather than relying simply on experts.
- The experiences and viewpoints of the parties involved: important problems should be addressed, not just regarded as a basic condition of the working activity.

- Development of local understanding of occupational health and safety: There should be a development of broader understanding of OHS, including psychosocial factors, often seen as too complicated or sensitive.
- Mutual understanding of the causal web behind identified problems: moving from individual instructions to avoidance of risk.
- An integrative approach: from side-car to integrated decision making.

Risk Management in SMEs

Jouko Suokas described concern in Finland over SMEs, presenting problems of inspection and insurance. Demands are increasing for quality and environmental management systems, and in some cases safety management systems. Across Scandinavia the trend is towards “self-control”, or “internal control”. In small and medium sized enterprises, there is a need for simple yet effective risk management tools. In Finland, about 10% of enterprises go into bankruptcy during their first three years. The growth of international markets, the increased use of new technologies, and production in networks bring new complexity to the operating environment. The need for systematic tools for risk management is self-evident, but all risk management tools have been developed for experts in larger companies.

A survey of SMEs was carried out to determine risk management needs. This led to a national research programme “Risk Management in SMEs”, to develop a comprehensive set of tools to cover risks in SMEs. The tool set covers business, personnel and product risks. The risk analysis typically starts with a quick survey on the vulnerabilities of a company. All the operations and dependencies are critically reviewed. Critical areas are studied in more detail. Entry into SMEs is difficult, through lack of time and resources. The tools have been developed for non-experts, so that personnel in an SME can participate in risk analysis when the area of their work and competence are discussed. This presents new opportunities for internal co-operation.

SMEs are homogeneous only concerning size, and difficulty in reaching them. This is why the close co-operation with authorities, insurance companies, labour market organisations and trade associations, and numerous training organisations has been emphasised. More than 100 Finnish SMEs have now been involved, and over 650 people have been trained in risk management. Participants have become aware of their influence on the level of risks.

The second part of the programme started in the beginning of 1999; the tool set will be complemented in the areas of environmental and contractual risks. Risk management training for small enterprises will be continued and new Internet-solutions for risk management will be developed. At present 70% of Finnish SMEs have access to the Internet. The project enjoys broad support, and steering group members have sought training in the use of the tools, using SME cases.

The Development of an Internal Control Tool for Small Companies

Ann-Beth Antonsson noted that small companies have difficulties in fulfilling requirements of health and safety under European directives. She described a

range of approaches, which typically work better in large than in small companies, including using binders, handbooks, brochures, thermometers, checklists, and adapting Finnish materials on order and tidiness. The role of intermediaries remains vital.

Internal control is a kind of management system for the working environment, compulsory in Sweden since January 1993. A research project was carried out in order to understand why and how small enterprises wanted to work with their internal control. It was seen as a management issue, with little participation from employees, and with little respect for the bureaucratic requirements involved, seen as a waste of time. Based on the evaluation, a tool was developed, outside the regulations, in order to support small companies to start working with IC, based on their current practices. About 90% of small companies like checklists, ready-made enquiries and similar tools. No small companies liked binders: they seem too complex and time-consuming. Most of the companies had regular meetings with the entire staff. She described a range of approaches, which typically work better in large than in small companies. Only necessary routines should be adopted; internal control should only be documented where needed, reducing work required. Thus the tool describes what companies have to do: survey the working environment with a checklist or similar tool; have a meeting at least once a year and discuss eight ready-made questions which reflect the requirements in the regulation, and state a policy; work with the working environment as a part of daily work; and register work-related accidents, diseases and near accidents when they occur.

It contains four alternative checklists/enquiries (including one psychosocial checklist) as guides to mapping and decision-making regarding the working environment. It contains a table where work-related accidents, diseases and near-accident can be registered. These events are quite rare in small companies. The 16 page illustrated brochure is easy to read.

If it is so easy, can it be effective? When the tool was tested, before publishing, the results showed that those who knew about IC and had tried working with it, were overwhelmingly positive. Those who knew very little about IC were less positive ("this suits larger companies, but not small ones"). Compared to other IC-tools, this tool is less concerned with building routines for how to work with the working environment, and more with what to do about it. The tool is less bureaucratic, and built up to suit the perspective of the companies, rather than the regulation. The authority checked the tool before publication, and has supported the distribution.

Healthy and Productive Workplaces: New Methods and Knowledge-support for Developing Your Own Work, Organisation and Company

Carin Hultin dealt with making health and safety a mainstream concern. Her project focus, working with an intermediary body, the Joint Industrial Safety Council, is on improving the learning processes of organisations, teams and individuals. Much emphasis has been put on integration processes. How can working environment aspects and activities be a part of the governing of production and daily routines of work, as well as linked to processes of quality and

environment? The project on “Healthy and Productive Workplaces” had support from the European Commission from 1996.

Sub-projects concerned laundries and manufacturing engineering. The laundries have a largely female workforce, many immigrants, with problems of workload and backpain. A user-friendly, web-based and animated platform for Intranet and Internet “learning at work” has been developed, with the theme of a CD-based illustrated “soap opera”, as well as other practical tools for production integration and knowledge support at work in small companies. The engineering company had around 100 employees, and were working on a folder for their environmental activities. Training was introduced for teams, linked to the environmental training and company quality procedures, leading to an overall integrated approach. A parallel project, Customer 100, took a similar focus, and management recognised the importance of health and safety. A practical publication on personnel economics has resulted. The project has influenced and created new training programmes and workplace initiatives, demonstrating how aspects of working environment, environment and quality can be integrated in the production line in small companies. The key issues are engagement of the owner, being simple and practical, and showing what it means in practice.

Helping Small Firms to Assess and Control Occupational Health and Safety Risks Appropriately

Andie Michael introduced the work of the Health and Safety Executive. The approach is based on goal-setting, rather than prescription, and is more flexible than in some other EU countries. It could be argued that this is too open, and that more guidance is needed. Her policy role is with small firms, with sector-specific services in addition. She is developing a new small firms strategy for HSE, concerned with working with partners. Health and safety is part of the dynamic nature of business; more people recognise that health and safety influence economic success. Recent statistics confirm that small workplaces, particularly in the manufacturing sector, are more dangerous than larger ones. In the UK, 99% of all businesses are small: approximately 3.6 million firms.

The UK government is keen to promote health and safety in small firms through its regulatory authority, the Health and Safety Executive (HSE). HSE produces a variety of guidance documents, aimed at small firms, winning awards for plain language. Paper guidance is supported by other methods of providing assistance, such as seminars, courses and personal contact. Internet usage in small firms has risen rapidly in recent months. Telephone support, campaigning and research continue. She outlined five steps to risk assessment: look for hazards, see who is affected, evaluate the risks, record your findings, and review the assessment. Largely, firms are advised to do it themselves, rather than through unregulated consultants. Firms with less than five employees are exempt from written documentation. Inspectors, if they call, will check policies. Small firms tend to have short lives, and may not be inspected.

The HSE’s Good Neighbour Scheme aims to provide support to small firms by setting up local networks via the supply chain, involving larger firms, often in association with a partner agency, such as the Institute of Occupational Safety and Health. CBI are enthusiastic. The scheme has not yet been evaluated. Evidence and

experience suggest that lack of support is a concern for small firms, with regard to occupational health. Small firms have difficulty finding the publications they need; would welcome the use of more case studies and best practice models to choose from; and value personal contact with an authoritative source, not necessarily an inspector. There is still much to be done in developing existing approaches, and in investigating others, including tools such as audits and the creative use of new technology.

She spoke about “COSSH Essentials”, briefing on chemical risks, developed in a systematic way, covering new regulations, expressed in plain English, with detailed material as required. The work was supported by professional and technical specialists, market testing and public consultation, and is linked with environmental concerns. There has not yet been evaluation. It is not clear what proportion of users are from small firms.

Workshop Participants

Ann-Beth Antonsson, Swedish Environmental Research Institute, Sweden
Kåre Askvik, National Labour Inspectorate, Norway
Lena Birgersdotter, Swedish Environmental Research Institute, Sweden
Sten Bornberger-Dankvardt, Örebro Medical Centre Hospital, Sweden
Danielle Champoux, IRSST, Quebec, Canada
Richard Ennals, Kingston University, UK
Roger Falk, journalist, Sweden
Eric Flemström, NIWL, Sweden
Peter Hasle, Centre for Alternative Social Analysis, Denmark
Seija Hiisijärvi, Finnish Institute of Occupational Health, Finland
Carin Hultin, Joint Industrial Safety Council, Sweden
Per Langaa Jensen, Technical University of Denmark, Denmark
André Lommel, Health and Safety Unit, DG Employment and Social Affairs, Brussels
Andie Michael, Policy Unit, Health and Safety Executive, UK
Pat O'Halloran, Health and Safety Authority, Ireland
Reinhard Paulesich, Vienna University of Economics and Business Administration, Austria
Fabio Strambi, University of Siena, Italy
Jouko Suokas, VTT, Finland
David Walters, South Bank University, UK
Arne Wennberg, NIWL, Sweden
Gerard Zwetsloot, TNO Work and Employment, Netherlands

3. Chemical Exposure Assessment and Exposure Data Handling in Small and Medium Size Enterprises

The workshop was led by Jan Levin, and held at the Office of the Swedish Trade Unions in Brussels, 10–12 April 2000.

Passive Sampling: A Prerequisite for Self-assessment?

Jan Levin noted that in most European member states, companies are required to monitor workers' exposure to harmful chemicals. To achieve quality in exposure assessment, European standards are available, with guidelines. There are also standards laying down requirements and test methods for instrumentation and procedures. Ideally, measurements are performed by certified occupational hygienists, and chemical analyses by accredited laboratories, so chemical exposure assessments are normally of a very high quality. Traditional exposure assessment can be expensive for small and medium size enterprises (SMEs). Expert measurements performed by certified occupational hygienists are expensive and time-consuming. Feedback of results to workers is often a slow multistage process. More measurement is needed. New user-friendly measurement systems for personal monitoring have been developed and validated. Passive samplers, easily worn on the lapel of the worker's shirt, are available for a large number of harmful chemicals.

The workshop discussed the advantages and possibilities for SMEs to make use of new measurement systems in order to make personal exposure assessments more effective and less expensive, and the workers more involved in the process. The basis is to let the worker do his own measurements at times of his own choice, send the samplers to the laboratory, and receive and interpret his own results. The workshop discussed practical requirements of the personal sampling system, worker training, motivation of workers to do the self-assessment, communication of results to worker and company, incorporating self-assessment into company quality systems for business benefit, the role of analysing laboratories, the role of occupational hygienists in the context of self-assessment, the validity of results from self-assessment, and acceptability of self-assessed measurements for regulating authorities.

Diffusive Sampling, Theory, Practice and Potential for Self-assessment

Richard H Brown works for the UK Health and Safety Laboratory, specialising in chemical exposure assessment. He introduced diffusive sampling, and potential use in self-assessment. The approach avoids using a pump, using samplers, which absorb (through the end or sides), and present results for analysis. Diffusion is according to Fick's law, concerning the analyte and static air, and calculations of mass collected, cross-sectional area and exposure time. Factors affecting performance of samplers include bias due to use of a non-ideal sorbent, face velocity (the amount of air movement external to the sampler), temperature,

pressure, humidity, and transients (short spikes of exposure). Diffusive samplers offer advantages: they are simple and convenient to use (and re-use), inexpensive, well characterised, appropriate for a range of analytes, worker-friendly, can be operated by inexperienced staff, and have less influence on worker behaviour. There are disadvantages: they are not suitable for particulates, sampling rates are not always available, full validation is costly, and it is important to ensure adequate air movement.

Practical applications were cited. Ambient rather than workplace monitoring has increased in the research literature. Inspectors are not enthusiasts for monitoring, due to expense. Self-assessment is a recent concern, as it is easy and cheap, and thus practical for SMEs. He considered the effect on workers' behaviour. A number of kinds of sites were monitored: coach building, optical equipment, rubber, petrochemical, furniture, but with unexciting results. Environmental surveys have concentrated on ambient air surveys, using non-specialists, rather than workplace surveys. He outlined pilot work with HSL staff (analytical chemists), HSE inspectors (occupational hygienists) and other contacts world-wide. Written instructions are essential, but training is not necessary, and there were no problems with non-specialists. He described ISPRA work on ozone, measured over an 8-hour episode, using school children, who had some training, and performed well. Samples were taken at the students' homes.

He ended with a look to the future. Diffusion samplers are a practical tool for self-assessment. He discussed the role for occupational hygienists, who may fear that their jobs are being compromised. Would they get the same results and conclusions? It is a matter of the relative advantages of worker participation and professional advice.

Practical Experiences with Self-assessment in Saw Mills and Polystyrene Workshops

Margit Sundgren described a project run since 1997 in Umeå, with a rationale in terms of worker influence, internal control, low cost, and more data. Why do exposure levels vary? She considered work tasks, how the work is done, production levels, climate and ventilation. The method is always available, offering workers the choice, and dealing with the results themselves. She illustrated introductory information on exposure, how it could be reduced, and the use of the demonstration sampler. It is important to conduct parallel expert measurements, interviews, and monitor effectiveness in internal control programmes. Are the results the same? What conditions are necessary for implementation? What makes it sustainable? What is the impact on internal control? It is important to use samplers that are easy to use and reuse. She outlined thermal desorption by gas chromatography process, in which several samples are taken on each occasion. So far the approach has been used in benzene, monoterpene and styrene exposures in industry. For *benzene*, the study involved workers in self-assessment, taking tanker drivers at a company transporting gasoline. Drivers decided when and how often to measure, and received their own results for interpretation. Drivers can perform self-assessment of exposure. Organisational support is needed to integrate the method into normal internal control of the working environment. For *monoterpenes*, the study was in four sawmills, each with seven or eight workers, taking 97 measurements and backed

by 56 expert measurements. There was no attempt to influence measurement activities. There was also a study of adsorbents, to find the most suitable. The results showed a wide range. Interest was positive, but declined, and the impact on internal control was weak. *Styrenes*, used in plastics, are more toxic, and were studied in six companies, with the objective of linking to internal control. The trials continue. So far no payment is involved. Expert measurements are made when time is available, rather than synchronised with the self-assessment. So far, self-assessment and expert measurements are in agreement, with a positive attitude from employers and employees, but no real integration with internal control. There needs to be a sustainable programme if variation is to be captured and understood.

Comparison of Self- and Expert-assessment of Occupational Exposure by Applying Mixed Models

Stephen M Rappaport has a longstanding interest in exposure assessment, and problems of small numbers of measurements. He works with the Umeå group, analysing the data. The study concerned personal monitoring, and the quality of measurement data that would come from an expert. He considered the sawmills and the plastics factory data, and used mixed effects models to determine the effects, using repeated measurements. The approach is being used internationally, supported by software packages. He analysed the data from the study discussed in the previous paper, where the same expert made all the measurements. He considered the correlation between worker and expert measurements, not made on the same days, but over the same period of time. The patterns appear similar.

Applying the mixed model, the correlation was over measurer, exposure levels and fixed effects of the particular factory, given that each person is part of a random sample. In a paper in 1999, a similar approach was used in analysing welding fume exposures in the construction industry where self-monitoring was involved, comparing self and expert to produce similar results to those conducted by experts. No significant differences could be detected in three of four sawmills and five of six factories using styrene. However, in one sawmill the self-assessment led to an estimated difference 15% greater than the expert assessment; and in one factory self-assessment led to an estimated exposure 57% greater than the expert assessment. Sample sizes were small. Measurements were taken at different times, but should be from the same population. More work is needed to evaluate the validity of self-assessments. Self-monitoring had no significant overall effect, it is a viable alternative to traditional methods, and mixed effects models offer advantages for evaluation. The study is important for the validation of self against expert.

Self-assessment of Exposure to Indoor Formaldehyde

Jan Levin used a recent study at Umeå. Formaldehyde presents problems in industrial and domestic contexts, but data on exposure had been lacking, so estimates tend to be made from air quality. A diffusive sampler was used, with validated sampling times from 15 minutes to a week. A random selection of the population were invited to take part, and samplers were sent by mail. Samplers were worn by the subjects, then kept by their beds. Twenty-two (44%) were happy

to participate, with houses aged 27 years on average. The readings were as expected, in terms of international figures for formaldehyde. Diffusive samplers are very useful in such work, and involve low cost. Indoor air concentrations are important, and apartments and houses give different results. It is easy to send out and use such samplers for this kind of research.

Recommendations for the Monitoring of Work Areas

Markus Berges works on research funded by the major insurance companies, specialising in exposure measurement. He considered process and substance specific criteria, arriving at recommendations to use passive samplers. He set the context of German legislation, and the requirement to monitor workplace exposures. This is complex and expensive for SMEs, so often they do not comply. It is not just a matter of cost: sometimes companies choose not to obey the law. In Germany there is a search for solutions for particular industry areas. Companies seek exemption if they can show regular compliance with limit values. The law sets criteria, but they are too demanding. His organisation stretched these definitions, enabling measurement or assessment at local level at low cost, while setting out safe ways of working and simple means of measurement. Data were taken from the literature, supporting submissions for scrutiny. Where there is consistently reliable compliance, no further monitoring is required. Where the limits are consistently exceeded, protective measurements are needed. Where there is general compliance, monitoring and protection is required.

He considered a recommendation for car garages, given data and understanding of the relevant rules. Old data are hard to use, meaning that measurements are needed. Carbon monoxide was seen as particularly significant, together with diesel engine exhaust. Passive samplers are used in wintertime, when doors are closed. Threshold limits are set. If limits are exceeded on average across a shift, technical and organisational changes are required. There is a need for briefing information on the use of passive samplers. General guidelines have been developed, linked to the size of the garage. The recommendation now has legal value, and is being spread by manufacturers and dealers' organisations.

Is Self-assessment a Useful Tool in Exposure Assessment?

Interactions Between Company, Occupational Hygienist and Laboratory in a Self-assessment Set-up: Experiences from a Private Laboratory

Peter Mortensen works with a private laboratory in Denmark, founded at the same time as the new Danish occupational health service. Initially relations were with colleagues with little or no experience, as with self-assessment. He favours activation of individual responsibility, narrowing gaps between experts and workers. More data would strengthen the position, ideally with regular feedback. Measurements are expensive; it is not clear that self-assessment is always cheaper. With self-assessment, he did not expect failures in laboratory analysis, transportation, storage or technical reports. Tools for interpretation exist, though education is needed. There are limitations on what can be measured.

Where is the risk in self-assessment? The purpose of investigation may be confused. It can be a matter of documentation, comparison with TLVs, explanation of sickness or nuisances, evaluation of actions, identification of sources of pollutants, and periodic surveillance. The gap is in the science. What is the consequence of leaving measurement, and its timing, to self-assessment? What data are we receiving? Is it an overall picture, or just worst case? There are issues of strategy. What happens with the introduction of new substances? Can we document the conditions in which measurement is conducted? Communication and interpretation of results can be difficult with self-assessed data, especially in the context of complex interpretation, where exposures have varied outcomes. It is not surprising that occupational hygienists are cautious. He identified two major risks. Design and sampling conditions need to match, and fraud must be prevented. All are seeking the truth, but there are issues of personal benefit and political motivation. At present workers lack knowledge of how the system operates, but self-assessment would open up new dangers. Does better quality result from the measurements? We need to define what is meant by quality: it may mean a basis for action, even faster action. Who is being helped by self-assessment? What is it used for? Where is it useful? Can it be seen as a competitor to prevention? Why not use the resources for action, rather than measurement? How do we ensure validity of measurements? This requires impartiality, available from occupational hygienists. Acceptance from companies is needed, which means control over costs of processing the results. Will companies accept that action follows certain results, automatically, when they have less control over the process? Given increasing laboratory costs, it is not clear how costs will fall.

Assessment of Dust Exposure in the Western European Carbon Black Manufacturing Industry from 1987 to 1995: Methods of Data Collection and Results

Martie van Tongeren works on exposure assessment at Birmingham. His study involves large companies, rather than SMEs. Dust exposures require active sampling, not passive. Self-assessment is not enough, as specialists are needed. Carbon black is a fine dust, used by the Chinese in ink in 2000 BC and more recently mainly on reinforcement to rubber. There are worries regarding inhalation, with effects on lungs, respiration, heart and cancer. The study covered 19 factories in seven countries, 3000 workers in three data collection periods. There were measurements of respiratory morbidity, considering inhalable and respirable dust. Many samples were needed, covering a large proportion of workers, repeated measurement, random sampling, and coverage of a large geographical area. Researchers were not allowed into the factories; designated people were needed in each factory, health and safety officers rather than hygienists. He illustrated the sampler, linked to a pump, with a cassette to be weighed back in the laboratory, with transport by post. An extensive training manual was produced, with training and factory visits.

The results showed 8,000 measurements of inhalable dust, with more sampling in the second and third periods. The percentage of reading over exposure limits fell over the study period. When dust levels are high, visibility is poor. Exposures were compared by job categories; warehouse and cleaning staff were worst affected, with reductions over the study period. Patterns of exposure vary between factories,

and levels may be seen as high by some international standards. This was not self-assessment, but it covered a large number of samples over a long period and wide area, using postage and unqualified factory staff. There was a lack of detailed information on work practices and control measures. Grouping of workers in factories raised issues, with multiskilling.

Self-measurement of Benzene in Air and Breath During Gasoline Refuelling

Stephen M Rappaport described non-occupational exposures, involved in filling cars. Little research had been done. Passive monitoring devices were tested, covering short periods. There was interest in ambient exposures, and benzene in breath. Variability in exposures would be explored, for example weather conditions. Thirty-nine non-smoking university staff and students were used, few with specialist knowledge and experience. Written instructions and kits were issued. Special devices were made, with packs to contain before and after samples. Analysis was with conventional thermal desorption. It was important to test alveolar air, as an indication of body uptake. Samples needed to be stable when stored. Few passive samplers failed to register detectable levels of uptake.

He analysed the data with the mixed model, adding data on height, gender, fuel octane, season, etc. Results showed variability of exposures, between fuellings by the same subject, rather than between people. About 25% of the variability in breath measurements was between subjects. Duration of measurements was not the same as duration of exposure to benzene. Different fuel blends have been investigated. Autumn exposure levels were the highest. It was easy to measure for benzene. Levels were variable in refuelling, partly explained by season, octane and duration of refuelling. There was less variability in breath measurements, suggesting that breath monitoring is an effective approach. Self-monitoring seems to work.

Long-term Exposures to Solvents and Welding Fumes in a Shipyard: Experiences from a Semi Self-assessment

Hans Kromhout is concerned with respiratory epidemiology, shifting the burden of field studies to the industry. He considered past experience of partial self-assessment, for example, an epidemiological study when investigating male infertility. The report was from a study of a marine ship-repair yard, using of mixed model techniques. The qualitative work was done by an industrial hygienist, who proposed a self-supported assessment system. A 1-year survey was designed, looking at self-assessment and actual exposure concentrations. The risk assessment was in 1998, highlighting welding fumes and organic solvents; the challenge was to development measurement and monitoring. A measurement strategy developed by Rappaport was followed. The SPEED program checks exposures and diagnostics. Starting with organic solvents, there were different job functions, involving diverse exposures to paint and glues. A measurement strategy was developed and implemented, evaluating the different functions and periods. There were 53 subjects, and 217 samples, covering 10 or 18 solvents. There was 78% success in measurement attempts, with failures due to no shows, sickness or

holidays. The results show variation in exposure values, but acceptable levels of exposure.

Concerning welding fumes, inhalable dust was measured, using pumps, testing shipbuilders and welders. A similar measurement strategy was designed, covering 32 subjects and 129 samples. Results were compared with new occupational exposure standards to be introduced in 2003. Failure rates were higher than before, with sickness, absence and fraud, especially in the early periods. Continued improvement was needed if new standards were to be met. Considering mixed effects, he analysed key co-variables.

Overall conclusions were given to the shipyard, concerning the level of measurements needed. Self-assessment with a random measurement strategy can work well, using a protocol. Pump measurements cause more problems than passive monitoring. Motivation, a well-trained contact person, and quality assurance are essential. Keep the occupational hygienist in place, with a computer and the right software, and let the workers do the job. The samples were relatively cheap, less than 200 euros each, with a vast range of measurements. The investment pays off, as less measurements are needed in future.

Can Self-monitoring and Self-assessment Assist in Exposure Reconstruction in an International Multicentric Nested Case Control Study?

Igor Burstyn has studied asphalt workers across Europe. He introduced bitumen, derived from oil; carcinogenicity for humans is not determined. Previous studies were complicated by the use of coal tar, no longer used in Western Europe. He outlined working arrangements in the asphalt industry, largely SMEs in Europe, using some unskilled labour. Work is mobile, schedules are chaotic, weather dependent and unpredictable. Past experience has included few large measurement surveys; small surveys are hard to interpret. Having analysed data from other studies, they failed to develop a multicentric survey, and started a pilot in November 1998. Workers resisted wearing pumps, as they impeded work, and lacked motivation. There needs to be improved assessment of exposure intensity, duration, and changes in production conditions for the next phase of the epidemiological study. There are differences between jobs and countries. The plan is for an exposure survey covering three to four countries, with repeated measurements, sampling of a representative set of operations, measuring inhalation and dermal exposures. The answer includes self-monitoring, using a passive sampler and dermal patches. Validation needs to be with respect to supervision by an occupational hygienist. Storage and mailing protocols are needed, training in use (using pictograms in a multilingual context), and with communication protocols covering linguistic and cultural diversity. Self-assessment should mean more involvement in the process. Interviews are needed with co-workers of cancer cases and controls, understanding exposures and production conditions, and assessing variability of recall among co-workers, supervisors and employers. Past exposures can be ranked. More work is needed on sampling methods. The outcome will improve validity and precision of exposure assessment for case-control study, and better exposure data for future studies. There needs to

be a methodology to integrate large scale exposure surveys into multicentric epidemiological studies.

How to Implement Self-assessment in Organisations

Anita Strömbäck is concerned with the prerequisites for self-assessment, and implementation in Swedish internal control. She is an organisational behaviour researcher, working from foundations in systems theory. She presented an account in terms of mental models, identifying different perspectives between experts and workers. Taking the example of fraud, she identified risks on both sides, as both employers and workers could wish to achieve particular outcomes. A shared mental model is needed.

Self-assessment of exposure demands participation by workers. She presented a simple control model, whereby the worker performs measurements and interprets results; the information also goes to safety delegates. Methods or devices must be user-friendly. The method must be practical, understandable and with opportunities for use. Organisational factors are context dependent, including support, production, culture, laws and regulations concerning work environment. In Sweden, under internal control, the employer is responsible for constant monitoring. Use of a device does not follow from user-friendliness. The expert's mental model of the world is different. She considered the user-friendliness of self-assessment of exposures in sawmills. Managers worried about raising the anxieties of workers; others wanted evidence of the credibility of the approach.

Why was there a variation in the number of measurements made by different workers? Production factors were relevant, and measurements tended to be made at the end of a pine or spruce process. Managers were positive if they did not have to be involved, or pay. Free choice was removed in implementing working approaches. Workers asked why they should measure, after 30 years in the sawmill without adverse health effects. Managers and workers with low exposure levels were reluctant to measure. Success depends on understanding the work organisation, and on using appropriate materials, within the context of internal control. Sawmills are small, and relations were with managers, who enabled workers to use self-assessment. In small enterprises there is often constant change in personnel and production processes, and high risk workers tend not to use masks. When the mask was used, the measurement was apparently cut off by the worker concerned, to distinguish emissions from exposure. Doubt was cast on the evidence base of the core study used in several of the presentations.

Self-assessment as a Tool in Internal Control of the Working Environment

Claes Trägårdh is from the National Board of Occupational Safety and Health. Sweden has 300,000 workplaces with at least one employee, 88% with less than 20, but only 3% with over 50, and a total of 400 inspectors. About 70,000 involve chemicals. Internal control requires systematic planning, carrying out and follow-up, to meet work environment requirements. The regulation is based on Swedish legislation and the EU Framework Directive. Employers conduct IC, and employees have a right to take part in self-assessment, which should be integrated in the work. Employers must have a work environment policy, indicating what is

needed and how it is to be done. The work starts with an investigation, undertaken continuously by the employer, looking for causes of ill health and making a written summary. The investigation is to be systematic, with measurements undertaken as part of the process. The next step is an action plan, to be implemented and followed up. So far, this does not really happen in SMEs. (**Richard H Brown** confirmed that there are similar problems in the UK.) Measures include ensuring employees obtain the necessary knowledge. The extent of documents required varies.

The responsibility is on employers, who may use hygienists. (**Richard H Brown** reported that in the UK there is a national exposure database, with moves towards a European system. There is an obligation to assess, but not measure.) Those involved are required to be adequately educated; interest has been limited, and measuring staff are getting older. Results of measurement must be documented, with access available to the workforce. Limit values are set for the working day, and ceiling levels. The purpose of measurement is important. Prevention should precede measurement, with investigation of exposures, and documentation. Self-assessment is easy to use, cheap, with quick feedback, participation, more measurement, and improvements in work environment. Documentation is needed, measurements are limited to what is necessary, there can be conflicts with regulations, and misunderstanding in the workplace.

Additional Discussions, Summary, Conclusions and Further Research

Jan Levin argued that self-assessment results are valid; more data are needed. He considered the role of the analysing laboratory and the occupational hygienist, both behind the desk and visiting the workplace. Self-assessment needs to be considered in context, with organisational support, which implies a need for further training for hygienists, if they are to adopt more of a consulting and analytical role. Professionals are under considerable commercial pressure, and may advertise their absence of measurements, while governments press for more measurement. Academic background and qualifications of occupational hygienists vary across Europe. In Denmark, most work as consultants for companies, and not on large data sets. In some cases, expenditure on improvements such as ventilation is wasted. Labour inspectors avoid using measurement.

In Sweden, labour inspectors have rarely asked for measurements. In the UK, inspectors are obliged to make judgements on a broader range of factors, as there are few opportunities to visit and measure. Self-assessment offers more data. The closure of government measurement programmes has ended measurement processes, and the emphasis has switched to validating methods. Self-assessment can be a strong tool in internal control, but needs a sound basis of knowledge of the company, so it can be used for surveillance. In an SME, self-assessment may work in association with advice from an occupational hygienist. It is important to know what measurement parameters are concerned. This implies a constrained version of self-assessment. Monitoring visits can lead to lower exposure levels through activation. Some kind of pressure is required to change practice in companies, to encourage measurement. When results are shown above limit levels,

what is to be done? This may discourage people from making large numbers of measurements. There are issues of learning organisations and good working environment. Good working practices can reduce exposures. Other metrics are needed, and effective means of communication.

Workshop Participants

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Information Society

1. Information Society: A Challenge to Health and Safety at Work

The workshop was led by Elisabeth Lagerlöf and Markku Aaltonen, and held at the European Agency for Safety and Health at Work, in Bilbao, 17–19 January 2000. The workshop was jointly organised by the Swedish National Institute for Working Life, the European Agency for Safety and Health at Work, and the Nordic Institute for Advanced Training in Occupational Health.

New Developments of the Agency's OSH Research Information Projects

Markku Aaltonen, of the Bilbao Agency, is concerned with research information and dissemination; research is primarily conducted from the Dublin Foundation. The Agency collects, evaluates and disseminates information, using the Internet. Gaps in the research field are identified, and decision makers are advised. The Topic Centre on Research Work and Health, led by INRS France, works for the Agency on these projects. The workshop was concerned with the changing world of work, and the impact on OSH systems. **Hans-Horst Konkolewsky** emphasised the decentralised networking approach, based on consensus.

Anette Rückert is responsible for OSH monitoring at the Agency. She emphasised the speed of change in European working life, and noted the increased use of information and communication technologies. New burdens arise for workers, including ergonomic problems, and increased stress through personal contacts with people. New forms of work are developing, such as telework, and changing patterns of working, with increased pace and workload. With globalisation, European and international dimensions are vital. Demographic changes mean an older workforce. There is increased interest in autonomous work and staying healthy. Social and labour market policies must keep pace, and adapt. Stakeholders must discuss and adapt their roles and tasks. SMEs lack health and safety knowledge, but need to be involved in the OHS process. Atypical workers fall outside prevention systems. IT is producing new work, which is more precarious. Leaner management has impacts on health and safety, and fewer specialists are employed.

In June 1999 a conference, under the German Presidency, dealt with changes in companies and requirements, learning organisations and safety and health in a state of change. Values are changing, from achievement to experience and self-realisation. Health and safety moves from control to an emphasis on competence and professionalism. Prevention is the key, European monitoring of working conditions is important, safety and health must be integrated in management processes of organisations, individual capabilities should be developed, networks enhanced, and the role of safety and health emphasised in new product development. OSH must be an integrated part of flexibility.

In September 1999 there was a conference under the Finnish Presidency, considering OSH, employability and exclusion. Exclusion of workers from the labour market for OSH reasons has human and financial costs, linking OSH and employability. A holistic approach is needed at strategic and local implementation levels. The Director-General made four clear recommendations, covering data collection to support policy development, exchange of experience, a new Social Action programme, and common European initiatives. Priorities of the focal points include work organisation, female workers, ageing workers, cleaner production processes, implementation of safety and health management, ergonomics, new technologies, noise, electro-magnetic radiation, chemical and biological risks. **Hans-Horst Konkolewsky** outlined progress towards a comprehensive European overview, covering the EU and EFTA.

Modern Work Life in a Nordic Perspective: Report from the Seminar

Elisabeth Lagerlöf is secretary-general of a permanent Nordic workgroup on OSH, which held a seminar on the management of change, involving national research directors, national authorities, social partners and representatives of the Baltic States.

A Nordic model can be identified, but not as homogeneous as in the 1960s and 1970s. Europe lags behind the US in new forms of work organisation; discussion tends to be too narrow, simply concerned with teamworking and telework. Opportunities for worker involvement increase as one moves north. There are important national factors, such as education and good industrial relations. On work time flexibility, there are less differences between men and women, and limited differences between full time and part time workers regarding terms of employment. She discussed good practice in managing change, and the role of learning organisations. Groupworking and teams are important, as is dialogue, and the availability of many forms of flexibility. This raises issues of public policy: how companies can be helped to improve performance, quality of working life, skills and expertise, and investment in staff. Expert knowledge is not enough; worker involvement in development is vital.

The Nordic OSH system is tripartite, well supported by research and legislation. The recent impact of unemployment has been serious, reducing levels of reporting. OSH systems are threatened by globalisation, outsourcing and changing roles of employers. The health effects of change are far from clear. The lack of resources presents difficulties, including both old and new forms of work. Researchers and authorities do not know when and how to intervene, for example

in cases of low dose exposures. More public support for health and safety is needed. Improved productivity follows OSH improvements. Improved networking is needed; globalisation should be used to spread the Nordic model internationally, with Nordic support.

The Future of Work in the Information Society

Timo Kauppinen was concerned with work in the information society. He referred to the “S-curve”, explaining change at an individual and organisational level. How can we jump onto a new curve at the right time? He traced the sequence of agrarian, industrial and information society, and identified the global context. There have always been turbulent times when society has changed form. In the industrial revolution you could occupy the state; in the information society you occupy the minds of people. In Silicon Valley, he traced the development of numerous companies based on core ideas. He noted how recently the microprocessor had been developed, and reflected on social and cultural movements in California. The conflict between capital and labour no longer explains economic change. We have new modern gaps and conflicts; gaps between well trained and untrained are increasing. We can see the gap between well-to-do and excluded widening. Self-employment, bureaucracy and undemanding manual work are growing. Income distributions have widened. There are “black holes” in the information society, where people have no access to information technology, as in developing countries. Labour in the information society will be divided: one third are self employed, one third are bureaucrats and one third are involved in repetitive work. Families are changing from traditional patriarchal patterns.

What is the role of the state in the information society? What is the future of Europe? It must be an expression of joint values, including well-being, democracy, full employment and multicultural tolerance. What do people want in working life? He described networking society, involving flexispace, flexitime, flexicontracts and flexilaw. seventy-seven per cent would prefer to be in paid work, and some 26% would like to be self-employed over the coming 5 years. In EU countries, levels of self-employment range from 6% in France to 41% in Greece, with an average of 13%. There is an increasing trend to work at home, combining work and family duties.

The Changing World of Work: Presentation of the State of the Art Report of the Topic Centre on Research – Work and Health

Steven Dhondt reviewed the situation in the Netherlands, and consequences at company and worker level. Research investigated externalisation through subcontracting, and the rise of network organisations. Job improvement and teamworking are gaining in popularity. Employability strategies are diverse. New organisational technologies are used in larger companies. He identified process innovation, functional flexibility, and externalisation. Does new organisation produce better conditions for workers? That is the dominant Dutch ideology. Smaller non-innovative companies tend to have better OSH conditions. Is it therefore better to have no OSH policy? There are higher job demands in bigger companies, and better performance imposes more strain, more sickness. How can

prevention be improved? He considered worker level issues. JIT and ISO companies, operating autonomously, have more short cycle work. Companies engaged in workflow encounter problems in terms of stress risks, from low control and high demands. Companies engaging in computer networking encounter complexity and stress. Research is needed into prevention policies, and links between job intensification and job control.

Bengt Knave reported on a review of the Swedish situation at the company level. Worker level results are coming in. The key issues are no different in Sweden, concerning changes in work. There has been consideration of occupational health and safety implications. Research has investigated different contractual arrangements, and the significance of call centres. The workforce has changed in composition, with ageing, women and migrants.

Gunborg Jungeteg described recent results on implications for occupational health and safety in Sweden. Change accelerated in the 1990s. The National Board has examined statistics on work-related accidents, showing an increase since 1997, as with work-related diseases, mainly caused by stress. She suggested a link with unemployment and "silent workplaces". The number of safety representatives has fallen by 15%, despite legal requirements for internal control systems. This was formerly a task for trade unions; it is now hard to find volunteers for the task. With outsourcing and a growth of consultants, home working and networking, explanations may be available. Occupational health services have faced change in the 1990s, with the withdrawal of government funding, and the necessity to seek funding on the market. Services have declined. The challenge is to cope with major changes: if they succeed, financial support may return.

The European Commission's Work on the Changing World of Work

Lars Erik Andreassen, from DG Employment and Social Affairs outlined the Communication on strategies for jobs in the information society, prepared for the Lisbon Summit. He introduced the European Work Organisation Network, in the context of the European Employment Strategy, Green Paper and Communication. A process of modernisation is under way in Europe and elsewhere, with improvements in macroeconomic circumstances, reforms in employment conditions, and at company level there are changes in work organisation. The new paradigm requires organisation and knowledge, not just technology, integrating of thinking and doing. The Green Paper "Partnership for a New Organisation of Work" encouraged new debate, and the involvement of the social partners. He considered Danish research on technological and organisational change, and key features of new work organisation, including impacts on productivity and employment creation, combining investment and organisational change.

The purpose of the Communication on the modernisation of work was to strengthen partnership and the involvement of the social partners. This means training, working time, changes in working relations, improving conditions for introducing new technologies, promoting involvement by workers. The Employment Strategy, or the Luxembourg process, includes a key role for work organisation, as part of the adaptability "pillar". Social partners are invited to negotiate at all levels, and member states and social partners are encouraged to

modernise labour law, removing obstacles and creating incentives. At the EU level, there are new guidelines for the Social Fund, with support for work on work organisation. The European Work Organisation Network is established to support change and promote cooperation. EWON identifies and analyses trends, stimulates actors, and inputs to the new observatory of organisational change. Membership includes the Commission, national institutes, and the Dublin Foundation. Many of the institutes concerned have backgrounds in health and safety, but with increased emphasis on work organisation and development within enterprises. There are discussions in EWON on stress and psychological issues, and a change in focus from previous work on working conditions. There is work on policies for adaptability, developing partnership. There is a new newsletter, with inputs from members and editions in all EU languages.

The new communication on job strategies for the information society reflects national strategies, linked to national action plans for the European Employment Strategy. Internet penetration in Europe is likely to double within four years, with correlation between Internet takeup and economic prosperity. Training needs are increasing, including retraining of older workers. The Communication deals with learning, working, public service and enterprise. Priorities are digital school, state, worker and enterprise. This raises issues of Internet access in schools, at primary and secondary level. All schools should be linked to the Internet by the end of 2002, and all teachers should be competent in the necessary skills. There are skills gaps for information systems specialists.

Impacts of Information Technology on Occupational Health and Safety

The Future Use of Information Technology in Occupational Health and Safety

Pelle Ehn set the scene for the Bauhaus in Weimar Germany, a precursor of the Digital Bauhaus where he now works. There was a search for a new unification of art and technology, involving politically engaged artists. When expelled from Germany, they moved to the USA, and the ideas later reached Scandinavia as Nordic design. The movement collapsed into élitism, despite artistic merit. Democracy was lacking. The lessons were learned by the founders of the Digital Bauhaus in Malmö. To illustrate the problem of technological forecasting, he cited the early 1970s Dynabook vision of Alan Kay at Xerox PARC, with The Learning Group, first exemplified in the Alto workstation, then in the Star office system. How did this vision emerge? How did Xerox fail to develop the ideas, later taken up by Apple and Microsoft?

In the 1970s, there was concern about automation and skill at work; the threat was seen as being from detailed control from production planning, provoking a response of democratisation and involvement of workers, with trade unions. In the 1980s, the threat of deskilling from new technology led to the design of new tools and user oriented systems development. In the 1990s the poor user quality of IT products became apparent, and qualification structures became chaotic. This stimulated attention to design in Stanford, with Terry Winograd's book *Bringing*

Design to Software, Mitch Kapor's approach to design at Lotus Software, and the Digital Bauhaus. Over this period, the role and scope of IT use has changed, with new roles for management, trade unions and work.

How does new technology create new working life? Can we move from nineteenth century Manchester to 21st century Silicon Valley? He described start-up companies, where the founders work long hours and then hire programmers for routine work. What qualifications are needed by the future worker? What does high connectivity and convergence mean for the concept of a workplace? What are the consequences of virtualisation? Virtual organisations are part of a physical world. Control rooms tend to be separated from the world that is controlled, but can be linked by portable devices. What is the impact of the computer on work? It is as important to understand narratives, as facts. What research could help the quality of work in the information society? We move beyond the PC into ubiquitous computing, the computer that is everywhere but hidden in smart tools, things and houses. This integration of computing power into physical environment constitutes a potential major change of the workplace. In an anthropocentric Digital Bauhaus approach this challenge will be met by joint efforts of artists and technologists, but user participation is fundamental.

New Trends in OSH Training

Richard Ennals set out approaches to networking supported by information and communications technologies. The networking approach to work organisation could provide a dissemination mechanism for healthy work. He outlined a proposed project from the International Commission for Occupational Health, "Work Life South", based on the four priorities of preventing accidents, preventing silicosis, preventing toxic effects of pesticides and preventing HIV/AIDS. He gave some indicative scenarios, using new technologies of the information society including geostationary satellites, and regarding ICOH as a virtual international university.

OSH Information in Internet: Today and Tomorrow

P K Abeytunga noted that the Canadian Centre for Occupational Health and Safety uses information as part of core services. The Internet is growing fast, blurring boundaries between countries, cultures and segments of society, transforming work and the marketplace. Information is the driving force of the digital economy, with OSH dimensions, and OSH information on the Internet is now taking shape. The volume of information is massive, and a knowledge-sharing culture is developing. Is the information available, up to date and reliable? What value is provided? Government is offloading work to citizens, and companies offloading to customers. The Internet enables individuals to tap information from anywhere. Information vendors are required to add value, with an emphasis on content and an appeal to ordinary users. Knowledge management and partnership will be valuable. Training materials and directories are available, with virtual bookstores and online journals via the Web. Email and discussion groups are proliferating, with expert moderated newsgroups and conferences. Connectivity has been enabled through universal standards over the last decade, from TCP/IP through to XML and Unicode. Extranets and intranets are developing rapidly, using the same standards.

Increasing numbers of sites are free of charge. PubScience, from the US Department of Energy, provides full text papers free. PubMed will offer similar services for medicine, by-passing publishers. This challenges conventional publishing, with long time lags.

There are problems and pitfalls. Limitless choice can mean confusion. Information overload is a major problem. The Internet is a shopping mall, blurring promotion and marketing. There are special interest groups within OSH, arguing conflicting views. Unless information is correct, true, balanced, up to date and properly interpreted, there can be problems. Personal responsibilities are increasing, and time pressure is difficult. This brings value for timeliness and customisability. High quality information is not easily available free of charge. Fee-based services challenge OHS information vendors. Focus shifts to content rather than containers, from managing documents, databases and files to managing knowledge, an intellectual challenge. This needs partnership between supplier and recipient, brought together via the Internet. The primary customer base shifts from intermediaries to end users. Users want to save time, read less and understand more. What can information providers do that the user cannot do for himself? This is the added value. Internet led changes are likely to continue, with expansion of the Web and OSH information. Users will include workers and the general public, and those in remote locations. The CCOHS is working with ILO and other international organisations, increasing the range of practical services for end users.

Vincent van Polanen Petel sketched changes from printing press to the industrialisation of printing, and then IT and electronic information. He discussed the pricing of information, asking which users could reach it. Additional costs of the information are almost nil. It is not a matter of mass markets, but custom markets, offering value for the customer, and with price discrimination. With OSH, there is the issue of overload and overlook, data rather than information. Partnerships need trusted third parties. Prevention costs increase, as conditions are to be improved. The cost of corrections diminishes, for enterprises covering costs of sick workers, and at society level. Costs of prevention and correction should be reduced through the provision of improved information.

New Developments of Safety Information Systems for Labour Inspection

Wiking Husberg is an end user, concerned with the interface between laws and enterprises. Laws and standards need to be available on the Internet, with training and education material, and collaboration with the OHS services. Incentives and penalties are threats rather than regular tools. Inspections need to provide equal treatment of all enterprises, with transparency and credibility. This means finding relevant information rapidly, giving answers on the spot or within a few days. Inspectors are advisory in large companies; in small companies they need to consult colleagues to ensure comparable understanding. This means a discussion forum, across the country and dealing with particular directives. Inspectors' information databases are to be built up, incorporating research translated into practical advice. There needs to be unlimited access to the public for websites and CD-ROMs. Chemical Risk Assessment tools have been developed, sold on a cost recovery basis, to enable companies to conform with legislation. Tools help assess

vulnerability of SMEs. A personal protective equipment advisory system on the Web was improved as a result of testing and advice. Systems need to embody models of SMEs, which are not catered for by current approaches. He outlined support provided for SMEs, including a range of pilot schemes and competitions. There are costs to be met.

Workshop Participants

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Conclusions from 2000 Workshops

Work Life 2000 has made the case for taking an integrated approach to working life, and the Malmö conference will address the policy implications. Changes in technology and work organisation have had radical impacts, which have not been understood. National policies are still addressing previous realities. There are challenges here for research, changing focus and timescale. The old emphasis was on single enterprises and national policies, but developments today are at intermediate, regional and European level.

National boundaries within Europe can obscure common ground, and the scope for co-ordinated research and development is considerable. Results from epidemiological studies deserve a wider audience, with the corollary that national and European research agendas need adaptation. There are particular issues for national governments, who like to control, or influence, the research agendas that may lead to new policy development. Insights derived from methodological advances need to be understood, and may require new organisation of academic and governmental work. European research synthesis can encounter single nation resistance, but continue; the advance of the knowledge process will be increasingly international.

Working life is no longer distinct, delimited by time and place. There are new pressures, new models of business strategy, and emerging insights into the consequences for occupational health and safety. The United States was the birthplace of first Taylorism and then business process re-engineering; globalisation means that Europe is not immune to such changes. Questions are raised about European culture and values. Europeans are suspicious of simple solutions, whether in terms of political ideology or technology, and there is a general recognition of the limits of market forces. Privatisation and outsourcing do not remove the responsibility and necessity for caring and “social glue”, but they relocate it, often first removing the necessary resources. This is recognised in the pillars of the European Employment Strategy, combining security with flexibility. Operating market economies does not free us from concerns for gender equality, work force diversity, and social justice.

Work Life 2000 raises questions regarding the reasoning which precedes political decision making. It is fashionable to declare that policies are based on sound science, but customary to see science in a national context, with institutional structures which compromise the independence of the conclusions reached. Within the EU we may see common perceptions of what constitutes scientific

rationality, but sufficient differences in institutional arrangements to make a single European state seem a remote prospect. In the current intermediate stage of closer relationships, and economic pressures to reduce duplication of research efforts, what are the possibilities for change?

Two umbrella concepts have recently been available, each powerful in isolation, but in combination offering new ways forward. "Work organisation" has provided a vocabulary to describe processes of change in the economy and society, shifting emphasis from the enterprise and national level to the intermediate, regional and European level. "Healthy work", or "occupational health and safety", operates in this changing environment, maintaining links with individuals and medical science in the context of working life.

It is in this context that we have to deal with the epidemiology of psychosocial factors at work, and the epistemology of the resulting conclusions. The field straddles the conventional disciplines, and seeks to measure those phenomena which are a consequence of deliberate externalisations through recent changes in the global market economy. As patterns emerge from epidemiological studies, it is no longer within the power of individual governments to prevent the questions being asked. As the patterns become clearer, in societies which subscribe to values based on democracy and science, what are the processes which link scientific knowledge and political action?

There are some natural inhibitors to speedy action, which may delay policy changes. There is a reluctance to act on evidence that was "not invented here", and a preference for keeping within traditional scientific procedures. Scientists and decision makers face the challenge of changing the organisation of their own work, thinking "out of their boxes".

For those involved in improving working life in Europe, or with a focus that is more localised at national or regional level, the rules of the game are changing. Work Life 2000 has shown the potential for knowledge-based social dialogue at a European level, with insights that transcend boundaries of nation or discipline. We have a common humanity, located in diverse cultural situations, and there is vast potential for learning from our differences.

Questions are begged about the nature of scientific truth, the basis on which decisions should be made which affect the future of society, the extent to which conclusions of medical research hold in different contexts, and the priorities which should determine public and private expenditure. These are profoundly European questions, to which, after some thousands of years, we have come to expect no easy answers. Dialogue continues.

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