

MANAGEMENT BY OBJECTIVES : A CASE STUDY

by

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ABSTRACT

Management by objectives is a relatively new phrase in the management literature and this report investigated some of the characteristics and implications of this approach to management.

The literature on this topic was reviewed where it was found that management by objectives was concerned with the identification of the important areas in which objectives need to be set, the specification of the relevant objectives within these areas, and the derivation of adequate plans to ensure that the objectives will be achieved. It was advocated that there should be a broad range of objectives established in every area affecting the survival of the organisation.

The review of literature was followed by a case study in which management by objectives was introduced into an industrial organisation. Field conditions that need to be satisfied if action research of this kind is to be conducted were carefully examined.

Working according to the principle of management by objectives involved several phases of operations. The first dealt with establishing objectives and corresponding levels of performance or targets. Next was the period in which corrective action was taken if accomplishment looked like falling short of expectation. At the end of this

period a work review session was held in which variances were examined, and factors preventing the achievement of the objectives identified. This led to the establishing of revised objectives and targets for the new period of operation.

It was found that establishing and working towards the achievement of objectives had implications for other management practices. It provided a means of readily identifying the training needs within an organisation, and could offer a rationale for formal appraisal concerning questions of promotion and possibly aspects of salary administration.

These practical aspects of the research were supplemented by an analytical study involving the assessment of organisational effectiveness. It was found that the organisational units examined in this study could be placed on a scale of effectiveness, so that those units that were "effective" were so over a range of ten organisational criteria, while those units at the other end of the scale were rated poorly with respect to most of the criteria.

It was also hoped to use the same kind of criteria to assess the change in effectiveness resulting from the introduction of management by objectives. It was found, however, that the period of 13 months over which the research was conducted was too short for there to be fundamental changes brought about in some of the organisational variables used in the above analysis.

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CHAPTER 1INTRODUCTION

Management by objectives has received a good deal of attention in recent years, yet some aspects of it are undoubtedly as old as management itself. What is perhaps its main feature is ages old, for Aristotle said that "the end must be seen before the way". It is also apparent that some people organise their work quite naturally along the lines of management by objectives. For example, the builders of the pyramids and the conquerors of Mt. Everest must have known exactly what they wanted to achieve and derived thorough plans to ensure that their purposes were accomplished.

While the necessity for having an objective in project organisation of this kind may be self-evident, the place of objectives in the management of continuing organisations, such as business enterprises, hospitals, political parties, etc., is not so clearly understood. In this context it has taken some time to develop the principle of management by objectives and the process is certainly far from completed yet. The importance of defining objectives for the effective management of business organisations was probably first touched upon by Fayol (1916). He advocated a rational approach to management in which business activity was divided into four main areas - the technical, the commercial, the financial, and the social. He suggested that forecasts

be developed in each area and specific plans of action drawn up with respect to each forecast, for these plans would facilitate "the utilisation of the firm's resources and the choice of best methods to use for attaining the objective".

Urwick (1929) also supported the idea of rationalising the activities of an organisation and saw that this type of division of resources meant that priorities had to be determined. He quoted one business leader of the times as saying that "it is more important to have all the functions of a business developed as to 10 per cent of their possible efficiency rather than one function developed as to 100 per cent efficiency at the expense of the others". While Urwick's main contribution was that he stressed the need for achieving "balance" between the major activities of the enterprise, the groups of activities that he described were similar to those referred to by Fayol, except that Urwick gave more emphasis to personnel (welfare, in the broadest sense) and technical research (the application of scientific discoveries to processes and equipment).

The recommendations of Fayol and Urwick, however, did not receive widespread acceptance and it seems that a narrower view was taken in general. In industry it appears that the usual assumption was that the main objective of a business was to make a profit. Drucker (1954) severely criticised this limited approach, pointing out that to emphasise only profits "misdirects managers to the point

where they may endanger the survival of the business". * In a similar vein Gross (1965) criticised the generalisation that the objective of public service organisations was to be "efficient".

Drucker and also Cordiner (1956) suggested that management should be broadly based with objectives established in all areas affecting the survival of the organisation. The kind of areas covered by them were:-

- . field of interest
- . profitability
- . marketing
- . innovation
- . survival
- . management development
- . industrial relations
- . social or public responsibility

By comparing these areas with those described by Urwick it will be seen that their foundation of management was much wider again, and emphasised the need for the organisation to keep abreast of technological change, varying economic and

* ".....To obtain profit today they tend to undermine the future. They may push the most easily saleable-product lines and slight those that are the market of tomorrow. They tend to short-change research, promotion and other postponable investments. Above all, they shy away from any capital expenditure that may increase the invested-capital base against which profits are measured; and the result is dangerous obsolescence of equipment. In other words, they are directed into the worst practices of management."

market conditions, and changing attitudes. This approach to management was a more dynamic one compared with the relatively static picture portrayed by Fayol. In all fairness, however, the difference reflected the rise in the influence of the environment in which the organisation existed rather than a difference in personal outlook, for Fayol clearly saw that one of the most important requirements of top management was "to assess the future and to make provision for it". In general, the type of organisation envisaged by these writers was not one characterised by speculation and quick returns, but rather a strong, viable organisation offering security of employment to its members and the prospect of secure profits in the future.

Areas in which Objectives may be established

The areas mentioned above will now be briefly described to indicate the types of objectives which may be established within them.

Field of Interest

This area refers to the particular industry or line of business in which the organisation is to be engaged, albeit the manufacture of a product or the provision of a service. The limits of operation may be determined by the expertise built up in the field, and the enterprise steered to develop within areas of proven capability. As internal economic conditions change, however, management may readily

change its field of interest. According to Allen (1961), substantial firms with a long history are usually those that shift their ground frequently in the course of their existence. He cites Rolls Royce as an example of a company which for many years was a motor-manufacturing firm, but now is regarded primarily as a member of the aircraft industry.

Profitability

Profits are a measure of the financial effectiveness of an organisation and have been described as the acid test of performance. Dean (1951) maintained that management should aim for a minimum level of profit, often specified as a percentage return on capital, for it was upon the achievement of this that the survival of the organisation depended. Above this minimum level March and Simon (1958) suggested that management may settle for a rate that they consider "fair".

Marketing

To facilitate the achievement of the profit objective, management may specify the value of total sales that the company needs to secure. In addition, share of the total market may be stipulated, for as Drucker stated, too high or too low a percentage may mean that the organisation is undesirably vulnerable to changing economic conditions. The demand for a particular product, however, does not last indefinitely, and management may keep an eye to phasing out

existing products and replacing them with others more suited to changing market conditions. In this sense Cordiner has come to consider products as having a life cycle involving phases of invention, development, cultivation of the market, establishment, renewal and obsolescence. This type of attitude to the establishment of appropriate objectives may be particularly important for those industries in which the life span of the products is comparatively short.

Innovation

Innovation is desirable on both economic and technical grounds, for old and inefficient machinery tends to inflate production costs, and the replacement of plant enables management to take advantage of the latest advances in research. However, as March and Simon pointed out, innovation is unlikely to occur satisfactorily unless especially catered for, and specific objectives in this area will be necessary if management is to keep up with technological change.

Survival

Traditionally, management accounting interest has been mainly concerned with the capacity of a business to make profits in the current year of operation, but more recently businesses have been appraised on their ability to make profits in the future. Management has taken explicit steps to preserve the future value of capital, and to maintain the physical resources of organisations including modernisation

of buildings, improvement of the physical working environment, and repair or replacement decisions to retain technical capacity.

Management Development

In addition to the financial and technical assets of organisations there are the human resources, and a growing need has arisen for businesses to invest in the development of the people who are to run them. Hunt (1965) pointed out that as the pace of technological and economic change increases, the problem of administration becomes more complex. Furthermore, increasing size has magnified the difficulties of co-ordination and control, led to the need for faster and more informed decisions, and heightened the problem of motivation. Factors of these kinds have raised the question as to what kind of objectives should an organisation have regarding the type of formal education desirable for its managers, as well as the kind of periodic training necessary for their progressive development.

Industrial Relations

This term is used in its broadest sense to denote the general state of personal relationships and attitudes of members of the organisation. Various avenues are open to management in this respect. For example, the I.B.M. study described by Drucker was one case in which an attempt was made through job enlargement to create a suitable working

environment for the individual. Alternatively, attention may be given to the organisation of work, and Bucklow (1966) cited a number of examples of well functioning work groups in which both productivity and job satisfaction were high. On the other hand, neglect of the working environment may lead to problems associated with high labour turnover or severe industrial unrest, and to avoid situations of this kind management may direct some of its energies in order to maintain a particular organisational climate.

Social or Public Responsibility

A final area in which management may have objectives is where the organisation assumes some social responsibility for society at large. In the present century there has been a general welfare movement which has resulted in improved physical working conditions, and the provision of canteens, sports facilities, and employee benefits. Some organisations encourage management and employees to participate responsibly in society by supporting community activities, the Territorial Army, a local government. Again, facilities in the form of buildings or equipment may be offered to community ventures, or financial contributions made for education or to charities.

Further Developments in Management by Objectives

Both Drucker and Cordiner were principally advocating the need for establishing multiple objectives rather than a single objective, and subsequently writers including Miller

and Starr (1960), Odiorne (1965) and McConkey (1965) have also supported this line of argument.

Granger (1964) took the development of management by objectives in a new direction when he distinguished between the types of broad organisational objectives outlined in the preceding paragraphs and those that could be ascribed to the sub-units within the organisation. Considered in this way the organisation could be thought of as having a hierarchy of objectives, with different kinds of objectives pertaining to each organisational level. Granger also pointed out that problems could arise when the objectives of the sub-units were inconsistent with the corporate objectives, although he did not pursue the point by explaining how this conflict may be resolved.

Another kind of difference was established by McGregor (1960) who distinguished between the formal objectives of the organisation and the actual objectives of the individuals occupying the positions within the organisation. Conflict could also exist when these two types of objectives did not correspond, and in McGregor's terms there was a need to develop integration between the objectives of the individual and the objectives of the organisation. Just how one should go about achieving this, however, was not described by McGregor.

A third development also dealt with the work objectives

at the level of the individual, and was concerned with the specification of levels of performance or targets corresponding to each objective. According to Humble (1965), the identification of objectives and targets should both clarify the requirements of the job and assist the individual to control and improve his own performance.

The Present Research

The developments in management by objectives described above raised a number of questions which formed the main points of investigation in this research project.

. firstly, how may objectives at different levels in the organisation be co-ordinated?

. secondly, what method may be used to integrate the objectives of the organisation with those of the individual?

. thirdly, how may objectives and their corresponding targets be established, and in what way can these be used by the individual to increase his effectiveness?

To answer these types of questions it was necessary to conduct a case study in which management by objectives was introduced into an industrial organisation. As the introduction of this new practice would undoubtedly affect the other management practices in the company, a further research point was generated:

. fourthly, what implications did management by objectives have for the existing management practices in the organisation?

A final area covered by the present research involved an analysis of organisational effectiveness. Here, the aims were:

. fifthly, to assess organisational effectiveness by means of a number of criteria.

. sixthly, to see if there was a change in effectiveness resulting from the introduction of management by objectives.

The following report on this investigation is divided into five parts. Parts One, Two and Three are concerned with the first four points mentioned above, and the remaining two points are examined in Part Four. Part Five provides a resume of the whole research.

PART ONE

THE FIELD RESEARCH

Any organisation may draw up its own broad objectives similar to those described in the previous chapter, and then define these objectives in more precise terms. Examples of such company objectives are shown in appendixes 1 and 2. However, once management has rationalised its objectives in this way what still remains unknown is the extent to which the objectives of the people in the organisation correspond to these formal objectives. In other words, it is not clear how the objectives of individual employees correspond to those of the formal organisation, nor even what kind of objectives people have at various levels in the organisation. Perhaps the real situation is that most people do not work towards clear objectives at all. How, then, may objectives at various levels in the organisation be set and co-ordinated?

To answer this question a research project was undertaken in which management by objectives was introduced into a manufacturing company. The aim was to see if the work objectives of people in the organisation could be formalised and specific criteria of achievement or targets established. If this could be done, what implications would this have for other management practices in the organisation?

CHAPTER 2THE COMPANY

The research was conducted in one factory of a large light engineering company which was established in the nineteenth century and was one of the pioneers in mass production techniques. With heavy demand for the product, management set up factories in a number of countries and developed an extensive network of retail stores and services. Sales increased and the Company grew till it dominated an international market.

As the Company was wholly dependent on one competitive product, however, it was vulnerable to the national trade barriers introduced after the First World War as well as to the growth of European and Japanese competition following the Second World War, and its market position declined. This decline in market standing seemed to bring out organisational weaknesses which further hampered the Company. To meet this situation production was diversified into a range of domestic appliances, instruments, and office machinery, a programme of modernisation in production was commenced, and methods of management were strengthened. As a result of these activities the Company entered a new phase of recovery and expansion.

The factory in which the research was undertaken was the Company's largest and dated from last century. Its six

storey Victorian buildings became a local land-mark, and the factory the principal employer of labour in the district. These very factors of size and age, however, magnified the difficulties besetting the Company as a whole. Particularly in the post World War II era the factory suffered from both plant obsolescence and increasingly keen competition from Japan, Germany and Italy. A further setback was a general deterioration in industrial relations over the same period. The years of the fifties became dogged by labour disputes ^{and} and the industrial unrest culminating in 76 stoppages in the first six months of 1965. Inextricably connected with the unrest was dissatisfaction with the method of work measurement and wage payment. Although the old method was unsatisfactory and created wide differences in pay between employees who were doing essentially similar work, the introduction of new methods was resisted. Not only this, but when new methods were established pay inequities still existed and were therefore a constant source of industrial irritation. These conditions meant that cost of manufacture was high at a time when increased competition was demanding lower selling prices. This, together with an inadequate cost control system, led to a decline in the financial position of the factory until operational losses were incurred.

To meet this situation management reacted in several ways. Modern industrial designs were introduced as market

research had shown that preferences in western societies has changed for products with newer styling and pastel colours. New materials were examined by industrial engineering, and component parts were re-designed to improve quality and satisfy customer demands. In an effort to maintain the competitive position of the Company emphasis was given to reducing production costs. Not only was there a drive to implement cost improvements but also cost control became an important aspect of managerial practice. In addition, management decided to devote more attention to the question of management development. It was within this content, that of management development, that the present research was commenced.

When the study began the division in which the research was conducted comprised some 350 production employees. The division was managed by a Product Manager who had 3 Production Managers under his immediate command and 14 Supervisors under his extended command. Each Supervisor controlled one Cost Centre. 12 Cost Centres were concerned with the production of machine parts and there were 2 assembly Cost Centres.

The technology in the division was static over the period of the study. In other parts of the factory there were changes in plant and equipment but these had no repercussions within this particular division. Parts were produced along mass production lines and in general the work

was light and fast, the work tempo being somewhat faster than that of alternative work in neighbouring areas outside the factory.

Attitudes tended to be firmly established, probably because of the age of the factory. The industrial unrest referred to above occurred mainly in other areas of the factory and in this division industrial relations were thought by both management and the unions to be satisfactory.

CHAPTER 3NATURE OF THE RESEARCH

In carrying out this investigation the researcher spent a good deal of time in the Company and became intimately involved in its day-to-day activities. This research method may be described as the "field study" method, ref. Scott (1965). The identity of the investigator was not disguised, as was Dalton's (1959) when he took the role of participant observer, but the aim was for the researcher as a representative of the University to develop an explicit but confidential role which was acceptable to the people in the organisation so that he could interview, observe, and gather information from the Company's records.

A second aspect of the investigator's role was that he was concerned with bringing about changes in the organisation. After interviews had been conducted in which the objectives of individual employees were obtained, meetings between the employee and his superior were called and the outline of the objectives was discussed until consensus was reached. In these sessions it was important that openness and trust be developed, and that the discussions be conducted in a work-diagnostic rather than personally critical manner. The researcher interfered minimally in the working relationship between the two, but served mainly as a catalyst enabling changes to take place. Since the decisions taken in the

meetings led to subsequent action in the organisation, this research followed the pattern of "action research", ref. Shephard (1965).

Previous experience in this area, for example the work of Jacques (1951) in the Glacier Metal Company, has shown that there seems to be an important condition which needs to be satisfied for action research to be undertaken successfully. It is that problems arising out of the research activities must be identified and worked through till a solution which satisfies all the people concerned is found. Only when difficulties are progressively resolved in this manner may the project move safely forward to the next phase of development.

In the current project there were four main phases of development which were:

- . initial contact with the organisation
- . establishing the project within the organisation
- . conduct of the on-going research
- . extrication

Each of these phases will be described in greater detail.

Initial Contact with the Organisation

Other studies, for example those by Trist et al (1963), and Rice (1958), have suggested that for a project to be established on a solid foundation in a factory four types of support or sanction were necessary. These were support

from top management, middle management, the unions, and the shop floor.

It seemed that support from top management was probably the most important of all of these. If higher management was not to take an active interest in the research, or, if it was not seen to take such an interest, then enthusiasm at the lower levels of management would be likely to wane. From the University's point of view the meeting of this first condition seemed fairly certain as the initial approach came from the Company. At that time the Company was instituting management development programmes, and as the management had heard that the University was interested in research opportunities in industry, they decided to approach the University to see if it was interested in doing research in the management development area. Staff of the University Department had been working in this field for several years and as they were wanting to extend research into new areas the approach by the Company was particularly timely.

Establishing the Project within the Organisation

After initial contact was made between top management and senior members of the Department, a series of meetings took place and the general nature of the project was decided upon. It was agreed that a project on management by objectives could commence practically immediately with a view to seeing how management development could be related to the achievement of objectives.

It was also decided that the research would be conducted within one division of the factory. The reason for this decision was that a new manager had been recently appointed in charge of the division, and as he had come from a company which had successfully applied social science principles to practical management, it was thought that he would be sympathetic to, and would support, the kind of research that was to be undertaken.

The previous experience of this manager proved to be a considerable asset. He took a personal interest in the research and enthusiastically encouraged its development within his division. In the presence of the researcher he discussed subjects with frankness and openness and this demonstration of trust facilitated the growth of confidence between both managers and supervisors and the researcher.

Later on when the project was nearly completed, a new manager took up the position of divisional manager and he, too, actively encouraged the research. At this stage the objectives of shop floor personnel were being obtained and the manager explicitly supported this important phase of the research by suggesting that operatives should not lose pay while they were being interviewed. Instead of being paid as if they were on "waiting-time" they were paid at "time-and-a-quarter" which approximated their average earnings.

It was also necessary to discuss the project with Trade

Union representatives to determine whether or not they had any anxiety over the presence of University personnel in the factory, particularly as the researcher wanted to interview members of the shop floor. An initial meeting was arranged with the Convenors of the two Unions representing shop floor members and at this meeting the general nature of the research was discussed. It was made clear that the work would not encroach upon areas in which the Unions had a strong interest, such as conditions of employment and wages. The point was also stressed that the University wanted to create an independent role in the factory which would mean that the research would be outwith the control of management.

The Union Convenors then arranged to call a further meeting of the Shop Stewards who were the elected representatives of the Trade Union members of the division in which the research was to be conducted. At this meeting the general outline of the research was again described. It was also explained that the researcher would be largely concerned with gathering opinions of different groups within the division. This information would be treated confidentially, and summaries of the opinions would be shown to other groups in the Company only if the report was sanctioned by all the people concerned. A further point that the meeting was particularly interested in was who was financing the research. The researcher was able to guarantee that the Company was in no way making any financial contri-

bution and that all costs were being met by the University. The meeting concluded with the two Unions fully sanctioning the project.

This left the shop floor to be approached. The initial contact was made through the Shop Stewards who told the operatives the main points covered in the previous meeting. Meanwhile a letter was composed by the researcher explaining the nature of the project in greater detail. Although the letter was stencilled, see appendix 3(a), it was individually addressed to each member of the shop floor and was personally signed. A short while after its distribution, a second letter describing the next phase of the research was drawn up, see appendix 3(b), and placed on the notice boards in each work section. To further strengthen the relationship between the researcher and the shop floor the Supervisors and Shop Stewards were asked to make joint nominations for one shop floor representative from each Cost Centre. These representatives were considered to be "solid citizens" who occupied positions of informal leadership in the work groups. Two lunch hour meetings were held with these representatives, aspects of the research were explained and discussed, and subsequent contact from the researcher was often channelled through them.

At this stage the project was considered to be accepted by the organisation.

Conduct of the On-going Research

The method at this stage of the project involved interviews and meetings held at the managerial, supervisory, and operative levels. To do this work further aspects of the researcher's role had to be developed. In the preliminary discussions with top management it was important to establish that once there was agreement of the general outline of the research, the conduct of the research was entirely the responsibility of the University. When this understanding had been reached the Company's management responded very satisfactorily and did not put any pressure on the researcher for short-term results. With middle management, too, it was necessary to resist suggestions that particular problems should be investigated by the research worker, and to establish that the research was to be conducted only within specific limits. At the operative level the problem was of a different kind. From considerations such as dress and probably manner of speech, there would be a tendency to identify the research worker with management rather than the shop floor. While the presence of the research worker was accepted through the recommendations of the Unions, the independence of the position was stressed by the research worker lunching in the workmen's rather than management's canteen.

Another important aspect of the research role has been alluded to already and concerned the confidential nature of

the relationship with members of the division. In the initial letter to operatives it was stressed that any statements made by individuals or any questionnaires filled in by them would be treated with the utmost confidence. Reports summarising discussions or presenting the results of questionnaires would be shown first of all to the group of people volunteering the opinions. These reports could be amended by the people concerned if an error of fact occurred, and the reports would then have to receive unanimous sanction before they could be published or shown to anyone else. When the objectives of managers and supervisors were obtained the same principle was followed. Each interview was summarised and a copy shown to the person at the next meeting. These summaries could be altered in any way until the person was satisfied with the final draft.

The establishment of the relationship between the research worker and the employees was actively supported by the divisional manager who described it as a "doctor-patient" relationship. This implied a further feature of the research worker's role, that of confidentiality. The divisional manager encouraged work relationships between himself and his subordinates to carry on regardless of the presence of the research worker who was thus able to note behaviour in the division from a position imbued with confidence but divested of authority. From this position it was hoped that it would be easier to grasp an understanding of the operations

of the whole division and would supplement the analytical aspects of the research discussed in Part Four. While developing an atmosphere of trust, it was desirable to keep relationships on a workmanlike basis. It was necessary at both the managerial and operative levels to discourage tactfully suggestions of continuing relationships on a social basis outside the factory.

Once the conditions for conducting the research had been developed, a start could be made on obtaining the objectives of people in the division. There was a number of ways of setting about this task.

According to Drucker (1954) the real difficulty was not so much in determining what objectives there should be, but in deciding how they may be set. Drucker himself argued strongly that the responsibility for setting objectives lay with the individual, with the power for approval or disapproval resting with higher management. He suggested that objectives could be set using the "management letter". This letter, written by the subordinate to his superior, was a statement of the former's objectives as he understood them. Any objections or modifications by the superior would be discussed and when agreement was reached both people would have a clear idea of the expectations of the job. A more formalised version of this idea was the "statement of objectives form" of which an example is given in appendix 4. This form would be completed by the subordinate and on sub-

mitting it to the superior differences in interpretation or emphasis would be discussed in a way similar to that used with the management letter.

Another basically different approach was for the objectives to be imposed from above. One possibility would be for a superior to call his subordinate into the office and say "I have some objectives I want you to achieve". It was plausible, however, that imposition of this kind would evoke defensive behaviour, especially if the levels of performance were too high. On the other hand, if the levels of performance were too low, complacency may be encouraged. Also, if the subordinate was to be held rigidly to the achievement of the objectives, it would be probable that he would attempt to shroud his performance in ambiguity so that the true position would never be known. In spite of these considerations, it was apparent that some managements were indifferent about where the initiation for setting the objectives comes from. As Moodie (1967) pointed out, 'this does not necessarily invalidate the approach but it does, by remaining the motivational element, reduce it to a planning and clarifying tool, and it marks a fundamental departure from its original theoretical basis'.

The current research aimed to preserve the spirit of the former approach, but the interview was used in a more intensive attempt to find out how employees saw their jobs through their own eyes. People were simply asked to describe

the main purpose and objectives of their jobs. No cues were given, nor was there any attempt to elicit specific remarks about the objectives. Rather, the aim was to obtain a description of what the person was actually trying to achieve in his job. Thus a person was encouraged to talk about a specific objective until the interviewer felt that the point had been thoroughly covered. In this way the person's comprehension of his job was fully explored. Periodically the interviewer would summarise what had been said. He could ask, for example, "Do you mean such and such?" By this means it would be known whether or not the interpretations were correct. Summarising was also a suitable technique for bringing the person back to the subject when he had strayed from the point.

Details of those interviews, and the work arising out of them will be dealt with more fully in later chapters. This phase of the project comprised the bulk of the field work and extended over a period of approximately 18 months.

Extrication

Having expressedly created a role which was meaningful in practical terms, the object of the final phase of the project was, from the practical point of view, to leave the role intact on the withdrawal of the researcher as the field work drew to a close, and to have it filled by a member of the Company's Personnel Department. In this way the action generated by the researcher would not cease when he left but would continue by being incorporated into the normal

activities of the organisation.

A close liaison was kept between the researcher and members of the Personnel Department during the course of the field work and periodically meetings were arranged at which progress in the project was described. As a result of these meetings members of that department became interested in the developments and implications of the research, and the Personnel Manager decided to examine the possibility of extending the work to other areas of the factory.

If, however, anything was to be achieved in this respect it was also essential for the Personnel Department to have the support of higher management. As the final phase of the project was approached an interim report, together with a brief resumé, were sent to the Managing Director and a meeting to discuss developments in the research was arranged between top management and senior members of the University staff.

Further discussions were then held within the Company and these led to a decision to extend management by objectives to the factory as a whole. Two officers of the Personnel Department took on this task, one dealing with top and middle management and the other with staff at the supervisory level.

University staff had initial discussions with these officers and the outline for extending management by

objectives was planned. As the practical work of obtaining objectives got under way, the University was able to maintain an advisory relationship with the Personnel Department and thus keep in contact with practical developments within the Company.

PART TWO

OBTAINING WORK OBJECTIVES

The conditions which were necessary before the operational aspects of the project could be started were outlined in the previous chapter, and "case histories" will now be described to show how the procedure worked in practice. The objectives of the managers, supervisors, and operatives will be discussed separately in Chapters 4, 5 and 6. These chapters provide a routine account of the types of objectives obtained at each of these levels, and the discussion of the implications of this procedure has been left over to Part Three of this report.

CHAPTER 4THE OBJECTIVES OF MIDDLE MANAGEMENT

It is important to stress again that the interviews with the managers were undirected. After rapport had been established, a manager would simply be asked to describe the main purpose of his job. This was called his goal. This process was the warming-up phase of the interview and the main function of the question was to prepare the manager for the subsequent discussion of his objectives. When the interviewer called, the manager was usually deeply involved in the day-to-day aspects of his work and a preliminary overview of the purpose of his job enabled the interview to progress to a broader and more thoughtful level of discussion. Next the manager was asked to describe the main things he was trying to achieve in order to accomplish his stated goal. The interviewer summarised the important points made by the managers and these major aspects of his job were called his objectives. As an example, the results of the first interview with manager A appear below.

Goal

To manufacture machine parts in the correct quantities, at the correct price, and in the correct time.

Objectives

Objectives of subordinates - To have the efforts of the

supervisors pointing in the same direction.

Training - To develop the supervisors to be self-reliant, and effective members of a management team.

Quality - To improve the quality of the parts manufactured so that the standard of the finished product is above that of competitors.

Production - To ensure that the quantity of parts produced meets production commitments.

Costs - To produce product parts at a price that will be attractive to customers in a competitive market.

Between the first and second interview the manager had evidently been giving more thought to the purpose of his work. At the next meeting these further objectives were added:

Objectives continued

Quality - To maintain liaison with the Assembly Department and Quality Control Manager and to investigate situations when parts machined to specification do not assemble because of a clash in tolerances.

Training - To develop supervisors so that they are suitable for promotion to a managerial position.

Production - To reduce the time that customers have to wait for replacements.

When these further points had been added, the manager was asked to think about each objective more specifically and to nominate levels of performance which he thought re-

flected the real situation in his department. The following levels of performance or targets were suggested.

Targets

Production

Stock - to be 2 days in front of the Assembly Department on all parts, and 1 week ahead on at least 60% of parts.

Agency Orders - to reduce the backlog of customer repair orders to 6 months on all parts.

Quality

Quality Level - to have an acceptable quality level of 95% on all parts as determined by quality audit and Staff Inspectors.

Machine Specification - to reduce the number of instances where parts machined to specification do not assemble with the mating part.

Training

Formal Training - to have one supervisor attend the next Company's training course.

On-the-job Training - in addition to the 2 supervisors suitable for promotion at present, to have another 2 ready for promotion within 6 months.

Costs

Budget - to operate within the budget.

At this stage the manager was satisfied that he had adequately covered the major objectives of his job and designated realistic levels of performance on each objective. A summary of these objectives and targets appears in appendix 5(a).

Meanwhile, a similar description of this manager's objectives had been obtained from his superior, see appendix 5(b). These two descriptions were exchanged with their permission and each manager was able to see what the other considered the objectives of the position to be.

The next session was a meeting involving the manager, his superior, and the interviewer. This was primarily a discussion between the departmental manager and the divisional manager, and the interviewer's role was mainly passive. Differences between the two descriptions were discussed and worked through until agreement was reached. For the final description of the objectives the following additions were made:

Objectives

Costs - To submit cost improvements proposals regularly.

Industrial Relations - To keep good relations with unions, yet maintain the initiative in labour relations and control of the shop floor.

Targets

Quality - For measured repairs and re-work to be reduced

below the budgeted figures for the cost centres, ie. 2.44, 1.83, 7.34, 3.73, 1.81, 5.03, 2.10 and 1.85%.

For unmeasured repairs and re-work to be reduced below the budgeted figures for the cost centres, ie. 0.61, 3.05, 4.59, 0.62, 1.81, 2.88, 4.90 and 0.93%.

Costs - To submit cost improvements proposals to the value of £8,000 per annum.

The complete and agreed set of objectives is shown in appendix 5(c). The objectives formed an operating plan for the manager, and the targets represented the state of his department as he thought it would be at the end of the next phase of operations. Complete agreement had been reached on what was to be achieved, but the manner by which this was to be done was being left to the subordinate.

A second example may now be provided by manager B. The same interviewing procedure was followed, but it will be noted that the lists of objectives produced by each manager were different. The goal and the objectives obtained in the first interview with manager B appear below.

Goal

To achieve the shop-order at an economic level of costs, and within these cost limits maintain the desired standard of quality.

Objectives

Production - To meet shop-order commitments of all lines.

Costs - To meet the budget.

Quality - To maintain quality by increasing frequency of inspection by staff inspectors;

To increase quality consciousness of operatives.

Human Relations - To achieve better human relations by increasing harmony between operatives and supervisors within areas, and by decreasing friction between supervisors of different areas;

To mould employees into a co-operative working team.

Repairs - To reduce costs by reducing scrap and re-work.

House-Keeping - To keep area in a clean and tidy condition.

Plant Maintenance - To introduce plant maintenance on a roster basis to reduce down-time, and thus prevent inflation of standard labour costs.

The following additions were made in the next interview:

Targets

Production - To meet the weekly Machine Building Programme:

Type of Machine	29k	188	195/196k	331k	451	Total
Number	75	250	350	220	70	965

Quality - 20 demerits on all classes of machines.

Costs - To achieve budget figures.

House-Keeping - To have stock boxes set up adjacent to their respective sub-assembly areas.

In the third interview the manager reflected on the listed objectives and targets and added the following to complete his description:

Objectives

Inventory - To establish buffer stocks on all classes of machines to ensure constant flow of any variety to the customer without delay.

Targets

Plant Maintenance - To appoint a skeleton staff (2 - 3 people) with high skill in Fitting, Turning etc., to maintain better machinery conditions.

Inventory - To establish 1 week's buffer stock.

The final description of his objectives appears in appendix 6(a).

The corresponding description of the objectives of this position had been obtained from the superior and these are shown in appendix 6(b).

The two descriptions were exchanged and a subsequent meeting was held at which the interviewer was also present. Differences in emphasis were discussed and by the end of the

meeting certain points had been dropped and others added. The agreed set of objectives appears in appendix 6(c).

While there are many similarities between the objectives of managers A and B, it will be noted that one important difference occurs which depicts the different ways by which they execute their roles. The objectives of manager B embody a strong emphasis on the personnel aspects of his job. His day-to-day work indicated, and his description of his objectives reflected, that proportionately more time was being given to developing a team spirit within his department. This involved strengthening the personal relationships between supervisors, between operatives, and between supervisors and operatives.

Another illustration of the differences between managerial objectives may be provided by an example of a third interview series. The initial description of the objectives of manager C are given below.

Goal

To achieve the correct amount of production and the right standard of quality, and to see that there is as little industrial relations trouble as possible.

Objectives

Production - To achieve the shop order and agency orders.

Quality - To have production meet quality control specifications.

Industrial Relations - To eliminate the causes of Failures-to-agree.

Training - To develop the supervisors to solve problems before they arrive as a union case.

Setters' Scheme - To instal the Setters' Incentive Scheme and to get it working on a correct basis.

Stores - In the store, to have set-up cards containing all tools, gauges, and cycle-times for jobs.

Targets

Industrial Relations - To reduce the number of Failures-to-agree to an acceptable level.

To these the following additions were made in the next interview.

Objectives

Costs - To meet the budget.

Targets

Quality - For % of lots rejected not to exceed 15.

Costs - See budget attached.

Setters' Scheme - To be installed in 3 months.

Store - To have 75% of cards completed in 3 months.

In the third meeting the description of the objectives

was considered to be near completion. The final listing of the objectives appears in appendix 7(a).

Although it had previously been the practice to obtain the superior's description of the manager's objectives at this stage, in this case this step was omitted. This was done mainly to save on interviewing time. Instead, a copy of the manager's objectives was simply handed to the superior and arrangements for the discussion were made for a later date. At this meeting the objectives and targets were discussed in turn. Again some items were deleted while others were either modified or added. The affected items are listed below.

Objectives

Costs -- To meet the budget as it varies with the sales forecast.

Targets

Production -- To clear current outstanding agency orders within 3 months.

The final set of objectives is shown in appendix 7(b). One of the main differences between this manager's objectives and those of his peers was the emphasis given to industrial unrest in his department. There had been a number of disagreements between the unions and management and the manager saw that this was disrupting both production and morale.

His aim had been to investigate thoroughly the causes of the unrest and to encourage his supervisors to attend to industrial relations problems at their inception.

In conducting the interviews described above, each session was terminated when it was felt that the manager had exhausted the points running through his mind. This was the main consideration determining how long any particular interview lasted. For this reason the duration of an interview and the amount of ground covered in the session was influenced by the day-to-day problems of the work situation. Especially when the work pressure was high, it was difficult to disengage a manager from divisional worries. Consequently, the number of interviews in any series could vary and this characteristic may be illustrated by the case of manager D. This manager was relatively new to his job and on top of this he had some pressing problems in his department at the time when the interviews were conducted.

To avoid repetition, the description of this manager's objectives has been shown in appendix 8(a), where it may be noted that the interviews were shorter but more frequent than those for the other managers.

Some Characteristics of the Descriptions of the Objectives

By using the unstructured interviews it was possible to

gain insight into the way the managers saw their jobs. It is clear from the initial descriptions of their objectives that the managers' perceptions of their jobs tended to be limited, probably because of the many incessant demands made upon them. The interviewing series enabled the managers to detach themselves from these activities and to begin to see their jobs in perspective. Their ideas about their jobs expanded and they were able to regard their work in broader terms. In this way the interview series indicated a learning process.

Not only this, but also the managers were able to see aspects of their jobs in more concrete terms. The nomination of targets gave the managers a "yardstick" by which they could judge their performance. As the precision of the targets was increased the managers were able to obtain an increasingly accurate knowledge of the potential of their departments.

Working Towards the Achievement of Objectives

Once agreement had been reached between the manager and his superior, the manager worked towards the attainment of the objectives and targets. The general idea was that with the requirements clearly defined the subordinate would have scope to employ his initiative, and it would not be necessary to have his work supervised in detail by the superior. Although the control exercised by the superior would be less

in one sense, in another it may be more effective, for should the subordinate at any stage require support, the assistance given him would be more appropriate.

At the end of a given period of time, performance over the period was reviewed at a meeting between the superior and the subordinate. It was important that the atmosphere of the meeting would be such as to encourage an open discussion of performances. Differences between expected and actual performance were examined, and reasons for these differences sought. This could lead to further action to correct the position, or if the difference reflected an inappropriate standard then a more realistic target could be suggested. In this way past performance was critically examined with a view to implementing corrective action on the one hand, and on the other to establishing new objectives and targets. The latter then formed a new operating plan for the manager.

The way this procedure worked in practice may be illustrated by the case of manager E. The initial set of objectives appears in appendix 9(a), 9(b) and 9(c) and the final description is shown below.

Goal

To increase the overall efficiency of the Department, to effect an increase in the quality of products, and to increase productivity per man.

Objectives

Production - To meet the shop order, to ensure a free flow of parts to the Building Area Parts' Stores by increasing the batch quantities;

To establish stocks of finished production parts in stores wherever possible.

Quality - To achieve a general improvement by increasing the quality rating as measured by the quality audit.

Costs - To achieve budget figures;

To further cut operating costs and effect cost improvements by changes of methods and re-organisation of plant and labour.

Building - To establish a Jig and Fixtures Store containing complete set-ups of each operation, thus making it possible to implement a Setter Incentive Scheme, to effect a possible reduction of indirect labour, and to maintain the efficiency of the Jigs, Fixtures and Tooling.

Targets

Quantity - To meet parts' orders as determined by the Building Programme;

To have adequate stocks with 75% of current production parts within next 3 months;

To clear outstanding 1965 agency orders by end of June;

To be in a position to supply all future agency orders within a month of the receipt of the order.

Quality - To get an average quality rating of 100% in all areas.

Costs - To meet budget figures below;

To submit cost improvements for the year to the value of £9,000.

Building - To have Jig and Fixture Store under way by August.

It will be seen that there were three main objectives concerning production, quality and costs. The first of these objectives was of particular concern to the manager. He was dissatisfied with the flow of parts from his department to the Assembly Department, and with some parts in particular the supply was so short that rush orders had to be put through. Small batches were being run off and this was involving excessive set-up time. To obviate this difficulty the manager aimed to increase the size of the batches and to establish stocks of finished parts for these items. Also, there was a number of customer orders for replacement parts carried over from the previous year. He wanted to clear all such orders as soon as possible, and planned to have these parts run off whenever production was ahead of the weekly shop order and free plant was available.

By the time the work review discussion was held the manager had moved his department forward from its "hand-to-mouth" existence and had achieved a degree of flexibility

in progressing work by building up stocks of certain parts. In addition, he had been able to clear all outstanding orders for replacement parts and had thereby decreased the time between the receipt of any such orders and the manufacture of the part.

With this objective under control his attention turned towards the quality performance of his department. Part of his difficulty lay with the machinery. Some machines were old and heavy demands were being placed on them as improvements in the product called for lower engineering tolerances. The divisional and the departmental manager agreed, however, that defects of this kind were outwith the departmental manager's control. It was also agreed that bad quality may be due in part to operational error and the manager was to emphasise the need for improved quality to the supervisors and operatives.

In the period between the initial setting of the objectives and the present review, it had been impossible to establish the Jig and Fixture Store as previously suggested. However, by this time the underlying problem had become clarified. In a previous organisational change affecting the whole factory a sizeable number of men had been involved in transfer within the Company. This loss of local skill within some work groups had meant that some operation lists had become out-of-date. Thus the immediate concern of the manager was to have all operation lists in his department brought up-

to-date.

As has been mentioned in Chapter 2, the Company had introduced a new cost control system which required a more detailed knowledge by managers of cost accounting. The manager had come to realise that he needed more training in the costing area so that he could increase the financial effectiveness of his department, and use his weekly budget expenditure statements in a more positive manner. The question of his own training and the provision of training for his supervisors was discussed with the divisional manager.

From this discussion the departmental manager drew up a set of objectives and targets for the ensuing period of operation. This description appears below.

Goal

To have the Department operating at an economic level with production and quality fulfilling requirements.

Objectives

Production - To ensure a free flow of parts to the Building Area and Parts Stores by working to Material Order requirements;

To establish stocks of finished production parts in Stores wherever possible;

To supply all actual Agency Orders.

Quality - To strive continuously to increase the standard of quality of parts.

Costs - To achieve budget figures;
 To cut further operating costs;
 To effect cost improvements.

Training - To see that all levels of supervision are given facilities;
 To increase their job knowledge.

Operation Lists - To up-date outstanding Operation Lists.

Targets

Production

Shop Order - To meet weekly shop order.

Agency Orders - To supply all Agency Orders within 4 weeks of their receipt.

Quality

End-of-Line Inspection - To achieve an 80% first-time pass for end-of-line inspection.

First-off Inspection - To achieve a 99% pass for first-off inspection.

Costs - To meet budget figures attached.

Training - To have supervisors attend the current series of Company training courses.

Co-ordination of Objectives

For each manager, work review sessions of the kind just described were held with the divisional manager, and analysis

of performance led to a re-definition of objectives for the subsequent period. While the objectives of each manager were obtained separately, and the discussion of the appropriateness of these objectives was a part of the individual working relationship between the manager and his divisional manager, as time went by it became apparent that some lateral communication between the departmental managers on this question was necessary. As this need came to the fore it was spontaneously and independently suggested by two managers to the interviewer that meetings of the departmental managers should be held at which the individual sets of objectives would be co-ordinated and the composite description presented to the divisional manager for discussion.

A series of such meetings was conducted at which points of difference between the managers were hammered out until agreement was reached. Unfortunately, a final set of objectives had not been established before the project as a whole drew to a close, and re-organisation of the division made it meaningless for practical purposes to pursue the exercise.



CHAPTER 5THE OBJECTIVES OF SUPERVISORS

A series of meetings was held with each group of departmental supervisors in the division to explain the nature of the research, and to allay any anxieties that the supervisors may have had over being interviewed about their jobs. As with similar meetings of this kind described earlier, the independence of the interviewer's position and the confidentiality of the discussions were stressed. When the initial formality of these meetings was broken down and the supervisors began to talk freely about their work and its associated problems, appointments were made for subsequent interviews.

The interviews were held with the supervisors individually and these sessions were conducted in a similar way to the earlier ones with the managers. The supervisors were first of all asked about the goal of their jobs, and then about their work objectives. The nature of the supervisors' objectives may also be illustrated by several "case histories" and as an example the description of the objectives of supervisor A is shown below.

Goal

To produce, in quantity and quality, the required number of different classes of machines to meet the shop order.

ObjectivesQuantity

Shop Order - to meet the shop order.

Flow of Work - to plan labour on each of four lines and to change operators between operations to achieve a free flow of work.

Quality - To ensure that defective parts are kept to a minimum by investigating complaints on faulty parts by operators, by investigating quality and audit complaints and by identifying faults.

Training - To train new operators on-the-job.

Discipline - To maintain discipline with respect to starting and stopping times, cleanliness, smoking, and fire precautions.

Targets

Quantity - To meet the weekly production targets (averaged):

Type of machine	A	B	C	D
Number	225	250	400	75

Quality - To have no more than 30 demerits on all classes of machines.

Compared with some of his peers, this supervisor tended to cultivate a more formal relationship with his subordinates. Supervisor B's style of supervision was quite different and this difference can be seen by comparing their

objectives. The description of the objectives of supervisor B is shown below.

Goal

To produce the highest quality at the lowest cost.

Objectives

Production

Flow - to see that parts are in a sufficient flow and to get early warning of when stocks are running low.

Spares - to keep spares of arbors, tools and gauges to maintain production.

Plant Maintenance - to maintain plant in an efficient condition.

Quality

Standards - to make sure that standards of quality are clearly understood.

Inspection - to check work prior to delivery.

Working Relations

Personnel - to maintain a close working arrangement with setters and the general personnel in the section.

Instructions - to make sure that instructions are carried out.

Complaints - to investigate any complaints and to follow these through.

Tact - to try to handle each operator with tact.

Operators' Records - To keep a daily record of each operator's production and to see how his output and wages are progressing for the week; if he is being held up, to investigate the reason.

Targets

Output

Shop Order - for gears (straight bevel, spiral bevel, and helical and spur) and pulley-wheels together to average approximately 5,500 per week.

Stocks - to maintain stock at a 3 week level.

Quality

Scrap - for scrap not to exceed a level of 5%.

Supervisor C seemed to adopt a position intermediate to that of supervisors A and B. The description of his objectives is shown below.

Goal

To see that the number of machines produced per week meets the shop order.

Objectives

Quantity

Shop Order - to meet the weekly shop order.

Shortage of Parts - to replace operators when a major shortage of parts is seen, and to notify the Cost

Centre responsible.

Plant Maintenance - to maintain plant in good working condition.

Quality

Level - to maintain a satisfactory quality level.

Faults - to investigate faults reported by operators or notified through quality audit, to identify the causes, and to inform the people concerned.

Personnel - To handle the operators individually, and to create harmony among them.

Targets

Quantity - To meet the weekly shop order (average) below:

Type of machine	A	B	C	D
Number	225	250	400	75

Quality - For number of demerits not to exceed 30 on all classes of machines.

An interesting point about the examples given above was that the descriptions were obtained in a single interview. These supervisors tended to be well on top of their work and to see their jobs in a broad perspective. Another example of a broad set of objectives was provided by supervisor D.

Goal

To be fully responsible for Production, Costs, Quality and Labour in the Section.

Objectives

Production

Production Schedule - to ensure that the production schedule is maintained.

Agency Orders - to see that agency order requirements are met.

Quality

Scrap and Re-work - to cut down scrap and re-work.

Top-Ten Scrap - to check and investigate top-ten scrap monthly.

Costs

Budget - to work within budget requirements.

Cost Reduction - to submit cost reduction proposals.

Personnel

Labour Requirements - periodically to review labour requirements and to hire, fire, or transfer where necessary.

Discipline - to maintain discipline.

Union Relations

Complaints - to investigate operator complaints.

Disputes - when operators are not satisfied with the handling of the complaint or the time taken to resolve it, to take up the issue with the Shop Steward.

Further description of supervisory objectives appear in appendix 10. These descriptions, compared with the ones illustrated above, tended to include considerable detail which referred more to the tasks executed by the supervisors than to the end-points or objectives at which the tasks were directed. This involvement in detail was able to be brought out by the unstructured nature of the interviews. The interviewer did not attempt to elicit stereotyped descriptions, so it was natural for such detail to be mentioned if this was the way the supervisors really saw their jobs. The real implication of these descriptions, therefore, was that many of the supervisors were unclear about the requirements of their jobs. The importance of this point will be taken up in Chapter 8. To cope with this problem of detail, one of the departmental managers called a meeting of all his supervisors, and their objectives were discussed collectively. The meeting produced a single set of objectives common for all sections in that department. This general description is shown in appendix 11.

Working Towards the Achievement of Objectives

One case, that of supervisor E, has been selected to illustrate how a person could work towards the achievement of his objectives at the supervisory level. This supervisor's initial description of his objectives is shown below.

Objectives

Production - to make the Shop Order;

To meet Agency Orders.

Quality - To get as high a quality of parts as is practicable with the existing machinery and tools.

Working Relations - To build up good working relations with employees and with the unions.

Labour Turnover - To cut down the high labour turnover.

Targets

Production - To meet the shop order weekly;

To clear current outstanding agency orders by the end of August.

Quality - For rejects on final inspection not to exceed 30%.

This supervisor had been newly appointed to a Cost Centre in which costs were high and quality was low. The fundamental problem, however, concerned the relationships between management and the shop floor. Because industrial unrest was rife in the section, management's attitude had hardened while some operators would 'fight' at the slightest provocation. Associated with this atmosphere was a high labour turnover which tended to intensify the production problems.

The supervisor realised that the route to improving the performance of his section lay in developing good working

relationships with the operators and the trade unions, and in endeavouring to reduce the high rate of labour turnover. In taking this approach the supervisor was helped by the attitude of the new manager who saw that it was necessary to deal with employee complaints at the earliest possible stage before they had developed to the level of a Failure-to-agree being registered between management and the unions.

After the specified period of time had elapsed (six months) performance over the period was reviewed in a meeting between the supervisor and his departmental manager. The general problem, that of industrial relations, had been rectified and it was considered that working relationships were now satisfactory. Labour turnover was practically non-existent.

The Shop Order was also being met, but there was a difference of opinion on the extent to which Agency Orders were being satisfied. This difference in perception was talked out and agreement was reached in the setting of a new objective. As far as the quality objective was concerned, this had been achieved with respect to all parts manufactured except one, and this item was to receive special attention in the next period of operation. It was also agreed that the overall quality performance of the section could be improved and a lower reject target aimed for.

In a separate interview with the supervisor the

following new set of objectives was arrived at.

Objectives

Production -- To make the Shop Order;

To meet Agency Orders.

Quality - To get as high a quality of parts as is practicable with the existing machinery and tools.

Working Relations -- To maintain the good working relations with employers and with the unions.

Personnel -- To reduce the number of personnel in the Cost Centre by about three so that while production is maintained earnings within the section are increased (this is to be accomplished by normal wastage).

Targets

Production -- For current outstanding Agency Orders to be cleared by January.

Quality -- For rejects on final inspection not to exceed 25%.

This description was shown to the departmental manager who suggested that a further discussion between himself and the supervisor should be held. Before the interviewer arranged this meeting, however, the manager wanted "to sow the seed" of costs with the supervisor.

At this meeting the additional point of budgets was discussed and it was agreed that the manager would review

the weekly expenditure reports with the supervisor. This on-the-job training would help the supervisor to relate his actions to particular items in the budget. In addition, provision was made for the supervisor to attend a training course on budgets run by the Personnel Department, but this aspect of supervisory development will be dealt with in some detail in Chapter 7.

CHAPTER 6THE OBJECTIVES OF OPERATIVES ON THE SHOP FLOOR

The objectives of the shop floor personnel were obtained in much the same way as had been done with middle management and the supervisors, only in this case the initial contact was made through the unions rather than top management. The discussions with shop stewards, the meetings with the shop floor representatives, and the operative letter and notice were all described in Chapter 3. These developments were followed by the distribution of a questionnaire in which the employees were asked what they thought about their jobs. Put more formally, job satisfaction was assessed and the results of this study are described more fully in Chapter 13.

After having found out what the operators thought of their jobs, the next step was to determine what they wanted from their work. As it was essential to obtain this information by interview it was necessary to have consent for this from both management and the unions. Again the confidentiality of the information was stressed to the Union Convenors, and they were shown a copy of a letter, see appendix 3(c), which was to be distributed to the shop floor. Some amendments to the initial draft of the letter were suggested, and then agreement was reached on the wording. The process was repeated with management, who ^{were} concerned with the question

of where and when the interviewing was to be done. When this subject was broached with the divisional manager, he suggested that the interviews should be conducted in a special room provided by the Company and, furthermore, that the operators should be paid at time and a quarter. This suggestion was of considerable importance as it clearly and tangibly demonstrated to the shop floor management's support for the research.

Three sections were chosen out of the division as a whole and employees within these areas were asked if they would consent to being interviewed. 37 operatives gave their consent and only one preferred not to take part. In the interviews the operatives were asked to describe the main things they wanted from their work, and the most important things they wanted done in their sections. The length of the interviews generally varied from 10 minutes to 20 minutes. Summaries of these sessions appear in appendix 12. From these summaries the major objectives of the shop floor were drawn together, as well as those factors which were considered important if the objectives were to be met. This composite description of the objectives is shown below.

Main Objectives

Production - To have a continuous flow of work through the Cost Centre.

Quality - To be able to do jobs properly.

Factors Helping the Objectives to be Achieved

Production - For there to be no excessive waiting-time;

When the shop order permits, to have batch quantities as large as possible;

To have services provided more readily.

Quality - For machines to be regularly maintained;

For bad work to be picked up before it goes too far.

Training - To have instruction on the technical aspects of the job and on the workings of the whole machine;

To have on-the-job training so that progress may be made from one grade of job to the next.

Job Timings - For jobs to be timed so that it is not more difficult to earn money on some jobs than on others.

Teamwork - To be able to help out when jobs are needed in a hurry.

Management and Supervision - To have a good understanding between management and supervision and the shop floor.

Communication - To be consulted when things crop up concerning the jobs on which one is working;

To be kept informed of the state of the shop order;

To be kept in the picture about events affecting the shop floor.

The original aim was to call a meeting of each supervisor and the members of his Cost Centre for, at such a

meeting objectives could be discussed along the same lines followed with the managers and the supervisors. Unfortunately, time did not permit this aspect of the research to be covered, but the implications of meetings of this kind will be taken up in Chapter 9.

PART THREE

IMPLICATIONS OF MANAGEMENT BY OBJECTIVES

In previous chapters the process of defining, working towards, reviewing, and re-defining objectives was described. These activities had implications for the manner in which the production personnel conducted their work, as well as for other management practices, particularly the way the Personnel Department could carry out some of its functions. Some of these implications of management by objectives are discussed under the following headings:

- certain management practices
- roles and relationships
- further development

CHAPTER 7CERTAIN MANAGEMENT PRACTICES

Management by objectives had immediate implications for the following aspects of management:

- training
- appraisal
- management by exception
- informations systems.

Each of these topics will be discussed in turn.

Training

There has been an increasing realisation of the need for training in industry and a number of conferences and committees have borne witness to this fact. Rowe (1965) lists the important bodies concerned with this development as including the British Institute of Management, the Federation of British Industries, the Acton Society Trust, the International Conference on Business Management and Education, and the Organisation for European Co-operation and Development. Among the more recent reports on management training and development have been the Franks Report, the Normanbrook Report, and a report by the National Economic Development Council. In these committees and conferences it has been recognised that most learning occurs on-the-job,

and that this needs to be supplemented by both training specifically related to job requirements and by further education of a broader and more general nature.

While the need for formal off-the-job training has been generally accepted in principle, there has been no general concensus on what kind of training should be conducted. A survey conducted by Stalker (1961) questioned the appropriateness of some of the existing courses and an attempt was made to discover what changes had been brought about as a result of formal training. It was found that in 86 per cent of the cases there was "no record of improvement in effectiveness" despite "the time and effort spent on training". The ineffectiveness of such courses may account for the disregard sometimes manifested towards training courses. For example, in a survey by Rowe (1964) it was found that formal training often was not provided for managers even if such a training course had been recommended for the particular manager. In some cases it was found that a person had a better chance of attending a training course if he had not been recommended for one than if he had been recommended.

If training, then, is to be run in accordance with the training needs of managers, there remains the problem of identifying what these needs are. This question is in no way an easy one. In a study reported by Rowe (1965) managers were interviewed to see to what they attributed deficiencies

in performance. It was found that in most cases (72% of statements) poor performance was attributed to inadequacies of personality. As, however, it is unlikely that fundamental personality changes will be brought about in training courses of several weeks', or even of several months' duration, the efficacy of formal training mounted on this rationale must be seriously questioned.

From this evidence there appears to be an urgent need to develop a satisfactory method of identifying current training needs of managers and supervisors in any particular company, and for running appropriate training courses to satisfy these needs. Management by objectives seemed to offer a basis for meeting both these requirements.

With the objectives and targets defined and established, the managers and supervisors could periodically observe the performance of their unit and note its progress towards the achievement of these standards. This comparison was a useful aid enabling them to investigate unexpected or undesirable areas of performance and to take appropriate action to rectify the position. One of the managers, however, found it difficult to control costs in this way, and his continuing inability to influence them was causing him to have a constant source of frustration about this area. Then he came to realise that his difficulty in controlling the cost performance of his department lay not so much with factors within his department but more with his lack of

understanding of the principles of cost accounting. At this point he said to the interviewer that training in Cost Control was essential if he was to operate effectively as a manager, and he was therefore going to see the divisional manager and ask to attend a training course on Budgeting.

The realisation of the desirability for further training need not necessarily occur only with the subordinate. In the case of one of the supervisors the question of training was broached in the work review discussion by his manager who had seen that the cost performance of the supervisor needed strengthening. In this discussion the supervisor came to realise that further training was necessary for his own development, and it was agreed that this would be approached in two ways. Initially the manager would periodically go over the Cost Centre's weekly expenditure report with the supervisor so that the relationship between performance and the specific budget items would be more fully understood. Furthermore, it would be arranged for the supervisor to attend a course on Cost Control run by the Personnel Department. In this way on-the-job training would be supplemented by a basic formal course in this area.

Although the two examples just given illustrate the principles involved most clearly, there were other cases in which training was generated in this way. One of the main advantages of this development was that training courses could be intimately related to the requirements of the

participant. As the relevance of the training would be apparent, the motivation to learn would probably be assured from the outset.

The identification of the individual training needs of managers and supervisors illustrated in these examples also has implications for the Personnel Department. If management by objectives was operating throughout the entire factory, the Personnel Department would be in a position to collect the individual demands for training and by collating these would be able to identify the current training needs of the whole organisation. Thus training programmes could be run which would satisfy the live training needs of the organisation. At present members of the Personnel Department are extending management by objectives to other areas of the factory and this possible development is being examined.

Appraisal

Periodically there may be a need to formalise the training arrangements described in the previous chapter, as well as to decide questions of promotion, transfer, and possibly salary administration. Within organisations such administrative decisions are necessary, and if these questions are to be decided rationally on merit, and not on some other criterion such as seniority or friendship, then appraisal must be made in one form or another.

So that fair comparison may be made between the assess-

ments of different people at the same period of time, or between the assessments of the same person at different periods of time, a number of methods of appraisal have been tried. Whisler and Harper (1962) reviewed many of these including the essay, the graphic rating scale, forced distribution, ranking, and critical incident ratings.

One of the major disadvantages of some of these methods has been that they have dealt largely with personality factors. The nature of these methods of appraisal placed the superior in the difficult position of having to judge the subordinate's personal worth, and often in the unenviable position of having to discuss the judgments with him. It is little wonder that in the survey conducted by Rowe (1964) it was found that "appraisers are reluctant to appraise", and that "interviewers are even more reluctant to interview".

Because of the emphasis on the personality factors, judgment has not necessarily had anything to do with job performance, as writers like Likert (1964) have advocated that it should. One of the features of management by objectives was that it was concerned with specific aspects of the job, and therefore the degree to which a person achieves his objectives may well form a rational basis for the formal appraisal of the individual where such evaluation is necessary.

In the present research one series of appraisal sessions was conducted in which the managers "experimented" with an appraisal interview structured along the lines suggested above: ability of the managers to achieve their objectives was to be the criterion on which assessment was to be made. The managers showed interest in the principle that appraisal was to be made on objective grounds, given the proviso that additional factors affecting their performance would be taken into consideration where necessary. Appropriate appraisal forms, see appendices 12, 13 and 14, were drawn up based on the outline of the objectives and targets, and separate interviews between the departmental managers and the divisional managers were arranged.

The interviews, however, did not fulfil the expectations of the participants. In retrospect it may be seen that it was a mistake to hold the appraisal interviews conjointly with one of the performance reviews. This perpetrated the same error committed in many performance appraisals as criticised by McGregor (1960). In these situations the superior is cast in two conflicting roles: those of judge and counsellor. According to the divisional manager he found it impossible to keep the personal element out of the discussion of performance. He felt that as he was reviewing the objectives he was, to a large extent, reviewing the person. Instead of an atmosphere of openness developing, the production managers adopted defensive attitudes which

inhibited the discussion of performance.

This experience suggested that the appraisal interview should be held completely separate from any work planning and review session. It is to be seen as an entirely different occasion. The appraisal interview could be constituted by the superior, the subordinate, and possibly, as described in Chapter 8, an officer from the Personnel Department if he was involved in the preliminary interviewing in which the initial objectives were obtained. The person's performance throughout, say, the whole year could be reviewed in the light of important situational factors, but the main basis for appraisal would be the extent to which the person's objectives had been achieved. To reinforce this point it was interesting to note that although the difficulty described in the previous paragraph had been experienced, the managers were still of the opinion that their ability to achieve their objectives could serve as a "fair" criterion for assessment.

The difference between the nature of the appraisal interview and that of the work review interview may be seen in another way. The climate of the latter should be positive, for it is an opportunity to examine performance critically with a view to implementing logical corrective action and to establishing new operating plans. By comparison, in the appraisal interview decisions affecting the individual personally must be taken and therefore the person will

probably be on the defensive.

Decisions taken in the appraisal interview will probably fall into three broad categories affecting those whose performance is somewhat below their objectives, those who just achieve their objectives, and those who meet their objectives comfortably. If the subordinate is not meeting his objectives it should be apparent not only to his superior but more importantly to himself that it must be unrealistic for him to be thinking of promotion at that moment. As described in the previous section, his need for further training may be fully realised, and his personal development in these areas should be his immediate concern. If, however, the person has been meeting his objectives comfortably and has his job well in hand, his suitability for promotion should be evident to all concerned. By co-ordinating assessments of this kind promotion within a company may be planned in advance and the filling of vacancies would not have to be based on snap decisions made in crash appraisal reviews. For those for whom a vacancy is not available, adjustments within the overall salary structure may be made if a company's policy is to pay annual bonuses.

These developments of management by objectives are speculative, but from the present position they seem feasible. Further research and experience is necessary, however, to examine these possibilities.

Management by Exception

In the cycle of defining objectives and targets, reviewing performance, and re-defining new objectives and targets, one of the aims was to establish realistic levels of performance which reflected the true capacity of the units under the charge of the managers and supervisors. The descriptions of objectives presented in previous chapters show that in the initial interviews many of the targets were not quantified, but in each repetition of the process of definition a number of the targets were specified with increasing precision. It may be interesting to anticipate further developments in this direction.

To take a hypothetical example, suppose a manager defined his objectives as shown in Table 1. In this table the detailed description of the objectives has been avoided and only the specific items entered. By way of explanation, it shows that there were two output objectives concerning the weekly shop order and agency orders (ie. orders for the replacement of parts); three personnel objectives involving personal relationships between supervisors and operatives, between supervisors and supervisors, and between operatives and operatives; and so on.

In addition to these objectives, suppose also that the manager was able to specify targets of the kind shown in Table 2. For most of these items there would probably be a direct relationship between the entry in Table 1 and the

Hypothetical Objectives of a Manager

TABLE 1

<u>Output</u>	<u>Quality</u>	<u>Costs</u>	<u>Training</u>	<u>Personnel</u>	<u>Industrial Relations</u>
1. shop order	1. parts audit	1. budget	1. formal courses a. Direct Labour b. Direct Labour losses c. Indirect Labour d. Overtime/Night-shift	1. relation between supervisors and operatives	1. relations with trade unions
2. agency orders	2. measured repairs and re-work	2. cost improvements	2. on-the-job	2. relations between supervisors	2. relations with the shop floor
				3. team-work	
				3. unmeasured repairs and re-work	

TABLE 2

Hypothetical Targets corresponding to the probably Objectives

<u>Output</u>	<u>Quality</u>	<u>Costs</u>	<u>Training</u>	<u>Personnel</u>	<u>Industrial Relations</u>
1. Lead time of 3 days	1. 95%	1. b+d = 29% of a. c+d = 37% of a.	1. number	1. absence rate	1. number of fall- ures-to-agree
2. clearance dates of 3 months	2. 2.5% of a.	2. f	2. items	2. labour turn- over rate	
	3. 1.5% of a.			3. accidents rate	

corresponding entry in Table 2. For example, the manager may be able to suggest that £2,000 would be a realistic expectation of the value of cost improvements he would suggest during the coming year. On the other hand targets such as absence, labour turnover, and accident rates may not correspond so directly with the items in Table 1, but used collectively they may help to indicate the general atmosphere or morale within the unit.

As the manager repeated the cycle of defining and re-defining objectives and targets the accuracy of the targets may be increased so that those suggested for any new phase of operations would indicate more closely the expected capacity of the unit. The movement towards this position of precision may be slow, however, for the insights that the person obtains from this kind of table are likely to be acquired gradually. In addition, this on-the-job learning may need to be supplemented by formal training.

The establishment of appropriate targets would satisfy one of the major requirements of "management by exception": that of specifying accurate and realistic standards. Table 2 may also be used in the "feedback" sense by observing

actual performance and comparing it with those expected levels of performance. Any deviations from expectation may be readily noted and quickly investigated with a view to implementing corrective action. In this way negative variances may be corrected or, if the variance was due to an inappropriate target, the level of performance may be re-defined more accurately.

The suggestion in this probable development of management by objectives is not that the manager should detach himself from the every-day demands of his job, for the personal touch must surely remain an important aspect of the manager's role. The implication is, however, that the negative variances may indicate areas needing the manager's immediate attention, and therefore his efforts may be directed more timely and more effectively.

A further point is that the proforma illustrated in Tables 1 and 2 is intended as an aid for the manager and not a control device for the superior. Management by objectives is not a control imposed from above. To use it ^{as such} would almost certainly make the manager defensive and therefore one of the basic purposes of management by objectives, that of scope

for personal development, would be countermanded. Its main use would be to the individual manager, to whom it may serve as a yard-stick of performances so that he may himself take corrective action quickly and appropriately.

Information Systems

In every business there is a need for developed systems by means of which relevant and accurate information may pass up and down the organisation. Traditionally, planning is done at the managerial level, and if this is to be effective the plans need to be communicated down the organisation in a meaningful way. Control is exercised as a result of feedback on performance, and adequate functioning of the whole process rests largely on the development of adequate two-way channels of communication.

Some information systems correspond to particular managerial functions. An example may be taken from the function of production management. In this division the Materials Controller was responsible for the overall co-ordination of production. From the Sales Forecast he derived a Monthly Building Programme which was further sub-divided to give the

weekly Shop Order. At the beginning of each week the managers were given the Shop Order, and from there it was communicated to supervisors and then to operatives. Production was laid on according to this plan. The managers held daily production meetings in which differences between planned and actual production were identified, and these deviations from expected production were summarised onto three-day shortage lists, ie. supervisors were given three days' notice for this production requirement. Critical shortage lists were issued daily if insufficient parts looked like halting production. Within this system the information was accurate, since the people involved were never far from the scene of production, and the daily meetings ensured that it travelled quickly. These features of speed and accuracy of the information undoubtedly were major factors enabling the division to maintain the high standard of production performance described more fully in Chapter 10.

A second example may be taken from the function of financial management. The initiative for compiling the Company budgets lay with top management who took important decisions on the basis of these financial statements. These

budgets showed the levels of financial performance expected of middle management. As the managers and supervisors were working to achieve their cost targets some of them realised that particular budget items bore no correspondence to the situation in their departments. If the entries were to be taken at their face value it would have been necessary, for example, to employ one and a half setters, or to utilise three and a half machines. This problem of discrepancy between the supposed and the real circumstances was taken up by one of the managers who, in consultation with his supervisors, revised some of the budget items so that a realistic position in his department was more accurately portrayed.

If this application of budget revision was extended to the factory as a whole, a series of meetings could be envisaged between managers and cost controllers, and between managers and supervisors. In these meetings differences between the demands of the practical situation and the accounting requirements of the organisation could be reconciled. Working over the items would be a two-way process with a view to producing a budget which would be more useful to both lower and higher management. The increased validity of the

accounting information should mean that the budget would be of more use in guiding the activities of lower management, and top management would be in a better position to make sound financial decisions.

Apart from the need for increased accuracy within some systems, there was probably also the need for the provision of more information systems. Organisation support of this kind may help the manager or supervisor to know more precisely the performance of his unit at any particular moment. The need for information on quality performance is an example. While manufactured parts were subject to sampling inspection, and while there was end-of-line inspection of assembled products, these practices were implemented mainly to check physically on production so that inferior products were not let through to the customer. The defective parts were fed back into the production line for repairs, or were scrapped if their condition was beyond repair. Inspection, then, served mainly practical purposes. If, on the other hand, details of these inspections were co-ordinated and the results passed back to those in charge of the units, inspection would also become an information-giving exercise, and the value of

the information would be that the managers or supervisors could use it to diagnose production errors. Major discrepancies from standard performance could be investigated and the causes of the poor quality rectified. It may be noted that in the costing system a computer was used to summarise weekly expenditures and Expenditure Reports were forwarded to the managers and supervisors in the subsequent week. While the information within this system could be provided quickly, the need was for greater accuracy of the information. With the quality system there was a requirement for improvement in both these conditions. That is, there was a need for a method of accurately assessing quality performance, as well as for means of conveying this information quickly to the managers and supervisors so that it could be acted upon.

As with quality, there was little feedback on those indices which reflected the social behaviour of the cost centres or departments as a whole. In one department the incidence of industrial relations activities was used as a guide for assessing the state of the shop floor, but no use was made in this way of labour turnover and absence statistics. Records

of absence and labour turnover were available for each employee, for they were kept for payroll and employment purposes, but this information was not collected and passed onto the managers and supervisors as was done with the Weekly Expenditure Reports. If this had been done the managers and supervisors would presumably be in a better position to investigate unexpected performance on this criterion according to the principle of management by exception. In this connection, the relationship between labour turnover and absence and conditions on the shop floor will be explained in greater detail in Chapter 20.

CHAPTER 8ROLES AND RELATIONSHIPS

In addition to the more immediate considerations described in the previous chapter, management by objectives had implications for fundamental relationships between people within departments and between departments within the organisation. These implications are discussed under the following headings:

- . role of the Personnel Department
- . interpersonal relationships
- . role of the supervisor

Role of the Personnel Department

The welfare movement in industry in the earlier part of this century affected the work of Personnel Departments, particularly in areas involving the physical conditions of employment, health and safety, and employee services and amenities. Since then, and especially since the Second World War, emphasis has been given to the development of personnel practices, and this has resulted in the implementation of

more sophisticated methods of employment, training and development, appraisal, job analysis and description, and wage and salary administration. Although problems in each of these areas remain far from being solved, the question arises as to which will be the next major direction of development in the nature of personnel work. Laffer (1963) reviewed the development of industrial relations, using the term in its broadest sense, and distinguished four major phases of growth. These were the struggle for recognition, adoption of machinery for negotiation and dispute settlement, development of personnel policies, and emphasis on organisation and technological matters. While there may be a tendency for personnel work to move into the organisational field, Dunnette and Bass (1963) stated that there appeared to be a reluctance for personnel management to develop appreciably in this direction, in spite of the fact that social scientists were being employed in industry to investigate problems and to apply their findings to the actual operations of the organisation. This resistance may be due in part to the fact that the route to the new role of the personnel department has not been investigated.

The current research did have implications for this possible development. In his interviewing role the researcher was in a position of being closely involved with ongoing organisational problems. Problems in the training area, for example, could be identified in the way described in Chapter 7, and if these needs were collated by the Training Officer courses could be run to satisfy current organisational requirements. Problems associated with the various organisational information systems may also be taken up and meetings arranged to work through these problems. For example, if the problem was one of quality control, the interviewer could convene a meeting attended by, say, the production manager and the industrial engineer, or if there were difficulties with cost control, the meeting could consist of the production manager, the cost controller, and the interviewer. On the other hand, there could be problems of a broader nature, for which it may be necessary to enlist the services of a number of specialists. Project teams could be set up and specialists seconded from other departments. When the recommendations of the project team were implemented and the problem solved, the team would disband and the individuals return to their normal jobs. The Personnel Depart-

ment would appear to be the logical choice to have the responsibility for co-ordinating such activities. This possible development of the role of the Personnel Department would be facilitated if the interviewer was also a member of this Department. In the current research project this step was taken when members of the Personnel Department took over the researcher's interviewing role. In their work these officers will examine the possibility of attuning the activities of their Department to the live needs of the organisation, and the practicability of creating a new role for the Department along the lines described above.

Management by objectives may also offer Personnel Departments a means of rationalising some of their own practices. From the literature it is apparent that different criteria are used when different administrative decisions are taken. For example, the basis on which salary adjustments are made may not be the same as that on which promotion is decided. Similarly, decisions relating to other personnel practices seem to be made on yet different grounds again. In the present research, as was described in Chapter 7, the production managers thought that the extent to which they

achieved their objectives could be a fair criterion if formal appraisals were to be made. If this development was to be investigated more fully it could be possible that management by objectives would provide a common rationale for a number of personnel practices, particularly training, promotion, and salary administration. Further research, however, would be necessary to examine this question in greater detail.

Interpersonal Relationships

Previous research has shown the importance of personal relationships in work situations, particularly in those situations where the work activity involves interaction between one person and another. Particular examples of such research were studies by Roethlisberger and Dickson (1939) and McKenzie (1958), who were primarily concerned with the relationship between the operative and his inspector. It was found that the way in which the work was done, especially the quality of the work, was influenced by the kind of relationship that had grown up between the two men. Poor personal relationships were associated with critical inspection attitudes and poor quality performance of operatives, but quality was high where there were co-operative

and positive relationships between the operatives and the inspectors. In the present research the initial discussion of the objectives and targets and the subsequent review of performance were situations in which agreement had to be worked out between the superior and the subordinate, so it could be expected that the satisfactoriness of these discussions would also depend upon the nature of the relationship existing between the two people.

In the previous chapter it was mentioned that at one time a superior had difficulty in maintaining a discussion which analysed the performance of the subordinate, without levelling criticism at him personally. The subordinate reacted by being defensive and under these circumstances it was impossible to conduct a fruitful discussion. With another superior-subordinate pair, tension also crept into the discussion when it touched upon personal issues. At this point it was necessary for the researcher to take on an active role temporarily. He stressed that "a gun was not being held at anyone's head" with respect to the achievement of the targets, and reminded the meeting that the purpose of the discussion was to analyse and to plan work. The meeting

regained its previous atmosphere, but the experience did illustrate how easily the sessions may slide from analysis to criticism.

At those meetings which worked well, the superior gave the impression that he was trying to encourage his subordinate where possible. This applied not only to the establishment of the objectives and targets, but also to the analysis of problems impeding the achievement of the objectives. It was also apparent at times that the superior was in a position to provide the subordinate with assistance, and this support appeared to strengthen the relationship between them.

It seemed that the successful development of management by objectives depended upon the personal relationship between the superior and the subordinate, as well as upon the role played by the superior. An authoritarian role whereby the subordinate was held rigidly to the achievement of his targets seemed to produce a defensive reaction in the subordinate. On the other hand, if the superior encouraged and counselled the subordinate in his efforts to establish viable objectives and targets, and where necessary provided personal

and organisational support for these to be achieved, then a climate was generated in which the subordinate was able to develop his work as well as himself. It appeared that the subordinate approached the exercise with caution initially, for he could find himself in an indefensible position if the objectives and targets were to be used as a control over him. The extent to which he was prepared to discuss his performance frankly depended upon his relationship with his superior and, more specifically, upon the extent to which confidence between the two was built up in the process of discussing objectives and reviewing performance.

Role of the Supervisor

The supervisor or foreman, forming as he does the link between management and the shop floor, occupies a position whose difficulties have long been recognised. Roethlisberger (1965) attributed the problems inherent in this job to the increasing necessity for greater technical knowledge, to the limitations placed on his responsibility owing to the rise of trade unionism as well as to management's co-option of the functions of hiring, firing, and training, and to the demands placed on him on account of his interaction with many people.

This latter point, particularly, was examined subsequently by Butler (1960) in a study of communication. It was found that foremen spent, on the average, approximately 40% of their time in communication of one form or another and that the communication involved a wide range of topics. These many and varied demands placed on the foreman led Roethlisberger to conclude that "nowhere in the industrial structure more than at the foreman level is there so great a discrepancy between what a position ought to be and what it is".

In the present research a study was made of the supervisors' satisfaction with their jobs. Part of this information was obtained by means of a job satisfaction questionnaire, and the administration and results of this study are described more fully in Chapter 14. Other information was obtained by interview, and these two methods served to complement each other.

The result most relevant to this section was that, although the supervisors in general liked their jobs, they considered that their work was difficult. The extent of this difficulty may be observed from Figure 2 in Appendix 27.

This graph depicts the supervisors' attitude to Work Ease. The range of the scale on this job aspect was 0 - 16, and the more difficult the job, the lower the scale score would be. For this group of supervisors the average score was 4.3, indicating that they thought their job very difficult indeed. These results, then, confirm Roethlisberger's earlier findings.

The interviews gave more insight into the nature of the problems facing the supervisors. They thought that the number of demands made on them were increasing, particularly arising out of the introduction of budgetary control, the drive for finer machine specifications, and the requirement that operation lists be up-dated. They not only had to understand and advise on a wide range of problems involving cost control, quality control, and engineering, but also to do a considerable amount of clerical work in order to provide higher management with relevant information. At the same time it was necessary to do manual work periodically for it was sometimes essential to perform emergency repairs to machinery in order to keep production moving and the cost centres running smoothly. These many tasks encroached upon the time the supervisors could make available to what they

considered to be their traditional function - the planning and organisation of production. These changes had created a fundamental problem in that the supervisors had difficulty in seeing their jobs in perspective. According to one supervisor, "we don't know what our jobs are".

The discussion of the objectives in the initial interview with the supervisors as well as in the subsequent meeting with their managers sought to clear up some of these difficulties. The descriptions of the supervisors' objectives outlined in Chapter 5 and those listed in appendix 10 show, however, that there was a wide range in the kind of objectives obtained. A few descriptions were concise and it was clear that these supervisors knew what they were about in their jobs. In contrast to these were a number of descriptions indicating that considerable ambiguity existed. It appeared from this experience that if objectives were to be lucid and comprehensible then the person must have a clear idea of his role in a company. It seemed desirable that more thought should be given to the question of the supervisor's role in the organisation if realistic objectives were to be obtained at this level.

CHAPTER 9FURTHER DEVELOPMENTS

As the practical aspects of the research drew to a close after a period of approximately 18 months, preparation was made, as indicated in Chapter 3, to have the work of the interviewer taken over by members of the Personnel Department of the Company.

At this stage of the research an attempt was also made to assess by means of certain criteria the effect of the introduction of management by objectives into the organisation. This aspect of the project is described in detail in Part Four of this report.

PART FOUR

ASSESSMENT OF ORGANISATIONAL EFFECTIVENESS

This aspect of the research supplements the practical one described in Parts One, Two and Three. Here, an attempt was made to assess organisational effectiveness using an analytical method. Organisational effectiveness has been considered in previous research in many different ways. Argyris (1962) and McGregor (1960) attempted to define it in terms of the integration between the individual and the organisation, where symptoms of unsatisfactory integration included restriction of output, apathy among employees, and the fulfilment of personal needs at the expense of organisational needs. In contrast to this definition was the "systems" approach described by Trist (1963) and Rice (1963) in which effectiveness was thought of as an organisation's ability to exist within its environment, ie. it was regarded as the organisation's capacity to survive, adapt, maintain itself, and grow. While each of these was a useful conceptualisation of organisational effectiveness both had their limitations, particularly when they were applied to middle management levels. This was mainly because the former approach was a very general one, and the latter dealt only with long-term considerations.

The present approach concentrated more on organisational characteristics than on characteristics either of the individuals within the organisation or the environment outwith the organisation. An attempt was made to assess the effectiveness of the units within the organisation by means

of a number of criteria. These were:

- . output
- . quality
- . costs
- . job satisfaction of operatives
- . job satisfaction of supervisors
- . work anxiety
- . accidents
- . absence
- . labour turnover
- . industrial unrest

Each criterion is considered in greater detail in the following chapters. In each chapter the format is generally the same. The introductory paragraphs deal with the importance of each criterion. Past research is then reviewed to see what kind of factors have been shown to be related to the criterion. As the criteria were to be used in this study to indicate the overall effectiveness of the cost centres, the factors particularly looked for were those of a social, situational, or organisational nature. The review is conducted in some detail since the importance of these kinds of factors for many of the criteria appears not to have been established in past research.

The last part of each chapter is concerned with the measurement of each criterion or variable. For all variables except job satisfaction, assessment was made over

a period of six months (January - June, 1966), so that the measurements would not be subject to chance variation. Assessment of job satisfaction was made at the time of the administration of the questionnaire. All measures were then converted to ranks enabling comparisons between the cost centres to be made. The overall aim was to see if some of the cost centres were effective units or "organisations", as shown by the criteria or variables, and if other cost centres were less effective in this regard. This approach could be considered to be an "operational" analysis of organisational effectiveness since management action could follow from this type of analysis.

CHAPTER 10OUTPUT

As a criterion of effectiveness output has considerable "face" validity since production targets must be reached if sales orders are to be met and company reputation is to be maintained. Because of its importance, a considerable amount of research has been devoted over the last half century to studying the kind of factors that affect output and, more particularly, those factors which lead to high levels of production and those conditions associated with restriction of output. The literature dealing with this research will be reviewed for the purpose of identifying these factors.

Factors affecting OutputFatigue

Fatigue, resulting from prolonged muscular activity, was one of the first factors investigated in relation to output. In the well-known study by Taylor (1911), conducted in the Bethlehem Steel Company, it was shown that the introduction of rest pauses considerably increased the amount of pig-iron loaded. The Whitley Committee (1916) undertook a large scale investigation of fatigue and in contrast to the above study found no direct relationship between output and hours worked, presumably because of the

influence of factors other than fatigue. The presence of some of these other factors was depicted by work curves in which output was plotted over time. These shallow inverted U-shaped curves with an inclining tail illustrated a spurt in production towards the end of the period and indicated the presence of a psychological factor.

In the "Hawthorne" studies the relationship between output and the length of the period worked was again examined under experimental conditions. Roethlisberger and Dickson (1939) varied the length of the working week in the Relay Assembly Test Room and observed the effect on output. As the number of hours worked per week was progressively decreased total weekly output rose continuously. In the final experimental period in which they re-introduced the original number of hours worked per week, there was an unexpected further increase in weekly output. This paradoxical result was attributed to the effect of a social factor, the nature of which was examined more fully in the Bank Wiring Observation Room study.

Physical Working Conditions

Early research also investigated the effect on output of certain aspects of the physical working environment such as lighting, heating, noise, smell and dust. For example, Weston (1949) found that under conditions of poor illumination differences among employees in productivity were

magnified. Weston and Adams (1930) and Luckiesh (1944) also reported that increasing the intensity of illumination led to an increase in output. These effects were further clarified by Tinker (1939) who found that there was an optimal level of illumination at which production tended to be maximised. Ghiselli and Brown (1955) reviewed numerous studies examining the effects of heating, and concluded that production was also a function of the temperature of the working environment.

However, the relationship between output and physiological states induced by various physical working conditions appeared to be complicated by both psychological and social factors. Baldamus (1951) found that once an employee adapts to a constant physical environment he worried less than was generally supposed over heat, cold, noise, smell, dust and light. Mayo (1945) also reported that people often preferred to continue to work in old, poorly lighted, poorly ventilated, and ill-kept plants.

Psychological Factors

As Fox and Scott (1943) noted, there were wide differences in production rates of individual employees, with some individuals often producing 100 per cent more than others, and on occasions up to five times their amount. These differences in performance were explained in terms of abilities and motivation, ref. Mace (1935), Viteles (1953),

and Maier (1955), where ability denoted the potential of the person to perform the task and motivation referred to his desire to perform the task. Later research was concerned with specifying the requirements for satisfactory job performance, and with identifying those candidates who possessed the relevant abilities.

Motivation was similarly studied and performance was found to be influenced by a number of motivational factors. One such factor is knowledge of results which has been shown to lead to marked improvements in performance, ref. Ammons (1956) and Bilodeau and Bilodeau (1961). Mann (1957) and Argyris (1962) applied these findings in the field of training and obtained marked improvements in the results of the training programmes.

The effect of financial incentives on individual performance was also examined. In a study by Wyatt (1934) the introduction of financial incentives not only markedly increased production, but also increased the difference in output between the higher and lower producers. That is, change in the method of wage payment brought out to a greater degree differences in the abilities of the operators.

Social Factors

Although psychological factors are undoubtedly important, the extent to which they operate is apparently dependent upon the prevailing social factors, as was shown

in the Bank Wiring Observation Room. In this study there was no correlation between operators' output and their abilities as measured by intelligence and dexterity tests. The absence of a relationship was explained partly in terms of the social control exercised by members of the work group over each other. This control was directed towards making levels of actual output conform to the group's idea of how much constituted a fair day's work, and was exerted even though the operators worked under a financial incentive scheme.

The existence of factors other than social control was demonstrated in the experiments of Coch and French (1948) and Bavelas (1947). These two experiments suggested that if members of work groups were allowed to participate in the discussion and solution of problems affecting the work life of the group, then the involvement of the individuals and the output levels of the group may increase. A later study by Morse and Reimer (1956) indicated that not only was the opportunity afforded the work groups to participate in decision-making important, but also the type of decisions involved was significant. That is, the granting of "safe" areas of decision-making, eg. the length of the tea-break, and the withholding of "hot" ones is unlikely to raise production levels for long. In Kuriloff's (1963) study operators were able to participate in making more important decisions by giving

work groups authority for planning, training, and quality control, and it was reported that this led to a 30 per cent increase in productivity. The group appeared to be motivated partly through gregariousness but largely through the opportunity to use skills, to teach and learn, and to take responsibility.

Other research suggested that cohesiveness may also affect the performance of work groups. For example, Van Zelst (1952) reconstructed work groups so that compatibility between members was increased, and recorded a marked reduction in labour turnover and in labour and material costs. Seashore (1954) found that in highly cohesive groups the differences in the levels of performance between members was smaller than those of employees in less cohesive groups. The relationship between group cohesion and output was probably put most clearly by Schachter et al (1951) who found that cohesiveness affected the amount of influence a group exerted on its members but did not necessarily determine the direction the influence would take.

In further research into the functioning of work groups, Katz et al (1950) took examples of high producing and low producing groups and looked for factors that would explain the difference in performance. From this and another similar investigation by Katz et al (1951) it was concluded that some of the differences in the productivity of groups could be accounted for by differences in supervisory leader-

ship. The important characteristics of the various types of leadership were explained in terms of the degree of delegation of authority or closeness of supervision, and the extent of employee-orientation or the supervisor's quality of supportiveness.

The Importance of Social Factors

This review of the literature has shown that output may be influenced by a number of major factors which were fatigue, physical working conditions, psychological factors, and social factors. The Hawthorne studies opened the way for the investigation of the social factors, and demonstrated that they could operate in two completely different directions. That is, social factors could lead to the sort of behaviour that was seen in the Relay Assembly Test Room or to an entirely different kind of behaviour such as that observed in the Bank Wiring Observation Room. In the first of these situations production was at a high level while in the second there was restriction of output. Later research revealed that there were a number of different kinds of social factors, all of which could lead to wide differences in the performance of work groups.

In the present research the cost centres in the division were examined to see if their output records were comparable, or if these units too, exhibited differences of the kind described above.

Assessment of Output Performance of the Cost Centres

Although the requirement that the shop order be met was so clearly important to the division, this proved to be one of the most difficult criteria on which to compare the performance of the cost centres. The weekly achievement of the shop order was recorded for the division as a whole but not for the individual cost centres.

A second objective index of performance that was considered was the standard labour costs, for this gave a measure of the actual production achieved by the cost centres. It was thought that differences between the actual and the budgeted figure could be compared, but again the weekly budgeted figure could not be determined for the individual cost centres.

Because of the difficulties in obtaining a method of comparison based on Company records, a rating method was used. Within the Company's organisation, the co-ordination of the cost centres' production was the responsibility of the Materials Controller. Thus the supervisors of the cost centres were responsible to the Materials Controller for meeting production targets. The Materials Controller and his two assistants made a composite ranking of the cost centres on their ability to meet the weekly shop order over the period January - June, 1966. These three people were specifically instructed to consider output record only

in making their rankings. While the limitations of such ranking methods have been described by writers such as Likert (1964), and the need for better measures of output was fully recognised, in the absence of a more objective method of assessment the rankings were taken as the measure of the production effectiveness of the cost centres.

Table 3

Ranking of Cost Centres on Output over the period
January - June, 1966.

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Ranking	1½	4	14	7½	10½	5	1½	9	3	6	13	12	10½	7½

CHAPTER 11QUALITY

There are many reasons why quality standards should be specified and maintained. To begin with, the product's quality may be one of the most important considerations to the customer who buys the article. Furthermore, if the product is to function properly the constituent parts need to be made to specification and the more complicated the product the stricter the specifications will usually be. The level of quality aimed at, however, must always be balanced against the costs involved.

The cost of ensuring a certain standard of quality is usually thought of in terms of the expenses incurred by the formal quality control organisation whose function it is to identify the causes of faulty production and to recommend or institute remedial action for the correction of production errors. While quality control will add certain costs to production, it has been found in a study reported by Juran (1951) that the introduction of quality control reduced costs from spoilage, re-work and inspection by 76 per cent. Thus quality control may in fact serve as a cost reducer.

A further and perhaps less obvious argument for maintaining high quality standards may be inferred from

the studies of Walker and Guest (1952) and Van Beck (1964). In the former case employees complained if they were not given time to finish off their jobs properly, and job satisfaction was associated with being able to produce goods of high quality. When organisational constraints in the latter study were removed to encourage operators to complete their work carefully, both morale and quality improved.

Factors affecting Quality

Physiological Factors

Quality, like output, may be affected by the number of hours worked. Pieracinni and Maffei (1906), Link (1920), Miles and Eyre (1924), and Florence (1924) all found a general relationship between quality and hours worked so that the amount of spoiled work tended to increase as the length of the period worked increased.

Of the physical working conditions, lighting and noise seemed to be the two which affected quality the most. With lighting the relationship appeared to be that an improvement in illumination tended to result in less defective output (Farmer, 1924) or increased accuracy (Oakley, 1945). A further refinement was made by Mitchell (1935) who found that an improvement in illumination together with a reduction in glare led to a decrease in the number of mistakes made.

The effect of noise on working efficiency was reviewed by Broadbent (1957) and the general conclusion from laboratory experiments was that the effects of high intensity, meaningless and continuous noise was not so much a reduction of the rate or speed of work, nor the production of failure of co-ordination, but rather an increase in the frequency of momentary lapses in efficiency and an increase in human error. These findings were confirmed in the industrial setting by Broadbent and Little (1960). On this evidence it appeared that noise was more likely to impair quality than output.

Individual Differences

While there was little research on the quality performance of individual operators, in the Bank Wiring Observation Room wide differences in performance between operators were noted. Detailed records for the 12 operators were kept and the range of quality performance was from 3.0 to 56.3 defects per 100,000 units made. The employees were rated not only on quality but also on output, and a further observation was that those who had the best output rates also rated highest on quality.

Inspection

Inspection is a means of measuring and appraising production, but research has shown that variations in measured quality may be attributed not only to differences in the standard of workmanship but also to variations in

the inspection standards themselves. For example, in an experiment by McKenzie and Pugh (1957) the same parts were shown to a number of inspectors and wide variations were noted between the judgments of the inspectors. The identical parts were then shown to each inspector at different times and some inspectors were found to be more consistent in their judgment than others. These results confirm the findings of earlier studies such as those by Lawshe and Tiffin (1945) and Evans (1951) dealing with the inaccuracy of inspection.

Attitudes

Inspection involves a relationship between the inspector and the operator whose work is inspected. The nature of this relationship was examined in the Bank Wiring Observation Room where it was found that quality was influenced by the personal relationship between the inspector and the operator. That is, a negative or antagonistic relationship tended to be associated with the registration of a large number of defects, but fewer defects were found in cases where inspectors had a co-operative relationship with the operatives. As a result of this study, Roethlisberger and Dickson (1939) concluded that the attitudes between the two people affected either the operator's work or the inspector's judgment of this work.

In large group situations involving relationship between production and inspection departments, group

attitudes were found to be important for the same kind of reasons. As McKenzie (1958) put it, "when production feel they cannot sanction the inspectors and/or their standards, and when inspection chooses to play its role in a dominant, authoritarian, and essentially invidious way, rather than as finding neutral facts, then not only will inspection accuracy be adversely affected, but there will be strong pressures against inspection supervisors testing their inspector's accuracy."

Situational Factors

While considerable research has been devoted to investigating the relationship between quality and the factors just described, the influence of situational factors on the level of quality is not clearly understood. The effect of situational or organisational factors has been investigated in only a small number of studies.

Northcott (1950) described the appointment of a new manager to an organisation which had inadequate technical staff, produced a product of poor quality, and had a poorly paid, discontented labour force. Work was reorganised at the operative level so that employees had an opportunity to use discretion in their jobs, and were able to control factors affecting the quality of their work. Standards of quality were established and knowledge of results was passed back to the operators who could further

regulate their performance. The method of wage payment was changed from piece rates to time rates, which were adjusted periodically for employees to receive a share in the increased efficiency. These changes in organisation over a period of three years resulted in a 250 per cent improvement in quality.

In another study described by Guest (1962) concerning a large complex industrial organisation, widespread changes were observed after the appointment of a new manager. The inherited situation was one characterised by suspicion, fear and hostility, and this attitudinal climate hampered the effective solution of technical problems. The appointment of the new manager was accompanied by changes in plant layout and machines, and by an attempt to cultivate different types of relationships between people. Over a period of three years these changes, which affected not only attitudes but also the patterns of actions and inter-relationships, were accompanied by a marked improvement in organisational performance including quality.

Rice (1958) carried out a study of two different types of work organisation. In one the task and work group organisation was typical of mass production situations involving job breakdown and task specialisation, differentiated work roles, and restriction on both task and role rotation. The experimental re-organisation gave emphasis to the formation of internally led work groups and provided scope

for some interchange of tasks and some acquisition of new skills. After the initial difficulties had been resolved, output and quality were established at better levels than before the re-organisation.

The Importance of Situational Factors

Past research suggests that quality is influenced by a multiplicity of factors, the most important being physiological factors, individual differences, inspection, attitudes, and situational factors. Evidence concerning the relationship between quality and situational factors, however, was scant. Although the relationship is possibly a tenuous one, the quality performance of the cost centres was assessed in the present study to see whether or not differences in performance existed in this particular case.

Assessment of the Quality Performance of the Cost Centres.

As with output, some difficulty was encountered in assessing the quality performance of the cost centres. Sampling inspection was carried out for the division as a whole, but this was primarily a managerial control to prevent bad work from going through, and the information was not kept as a record of quality performance. However, the costs incurred through scrap and repairs were tabulated as part of the weekly expenditures of each cost centre, and these figures were therefore used as the basis for assessment.

As the cost centres differed in size the absolute expenditure figures could not be used for purposes of comparison, but this difficulty was obviated by calculating the total expenditures on scrap and repairs and comparing these with the budgeted expenditures, as shown in Appendix 16. The quality performance of each cost centre was then assessed according to the extent to which it achieved, or failed to achieve, its scrap and repair targets.

The performance of each cost centre calculated in this way is shown in Table 4 below. A negative sign indicates performance within the budget.

Table 4

Difference between Budget and Actual Scrap and Repair Costs for each Cost Centre over the period January - June, 1966.

	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
% Difference between Budgeted and Actual Costs	-6.4	-10.7	-2.2	4.3	17.5	9.0	-2.3	8.2	11.0	-7.7	-25.5	2.9	-10.1	-2.6

The cost centres were then ranked from best to worst performance, and this assessment is shown in Table 5.

Table 5

Ranked Quality Performance of each Cost Centre
over the Period January - June, 1966.

Ranked Quality Performance	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	5	2	8	10	14	12	7	11	13	4	1	9	3	6

CHAPTER 12COSTS

Manufacturing costs are of major importance to managers and supervisors because, as sales are completely outwith their control, their major contribution to profits is through the costs of manufacture. The difference between the standard costs of manufacture and the actual costs is particularly important, for identification of these variances may enable control action to be taken at the operational level.

In this chapter there is no review of the literature dealing with factors related to costs for there has been a paucity of research in this area.

Assessment of the Cost Performance of the Cost Centres

Although standard costing involves major elements such as materials, labour and overheads, ref. Henrici (1960), the costing system of this Company gave more emphasis to labour costs as these were the most variable ones. A Weekly Labour Expenditure Report was prepared by the Cost Controller of the division to help managers and supervisors control their costs. As this same information was used in this study as the basis for assessing the cost performance of the cost centres, the Weekly Expenditure Report, and the

way it was compiled, is now described in some detail.

Weekly Expenditure Report

This report dealt with four major aspects of costs which themselves constituted a number of separate items.

The four major aspects were:-

- . Direct Labour
- . Direct Labour Losses
- . Hourly Paid Indirect Labour
- . Overtime and Nightshift Premiums

Direct Labour

This was the total expenditure on productive operations throughout the cost centre in a single week. It included all labour clearly related and conveniently traceable to specific parts, such as the labour of machine operators and assemblers. Viewed in another way, it included pay to operatives working under incentives as well as pay for operatives on "production time" for which no incentive scheme was appropriate.

Direct labour was constituted by four major items:-

- . standard direct labour
- . rate variance
- . operational variance
- . production time variance

standard direct labour

Every operation performed in the production pro-

cess was given a standard time, usually established by M.T.M. (Method Time Measurement) or some similar technique. These operations were also evaluated at a standard rate of pay, and this rate was constant from one cost revision to the next. By this means each job was appraised as taking a specific time to complete, and carried a certain rate of pay. The Standard Direct Labour gave the value of the work performed and provided a measure of actual production.

rate variance

This was the difference in the rate of pay between the job evaluation rate and the rate actually paid. The additional expense was incurred when it was necessary to use more highly skilled operatives than those normally required for the job. The total rate variance was the difference between the standard rate per hour and the actual rate per hour, multiplied by the actual number of hours involved.

operational variance

The difference between the time actually spent on the job and the estimated time that the job should have taken was called Operational Variance. It was calculated by taking the difference between actual hours and standard hours, and pricing this at the standard rate of pay. This could also be called "wage" variance.

production time variance

For some productive jobs no standards were available,

and the Standard Cost had to be estimated. Production Time Variance was the difference between the estimated time and the straight time taken to do the job.

Direct Labour Losses

Under this heading were all amounts paid to direct workers for activities of a non-productive nature. Items included here were:-

- . repairs
- . set-up by incentive workers
- . materials handling by direct workers
- . cycle-allowance or machine limitation
- . waiting, idle, and down-time
- . guarantee or G.M.U. (Guaranteed Minimum Unit)
- . 15% time work premium
- . subsidy-measured
- . subsidy-unmeasured
- . training or re-training of operators
- . all other direct labour losses

repairs

These costs were those involved in making good work which had been incorrectly performed. Examples of these repairs included: missed operations which had already been paid for, re-drilling or reaming holes made incorrectly, filling holes bored in wrong places and drilling new holes in the correct places, touching-up damaged paint-work, re-

shaping of parts to prevent fouling at the assembly stage, and altering parts that were outwith tolerance.

set-up by incentive workers

This referred to set-up work done by direct workers as distinct from that done by hourly paid Indirect Setters or by Setter/Operators.

materials handling by direct workers

Sometimes incentive workers were required to do work other than the specific operations pertaining to the manufacture of parts. Work normally done by bogey-men was classified under this heading. This type of work was done when the operator would otherwise have been on Waiting-time.

cycle-allowance or machine limitation

Payment was made here when one or more machines operating within a group of machines was out of production. This could have been due to bad grouping, machine break-down, or failure to keep all the machines within the group supplied with work.

waiting, idle and down-time

Operatives booked onto Waiting-time when they could not be engaged on productive work. This occurred with machine break-down, or through lack of materials where it was impossible to re-allocate work for them or to transfer them temporarily to another department.

guarantee or G.M.U.

When an operator could not sustain a rate of work called a 60 unit-hour, payments were made to bring his pay up to this guaranteed minimum unit. As training should have enabled every operator to reach this standard these payments should not have been constantly re-occurring.

15% time work premiums

This was a subsidy paid to people on time-work where there was no opportunity for incentive payments.

subsidy-measured

Payments of this kind were made as additions to standard cost and could have been brought about by temporary production problems.

subsidy-unmeasured

These payments were also at a unit-hour higher than normal. As they could not be measured by Industrial Engineering, they were subjective in nature.

training or re-training of operators

All payments on the learner scale were shown against this item. As the operator developed and his rate of production increased, the Standard Labour value of his production was transferred to Standard Direct Labour so that only the balance remained under this heading.

all other direct labour losses

These were payments made to operators who otherwise would have been on Waiting-time. It included jobs such as cleaning floors and other odd jobs.

hourly paid indirect labour

Into this category fell the wages of people who, although they did not perform the specific operations by which parts were manufactured, yet provided support necessary for production activities generally. Such people were paid by the hour and included Setters, Inspectors, Labourers, etc.

overtime and nightshift premiums

Overtime and nightshift, introduced so that production targets would be met, were paid at a higher rate, for example at time and a half or double time depending upon the period worked. These additions to costs were shown separately. Thus, if employees worked at time and a half only the half was shown in this category, and the time was shown against Indirect Labour. Alternatively, if Direct Labour was involved it was separated into Direct Labour and Direct Labour Losses.

Cost Effectiveness

A measure of costs was needed that reflected each cost centre's ability in dealing with costs. As Horngren

(1967) stated, this may be indicated not so much by the absolute costs incurred, but by a unit's capability to work towards and achieve its budgeted costs. The difference, then, between budgeted costs and actual costs was taken as the measure of cost effectiveness. This assumed, of course, that the budget levels were set realistically in all cost centres. A further limitation of this approach to measuring cost effectiveness was that "hidden" costs, due to accidents or labour turnover for example, could not be accounted for.

The annual budget was available for each cost centre, and the overall target for cost performance was obtained by expressing the sum of Direct Labour Losses, Hourly Paid Indirect Labour, and Overtime and Nightshift as a percentage of Direct Labour. This served to relate the amount of money spent on non-productive labour to that spent on productive labour. These budget target percentages are shown in appendix 17.

Cost performance was recorded over the first six months of 1966 and the difference between the budgeted percentages and the actual percentages is shown in Table 6 below. In this Table the positive signs indicate expenditures in excess of budget.

TABLE 6

Difference between budgeted percentage costs and actual percentage costs for each Cost Centre over the period January - June, 1966.

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
% Differ- ence	-41.0	25.6	+10.5	+3.9	+7.2	+50.8	-6.5	+5.0	+44.2	-27.4	+4.2	-2.5	-5.0	+3.6

The cost centres were then ranked from highest to lowest on the cost performance shown in Table 6.

Table 7

Cost Centres ranked from Best Cost Performance to Worst Cost Performance.

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Rank	1	11	10	6	9	14	3	8	13	2	7	5	4	12

CHAPTER 13JOB SATISFACTION OF OPERATIVES

As yet the importance of employee attitudes has not been fully determined. Some studies, such as those by Trist and Bramford (1951), Marriott (1951), and Katzell et al (1961), have found that positive attitudes were associated with high levels of output, but other research, like that of Brayfield and Crockett (1955), has reported situations of high output in which there was considerable dissatisfaction. While a high level of job satisfaction may not necessarily be associated with high levels of productivity, on balance it seems that more often than not it is. In a review by Vroom (1964) it was found that out of 17 case studies of job satisfaction, there were 11 in which job satisfaction and productivity were positively related.

Assessment of Job Satisfaction within the Cost Centres

In order to see what sort of relationship existed in this study, job satisfaction of the operatives in the 14 cost centres was measured. Walker and Lumsden's (1963) interpretation of job satisfaction was used, in which job satisfaction was considered to be a complex product of a person's satisfaction with particular aspects of his job. If a person's satisfaction on each of these specific aspects could be measured, then from these results his overall job

satisfaction may be assessed.

Job satisfaction was assessed in this study by means of a questionnaire which covered ten different aspects of jobs. These were: communication, company and management, physical working conditions, security, social supervision, wages, work ease, work interest and work variety. Each job aspect has been defined in appendix 18. The questionnaire, used previously by Mountain (1965), covered those job aspects which past research had shown to be important to factory employees.

In part two of the questionnaire the paired comparison technique was used to determine the order of importance employees attached to the ten job aspects. The nine items pertaining to each job aspect are shown in appendix 19. The first part of the questionnaire attempted to establish the level of satisfaction with each of the ten job aspects. These questionnaire items relating to each job aspect appear in appendix 20. The items used in the questionnaire were selected so that the correlations with the job aspect to which they referred were high, and were low with any other job aspect. A copy of the job satisfaction questionnaire is shown in appendix 21.

Administration

Considerable care was taken in the administration of the questionnaire. The method used to make contact with

the shop floor through trade union shop stewards and shop floor representatives has been described previously in Chapter 3. In following up this initial contact a lunch-hour meeting of the shop floor representatives was held in which they were asked if they would distribute and collect the questionnaires. The nature of the questionnaire and the type of questions were described to them. It was also stressed that the questionnaires were to be completed anonymously, and that the results would be confidential. These group figures would first be shown to members of the shop floor and would then be published or given to management only with the consent of everyone on the shop floor.

The questionnaire was distributed to the whole of the shop floor and the response rate was 66%.

Scoring

In part two of the questionnaire the number of times an aspect was preferred in the paired comparisons was counted, giving a preference score for each aspect.

For those items in part one concerning level of satisfaction, respondents placed a cross on a five point scale to indicate their agreement or disagreement with the statement. These were scored from zero to four, with the higher score indicating greater satisfaction. With approximately half the items the direction of the scale had to be reversed before the scores could be used, as these

statements had been presented in the negative rather than the positive sense to counteract response bias. With four items for each job aspect, the possible range of scores was 0 - 16.

Actual scores obtained from the administration of the questionnaire were recorded on punch cards. One card was punched for each respondent and the cards were machine sorted to provide the desired results.

Results

The rank order of importance given by the employees to the ten job aspects is presented in Table 8 below.

Table 8

Rank Order of Importance of the Ten Job Aspects

Job Aspect	Ranking in Importance		
	All	Males	Females
Wages	1	2	2
Security	2.5	1	4
Supervision	2.5	4	1
Company and Management	4	3	3
Communication	5	5	6.5
Work Interest	6	6	6.5
Physical Working Conditions	7	7	5
Social	8	8	8
Work Variety	9	9	10
Work Ease	10	10	9

From this table it appears that the job aspects considered to be the most important tended to be characteristic of the context in which the work was done rather than those of the work itself. To see whether these preferences reflected general attitudes common to most employees in the division, or whether they were more specific and related to the cost centres in which the employees worked, similar rankings were obtained for each cost centre. These are given in Table 9.

Table 9

Ranking of Importance of the Job Aspects for each Cost Centre

Job Aspect	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	5	5	5	6	10	4.5	6	7½	6	5	7	7	4	6
C&M	4	1	4	4	2	3	1	4	4	1½	4½	4	1	1
PWC	7	6	7	5	6	4.5	5	9	7	7	6	6	8	7
Se	2	4	2	1	4	2	3	1½	3	4	2	1	2½	2
So	8	7	8	9	7	8	7	5	8	8	8	8	6½	8
Su	1	2	3	2	3	6	2	1½	2	3	3	2	2½	3½
W	3	3	1	3	1	1	4	3	1	1½	1	3	5	5
WE	10	10	10	10	9	10	10	10	10	9	9	9½	10	10
WI	6	8	9	7	5	7	8	7½	5	6	4½	5	6½	3½
WV	9	9	9	8	8	9	9	6	9	10	10	9½	9	9

By inspection of this table it appears that the degree of importance attributed to any job aspect was generally held throughout all the cost centres. This characteristic was

found to be highly significant (see appendix 22). Thus, it appears that the preferences for job aspects tended to be common to most employees, regardless of the cost centre in which they worked.

The level of satisfaction on each job aspect was next considered. For all the employees in the division the average levels of satisfaction expressed on each job aspect were obtained and are shown in appendix 23. The possible range of scores was from 0 - 16.

To see whether satisfaction depended upon the unit in which the person worked, average satisfaction scores for each cost centre were obtained and are given below.

Table 10

Level of Satisfaction on each Job Aspect for each Cost Centre

Job Aspect	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	7.0	5.0	6.7	6.6	4.6	4.6	4.8	7.6	4.0	6.6	4.9	4.0	5.0	7.1
C&M	4.3	6.5	6.7	6.3	6.3	6.4	5.5	5.5	5.8	7.1	6.6	4.4	5.9	6.7
PWC	7.0	6.7	9.8	7.7	8.2	4.7	8.1	6.9	5.7	10.7	6.6	4.8	6.9	7.7
Se	5.8	6.6	9.2	6.8	6.5	6.9	9.2	6.4	5.8	8.2	6.4	4.1	6.5	9.1
So	11.0	7.5	8.0	7.9	5.2	8.0	7.6	11.8	7.8	8.2	7.9	4.9	9.3	10.0
Su	11.0	6.4	8.7	6.8	6.7	6.3	6.8	8.0	5.2	6.3	8.0	5.4	6.2	7.9
W	6.5	5.4	7.4	6.0	6.3	4.6	6.7	7.1	5.2	7.3	5.4	4.5	4.6	7.4
WE	5.5	8.2	9.2	8.0	10.5	7.7	7.0	10.4	8.3	10.7	8.6	9.3	10.3	9.4
WI	9.0	9.7	10.9	9.9	9.3	9.6	10.9	10.4	9.3	9.4	9.4	6.9	11.2	12.7
WV	9.3	7.7	7.7	8.1	8.1	7.3	9.0	9.4	6.9	10.0	4.8	4.4	8.0	8.3

In order to examine further the differences between cost centres, each cost centre was ranked according to their average satisfaction score on each job aspect. These rankings are shown in Table 11.

Table 11

Ranked Satisfaction on each Job Aspect for each Cost Centre

Job Aspect	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	3	7½	4	5½	11½	11½	10	1	13½	5½	9	13½	7½	2
C&M	14	5	2	7½	7½	6	11½	11½	10	1	4	13	9	3
PWC	7	10	2	5½	3	14	4	8½	12	1	11	13	8½	5½
Se	12½	7	1½	6	8½	5	1½	10½	12½	4	10½	14	8½	3
So	2	12	6½	8½	13	6½	11	1	10	5	8½	14	4	3
Su	1	9	2	6½	8	10½	6½	3½	14	10½	3½	13	12	3
W	6	9½	1½	8	7	12½	5	4	11	3	9½	14	12½	1½
WE	14	10	7	11	2	12	13	3	9	1	8	6	4	5
WI	13	7	3½	6	11½	8	3½	5	11½	9½	9½	14	2	1
WV	3	9½	9½	6½	6½	11	4	2	12	1	13	14	8	5

The differences between the cost centres in this table were tested using Friedman's "Two-Way Analysis of Variance by Ranks", and were found to be significant at the 0.001 level of confidence, see appendix 24. This suggests that answers to the questionnaire varied considerably between the cost centres in the division. Because of this finding, it was considered possible to obtain an overall job satisfaction

ranking for each cost centre by averaging the ten rankings shown in Table 11. The overall job satisfaction ranking is given below.

Table 12

Ranked overall Job Satisfaction of each Cost Centre

	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Rank	7	10½	2	6	9	12	5	4	13	3	10½	14	8	1

CHAPTER 14JOB SATISFACTION OF SUPERVISORS

The supervisor, occupying as he does the most differentiated role in the work group, is in a position to influence considerably the behaviour of its members. After reviewing studies such as those of Fox and Scott (1943) and Mayo and Lombard (1944), Miller and Form (1951) concluded that "the first-line supervisor is more important than any other official in determining morale and efficiency within a work group". Because of the importance of their position, the supervisors' attitudes to their jobs were ^{assessed} in order to see if there was any relationship between job satisfaction of supervisors and the other criteria on which cost centres were assessed.

Assessment of Job Satisfaction of the SupervisorsAdministration

A job satisfaction questionnaire similar to that used for the operatives was administered to the 14 supervisors in charge of the cost centres in the division. Slight modifications were made to some of the job aspects, and the new descriptions are shown in appendix 25.

Results

The order of importance in which the supervisors

ranked the ten job aspects is given in Table 13 below.

Table 13

Rank Order of Importance of Job Aspects given
by the Supervisors.

Job Aspect	Ranking in Importance
Management	1
Company	2
Security	3
Communication	4
Work Interest	5
Wages	6
Physical Working Conditions	7
Work Variety	8
Social	9
Work Ease	10

From this table it may be seen that the attitudes of the supervisors were similar to those of the operatives in so far as the most important aspects of the job were the extrinsic ones. To see whether or not most supervisors held this general attitude the relative importance of the job aspects for each supervisor has been shown in Table 14.

Table 14

Ranking of Importance of the Job Aspects for each Supervisor

Job Aspect	Supervisor's Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	5	1	3½	5½	8½	4	3	3½	6	3	9	5	1	1
Coy	2½	5	2	2	1½	4	3	2	4	5½	7	3	2	2½
PWC	5	2½	8½	7	5	6½	6	7½	4	8	4½	8	7½	7
Se	1	5	5½	5½	3½	6½	1	3½	2	3	7	3	4	4
So	7½	8	7	8½	8½	10	9	9	8½	8	2½	8	7½	6
Mgt	5	2½	3½	2	6½	2	3	1	1	1	4½	1	4	2½
W	7½	9	1	2	6½	1	7½	5	10	5½	7	6	4	5
WE	10	10	10	10	10	8½	10	10	7	10	10	10	10	10
WI	2½	5	5½	4	1½	4	5	7½	4	3	1	3	6	8½
WV	9	7	8½	8½	3½	8½	7½	6	8½	8	2½	8	9	8½

By inspection of Table 14, it seems that there was a high degree of agreement between the supervisors regarding particular job aspects, and this relationship was found to be highly significant, as shown in appendix 26.

The supervisors' satisfactions with each job aspect were next obtained and these are shown in appendix 27. The level of satisfaction could range from 0 - 16. Appendix 27 indicates that the supervisors liked this work but thought it was difficult. Also, they were relatively satisfied with their relationships with both their managers and their subordinates. On the other hand, they were dissatisfied with

the Company's general attitude towards them, the amount of information they received, and their wages.

Next, the level of satisfaction on each job aspect was obtained for each supervisor. These scale scores are shown in Table 15 below.

Table 15

Level of Satisfaction on each Job Aspect for each Supervisor

Job Aspect	Supervisor's Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	4	2	4	5	4	9	8	10	7	5	8	10	8	8
Coy	6	6	3	4	5	5	8	8	9	5	9	5	5	8
PWC	12	8	3	6	10	7	14	6	5	14	11	6	9	12
Se	8	12	4	5	2	12	7	10	8	8	12	12	7	8
So	12	13	9	10	6	10	5	16	11	12	13	10	15	16
Mgt	14	7	8	10	5	8	12	12	7	15	11	6	12	8
W	2	7	0	1	1	2	14	0	2	10	4	0	3	0
WE	4	8	4	4	8	5	4	2	2	1	6	0	4	8
WI	16	9	12	13	12	16	14	14	10	12	13	10	16	12
WV	4	6	12	12	10	9	11	2	15	12	12	8	8	12

The scale scores in Table 15 were then converted into ranked scores which are shown in Table 16.

Table 16Ranked Satisfaction on each Job Aspect for each Supervisor

Job Aspect	Supervisor's Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	12	14	12	9½	12	3	5½	1½	8	9½	5½	1½	5½	5½
Coy	6½	6½	14	13	10	10	4	4	1½	10	1½	10	10	4
PWC	3½	8	14	11	6	9	1½	11	13	1½	5	11	7	3½
Se	7½	2½	13	12	14	2½	10½	5	7½	7½	2½	2½	10½	7½
So	6½	4½	12	10	13	10	14	1½	8	6½	4½	10	3	1½
Mgt	2	11½	9	7	14	9	4	4	11½	1	6	13	4	9
W	7	3	12½	9½	9½	7	1	12½	7	2	4	12½	5	12½
WE	8	2	8	8	2	5	8	11½	11½	13	4	14	8	2
WI	2	14	9½	6½	9½	2	4½	4½	12½	9½	6½	12½	2	9½
WV	13	12	4	4	8	9	7	14	1	4	4	10½	10½	4

It can be seen from Table 16 that some supervisors were more satisfied with their jobs than others. The extent of this difference between the supervisors was tested, as shown in appendix 28 and was found to be statistically significant. Because of this wide difference in satisfaction between the supervisors an overall job satisfaction ranking was obtained by averaging the ten rankings on the specific job aspects. These rankings are given in Table 17.

Table 17Ranked Job Satisfaction of each Supervisor

	Supervisor's Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Rank	7	9	14	11	13	6	3	8	10	4	1	12	5	2

CHAPTER 15WORK ANXIETY

As well as a source of satisfaction, the work environment may provide support which is conducive to mental health, according to French and Kahn (1962). On the other hand the work situation may provide pressures and conflicts which interfere with mental health and, as Kahn et al (1964) stated, the stresses from frustrations or conflicts at work may generate intense emotional reactions. Symptoms of this reaction may include headaches, backaches, digestive upsets, lack of concentration, tiredness, and feelings of general apprehension or dread. Illness of this kind has been considered to be a form of neurosis which may vary in its severity and in the extent to which a person's work is impaired.

In an early study by Hersey (1936) it was observed that many people experience definite "ups and downs" in their general emotional state, and that in those periods in which the person felt emotionally low he tended to sustain a greater number of accidents compared with the other periods in which he felt brighter. A later and more comprehensive survey was described by Fraser (1947) who used a sample of approximately 3,000 male and female factory operatives. These employees were given a battery of psychological tests,

an interview with a social worker, and a medical and psychiatric examination. It was found that 20 per cent of the employees showed evidence of minor neurosis and 10 per cent suffered from a severe neurosis. Neurotic illness was considered to account for between a quarter and a third of all absence from work due to illness.

Although the complete significance of neurosis in industry is difficult to assess, Tredgold (1947) considered that it was undoubtedly great enough to cause considerable concern. Tredgold subsumed its effects in general terms under loss of production through absence from work, inefficiency of the anxious employees while they were working, and the unsettling effect on the other members of the company. In an experiment by Schachter et al (1961) in which a group of assembly workers were subjected to experimental conditions till they became "disturbed and upset", it was found that anxiety induced in this way had no effect on the performance of routine tasks but did impair the learning of new tasks.

Factors Involved

Little research has been done in this area, and that which has been undertaken has mainly concerned endogenous factors. Kitson (1925) reported a close relation between emotional maladjustment and vocational maladjustment, and Read (1931) found that people who were maladjusted at

school were often maladjusted in industry. This suggests that some people more than others will have difficulty in coping with the stresses produced in working situations.

Of more interest to the present study was whether or not unsatisfactory work situations lead to a higher incidence of work anxiety than do work situations considered to be generally satisfactory. To throw more light on this question measures of anxiety were obtained for the operators in each of the cost centres. These scores were averaged so that anxiety levels within each cost centre could be obtained.

Assessment of Anxiety within each Cost Centre

Included in the questionnaire on job satisfaction described in the previous two chapters were four questions referring to occupational health. These questions concerned tiredness, headaches, and eyestrain and are shown in appendix 29.

The answers were scaled on a five point scale ranging from zero to four. Thus the scores for this whole item could range from zero to sixteen. In the actual scoring of the question the direction of the scale was reversed so that a low score indicated the presence of work anxiety. Anxiety scores for all operatives in each cost centre were averaged, and these scale values are shown in Table 18.

Table 18Average Scores on the Anxiety Scale for each Cost Centre

Average Score on the Anxiety Scale	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	10.0	10.1	10.7	9.0	10.8	8.2	11.3	11.3	10.4	13.6	9.1	8.5	10.6	13.3

The scale scores in Table 18 were then converted to ranks with the lowest rank corresponding to the cost centre with least anxiety.

Table 19Ranking of the Cost Centres on their Anxiety Scale Scores

Ranking of the Cost Centres on the Anxiety Scale	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	10	9	6	12	5	14	3½	3½	8	1	11	13	7	2

CHAPTER 16ACCIDENTS

Accidents have been defined by Kahn (1961) as being undesirable or unfortunate events that occur unexpectedly. They form a regrettable aspect of everyday life and it has been pointed out that the number of war casualties among American servicemen during World War II was exceeded by civilian casualties. The largest proportion of civilian injuries and deaths was attributable to accidents in the home, but occupational accidents contributed substantially to the total.

In British industry the problem is no less severe, for the annual accident rate over the past three and a half decades has never fallen below 21 per thousand of all persons employed in industry, ref. Hepburn (1965). Operatives, management and unions all regard accidents as undesirable, and in this sense they may be contrasted with absence and labour turnover where it has been argued that a certain amount of either may be desirable.

One lamentable aspect of accidents is their personal consequences which may vary from hurt pride to injury to life or limb. Thus what Viteles (1933) calls the social effects of accidents may be comparatively negligible or involve adversity for the individual and his family. The

provision of safe working conditions and the implementation of safety programmes, therefore, are part of management's social responsibility.

Accidents also involve considerable financial costs. Pioneering work by Heinrich (1931) indicated that the total cost of industrial accidents was five times the cost of workers' compensation insurances premiums. Later studies by, for example, Simmonds and Grimaldi (1956) and Howard (1964), have arrived at estimates even greater than this. The difference between these estimates stems from the differences in the methods of costing accidents of which five were described by Howard (1963). The major items involved seem to be fixed costs, including workers' compensation insurance and the provision of physical safeguards, and variable costs, of which the most important items included labour costs, costs arising out of overtime, and damage to materials and equipment.

Factors Involved

The serious consequences of accidents, both in human and financial terms, eventually led people to inquire into their nature. The initial concept of "accidents", as the term suggests, was of something outwith man's control, involving a large element of fate or chance. As research was intensified the complex nature of accidents became better understood, so the idea of chance was less and less

necessary as an explanatory concept, and the importance of predisposing conditions became more apparent.

Ryan and Smith (1954), among others, distinguished between two main types of conditions or factors. The first of these was referred to as hazards, eg. oily floors, and any person coming under this influence was likely to have an accident. The second category referred to individual differences between people, suggesting that some people were more likely to have accidents than others, irrespective of hazards.

The Physical Environment

Much of the early work on accidents was concerned with identifying hazards or aspects of the physical working environment which contributed to high accident rates. Aspects found to be significantly correlated with accident rates included temperature excesses (Osborn and Vernon, 1922), poor illumination (Vernon, 1937), degree of operational congestion (Keenan et al, 1951), and excessive physical working strain or fatigue (Keenan et al, 1951 and Vernon, 1937). In addition to these aspects of the external physical environment, Kerr (1957) distinguished factors related to the internal environment and in this category included disease organisms, alcohol and toxic items.

In line with this research have been attempts to reduce accident hazards by eliminating toxic substances from the

production process, by the development of safety standards, and by implementing preventive maintenance, good quality tools, adequate factory layout, efficient materials handling methods, good housekeeping, and machine guarding. Heinrich (1931), however, concluded from his studies that only about ten per cent of industrial accidents were due to distinctly physical causes of the kind just described.

Individual Differences

The fact that some people have more accidents than others was a very early finding reported by Greenwood and Woods (1919), who found that about 80 per cent of accidents were suffered by approximately 20 per cent of people.

The search for personal characteristics involved revealed that a number of factors was related to high accident rates. These factors included faulty vision (Tiffin, 1951) and slow motor and perceptual speed (Drake, 1940). Henig (1927) also found a relationship between accidents and scores on the Army Alpha Mental Test, and Chambers (1939) in his study reported that very few of the people regularly having accidents were above average in handwork, intelligence and learning ability, dependableness, and industry.

In addition to these characteristics, a number of researchers (Fisher, 1922; Goldmark et al, 1920; Vernon, 1937, and Van Zelst, 1954) found accidents to be related to inexperience. A further study by Hersey (1936) suggested that

many people experience definite "ups and downs" in their general emotional state, and that the frequency of accidents was related to these emotional cycles.

The evidence for a relationship between personal characteristics and accidents was substantiated by a different kind of study by Marbe (1926) who formulated Marbe's law, which stated that the probability that an individual would sustain an accident may be determined from the number which he has already sustained. This type of relationship was confirmed by Slocombe (1930) who found that there was a correlation of 0.51 between accident rates of people over two successive years.

From the studies indicating that a large proportion of accidents occur with a small proportion of people, and those showing that there was a tendency for accidents to be "repeated", the concept that certain people were "accident prone" developed, and was supported by writers such as Viteles (1933).

Somewhat later the accident proneness theory came under criticism. Mintz and Blum (1949) pointed out that a small number of people could be expected to have more accidents than others by chance, and indicated that the frequency of "repeater" accidents approximated a pure chance (Poisson) distribution. Taking data reported by Ghiselli and Brown (1955), Kerr (1957) suggested that only about 15 per cent of

the variance of accidents was accounted for by variance of individual "accident proneness".

Situational Factors

If, as Heinrich (1931) estimated, the physical environment accounts for only ten per cent of accidents, and if, from the evidence above, the propensity of people to be accident repeaters accounts for something like 15 per cent of accidents, the most part of accident behaviour still remained to be explained.

Developing the concept of the accident prone person, Kerr (1950) carried out a study to see if there were accident prone departments. In a group of 53 departments of a single company accident rates were found to vary from 0.0 to 22.7 per 100 workers per annum, and severity values ranged from 0 to 75. Furthermore, departments highest in accident frequency were usually also above average in accident severity. Kerr also tried to relate accident rate to specific factors within the departments. It was found that accidents occurred more frequently in departments with low promotion probability, low intracompany transfer rate, and high noise level, and that greater accident severity was found in departments with a predominance of male workers, low promotion probability, low suggestion record, non-youthfulness of employees, and high average tenure of workers.

A subsequent study by Keenan et al (1951) also reported

differences in accident rates within a group of 44 departments, and an attempt was made to correlate differences in the accident rates with certain psychological characteristics of the organisational units.

One such characteristic that has been found to correlate with accident rates is job satisfaction, ref. Stagner et al (1952). An interesting study by Vibert (1957) dealing with morale reported that high morale workers attribute causes of accidents to themselves, whereas low morale workers blamed management's neglect for the accidents. In another study concerning situations in which negative attitudes towards employment had developed, Davids and Mahoney (1957) found significant correlation between negative attitude and high accident rates. Fleishman et al (1963) also found a relationship between accidents and style of supervision, where high accident rates tended to go with high "structure" and low "consideration".

From this evidence it appears that there is a number of factors within organisational situations that may contribute to accidents. Accident behaviour appears to vary widely between situations, and markedly different situations, such as the conventional and composite work organisations described by Trist et al (1963), have been found to be characterised by different levels of accidents. To see if this kind of relationship also existed in this study, the accident rates for the different cost centres in the division

were calculated and compared.

Assessment of Accident Behaviour of the Cost Centres

It is possible to define an accident in a number of different ways, and the particular measure used in each case may greatly affect the incidence of accidents found in any one factory. On the one hand, an accident may be said to have occurred every time an injury is sustained, while on the other hand it may be held that an accident should be counted only if the magnitude of the injury is such that work is appreciably interrupted.

A further consideration is that accidents are difficult to measure accurately. As Hill and Trist (1953) suggested, there are wide differences between people's readiness to report accidents, with some people reporting even slight mishaps, and others seeking medical attention only for the severest of injuries. Furthermore, as the present study showed, the readiness of people to record accidents varied considerably. Over some periods both minor and major accidents were entered in the accident log book while at other times only the latter were recorded.

The most accurate measure available was considered to be the frequency of legally reportable accidents, involving the loss of three or more working shifts. On this basis the average frequency per employee of reportable lost-time

accidents for each cost centre was calculated and is shown in Table 20 below.

Table 20

Average Frequency per Employee of Reportable Lost-time Accidents for each Cost Centre over the Period January - June, 1966.

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Frequency reportable lost-time accidents	0.00	0.03	0.00	0.00	0.11	0.00	0.00	0.00	0.04	0.00	0.07	0.00	0.00	0.00

It will be observed in Table 20 that this measure failed to discriminate between the cost centres. An alternative measure encompassing other less serious accidents may have more usefully reflected differences in the cost centres' accident behaviour. As, however, it was impossible to gather information that would permit this latter type of analysis to be made, the limitations of Table 20 had to be accepted. Using this data the cost centres were ranked according to the frequencies shown in Table 21, below.

Table 21

Ranked Average Frequency per Employee of Reportable Lost-time Accidents for each Cost Centre over the Period January - June, 1966

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Ranking	5.5	11	5.5	5.5	14	5.5	5.5	5.5	12	5.5	13	5.5	5.5	5.5

CHAPTER 17ABSENCE

A recent B.I.M. publication dealing with the incidence of absence in British industry stated that approximately one million people are absent from work each day, a figure representing about five per cent of the labour force. Absenteeism of this order seems to have led to the traditional view that, while some absence is inevitable, owing to sickness, injuries and sporadic domestic problems, much of it is undesirable as it involves loss of production and represents dissatisfaction of employees with aspects of the job.

An attempt was made by the B.I.M. to assess the financial effects of absence. The variable costs of absence (involving sick pay, overtime, redeployment, extra labour employed, cost of loss of sales resulting from absence) and the fixed costs (including administration, medical and personnel departments) were calculated in eleven firms and the total cost per man-hour lost was found in most cases to lie between 4s. and 6s. In another study by Byrt and Wall (1951) in which a different method of costing was used, the cost per man-hour lost was 13s.

There is certainly not, however, a direct relationship between absence and costs, and Mayo (1945) was perhaps the first to draw attention to this by challenging the assumption

that man-hours lost could be equated with production lost. He suggested that when a person was absent from work the remainder of the work group may compensate for the loss of production of the individual. Behrend (1959) also pointed out that it was by no means certain anyhow that the absentee would have produced at his normal rate if he had been persuaded to attend. Furthermore, if absenteeism was reduced, then perhaps more serious and more costly problems would be generated. Although, as these arguments illustrate, the relationship between absence and productivity is undoubtedly complex, the consensus still appears to be that absence does lead to some loss of production and to an increase in costs.

Factors Involved

Dissatisfaction

There is considerable evidence to support the notion that absence may be indicative of dissatisfaction with aspects of the job. Job aspects found to be related to absence include too much waiting-time (Van Beck, 1964), poor promotion opportunities (Patchen, 1960), insecurity (Owens, 1966), type of supervision (Argyle et al, 1958), and type of management (Fox and Scott, 1943). Absence has also been found to be related to more general attitudes, so that absence tends to be high when work attitudes are negative or when job satisfaction is low (Roethlisberger and Dickson, 1939; Kornhauser and Sharp, 1932; Kerr et al, 1951; Metzner

and Mann, 1953; Shephard and Walker, 1957; Fleishman et al, 1963).

Economic Conditions

A review of the research literature on absence, however, shows that dissatisfaction is not the only major factor related to absence. For example, in a study by Behrend (1953), absence rates were observed over a period of changing economic climate and it was found that voluntary absence fell as a period of full employment changed to a period of less full employment. The inverse relationship found between the level of unemployment and the level of absenteeism led to the conclusion that an increase in local unemployment or redundancy could be expected to lead to a reduction in absenteeism.

Personal Characteristics

In addition to the economic factor, the relationship between absence and personal characteristics has also been examined. Noland (1945) reported correlations between absence and level of education, efficiency, number of dependents, similarity of job to former job, age, and home situation. While other evidence on the connection between absence and age is conflicting, see Kossoris (1948), Behrend (1951), Liddell (1954) and Kahn et al (1957), relationships between absenteeism and family responsibility have also been found by Liddell (1954), Kahn et al (1957), and Shepherd and Walker (1958). The general position as reviewed by Behrend

(1959) seems to be that family responsibilities may tend to reduce absenteeism among male workers but among women they may have the opposite effect.

Some studies have also touched on the idea that there may be a more general personality predisposition towards absenteeism. The tendency for a large part of absenteeism to be attributable to a relatively small group of employees was noted by Fox and Scott (1943), Mayo and Lombard (1944), and Mayo (1945), and the fact that people given to being absent tend to be so from one year to the next has been reported by Arbous and Sichel (1954), Liddell (1954), and Holt (1956). The case for "absence-proneness", however, seems not to be wholly accepted, and it has been argued that absence may be largely situationally determined, so that if the situation is altered, say by changing jobs, then the pattern of absenteeism may also be altered.

Situational Factors

The situational implication of absence was brought out in a study by Hill and Trist (1955) when they examined the effect of length of service on absence behaviour. It was found that as length of service increased certificated absence took the place of no-excuse absence. The interpretation was that absence reflected the state of the relationship between a person and his work: the person sought temporary relief from the stresses of his work by going absent. For the relatively new employee this took the form

of uncertificated absence. If, on the one hand, the decision was made to withdraw completely from that work, then labour turnover resulted. On the other hand, if the person decided to remain with the company yet still sought temporary relief, then he indulged in sanctioned absence.

A further study also throws light on the relationship between absence and situational factors. Crowther (1957) recorded absence rates of a number of divisions of one company over a six year period and found similarity in the trends of the absence rates over this period, ie. the rank order of absence severity did not vary appreciably over successive years. The stability of the general levels of absence of the factories was interpreted as indicating that the rates were influenced by long-term characteristics of the factories. This suggests that situational factors that have become institutionalised appear to be reflected in absence behaviour. In this connection the study by Trist et al (1963) may be noted in which different types of work organisation, the conventional and the composite, were associated with different levels of absence.

Importance of Situational Factors

It appears, then, that absence is a complex phenomenon. As Gaudet (1957) said, it reflects a "hodge-podge" of many factors. Of particular interest to the present study is the evidence that absence is an endemic characteristic of a work situation. Because of this, not only would the production

and cost effectiveness of a work section be hampered by absence as suggested earlier, but also the supervisor may be under greater work pressure. It is probable that he would be frequently changing his work roster on short notice, which would disrupt his planning and encroach on his time. Furthermore, the flexibility of labour within the cost centre would be decreased. This may mean that cost centres with high absence rates would be at a general disadvantage compared with those with lower rates. For these reasons absence was used in the present study as one criterion in an attempt to measure the difference in effectiveness between the cost centres in the division.

Assessment of Absence Behaviour of the Cost Centres

Although absence is occasioned by "failure to be present at the appropriate time and in the appropriate place to meet the terms of the (employment) contract", ref. Gibson (1966), the reasons for taking leave of absence, as the review of the literature above suggests, are connected not only with health but are related as well to general job attitudes, family responsibilities, general economic conditions, etc.

Probably because absence may be influenced by a number of factors, there has always been some difficulty in finding ways to measure it. For example, Kerr (1950) and Kerr et al (1951) suggested that the different types of absenteeism, ie. total, excused, and unexcused, are all unrelated, and

concluded that absenteeism is far from being a unitary trait. Huse and Taylor (1962) measured absence in four ways: absence frequency (total number of times absent), absence severity (total number of days absent), attitudinal absences (frequency of 1-day absences, assuming that the employee did not want to come to work), and medical absences (frequency of absences of 3 days or longer, assuming that the employee was unable to come to work). The reliabilities of these measures over successive years varied appreciably from one measure to another.

Because of this and other evidence that different measures of absence may reflect different kinds of absence behaviour, four measures of absence were taken in the present study. One categorisation was according to whether or not time off was taken with a doctor's certificate. Next, both severity and frequency measures were recorded within the certificated and uncertificated absence categories.

Certificated Absence-Severity

Severity was measured by the duration of time that a person was absent from his place of work. The average time lost on certificated absence per employee over the first six months of 1966 was 31.9 hours, see appendix 30.

Next, certificated absence severity was calculated for each cost centre and these rates are shown in Table 22 below.

Table 22

Average Certificated Absence-Severity per Employee
for each Cost Centre over the period January -
June, 1966

Average No. of Hours Absent	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	24.0	23.4	45.2	28.9	19.8	38.7	19.0	39.3	40.0	9.0	64.0	25.0	42.6	19.2

The cost centres were then ranked from lowest to highest according to these severity rates and the ranking is shown below.

Table 23

Ranked Certificated Absence-Severity for each Cost
Centre over the period January - June, 1966.

Rank	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	6	5	13	8	4	9	2	10	11	1	14	7	12	3

Certificated Absence-Frequency

Frequency was measured as the number of separate absence events occurring during a specified period of time. This criterion of absence was chosen as a number of studies referred to above had shown that frequency rather than severity was more closely related to job attitudes. For this reason, no distinction was made between absence and lateness,

it being considered that both events reflected employee attitudes to work.

The average frequency of certificated absence per employee over the six month period was 0.8, see appendix 31.

Certificated absence frequency was also calculated for each cost centre and is given in Table 24.

Table 24

Average Frequency of Certificated Absence per Employee for each Cost Centre over the period January - June, 1966

Frequency of Absence	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	0.5	0.8	0.7	0.9	0.4	0.6	0.7	1.5	1.0	0.4	1.0	0.7	1.1	0.5

The cost centres were then ranked from lowest to highest on the basis of these rates, and the ranking is shown below.

Table 25

Ranked Average Frequency of Certificated Absence for each Cost Centre over the period January - June, 1966

Rank	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	3.5	9	7	10	1.5	5	7	14	11.5	1.5	11.5	7	13	3.5

Uncertificated Absence-Severity

The average time lost through uncertificated absence per employee over the period was 30.6 hours, see appendix 30.

Uncertificated absence severity was calculated for each cost centre and the rates are shown in Table 26.

Table 26

Average Uncertificated Absence Severity for each Cost Centre over the period January - June, 1966

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Average No. of Hours Absent	4.2	34.6	26.0	21.2	19.2	27.0	18.4	35.9	49.8	27.7	22.4	46.9	19.8	33.5

The cost centres were then ranked from lowest to highest on the basis of these rates, see Table 27.

Table 27

Ranked Average Uncertificated Absence Severity for each Cost Centre over the period January-June, 1966

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Rank	1	11	7	5	3	8	2	12	14	9	6	13	4	10

Uncertificated Absence-Frequency

The average number of times an employee took uncertificated absence over the period was calculated as shown in

appendix 31, and was found to be 11.0.

Average uncertificated absence frequency was calculated for each cost centres, and the figures are shown in Table 28.

Table 28

Average Uncertificated Absence Frequency for each Cost Centre over the period January - June, 1966.

Frequency of Absence	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	5.8	10.4	10.2	7.7	8.1	5.8	12.2	9.8	17.5	10.3	9.3	13.5	10.3	7.7

The cost centres were then ranked from lowest to highest on the basis of these figures, see Table 29.

Table 29

Ranked Uncertificated Absence Frequency for each Cost Centre over the period January - June, 1966

Rank	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	1.5	11	8	3.5	5	1.5	12	7	14	9.5	6	13	9.5	3.5

Overall Assessment of Absence Behaviour

The average number of times an employee was absent from work in the six month period was 11.8, see appendix 31, and this involved a total of 62.5 hours, see appendix 30.

While this represents the level of absence of the whole

division, for the purpose of this study it was also necessary to obtain a measure of absence behaviour for the cost centres within the division.

On the evidence of past research four separate measures of absence were obtained, as some results had suggested that the different measures correspond to quite different conditions. The degree of similarity between the measures was tested as shown in appendix 32, the expectation being that it would be low. The test showed that the converse was the case in this study, and that there was a similarity between the measures that was statistically significant.

This finding is not surprising if regarded in the context of the Hill and Trist (1955) research. They suggested that the important condition underlying absence was the state of the relationship between a person and his work. Stress in this relationship may be expressed as unsanctioned or sanctioned absence, depending upon length of service.

As the data in appendix 32 are consistent with the above proposition that indices of absence may reflect the presence of an underlying factor, a single ranking of the cost centres was obtained by averaging the rankings on the separate absence measures. The final ranking of the cost centres on absence behaviour is shown in Table 30, below.

Table 30

Ranked Absence for each Cost Centre over the
period January - June, 1966

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Ranking	1	9	8	7	2	6	5	13	14	4	10	12	11	3

CHAPTER 18LABOUR TURNOVER

Labour turnover has presented a problem to industry for over fifty years, and in the present decade the average annual labour turnover rate for manufacturing industry in Britain has been approximately 36 per cent, as shown by the statistics compiled by the Department of Labour and Productivity. While some is inevitable (due to retirement, death, sickness, marriage or pregnancy), and some may be advantageous (to facilitate promotion, acquire "new blood"), labour turnover of this magnitude is usually held to be undesirable. The general view is that it disrupts production, leads to poorer quality because of the "green" labour, inflates costs, and lowers morale.

A number of studies has been done on the cost of labour turnover. As Byrt (1951) stated, labour turnover increases fixed costs per unit since the volume of production will be less, and leads to an increase in variable costs on account of expenses such as recruitment, advertising, and training. Most costing studies calculate the cost per separation by evaluating the total financial loss incurred when an employee leaves a company and is replaced by another employee. Pearce (1954) reported four studies in Britain where the cost per leaver was found to be £20, £24, £25 and £47. In a more recent publication by the Economic Develop-

ment Committee for the Clothing Industry (1967) the cost per leaver was calculated to be approximately £150. Labour turnover costs may be even higher than this in some cases because the estimated cost depends on the degree of skill of the labour involved as well as on the method of costing used (Knowles, 1964b).

Factors Involved

A review of the literature indicates that labour turnover may be influenced by a multiplicity of factors. Some of these factors are specific. For example, McKenzie and Pugh (1957) found that the personal relationship between the inspector and the operators was the crucial thing determining the high labour turnover in one department of a company. On the other hand, labour turnover may be influenced by factors of a more general nature, and these factors are described below.

Economic Conditions

Previous research has indicated that labour turnover is closely related to general economic conditions. For example, Woytinski (1942) observed that fluctuations in the general level of labour turnover tend to be closely associated with the business cycle. Cook (1951), in considering the labour market, suggested that in periods of increasing business activity labour turnover tended to rise as more jobs became available, and that it tended to fall

as fewer jobs were available in periods of recession or slump. In a comprehensive survey conducted in a number of factories, Behrend (1953) confirmed that this relationship existed in British industry.

Personal Characteristics

A good deal of research has been done on the relationship between labour turnover and personal characteristics. These have included characteristics such as intelligence, aptitude, and interests, as well as personal data such as age, sex, and previous employment history.

A close relationship appears to exist between labour turnover and both intelligence and aptitude. According to Viteles (1924) and Brown and Ghiselli (1953), the relationship is curvilinear so that employees with scores close to the average for the work group tend to have a longer length of service than those with scores towards either extreme. Studies by Strong (1943), Kriedt and Marguerite (1953), and Boyd (1961) have also found that employees whose interests at the time of engagement are more appropriate for the type of work to be done tend to stay on the job longer than those with interests alien to the nature of the work.

The importance of personal history in predicting labour turnover has been investigated in a number of studies, eg. Wickert (1951), Mosel and Wade (1951), Long (1951), Kriedt and Marguerite (1953), and Wilson (1959). Knowles (1964a)

listed some of the characteristics investigated as including marital status, length of marriage, number of children, number of dependents, previous experience, number and average length of service on previous jobs, reason for leaving last job, employed or unemployed at time of application, level of education, and method of recruitment, eg. newspaper advertisement, referred from school, advised by other company employee, and application at gate. Few of these characteristics, however, showed a consistent relationship with labour turnover. The most reliable indicator of the probable length of service on the current job appears to be the average length of service on previous jobs, ref. Mosel and Wade (1951), Minor (1958), and Knowles (1964c).

The Organisational Factor

Any survey of labour turnover, such as that conducted by Long (1951), will reveal a wide range of labour turnover rates between organisations. In order to examine the reasons for such differences, Byrt (1948) conducted a survey over 106 firms which together had a work force of 50,000 employees. He compared certain managerial procedures and practices to see if differences in these could account for the variation in labour turnover rates. No common cause was found and it was concluded that explanations of labour turnover were to be looked for in each particular circumstance. Greystoke et al (1952) reached a similar conclusion in their study when they suggested that labour

turnover would be controlled mainly by management's own acts and policies.

An alternative approach to the study of labour turnover has been described by Jacques (1951) through analysis of the wastage curve. While it had been recognised by Brissenden and Frankel (1922) that the major part of labour turnover was due to very short service employees, Jacques was the first to depict this feature by means of the wastage curve. In a later study by Rice et al (1950) it was shown that under varying economic conditions the wastage curve changed its intercept on the Y-axis, while at the same time its general shape remained basically unaltered. The interpretation was that the wastage curve reflected the organisation's culture and this would be only partly affected by changing economic conditions.

In a survey by Knowles (1962) wastage rates of nursing trainees at 17 metropolitan hospitals were obtained over a five year period. The data showed that the rates varied from year to year, largely on account of external economic conditions. When, however, the hospitals were ranked according to the severity of the wastage it was found that the same rank order tended to occur from year to year. That is, hospitals with a low average wastage tended to have consistently low wastage rates relative to the other hospitals, and hospitals with high average wastage tended always to have high wastage rates. This suggests that labour turnover

is an endemic or long-term characteristic of organisations, and for this reason it is an important criterion if the overall effectiveness of organisational units is to be assessed.

Assessment of Labour Turnover of the Cost Centres

In the present study labour turnover rates for the first six months of 1966 were calculated for each cost centre in the division. Labour turnover was calculated by expressing the number of leavers as a percentage of the average employment over the period.

$$\text{ie. } LT = \frac{n}{\frac{N_1 + N_2}{2}} \times 100\%$$

where n = number of leavers over the period,

N_1 = number of employees at beginning of period,

N_2 = number of employees at end of period.

The labour turnover rate for the whole division over the period was 29.4 per cent. The rates for each cost centre within the division are shown in Table 31.

Table 31

Labour Turnover Rate for each Cost Centre over the period January - June, 1966

Labour Turnover Rate (%)	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	16.7	27.6	31.8	8.0	15.8	38.1	4.4	19.0	52.7	21.7	27.6	45.0	36.6	0.0

The cost centres were then ranked from lowest to highest in terms of the severity of labour turnover.

Table 32

Ranked Severity of Labour Turnover for each Cost Centre over the period January - June, 1966

Ranked Labour Turnover Severity	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	5	8.5	10	3	4	12	2	6	14	7	8.5	13	11	1

CHAPTER 19INDUSTRIAL UNREST

Industrial unrest presents industry with a considerable problem as the statistics published by the Department of Employment and Productivity indicate. The number of strikes per year in all industries over the past decade has remained comparatively constant involving on the average between two and three per cent of all workers annually, and an average yearly loss of approximately 0.15 working days per worker employed. These rates in themselves may not appear very high but the strike itself represents only the culmination of a lengthy deterioration in human relations. To the costs of strikes may be added the effects of other forms of industrial unrest such as restriction of output, work-to-rule, go-slows, sabotage etc., but as data on the frequency of these expressions of discontent are not available the real consequences of industrial unrest cannot be gauged.

Factors Involved

Like other indices of industrial behaviour, industrial unrest apparently may be influenced by a number of factors. The literature on this topic will be reviewed with respect to these factors.

Specific Issues

The Department of Employment and Productivity collects data on industrial stoppages and the causes of these stoppages are listed as: wage disputes; hours of work; employment of particular classes or persons; other working arrangements, rules and discipline; trade union status; and sympathetic action. Stoppages over wages and conditions of employment account for approximately 95 per cent of all cases. Meredith (1948), however, suggested that "no impartial student of strikes can fail to be impressed by the lack of correlation between the precipitating cause of the strike and the amount of feeling necessary to lead to such drastic action..... The choice of a bone of contention..... may be almost accidental". In a similar vein, it was found in a study by Warner and Low (1947), that while "most of the formal demands of the strikes concerned wages and the recognition of the union", interviews with workers before and during the strike revealed that "many of the basic grounds for discussion had little to do with the amount of money received".

The same difference between immediate issues and their underlying condition was made by Roethlisberger and Dickson (1939) when they distinguished between the manifest and latent content of complaints. Their interviewing programme showed that "the workers by themselves were not able to specify precisely the particular source of their dissatis-

faction, but that if they were encouraged to talk freely, the effect was not merely emotional relief but also, in many instances, the revelation to the critical listener of the significance of the complaint". In some ways the initial dissatisfaction had been displaced onto more tangible issues. In the subsequent interviews certain complaints were no longer treated as specific facts but were taken to be indicative or symptomatic of underlying factors needing further investigation.

Underlying Factors

The nature of the factors underlying industrial unrest may be illustrated by specific cases that have been closely studied. For example, a study by Trist and Bramford (1951) concerned the introduction of mass-production techniques in coal-mining. The subsequent breaking-up of the cohesive work groups and the loss, among other things, of the opportunity to interact and the means of providing support and a sense of security to members performing dangerous work, led to a deterioration of morale and an increase in absenteeism and work stoppages.

The behaviour of the work group may also be affected by the conduct of the supervisor in charge of the group. If style of supervision was described in terms of "structure" and "consideration", Fleishman et al (1955) found that, in general, leadership climate involving high structure and low consideration tended to be associated with high rates of

absenteeism, accidents, labour turnover and grievances. A later study by Fleishman and Harris (1962) examined this relationship more closely using labour turnover and grievances as the main criteria. Foremen with low consideration tended to have high labour turnover and grievances irrespective of the amount of structure they exercised. On the other hand, if consideration was high an increase in structure did not necessarily lead to a rise in labour turnover and grievances.

From a different aspect altogether, Kornhauser (1954) put the view that to the employee the organisation may be a source of great satisfaction or a cause of discontent. Which viewpoint the majority of the organisation employees held was said to be not primarily a consequence of their personal idiosyncrasies but rather the result of the major dimensions of the organisational environment. The employee was seen as personalising his reaction to this environment and translating it into organisational behaviour involving one or other form of industrial unrest.

A further aspect of the organisational implications of industrial unrest is embodied in the research by Trist et al (1963) described earlier. This study concerning the composite and conventional work organisations revealed that the composite organisation was superior on a number of indices of which grievances was one.

While the Trist et al research compared two alternative types of work organisation with respect to differences in their grievance rates, Knowles (1965) examined industrial unrest behaviour within a single organisation. In this longitudinal study it was found that industrial unrest occurred in a cyclical pattern so that a relatively long period of quiescence would give way to periods of industrial unrest involving complaints and the lodging of grievances, and this activity tended to culminate in mass meetings and strikes. In such periods "heat and mass resentment dominated the scene". The resolution of the conflict at this stage would lead to another period of industrial harmony and the recommencement of the cycle. One interesting implication of this behaviour was the effect it had on labour turnover. The atmosphere prevailing in the organisation affected the length of service of new employees. On the whole employees joining during periods of industrial quiet remained with the company approximately 50 per cent longer than those joining in periods of industrial unrest.

Because of these organisational implications of industrial unrest, the question arises as to whether or not the sub-organisations or cost centres differ in their propensity for industrial unrest, as do industries, and for this reason a measure of industrial unrest was taken for each cost centre in the present study.

Assessment of Industrial Unrest in the Cost Centres

It has been suggested by Whyte (1956) that at best the written grievance is not a good indicator of the state of affairs on the shop floor. To support this proposition he cited Roy's (1954) study in which few grievances were processed although the operators were hostile towards management. This hostility was worked out through restriction of output. Also, Dalton (1959) found that many of the dealings between unions and management over what would normally be considered to be grievances were seldom formalised as written grievances.

Although the absence of a grievance may not indicate good industrial relations, Whyte suggested that, in general, the presence of processed grievances does indicate widespread operative discontent. This view was taken in the present study and the number of "Failures-to-agree" were considered to reflect, up to a point, the state of industrial unrest within the cost centres.

A grievance is a complaint by an operative against a company for an alleged transgression of his rights, as defined by the employment contract or by precedent. The grievance process aims to assess the complaint and if it is valid to have the violation corrected. In this Company, a Failure-to-agree was registered when a grievance that an operative raised with his supervisor was forwarded to the

shop steward, and agreement could not be reached between the shop steward and the supervisor. At this stage the Industrial Relations Officer became involved in the process of conciliation, and each event of this kind was recorded by the Company in a log book.

From the Company log book the frequency of Failures-to-agree was obtained for each cost centre over the period covering the first six months of 1966. These frequencies are shown in Table 33 below.

Table 33

Frequency of Failures-to-agree for each Cost Centre over the period January - June, 1966

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Frequency of Failures-to-agree	-	-	-	-	-	1	-	-	5	-	-	-	-	-

Although the data on this criterion are obviously inadequate, in accordance with earlier procedures the cost centres were ranked on the frequencies entered in Table 33.

Table 34

Ranked Frequency of Failures-to-agree for each Cost Centre over the period January - June, 1966.

	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Ranking	6½	6½	6½	6½	6½	13	6½	6½	14	6½	6½	6½	6½	6½

CHAPTER 20IMPLICATIONS OF THE ANALYTICAL STUDY

The review of literature undertaken in the previous chapters showed that in most cases a relationship existed between the variables considered individually and factors of a social, situational, or organisational nature. With some variables, such as labour turnover, the relationship was strong, while with others like quality and costs, the evidence was slight or even practically negligible. The main point of interest in the present analysis, however, was to see what sort of pattern emerged when the variables were considered together. For this purpose Table 34 was drawn up in which the cost centres were placed in rank order with respect to each of the variables.

By inspection of Table 35 it will be noted that the rankings for any single cost centre tended to cluster together. For example, the rankings of cost centre "g" tended to be generally low, while those for cost centre "i" tended to be high throughout. The strength of this relationship was tested as shown in appendix 33 and was found to be highly significant statistically. That is, while there was evidence in the literature that situational or organisational factors may have some influence on individual variables, Table 34 suggests that factors of this kind were probably of fundamental importance in affecting the behaviour of the

variables.

To clarify the implications of Table 35, the cost centres were re-arranged in Table 36. This table indicates that there were four cost centres, "g", "j", "n" and "a", which could be considered to be generally effective if all the variables were taken together, while there were other cost centres, "c", "e", "f", "l" and "i", which could be considered to be less effective if regarded in this way.

Table 35.

Ranking of all Cost Centres on each Variable

Variable	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Output	1½	4	14	7½	10½	5	1½	9	3	6	13	12	10½	7½
Quality	5	2	8	10	14	12	7	11	13	4	1	9	3	6
Costs	1	11	10	6	9	14	3	8	13	2	7	5	4	12
Job Satisfaction of Operatives	7	10½	2	6	9	12	5	4	13	3	10½	14	8	1
Job Satisfaction of Supervisors	7	9	14	11	13	6	3	8	10	4	1	12	5	2
Work Anxiety	10	9	6	12	5	14	3½	3½	8	1	11	13	7	2
Accidents	5½	11	5½	5½	14	5½	5½	5½	12	5½	13	5½	5½	5½
Absence	1	9	8	7	2	6	5	13	14	4	10	12	11	3
Labour Turn-over	5	8½	10	3	4	12	2	6	14	7	8½	13	11	1
Industrial Unrest	6½	6½	6½	6½	6½	13	6½	6½	14	6½	6½	6½	6½	6½
Sum of Ranks	49½	80½	84	74½	87	99½	42	74½	110	43	81½	102	71½	46½

The effective cost centres generally tended to be reliable as far as meeting production requirements was concerned, to have low costs of manufacture, and to have relatively good standards of workmanship. The members of the work groups, including both supervisors and operatives, tended to have high levels of job satisfaction and low levels of work anxiety. These work groups were comparatively stable as indicated by the rates of absence and labour turnover.

Table 36

Ranking of all Cost Centres on each Variable

Variable	Cost Centre													
	g	i	c	a	m	d	h	b	k	e	e	f	l	i
Output	1½	6	7½	1½	10½	7½	9	4	13	14	10½	5	12	3
Quality	7	4	6	5	3	10	11	2	1	8	14	12	9	13
Costs	3	2	12	1	4	6	8	11	7	10	9	14	5	13
Job Satisfaction of Operatives	5	3	1	7	8	6	4	10½	10½	2	9	12	14	13
Job Satisfaction of Supervisors	3	4	2	7	5	11	8	9	1	14	13	6	12	10
Work Anxiety	3½	1	2	10	7	12	3½	9	11	6	5	14	13	8
Accidents	5½	5½	5½	5½	5½	5½	5½	11	13	5½	14	5½	5½	12
Absence	5	4	3	1	11	7	13	9	10	8	2	6	12	14
Labour Turn-over	2	7	1	5	11	3	6	8½	8½	10	4	12	13	14
Industrial Unrest	6½	6½	6½	6½	6½	6½	6½	6½	6½	6½	6½	13	6½	14
Sum of Ranks	42	43	46½	49½	71½	74½	74½	80½	81½	84	87	99½	102	114

In the less effective cost centres the picture was the completely opposite. For cost centres "c", "e", "f", "l" and "i", performance with respect to output, quality, and costs was generally low. There was a considerable amount of dissatisfaction within these units, and many of the operatives experienced relatively high levels of work anxiety. With a tendency for there to be relatively high rates of both absence and labour turnover, the work groups were relatively unstable.

It may be seen from Table 36 that there were instances in which the general relationship described above did not hold up. For example, it will be noted with cost centre "i" that it was usually reliable in meeting the shop order. This it achieved, however, at the price of poor quality and high costs.

On this evidence it seems that the behaviour of a single criterion can only be really understood in the context of the general situation in a cost centre. It appears that conditions within the situation tend to re-inforce one another. For example, it was noted in Chapter 17 that when absence was high, the supervisor could start the day at the disadvantage of having to abandon his production plan, probably of having to change his machine set-up and therefore inflate his costs of production, and perhaps of having to transfer men onto operation with which they may now be out of touch. Again, if a cost centre had high labour

turnover, employment rates would be high also. If, in addition, there was industrial unrest in the area, the probable length of service of new employees would be short, as noted in Chapter 19, and this in turn would tend to increase the rate of labour turnover. Within this deteriorated situation, as Table 36 suggests, would be the concomitant problems of interrupted production, high manufacturing costs, and low quality standards.

This research points to the general conclusion that the effective sub-organisations will probably have developed processes that tend to be self-generating, so that the more effectively the units function, the more likely it is that they will continue to do so. Conversely, the more ineffective the sub-organisation, the harder it will be for it to break out of its difficulties as an attempt at improvement in any one direction is likely to be thwarted by the inter-relatedness of all the other factors in the situation. If long term improvements are to be achieved, then it is the fundamental issues that need to be identified and solutions to these problems sought.

CHAPTER 21THE "BEFORE-AFTER" STUDY

One of the original aims of the research was to attempt to assess the effect of the introduction of management by objectives into the organisation. The technique which was to have been used in the "before-after" sense has been outlined previously by Knowles (1967). It involves the application of principle components analysis to the large number of variables shown in the earlier part of this report to be relevant to complex organisational situations. An outline of this method is presented in Appendix 34.

This analysis was not carried out, however, as at the end of the 18 months taken up by the field study it was evident that while specific variables, such as the shop order and costs, had been affected within this time, other variables reflecting more fundamental characteristics of the division would not have been significantly changed within a period as short as this. It was therefore decided that it would be uneconomical to gather data on all of the variables, but some historical coverage of criteria such as the shop order, costs, and labour turnover may be of interest.

Achievement of the Shop Order - The division's capacity to meet its production commitments was measured by the extent

to which it met the weekly shop order. The number of machines produced and assembled each week was recorded, and from these output records the percentage achievement of the shop order was calculated. Production performance calculated on this basis is shown in Appendix 35. By inspection it is evident that the division was able to meet its production requirements, and to do this consistently from one week to another.

Costs - The cost performance of the division was assessed by means of expenditures on Direct Labour Losses, Variable Indirect Labour, and Over-time and Night-shift Premiums, with these items being expressed as a percentage of the expenditure on Standard Direct Labour. The derivation of each of these items has been explained more fully in Chapter 12.

Monthly expenditures in the division were recorded and are shown in Appendix 36, which indicates a steady improvement in cost performance over the period of the study.

Labour Turnover - Monthly labour turnover rates were also calculated and are shown in Appendix 37. As may be observed, labour turnover fluctuated over the duration of the research. The comparatively high rates in 1966 correspond to a period of increasing size of the labour force, while the comparatively low rates in the initial part of 1967 were associated with a fall in market orders for the

product. While the division was able to cope with the excess labour partly through internal transfer within the Company, fear of retrenchment also contributed to the low labour turnover during these months.

The above account of the behaviour of this division must be regarded as purely descriptive, and it is in no way suggested that the change in the criteria was due solely to the introduction of management by objectives. The improvements in the division's cost performance and its ability to meet the shop order were undoubtedly influenced by the appointment of the new divisional manager at the beginning of the study, and by the way in which, in the words of one of the production managers, the division "pulled together" before external market conditions led to a fall in orders. The fluctuations in labour turnover, on the other hand, appeared to be influenced in the short term more by the consequences of external factors than by any changes that may have been brought about within the division. It would seem that if the "before-after" model was to be used to assess the effects of organisational change, it would be necessary to measure the behaviour of a larger number of variables, as suggested above, and to record their behaviour over a longer period of time.

PART FIVE

CHAPTER 22RESUME

Management by objectives is a relatively new phrase in the literature of management and the research embodied in this report was concerned primarily with examining some of the characteristics and implications of this approach to management. A review of the literature showed that some of the characteristics of management by objectives were inherent in the principles described by early writers such as Fayol and Urwick, where emphasis was given to adopting a rational approach to management, to identifying ends or objectives so that overall direction would be given to organisational endeavour, to specifying priorities within the framework of objectives, and to deriving realistic plans that would ensure the achievement of the objectives. The emergence of management by objectives as a management principle, however, occurred in the fifties, largely as a result of the work of Drucker and Gordiner, both of whom advocated a critical examination of all areas in which objectives were necessary to safeguard the survival of an organisation. In the last decade considerable interest has been taken by industry in management by objectives and now use of the phrase has become commonplace.

The review of literature also showed that little research had been undertaken in this relatively new area.

The present study therefore examined the introduction of management by objectives into the existing range of management practices within a single industrial organisation. Four clearly definable phases could be identified in this project. The first phase concerned making initial contact with management; the second involved establishing the research with all major groups in the organisation including top and middle management, the supervisors, the shop floor, and the trade unions; the third phase was the period of the ongoing research; and lastly there was the phase of extrication. In the first two phases particular attention was given to gaining the support and sanction of all people likely to be directly associated with the research so that the project would be accepted and would commence on a solid foundation in the organisation. The third phase was one of action research in which the discussion of work problems and the decisions taken led to subsequent action within the organisation. The final phase was a new development in action research and concentrated upon withdrawing the researcher from the organisation while at the same time ensuring that the activities that he had developed were carried on by members of the Company. The field work of the research, covering phases two and three, extended over a period of 18 months.

There will always be differences between the formal organisational objectives discussed in the review of

literature and the actual work objectives of people within the organisation, and one of the central questions in management by objectives is how to make the one kind of objectives consonant with the other. One approach would be for top management to impose the formal objectives upon the people in subordinate positions. Past research, however, has shown that in general authoritarian methods tend to lead to serious organisational inefficiencies which may be avoided if participative or consultative practices be used. The latter type of approach was adopted in this study and the interview method was used to establish work objectives at various levels in the organisation. A non-directive interviewing technique was employed to obtain work objectives of people in subordinate positions, and these descriptions were then discussed by both the subordinate and his superior until agreement between them was reached. Through working up and down the organisation in this pair-wise manner, the aim was to reconcile formal organisational and individual objectives, and to modify both in accordance with realities existing at all levels in the organisation.

The agreed objectives, as well as the corresponding standards of achievement or targets, applied to a given period of time and together they formed an operating plan for the individual manager or supervisor. Performance over the period was then observed and corrective action taken by the individual with respect to deviations from expectation.

At the end of the period a work review session involving the subordinate and his superior was held to discuss performance. Unrealistic standards were amended, and negative variances pointed the way to immediate follow-up action. Areas in which the subordinate needed additional organisational support from his superior were also identified. The session concluded with a re-definition of objectives and targets for the ensuing period of operation.

In working to achieve their objectives and targets some managers and supervisors came to realise that they needed further training in specific areas if they were to improve their effectiveness and achieve their desired level of performance. This development had important implications for the work of the personnel department, for it offered the means of identifying training needs within the organisation. If training needs identified in this way were to be collated by this department, then training programmes could be run to satisfy the immediate training requirements of the whole organisation. In a similar manner formal appraisal methods could be linked to performance. Thus management by objectives could form a common rationale for a number of management practices including training, promotion, and possibly salary administration. In addition, management by objectives offered opportunities for improving organisational communication on the interpersonal level as well as by developing information systems. The overall effect of these

implications of management by objectives is that the personnel department would probably be drawn closer to the heart of operations within the organisation, and its role would change from a static one concerned with implementing formal practices to a more dynamic one closely in touch with live organisational problems. There was a further implication of management by objectives for the principle of management by exception. The definition of objectives led naturally to specifying concrete levels of achievement or targets, which in turn facilitated the identification of those areas in which performance was below the expected standard. On this evidence it seemed that the appropriate route to management by exception was through management by objectives.

The operational aspects of the research just described were supplemented by an analytical study whose main aim was to illustrate the importance of factors of a situational or organisational nature. Past research was reviewed and it was shown that in general factors of this type had some kind of a relationship with certain variables (namely output, quality, costs, job satisfaction of operatives, job satisfaction of supervisors, work anxiety, accidents, absence, labour turnover, and industrial unrest) although in some cases the relationship was slight. When the variables were taken together, however, the relationship was found to be strong. It was found that by means of these variables organisational units could be placed on a scale of effectiveness. These

units could be considered as systems in this regard, for those units which were effective were so with respect to most of the variables, and the less effective units tended to be relatively ineffective on practically every criterion.

This study also showed that the targets corresponding to the objectives described earlier on could be used as criteria of effectiveness, and in this way they could indicate units bedevilled by underlying problems. It seemed that in the management by exception sense attention needed to be directed to the basic problems affecting those less effective units if overall effectiveness was to be raised.

It was originally hoped that these variables could have been used in a "before-after" model to evaluate the effect of the introduction of management by objectives into the organisation. The conclusion on this aspect of the research was that the period of 18 months over which the study extended was too short for there to be changes brought about which would affect factors of a fundamental organisational nature.

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APPENDIX 1STATEMENT OF CORPORATE OBJECTIVES
OF HEWLITT PACKARD

The achievements of an organization are the result of the combined efforts of each individual in the organisation working toward the common objective. If the organisation is to maximise its efficiency and success, there are a number of specific requirements which must be met.

FIRST, the most capable people available must be selected for each assignment within the organisation. Especially in a technical business where the rate of progress is rapid, a continuing programme of education must be undertaken and maintained. Techniques that are good today will be outdated in the future and every person in the organisation from top to bottom must continually be looking for new and better ways to do his work.

SECOND, a high degree of enthusiasm must be encouraged at all levels; in particular, the people in important management positions must not only be enthusiastic themselves, they must be selected so they will engender this enthusiasm among their associates. There can be no place, especially among the people charged with management responsibility, for half-hearted interest or half-hearted effort.

THIRD, even though an organisation is made up of people

fully meeting the first two requirements, it is necessary that all levels work together in unison toward common objectives and avoid working at cross purposes if the ultimate in efficiency and achievement is to be obtained. The first two requirements can be met by careful selection of the people we hire and by consideration of these points in giving them assignments of responsibility.

It has been the policy of the Hewlett Packard Company to encourage people to work toward the common objective, not by using a tight military-type organisation, but, rather, by having overall objectives which are clearly stated and agreed to, and by having a wide latitude of freedom for individual people to work toward those goals in ways they determine best for their own areas of responsibility. For this approach to be effective, it is important that these objectives be fully understood and accepted by all people within the organisation, and that they be reviewed and, if necessary, modified from time to time to be sure they are appropriate for changing business conditions.

The corporate objectives of the Hewlett Packard Company are stated as follows:

1. Objective: Profit

To recognise that profit is the best single measure of our contribution to society, and the ultimate source of our corporate strength. We should attempt to achieve the maximum possible profit consistent with our other objectives.

Men, materials, facilities, money and time are the resources available to us for conducting our business. By applying our skills, we turn these resources into useful products and services. If we do a good job, our customers will pay us more for our products than the sum of our costs in producing and distributing them. This difference, our profit, represents the value we add to the resources we utilise. Thus, our profit is the proper measure of the contribution we make to society.

It is impossible to operate a business for long without making a profit, and so, if a company is to meet its other objectives, it must make a profit in doing so. Our ability to properly serve our customers, to finance growth, to offer our people rewarding employment opportunities, and to make contributions to the community and the society in which we operate all depend directly upon our ability to generate an adequate profit.

In meeting our profit objective we must always be mindful that we are building for the long pull. It is always possible to improve profits for a time by reducing the level of our investment in new product engineering, in customer service and in the other activities which are not essential to our day-to-day performance. But, in the long run we will pay a severe price for overlooking any of these areas. One of our most important tasks is maintaining the proper balance between short-term profit performance, and investment for main-

taining strength in the future.

Since the profit that can reasonably be expected on each product varies with its competitive situation, the unique value of that product, and the capital investment necessary to produce it, the same profit level cannot be expected from each product or from each division or unit of the company.

2. Objective: Customers

To strive for continued improvement in the quality, usefulness and value of the products and services we offer our customers.

The fundamental basis for success in the operation of our business is the job we do in satisfying the needs of our customers. This means that every person in every part of our organisation must think continually in terms of how his activity relates to this central purpose of serving our customers. The concept begins with the generation of new ideas and new technology from which we can develop useful, significant products. These new approaches then form the basis for development of instruments which will solve latent problems of future importance. To be useful to our customers, in the present era of rapid change, these new instruments must be developed quickly.

Furthermore, we must engineer our products so that they can be produced efficiently. Then we must employ manufacturing

techniques which assure our customers the ultimate in quality and economy at the same time. Hewlett Packard customers expect and should receive the finest of craftsmanship and the best in value for their money.

And finally, we must provide our customers with the best possible service. This applies to application engineering assistance before the sale, to expeditious quotation and order handling, to on-time delivery, and most important, to service following delivery. When a customer buys an instrument from the Hewlett Packard family, he should expect not only that it perform well the day he receives it but that it be backed with the best possible service so that he can expect long trouble-free operation.

To build strength for the future we must be customer-orientated in every part of our organisation.

3. Objective: Field of Interest

To concentrate our efforts in the field of instrumentation, continually seeking new opportunities for growth but limiting our involvement to areas in which we have capability and can make a contribution.

The original Hewlett Packard products were electronic measuring instruments. With growth, our product line has expanded until it now includes instruments for chemical and biomedical measurement and analysis. Our ability to develop new techniques for temperature measurement has led us into

the scientific instrument field, and we expect to broaden our involvement in that area through additional contributions. In the future, use of high speed data handling and electronic computational techniques in instrumentation will lead to more complex and detailed application opportunities for us in the measurement field. Thus our growth has led, and will lead, to a continual broadening of our field of interest, but always within the field of instrumentation. We feel that there is ample opportunity for us to meet our future growth objectives within this broad technological area.

The key to H.P.'s prospective involvement in any field of interest is contribution. Our philosophy of diversification and expansion is founded upon the concept of building on our present strength. Every move must be based upon recognition that we have the proven capability to make a contribution in technology and engineering, in manufacturing, or in marketing. Our objectives do not permit us to engage in "me-too" activities.

In order properly to meet this objective, it is important that we place maximum effort on our new product programme, for it is only by continually developing new instruments and new techniques that we can build and maintain a position of leadership. This means we must continually seek new ideas for new and better kinds of instruments.

In a similar way, our manufacturing programme must be

planned and organised so that the newest methods and techniques are quickly applied. We should strive to develop and install manufacturing processes and procedures which contribute to quality, efficiency and economy.

The marketing area also offers opportunity for contribution. We need to investigate new techniques for distributing our products and methods for offering better customer service, both before and after the sale. A contribution in the fields of marketing and manufacturing is often as significant to our customers as is the availability of a unique new product.

4. Objective: Growth

To emphasise growth as a measure of strength and a requirement for survival.

One of the very important problems in a business has to do with growth. In the past we have speculated many times as to what is the optimum size of a company. I have heard other people do likewise. Some people feel that when a company has reached a certain size there is no point in letting it grow any further. Other people feel that they want to develop as big an empire as possible, and bigness seems to be one of their main objectives.

We do not believe that growth is important for its own sake; however, for at least two basic reasons, continuous growth is essential for us to achieve our other objectives.

In the first place, we are involved in the area of advanced technology that is intimately related to the expansion and growth of our economy. To remain static in this field is to lose ground. We cannot maintain a position of strength and leadership in our field without growth.

The second reason for the importance of growth concerns our people. To continue to have the kind of an organisation we now enjoy depends upon attracting and holding high caliber people. These individuals will align their future only with a company which offers them the opportunity for personal progress. This will occur as a result of a programme of constructive growth.

Since our growth stems largely from the important contributions we make in the fields of instrumentation, we must apply our resources not where they will yield the best return on a short term, but where they will build strength for the future.

5. Objective: Employees

To provide employment opportunities for H.P. people that include the opportunity to share in the company's success which they help make possible. To provide for them job security based on their performance, and to provide the opportunity for personal satisfaction that comes from a sense of accomplishment in their work.

We have been generally proud of our employment policy, or rather the result of that policy, in terms of the kind of people we have in our organisation; their performance and

their attitude toward their job and toward the company. In the field of personnel, it is my opinion that the general policies and the attitude of management people toward the employee are more important than specific details of the personnel programme. Personnel relations will be good if the people have faith in the motives and integrity of the company. Personnel relations will be poor if they do not.

The opportunity to share in the success of the company is evidenced by our generally above-average wage and salary level, through the operation of our incentive plan, our retirement programme, and other employee benefits. The objective of job security is shown in a number of ways. We have attempted to avoid large ups and downs in our production programme because this method of operation would require that we hire people for short periods of time and lay them off when we do not need them. It is evidenced by the fact that we have attempted to be lenient with some of our older employees who, as we have grown, have not measured up to the standards we might have reason to expect. But, in the interest of those employees who are carrying their full load and who are growing with the company, we have not felt committed to accept anything like an absolute tenure status, nor do we feel that this policy implies that we should recognise seniority except in cases where other factors are reasonably favourable.

We have stated a number of times that we believe it is

important for people to enjoy their work at the Hewlett Packard Company. This means they should have the opportunity to achieve a large degree of personal satisfaction through accomplishment. We must make it possible for our people to feel a real sense of accomplishment in their work and make sure they receive the recognition they need and deserve.

6. Objective: Organisation

To maintain an organisational environment which fosters individual motivation, initiative and creativity, and a wide latitude of freedom in working toward established objectives and goals.

In our discussions of operating policies, we often refer to the concept of "management by objective". By this we mean that insofar as possible each individual at every level in the organisation should make his own plans to achieve company objectives and goals. After receiving approval of his plans from his supervisor, he should be given a wide degree of freedom to work within the limitations imposed by these plans, and by our general corporate policies. Finally, his performance should be judged on the basis of how well he achieves the goals he helped establish.

To be successful, the "management by objective" philosophy requires that each employee understands corporate objectives, goals and policies. Thus a primary H.P. management responsibility is the communication of these matters.

It should be pointed out that successful practice of "management by objective" is a two-way street. The concept imposes upon management the responsibility to communicate objectives, goals and policies throughout the organisation. It also imposes on every employee the responsibility to take sufficient interest in his work to want to plan it; to propose new and untried solutions to old problems; to stick his neck out when he has something to contribute. "Management by objective" offers opportunity for individual freedom and contribution; it also imposes an obligation for everyone to exercise initiative and enthusiasm.

7. Objective: Citizenship

To meet the obligations of good citizenship by making contributions to the community and to the institutions in our society which generate the environment in which we operate.

It has been increasingly apparent in the past few years that business institutions have responsibility to the society in which they exist beyond making a profit for their stockholders. We have a freedom of action which is the direct result of the American type of government. Many of the technical developments which we are now using have come about because the frontiers of knowledge have been pushed forward by our universities. A large part of the special capability which our people use in everyday work is the result of their education in our schools and colleges. Our churches play a large part in the moral training which we rely on every day

without giving the matter a second thought. This points up the fact that the Hewlett Packard Company as a business should recognise its obligation to support these institutions as one of its objectives.

It is important that everyone in the organisation understand these objectives and continually orientate his work to help us achieve them. These basic objectives serve not only as a guide in our individual work, in the decisions we make and the direction in which we place emphasis; these objectives also provide a controlling guidance in the selection of new people we bring into our organisation, and in the evaluation of all of our management people.

In this regard I want to emphasise particularly that we must evaluate our management people at all levels, not just for the profit they produce in their division or unit, but we must evaluate them as well by how adequately all of these other objectives are being met in their area of responsibility. In this matter, the objective of profit is an important requirement, but the objective of making a contribution in terms of the best in quality, performance, service, and economy, are also important requirements, and none is sufficient without the others. It is our intent that we give highest recognition to those people who can build long-term strength into their area of responsibility.

APPENDIX 2

GENERAL ELECTRIC COMPANY OBJECTIVES

1. To carry on a diversified, growing, and profitable world-wide manufacturing business in electrical apparatus, appliances, and supplies, and in related materials, products, systems, and services for industry, commerce, agriculture, government, the community, and the home.

2. To lead in research in all fields of science and in all areas of work relating to the business, including managing as a distinct and a professional kind of work, so as to assure a constant flow of new knowledge and of resultant useful and valuable new products, processes, services, methods, and organisational patterns and relationships; and to make real the Company theme that "Progress is our most important Product".

3. To operate each business venture to achieve its own favourable customer acceptance and profitable results; especially by planning the product line or services through decentralised operating management, on the basis of continuing research as to markets, customers, distribution channels, and competition, and as to product or service features, styling, price range, and performance for the end user, taking appropriate business risks to meet changing customer needs and to offer customers timely choice in pro-

duct and service availability and desirability.

4. To design, make, and market all Company products and services with good quality and with inherent customer value, at fair prices for such quality and value.

5. To build public confidence and continuing friendly feeling for products and services bearing the Company's name and brands through sound, competitive advertising, promotion, selling, service and personal contacts.

6. To provide good jobs, wages, working conditions, work satisfactions and opportunities for advancement conducive of most productive performance and also the stablest possible employment, all in exchange for loyalty, initiative, skill, care, effort, attendance, and teamwork on the part of employees - the contributions of individual employees that result in "Value to the Company" and for which the employee is being paid.

7. To manage the enterprise for continuity and flow of progress, growth, profit, and public service through systematic selection and development of competent managerial personnel for effective leadership through persuasive managerial planning, organising, integrating, and measuring for best utilisation of both the human and material resources of the business; using a clear and soundly designed organisation structure, and clearly expressed objectives and policies, as a vehicle for freeing the abilities, capacities, resource-

fulness, and initiative of all managers, other professional workers and all employees for dynamic individual efforts and teamwork, encouraged by incentives proportionate to responsibilities, risks, and results.

8. To attract and retain investor capital in amounts adequate to finance the enterprise successfully through attractive returns as a continuing incentive for wide investor participation and support; securing such returns through sound business and economic research, forecasting, planning, cost management, and effectively scheduled turnover of all assets of the enterprise.

9. To co-operate both with suppliers and also with distributors, contractors, and others facilitating distribution, installation, and servicing of Company products, so that Company efforts are constructively integrated with theirs for mutually effective public service and competitive, profitable progress.

10. To adapt Company policies, products, services, facilities, plans, and schedules to meet continuously, progressively, foresightedly, imaginatively, and voluntarily the social, civic, and economic responsibilities commensurate with the opportunities afforded by the size, success, and nature of the business and of public confidence in it as a corporate enterprise.

APPENDIX 3(a)

INTRODUCTORY LETTER TO SHOP
FLOOR PERSONNEL

Letter to Each Member of the Artisan Unit

Dear

The University of Edinburgh is conducting a research project in the Artisan Unit. In this research it is hoped that general day-to-day work problems will be more clearly understood, and thus solved. If this is possible it is hoped that the solutions will be of benefit to all, and perhaps of value to industry at large.

It is stressed that in doing this work the University is not being paid by management, nor by the unions. In being independent, the University hopes that what will result is a type of "doctor-patient" relationship between the researcher and the members of the Artisan Unit, where complete confidence can exist.

In the research I hope to deal with all levels of personnel. At present certain aspects of management are being looked at. Later, it is hoped that problems on the shop floor will be studied. Finally, it is also hoped that union matters will be examined. The overall aim is to study problems which either exist, or are thought to exist, or exist but are not recognised.

The next stage of the project will be to ask people to fill in questionnaires. The results obtained will be confidential between the individual and myself, and will not be given to anyone else. The analysis of the results will be shown as soon as possible to the group of people concerned. This analysis will not be shown to others, or published in articles by the University, unless the people involved give their permission. At other times I hope to talk to individual people about particular problems. Any information given in conversation to me in this way will be treated with the utmost confidence.

The project is to last about two years. I hope to be at the Company two days per week on the average. If you can understand my Australian accent, I will be only too glad to answer any immediate questions about the study.

Regards,

Mike Knowles.

APPENDIX 3(b)

FOLLOW-UP LETTER TO SHOP
FLOOR PERSONNEL

THE UNIVERSITY OF EDINBURGH

To Members of the Artisan Unit

In my last letter it was briefly said that the University hoped to examine all types of work problems in the Artisan Unit. Now, as a starting point, we would like to know exactly what people think about their jobs. In order to find this out, a number of questions have been drawn up about various aspects of your work. We hope that these questions will be answered very frankly. Of course, no one has to answer the questions unless they want to.

Certain members from each Cost Centre will be asked to hand out lists of questions to every person. When they are filled in, the answers will be collected by the same members who will hand them on to me. The results of the questions will then be drawn up.

The results will be confidential. They will show what each Cost Centre thinks about the jobs in that area. These results will be told only to the group of people in that particular area, and will not be shown to anyone else unless permission is given by the group.

M.C. Knowles

APPENDIX 3(c)

LETTER RELATING TO OBTAINING OBJECTIVES
OF SHOP FLOOR PERSONNEL

UNIVERSITY OF EDINBURGH

Dear ,

Last year I handed out a set of questions to try and find out what people want from work. Although it was found that people often wanted very different things, there were other points on which most people had the same opinion.

Since then, managers have been asked similar questions. Again, while there were some different points of view, after several talks between managers, we were able to come up with a number of things upon which they all agreed.

Next, we talked to supervisors to see what they wanted from work. Any differences from what the managers wanted were discussed, and this produced a list of points upon which everyone agreed.

Now I would like to bring the research back to the shop floor to link up with the work done last year. Here, I would like to talk to volunteers to ask them what they want from their jobs. Everything discussed will be confidential. From talking to a number of people in an area it may be possible to come up with things that the whole section wants to see done. These points may then be discussed with the supervisors. In this way we want to see if there is a common basis for work in the Artisan Unit between managers, supervisors and operatives.

I have had several meetings with the officials of both Unions and they are willing to let the research be done. Also, management has said that time spent in interview will be paid at a 75 unit-hour. Finally, it is stressed that to be interviewed is purely a voluntary matter; everyone will be asked, but no one will be interviewed unless he or she wants to be.

Yours sincerely,

APPENDIX 4

STATEMENT OF OBJECTIVES FORM

Purpose

The purpose of this document is to assist communications between managers at all levels and their immediate superior. It is a device to reduce inconsistencies in the demands made upon a manager by his superior and by the Company. It highlights accurately objectives and priorities. This document may not solve all the problems, but at the very least it will bring them out into the open.

This document becomes a charter between a manager and his superior under which that manager operates.

Instructions on How to Complete Form

- 1) Each manager should complete this document in duplicate - one copy he will retain, while the other will be retained by his immediate superior.
- 2) Each manager should fill in his name, his superior's name, department, division, and the date on completion.
- 3) Items A to J should then be completed by each manager to the best of his knowledge. The objectives, while written briefly, should be as clear as possible.
- 4) As a guide, items should be written in so that measurable yardsticks are apparent, ie. (Item B) "Current objectives of my job".
To reduce indirect costs by 2% over the next three months.
To increase production in the XYZ product by 5%.
To introduce and maintain a systematic maintenance programme.
To examine and overhaul 10 machine tools per week.
- 5) Item K should be completed after an interval of three months or time interval agreed upon by the manager and superior.
- 6) Use the back of the sheet if space at front is not sufficient.
- 7) The completed documents become the property of the manager and his superior for their use only and do not require to be further copied or circulated outwith the area under their control.

From.....

To.....(Superior)

Statement of Objectives

A. Objectives of Superior's job.

B. Objectives of my job.

C. Performance standards required to do my job.

D. Action necessary to do above.

E. Major obstacles within my unit road-blocking my performance.

F. Action by my superior which helps my performance.

G. Action by my company which helps my performance.

H. Action by my superior which hinders my performance.

I. Action by my company which hinders my performance.

J. Proposed course of action over next six months to attain objectives.

K. Analysis of action taken against original objectives proposed.

Signed by Manager completing.....

Reviewed and accepted by superior (with Manager in attendance)

Superior's signature..... Date.....

APPENDIX 5(a)

GOAL

To manufacture serving-machine parts in the correct quantities, at the correct price, and in the correct time.

OBJECTIVES

Objectives of subordinates - to have the efforts of the eight supervisors pointing in the same direction.

Quantity - to ensure that the quantity of parts produced meets production commitments.

Quality - to improve the quality of parts manufactured so that the standard of the finished product is above that of competitors;

to maintain liason with Building Department and Quality Control Manager to investigate the situation when parts machined to specification are not buildable because of a clash in tolerances etc.

Costs - to produce product parts at a price that will be attractive to customers in a competitive market.

Training - to develop all supervisors so that they are suitable for promotion to a managerial position;

to develop the eight supervisors to be self-reliant, and effective members of a management team.

TARGETS

Quantity

Stock - immediately: to be 2 days in front of the Building Department on all parts, and 1 week in front on at least 60% of parts;

by end of year: to get a week's stock in front on all parts.

Agency Orders - immediately: to reduce backlog to 6 months on all parts;

by end of year: to be less than 3 months behind on all orders.

Quality

Quality Level - to have an acceptable quality level of 95% on all parts as determined by quality audit and staff inspectors.

Machine specification - to reduce the number of instances where parts machined to specification do not assemble with the mating part.

Training

Factory TWI Course - to have the one remaining supervisor attend this course immediately.

On-the-job Training - in addition to the 2 supervisors suitable for promotion at present, to have another 2 ready for promotion by July.

COSTS

Description

Weekly Budget Figure (£s)

Areas

1. Direct Labour Losses	11	21	31	41	51	61	71	81
2. Hourly Payroll	29	30	59	28	75	37	40	19
3. Premiums	149	147	100	64	126	118	154	35
Sub-total	10	7	15	7	12	9	20	5
4. Employee Benefits	188	184	174	99	213	164	214	59
5. Standard Tools, Jigs, Dies, Gauges, etc.	60	55	73	40	83	50	83	29
6. Special Tooling	29	37	30	12	71	23	57	19
7. Production Supplies and Services	5	-	-	-	9	5	-	-
8. Jobbing Charges	68	72	103	40	140	81	113	49
9. Utilities	32	32	42	29	57	29	55	21
10. Scrap	6	8	8	3	16	8	10	6
Total	22	22	30	20	39	20	39	11
Direct Labour	410	410	460	243	628	380	571	191
	164	164	218	161	277	139	286	108

APPENDIX 5(b)

GOAL

To meet customer requirements as efficiently and economically as is consistent with resources available.

OBJECTIVES

Quantity - to meet the shop order as set by the Material Control Programme.

Quality - to manufacture components and sub-assemblies to the requisite quality standards.

Costs - to work within the budget;

to submit cost improvements proposals regularly.

Selection - to select subordinates so that, with training, some will be capable of promotion.

Training - to assume responsibility for the training of immediate subordinates, or for making recommendations to the Product Manager when outside training is necessary.

Industrial Relations - to keep good relations with unions, yet maintain the initiative in labour relations and control of the work situation.

TARGETS

Quantity - to meet M.O.S. component requirements within the specified lead time.

Quality - (a) quality audit - the quality rating of the various cost centres to be 100%,

- (b) measured repairs and re-work - to be reduced below the budgeted figures for the 8 cost centres (ie. 2.44, 1.83, 7.34, 3.73, 1.81, 5.03, 2.10, and 1.85%),
- (c) unmeasured repairs and re-work - to be reduced below the budgeted figures for the 8 cost centres (ie. 0.61, 3.05, 4.59, 0.62, 1.81, 2.88, 4.90, and 0.93%).

Costs - for budget figures and percentages to meet requirements below:

COSTS

Description

Weekly Budget Figure (€s)

Areas

	11	21	31	41	51	61	71	81
1. Direct Labour Losses	29	30	59	28	75	37	40	19
2. Hourly Payroll	149	147	100	64	126	118	154	35
3. Premiums	10	7	15	7	12	9	20	5
Sub-total	188	184	174	99	213	164	214	59
4. Employee Benefits	60	55	73	40	83	50	83	29
5. Standard Tools, Jigs, Dies, Gauges, etc.	29	37	30	12	71	23	57	19
6. Special Tooling	5	-	-	-	9	5	-	-
7. Production Supplies and Services	68	72	103	40	140	81	113	49
8. Jobbing Charges	32	32	42	29	57	29	55	21
9. Utilities	6	8	8	3	16	8	10	6
10. Scrap	22	22	30	20	39	20	39	11
Total	410	410	460	243	628	380	571	191
Direct Labour	164	164	218	161	277	139	286	108

APPENDIX 5(c)

GOAL

To manufacture machine parts in the correct quantities, at the correct price, and in the correct time.

OBJECTIVES

Objectives of Subordinates - to have the efforts of the eight supervisors pointing in the same direction.

Quantity - to ensure that the quantity of parts produced meets production commitments.

Quality - to improve the quality of parts manufactured so that the standard of the finished product is above that of competitors; to maintain liaison with the Building Department and Quality Control Manager to investigate the situation where parts machined to specification are not buildable because of a clash in tolerances etc.

Costs - to produce parts at a price that will be attractive to customers in a competitive market.

Industrial Relations - to keep good relations with seniors, yet maintain the initiative in labour relations and control of the work situation.

Selection and Training - to select and develop all supervisors so that they are suitable for promotion to a managerial position; to develop the eight supervisors to be self-reliant, and effective members of a management team.

TARGETS

Quantity

Stock - immediately: to be 2 days in front of the Building Department ~~on all~~ parts, and 1 week in front on at least 60% of parts;

by end of year: to get a week's stock in front on all parts.

Agency Orders - immediately: to reduce backlog to 6 months on all parts;

by end of year: to be less than 3 months behind on all orders.

Quality

Quality Level - to have an acceptable quality level of 95% on all parts as determined by quality audit and staff inspectors.

Machine Specifications - to reduce the number of instances where parts machined to specification do not assemble with the mating part.

Costs

Budget - to operate within the budget, see sheet attached.

Cost Improvements - to submit cost improvements proposals to the value of £8,000.

Training

Factory T.W.I. Course - to have the one remaining

supervisor attend this course immediately.

On-the-job Training - in addition to the two supervisors suitable for promotion at present, to have another two ready for promotion by July.

COSTS

Description

Weekly Budget Figure (fs)

Areas

1. Direct Labour Losses	11	21	31	41	51	61	71	81
2. Hourly Payroll	29	30	59	28	75	37	40	19
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10. Scrap	6	8	8	3	16	8	10	6
Total	22	22	30	20	39	20	39	11
Direct Labour	410	410	460	243	628	380	571	194
Direct Labour	164	164	218	161	277	139	286	108

APPENDIX 6(a)

GOAL

To achieve the shop-order at an economical level of costs, and within these cost limits maintain the desired standard of quality.

OBJECTIVES

Quantity - to meet shop-order commitments on all lines.

Quality - to maintain quality by increasing frequency of inspection by staff inspectors;

to increase quality consciousness of operatives.

Costs - to meet budget commitments;

to reduce scrap and re-work.

Human Relations - to achieve better human relations by increasing harmony between operatives and supervisors within areas, and by decreasing friction between supervisors of different areas;

to mould employees into a co-operative working team.

House-keeping - to keep area in a clean and tidy condition.

Plant Maintenance - to introduce plant maintenance on a roster basis to reduce down-time and inconvenience of hold-ups on the building line, and thus prevent inflation of standard labour costs.

Inventory - to establish buffer stocks on all classes of

machines to ensure a constant flow of any variety to the customer without delay.

TARGETS

Quantity - to meet the weekly Building Machine Programme:

Type of Machine	<u>29k</u>	<u>188k</u>	<u>195k/196k</u>	<u>331k</u>	<u>451k</u>	<u>Total</u>
Number	75	250	350	220	70	965

Quality - 20 demerits on all classes of machines.

Costs - to achieve budget figures, see sheet attached.

House-keeping - by October to have stock boxes set up adjacent to their respective sub-assembly areas or building areas.

Plant Maintenance - to appoint a skeleton staff (2-3 people) with high skill in Fitting, Turning, etc., to maintain better machinery conditions.

Inventory - to establish 1 week's buffer stock by end of June.

Description	Weekly Budget Figures (£s)				% to Direct Labour			
	<u>Cost Centres</u>				<u>Cost Centres</u>			
	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>
1. Direct Labour Losses	63	52	175	65	26.36	25.11	49.00	26.65
2. Hourly Payroll	71	95	83	63	29.70	45.89	23.25	25.82
3. Premiums	20	19	14	15	8.36	9.18	3.92	6.15
Sub-total	154	166	272	143	64.42	80.18	76.17	58.62
(Target)	-	-	-	-	(55.00)	(77.00)	(70.00)	(65.00)
4. Employee Benefits	64	59	103	67	26.78	28.50	28.85	27.46
5. Standard Tools, Jigs, Dies, Gauges, etc.	35	28	4	3	14.64	13.52	1.12	1.23
6. Production Supplies and Services	43	37	84	38	18.00	17.88	23.53	15.57
7. Maintenance - Plant - Outside Purchase	-	2	-	1	-	0.97	-	0.41
8. Jobbing Charges	50	44	82	45	20.92	21.26	22.97	18.44
9. Utilities	20	25	15	4	8.37	12.08	4.20	1.64
10. Scrap	57	50	24	12	23.85	24.16	6.72	4.92
Total	423	411	584	313	176.98	198.55	163.56	128.29
Direct Labour	239	207	357	244	100.00	100.00	100.00	100.00

APPENDIX 6(b)

GOAL

To meet customer requirements as efficiently and economically as is consistent with resources available.

OBJECTIVES

Quantity - to meet the shop-order as set by the machine building programme.

Quality - to build machines to the requisite quality standards.

Costs - to work within the budget;

to submit cost improvements proposals regularly.

Selection - to select subordinates so that, with training, some will be capable of promotion.

Training - to assume responsibility for the training of immediate subordinates, or to make recommendations to the Product Manager when outside training is necessary.

Industrial Relations - to keep good relations with unions, yet maintain the initiative in labour relations and control of the work situation.

TARGETS

Quantity - to produce 965 machines per week.

Quality - (a) machine audit - the number of demerits per machine not to exceed 25 at the present time, and to be reduced to 20 by the end of the year.

- (b) measured repairs and re-work - for areas 1408/31 and 1408/41, no more than 5% and 4% respectively.
- (c) unmeasured repairs and re-work - for areas 1408/31 and 1408/41, no more than 10% and 8% respectively.
- (d) parts audit rating - 90%.

Costs - for budget figures and percentages to meet requirements below:

<u>Description</u>	<u>Weekly Budget Figures (£s)</u>				<u>% to Direct Labour</u>			
	<u>Cost Centres</u>				<u>Cost Centres</u>			
	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>
1. Direct Labour Losses	63	52	175	65	26.36	25.11	49.00	26.65
2. Hourly Payroll	71	95	83	63	29.70	45.89	23.25	25.82
3. Premiums	20	19	14	15	8.36	9.18	3.92	6.15
Sub-total	154	166	272	143	64.42	80.18	76.17	58.62
(Target)	-	-	-	-	(55.00)	(77.00)	(70.00)	(65.00)
4. Employee Benefits	64	59	103	67	26.78	28.50	28.85	27.46
5. Standard Tools, Jigs, Dies, Gauges, etc.	35	28	4	3	14.64	13.52	1.12	1.23
6. Production Supplies and Services	43	37	84	38	18.00	17.88	23.53	15.57
7. Maintenance - Plant - Outside Purchase	-	2	-	1	-	0.97	-	0.41
8. Jobbing Charges	50	44	82	45	20.92	21.26	22.97	18.44
9. Utilities	20	25	15	4	8.37	12.08	4.20	1.64
10. Scrap	57	50	24	12	23.85	24.16	6.72	4.92
Total	423	411	584	313	176.98	198.55	163.56	128.29
Direct Labour	239	207	357	244	100.00	100.00	100.00	100.00

APPENDIX 6(c)

GOAL

To achieve the shop-order at an economical level of costs, and within these limits maintain the desired standard of quality.

OBJECTIVES

Quantity - to meet shop order commitments on all lines;
to establish buffer stocks on all classes of machines to ensure a constant flow of any variety to the customer without delay.

Quality - to improve quality, and to increase quality consciousness of operatives.

Costs - to meet budget commitments;
to reduce scrap and re-work.

Human Relations - to mould employees into a co-operative working team;

to decrease friction between supervisors of different areas; and

to achieve better human relations by increasing harmony between operatives and supervisors, yet maintain the initiative in union matters.

Selection and Training - to select and develop supervisors to be suitable for promotion.

House-keeping - to keep area in a clean and tidy condition.

TARGETS

Quantity

Shop-order - to meet the weekly Building Machines Programme in terms of variety and quantity.

Stock - to establish 1 week's buffer stock by end of June.

Quality

Machine Audit - the number of demerits per machine not to exceed 20.

Parts Audit Rating - of 90%.

Costs

Budget - to achieve budget figures, see sheet attached.

Cost Improvements - to submit cost improvements proposals to the value of £6,000.

House-keeping - by October to have stock boxes set up adjacent to their respective sub-assembly areas or building areas.

Description	Weekly Budget Figures (£s)				% to Direct Labour			
	Cost Centres				Cost Centres			
	11	21	31	41	11	21	31	41
1. Direct Labour Losses	63	52	175	65	26.36	25.11	49.00	26.65
2. Hourly Payroll	71	95	83	63	29.70	45.89	23.25	25.82
3. Premiums	20	19	14	15	8.36	9.18	3.92	6.15
Sub-total	154	166	272	143	64.42	80.18	76.17	58.62
(Target)	-	-	-	-	(55.00)	(77.00)	(70.00)	(65.00)
4. Employee Benefits	64	59	103	67	26.78	28.50	28.85	27.46
5. Standard Tools, Jigs, Dies, Gauges, etc.	35	28	4	3	14.64	13.52	1.12	1.23
6. Production Supplies and Services	43	37	84	38	18.00	17.88	23.53	15.57
7. Maintenance - Plant - Outside Purchase	-	2	-	1	-	0.97	-	0.41
8. Jobbing Charges	50	44	82	45	20.92	21.26	22.97	18.44
9. Utilities	20	25	15	4	8.37	12.08	4.20	1.64
10. Scrap	57	50	24	12	23.85	24.16	6.72	4.92
Total	423	411	584	313	176.98	198.55	163.56	128.29
Direct Labour	239	207	357	244	100.00	100.00	100.00	100.00

APPENDIX 7(a)

GOAL

To achieve the correct amount of production and the right standard of quality, and to see that there is as little union trouble as possible.

OBJECTIVES

Production - to achieve the shop order and agency orders.

Quality - to have production meet quality control specifications.

Unions - to eliminate the cause of unions failing to agree.

Training - to develop the supervisor to get problems before they arrive as a union case.

Setters' Scheme - to instal the Setters' Incentive Scheme and to get it working on a correct basis.

Stores - in the Store, to have set-up cards containing all tools, gauges, and cycle-times for jobs.

TARGETS

Unions - to reduce the number of Failures-to-agree to an acceptable level.

APPENDIX 7(b)

GOAL

To achieve the correct amount of production and the right standard of quality, and to see that there is as little industrial relations trouble as possible.

OBJECTIVES

Production - to achieve the shop order and agency orders.

Quality - to have production meet quality control specifications.

Costs - to meet the budget as it varies with the sales forecast.

Industrial Relations - to eliminate the cause of Failures-to-agree.

Training - to develop the supervisor to solve problems before they arrive as a union case.

Setters' Scheme - to instal the Setters' Incentive Scheme and to get it working on a correct basis.

Stores - in the store, to have set-up cards containing all tools, gauges, and cycle-times for jobs.

TARGETS

Production - to clear outstanding agency orders within 3 months.

Quality - for % of lots rejected not to exceed 15.

Costs - to meet the budget.

Setters' Scheme - to be installed in 3 months.

Stores - to have 75% of cards completed in 3 months.

APPENDIX 8(a)

Goal

To make a profit.

Objectives

Attitudes - to correct attitudes of supervisors so that they use parts in a more positive way to get the machines built.

Quality - to develop quality consciousness with respect to pertinent points of quality.

Discipline - to tighten up supervision on the shop floor.

Morale - to support operatives when they feel they have a legitimate grievance.

The following points were added in the next interview.

Objectives

Production - to meet the shop order.

Quality - to build machines of a quality standard acceptable to the customer.

Training - to develop the supervisors to take more responsibility;

to modify the attitudes of supervisors so that they use parts in a more positive way to get the machines built.

Co-operation between Departments - to make the Department more approachable, and to develop confidence of other Departments in the Assembly Department.

In the third interview further objectives were specified.

Objectives

Production - To reduce lost production time by measuring and analysing machine breakdown.

Costs - To work towards the achievement of the budget.

Additions made in the next interview were as follows:

Objectives

Production - To meet the shop order.

Quality - To build machines of a quality standard acceptable to the customer.

Plant Maintenance - To draw up a plant maintenance programme to reduce the number of machine breakdowns.

In the next interview the question of targets was considered and the following standards were suggested by the manager.

Targets

Production - To meet the weekly shop order.

Quality - To reduce rejected parts to a level of 6%.

At this stage the manager was satisfied that his objectives had been comprehensively covered and his final description of them appears in appendix 8(p). Perusal of this description indicates that this manager was placing more emphasis on quality than were the other departmental managers. This reflected partly situational factors in that the manager was in charge of the assembly of all machines in the division,

and partly his personal interest in engineering.

Next the discussion of these objectives with his superior was held. The superior acknowledged the merits of some of the objectives, and other points considered in this interview were costs, quality, operative training and absenteeism. The need to check the practicability of individual budget items was agreed upon, as was the need to have assembled machines whose quality standards were neither too high nor too low. As a result of this discussion the following points were added.

Objectives

Operative Training - To develop flexibility of the labour force by increasing the skill qualifications of operatives.

Absenteeism - To increase discipline with regard to absenteeism.

Targets

Costs - To check individual budget items so that the budget is more realistic.

The final description of the objectives appears in appendix 8(c).

Some Characteristics of the Description of the Objectives

By using the unstructured interview it was possible to

APPENDIX 8(b.)

GOAL

To make a profit.

OBJECTIVES

Production - to meet the shop order;
to reduce lost production time by measuring and analysing machine breakdowns.

Quality - to build machines to a quality standard acceptable to the customer;
to develop quality consciousness in the department with respect to pertinent points of quality.

Costs - to work towards the achievement of the budget.

Training - to develop the supervisors to take more responsibility;
to develop the supervisors so that they use parts in a more positive way to get the machines built.

Morale - to support operatives when they feel they have a legitimate grievance.

Co-operation between Departments - to make the department more approachable, and to develop confidence of other departments in the Assembly Department.

Plant Maintenance - to draw up a plant maintenance programme to reduce the number of machine breakdowns.

TARGETS

Production - to meet the shop order.

Quality - to reduce rejected parts to a level of 6%.

APPENDIX 8(a)

GOAL

To make a profit.

OBJECTIVES

Production - to meet the shop order;
to reduce lost production time by measuring and analysing machine breakdowns.

Quality - to build machines to a quality standard acceptable to the customer;

to develop quality consciousness in the department with respect to pertinent points of quality.

Costs - to work towards the achievement of the budget.

Training - to develop the supervisors to take more responsibility;

to develop the supervisors so that they use parts in a more positive way to get the machines built;

to develop flexibility of the labour force by increasing the skill qualifications of operatives.

Morale - to support operatives when they feel they have a legitimate grievance.

Co-operation between Departments - to make the department more approachable, and to develop confidence of other departments in the Assembly Department.

Plant Maintenance - to draw up a plant maintenance programme to reduce the number of machine breakdowns.

Absenteeism - to increase discipline w.r.t. absenteeism.

TARGETS

Production - to meet the shop order.

Quality - to reduce rejected parts to a level of 6%.

Costs - to check individual budget items so that the budget is more realistic.

Absenteeism - to reduce rate to 4 - 5%.

APPENDIX 9(a)

GOAL

To get production figures to the stage where parts are in a stock position in the store, and to achieve this economically.

OBJECTIVES

Production - to ensure a free flow of parts to the Building Area Parts Stores by increasing the batch quantities; to clear outstanding (1965) agency orders.

Quality - to achieve a general improvement by increasing the quality rating as measured by the quality audit.

Costs - to achieve budget figures; to generate cost improvements.

Building - to establish a Jig and Fixture store with a view to implementing the Setters' Incentive Scheme.

TARGETS

Quantity - to meet parts orders as determined by the Building Programme;

to have two weeks' stock with 75% of current production parts within next 3 months;

to clear up 1965 agency orders by first week in June;

in 6 months' time to be clearing agency orders within a month of receipt of orders.

Quality - to get an average quality rating of 90% in all areas.

Costs -- to meet budget figure below;

cost improvements to value of £9,000.

Building - to have Jig and Fixture store under way by August.

<u>Description</u>	<u>Weekly Budget Figures (£s)</u>					<u>% to Direct Labour</u>				
	<u>Cost Centres</u>					<u>Cost Centres</u>				
	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>51</u>	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>51</u>
1. Direct Labour Losses	21	46	56	35	72	26.92	22.54	24.13	21.35	24.08
2. Hourly Payroll	29	16	75	90	90	37.18	7.84	32.33	54.88	30.10
3. Premiums	4	8	5	5	5	5.13	3.92	2.15	3.05	1.67
Sub-total	54	70	136	130	167	69.23	34.30	58.61	79.28	55.85
4. Employee Benefits	24	49	61	49	82	30.77	24.02	26.29	29.88	27.42
5. Standard Tools, Jigs, Dies, Gauges, etc.	14	41	41	29	49	17.95	20.09	17.68	17.69	16.39
6. Production Supplies and Services	34	83	42	28	55	43.59	40.69	18.10	17.07	17.72
7. Jobbing Charges	15	39	46	32	59	19.23	19.12	19.83	19.51	19.73
8. Utilities	4	12	5	10	6	5.13	5.88	2.16	6.10	2.01
9. Scrap	11	28	31	22	40	14.10	13.43	13.36	13.41	13.38
Total	156	322	362	300	456	200.00	157.83	156.03	182.94	152.50
Direct Labour	78	204	232	164	299	100.00	100.00	100.00	100.00	100.00

APPENDIX 9(b)

GOAL

To increase the overall efficiency of the Department, to effect an increase in the quality of products, and to increase productivity per man.

OBJECTIVES

Production - to ensure a free flow of parts to the Building Area Parts' Stores by increasing the batch quantities;

to establish stocks of finished production parts in stores wherever possible.

Quality - to achieve a general improvement by increasing the quality rating as measure by the quality audit.

Costs - to achieve budget figures;

to further cut operating costs and effect cost improvements by changes of methods and re-organisation of plant and labour.

Building - to establish a Jig and Fixtures Store containing complete set-ups of each operation, thus making it possible to implement a Setter Incentive Scheme, to effect a possible reduction of indirect labour, and to maintain the efficiency of the Jigs, Fixtures and Tooling.

TARGETS

Quantity - to meet parts' orders as determined by the

Building Programme;

to have adequate stocks with 75% of current production parts within next 3 months;

to clear outstanding 1965 agency orders by end of June;

to be in a position to supply all future agency orders within a month of the receipt of the order.

Quality - to get an average quality rating of 90% in all areas.

Costs - to meet budget figures below;

to submit cost improvements to the value of £9,000.

Building - to have Jig and Fixture store under way by August.

<u>Description</u>	<u>Weekly Budget Figures (Rs)</u>					<u>% to Direct Labour</u>				
	<u>Cost Centres</u>					<u>Cost Centres</u>				
	11	21	31	41	51	11	21	31	41	51
1. Direct Labour Losses	21	46	56	35	72	26.92	22.54	24.13	21.35	24.08
2. Hourly Payroll	29	16	75	90	90	37.18	7.84	32.33	54.88	30.10
3. Premiums	4	8	5	5	5	5.13	3.92	2.15	3.05	1.67
Sub-total	54	70	136	130	167	69.23	34.30	58.61	79.28	55.85
4. Standard Tools, Jigs, Dies, Gauges, etc.	14	41	41	29	45	17.95	20.09	17.68	17.69	16.39
5. Scrap	11	28	31	22	40	14.10	13.93	13.36	13.41	13.38
Direct Labour	78	204	232	164	299	100.00	100.00	100.00	100.00	100.00

APPENDIX 9(c)

GOAL

To meet customer requirements as efficiently and economically as is consistent with resources available.

OBJECTIVES

Production - to meet the shop order as set by the Materials Control Programme.

Quality - to manufacture components and sub-assemblies to the requisite quality standards.

Costs - to work within the budget;

to submit cost improvements proposals regularly.

Selection - to select subordinates so that, with training, some will be capable of promotion.

Training - to assume responsibility for the training of immediate subordinates, or for making recommendations to the Product Manager when outside training is necessary.

Industrial Relations - to keep good relations with unions, yet maintain the initiative in labour relations and control of the work situation.

TARGETS

Production - to meet M.O.S. component requirements within the specified lead time.

Quality - (a) quality audit - the quality rating of the various cost centres to be 100%;

- (b) measured repairs and re-work - to be reduced below the budgeted figures for the cost centres, ie. 2.56, 6.37, 2.16, 1.83 and 1.34%;
- (c) unmeasured repairs and re-work - to be reduced below the budgeted figures for the cost centres, ie. 1.28, 1.96, 1.29, 0.61 and 0.67%.

Costs -

- (a) for budget figures and percentages to meet requirements below;
- (b) to submit costs improvements' proposals to the value of £9,000 per annum.

<u>Description</u>	<u>Weekly Budget Figures (£s)</u>					<u>% to Direct Labour</u>				
	<u>Cost Centres</u>					<u>Cost Centres</u>				
	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>51</u>	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>51</u>
1. Direct Labour Losses	21	46	56	35	72	26.92	22.54	24.13	21.35	24.08
2. Hourly Payroll	29	16	75	90	90	37.18	7.84	32.33	54.88	30.10
3. Premiums	4	8	5	5	5	5.13	3.92	2.15	3.05	1.67
Sub-total	54	70	136	130	167	69.23	34.30	58.61	79.28	55.85
4. Employee Benefits	24	49	61	49	62	30.77	24.02	26.29	29.88	27.42
5. Standard Tools, Jigs, Dies, Gauges, etc.	14	41	41	29	49	17.95	20.09	17.68	17.69	16.39
6. Production Supplies and Services	34	83	42	28	53	43.59	40.69	18.10	17.07	17.72
7. Jobbing Charges	15	39	46	32	59	19.23	19.12	19.83	19.51	19.73
8. Utilitties	4	12	5	10	6	5.13	5.88	2.16	6.10	2.01
9. Scrap	11	28	31	22	40	14.10	13.43	13.36	13.41	13.38
Total	156	322	362	300	456	200.00	157.83	156.03	182.94	152.50
Direct Labour	78	204	232	164	299	100.00	100.00	100.00	100.00	100.00

APPENDIX 10(a)

GOAL

To maintain production of balance wheels, bobbin winders, gear boxes and needle bars.

OBJECTIVES

Production

Current Floor Work - to make sure that work is flowing through each section;

to switch to an alternative job if stocks run low.

Jigs and Fixtures - to maintain and repair jigs and fixtures.

Write-ups - to check write-ups to make sure that the job is being done by the book.

Tools and Cutters - to check tools and cutters to make sure that there are spares available.

Plant Maintenance - to check plant to make sure that major repairs are being taken care of.

Quality

Gauges - to check gauges in use to make sure that the operators are using them.

Cost Improvements - to look for new ways of doing jobs.

Clerical - to write out speedimemos for various requests, eg. spare parts, spare bushes;

to check the parts required.

Write-ups - to check to make sure that the write-up is up to date;

to make sure that the job is being done according to the write-up;

to vet new write-ups to make sure that there are no mistakes.

Gauges - to make sure that operators understand the importance of using them.

TARGETS

<u>Item</u>	<u>Number of Parts</u>	<u>Shop Order</u> (approximate average)
<u>Steady Orders</u>		
Bobbin-winder (bench attachment)	10	750 per week
29K gear box	15	80 " "
Needle bar assemblies	6	80 " "
Bobbin-winder (machine attachment)	11	1,200 per month
Walking-foot	10	40 " "

Batch Orders - to run off 6 - 12 months' supplies of small batch orders.

Agency Orders - if possible, to take agency orders out of current production;

to clear at rate of 650+ per week till end of year.

APPENDIX 10(b)

GOAL

To supervise the operative staff and to keep them supplied with the required parts so that the shop order is produced.

OBJECTIVES

Output

Shop Order - to produce the shop order.

Shortages - to chase up shortages of parts, to check that there is an order, and to put the order into production.

Machine Parts - to put in orders for spare parts and locating parts to the Tool Room, and to supply parts' specifications on a speedimemo.

Maintenance - to supply speedimemos to Tool Room for Fitters to do machine repairs;

to estimate and order one week in advance the week's supply of lubricants, washing liquids and cooling oils;

to maintain cleanliness of machinery and immediate surroundings;

to report dangerous defects in floors, windows, sinks, heating, lighting, etc.

Repairs - to put in requisitions for new belts and belt repairs;

to watch counter shafts for wear and submit

requisitions for repairs;

to write out a small line for any welding repairs that occur.

Screws - to control screws and to keep stock up to current production.

Machine Setting - to set up machines from time to time when setters were not available.

Transport - in the absence of labouring staff, to deliver finished parts to the stores by trolley.

New Jobs - to machine a run as a test quantity and to submit them to the Measuring Department for a report.

Quality

Gauges - to check caliper, position and plug gauges to see if they meet requirements; if they don't to return them for repairs. If no gauges are available, to place an order for them.

Tools - to send all milling tools, drills and form tools to Tool Room for resharpening;

to make special tools within the Department for small jobs;

periodically to re-order micro-bore tools;

periodically to re-assess the life of a tool and to suggest alternative designs.

Down-check on machine work - periodically to check parts from machines to make sure that they are within specification.

Complaints - to investigate complaints from Building Department and to take action where necessary to correct faults.

Scrap - to inspect all scrap and to repair it if possible; if material is faulty, to write it off.

Complaints from operators - to follow up all complaints and if necessary to instruct tool setters to put it right.

Material - to investigate complaints of unmachineable material and to notify engineers in foundry to do a material test.

Machines - w.r.t. above, if favourable report is received, to look at speed of machine and if revolutions are too high to contact industrial engineer to reduce cutting speed.

Budgets - to check expenditures each week and to enter in the book where costs are over or under the budget figure.

Selection - to be given information about time-keeping records at time of interview of new transfers from other departments.

Placement - to interview new employees prior to placement.

Transfers - to have responsibility for transferring operators who are not suitable for immediate jobs.

Standard Down-checks - when an operator complains he is not making wages, to carry out a down-check and instruct operator where he is losing time; if the job is too tight,

to write a line for M.T.M.

Discipline - time-keeping - to inspect time cards.

Types -- to collect all orders in the Department for types, to cut them to length, and to put them through outside store;

to harden them when returned and to place them in stock.

TARGETS

Production

Shop Order - to meet the shop order of approximately 500 parts per week.

Agency Orders - when the shop order is exceeded, to run off Agency Orders as required.

Costs - to keep within the budget of 7% of the total cost of production:

measured subsidies
non-measured subsidies
special allowances
measured repairs & re-work
non-measured repairs & re-work
perishable tools

i.e. 7% of	£90 per week =====

APPENDIX 10(c)

GOAL

To fulfil the shop order.

OBJECTIVES

Output

Parts Orders - to maintain an even flow of work on each part order as given by the stock card.

Repairs and Maintenance - to repair/maintain tools, gauges, fixtures, machinery.

Setting up machines - when Setters are absent, or when there are too many machines for them to set up at the one time, to step in and help set so that the machines are kept going.

Stock boxes - to pull stock boxes from one operator to another to keep the flow of work going.

Housekeeping - to maintain good housekeeping.

Quality

Complaints - to check complaints made by other departments and to correct faults.

Costs

Cost Savings - to look for cheaper methods of doing jobs.

Standards - to see that standards are applied to all new jobs.

Placement - to have men placed on jobs which suit their abilities.

Training - to train new men on-the-job to show them how to use the machines and gauges, and to tell them what quality standards are required.

Clerical - to sign and check work-cards of operators.

TARGETS

Output

<u>Item</u>	<u>Job</u>	<u>Weekly Quantity</u> (approx.)
bushes - large lots	turning, milling, honing	8,000
- mixed lots	" " " "	1,000
brackets	" " " "	varies widely
shafts	" " " "	1,000
regulators	" " " "	400
ball race honing	" " " "	400
columns	" " " "	400
eccentrics	" " " "	400
pulley-wheels	" " " "	500
feed-wheels	" " " "	600

APPENDIX 10(d)

GOAL

To get good parts out of the Department for Builders.

OBJECTIVES

In-coming parts - to make sure that good parts are coming into the various sections by checking parts with the drawings; if parts are out, to talk it over with other supervisors; if parts are not too far out, to check with Quality Control and to start repairing them.

Repairs - to repair parts that come back from Builders.

Porter Work - to take repaired parts back to Store for delivery to Builders.

Work-in-Process - when work is not coming through, to go into store and various sections asking for it to be delivered.

Write-ups - when there are no write-ups, to put in a speedimemo to the Chief Engineer and to provide details of the operation to the Industrial Engineer.

Budget - to account for all expenses by checking with the Office where the money has been spent.

APPENDIX 10(e)

GOAL

To meet the weekly shop order.

OBJECTIVES

Progress Work -- to chase up work from other sections when it is not coming through.

Portering - to move work out to the Dispatch area when it is finished by an operator.

Checking finished work -- to check the weight of finished work to see that it tallies with the quantity on the card.

Write-ups - when write-ups in the area are not available, to compile new ones for the jobs.

APPENDIX 10(f)

GOAL

To meet the weekly shop order.

OBJECTIVES

Output

Incoming Work - to chase up work from other sections when it is not coming through.

Finished Work - to check the weight of finished work to see that it tallies with the quantity on the card.

Portering - to move work out to the Dispatch area when it is finished by an operator.

Checking Fixtures - to check faulty fixtures when Staff Inspector is not available.

Repairs to Fixtures - to regrind fixtures to drawing dimensions when there is a hold-up in the Tool Room.

Repairs to Gauges - frequently to chase up repaired gauges.

Production Meeting - to attend weekly production meeting dealing mainly with shortages.

Shortages - to re-arrange machines for urgently needed shortages.

Progress of Work - to handle queries concerning progress of work.

Quality

Fixtures - if parts don't gauge properly and fixtures

can't be adjusted, to requisition for Engineering investigation to have fixture modified.

Costs

Budget - weekly, to check up budget sheets to make sure that section is within its budget.

Requisition Lines - to tally up cost of week's expenditure on tooling and to mark up total on chart.

Down-Checks - to carry out down-checks when operators complain about their standards.

Clerical

Write-ups - when write-ups in the area are not available, to compile new ones for the jobs; when job is changed, to do necessary paper-work to have write-up amended.

Unions - periodically to handle complaints through shop stewards.

TARGETS

Output

Shop Order - to produce the Shop Order as per the requirements of Production Control.

Agency Orders - to clear existing agency orders.

Quality - to have less than 1 - 2% scrap.

APPENDIX 10(g)

GOAL

To meet the shop order, ie. to make the parts in the proper time.

OBJECTIVES

Output

Shop Order - to discuss with Tool Loader what the priority of jobs should be.

Re-work - to attend to work returned from the Building Department immediately.

Work Flow - to talk with other supervisors about flow of work.

Boxes - to help porters and operators by pulling boxes from place to place to keep the work flowing.

Shortages - to tackle shortages immediately, eg. parts, agency orders.

Meetings - periodically to attend Production Manager's meeting on shortages and other aspects of work.

Repairs of Plant - to make out speedimemos for machinery breakdowns.

Repairs of Equipment - to make out speedimemos to Tool Room; sometimes to provide accompanying sketches.

Standards - to ensure that every job has a standard; if not, to apply to Time Study to get someone out to time the job.

Write-ups - if no write-ups are available, to apply to Engineers to have them supplied;

to assist Engineers in drawing up the write-up.

Incoming Work - to check incoming work from store and sections so that daily routine can be planned.

Tool Room - periodically to check for cutters, tools, etc.

Tooling - when no tools for a job are available in the store, to make arrangements with Engineers to have them brought up.

Finished Work - to dispatch finished work from Section.

Tool Store - to check with Tool Store regarding cutters and fixtures.

Measurement of Cutters - to measure cutters to drawing specification for Cutter Grinders.

Setters - to discuss with Setters regarding machine set-up.

Quality

Specifications - periodically to check machines to see that work is being made to specification.

Inspection of Setters - along with Inspector, to check first half dozen parts of each machine set by the Setter.

Complaints - periodically to discuss complaints with Quality Control Engineers.

Inspection of Operators - to check on operator's parts to ensure that he is gauging his work properly.

Costs

Budget - to study budgets to see where money can be saved.

Cost Improvements - to look for better methods of doing jobs.

Personnel

Operators' Jobs - at various times of the day to see how operators' jobs are going.

Discipline - to maintain discipline and see that the men are fully employed, eg. starting-time, tea-breaks.

Unions

Shop Steward - to follow through any complaints from the shop floor.

Clerical

Requisition Lines - to sign requisition lines for cutters, etc.

Work Cards - to sign operators' and setters' cards for payment for different jobs.

TARGETS

Production

Shortages - to give top priority to work on shortages' list.

Current Production - as shortages are cleared, to work on normal production in order to keep ahead of the Builders.

Costs

Budget - to keep within the budget.

Cost Improvements - to submit cost improvements throughout the year.

APPENDIX 10(h)

GOAL

To achieve production in quantity and quality.

OBJECTIVES

Output

In-coming Material -- to check all incoming material to see that the quality is up to standard, and to reject faulty material.

Progress Parts -- to chase up progress parts for final assembly which have gone to other departments.

Plant -- to maintain efficiency of plant.

Setting -- to advise Setters on problems that arise.

Operating Procedures - to ensure that the operators know the correct procedures for the different operations.

Stock Control - to be given correct information from Materials Control to save double handling of machine set-up etc.

Safety - to ensure that guards are on machines before operators start them.

House-keeping - to ensure that the section is reasonably tidy.

Quality

Bad Work - to go round the section and inspect for bad quality.

Personnel

Human Relations - to ensure that the section runs with some sort of harmony.

Discipline - to maintain discipline, eg. time-keeping, idleness.

Unions

Shop Steward - to handle problems of dissatisfied operators with shop stewards before taking them to higher level.

TARGETS

Production

Shop Order - to achieve the weekly shop order.

Agency Orders - to clear all outstanding agency orders by end of February.

Repairs - to repair faulty parts returned from other areas.

Quality - to aim for approximately 80% quality.

APPENDIX 10(i)

GOAL

To produce machine arms and beds in a satisfactory manner, and to keep the production flowing in both areas.

OBJECTIVES

Quantity - to keep a continuous flow of production through to the assembly line; where there are hold-ups or shortages in the Black Squad, to switch to the production of an alternative part; where there are stoppages in other areas, to find alternative jobs, if available, for operators.

Clerical - to authorise speedy memos for plant repairs;
to authorise requisitions for stores;
to forward subsidy sheets to the office for payment;
daily, to collect piece-work sheets and forward to office;
daily, to make out a delivery card giving production in each area for previous day;
to check bad work-in-plant and complete rejected parts forms;
to check requests for down-checks on standards and complete forms;
to check machines returned on a departmental repairs ticket;
to fill in repairs ticket and materials move-

ment ticket, and to take necessary action.

Training - to instruct new operators on-the-job.

Placement - to interview new employees for placement on vacant jobs.

Inspection - from time to time to check operators on-the-job and to make sure that they are using gauges.

Absenteeism - to shift men between operations when absenteeism occurs.

Disputes - to try to settle disputes before they get out of hand, or, if they cannot be settled, to refer them to the Production Manager.

Plant Maintenance - to repair machinery when Fitters and Setters are not available.

Machine Repairs - when no one else is available, to repair faults to machines returned from the assembly line.

Stowing of Machines - periodically, to see that any surplus machines not immediately required are stowed away in an orderly fashion;

to arrange for return when
necessary.

TARGETS

Quantity - to meet the Arm and Bed Programme and the Machine Building Programme.

<u>Type of Machine</u>	<u>Paint Shop</u>	<u>Assembly</u>
188	400	325
195/196		350
331		220
29K	100	

APPENDIX 11

Collective Description of Supervisory Objectives

Goal

To have a section operating at an economic level with Production and Quality fulfilling requirements.

Objectives

Production

Shop Order - to maintain an even flow of parts as per production orders.

Agency Orders - to supply all Agency Orders within four weeks of their receipt.

Maintenance - to ensure that Plant Tooling, Jigs, and Gauges are adequately maintained.

Quality - To achieve a 100% quality performance.

Costs

Budget - to control expenditures as per the Budget requirements.

Cost Improvements - to look for Cost Improvements by continuously examining work methods.

Personnel - To ensure that discipline and housekeeping standards are kept at a high level and to see that safety regulations are observed.

Operation Lists - To see that all parts are fully covered by updated Operation Lists.

APPENDIX 14

OPERATIVE A

If work was busy operators were happy, but they were unhappy when it was slack.

Quality was a problem at present and has been since Quality Control followed the introduction of M.T.M. Bad quality was causing delays because the supervisor had to refer the matter to Industrial Engineering instead of being able to give on-the-spot decisions. There was also inconsistency of quality standards, eg. supervisors' opinions often differed from those of Quality Control, and the percentage of parts rejected always fell when work moved more quickly in the line. The quality of parts was also influenced by the standard on incoming parts or material.

It was felt that quality would go up if everyone was paid a standard wage. Men would not work for quality if they were being paid only for production. Piece workers were divided into two groups: the satisfied group which had easy jobs and the dissatisfied group with tight standards. With a fixed wage there may be some bad operators but to get good production here would be a job for the supervisor.

The supervisors did not have enough responsibility. Too often they had to refer a decision to outside specialists.

It was thought that this made the supervisor's job too easy, as well as "gumming-up" the work process. Furthermore, supervisors had too much clerical work to do.

Management gave too little thought to the selection of supervisors and did nothing to find out whether or not a person had qualities to lead. Too often the job was given to men who did not know how to give orders. Also, management policy was inconsistent. For example, with absenteeism, people who have had bad attendance records for years were being suddenly sacked even though management denied it was implementing a redundancy programme. Like the supervisors, managers too tended to "pass the buck" and not to face up to their responsibilities.

OPERATIVE B

People don't like being on waiting-time and want a steady flow of work. This may be caused by machine break-down which in turn may be exaggerated by the lack of tools in the store within the area.

OPERATIVE C

The men want more work than there is at present, and would like to know that work was guaranteed for weeks or months ahead.

When job difficulties occur there is not enough guidance from supervision because technical knowledge is lacking.

Also, when men are changed round in jobs there is not enough job instruction. There should be a settling-in period when the person would be paid at a higher rate than normal as good money cannot be made until a man "really knows the job".

On some jobs it was much easier to make money than on others.

OPERATIVE D

Production, and therefore money, was the main interest of direct workers who wanted greater production, a better supply of work, and for machines not to break down.

Transition of labour was not wanted as it cut down production which, in turn, affected people further down the line.

Operators want jobs to be done properly and therefore want better tuition. This applied to new operators as well as to transfers. In the company training school the new employee was given only a grounding in a particular skill and it was not until he had been on his job some time that he was able to make satisfactory money. When, however, he was transferred to a new job his acquired job knowledge was no longer relevant and he had to learn the new job from scratch. Under the present set-up he was not paid average earnings for this period and this discouraged him from learning the job thoroughly. When a person changed from

Time-Study to M.T.M. he was paid average earnings and this practice should also be applied to transfers. There should, in fact, be more done on training altogether. For example, set-up men should instruct operators on how machines were to be used, and new employees should be taught how to do operations by the men leaving the jobs.

Direct contact between the supervisor and the men is necessary to the production problems being handled quickly.

Travellers (the large yellow sheets) were not really necessary. Clerical work took up too much time and could cost the operator up to 10/- per week.

In their area better working conditions were required. These included fresh air, dust collection and new toilets.

Management were after parts, particularly good parts.

OPERATIVE E

At present, work "in the line was drying up": people wanted more work and therefore greater security. Also, an even flow of work with no waiting-time was desirable.

OPERATIVE F

The shop wanted more information. In particular, it wanted to know the shop order 2 - 3 weeks away so that it would be possible to plan in advance the parts required. At present production was put on on a day-to-day basis, and

there was often a lot of waiting-time. With the shop order known, machines may be set up in advance and would be waiting for the operator.

Since the introduction of M.T.M. machine maintenance had dropped away as operators were not paid for this work. To combat this, supervisors should stress that this is part of the operator's job. Also, an operator with a battery of machines should be paid a cleaning allowance.

The Fitter's job was not clearly defined. Furthermore, as they did not work under incentive payment, they did not have the same opportunity to increase their wages as did the operators. They felt, too, that they were providing information to specialists but were neither recognised nor paid for their contribution.

OPERATIVE G

Production should run smoothly and must not be interrupted by long delays.

Equipment, including both machines and tools, needs to be improved. With some machines at present it is only "your own hands and knowledge that gets the job done".

There should be more opportunity for getting suggestions implemented. This particularly applied to technical staff whose attitude to the operative was: "You're here to do as you are told".

At present, there is increasing co-operation between people on the shop floor and the area is starting to pick up. Fitters, Setters, the store-man and operatives are all bringing information together.

With the current organisation, however, the local touch has been lost, eg. tools have to be ordered from a centralised Tool Room incurring considerable delay and a slowing down of the whole system.

OPERATIVE H

Quality is the major objective of a production section. Once bad work starts it often passes through several operations before it is picked up. Thus the main requirement is to catch scrap before it goes too far.

Four things may be done to improve quality:

- . regular equipment checks, eg. Q.C. should check drills, etc. every morning;
- . production checks;
- . checks should be made on the first few parts produced in each run;
- . a QC rover should move round to pick up faults missed by operators.

Thus, while the current organisation has been efficient in some respects, it has led to inefficiencies in others.

OPERATIVE I

The job involved here was concerned with straightening

parts produced by a machine. The work was done by hand and it was practically impossible to bring the parts to the required standard. A concerted effort should be made to try to solve the difficult jobs like this one in the department.

OPERATIVE J

Too little information was conveyed from the top to the floor. The men wanted to know what the situation was and whether the redundancies were the result of streamlining or because work was completely drying up.

Men on the floor wanted continuity of work guaranteeing security and money, with no excessive waiting-time.

They wanted good supervision and notice to be taken of legitimate complaints.

There was a conflict between management and operatives on the question of selection. A section valued personality factors in the new-comer and wanted a person who was likeable and who they could "get to know quickly". Management was interested in a capable worker.

OPERATIVE K

It was essential to have a smooth flow of parts. Often problems concerning parts not on critical shortage tended to be neglected and the flow of these parts tended to slow down.

Problems of quality should be looked into when they

arise. There have been scenes involving supervisors and engineers when other departments complained about bad quality, but when these were over the basic problem remained the same. Bad parts would be left aside or let accumulate till something such as stock-taking occurred and then there would be another 'panic'.

At present, supervision was lacking in knowledge about the particular jobs and the operators were not being given enough help with their problems. Also, management tended to be "on your back all the time", and you weren't allowed to talk on the job. If you were "hounded" in this way you tended not to worry about helping out when you knew a job was needed in a hurry but only "to do your own job". It would be nicer, too, to have more personal support, eg. not to be docked time for leaving work early as a D.P.

OPERATIVE L

Operators want to get the work out. In his section in particular, however, he would like more variety in his work.

The gaffer (supervisor) should know both the job and the men, but the present one has to ask the operators how to do certain jobs.

M.T.M. does not suit all jobs. Also, it assumed that all men can do all jobs equally well. The individual incentive scheme leads to bad work. It would be better if

everyone was on a standard rate.

The machinery was too old. With overhead belts, up to a dozen machines can be made idle if one of the belts broke.

The working conditions were poor; the area was dirty and dimly lit.

OPERATIVE M

Production should be smoother and more parts should be cut off in any one go so that critical shortages would be eliminated.

Often parts are not right and QC lets them go through. This may be partly because QC works off paper standards and not from experience, and also because the level of the standards varies according to the demand by the Builders. Some M.T.M. standards are too tight and if a person is having difficulty in making a day's wage he skips using his gauges. This results in lowering quality and reducing output.

M.T.M. standards also lead to one group of people who make good money and another group who do not. It would be better to have everyone on a standard wage working to a weekly target with a group incentive attached.

There should be good relations between the shop floor and both management and supervision.

OPERATIVE N

Ventilation - to have heat and dust maintained at an acceptable level.

Machine Maintenance - to have machines regularly overhauled so that they are kept in a smooth running condition;
to oil machines regularly to prevent machine breakdown.

Pay - to earn as much money as possible.

Training - to pick up skills on-the-job so that work will be paid at the highest possible rate.

Timings - to ask for down-checks on bad jobs so that a fair time is put on all jobs.

OPERATIVE O

Flow-of-work - to have a continuous flow of work through the section;

to average out orders so that wide fluctuations are avoided.

Pay - to earn as much as possible.

Job Timings - to equalise timings on jobs so that all jobs are at the same level of difficulty.

OPERATIVE P

Work - to have a smooth flow of work in the section.

Information - to be kept informed of the state of the shop order.

Pay - to have a guaranteed rate of pay at a 75 unit

hour, but to have scope to earn more than this.

Relationship with the manager - to have a good understanding between the manager and the men.

OPERATIVE Q

Work - to have a steady flow of work.

Pay - to be able to make as much money as possible.

Information - to be "kept in the picture" about events affecting the shop floor.

Timings of jobs - to have jobs retimed so that they all are of equal difficulty.

Training - to have on-the-job training so that an operator may progress from one grade of machine to the next.

OPERATIVE R

Pay - to have a rate of pay not below that of operators.

Physical working conditions - to have machines regularly maintained so that the job is kept clean.

OPERATIVE S

Nature of work - for flow of work to be continuous; for batch quantities to be reasonably large.

Supervision - to help with problems cropping up in the work; for operators to get clear instructions on what is required; for supervision not to be too close.

Co-operation - to get more help from letters on difficult aspects of jobs.

OPERATIVE T

Supply of work - to have work moving through the section continuously.

Quality - to have good parts coming into the section;
to have jobs with tight standards re-timed so that pride in one's work may develop.

OPERATIVE U

Supply of work - to have work to do at all times.

Rates of pay - to have the more difficult jobs paid at a higher rate than jobs which are easier to learn.

Training - to have more experienced operators provide on-the-job training for new employees.

OPERATIVE V

Quantity - when shop order permits, to have batches as large as possible.

Consultation - for operators to be consulted when things crop up concerning the jobs on which they are working.

OPERATIVE W

Timings - for timings on jobs to be fair;
for timings to be made on runs longer than those made at present.

Supervision - to get follow-up on requests.

Teamwork - for people to work together the way they should.

Fitter/Setters - to have a sufficient service so that

hold-ups do not occur.

Training - to have an operator training programme so that people can qualify as setter/operators;

to have Time-Study explained to operators.

OPERATIVE X

Flow-of-work - to have plenty of work;
to get good runs of work.

Job Timings - to have tight jobs re-timed;
to have more flexibility in the timings of jobs.

OPERATIVE Y

Flow-of-work - to be steady.

Supervision - to give the operator help when he needs it;
to back him up when he has a case.

OPERATIVE Z

Job Timings - for jobs with tight standards to be re-timed.

Supervision - to take a personal interest in the operator's job;
to help the operator when he gets into difficulties.

Training - for ^S letters to show operators the right way to start jobs;

for more experienced operators to show newer

operators the best ways to do jobs.

Induction - for some allowance to be made in this period when all the easy jobs are taken up.

OPERATIVE a

Timings - for all jobs to be properly timed.

Supervision - to attend to operators' requests;
to take an interest in the operator, eg. whether or not he is making money.

Operators had to maintain their machines to prevent machine breakdown but were not being paid for this work.

OPERATIVE b

Machines - to prevent machine breakdowns.

Scrap - to reduce scrap by having more on-the-job training.

Timings - to have jobs timed on "average" operators rather than on skilled operators.

Training - to be instructed on the workings of the whole machine so that the function of individual parts would be understood;

to be instructed on the technical aspects of the product.

OPERATIVE c

Production - to have the job run smoothly.

Scrap - to have the machines set-up correctly when a

run of work is commenced.

Waiting-time - to reduce waiting-time, possibly by having the Setters work ahead of the operators.

Set-up - to have enough Setters so that operators are not kept waiting for machines to be set-up.

OPERATIVE d

Quality - to have fairer times put on the job operations so that the operators could give more attention to quality.

OPERATIVE e

Production - to have work kept flowing through the area.

Timings - for all jobs to have reasonable timings.

Management and Supervision - for immediate management to take an interest in your work.

OPERATIVE f

Production - to run off large batch quantities.

Supervision - to have both good and bad jobs spread round the whole section;

to have inquiries into the difficulties that one may be having with one's work.

OPERATIVE g

Production - to have plenty of work in the section.

Quality - to be able to do jobs properly.

Supervision - to have good and bad jobs shared out alike.

Information - to know more about the work situation.

OPERATIVE h

Quality - to be able to do as good a job as one can.

Timings - for timings on some jobs to be revised.

Engineering - to have services more readily provided.

OPERATIVE i

Job Timings - to have bad jobs re-rimed;

to be timed over a longer period;

for factors other than handling time to be taken into account, eg. clearing work, broken tools etc., and the fact that a job timed on one machine may be set-up on another.

Supervision - for complaints to be given a proper hearing;

for people not to be disciplined within the work area.

Work allocation - batch quantities to be as large as possible;

for there to be as little changing round of jobs as possible;

for both good and bad jobs to be fairly handed round the section.

Factors Affecting Objectives

Re-organisation - previously one operator would check with the next to see if the parts were suitable, now contact has been lost and the amount of bad work coming into

the area has increased.

Timings - operators tend to work only to the specifications, even though they sometimes know the job won't work.

The main aim of the job was to make money.

In Time Study a lot goes on judgement and if you get on well with the Engineer you were likely to be given a good time.

OPERATIVE j

Job Timings - to have jobs with poor timings re-timed.

Supervision - to be given personal consideration by the supervisor, especially on conditions that are outwith your control.

It was thought that it was hard to get present-day standards with the old machinery. Also, jobs should be timed so that in order to make money you had to work steadily, but not so fast that you broke into a sweat.

APPENDIX 13

APPRAISAL FORM FOR MANAGER A

Item	Objective/Target	Achievement	Comment
<p><u>Quantity</u></p> <p>1. Stock</p> <p>2. Agency Orders</p>	<p>To be 2 days in front of the Building Department on all parts; and one week in front on at least 60% of parts.</p> <p>To reduce backlog to 6 months on all parts.</p>		
<p><u>Quality</u></p> <p>1. Level</p>	<p>To have an acceptable quality level of 95% on all parts as determined by quality audit and staff inspectors.</p>		
<p>2. Machine Specification</p> <p>3. Measured Repairs and Re-work</p>	<p>To reduce the number of instances where parts machined to Specification do not assemble with the mating part.</p> <p>To be reduced below the budgeted figures for the cost centres (ie. 2.44, 1.96, 7.34, 3.73, 3.42, 2.10%).</p>		
<p>4. Unmeasured Repairs and Re-work</p>	<p>To be reduced below the budgeted figures for the cost centres (ie. 0.61, 3.98, 4.59, 0.62, 2.85, 4.90%).</p>		

Item	Objective/Target						Achievement	Commer
<u>Costs</u>	<u>% to Direct Labour</u>							
1. Budget.	<u>Cost Centres</u>							
(1) Direct Labour Losses	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>61</u>	<u>71</u>		
(2) Hourly Payroll	17.69	18.01	27.06	17.39	26.91	14.00		
(3) Premiums	90.85	56.90	45.87	39.76	58.63	53.85		
Sub-Total	6.10	4.41	6.87	4.35	5.05	7.00		
(4) Employee Benefits*	114.65	89.33	79.80	61.50	90.59	74.85		
(5) Standard Tools, Jigs, Dies, Gauges, etc.	36.59	30.88	33.48	24.84	31.96	29.02		
(6) Special Tooling	17.69	20.59	13.77	7.45	22.59	19.90		
(7) Production Supplies and services	3.05	-	2.89	-		
(8) Jobbing Charges*	41.46	44.48	47.25	24.85	53.11	39.51		
(9) Scrap	19.51	19.48	19.27	18.01	20.67	19.23		
* denotes partial control only.	13.41	12.13	13.75	12.42	14.18	13.64		
2. Cost Improvements	To submit cost improvements to the value of £8,000.							

Item	Objective/Target	Achievement	Comment
<p><u>Industrial Relations</u></p> <p>1. Unions</p>	<p>To keep good relations with unions, yet maintain the initiative in labour relations and control of the work situation.</p>		
<p><u>Training</u></p> <p>1. Factory T.W.I. Course</p> <p>2. On-the-job Training</p>	<p>To have the one remaining supervisor attend this course immediately.</p> <p>In addition to the two supervisors suitable for promotion at present, to have another two ready by July.</p>		
<p><u>Objectives</u></p> <p>1. Of Subordinates</p>	<p>To have the efforts of the supervisors pointing in the same direction.</p>		

APPENDIX 14

APPRAISAL FORM FOR MANAGER B

Item	Objective/Target	Achievement	Comment
<u>Quantity</u> 1. Shop Order 2. Stock	To meet weekly Building Machine Programme. To establish 1 week's buffer stock.	Averaging % per week	
<u>Quality</u> 1. Machine Audit 2. Parts Audit Rating 3. Measured repairs and re-work 4. Unmeasured repairs and re-work	For number of demerits per machine not to exceed 20, Of 90%, For areas 1408/31 and 1408/41, no more than 5% and 4% respectively. For areas 1408/31 and 1408/41, no more than 10% and 8% respectively.		

* Denotes partial Control only.

Item	Objective/Target	Achievement	Comment
<u>Ccsts</u>			
<u>% to Direct Labour Cost Centre</u>			
1. Budget	11 21 31 41		
(1) Direct Labour Hours	26.36 25.11 49.00 26.65		
(2) Hourly Payroll	29.70 45.89 23.25 25.82		
(3) Premiums	8.36 9.18 3.92 6.15		
Sub Total	64.42 80.18 76.17 58.62		
(Target)	(55.00) (77.00) (70.00) (65.00)		
(4) Employee Benefits*	26.78 28.50 28.85 27.46		
(5) Standard Tools, Jigs, Dies, Gauges, etc.	14.64 13.52 1.12 1.23		
(6) Production Supplies and Services	18.00 17.88 23.53 15.57		
(7) Jobbing Charges*	20.92 21.26 22.97 18.44		
(8) Scrap	23.85 24.16 6.72 4.92		

Item	Objective/Target	Achievement	Comment
<u>Costs contd.</u> 2. Cost Improvement	To submit cost improvement proposals to the value of £6,000.		
<u>Human Relations</u> 1. Team-work 2. Supervision	To mould employees into a co-operative working team. To decrease friction between supervisors; To increase harmony between operatives and supervisors.		
<u>Selection and Training</u> 1. Supervisors	To develop supervisors to be suitable for promotion.		
<u>House-keeping</u> 1. Cleanliness	To keep area in clean and tidy condition; By October to have stock boxes set up adjacent to their respective sub-assembly or building areas.		

APPENDIX 15

APPRAISAL FORM FOR MANAGER E

Item	Objective/Target	Achievement	Comment
<p><u>Quantity</u></p> <p>1. Parts Orders</p> <p>2. Stock</p> <p>3. Agency Orders</p>	<p>To meet parts orders as determined by the Building Programme.</p> <p>To have adequate stocks with 75% of current production parts within next 3 months.</p> <p>To clear outstanding 1965 agency orders by end of June;</p> <p>To be in a position to supply all future agency orders within a month of the receipt of the order.</p>		
<p><u>Quality</u></p> <p>1. Quality Audit</p> <p>2. Measured Repairs and Re-work</p> <p>3. Unmeasured Repairs and Re-work</p>	<p>To get an average quality rating of 100% in all areas.</p> <p>To be reduced below the budgeted figures for the cost centres (ie. 2,56, 6,37, 2,16, 1,83, 1,34%).</p> <p>To be reduced below the budgeted figures for the cost centres (ie. 1.28, 1.96, 1.29, 0.61, 0.67%).</p>		

Items	Objective/Target	Achievement	Comment
<u>Costs</u>	<u>% to Direct Labour</u> <u>Cost Centres</u>		
1. Budget	11 21 31 41 51		
(1) Direct Labour	26.92 22.54 24.13 21.35 24.08		
(2) Hourly Payroll	37.18 7.34 32.33 54.88 30.10		
(3) Premiums	5.13 3.92 2.15 3.05 1.67		
Sub Total	69.23 34.30 58.61 79.28 55.85		
(4) Standard Tools, jigs, Dies, Gauges, etc.	17.95 20.09 17.68 17.69 16.39		
(5) Scrap	14.10 13.93 13.36 13.41 13.38		
2. Cost Improvements	To submit cost improvements to the value of £9,000.		

Item	Objective/Target	Achievement	Comment
<u>Building</u> 1. Store	To have Jig and Fixture store under way by August.		
<u>Training</u> 1. Subordinates	To assume responsibility for the training of immediate subordinates, or for making recommendations to the Product Manager when outside training is necessary.		
<u>Industrial Relations</u> 1. Unions	To keep good relations with unions, yet maintain the initiative in labour relations and control of the work situation.		

APPENDIX 16

Quality Performance of each Cost Centre on the period
January - June, 1966

	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Scrap	171	472	485	955	791	805	876	485	2487	614	98	1814	176	15
Repairs	12	44	124	150	136	57	372	92	457	9	78	98	1129	410
Total	183	516	609	1106	927	862	1248	577	2944	623	176	1912	1305	425
Standard Labour	1586	6037	4133	5628	2730	3517	5337	2504	9738	4843	5171	5910	8806	2697
% of Standard Labour	11.5	8.5	14.7	19.7	34.0	24.5	23.4	15.0	30.2	12.9	3.4	32.4	14.8	15.8
Budget (%)	17.9	19.2	16.9	15.4	16.5	16.5	25.7	16.8	19.2	20.6	23.9	29.5	24.9	18.4
Difference	-6.4	-10.7	-2.2	4.3	17.5	9.0	-2.3	8.2	11.0	-7.7	-25.5	2.9	-10.1	-2.6

APPENDIX 17

Direct Labour Losses, Hourly Paid Indirect Labour,
and Overtime and Nightshift Premiums, expressed as
a percentage of Standard Labour for each Cost Centre
over the period January - June, 1966.

	Cost Centres													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Cost %	53.9	79.9	69.1	59.8	121.9	140.1	73.4	66.6	134.8	47.5	68.7	77.0	71.2	95.1

APPENDIX 18

Description of each of the ten Job Aspects

<u>Aspects of the Job</u>	<u>Description</u>
Communication (Com)	Knowing what is happening, and what is going to happen, in the place.
Company and Management (CM)	Includes what the employee thinks of the company, and what he thinks is management's feeling towards him.
Physical Working Conditions (PWC)	Physical things about the work place which are not a part of the work.
Security (Se)	The feeling that the job will go on either with the present company, or in the same type of work.
Social Aspects of the Job (So)	Feelings of employees towards other employees, particularly their work mates.
Supervision (Su)	Feelings of employees towards their supervisors.
Wages (W)	The total amount of pay.
Work Ease (WE)	Easiness of the job.
Work Interest (WI)	Interest in the job, and sense of pride in doing the work.
Work Variety (WV)	The number of different things to do in the job.

APPENDIX 19

Questionnaire Items occurring in Part Two of
the Questionnaire

<u>Job Aspect</u>	<u>Item</u>
Communication	1d To know what is happening in other sections of the firm.
	5a To get a booklet or be told everything you need to know when you start the job.
	10a A boss who likes you to make suggestions about how things should be done.
	15b To know how much work the firm is getting.
	16a To have things explained to you clearly.
	20b To always know who's who around the place.
	34b To always be told of important decisions affecting your job.
	37b To have a boss who lets you know what is going on.
	43a To be told of changes which are going to take place.
Company & Management	3b A firm that's well run.
	10b A firm which is up-to-date.
	12a A good firm to work for.
	14b A firm you can trust.
	22b A firm which looks after its employees well.

- 23a A firm which likes to co-operate with the trade unions.
- 33a A firm that makes quality products.
- 36a To work for a firm you can be proud of.
- 39a A firm that treats its employees fairly.

Physical Working Conditions

- 7a To have safe working conditions.
- 9a To have good facilities, such as a canteen.
- 15a Not too much noise where you work.
- 23b A job which is clean.
- 24b A job with hours of work which suit you.
- 29b A job which is close to home or easy to get to.
- 32b To have a comfortable place to work in.
- 38b To have good machines to work with.
- 42a To have good materials to work with on the job.

Security

- 5b To have few worries about being put off.
- 9b To feel that the firm needs you in your job.
- 11a To know that you can always get your kind of job with another employer.
- 13a A firm which is unlikely to go out of business.

- 12b A secure job.
- 25a To know that you can do your job well.
- 27a A firm which can always sell its products.
- 33b A job where you can learn useful skills.
- 44a A steady job.

Social

- 8b To make friends at work.
- 17b For your work mates to think you do a good job.
- 19a A job where you work with friendly people.
- 21a To work where people get along well with each other.
- 29a To work with people who are helpful.
- 31a A job your friends would like too.
- 39b To work together with other people.
- 41a To get on with your work mates.
- 45a To mix with different people at work.

Supervision

- 1b A boss who is helpful.
- 6a A boss who is good at his job.
- 17a To know your boss is interested in your ideas about the firm.
- 18a A boss who stands up for you if things go wrong.

- 21b A boss who listens to your problems with the job.
- 30a A boss who will admit his mistakes.
- 32a A boss who praises you when you do well.
- 36b A boss who understands your problems with the work.
- 44b A boss who has no favourites.

Wages

- 2a To earn good money.
- 6b To be paid according to the amount of work you do.
- 12b To know just how much you can earn each week.
- 13b To earn enough to buy the things you want.
- 20a To work hard and get higher pay.
- 24a A job which is well paid.
- 28a Bonuses or piecework rates which are fair to all.
- 34a To know you can earn a bit extra each week.
- 45b To earn a bit more than your friends.

Work Ease

- 3a A job which doesn't make you too tired.
- 20b A job which doesn't require much effort.
- 26a A job at which you don't have to concentrate too hard.

- 27b A job which is not too difficult.
- 30b A job which is not hard to learn.
- 31b A job at which you don't have to worry.
- 35b A job where you have a chance to talk or think about other things while you are working.
- 38a A job which is easy to do.
- 40a A job which is not too complicated.

Work Interest

- 2b A job you like doing.
- 4b A job which is interesting.
- 7b To be able to take a pride in your work.
- 14a A job where the time passes quickly.
- 18b To have a responsible job.
- 25b A job which gives you a chance to learn something new.
- 35a A job where you do interesting things.
- 41b To feel you are doing a useful job.
- 43b A job you really find interesting.

Work Variety

- 4a To be able to speed up or slow down when you want to.
- 8a A job which is not too routine.
- 11b To have something different to do each day.

- 16b To have changes in your work from time to time.
- 22a A job which is not monotonous.
- 28b A job in which you have a variety of things to do during the day.
- 37a To have different ways of going about your job.
- 40b A job where you work with several different kinds of materials.
- 42b To be able to move around on the job.

APPENDIX 20

Questionnaire Items occurring in Part One of
the Questionnaire

<u>Job Aspect</u>	<u>Item</u>
Communication	7. Employees here are always kept informed on new things that are going to happen.
	13. Employees don't always know enough about what is going on in the firm.
	22. I find it very easy to let my boss know how I feel about things.
	41. It is very hard to find out what other people are doing in this place.
Company & Management	6. The welfare of employees is carefully considered before any changes are made here.
	27. This firm is very strict about absences from work.
	31. This company recognises good work and rewards it.
	43. This company makes really high quality products.
Physical Working Conditions	17. The washrooms and other facilities here are never kept tidy.
	28. The factory is well lit and well ventilated.
	33. The machines here are very safe to operate.

37. The machines here make the work hard.

Security

2. You can be sure of keeping your job here as long as you want to.

10. This is a job where you can learn skills which are always in demand.

16. There is no chance of being laid off in this job.

25. I always feel I am needed in my job.

Social

1. The people here work together as a team.

3. There are groups here who stick together and won't mix with others.

39. New employees get to know everyone very quickly.

42. The people here are always friendly.

Supervision

14. If you make mistakes you are criticised so that others can hear.

26. The people I work for will always admit their mistakes.

32. The person I work for is not always fair.

36. The person I work for is not very understanding.

Wages

4. Extra skill and effort get you more money in this job.

27. I am unhappy with the opportunities here for earning extra money.
29. I feel I should be able to earn a lot more.
34. The wages I earn are not very good.

Work Ease

20. I find it hard to keep up with my job.
24. I find it easy to think about other things while I am doing my job.
35. My job is easy to do.
44. My kind of work is easy to learn.

Work Interest

8. I find that time passes very quickly in my job.
15. I would like to have a job with more responsibility.
30. I find my job rather boring.
40. I feel that I am really doing a job that is worthwhile.

Work Variety

9. I get plenty of variety in my job.
12. In my job, I can speed up or slow down when I want to.
23. My job is too routine.
38. I cannot change round enough in my job.

APPENDIX 21

Job Satisfaction Questionnaire

University of Edinburgh

WHAT YOU THINK ABOUT JOBS

This is to find out what you think about your job. Your answers will not be seen by anyone except myself. So please feel free to answer frankly.

Do not give your name, but please answer the following:

What job do you do? _____

What Cost Centre do you work in? _____

Which sex are you? _____

PART I

Over the page are some sentences about things to do with jobs. Thinking about your own job, decide how you feel about each sentence, then show how strongly you agree or disagree by placing an X on the line between "Strongly disagree" and "Strongly agree".

EXAMPLE

Working here you make a lot of friends	Strongly disagree	Strongly agree
	_____	_____X_____

An X put in the place shown means that you agree strongly. If you disagree, because this is only true sometimes, you could show that you disagree by placing an X like this:

_____X_____

If you are quite uncertain, or feel that you cannot answer either way, then put an X close to the middle of the line like this:

_____X_____

Strongly
disagree

Strongly
agree

1. The people here work together as a team
2. You can be sure of keeping your job here as long as you want to
3. There are groups here who stick together and won't mix with others
4. Extra effort and skill get you more money in this job
5. I find that my work upsets my health sometimes
6. The welfare of employees is carefully considered before any changes are made here
7. Employees here are always kept informed on new things that are going to happen
8. I find that time passes very quickly in my job
9. I get plenty of variety in my job
10. This is a job where you can learn skills which are always in demand
11. I get eyestrain from my work
12. In my job, I can speed up or slow down when I want to
13. Employees don't always know enough about what is going on in the firm
14. If you make mistakes you are criticised so that others can hear
15. I would like to have a job with more responsibility

Strongly
disagree

Strongly
agree

16. There is no chance of being laid off in this job
17. The washrooms and other facilities here are never kept tidy
18. My work tires me out too much
19. I often get headaches from my work
20. I find it hard to keep up with my job
21. I am unhappy with the opportunities here for earning extra money
22. I find it very easy to let my boss know how I feel about things
23. My job is too routine
24. I find it easy to think about other things while I am doing my job
25. I always feel I am needed in my job
26. The people I work for will always admit their mistakes
27. This firm is very strict about absences from work
28. The factory is well lit and well ventilated
29. I feel I should be able to earn a lot more
30. I find my job rather boring
31. This Company recognises good work and rewards it
32. The person I work for is not always fair
33. The machines here are very safe to operate.

	Strongly disagree	Strongly agree
34. The wages I earn are not very good	----- ----- ----- -----	
35. My job is easy to do	----- ----- ----- -----	
36. The person I work for is not very understanding	----- ----- ----- -----	
37. The machines here make the work hard	----- ----- ----- -----	
38. I cannot change around enough in my job	----- ----- ----- -----	
39. New employees get to know everyone very quickly here	----- ----- ----- -----	
40. I feel that I really am doing a job which is worthwhile	----- ----- ----- -----	
41. It is very hard to find out what other people are doing in this place	----- ----- ----- -----	
42. The people here are always friendly	----- ----- ----- -----	
43. This Company makes really high quality products	----- ----- ----- -----	
44. My kind of work is easy to learn	----- ----- ----- -----	

PART 2

Below you will find sentences that are put together in pairs. Each sentence says something which lots of people think is important about a job. Pick the one sentence in each pair which you think would be more important to you if you were thinking of the best possible job for you, and put a (✓) in the box beside it, like this,

EXAMPLE

✓

 To be able to make new friends
To have different things to do in the job

If you had placed the ✓ in the bottom box as shown, this would mean that you liked to have different things to do, and thought this was better than to be able to make new friends. If you thought that friends were more important, you would have placed a (✓) in the upper box.

REMEMBER choose the thing you would like more in a job, and although it may sometimes be hard for you to make up your mind, don't miss out any pairs.

1.

 To know what is happening in other sections of the firm
A boss who is helpful
2.

 To earn good money
A job you like doing
3.

 A job which doesn't make you too tired
A firm that's well run
4.

 To be able to speed up or slow down when you want to
A job which is interesting
5.

 To get a booklet or be told everything you need to know when you start the job
To have few worries about being put off
6.

 A boss who is good at his job
To be paid according to the amount of work you do
7.

 To have safe working conditions
To be able to take a pride in your work
8.

 A job which is not too routine
To make friends at work
9.

 To have good facilities, such as a canteen
To feel that the firm needs you in your job

10. A boss who likes you to make suggestions about how things should be done
 A firm which is up-to-date
11. To know that you can always get your kind of job with another employer
 To have something different to do each day
12. A good firm to work for
 To know just how much you can earn each week
13. A firm which is unlikely to go out of business
 To earn enough to buy the things you want
14. A job where the time passes quickly
 A firm you can trust
15. Not too much noise where you work
 To know how much work the firm is getting
16. To have things explained to you clearly
 To have changes in your work from time to time
17. To know your boss is interested in your ideas about the firm
 For your work mates to think you do a good job
18. A boss who stands up for you if things go wrong
 To have a responsible job
19. A job where you work with friendly people
 A secure job
20. To work hard and get higher pay
 A job which doesn't require much effort
21. To work where people get along well with each other
 A boss who listens to your problems with the job
22. A job which is not monotonous
 A firm which looks after its employees well
23. A firm which likes to co-operate with the trade unions
 A job which is clean
24. A job which is well paid
 A job with hours of work which suit you
25. To know that you can do your job well
 A job which gives you a chance to learn something new

26. A job at which you don't have to concentrate too hard
 To always know who's who around the place
27. A firm which can always sell its products
 A job which is not too difficult
28. Bonuses or piecework rates which are fair to all
 A job in which you have a variety of things to do during the day
29. To work with people who are helpful
 A job which is close to home or easy to get to
30. A boss who will admit his mistakes
 A job which is not hard to learn
31. A job your friends would like too
 A job at which you don't have to worry
32. A boss who praises you when you do well
 To have a comfortable place to work in
33. A firm that makes quality products
 A job where you can learn a trade or some other skill
34. To know you can earn a bit extra each week
 To always be told of important decisions affecting your job
35. A job where you make interesting things
 A job where you have a chance to talk or think about other things while you are working
36. To work for a firm you can be proud of
 A boss who understands your problems with the work
37. To have different ways of going about your job
 To have a boss who lets you know what is going on
38. A job which is easy to do
 To have good machines to work on
39. A firm that treats its employees fairly
 To work together with other people
40. A job which is not too complicated
 A job where you work with several different kinds of materials
41. To get on with your work mates
 To feel you are doing a useful job

42. To have good materials to work with on the job
 To be able to move around on the job
43. To be told of changes which are going to take place
 A job you really find interesting
44. A steady job
 A boss who has no favourites
45. To mix with different people at work
 To earn a bit more than your friends

APPENDIX 22

Preference for Job Aspects within the Cost Centres

Kendall's Co-efficient of Concordance

Job Aspect	Cost Centre														Rj	Rj-Rj	(Rj-Rj)
	a	b	c	d	e	f	g	h	i	j	k	l	m	n			
Com	5	5	5	6	10	4.5	6	7½	5	7	7	7	4	6	84	-6.7	44.9
C&M	4	1	4	4	2	3	1	4	4	1½	4½	4	1	1	39	38.3	1466.9
FWC	7	6	7	5	6	4.5	5	9	7	7	6	6	8	7	90½	-13.2	174.2
ee	2	4	2	1	4	2	3	1½	4	2	1	1	2½	2	34	43.3	1874.9
eo	8	7	8	9	7	8	7	5	8	8	8	8	6½	8	105½	-28.2	795.2
su	1	2	3	2	3	6	2	1½	3	3	2	2	2½	3½	36½	40.8	1664.6
W	3	3	1	3	1	1	4	3	1	1	3	3	5	5	35½	41.8	1747.2
TE	10	10	10	10	9	10	10	10	9	9	9	9	10	10	136½	-59.2	3504.6
VI	6	8	9	7	5	7	8	7½	5	4½	5	6	6½	3½	88	-10.7	114.5
WV	9	9	9	8	8	9	9	6	9	10	10	9	9	9	123½	-46.2	2134.4

773

Rj = 77.3 S = 13521.4

$$W = \frac{S}{1/12h^2(N^3 - N)}$$

$$= \frac{12S}{12N(N^2 - 1)}$$

where S = sum of (Rj-Rj)²

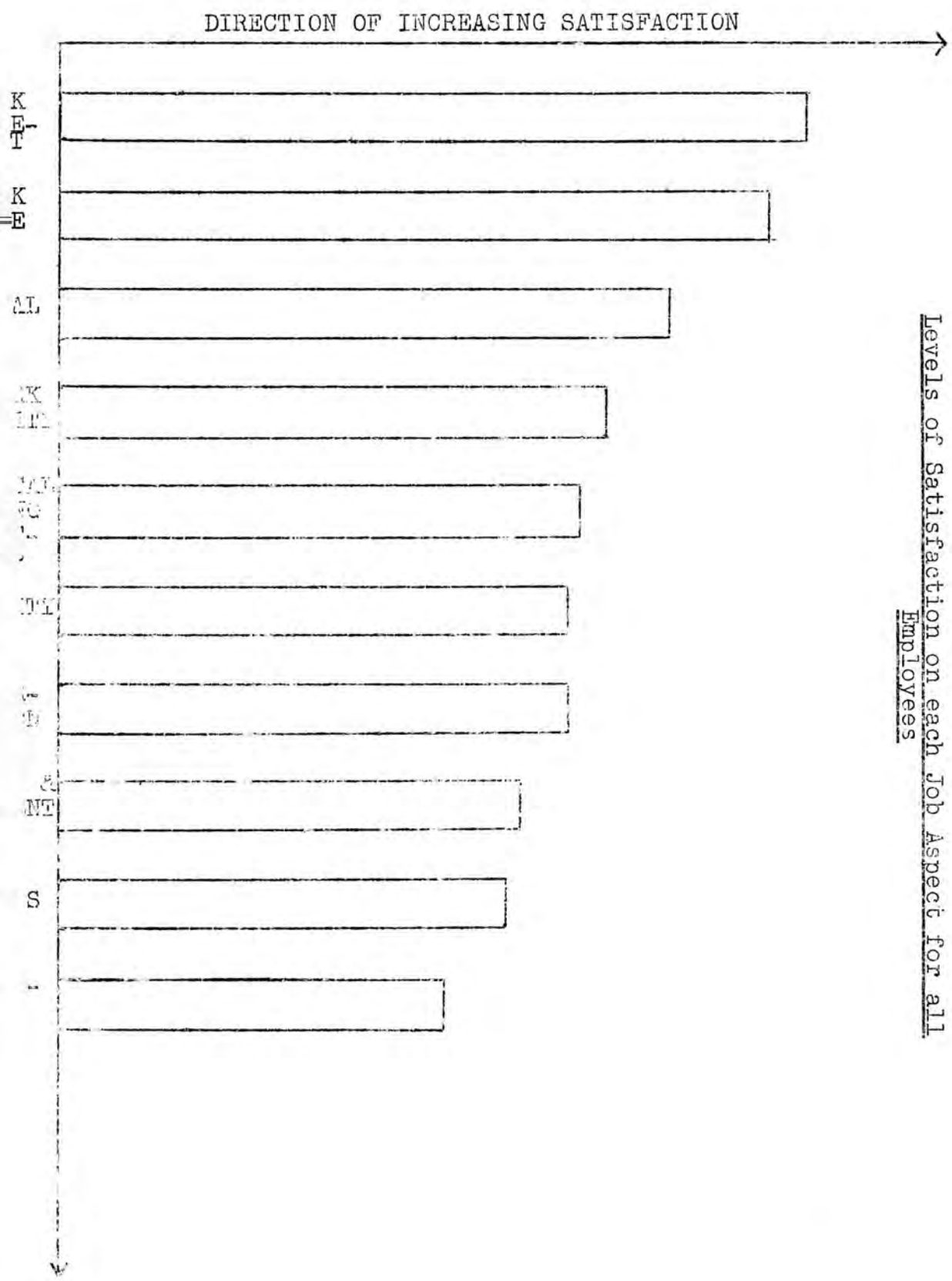
h = number of columns

= 0.84

2

APPENDIX 23

Levels of Satisfaction on each Job Aspect for all Employees



APPENDIX 24

Preference for Job Aspects for each Cost Centre

Friedman Two-way Analysis of Variance by Ranks

Job Aspect	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
c	3	7½	4	5½	11½	11½	10	1	13½	5½	9	13½	7½	2
C&M	14	5	2	7½	7½	6	11½	11½	10	1	4	13	9	3
PWC	7	10	2	5½	3	14	4	8½	12	1	11	13	8½	5½
Se	12½	7	1½	6	8½	5	1½	10½	12½	4	10½	14	8½	3
So	2	12	6½	8½	13	6½	11	1	10	5	8½	14	4	3
Su	1	9	2	6½	8	10½	6½	3½	14	10½	3½	13	12	5
W	6	9½	1½	8	7	12½	5	4	11	3	9½	14	12½	1½
WE	14	10	7	11	2	12	13	3	9	1	8	6	4	5
WI	13	7	3½	6	11½	8	3½	5	11½	9½	9½	14	2	1
WV	3	9½	9½	6½	6½	11	4	2	12	1	13	14	8	5

Rj	75½	86½	39½	71	78½	97	70	50	115½	41½	86½	128½	76	34
R̄	7	10½	2	6	9	12	5	4	13	3	10½	14	8	1

$$x^2 = \frac{12}{Nh(h+1)} \sum_{j=1}^h (R_j)^2 - 3N(H+1)$$

where N = number of rows

h = number of columns

Rj = run of ranks in jth column

= 57.11 ***

APPENDIX 25

Description of the Ten Job Aspects used in the
Supervisory Attitude Study

<u>Job Aspect</u>	<u>Description</u>
Management (Mgt)	The relationship of the supervisor with his manager.
Company (Coy)	Includes what the supervisor thinks of the company, and what he thinks is senior management's feeling towards him.
Security (Se)	Features of the job which lead to assurance of continual employment, either within the same company or within the same type of work.
Communication (Com)	Aspects of the job involving the spread of information in any direction within the organisation.
Work Interest (WI)	Interest in the job, the sense of pride in accomplishment given by the job, and the amount of responsibility desired in the job.
Wages (W)	The total amount of earnings.
Physical Working Conditions (PWC)	Physical aspects of the work place which are not necessarily a part of the work.
Work Variety (WV)	The variety of tasks available in the job.
Social (So)	The relationship of the supervisor with other members of the work group, and other supervisors.
Work Ease (WE)	Aspects associated with the level of difficulty of the job.

Preferences of the Supervisors for the Job Aspects

Kendall's Co-efficient of Concordance

Job Aspect	Supervisor's Cost Centre														Rj	Rj-Rj	(Rj-Rj) ²
	a	b	c	d	e	f	g	h	i	j	k	l	m	n			
Com	5	1	3½	5½	8½	4	3	3½	6	3	9	5	1	1	59	18	324
Coy	2½	5	2	2	1½	4	3	2	4	5½	7	3	2	2½	46	31	961
FWC	5	2½	8½	7	5	6½	6	7½	4	8	4½	8	7½	7	87	-10	100
Ca	1	5	5½	5½	3½	6½	1	3½	2	3	7	3	4	4	54½	22.5	506.25
So	7½	8	7	8½	8½	10	9	9	8½	8	2½	8	7½	6	108	-31	961
I-st	5	2½	3½	2	6½	2	3	1	1	1	4½	1	4	2½	39½	37.5	1406.25
W	7½	9	1	2	6½	1	7½	5	10	5½	7	4	4	5	77	0	0
W3	10	10	10	10	10	8½	10	10	7	10	10	10	10	10	135½	-58.5	3422.25
WT	2½	5	5½	4	1½	4	5	7½	4	3	1	3	6	8½	60½	16½5	272.25
WT	9	7	8½	8½	3½	8½	7½	6	8½	8	2½	8	9	8½	103	-26	676

770

Rj = 77.0 S = 8629

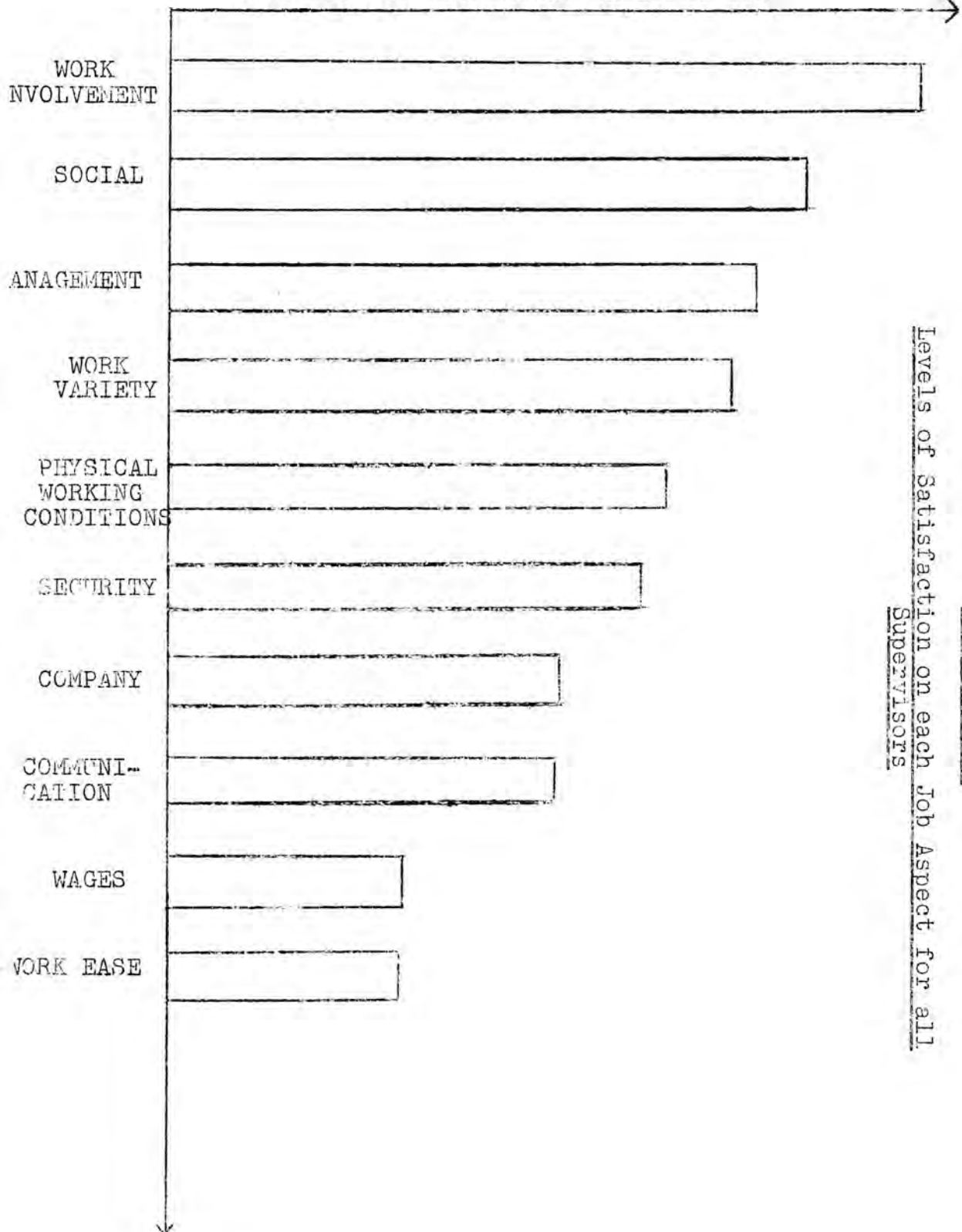
$$W = \frac{S}{1/12h^2 (N^2 - N)}$$

$$= \frac{12S}{12N(N^2 - 1)}$$

where S = sum of (Rj - Rj)²

= 0.73

DIRECTION OF INCREASING SATISFACTION →



Levels of Satisfaction on each Job Aspect for all Supervisors

APPENDIX 28

Ranked Satisfaction on Job Aspects for each Supervisor

Friedman Two-way Analysis of Variance by Ranks

Job Aspect	Supervisor's Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Com	12	14	12	9½	12	3	5½	1½	3	9½	5½	1½	5½	5½
Coy	6½	6½	14	13	10	10	4	4	1½	10	1½	10	10	4
PWC	3½	8	14	11	6	9	1½	11	13	1½	5	11	7	3½
Se	7½	2½	13	12	14	2½	10½	5	7½	7½	2½	2½	10½	7½
So	6½	4½	12	10	13	10	14	1½	8	6½	4½	10	3	1½
Mgt	2	11½	9	7	14	9	4	4	11½	1	6	13	4	9
W	7	3	12½	9½	9½	7	1	12½	7	2	4	12½	5	12½
WE	8	2	8	3	2	5	8	11½	11½	13	4	14	8	2
WI	2	14	9½	6½	9½	2	4½	4½	12½	9½	6½	12½	2	9½
WV	13	12	4	4	8	9	7	14	1	4	4	10½	10½	4

R_j = 68 78 108 90½ 98 66½ 60 69½ 81½ 64½ 43½ 97½ 65½ 59

$$x^2 = \frac{12}{NK(K+1)} \sum_{j=1}^K (R_j)^2 - 3N(k+1)$$

where N = number of rows

k = number of columns

R_j = sum of ranks in jth column

= 24.23 *

APPENDIX 29

Statements in Part One of the Job Satisfaction
Questionnaire referring to Symptoms of
Anxiety

5. I find that my work upsets my health sometimes.
11. I get eyestrain from my work.
18. My work tires me out too much.
19. I often get headaches from my work.

APPENDIX 30

Measurement of Absence Severity

Severity rates were calculated using the following formula:

$$S = \frac{T_s}{N}$$

where S = absence severity,

T_s = total number of man-hours lost
over the period,

and N = average employment over the period.

a. Certificated Absence Severity

$$\begin{aligned} S &= \frac{10010.5}{314} \\ &= 31.9 \text{ hrs.} \end{aligned}$$

b. Uncertificated Absence Severity

$$\begin{aligned} S &= \frac{9513.0}{314} \\ &= 30.6 \text{ hrs.} \end{aligned}$$

c. Total Absence Severity

$$\begin{aligned} S &= \frac{19623.5}{314} \\ &= 62.5 \text{ hrs.} \end{aligned}$$

APPENDIX 31

Measurement of Absence Frequency

Frequency rates were calculated using the following formula:

$$F = \frac{T_f}{N}$$

where F = absence frequency,

T_f = total number of absences over the period,

and N = average employment over the period.

a. Certificated Absence Frequency

$$\begin{aligned} F &= \frac{251}{314} \\ &= 0.8 \end{aligned}$$

b. Uncertificated Absence Frequency

$$\begin{aligned} F &= \frac{346.3}{314} \\ &= 11.0 \end{aligned}$$

c. Total Absence Frequency

$$\begin{aligned} F &= \frac{3714}{314} \\ &= 11.8 \end{aligned}$$

Overall Ranks of Absence Behaviour using Kendall's Co-efficient of Concordance

Cost Centres	Certificated Absence		Uncertificated Absence		R _j	R _j - \bar{R}_j	(R _j - \bar{R}_j) ²
	Frequency	Severity	Frequency	Severity			
e	3½	5	1½	1	12.0	18.0	324.0
b	9	5	11	11	36.0	6.0	36.0
c	7	13	8	7	35.0	5.0	25.0
d	10	8	3½	5	26.5	3.5	12.25
e	1½	4	5	3	13.5	16.5	272.25
f	5	9	1½	8	23.5	6.5	42.25
g	7	2	12	2	23.0	7.0	49.0
h	14	10	7	12	43.0	13.0	169.0
i	14	14	14	14	50.5	20.5	420.25
j	1½	1	9½	9	21.0	9.0	81.0
k	11½	14	6	6	37.5	7.5	56.25
l	7	7	13	13	40.0	10.0	100.0
m	13	12	9½	4	38.5	8.5	72.25
n	3½	3	3½	10	20.0	10.0	100.0

$\sum R_j = 420$

$S = 1759.5$

$\sum R_j^2 = 30$

$$W = \frac{S}{1/12K^2 (N^3 - N)}$$

where W = Kendall's co-efficient of concordance,

S = number of squares of the observed deviation from the mean of R_j,

K = number of sets of rankings,

and N = number of entities ranked.

$$\text{ie. } S = \sum (R_j - \frac{R_j}{N})^2$$

$$\begin{aligned} \therefore W &= \frac{12 \times 1759.5}{16 \times 2730} \\ &= 0.48 \end{aligned}$$

$$\begin{aligned} \therefore x^2 &= K(N - 1)W \\ &= 4 \times 13 \times 0.48 \\ &= 25.96 \end{aligned}$$

APPENDIX 33

Ranking of all Cost Centres on each Variable

Variables	Cost Centre													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
Output	1½	4	14	7½	10½	5	1½	9	3	6	13	12	10½	7½
Quality	5	2	8	10	14	12	7	11	13	4	1	9	3	6
Costs	1	11	10	6	9	14	3	8	13	2	7	5	4	12
Job Satisfaction of Operatives	7	10½	2	6	9	12	5	4	13	3	10½	14	8	1
Job Satisfaction of Supervisors	7	9	14	11	12	6	3	8	10	4	1	12	5	2
Work Anxiety	10	9	6	12	5	14	3½	3½	8	1	11	13	7	2
Accidents	5½	11	5½	5½	14	5½	5½	5½	12	5½	13	5½	5½	5½
Absence	1	9	8	7	2	6	5	13	14	4	10	12	11	3
Labour Turnover	5	8½	10	3	4	12	2	6	14	7	8½	13	11	1
Industrial Unrest	6½	6½	6½	6½	6½	13	6½	6½	14	6½	6½	6½	6½	6½

$$W = \frac{S}{1/12h^2(N^3 - N) - \frac{h \sum T}{T}} = \frac{S}{1/12h^2(N^3 - N) - \frac{h \sum T}{T}}$$

where S = sum of squares of the observed deviation from the mean R_j ,

h = number of criteria on variables,

N = number of cost centres,

and $T = \frac{\sum (t^3 - t)}{12}$

where T = number of observations in a group tied for a given rank

$$\begin{aligned} \therefore W &= \frac{12 \times 6,736}{100 \times 2,730 - 10 \times 228.5} \\ &= \frac{80,832}{270,715} \\ &= 0.2986 \end{aligned}$$

$$\begin{aligned} \therefore x^2 &= h(N - 1)W \\ &= 10 \times 13 \times 0.2986 \\ &= 38.82 \text{ ***} \end{aligned}$$

APPENDIX 34

Application of Principle Components Analysis

Using the data in Table 36, a U-table may be drawn up by subtracting the row mean from each cell entry in the row, see Table 37.

Table 37

U-table

Variable	Cost Centres													
	g	j	n	a	m	d	h	b	k	c	e	f	l	i
O	-6	-1½	0	-6	3	0	1½	-3½	5½	6½	3	-2½	4½	-4½
Q	½	-3½	•	•	•	•	•	•	•	•	•	•	1½	5½
C														
JS.O														
JS.S														
WA	-4	-6½	•	•	•	•	•	•	•	•	•	•	5½	½
Ac														
Ab														
LT														
IU														

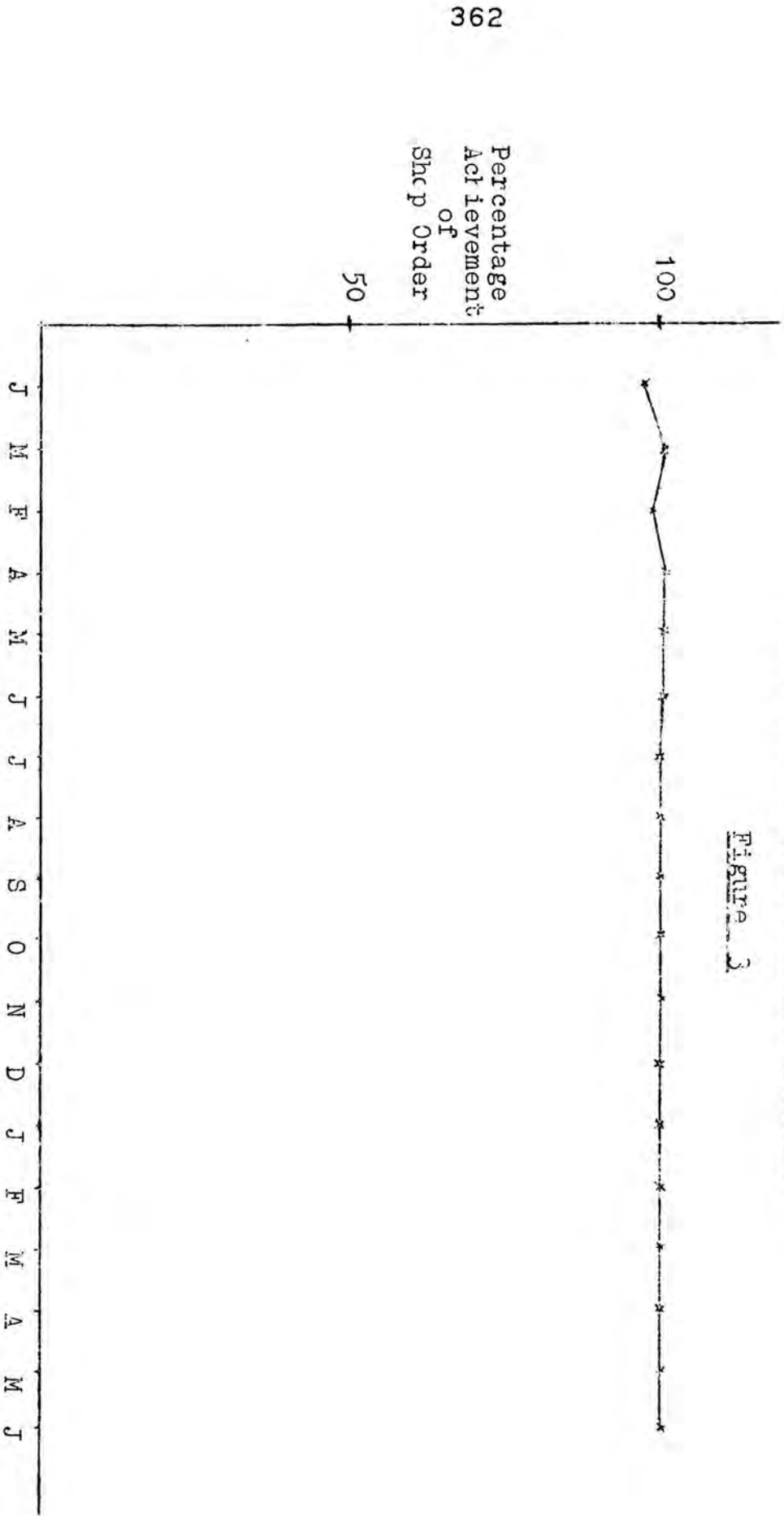
By multiplying U by its transpose, an I-matrix may be obtained, i.e. $I = U \times U^t$, see Table 38:

Once the major dimensions of organisational effectiveness have been identified, they may be used to account for change in effectiveness over time. Suppose, for the sake of simplicity, that there are two major components which contribute to approximately the same degree towards effectiveness, as shown in Table 39. Suppose, also, that output and labour turnover, for example, have the highest loadings on the respective latent vectors. These two variables may now be taken and the raw data or absolute figures (instead of the rankings) used to plot the position of the organisation over any particular period. Subsequently the position of the organisation may be re-appraised at a later date with respect to these criteria. Should there be more than two major dimensions, the situation would be more complicated, but the principle would be the same.

APPENDIX 35

Percentage Achievement of the Shop Order
over Period January 1966 to June 1967.

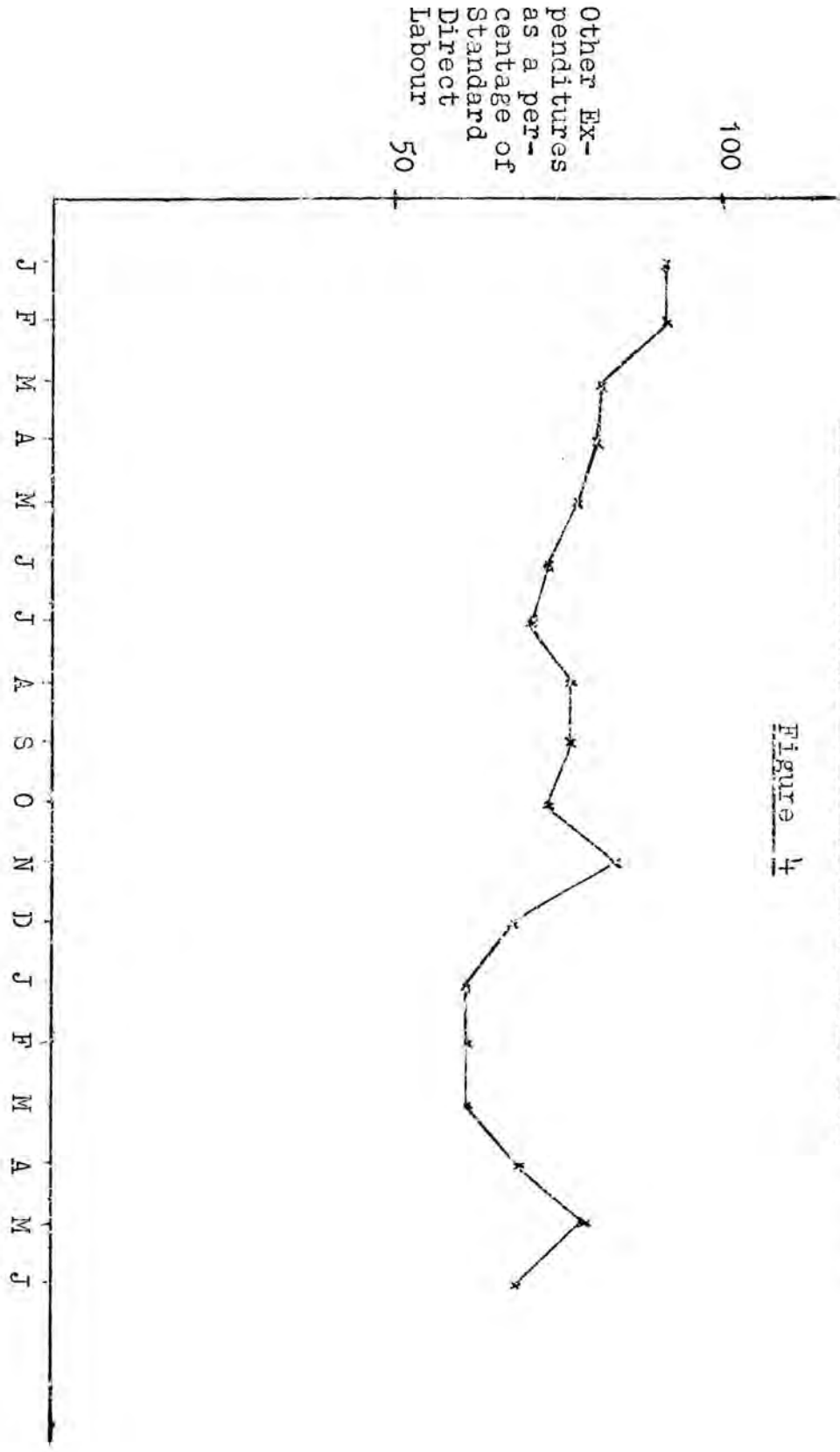
Figure 3



APPENDIX 36

Total Expenditure on Direct Labour Losses, Variable Indirect Labour, and Over-time and Night-shift Premiums, expressed as a percentage of Standard Direct Labour over Period January 1966 - June 1967.

Figure 4

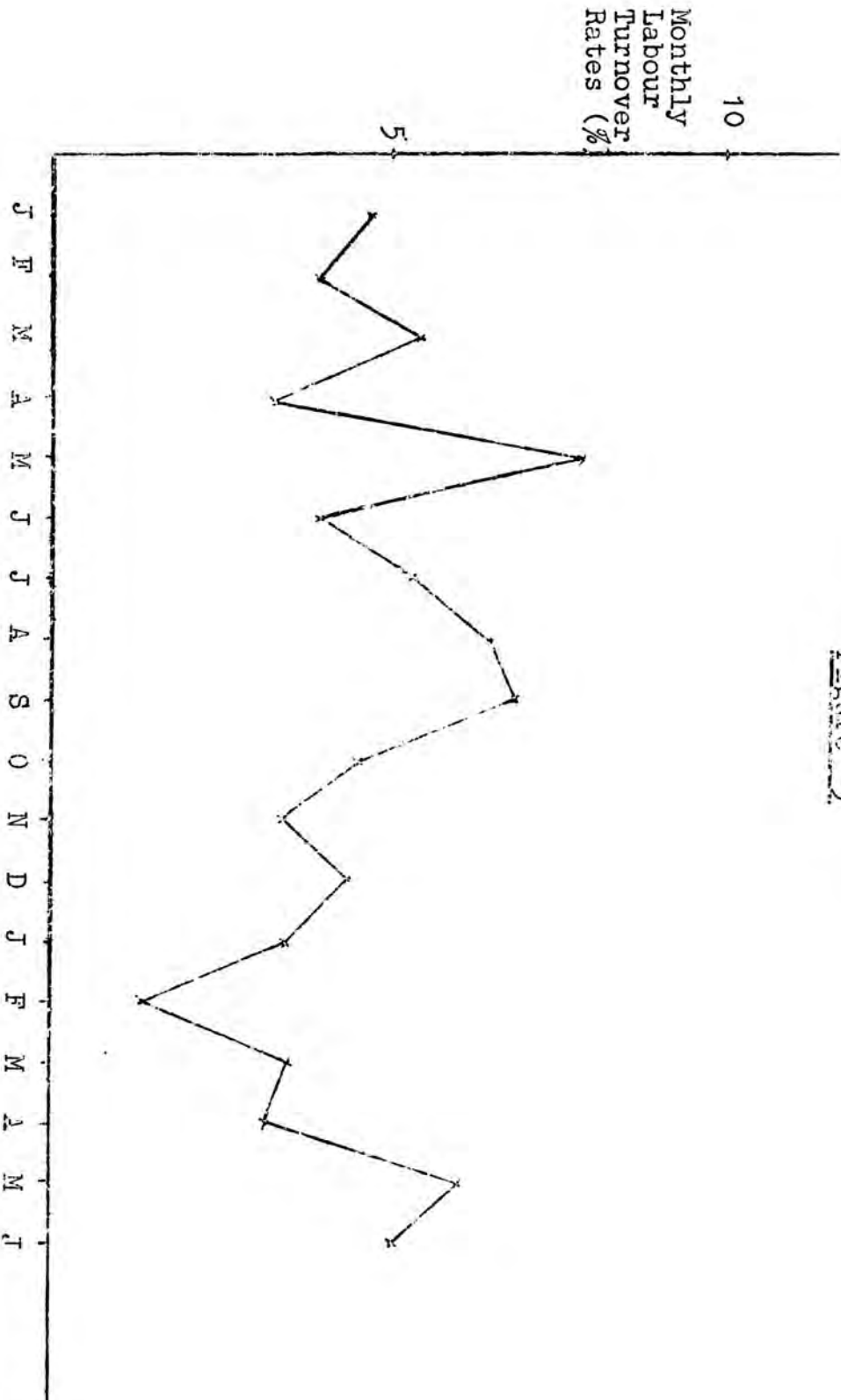


Period January 1966 - June 1967

APPENDIX 32

Monthly Labour Turnover Rates over Period
January 1966 - June 1967

Figure 5



Period January 1966 - June 1967

