Architectural design management aspects of the "Groenmarkt" project

Technische Universiteit
Eindhoven
Stan Ackermans Instituut
Centrum voor Technologisch Ontwerpen

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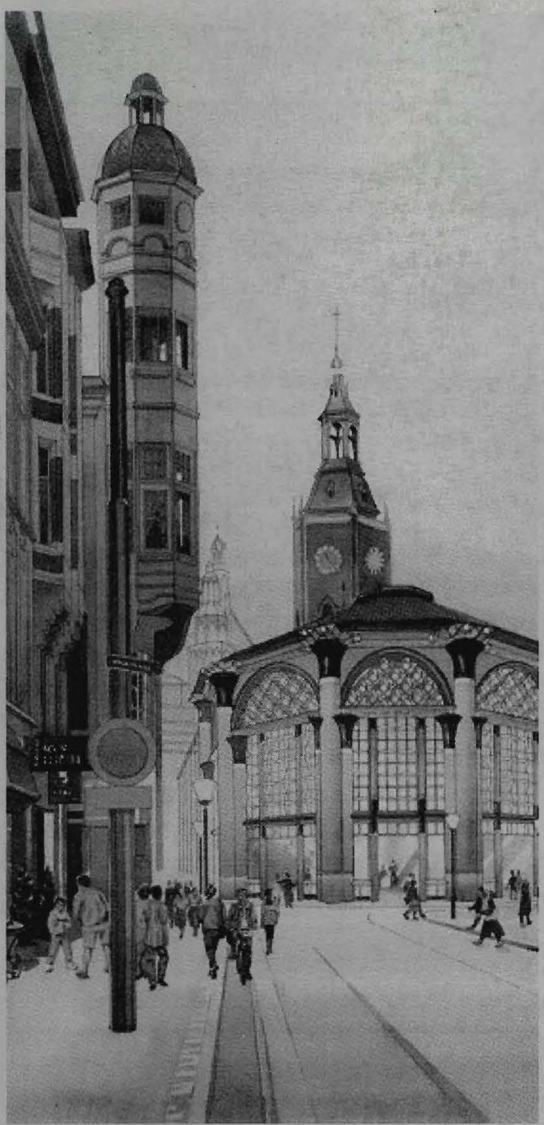

ARCHITECTURAL
DESIGN
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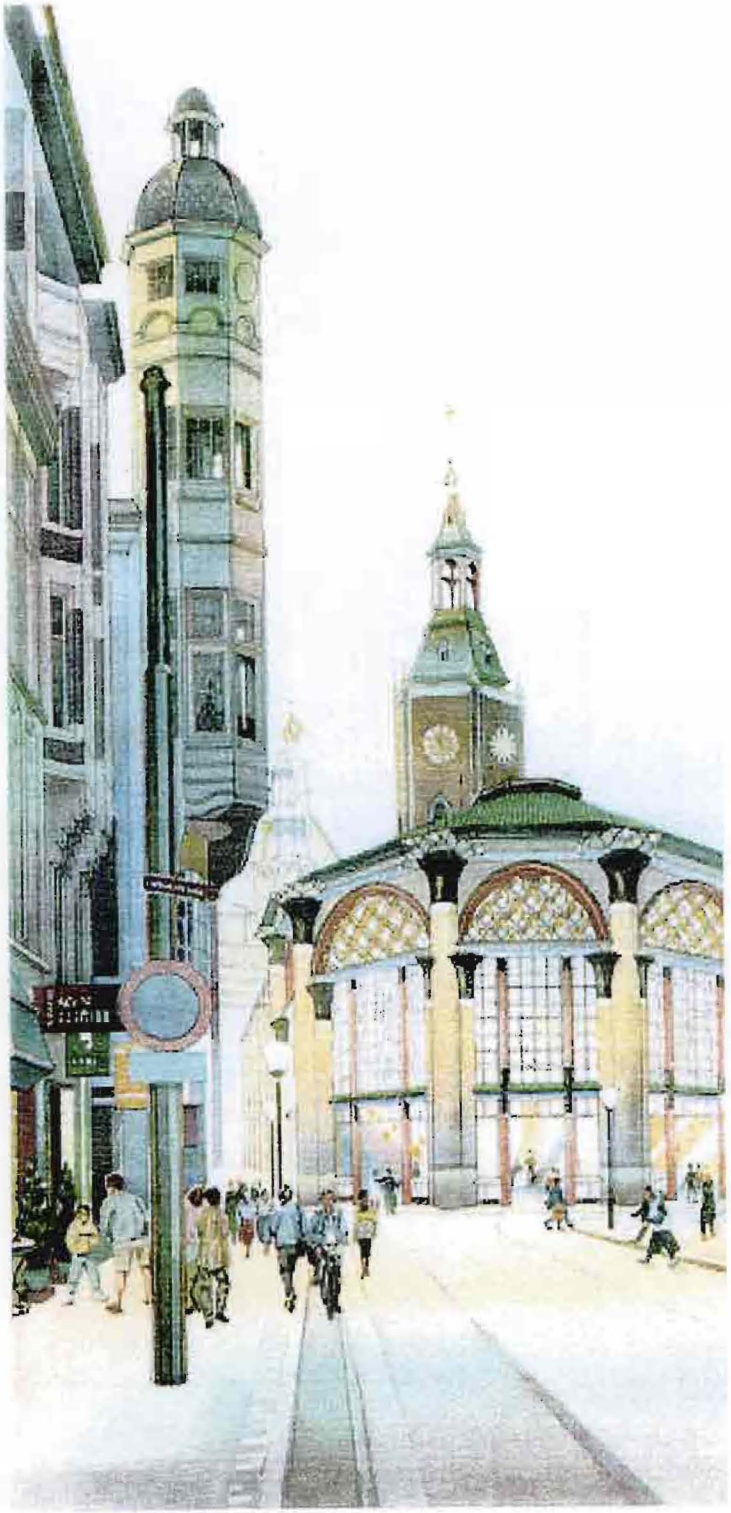

Architectural Design Management Systems
Stan Ackermans Institute
Eindhoven Unisersity of Technology

ADMS

BSB

ADMS-reeks

Dit boekje is een deelproduct van de post-doctorale technologische ontwerpersopleiding Architectural Design Management Systems (ADMS). De kern van deze opleiding bestaat uit een aantal blokken waarin de cursisten ADMS-thema's uitdiepen. Dit kan plaatsvinden via een literatuurstudie, een workshop of een praktijkverkenning. Elk blok beslaat 10 à 15 dagen. Na de blokken doorlopen te hebben volgt een praktijkopdracht bij een ontwerpend bedrijf. Relevante rapportages van de blokken en de praktijkopdrachten worden gepubliceerd in de ADMS-reeks.

ADMS is een tweejarige post-doctorale kopopleiding die zich richt op een geheel nieuw specialisme in de bouw: het ontwerpen en managen van bouwkundige ontwerpprocessen. ADMS wordt verzorgd door de faculteiten Bouwkunde en Technologie Management van de TU Eindhoven. De opleiding is ontstaan vanuit de behoefte van (vooral grote) ontwerpbureaus om het steeds complexer wordende ontwerpproces, met zijn steeds wisselende bouwpartners en takenverdeling, meer professionele sturing te geven. Deze behoefte betreft niet alleen architectenbureaus maar ook projectontwikkelingsmaatschappijen, organisatieadviesbureaus, grote bouwbedrijven en bouwbureaus van beleggingsmaatschappijen.

Architectural Design Management aspects of
the "Groenmarkt" project

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January 15th 1998

Architectural Design Management Systems
Stan Ackermans Institute
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Preface by the lecturers

This publication is a result of the course module "Case study Project". The course module forms part of a two-years full time postgraduate programme on Architectural Design Management Systems (ADMS). The ADMS school is a collaborative initiative between the Faculty of Architecture, Building and Planning and the Faculty of Technology Management of the Eindhoven University of Technology.

The case study project aims to integrate all acquired knowledge and skills on how to design and manage the design process of a specific building design project. It is directed not only to evaluate an existing building design project, but also to generate sounded alternatives on how to improve the design process. The case study assignment is carried out by ADMS students as group work. The assignment ideally consists of four parts:

- An orientation phase of data collection and interviewing core members of the building design project. This will result in a formal description (brief, design team organisation, organisation of design team partners, phase documents, methods, tools and techniques applied to manage the design process in terms of objectives to be realised, and management of time, quality and cost);
- An analysis of the design process of the building design project on efficacy and efficiency;
- Proposals on how to improve the process design;
- A written and oral presentation of the full case study

The case study project which is reported in this document concerns the 'Groenmarkt project' in The Hague. A building project initiated by the municipality to remain the old historic City Hall and to extend this Hall with office and new luxurious shopping functions. Main partners in the building design process of the Groenmarkt project have been MAB (a real estate development organisation), John Outram Associates (architect), Inbo Adviseurs Bouw (as subordinate partner of the architect), Corsmit Raadgevend Ingenieurs bureau (structural engineering), Techniplan Adviseurs (technical installations). These partners have been interviewed by the ADMS students and have facilitated the process of data collection and evaluation of the Groenmarkt project.
In this respect we would like to mention and to thank the following persons for their contribution:

- ir. M.A. Douma (Techniplan Aviseurs bv)
- ir J.J.M. Font Freide (Corsmit Raadgevend Ingenieursbureau bv)
- Ing. E.A. Hofman (MAB bv)
- ir.L.H.M.J. Lousberg (Inbo Adviseurs Bouw)
- Ing. J.H. Ploeg (Inbo Adviseurs Bouw)

During the Case Study Project, the ADMS students received feedback, not only from the responsible lecturers, but also from Colin Gray from the University of Reading and from Dr M. Paul Nicholson from the University of Nottingham. Colin Gray and Dr Paul

Nicholson, experts in Architectural Management, were invited for respectively 2 and 3 days to lecture and to supervise the group work of the ADMS students. We feel very obliged to both invited guests for their contributions. They enriched the course content with their insights and gave several valuable recommendations to the students how to work out and to improve the Case Study Project.

The total time available to complete the Groenmarkt Project was five weeks. The first two weeks were utilised for data collection and to analyze the project. At the end of the second week and during the third week, the ADMS students received feedback on their preliminary evaluation report. The third week was also dedicated to lecturing. Several topics related to architectural design management were addressed.

Based upon the results of the evaluation report, we as lecturers decided to formulate the design management tasks to be worked out by the ADMS students in the following two weeks. For a detailed description of the design tasks we refer to the introduction chapter in this report. The last two weeks were dedicated to complete these design tasks. The design tasks were carried out on an individual basis or by couples of ADMS students.

The ADMS students had to complete their design tasks within a very limited time constraint. Feedback on the content as given by the lecturers in the last week of the course module, have to a limited extent led to a revised final version. Several parts in this report may also be improved grammatically. Nevertheless, one may conclude that in general a satisfying result has been achieved by the ADMS students.

Our conclusion was that the content may be worthwhile for a larger target group. One may think in this respect on future ADMS students and professionals in the field of Architectural Design Management interested in the work of our ADMS students. This is why we have given our approval to bring out the report in the by now traditional series of ADMS publications.

Dr ir J.I.M. Halman and Dr ir M. Prins

Preface

This paper is written as a part of the case study "Groenmarkt". This case study is a module of the post-graduate study Architectural Design Management Systems (ADMS). ADMS is a two year full-time study at the Stan Ackermans Institute of the Eindhoven University of Technology.
The goal of this module was to integrate the knowledge acquired during the ADMS course. To do so within the given time-frame the different aspects to be addressed in this module were split up and subdivided amongst the ADMS students. A number of these aspects are addressed in this paper.
This paper is written within the framework of this module in less than two weeks time.

The case study has been enhanced by the support of Colin Gray and Paul Nicholson. They contributed respectively two and three days to the case study. We would like to thank them for their efforts.

We also like to thank the design participants of the "Groenmarkt" project for their co-operation in providing information by interviews and other means. Those participants are:
ir. M.A. Douma, Techniplan Adviseurs BV;
ir. J.J.M. Font Freide, Corsmit Raadgevend Ingenieursbureau BV;
ing. E.A. Hofman, MAB BV,
ir. L. Lousberg, Inbo Adviseurs Bouw,
T.J. Ploeg, Inbo Adviseurs Bouw;
dr.ir.ing. W.Tijhuis, Inbo Adviseurs Bouw.

The ADMS students.

Contents

Introduction

1. Design tasks for ADMS case study

Based upon the preliminary results of the case study evaluation (up till now a rough process description given in chapter one) 10 design tasks have been formulated.
The case study is integrative in the sense that all knowledge acquired in the preceding course modules will have to utilised.

The tasks are sorted out into two collections. The first one concerns 7 main tasks. The second collection consists of 3 complementary tasks. These tasks are divided among the ADMS students. This approach will guarantee not only a profound but also broad investigation of relevant aspects concerning the design management tasks related to a building project.

It is expected from each ADMS student that he/she will deploy maximally his/her own creativity, knowledge, skills and experience and explicitly relate the work with relevant literature in the field. For each task it is expected that the analysis and design is worked out as concrete as possible.

2. Main tasks

1. Work out an alternative project organisation (structure) for the evaluated project, that enables better chances for inspiring project leadership and without loosing the quality of the current informal way of collaboration.
   Work out also for this intended new project organisation (structure) a detailed plan for the PSU (Project Start UP) of this project.

2. The existing building within the project was owned by the city and used for marriage purposes, This function will remain after project completion. Imagine this project carried out as a PPP (Public Private Partnership). What are the consequences in case of PPP. Think of property relations, risks for all parties concerned, management of cost, time and quality, and the project organisation. Work out for this PPP, the project strategy and structure with The Hague municipality as project principal.
   Develop alternatives for the property relations, purchase and transfer of land and buildings and compare these alternatives in terms of pros and cons. Based upon the results of your design study: would you have recommended the city government to carry out the existing project as a PPP?

3. Analyse within the context of the project evaluation, the following two cases
   a. A serious delay in the project occurs again, caused by the fact that the Architect fails again to meet the dead lines agreed upon. This delay creates a large outrun in project costs. Work out a proposition for arbitration, to recover the loss from the architect.
   b. After project completion the building appears seriously damaged. This is caused by the architectural detail solutions for the ornaments, as drafted by the architect. Analyse in which case/situation the principal may recover the damage from (1) the architect; (2) INBO; (3) the contractor (4) the supervisor of construction activities.

   Work out both questions for the following situations:
   1. The Architect has been contracted with the NL Standard Agreements
   2. The Architect has been contracted with the British Standard Agreements

   What are the chances for success of a legal procedure in case a mutual settlement is not achieved? Your opinion should be based upon a profound analysis.
   Develop an advise report for design managers how to deal with contract liability management in general and for foreign parties in particular.

4. Suppose that a main conclusion of the case study evaluation will be that for projects like this one (complex location within inner-city, change of building function, foreign parties within project team, a local government striving for high quality architectural solutions) time overrun is very usual.

Work out, using WBS, network and time scheduling, how to anticipate and prevent with a number of management and acceleration options, the problem of time overrun.
Work out, based upon your findings, how to accelerate the evaluated project, by reducing the current time overrun with 50%. What are the risks and potential benefits of such an acceleration (from the perspective of the project principal)?

5. Develop a proposal how to monitor and to control the project progress (time and costs, using earned value etc.) from preliminary design up till tendering.

6. Work out a proposal for implementing a project quality system for the evaluated project. Take into account quality systems that are already available within the parties concerned and possible resistance against implementation of project quality systems.
Considering the theory of concurrent design & engineering, what are bottlenecks for the way the project flow has been managed up till now, and what are potential bottlenecks for the near future (project construction)? Work out possible improvements related to the items discussed.

7. Work out alternatives for building the current project. Work out also alternative changes in building & construction design leading towards improved realisation performance: easier to produce (time) or cheaper to produce (cost). Compare the alternatives and make suggestions how to select a production option.

3. Complementary Tasks

1. Work out in terms of project phasing, contracts, cost planning etc, the differences if the Architect as well as the contractor are working with British standard conditions for design and construction.
Work out and conclude opportunities and threats of these changing legal relations between parties on the Dutch building market.

2. Evaluate at least three options for tendering constructors. Work out how the existing lack of integration with construction parties may be corrected. Consider within your evaluation also potential risks in terms of time, quality and costs.
Your evaluation should be to advise MAB (the project principal) which tendering procedure to follow (for this project specifically and future projects in general) with also a check list for selecting the contractor.

3. During the concept deliberations the city government expressed the project as acceptable. One hour before closure of term for public objection, the neighbourhood supported by an expert lawyer, submits a sounded objection against the current project. Governmental procedures are not in favour, the project plan is a half year behind intended time schedule. Neighbourhood inhabitants are opposed against an augmenting pressure to park cars and neighbourhood business opponents are against the traffic closure during construction period.
    1. Work out the consequences for the profitability of the project
    2. Work out a plan how to deal with the problems raised by the neighbourhood
    3. Investigate possibilities to enforce the continuity of project realisation by presenting the case in court
    4. Develop alternative strategies to settle the problems by gentlemen agreements.

In the first chapter of this report the rough description of the process will be given. In the following chapters the tasks formulated above will be looked into. The tasks will not be described in the order given above, but the tasks done by one ADMS student will be presented together. The exact order of tasks is presented in the contents.

Chapter 1

Project evaluation of the project "Groenmarkt" in The Hague

Since november 25 th the group of 7 ADMS students has interviewed the participants of the "Groenmarkt" project to get an overview of history and organisation of the project process.
Every interview has been integrated into a total survey, that is presented to you.
In order to make a structure of the project it has been devided into eight parts concerning the most important issues:

1. Project preparation and the Brief
2. Organisation
3. The Project Schedule
4. Information
5. Time Management
6. Cost Management
7. Quality Management
8. Bottlenecks

This report relies on availble information and will serve as input for further evaluation and discussion.

Project Preparation and the Client's Requirements

Project level

In the early nineties the City Council of The Hague formulated the need for a new residence, where all municipal functions would fit in. The result was the new City Hall, designed by Richard Meier, which was completed in 1995. Most of the space in the old City Hall had no importance anymore for the municipal functions, so the City Council decided to develop a new function for the building and the location around it. They wished to create a new form for this location. The old City Hall is situated between a triangle of streets in the centre of The Hague and is surrounded by three tramway lines. The original building was built in 1564. In 1767 it got its first extension, in 1972 its last extension. After analyses of the area and its buildings three options were developed:

1. Demolish the building and create a whole new area for hotels, restaurants and pubs; a public function.
2. Remain everything and search for a function, which fits in it.
3. Remain the old historic valuable part of the building and demolish the rest of it (the extension of 1972), this as part of a whole redevelopment of the area.

Several Real Estate developers were invited to develop a solution, which should fit in one of these options.

MAB was one of these real estate development organisations. With a special "concept-group", they developed a complete plan for this location, which showed many similarities with the third option. After a study of all plans, the plan of MAB was chosen and the building and its site was sold to MAB. The motivation of the choice was related to the fact that MAB was the only Real Estate developer, who wanted to built the whole available area. The plan seems very simple. The old building (before 1972) will be remained and will get a new function as office space. The first floor will get an official municipal function (weddings). The City Council rents this space from the MAB. The new extension will be erected on the basement of the demolished extension, and will be built in the same style as the old City Hall. The floor space of this new extension will amount about 2000 square metres, divided over two floors. New luxurious shops, an enrichment for the area, will be settled in this new building.

As the new function wouldn't cope with the development plan of the government the City Council started the procedure clause 19. In this procedure a change in the destination plan is proposed, which would agree with the new function. Awaiting the approval of this change and the building license, many elements of the process could already be started. This procedure saves lots of time.

The feasibility of the project depends on the ratio between the costs and the benefits of the project. MAB developed several software programs, which work with characteristic factors and numbers. With these programs, MAB could get a clear view of the feasibility of the project. The budget of the whole project was fixed on an amount of 12.5 million Dfl. (£5,000,000).

MAB, as a professional principal, has developed its brief itself in a very detailed way. The brief, in the form of a conceptual, consists for the greater part of sketch drawings to get a clear image what the building should look like. Information is related to the global form of the building, the amount of square metres, positions of stairs and elevators, entrances and functions.

Participants

John Outram Associates

There was no relation between MAB and the architect before this project. However MAB was familiar with the work of John Outram. It was the conviction that John Outram's neo-classic style was the perfect style for this project. The English architect was chosen on base of the previous buildings he designed. There was no tender-process for any architect. On base of the brief and after the Outline of the Proposals, John Outram made an architectural Preliminary Design. John Outram Associates is contracted on the conditions of the SR'88 (the Dutch SFA'92).

After the presentation and approval of the architectural Preliminary Design, other partners for the project are contracted by MAB. In this design-group, MAB as client has the role of project manager. The roles of the other partners are as follows:

INBO Advisors

The differences in technical standards and juridical regulations between Great Britain and Holland could cause some problems for an foreign architect in Holland. INBO is contracted to work out the plans of the architect, according to the rules and norms of the Dutch Government and society. INBO is contracted for every stage of the project, till the start of the tender-process for the contractors. In this process, INBO is the subordinate partner of the architect.

Corsmit Structural Engineering

Corsmit is contracted for the structural engineering part of the whole project. They are obliged to make a construction project on base of the design proposals for the construction plan and to make calculations for it.

Techniplan installations

The installation part of the project is provided by Techniplan. It has the same position as Corsmit.

Organisation

Project level

Within a project organisation two types of relationships can be distinguished:

- contractual relationships;
- organisational relationships.

Contractual relationships proceed from an agreement between participants. These agreements content the responsibilities, authorities and liabilities for each of the participants. Organisational relationships are expressed in the way the participators are co-operating with each-other.

Contractual relationships

All participants have an agreement with MAB Real Estate Development so all participants have a direct contractual relationship with MAB Real Estate Development (MAB). The participants in this project are John Outram Associates Chartered Architects (JOA), INBO Advisors, Corsmit Structural Engineers (Corsmit) and Techniplan. These contractual relationships are drawn in figure 1.1.

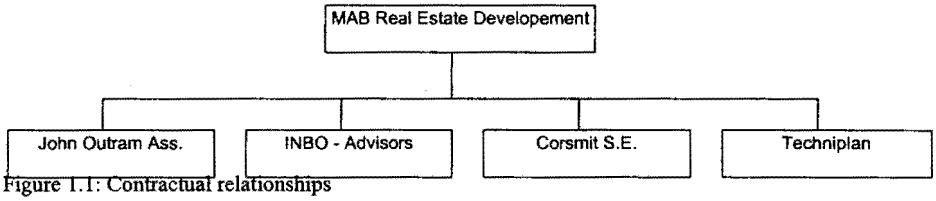


Figure 1.1: Contractual relationships

In this project MAB is the project principal as well as the project manager. Based on the contracts between MAB and the other participants, they are only responsible and liable for their activities towards MAB.

The 'SR 1988' is applied for the agreement of MAB and JOA as well as MAB and INBO, Standard Regulations 1988 for legal relationships between directors and architects. The main reason to apply these regulations on the agreement between MAB and INBO is because of the interpretation of INBO as a facilitating architect by MAB instead of architectural engineers.

According to these regulations the architects, JOA and INBO are liable for:
- reproachable mistakes by the architect or his staff;
- detriment by exceeding his authority by the architect or his staff;
- exceeding the construction costs.

Supplemental to the last item the architect is only liable for exceeding the construction costs if the architect is reproachable for the exceeding. If so, than the architect has to make a new design on his own expenses.

How liabilities and responsibilities are devided between JOA en INBO is unknown at this moment.

For the agreement between MAB and Corsmit supplemental regulations are recorded in "RVOI 1987", Regulations for legal relationships between the principal and the advising engineers. In this particular case the regulations for structural engineers (appendix B, RVOI 1987) are applied. In the standard agreement made by Corsmit, the different activities in the different stages of the design-process and their agreement numbering are similar to the activities and their regulation numbering in the RVOI 1987.

For the agreement between MAB and Techniplan the same supplemental regulations are applied. Except that in this case the regulations for mechanical and electrical engineers (appendix C, RVOI 1987) are applied. Next to these regulations the "General regulations for constructing mechanical and electrical installations and a supplemental 1996", technical regulations, are also applied on this agreement by MAB and TVTI/W(E en S) 1993.

Organisational Relationships

For the project "Groenmarkt" the principal, MAB implemented a design team-construction to develop the project. Within a design team all designing disciplines are participant in the design process. Not involved in the design team are the engineering design and contractor disciplines.

In the design team for the project "Groenmarkt" the participators concerned are John Outram Associates Chartered Architects (JOA), Corsmit Structural Engineering (Corsmit) and Techniplan. They where being added on different times during the design process. This will be made clear later on.

To make clear the involvement of MAB in the design team during the design process three roles for MAB can be distinguished:

- Director (MAB Real Estate Developer);
- Project management (MAB Building Management);
- Development Consultancy (MAB Concept group).

In the earliest stage the project principal ordered to make a Conceptual Design; "Structuur Ontwerp" (SO), by the development consultants of MAB. The design team during this stage of the design-process consists of only one team member: MAB Concept group (figure 1.2). They developed a conceptual design that became the standard for all demands related to the project for the next stages of the design-process.

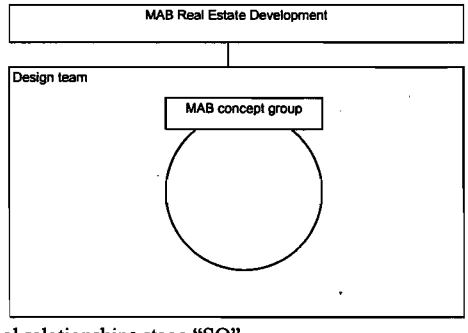


Figure 1.2: Organisational relationships stage "SO"

During the early stage of Preliminary Design; "Voorlopige Ontwerp" (VO), a new line-up for the design team arose. JOA was contracted for making a Preliminary Architectural Design based on the conceptual design made by MAB Concept group. MAB Building Management became involved in the design-process as project manager (figure 1.3).

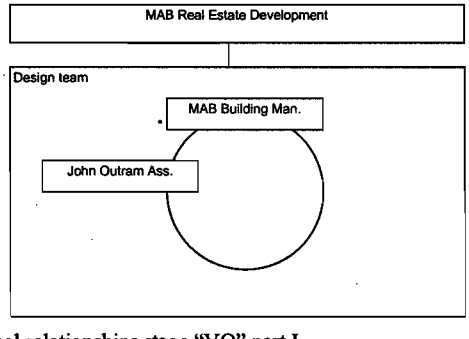


Figure 1.3: Organisational relationships stage "VO" part I

When JOA finished their Preliminary Architectural Design, MAB contracted the other participants mentioned at the beginning of this chapter (figure 1.4). Their instruction was to make a preliminary

building-technical, structural, mechanical and electrical design based on the preliminary architectural design made by JOA within Dutch regulations.

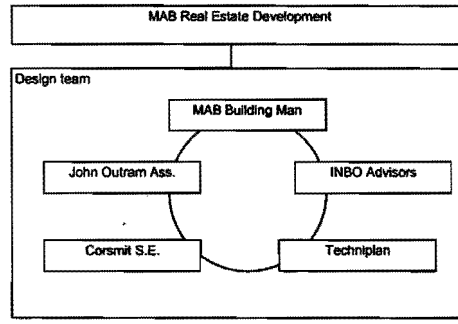


Figure 1.4: Organisational relationships stages "VO" part II and "DO"

According to the different communication-lines between the participants of the design team, it can be concluded that a kind of hierarchy within the design team exists. The three Dutch participants are supporting JOA in making their architectural design feasible in the Netherlands. All drawings and documents must be approved by JOA. Overall decisions can only be made by MAB Building Management.

They are responsible toward the director MAB Real Estate Development. The integration of these communication-relationships are shown in the last design team-model (figure 1.5).

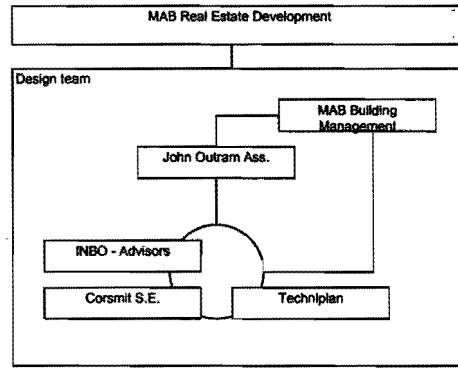


Figure 1.5: organisational relationships stage VO part II including hierarchical communication relations

Participants

John Outram Associates

Their is only very little known about the internal project-organisation of JOA. Known is that all drawings and documents need to be approved before they are distributed to the other participants. This procedure causes a delay in the design-process for a couple of months. His opinion towards this delay is that he is worth waiting for because otherwise there wouldn't be a satisfying design.

INBO Advisors

The only knowledge of the internal project-organisation is that they do have an internal project leader for the project "Groenmarkt".

Corsmit Structural Engineering

The office is organised in such a particular way that it's possible that the partners can spend large amounts of their time in doing projects. The partners tasks includes keeping contact with the principal, making a conceptual structural design and managing their staff as port of the project team. Every project team has a different format, but it's always composed of an advising structural engineer, a structural engineer and draughtsmen. Beside this team there is an internal project leader. In this project this appears to be the advising structural engineer. So for the project "Groenmarkt" the following internal project-organisation is set up (figure 1.6):

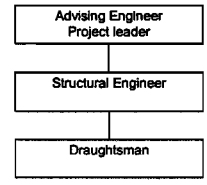


Figure 1.6: Internal project-organisation Corsmit Structural Engineering for the project "Groenmarkt"

Techniplan

In the early stage of the project only the manager of Techniplan was involved. He had to try to get the assignment. When he succeeded, the assignment was handed over to a project engineer. This project engineer also became the internal project leader and the external spokesman. Within the organisation the project leader takes care for the design of conceptual, preliminary an final design for both mechanical and electrical installations. In the project "Groenmarkt" the project leader was the mechanical project-engineer. He made the different mechanical designs during the design-process as well as the different calculations. For the electrical designs needed during the process he collaborates with his collegue, the electrical project-engineer. The last part of the internal project-organisation (figure 1.7) is the draughtsman for executing the drawing work.

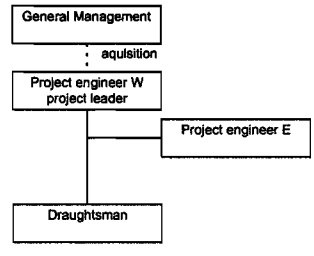


Figure 1.7: Internal project-organisation Techniplan

The Project Schedule

The schedule of this project has been made by the project-owner MAB. For different reasons this schedule has not been adhered to.
Whenever milestones could not be met by one of the participants, the schedule has been adapted to meet this problem. In the regularly held design-team meetings the overall planning has been adjusted to circumstances that arose. Not being able to adhere to the schedule has not resulted in financial consequences for the responsible participant.
Another delay has been caused by the local government. The committee concerned with monitoring building activities in the city-centre of The Hague delayed the project for about two months. It remains unclear how the rest of the delay arose.

At this moment the total delay is about nine months. According to MAB the building will be finished in the end of August 1999. In the original planning this date was set at the end of December 1998.

It remains unclear why there has been so little pressure to limit the delay of the performed amount of work. Until this moment the project-owner has taken account for the consequences of this delay.

Scheme: The Project Schedule

Information

Project level

For controlling the data flows in a project the principal or project manager can use different tools. Most important parts of these tools for data flow- and configuration management are:

- drafting
- identification and registration
- acceptation and approval
- revision
- distribution
- recording
- disposal

In the project "Groenmarkt" the project manager didn't use any kind of these data flow- or configuration management systems. There were no agreements for a specific identification-, registration-, revision-, distribution-, recording- or disposal system. All the participants had their own systems. There were only some informal agreements about approval between the participants. At the end of each stage the different participants controlled all the documents of the other participants before they were sent to MAB Building Management and JOA. MAB Building Management required an approval of the documents made by the participants to ensure the highest architectural quality as possible.

Participants

MAB Building Management

From the different documents which are made by the participants in this project MAB distillates the most important information. This information is summarised in a decision-document that's made at the end of every stage of the design-process. These decision-documents are made only for internal use of MAB and not for external use. All documents made in the different stages of the design-process by the participants are checked by a specialist in the MAB organisation. Based on the conclusions of these specialists MAB decides to go on, to ask for corrections or to finish the project.

John Outram Associates

For identification of documents and drawings made for a specific project JOA uses a unique identification system.

INBO Advisors

For identification of documents and drawings made for a specific project INBO uses a unique identification system.

Corsmit Structural Engineering

For identification of documents and drawings made for a specific project Corsmit uses the following identification system.

Every document has a unique registration code. For example the code **9701 VO-C001 A** is a type of code used by Corsmit. The first number (9701) is the project number, VO means the stage of the design process the document belongs to, C001 is the document type (C = Construction) and the drawing number. The last capital makes clear which revision the drawing includes.

Corsmit has a systematic procedure for approval of the their documents. First the draughtsman has to check his own work. Then the structural engineer has to correct the documents made by the draughtsman. The last control is by the advising structural engineer. He has to approve the drawing or other documents before they are distributed.

If drawings or documents are revised during the design-process the revision code in the registration code changes. The draughtsman has to look after all the drawings that also have to be modified. For approval of revisions the same procedure is considered as for new documents. Communication about revision is informal and won't be record.

The distribution of the documents is recorded in a drawing list.

Techniplan

For identification of documents and drawings made for a specific project Techniplan uses a unique identification system:

The unique registration code at Techniplan could be: **MPH 2 34 ct W.** The first three capitals refer to the director of the project. In this case MPH stands for MAB Real Estate Developer. The first number in line refers to the stage of the project. According to the list 2 stands for executing.

1. Design;
2. Execution and construction;
3. Co-ordination;
4. Brief;

:

:

:

9. Construction.

The next number is the drawing number, ct are the initials of the draughtsman and the capital refers to the disciplines. The following disciplines are distinguished:

E: Electrical;
V: Ventilation;
W: Sanitary;
B: Building technics;
T: Transportation.

As long as the documents are in a preliminary stage they are recorded as "Concept". In the final stage the mark "Concept" is removed. For the approval of the documents a sign of the project leader is needed. After this approval documents can be distributed. It is recorded to which participants documents are sent.

Time management

Project level

The "Raadhuis Groenmarkt" project is more cost- than time constrained. The overall planning of the project is limited to an overview of the most important stages related to a monthly time schedule. On the overall level of the project, time is controlled by MAB. For this purpose each design-team meeting serves as a milestone in which the activities of the participants are described for that moment. In these meetings the activities for the next milestone are decided upon. If necessary, the responsible participants will be addressed. How these participants manage their own time is of no concern of MAB, because of the limited complexity of the project.

Participants

Corsmit

Corsmit plans its activities according to the milestones of MAB. The activities are based on the "RVOI" and finalised in detail in consultation with MAB. The internal plan is based on experience. Each fortnight the state of affairs of all projects is evaluated. In case of time-pressure, first the possibility to shift between projects will be reviewed before external capacity will be addressed. Corsmit has not made an overall planning due to the limited complexity of the project.

Techniplan

The activities of Techniplan are also based on the "RVOI". The hour-schedule has a lump sum basis, which is related to the gross floor area and the type of installation via company based references. If the activities are more time consuming than planned, the extra work is paid for by MAB.
Every quarter of a year Techniplan draws up an internal plan. In case the activities still exceed the planning, this is taken care of by working overtime. Besides the fact that external capacity is not available, Techniplan considers extension of the bureau as a threat to the informal way of working and not desirable because of changes in assignments.

INBO

INBO's activities rely on the "SR'88". The hour schedule is based on budget and experience. Planning is the base for time management and if necessary activities are speeded up. At certain points in the design process the state of affairs is evaluated, which may lead to a rescheduled planning.

Cost Management

There is a difference between the budget planned by the client, management of the costs done by the internal project managers, and the cost approximation of every participant of the design process.

Participants

The project manager MAB

The budget is set by MAB, who is the principal and the project manager at the same time. Its amount is based on the project activities and is based on a software program that MAB uses for its projects. From the beginning of the project, the separate budgets were estimated according to the costs in every separate stage. These budgets were provided by the planning and costs specialists of MAB. Their expertise is always based on experience and historical information from comparable projects.
Thanks to that, MAB can monitor the costs performance on the project and recognise the factors creating changes to the cost baseline. There is no risk analysis method that is attached to the stages. The risk is connected to the investments during the building process.
The architect's fee is a percentage fee of the total construction costs (accordingly to the Dutch SR'88).
The consultants fees - INBO, Techniplan and Corsmit are lump sum based (RVOI). The design participants ought to manage their internal costs.
The internal MAB costs (fees) are attached to the stages.
The costs baseline is measured every time changes occur and every time the periodical meetings are prepared. The consequences of the higher costs of design changes are that the design expenses are cut in some other places so the total budget may maintain.
Making design changes MAB considers the estimated proportions between the costs and the proceeds. The are no standard methods to prevent the loss, as man cannot predict them.

John Outram Associates

It's the architect's duty to make a financially feasible plan. If the budget is exceeded (because of the plan) the architect has to make a correction or redesign on his own expenses.

INBO - internal costs management

The budget for the advisory work of INBO is based on estimated costs made by INBO advisors. INBO had to make a resource planning determining the work breakdown structure (drawings, advise), input of people and the time connected to this.
The costs are directly attached to the time registration. All the activities have a code (project number en phase number) and are introduced into the system every week.

The budget is a management tool. It contains an information network, which gives the management team a clear insight into: organisation of the cash-flow, cost registration of the project and the project registration. In this way the cash-flow can be controlled through the declarations and expenditures.

The INBO advisors monitor the hour-registration carefully and are ready to undertake some corrective and preventive actions.
When the costs limit has been exceeded INBO tries to find the reason of the changes and the consequences for the project. If there is no extra budget for the other solution, INBO has to cover the loss.

Corsmit - internal cost management

The advise fee is based on the agreed sum. The sum is made using the activity duration estimation (experience) and the project parameters.
Corsmit's personnel is charging hours to the project. In the end of the month the total cost survey is made. When the cost limit is being crossed, the reasons for the situation are evaluated. The team is trying to develop more efficient work methods to bring the costs down .
Every three months the total profit and loss of the firm is analysed and the separate projects are monitored.

Techniplan

- internal cost management
  The advise fee was based on the hour-planning. This planning was defined by experience and the project parameters: m2, kind of installation. The costs attached to every hour are put into the system every week. Then the evaluation of the project progress takes place connected to an estimation of the necessary time to finish the project.
- installation cost
  The installation cost estimation was based on the project parameters. There was a difference between the new building and the adjustments required in the old part of the building (ventilation, cooling). Techniplan developed the costs of investment and MAB defined the budget.
  In the detailed definition of the project (Detailed design) the costs were updated. It seemed the costs crossed the limit at this moment. It led to a reduction of the installation fittings in the store. The cooling installation had been reduced to top cooling.

Quality Management

Project level

The different participants of the design team of this project have not adjusted their quality systems to each other. Some of them have implemented a quality system and obtained an ISO 9000-certificate, but this project is not performed in conformity with a quality system connected to the project. As the MAB is not only the client of this project, but also responsible for the project management, the overall-quality of the object that will be built is controlled by this participant. Beside this each of the participants of the design team has his own responsibility to realise an object quality corresponding to the Clients Requirements and within the financial conditions formulated by the MAB.
The meetings of the design team, which take place monthly, contribute to the control of the process quality. During these meetings important decisions are taken, information is exchanged, the planning for the next four weeks is made for each of the participants and the progress of the project is controlled.

Participants

INBO

INBO doesn't use a real brief, but in fact the Scheme Design functions as a kind of Clients Requirements. Outram is responsible for realising the desired quality of the object. Calculations during the process lead to modifications of the design, which also has consequences for the quality requirements of the object.
INBO uses a quality system and has obtained the ISO-certificate some years ago. It must be mentioned that all quality requirements have always been realised in previous projects, also before the quality certificate was acquired. The encoding of the drawings and documents and the filing of these documents takes both place in conformity with the quality system for which INBO has been certified. INBO doesn't know if the other participants of the design team also have obtained a certain quality certificate and which quality system they are using within their organisations.
Because of missing a real decision document for each stage, there cannot be spoken of a quality test for each stage. But during the final part of a certain stage all drawings are checked within INBO before they are sent to the MAB, the client. Subsequently the MAB performs some quality tests, but until now these tests didn't lead to big adjustments of the designs produced by INBO. Sometimes it happens that activities have been started about which no decision has been taken yet. Until now in none of these cases this has caused serious problems in the process.

MAB

The MAB is not ISO-certified and doesn't have a quality system to guarantee the process quality. A quality plan connected to the project doesn't exist either. The quality of the object (according to mr. Hofman this is called the 'MAB-quality') is guaranteed by the fact that testing the design takes place after each stage by a concept group, a structural expert and a technical installation expert (all employees of the MAB). The concept group tests the plan on its urban planning and architectural viewpoints, as formulated in the Structure Plan (=the Client's Requirements) by the MAB. The structural expert tests the feasibility of the plan concerning the constructive design (costs and constructability). The technical installation expert tests the feasibility of the plan concerning the technical installations (costs and constructability). These quality tests depend on the stage in which the project is: the further the process, the stricter the tests. From the results of the quality checks the project manager is given feedback within the MAB. If the quality requirements have not been realised by Techniplan or by Corsmit, the project manager gives the member concerned feedback, after which he has to revise his design.

Techniplan

Since two months Techniplan has been occupied with the start up and the implementation of the ISO quality system. The objective of the organisation is to have acquired the ISO-certificate within one year. The reason for implementing this quality system is the fact that Techniplan expects an ISO-certificate to be required by the clients within a short time (government and European tender). Mr. Douma from Techniplan expects that the implementation of the quality system will neither lead to qualitative better products nor to a better process quality.

Once a month a meeting takes place among the different members of the design team, during which important decisions are made. When modifications of the design take place, these decisions sometimes have some consequences for the object quality to be realised.
In every project Techniplan makes an evaluation of the quality of the installation by herself, after the Detail Design stage has been finished. If it appears that the desired quality requirements have not been realised, Techniplan's design of the installations will be adjusted.

Corsmit

In 1995 Corsmit has acquired an ISO-certificate because of the fact that the market demands it. The office has had a good-working quality system for years, which had to be adjusted to be able to obtain the ISO 9000-certificate.
Within Corsmit a consulting engineer is responsible for the general management of a project until the project has been finished. In most cases this consulting engineer will be at work on the project daily in the early stages and he attends the meetings of the design team. In a later stage of the project many co-ordination activities will be performed by the project manager.

With relation to the quality of the object every member of the design team has his own responsibility. However the overall-quality of the object to be built belongs to the MAB. To be sure that the quality of the building will be realised as prescribed by the Client's Requirements, the MAB has employed professionals who have to check all designs and calculations an other time. If the quality requirements are not being obtained, a direct feedback to the structural engineer takes place, after which the necessary adjustments have to be made by this participant. For the other technical advisors (INBO and Techniplan) the MAB makes use of the same procedure. During the stage of Production Information and Bills of Quantities more attention is paid to this quality control comparing to the previous stages, because all designs and calculations are being made definitively in this stage.
According to mister Font Freide it is difficult to control the quality of the process, as it is often about incidents, which can not be expected and avoided. It is only useful to take measures against cases which occur repeatedly.

Bottlenecks

Project level

According to all participators in the process one can say it's been a smooth process so far. There haven't been any problems that are worth mentioning and that have led to bottlenecks of any kind. The only bottleneck that all participators were involved in, was the cut back which was necessary at the end of the DO stage. The budget was exceeded and therefore some changes had to be made. Cut backs were made in the materialisation of the design. In addition the outdoor lighting, designed by John Outram, was removed from the building.
MAB, the client party, however, expects problems during construction. These problems could be caused by the complexity of the city centre. These problems will have, according to MAB, a logistic base. The fact, that the location is positioned in the middle of the old city centre of The Hague, will cause some problems. Trams will be passing the location during construction. In addition, calamity traffic will have to be able to pass the square. Besides, the city of The Hague has put some essential pre-conditions to the process.

The original town hall has to be kept in function during construction, which means that wedding parties have to be able to take place during the construction period.
Therefore it is important that the contractor, who will be selected, is familiar with the management of logistic processes. MAB will construct a global logistic plan which will be discussed with the selected contractor.
MAB will contribute its knowledge with relation to construction of buildings in complex situations in city centres.
The selection criteria with regard to the contractor are based on the level of quality and the size of the organisation. The final decision is based on the price.
The building will be opened in September 1999.

Participants

MAB

MAB has experienced the process as very smooth until now. The problems which were met until now relate to the licences which had to be obtained. Especially the licence which had to be provided by the Department of the Environment Historic Buildings Bureau had impact on the time management of the project: it caused a delay of two months. Besides, the approval from the Committee Project City Centre took to much time.
John Outram was to blame for the fact that the drawings which were made by Outram and which had to serve as basis for the drawings of the other participators, where late on a regular basis. This also caused some delay of the process.

INBO

There haven't been any problems for INBO so far. The process has had a very informal character until now. On the whole INBO doesn't have a standard solution for problems to come in the project.

Techniplan

Techniplan also didn't meet any problems that are worth mentioning during the process so far.

Corsmit Structural Engineering

The process has been smooth for Corsmit also until now. The only problem which had to be discussed was related to the position of the steam conduct. After considering the different alternatives, Corsmit has chosen the one to change the position of the foundations for the new building. Breakdowns in communications during the process have been solved in an informal way.

Chapter 2

Jolanta Duniec

Maintask 2: "Public-private partnership - a leap in the dark? "

The Fourth Note about the Regional Planning pays al lot of attention to development of the planning and investment build-up. According to that, the quality, durability and profitability of investments must be improved. Regional planning has chosen 13 city areas (VINEX locations as well) that would be strengthened to manage the European competition. Good economical and living climate are a pro. The developing locations must present good policy for companies, supplies and parking norms. Because the old city centres present so complex, different problems the responsibility of development lays on the local leaders (whatever is the level of federal assistance). There is also a limit to which the government can do by itself - the private participants offer the capital, an expertise and a leadership.
To stimulate the investments and to develop an organisational construction supporting it, government thought of PPP - private-public partnership.
The public institution opened for the initiatieve of the private participants. In such a PPP project (most of the times a city development) the municipality works with one or more market participants. PPP creates interesting projects where the private participant invests, builds, explores and sometimes sells the object. It concerns building projects and road projects. PPP is never an objective in itself. It can be described as partnership without engagement, that realises a spatial investment on joint account. It is a way to enable the government to develop the projects with less risk and means.

The PPP creates a lot of expectations. It pulls investors, project developers, bankers and concerns. Characteristic for PPP is that the government makes the conditions (plans, functions) and leaves a couple of functions for the market participants (for exmple realising the infrastructure and developing the building plans). There are no permanent partnership forms. Every site knows its own problematic and the partnership forms corresponding to it.
Every city has it's growing potential. The municipal policy has to manage development of industrial circles, housing, transportation and provision in relation to each other. The attention for the dependencies between the centre and the satellite towns is the policy point as well.

Bottom-up and top -down approach. What are the traditional roles of the participants?

Public participant

Public participant is a top-down planner. The public participant can be represented by the government or a local municipality. The official representation of the government comes from the four departments: VROM (planning), Foreign Affairs, Maintenance of Ways and Waterworks, Economical Affairs) and the burgomasters.
Their role of the City council is important because it gives a direction of a location development. First of all it must support the city structure. A good filling in the urban planning which gives a function combination according to the character of the city is of great importance.
The municipality is involved in obtaining of the ground (in most of the cases it is the only owner of the site). In this case the ownership gives the power to set the requirements.
The public participant pays attention to labour market, car dependence, tourism intensity and governmental supplies. Public participants demands the spatial quality and higher investment volume as well. The government takes care of decision-making about the measures and realisation of infrastructure. Characteristic for public sector is the democratic decision-making process. He tries to minimize the risks while investing. The political opinion and influences decide about the field of involvement.
The tasks of the public institution in the partnership may be for example:

- establishing the investor tasks
- delivering the site

- giving a permission (sometimes exclusive), legislation, regulations
- sometimes working out a preliminary technical design (incl. infrastructure)

Private participant

Private participant is a market player. The private investor starts with the economically-financial feasibility: the requirements of the market. He analyses the needs of the market - he goes for the object he wants to realise on account of the profits. The profitability of the object and its future fit in the portfolio decide about the investement's start. The bottom- up approach is indispensable for the synergy effect. It is of decisive importance to define the maximum investments level that can be realised.
The private participants can be divided in some groups[6]:

Developers are oriented on the profit chances at short notice. Developers invest their money, taking the risks of the project He buys the interesting sites, works out the plans and co-ordinates and leads the realisation of the project. The next step is to sell it. Most of the time to the organisations or to the investments trust. The profits are uncertain in the initial stage, so it is always a risk that is influenced by the market changes as well. Developers measure the profit -loss account on a higher level. They analyse a set of projects in the country or even abroad to make a cash-flow survey.

Investment trust uses the building projects as one of the investments possibilities. The objective is to make high returns on the deposit. Only 10 to 15 % of the financial capacity goes to the real estate. The reason for this is spreading of risk. The real estate can be profitable during a high inflation or a low rate.
When the investment trust deals with asset management it means that they manage the whole portfolio of real estate themselves. There must be complex expertise about the objects and the real estate market available.
For the investments trust the PPP is still to complex because of its organisational part and doesn't seem to make a favour offer.

The PPP process.

The city development can be caused by economical development or changes on the market. The interest of the municipality is to have a financial stability. They offer the inhabitants good living conditions and pull the services to provide work. When the city centre becomes occupied by offices it brings working places, but also pulls the traffic and parking problems with it. The inhabitants of the city demand socially-cultural functions in the city. While developing healthy structure the municipal planning has to face the changes and make planning in some areas like: housing improvements, commercial redevelopment, open space development, parking improvements etc.
The PPP is not only a financial operation but offers a partnership in developing of private initiative.
The process stage can be divided as following [8]:

process stage	*involvement government*	*involvement private investor*
development	*	*
winning of the ground	*	
planning main infrastructure	*	
technically preparing the site	*	*
object development		*
realisation		*
sell or rent		*

The involvement of a public participant.

Management of the land policy.

The urban dynamics is most important factor of the spatial and social structures of the city. Together with the municipal policy it influences the changes in plan and the ground prices [1]. The large exodus from the old central districts in the 70 and '80 left spaces that need revitalising. The city needs more houses but also more industrial sites to provide work. The prosperity and technological development of the functions causes need for more space. It is of great importance to the offices as the inhabitants and leads to combined effort of the internees. While the ground's prices rise because of the growing demand for establishment, the municipality will profit from this situation.

The municipal finances are dependent of a good planning and land policy. Land policy can be seen as a steering mean to realise the objectives in spatial territory like: public establishment, economical policy and revitalising and positioning of the city.
The demand for the ground in the city can vary, but the offer stays constant. This situation force the municipal office to chose between competitive claims to the ground. It must go with the total vision of the area. Planning of one site has an immense influence on the surrounding sites. For example starting the shopping centre would improve the living conditions in the area, but it would cause rising of the house prices (in fact the ground prices). The position of the government has changed through the decades depended on political ideas and social needs.
There is some characteristic reorientation in governmental land policy in the Netherlands that is based on the following developments [9]:

- improving of the city centre position
- additional environmental measures
- housing policy dependant on the market conjuncture
- privatising of the land exploitation process
- less land in the municipal hands
- spreading of the land policy outside the municipality
- orientation of the municipal ground services toward the European competition

The municipal office can manage the land policy in two ways:

- *active land policy* - the municipal office wins the land makes ready for building and sells or distribute the land. This activities improve the steering possibilities. The municipal office influences the realisation tempo of the development plan. It decides about the development directions and makes a clear planning. The proper pricing of the land can take place.
  An other advantage is that the municipal office can calculate the production cost to the delivery price. There can be a space for price differentiation dependent on economical consequences of the functions. It can be positive to create a balance between weak and strong functions.
- *passive land policy* - the municipal office reacts on the private initiative. There is no land winning or financial risks. The role of the public instance is this of co-ordinator setting the proper conditions. The only activities are restricted to the public supplies planning and realisation. The exploitation of the ground becomes a duty of the private investor.

Management of the real estate take place at the municipal land service. It is financial centre of the land development, taking care of the profits and cost account (profit from the land selling). The feasibility of the municipal plans is more dependent of the negotiations with market participants (landowners, developers etc.). It's attitude is a clear insight in spatial policy, investments directions and subsidy. The last time the municipal services tries to act in the role of the project developer taking the risks as well. The capital of the services decides about the projects.

Purchase of land.

The municipal influence on the exploitation of the grounds consists of the winning of the ground and selling it under special conditions. Winning of the ground is a difficult process, because it requires good timing, prices and very detailed planning to be sure about the economical and political feasibility of the future projects [3].

When the land is obtained too late the planning process is delayed and brings more cost. When the land is obtained too early it causes post up of the credit what increases the book value.
The land winning happens in first instance within the developments planning. The strategy is dependent on the future functions, the scale of the land and the land property relations.
One of the land winning means is the *expropriation procedure.* This is connected with a lot of prescriptions and restrictions. The underlying condition is the interest of the public and spatial planning. For that purpose the development plan has the form of accepted irrevocable plan.
The expropriations is also possible on the ground of building scheme of great importance for the public establishment or a reconstruction of the build-up area (with a statement of Deputy States).
Since 01.01 1985 the municipal office has the exclusive right to buy the land pointed out as urban renewal site.
Even if the municipal office has than a better position than market player, it is still dependent on the co-operation with the selling person (the price, time). The loss of ground or establishment (as well as incomes, cost of changes and moving out) must be repaid by the government.
The costs of the purchase of the land include: the purchasing price, book value of the land, cost of expropration, recovering the demages [7].

Transfer of land.

Delivering of the ground can be solved in two ways - selling the ground or giving it for rent. It is differently solved in each municipality, coloured with political discussions and financial ideas. Last decade the accent of this issue is moved form the financial surplus value to the importance of the rent to the urban policy and re-development.
Renting the ground - not owning it- is seen by entrepreneurs as a negative establishment factor. The condition attached to the rent differ strongly in region as well as the ground prices. The municipal conditions declare the rent time, termination of the rent, canon value.
In 1986 The Hague introduced a new ground system - an *eternal ground rent.* It is a very positive factor that pulls the investors. Ransom happens one time, and the ground owner is sure of his future position. The eternal ground rent in the city centres is a good foundation for the co-operation towards the city reconstruction. The owners can have an influence both in control and sharing the financial risks.
The price of the ground is dependent of the cost price (buying the ground, preparing for building, bringing infrastructure etc.) and the market price. The last one is defined on the grounds of the state of location:

- destination of the location
- image and position
- infrastructure
- public and technical supplies
- relation to the environment and alternatives
- the size

Exploitation of the ground

Development of the new locations is very traditional. The issuing of the site forms is the end of the municipal exploitation process, except the situation where the public and private investor decides to exploit the ground together. When the exploitation process is taken over by the developer it forms an advantageous situation for the public instance. They give the licence to the private participant, control the process, develop the necessary function (housing) and can avoid the organisational and economical risks.
Dovetailing the particular investor can happen in different stages: winning of the ground, preparing for building and selling of the ground. It depends on the motives, market knowledge and a financial considerations. The choice of the developer falls during the negotiations when the conditions and the plan quality is being priced. The structure of the plan: combination of the functions like infrastructure, housing, green, supplies is conclusive.

The ground exploitation policy has some variants dependent on the way that the private and public authorities develop the plan together:

- the public authority makes use only of its development plan and price mean
- active participation of the authority while it let the ground for development and buys the ground back for a lower price
- co-operation with the land owners consortium (spreading of risks)

The exploitation forms that comes out of these variants are following:

- the municipal office owns the grounds, makes the development plans and issues the sites
- the private investors own the ground. The municipal office has to make the development plan and sign the exploitation contract with the developer. It should include the conditions of the realisation of the plan, contribution to the sold house, municipal commitments considering the licences.
- integral realisation by the private investor - he is already the owner of the ground or he buys the ground in from the municipal ground services. The municipal office makes the spatial, quality and establishment conditions (structure plan). Characteristic is that the ground transfer and building site are a duty of the private developer, taking the risks.
  The public authority must be very specific in the contract about the functions in the plan, maximal issuing prices, risks of the private participants, stages of the investment, quality of it and control moments.

The involvement of the private participant.

The traditional role of the private participant is changed last years. He becomes involved in the investment process much sooner and is ready to take the risks.
What is the reason of this behaviour? The only answer is - the profit.
The private investor puts 10- 20 % of the investment and organises the project on his own risk. The money earned on the selling of the object are invested in the next project. The profit depends on the market.
The public private partnership can involve the private participant in the new kind of market. It can be of great importance when the company wants to change its profile, clients to be able to continue its existence or simply when it's being faced with the decrease in one of its investment objectives.
In some cases the private developer wants to manage a bigger area - like in The Hague. He has bigger influences on governmental decisions and the plan he is developing can get an integral form. All the sites can be developed in direct relation to each other and there is minor risk of sudden competitive projects in the neighbourhood.
The risk taken by investing in the project can be reduced by the public authorities by defining policy guarantee - the guarantee of governmental decisions and policies during a specific period. It is the hearth of the matter. Like in the case of the Groen Markt project the municipal office could guarantee its help in juridical issues, managing of a difficult site, its attainment.
The municipal office has its own interest in helping hand: the better the plan is (quality, profitability) the higher rental value the ground can have.
The risk sensitiveness of the different stages is much dependent on long procedures, political changes and cost rising. The risk for the private participant will arise during the process. That's why the risk management has a crucial role. There should be a clear risk spreading agreement in the PPP contract.
The most important is the winning of the ground risk and the last phase - selling the objects.
In the first stage the partners can agree on sharing the ground price: the municipal office buys it for X, and in the case of higher price the private investor contributes 75% of the resting price.
When the municipal office is the owner of the ground the risk concentrates on the delivering of the object - on the proper moment and according to the market needs.

Public Private Partnership.

Ground exploitation forms

There are two forms of ground exploitation where the municipal ground services co-operate with the private investor.

The first is integral realisation by municipal services. Different ground owners has to deliver the site in exchange for exclusive building production. The only constrain is the price bargain - the private owner can sell the land to the developers for better prices.
This realisation can take a form of structured PPP where the objectives of every participant, stages and risks of investment project are clearly defined. Characteristic of this form is:

- responsibilities and risk is held by the public authority
- the ground when delivering to the municipal services has one value. It is link with the quality of the future function.
- the value of the ground delivered by the municipal service is set in consultation with the private participants and market conditions
- the structure plan is realised in conformation with the urban planning
- the private participant gets only the commercial functions in return

The second form of ground exploitation is combined exploitation. The co-operation is limited to the grounds owned by the private investors. They request public authority for help in realisation of their part of the plan. Usually it is based on the ground winning and technical preparation by the municipal office. Another construction can offer the only the exploitation to the public participant after the project has been completed.
This co-operation brings some issues for the municipal office like:

- founding the ground for the companies or inhabitants that have to move
- special cost connected with the public supplies that cannot be calculated in the ground price
- possibility of declaring own consult and involvement

Particular participant or consortium are the following aspects based on the production on the site or profitability of importance:

- freedom of managing the ground rent - to pull the participants
- possibility of changing of the plans in conformation with the market changes
- advantageous stages of the realisation
- payment contracts that support the positive cash-flow

PPP- characteristics.

The private public partnership is not a usual organisational construction.
What are its characteristics? First of all let's bring the positive sites, that motivate the participants :

- the project achieve a surplus value
- various functions combine very well what gives a synergy effect. The profitability increases (except for the cultural and public). Synergy effect arises from combination of the elements and the functions. The functions are the activities that deliver cash-flow because of the user payments (shops, movies, offices, museum etc.). Elements consists of project elements which make a contribution to the profits, but do not generate the cash-flow (park, station, road, tunnel). Some cultural functions attract investments even if they are not so profitable.
  Synergy of the parts delivers higher cash-flow than the sum of the profits while the elements generate it separately.
- the quality management
  The partnership allows better quality management - coherence of the spatial and functional integration of the project parts and the interaction between the project and the environmental supplies.

The risks are dependent of the next factors:

- extending of the planning time or procedures terms
- cost extending
- political changes
- social (market) changes

A consequence of that can be liquidation of the parts of a project and slow development.

What is the reason of the bottlenecks?

- luck of trust between participants
- not specified or unclear starting-points (brief)
- irresolution - when everybody waits for the worked out vision

Two points of view

There must be a better integration of the interests of the participants. Their vision may be the same, but the objectives and the way of reaching them can differ extreme. Out of all interests the participant must agree on two views:

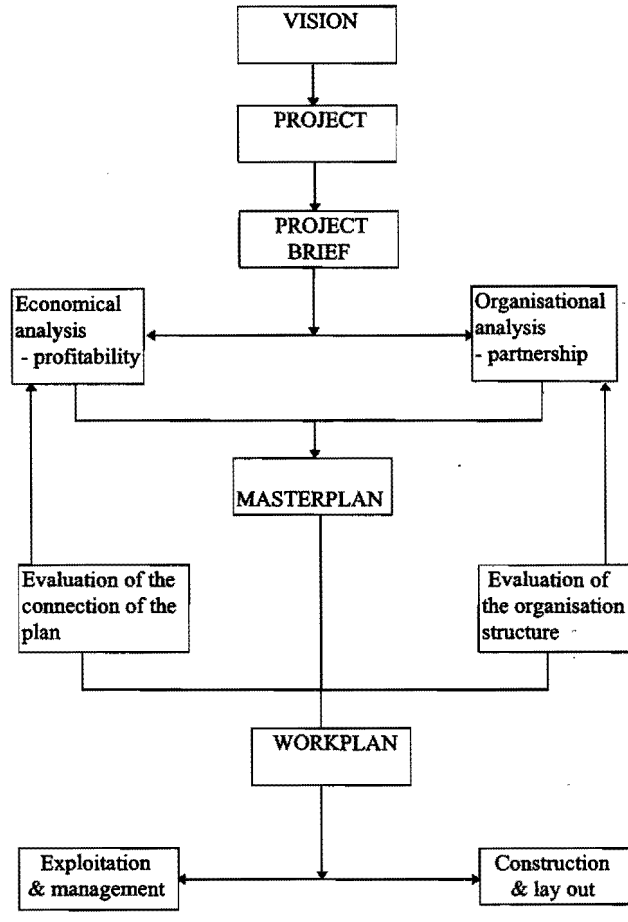
1. Spatial point of view:
- the surface of territory- structure of the environment and the relationship with the surrounding functions.
- infrastructural accessibility and position in the city

2. Economical point of view:
- social - economical profitability (the surplus value of a project)
- financially-economical profitability - enough scope for the functions
- investment analysis: volume, stages and quality of the necessary investments

Relevant environment and the size of the investment

In a developed area are more functions to be executed: offices, shops, houses or even social supplies. They can have more concepts and more quality levels. The bigger scale of the plan has as an effect that the establishment offer or other new developed functions put their stamp on the market.
Synergy elements must be viewed in relation to its environment. Functions and elements outside the project's area may get under influence or have influence on the cash-flow. New project must offer a new stronger composition in the area. The scope level is not only the nearby neighbourhood but the interest area. Investment in one part of the city can pull all the users from the other place (steeling the profits), forming great competition. Is the profit higher or divided in other way?
What is the difference on the international level, when the location has a competitive function for the Netherlands? What are the proportions of private and public functions?

Frame of the PPP process model handled by ORI [5]



Economical scope

Without the analysis of the economical-organisational scope it wouldn't be possible to make a step from the program to the masterplan.
Every participant wants to be sure about the extra profits that this partnership would deliver. This economical scope is based on the composition of the project and its place in the environment. It is formed by the sum of expenditures made in de exploitation stage.
These returns decide about the rent level and investment volume. If there is enough attention for the enlargement of the economical scope in the planning stage there would be a possibility to combine extra investments for better quality of the plan. The synergy effect must be analysed carefully to plan a good combination of functions and arrange the investments for less profitable elements.
According as the participants more insight into economical profitability of the plan, there is a ground for trust and arrangement.
The question is if there are enough profits for every and each participant during the process to guarantee its contribution. How to spread the profits?

Economical and social Profitability

Review of the project shows the feasibility on the social profitability of the total project and the economical profitability of its parts.
The economical analysis is aimed to the cash-flow that can be realised per function. When the capitalised cash-flow (decreased with exploitation en management cost) compensates the investments cost there is enough motivation for the private participation.
The large-scale project combined with the quality and different functions can result in an extraordinary attractive power to the users. The extra cost caused by the difficult municipal situation (soil pollution, technical and logistical problems) may be compensated by the concentration of provisions. It can be an extra stimulus for development of innovation solutions related to the city centres.
The intensification and combination of the functions may have as result a higher cash-flow. This synergy-effect causes higher proceeds that can be invested in the non-commercial project elements that contribute to the profitability of the total project.
This combination of functions demands special attention and cannot be restricted to the market analysis of each function. The magnitude, variation of the functions and their interaction in the environment can have a large influence on the advantages and disadvantages of every project.
The uncertainties and margins attached to every solution may lead to different interpretations and long project start-up. But the good site is that the project brief and intentions become clear to every participant. Exchange of the information, prospects and calculations provide a base for a compromise.
The partition of the profits and losses takes place on different levels: project level, surrounding and region.
De partition on the project level means that the private and public participants have to balance profits and losses on elements and functions. The private site pays for the collective goods as well like site ready for building and infrastructure. It can be managed by internal agreements.
The other method is to dived the project into functions. The exploiters of the profitable functions contribute to the less profitable functions, which increase the attractive power of the area.
The analysis on the economically- spatial scope must be set in the early stage of the planning for both methods. It must give a view and certainty for the participant about the avail that would pay for extra cost and effort.
The function itself can also bid a balance of the cost and profit, for example though a differentiation of the rental prices on account of the expected turnover (look art.1626 BW).
The easiest balance instrument for incomes and expenses is the land ownership and management. The condition is that there is one land owner or a consortium that temporary owns the project territory.

Organisational analysis

There are several possible organisational forms that can be used for public-private partnership. It is dependent on the scale : grade of functions, It depends on the internal organisational structures of the participants and their interest in independent organisational construction. It may develop in:

- *consortium tackling*

  An independent organisational form. It fits a project with a small differentiation. For the city council it means two roles: responsible for management and policy instance and shareholder in the partnership. The participants can agree on the risk amount they are taking. The one taking the highest risk gets most profits of a successful project. The risk is spread.
- *couple sell* (with private and public participants).

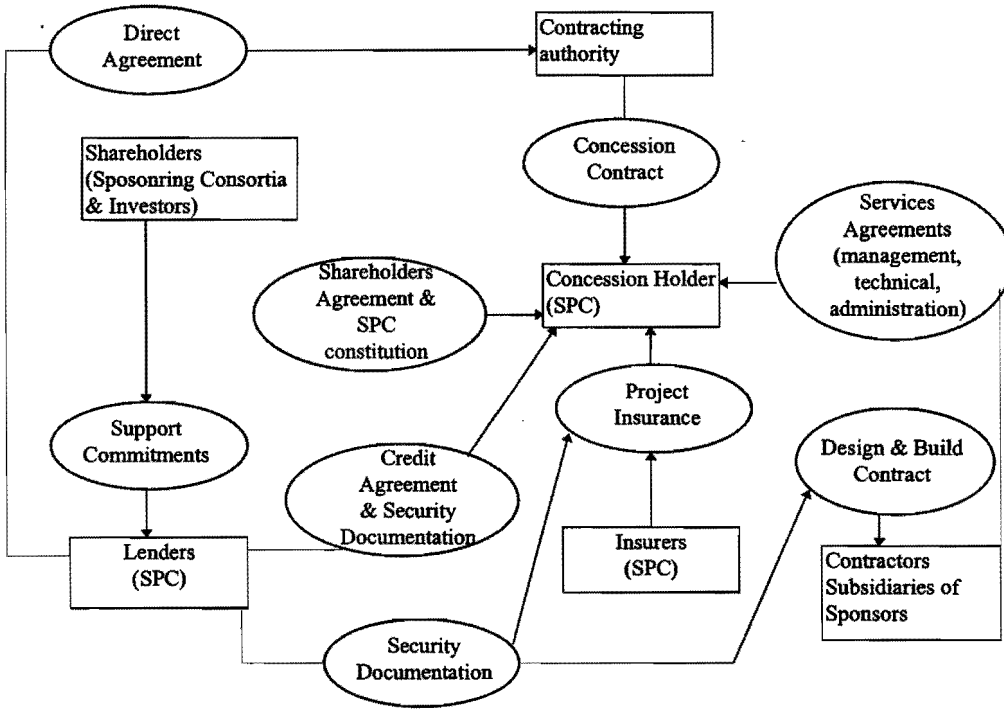
  It is possible when the city council is working with the consortium. Advantage is that there is one private participant that manages everything internal
- *network organisation*

It is less independent organisation form. The city council takes part in development of infrastructure, buying the land and preparing the construction site. The private participants develop and manage the real estate. The extra profits that are connected to a spatial function must be delivered to the joint budget.

The master plan is set up as a framework where the functions get its priorities. In such a way it can be decided which combination of the functions supplies the maximum cash-flow in the exploration stage. The results underlie the project and have to be feed back on time. In the same time the consistence of the plan and the efficiency of the project organisation are strengthened.

The PPP organisational structure of Lovell White Durrant (1995)

The construction of the public private partnership rely on the both side profits. Often the very complex sites or less profitable objects are to expensive for the public authority to realise. In place of the capital expenditures for the building of the highway, the government gives the concession to the private company that builds, takes care of the financing and later explores the object. It seems to be a better solution even if the government has to finance a part of the investment.
The PPP doesn't base on investing the money of the private participant. It is usually less than 20 % of the investment. The public sector delivers the site and the rest - about 80% comes from the lenders.
The great part of the investment is spent on construction. So it is important in which way the contractor will be chosen. The competition and market must be considered.
The concession contract regulates the financial duties. Usually the private investor is obliged to pay the taxes and to give a percentage of the profits to the public instance (except non profit projects while the private investor is free of taxes).
The choice of the private developer must be based on his financial reliability and experience. The chosen companies present their offers, where the year profits and costs are included. He manages the whole construction process and makes agreements with the designers, specialists and contractors.
In some of the cases one of the concession holders is a contractor, that dictates the conditions. This situation is most of the time disadvantageous for the public authority.



The Hague - Groenmarkt project case.

The Groenmarkt project is not the only one managed and executed in the Hague. This city is now in the stage of the largest modernising and restructuring of the city centre. There are a lot of projects carried out of national importance. The dominant function within are the stores and offices providing establishment of the national and international companies.

The whole city centre area has been growing almost organically. The property relations had been cut up during al the years. As I pointed earlier The Hague handles very specific land transferring solution: an eternal ground rent (eeuwige erfpacht). It means that the development of the centre is dependent on particular landowners.
In the case of the Groenmarkt the area belonged to the municipality. The old function - the City Hall with its extension (a new council chamber and an information centre) was managed by The Hague municipality. It was the owner of the property.
During development of the centre of The Hague the new, very representative and modern building had been prepared to adopt al these functions.
The old building remained almost unused with exception of the marriage-hall.
In this situation it depended on the municipality what would happen with the buildings on the Groenmarkt. The old city hall built in 1564 was of national importance and was on the Historical Buildings register. The new expenditure didn't fit in the square style and according to the inhabitants should have been replaced by a more proper building.
The Groenmarkt design project is almost finished, as advising an organisational structure is a bit too late.
The following alternatives and studies are in the form of redesign of the process.

Alternatives for a re-development of the Groenmarkt

The beginning of the process brings the strategic solutions and decisions. In the early stage the objectives of the project should be formulated by The Hague municipality. What is the purpose of the property? How it fits the area? Should it be changed? What are the priorities of re-development?

Municipal project.

The Groenmarkt site is one of the characteristic places in The Hague. The City Hall with its stylish facade and ceremonial function became an indispensable object. The municipality could think of placing public functions in the existing building. It would be still inconsequent policy of the city renewal, while all the functions would be gathered in the "white city hall" in the heart of The Hague.

But nevertheless the municipality could design the new building itself. The department of city development could make spatial studies, feasibility study and a realistic design. The next step would be a public tender.

The municipality would be responsible for the whole project. It means that the costs of design, expertise, making the ground ready to build and executing the plan would be investment of the municipality as well as the risks. The land property relations would stay unchanged.

Invitation for re-development ideas.

Another option is inviting different developers for designing a commercial function suggested by municipality. The developer would prepare the object plan and specifications, organise the construction, execute it and deliver to the municipality. It is rather not so popular event, because as a consequence the municipality has to take care of the commercial function and play on the market. It could rent the buildings to the private investors and try to win highest profits. The advantage of this option is that a completed project is delivered in the hand of the public participant, without the construction risks and management. The property would stay in hands of municipality.

The existing project gives a very good base to be worked out as a **public private partnership**. It would be a third option.
Municipality is the owner of the land belonging to the Groenmakt project. It means that he is independent from the private land owners. Involving the private developer The Hague municipality pulls an experienced specialist in redesigning and building of the city centre. The Hague municipality doesn't have to look very far. There are some serious, experienced developers already busy in the city centre. After inviting them for a first round - where they would present their suggestions and development plan based on calculations.

It is quiet positive solution. The municipality gathers in such a way all the options of spatial, functional and economical development of the area. It could be an orientation to calculate the optimal value of the land and the project. This very complex situation requires market knowledge, organisational skills and risk management.

In the case of Groenmarkt the municipality has developed three options for the form and function of the area. It suggested :

- demolish the building and create a whole new area for hotels and restaurants
- remain the buildings and add commercial functions
- remain only the historical city hall building and redevelop the area.

MAB has chosen the third option, developing the area of Groenmarkt. Its vision suited the municipality and decided of its choice.
Next step in the co-operation is to develop the plan for the area together to specify the size and details of the project. It is necessary to achieve optimalisation of the start conditions.
The developer and the public participant must decide who else sould be involved in the PPP. What is the level and time of involvement? What are their objectives?The very important action is the project briefing. The strategic innovation for the municipality is changing the point of view: not only the urban structure, but also the project approach (market approach) is structural in this game. The combination of these two factors can be a key to success. Here is the time to discuss commercial and non commercial functions. And to discuss the content of the agreement: municipal policy, the vision on exploitation stage - the future function, the property relations, transfer of the land, use of city property, financing, service system, licensing, construction obligations, parking concessions, remedies for default [2].
The very important decision is hoe is the pulling side.
In the case of Design, Build and Use project, the private participant as MAB develop the whole project inclusive the realisation and exploitation. As I mentioned before The Hague knows the eternal land rent. It means that MAB would rent the land. The price would depend on the book value of the land, the market price in the combination with the function profitability (future profits of the area).
MAB would pay a canon in one time.
A couple solutions offers exploitation of the land. Public private partnership means that the plan includes some non commercial functions: on the ground floor of the historical City Hall the municipal functions remain. These are responsibility of the municipality. The object quality and administration stays in the hands of MAB.
MAB is also obliged to pay the taxes and a percentage of the profits of course dependent on the organisational structure.
After that the economical and organisational analysis should take place. The process conditions are optimalised to start the project. It means that involvement of the participants arises and their co-operation needs more time.

Economical analysis start with feasibility study. All the functions should be calculated in m2, costs and future cash-flow. The responsibility for the project parts must be spread over the participants: the commercial functions, infrastructure, public spaces and additional functions. The participants get the picture of the investment profitability. Also the technical feasibility must be checked.
The problem of the starting profits (a long term repayment of the cost) should be discussed as well. The private investor can negotiate than better fiscal measures or project participation constructions.[5]

The **organisational analysis** should bring the best construction of the project. The role of the participants, their organisational responsibilities and risk ought to be formulated. It is connected with the characteristics of the location. The Groenmarkt project is a complex city centre location with a difficult building site. The next factor is the monumental style and the old building function. The new function (the shops and offices) is in contradiction with the development plan! It means that the co-operation of the municipality is more than necessary.
What choice do municipality and MAB have?

1. **consortium:** The municipality is one of the shareholders in this construction. He is responsible for the management of the project -licences, building permission and the development policy (to provide the fulfilment of the project). MAB is the shareholder and the executive participant in this

construction. The risk amount is divided to the participants. On base of that the future profits are distributed.

This organisational form mobilises the municipality to take an active part in the management. Involvement arises and communication is better. The risk taken by municipality is a form of guarantee for the project fulfilment.

2. **network organisation:** The role of the municipality is greater. It is actively involved in development of the plan, infrastructure, it provides the land and prepares the construction site. In the case of the Groenmarkt the land pursuing forms no risk - because it is in one hand. The municipality would be involved in preparing the site - which in this case is a critical issue. The municipality by its involvement in preparing the construction site (organisation of the transportation, delivering the storing places etc.) would rich a good co-operation position. Only development of the plan, execution and exploitation must be formulated. This is responsibility of MAB.

The advantage of network organisation lays in the fast and flexible decision making system.
The condition here is that the municipality organises a clear project group with internal, fast communication lines. It must be set who is taking which decisions.
As a consequence of that the information should be available for the partners.
The most difficult change that would provide the success of the public private partnership is changing of the public authority role. It should act as a private company - efficiently, focused on goals within the time set.
In the case of the Groenmarkt the municipality did not consider time as an important factor. The project had experienced time delays (more than two months) that can cause a year delay of the delivering of the project in total. Such delays can be negative when the market needs are changing.

Another success factor is a long term partnership, that brings experience, confidence and co-operating skills. By using the network organisation the partners learn from each other and become dependent on joint structure, decision system and the budget, that can be a base for the future investments.

How to work together? - the integral approach.

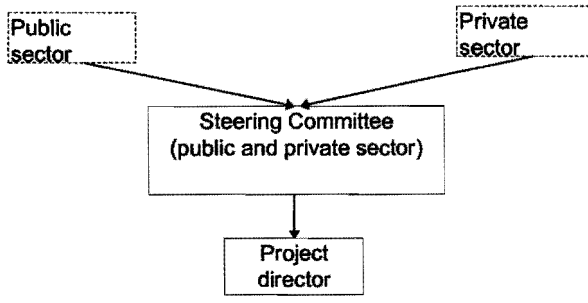
The most of the realised PPP projects had fallen because of conflict of interests. The differences in culture and objectives made the integrates approach impossible. Finding the balance in social and commercial benefits is the foundation for better co-operation. Difficulty comes with the organisational differences which can be managed by taking in consideration of the next points:

- The PPP projects know a long realisation time. The involved participants have to bring their interests on one line. The differences must be analysed and all the conditions must be set
- there must be agreement on the decision making system and moments
- there must be a clear communication structure with al the parties concerned during the whole process. It can be supported by the access to the decision documents.
- the project must have a base in form of feasibility study made by independent, objective consulting company
- there must be risk management undertaken by the PPP
- the vision must be coherent from the beginning - the economical feasibility, organisational structure of the plans and a process course must be adjusted to each other
- there must be space for an apposition
- the long investment term and a great scale of the urban structuring processes brings out the question about the one model of project organisation. That's why the process must be contractually divided in small stages [4].
- all the stage results must be defined in advance
- the quantifiable measuring points should be formulated
- in every stage the responsibilities must be formulated
- as well as the conditions and relations
- an arbitrage protocol should be prepared in the beginning
- the partnership contract has to take place after the tender

- the supervision over the execution of the project should be turned over to the specialist company

To be able to control the process the participants should take part in the integrated planning and make the progress reports. Everybody should be aware of the changes in the original plan. It can help detecting the bottlenecks in early stage.

I would rather recommend an independent project-director managing the project process.
The structure proposed by Reijnier [8] in his article is most alike.



The public and private participants would be organised in a streering committee - organising, planning the strategy and controlling the activities.
They would have their tasks, responsibilities and creative input. The independent project director would organise the project and lead the operational management. He would provide the communication, monitor and integrate the progresses.

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Chapter 3

Jan Willem Fransen

Complementary task 1: The Standard Agreements for the appointment of an architect in the United Kingdom and in the Netherlands; a comparison

Designing a building is a very complex work. And it is even more difficult to do such a job in a foreign country. In another country, not only the right to practise the profession of an architect will give some difficulties, also the rights, the obligations, the liabilities and responsibilities of a foreign design-assignment will be completely different.

In most of the European countries, professional architect's organisations came to meet their members and other architects with a Standard Agreement. Examples of these professional architect's organisations are the "Bond van Nederlandse Architecten" (BNA) in the Netherlands and the "Royal Institute of British Architects" (RIBA) in the United Kingdom. Parties in a design contract can use these Standard Agreements or parts of it to draft a straight contract. At the moment the agreement is used in a contract, the Agreement -or elements of it- gets a private status, on which the parties are committed. It is the intention of the Standard Agreements to cover every detail in any building design assignment. Members of these professional architect's organisations are obligated to use these Standard Agreements.
The Standard Agreements are drafted within the Public Law of the country.
There are differences between the Standard Agreements of the several European countries, although there is a trend to tune these Agreements on each other.

On the following pages a short comparison is made between the Dutch and British Standard Agreements.

The Dutch Standard Agreements

"De Standaardvoorwaarden 1997 Rechtsverhouding opdrachtgever-architect (SR'97)" or in British terms "the Standard conditions 1997 Juridical relation client-architect" is divided in three chapters and enclosures. They are as follows

- Part 1: General Definitions; contains the definitions used in this Agreements and gives an explanation about the general issues used in an assignment. Furthermore this chapter describes the obligations of the parties in the Agreement; the architect and the client, their liabilities and their responsibilities. It gives a description of what to do with problems as suspension, resumption and termination of an assignment and the consequences of these items for the parties involved. Also the item copyright is described in this chapter. At last this chapter gives an explanation in which way of possible arbitration these Agreements could be used.
- Part 2:Activities of the architect; contains a descriptions of all possible activities, executed by the architect in an assignment. There is a distinction between the activities for a "common" design (new building), a restoration project, an interior-design and advice activities.
- Part 3: Costs of work and advice; contains the ways of payment and how to calculate the fee of the architect. There is a distinction between the payment based on a part of the total project-costs, based on hours of work or based on a lump sum.
- Enclosures; contain several descriptions and classifications of kinds of building. Furthermore it gives a number of methods to calculate the fee of the architect and several checklists what should be produced for the activities described in part 2.

The British Standard Agreements

"The Standard Form of Agreement for the Appointment of an Architect 1992 (SFA/92)" is divided in several parts:

- The first part contains an explanation about the purpose and the use of this SFA/92. It gives a description of how to set up an agreement (contract), how it is completed, what the conditions are and how amendments are made to these conditions (stated by both parties). It gives also a short description about the four Schedules, which are used in the set-up of the agreement. Following in this part, the SFA/92 explains how the completion and the details of the whole contract could be realised. This with the use of the Memorandum, the Schedules and the conditions of the Appointment. At the end of this part, the SFA/92 mentions several supplementary schedules available for commissions relating to Historic Buildings, Community Architecture and Design and Build procurement.
- The second part gives us an example of a contract; the Memorandum of Agreement. It identifies the parties, states their intentions and defines the nature, scope and cost of the professional services to be provided. Both parties, the client and the architect could use this example or parts of it for their own contract. A list of definitions, which are used in the SFA/92, is added to this Memorandum.
- The third part of the SFA/92 contains a description of the conditions of Agreement (and related definitions). These conditions are plainly worded and intended to be used as a standard. They are also divided in four parts:
    - Part 1 describes the conditions common to all commissions and relates to the law of the contract, the obligations of the parties, assignment and subcontracting, payment, suspension, resumption and termination, copyright and disputes.
    - Part 2 relates to the design-work of building projects, the stages A-H (see Schedule Two), as stated in the RIBA's "Plan of Works". It describes the obligations of the parties and the copyright of the design-work.
    - Part 3 relates to the conditions specific to contract administration and inspection of the work stages J-L (see Schedule Two). It describes the obligations of the parties and the site staff of the client, which is recommended by the architect.
    - Part 4 relates to the conditions specific to the appointment of consultants and specialists where architect is lead consultant.
- The fourth part contains the four Schedules, which are needed to set out a contract properly:
    - Schedule 1 contains the information to be supplied by the client for the architect; the common commissions, the commissions specific to the design of building projects stages A-H and the commissions to the services specific to contract administration and inspection of the works, work stages J-L.
    - Schedule 2 identifies the information to be provided by the architect. It contains the services to be provided by the architect and the services to be provided specific to building projects. These last services are divided in the stages A-L; from the inception and feasibility study (stage A-B) to the operations on site and completion (stage K-L).
    - Schedule 3 gives us an example of a way that payment for the services is calculated, charted and paid.
    - Schedule 4 describes an example of an appointment-form for other consultants, specialists and site staff.

Other supplements are available from the RIBA.

A comparison

With respect to content, both Standard Agreements are mainly the same. Both Standard Agreements have the intention to cover every activity and production-part to the appointment of an architect. The Standard Agreements are drafted for all parties involved, but from the point of view from the architect. The assumption is made that there is a trend for tuning these Standard Agreements on each other within the framework of the European Unification.

However, the way these Standard Agreements are set up is different. The SFA/92 is drafted as an example how a contract is set up. It prescribes the users how to come to a proper contract. Standard fill-up-forms of contracts are included.
The SR'97 has to be seen as an aid for setting up a contract. It serves as an aided tool, which mention the problems and aspects people can meet with the set up and execution of an contract between the client and an architect.

On description-level more differences are distinguished. By example, the SFA/92 has a bigger subdivision of activities provided by the architect, specific to building projects. Also the sequence of subjects is different. These differences are of minor importance for the choice of one of these Standard Agreements.

Maintask 3: Two Problems

With the treatment of these two problems, the assumption is made that the Standard Agreements are in force completely on these occasions.

The delay

A serious delay in the project occurs again, caused by the fact that the Architect fails again to meet the dead lines agreed upon. This delay creates large outrun in project costs. Work out a proposition for arbitration, to recover the loss from the architect.

In the contract both parties, the architect and the client agreed about the time-schedule, which contains the deadlines of delivered work and payment. According to both Standard Agreements, these moments are mentioned in the contract (SR'97 Chapter 2 article 2.2.c; SFA/92 Conditions of Appointment articles 1.2.3, 1.2.5).
The problem could occur, that the architect reports he or she won't be able to meet the deadlines of delivered work. After this report, the parties should redefine their contract.
Doesn't the architect report the inability to meet the deadlines, a research after the occurred problems will be set up to search the cause of it. This delay could be caused by a third person or superior forces. An investigation will be made how to recover the losses, caused by this person, or if the losses could be covered by the insurance. This third person could be the client. In that case, arbitration will decide, who is paying the losses and what the amount will be. Lack of keeping the Agreements will be able one of the parties to end the contract (SR'97 Chapter 6; SFA/92 Conditions of Appointment articles in 1.6). The Standard Agreements provide in several situations, which could cause termination of the contract and give a redundancy pay settlement (SR'97 Chapter 7; SFA/92 Conditions of Appointment, articles in 1.5).

In this paper, the assumption is made the losses are to blame to the lack of work of the architect. This person is liable. The extra costs -made by the client and caused by this delay- will be recovered from the architect (SR'97 Chapter 5 article 13.1; SFA/92 Conditions of Appointment, article 1.5.19.). With the help of arbitration this recovering process will be executed and the height of compensation will be fixed (SR'97 Chapter 9 articles 43, 44; SFA/92 Conditions of Appointment, article 1.8.1). This arbitration procedure will only start if the request of arbitration is made within the fixed term according to the Standard Agreements.

The amount of the compensation is, according to the Standard Agreements, bound to a beforehand fixed maximum price. The SR'97 uses some standard amounts and methods to obtain this amount (SR'97 Chapter 5 article 18). Also the term in which clients could recover their losses is fixed by the SR'97 (SR'97 Chapter 5 article 19). In a contract, fixed according to the SFA/92 additions are made by the parties to fix these terms and amounts (SFA/92 Memorandum of Agreement, articles 5, 6.1, 6.2, 6.3).

Using the SR'97 in a contract, the architect is obligated to effect a professional indemnity insurance, by the standards of the BNA. The SFA/92 mentions this insurance duty only in the supplements. Probably, members of the RIBA are automatically insured by their membership. In the Netherlands, such an arrangement is made too for the members of the BNA.

If the client is insured for such risks, he won't be able to recover his losses from the architect (SR'97 Chapter 6 article 22.2). In most of the cases, the insurance companies meet already on these condition. The SFA/92 doesn't mention this "apart" case.

The delay caused by the architect in the project "Groenmarkt" could cause some serious losses. To avoid this the client needs to talk to the architect about his behaviour and discuss the problems. Perhaps there is another cause of delay, instead of the lack of strictness by the architect:

- What is the really cause of the delay?
- Who caused it?
- Could this process of delay be stopped?
- Is it possible to recover the losses and in what way?
- Is there an insurance to cover the losses?

If the circumstances for the delay and its causes are set out, steps can be taken to the consequences and it allows the parties to prevent eventually future struggles.

Damage!

After project completion the building appears seriously damaged. This is caused by the architectural detail solutions for the ornaments, as drafted by the architect. Analyse in which case/situation the principal may recover the damage from:

- the architect (United Kingdom);
- INBO (the Dutch "assistant-architect");
- the contractor;
- the supervisor of construction activities.

Also in this case the Standard Agreements will fix the amount of compensation for the inconvenienced parties and the maximum term after realisation of the project to hold someone liable for any damages (SR'97 Chapter 5 articles 18 and 19; SFA/92 Memorandum of Agreement, articles 5, 6.1, 6.2, 6.3). Before that, the parties have to make sure who had really the responsibility for the technical quality and safety during the design process. Also an investigation has to be made for the person, who carried the responsibility with regard to the client (SR'97 Chapter 5 and 6; SFA/92 4th part Schedule 4 Appointment of consultants, Specialists and Site Staff, Conditions of Appointment several articles). If the responsible person (not the architect) is appointed by the client himself, the architect has no liability at all.
The client has to recover his losses from that person himself by means of arbitration or any juridical way.

If the responsible person is appointed by the architect, the architect has to pay the losses of the client. On his turn, the architect could recover his "fine" from the responsible person(s), dependent on the Standard Agreements of the contract he/she has with those person(s). Examples of these Standard Agreements are the "Regeling van Verhouding tussen Opdrachtgever en adviserend Ingenieursbureau 1987" (RVOI'87) or the "Joint Contracts Tribunal 1980" (JCT'80); the Standard Agreements for contracting a technical engineer in the Netherlands and the United Kingdom.

If the damage is caused by the lack of quality of work of the architect, the architect is liable for all losses caused by this damage.

The damage could also be caused by superior forces. In this case, a survey has to be made whose insurance will cover the losses.

Before starting to recover any losses, investigations have to be made about the possible forms of project-organisation. These investigations should be made for the design-process as well for the construction.

In the case of the project " Groenmarkt", a survey to the organisational structure has to be made:

- Which contracts are used?
- What were the Standard Agreements for these contracts?
- Which parties are involved?
- What are the (contractual) relations between those parties?
- Etc..

Secondly, the cause of the damage has to be investigated:

- Is the damage caused by a "rotten" design?
- Was the construction taken into account by the designer?
- Who was responsible for the technical quality and the safety (also the safety for the execution) of the design?
- Etc..

After the organisational (contractual) structure is pointed out and the origin of the damage is detected, it will be able to hold a party responsible.

Conclusions and recommendations

The Standard Agreements in the Netherlands and those in the United Kingdom are merely the same, as well theoretically as in the practical use. The only differences, that could be determined are situated in the form and sequence of the several aspects. These differences are of minor importance for the choice of one of these Standard Agreements.

This will not mean that working in a foreign European country is an easy job, without any problems. Architects, who intend to work in another country have to prepare themselves in a very severe way.

Before starting with a project in a foreign country, several aspects need to be examined:

- Working in a foreign country:
    - Is it possible to practise the profession of an architect in that country?
    - What are the requirements to practise the profession of an architect?
    - Is it possible to work with another architect in that country (joint-venture)?
    - What are the Standard Agreements for purpose in a contract.
    - How are these Standard Agreements used in practise?
    - What are the prices and costs for the several aspects of work?
    - What is the architect's fee?
    - Is there any juridical protection?
    - Etc..
- For a starting architect, it is reasonable to do a project with an architect in that country. Perhaps this could be the start for a long-term joint-venture. A analysis of the agency of that architect has to be made (and vice versa):
    - What is the goal and the mission of the other architect's agency?
    - What are the strength and weaknesses of the other agency?
    - What is the organisational structure?
    - What is the financial situation of this agency?
    - Are there any threats or opportunities for this agency?
    - Are there any threats or opportunities for this joint-venture?
    - Is it possible to analyse some recent projects of this agency?
    - In what juridical way the joint-venture has to be arranged?
    - What are the obligations of the parties?
    - What are the consequences, if one of the parties isn't able to meet his obligations?
    - Etc..
- The project itself has also several aspects to be taken into account:
    - Every activity and material part of the project need be recorded;
    - All parties involved need to be mentioned;
    - Responsibilities and liabilities need to be pointed out (on every activity and material part of the project);
    - All preceding aspects need to be fixed in the contract, covered by the Standard Agreements;
    - Etc..

The parties involved have to take care they won't kill the project by pointing out every detail, but they also have to be aware a project could become a disaster, caused by a single detail.

Literature complementary task 1 and maintask 3

1. *Evaluation on the project "Groenmarkt" in The Hague*; ADMS-report, December 1997;
2. *De Standaardvoorwaarden 1997 Rechtsverhouding opdrachtgever-architect (SR'97)*; Koninklijke Maatschappij ter Bevordering der Bouwkunst en de Bond van Nederlandse Architecten, 1997;
3. *The Standard Form of Agreement for the Appointment of an Architect 1992 (SFA/92)*; the Royal Institute of British Architects, 1992.

Chapter 4

Daan Huitink and Peter Timmermans

Main Task 1: How to optimise the total design and construction process

Organising the project and choosing the organisational form for the project team

MAB, the client and projectmanager of the Groenmarkt project in the Hague, has chosen the design-team as the way of organising this project. A design-team (= contractual form) comes into being on the moment the client itself contracts all designing and advising parties. Contractually seen all participants are on the same level beneath the client.
Organisationally seen they are co-operating on an equal base to obtain the best possible project result. In the end MAB takes all important decisions concerning time, costs and quality.
The choice for the design-team as the way of organising the design and construction process, is mainly based on common use.
In the first instance it is hard to say whether the design-team is the best way of organising the project. But it is very clear that 'common use' is not the right way to take such important decisions. The way in which the project is organised mainly decides the final process and product quality which can be reached. Besides, the way the project is organised specifies all responsibilities and liabilities.
That's the reason that it is important to carefully examine and select the project organisation, adjusted to the goals of the client[6].

The demands which MAB has put to the project, are:
- The building has to have a high-quality architectural appearance;
- It has to be easy to let the building out;
- the project has to be profitable.

These statements have to be the starting points for selecting the ideal way of organising the Groenmarkt project. It's important to mention that there should not be attached too much importance to the consideration of who will be doing the job[6]. It's far more important to decide which tasks have to be executed, the way they have to be executed and the way in which they are connected to each other. When the demands of the client are put in the front, it is far more important to consider what is to be done than by whom it is to be done.
Project organisations differ from each other because of the differences between responsibilities and liabilities and the participants that will carry these[7]. This can be represented by the following factors:

- the contractual relationships between the participants;
- the distribution of tasks, responsibilities and liabilities;
- the way in which the participants are enlisted in the project and the points in time they are enlisted.

Project organisations can be abstracted by representing them as models. Two kind of models can be distinguished[6]:

1. models in which there is talk of a segregation between the design and the construction stage; like traditional, construction team and management contracting;
2. models in which there is talk of a combination between the design and the construction stage; like general contracting, design & build, brochure plan (together, they are called: turn key)

Now, I shall discuss the different project organisation types within the model[4]:

1.)

traditional:
the architect is responsible for the design and the contractor for the construction. The architect takes care of the integration of the work done by all designing parties (instalment adviser, structural

engineer, costs adviser, ..) The architect selects the materials, the products and the way the building is constructed. When the design has come to the stage of 'the bill of quantities', the architect will usually request quotations at different contractors (tendering process). The client will give the job to the cheapest firm. The contractor will contract sub-contractors and suppliers. The architect will sometimes be operating as a projectmanager during the construction stage. This way of organising the building process is still used in half of the cases. All following figures don't represent the contractual forms, but they represent the way the participants are connected to each other in an organisational kind of view.

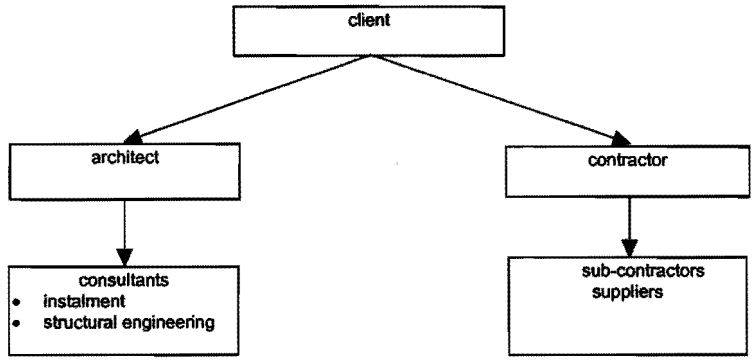

Figure 4.1: the traditional model

advantages (for the Groenmarkt Project):
- the traditional model offers the possibility to get the lowest possible offers by different contractors. They compete with each other;
- relatively simple;
- clearly segregated responsibilities and liabilities.

disadvantages (for the Groenmarkt Project):
- because of the segregation between design and construction, the process passes off jerkily. The total time, needed to complete the project, is therefor relatively long;
- the contractor is contracted for the construction. Therefore it is impossible to use his knowledge during the design stage. It also is impossible to adapt the design to the possibilities the constructing firm has in relation to construction techniques and logistics;
- liabilities are not clear enough, which means that most of the time the client has to pay for mistakes made by one of the participants;
- if the architect doesn't bring aspects of construction or maintenance into account, it will affect the management of time, costs and quality during the construction process;
- the client himself is liable for the project result.

construction team:
A team, consisting of the client, the architect, specialists and a contractor, is responsible for the design and a contractor is responsible for the construction. These contractors could be the same firms or persons, but that is not necessarily so. The contractor participates in the design-team by sharing his knowledge about construction, costs and the market with the team. The contractor in the design-team is frequently asked to sign a contract in which he approves that he has no rights in the first place to construct the building. Most of the time, however, the contractor who participates in the design-team also constructs the building. A construction team is applied in 20% to 30% of the cases.
Contractor 1 and contractor 2 may be the same people or organisations in the following figure, but that is not necessarily so.

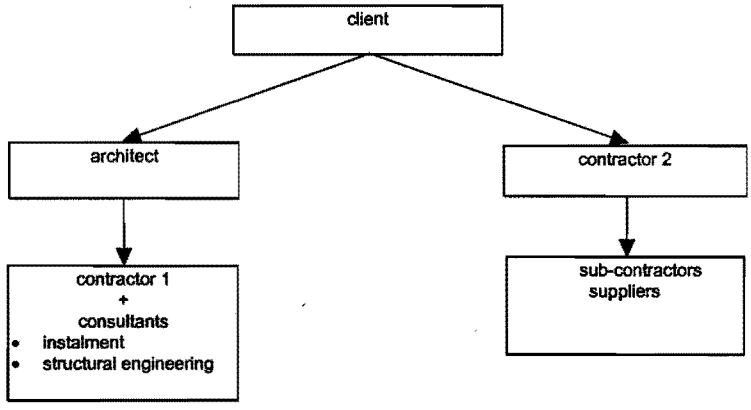

Figure 4.2: the construction team model

advantages (for the Groenmarkt Project):
- design and construction can be integrated;
- the knowledge of all important participants can be used;
- the time-consuming tendering process is cancelled. Usually the contractor can start with his stage of production information. 'Fast tracking' also belongs to the possibilities.

disadvantages (for the Groenmarkt Project):
- the offer that the contractor makes mostly isn't based on construction costs. Therefore, it is important that the contractor, who is participating in the design-project, signs a contract (as discussed before). There also should be an architect or costs-adviser in the team who has enough knowledge of construction costs;
- it's harder to determine responsibilities and liabilities, compared to the traditional model;
- the client himself is liable for the project result.

management contracting:
A design-team is responsible for the design and the management contractor, who will be connected to the team in an early stage, is responsible for advising the client about aspects considering construction and costs in the design stage, for contracting the contractor and for co-ordinating the construction process.
In this kind of model there is no main-contractor. Several contractors (sub-contractors) are directly contracted by the management contractor who will fulfil the co-ordinating role of the main-contractor. Liabilities are clearly divided between the contractors.

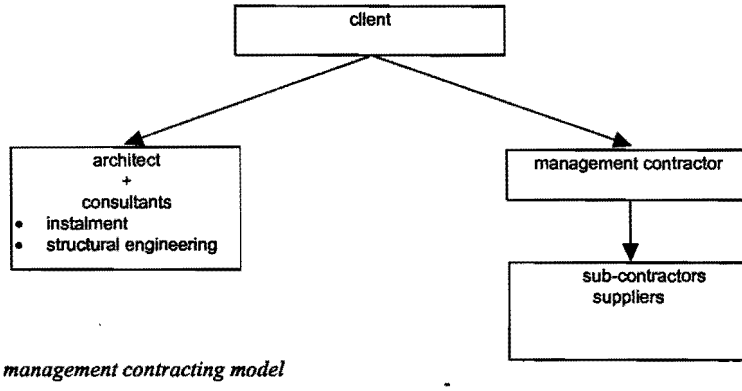

Figure 4.3: the management contracting model

advantages (for the Groenmarkt Project):

- the fee which the management contractor receives for his co-ordinating role during the construction stage can be lower than the addition the main-contractor receives for co-ordinating the process in a traditional model;
- the management contractor is, in contrast to the contractor in the construction team, objective towards use of materials, construction techniques,..;

disadvantages (for the Groenmarkt Project):

- non of the participants can be held integrally liable;
- the liability of the management contractor is limited by the height of his fee;
- the financial risk is still the responsibility of the client.

2.)

general contracting:

one of the participants (for example the contractor, a real estate developer or a projectmanager) offers the complete responsibility and co-ordination of the design and the construction process. Often including the financing. Characteristic of this way of organising a project, is the influence of the client. During the process the client still has the possibilities to influence the final result.
The general contractor often offers the client a total concept for one price, at his own risk, including his fee. Therefore the general contractor is liable for the final result.

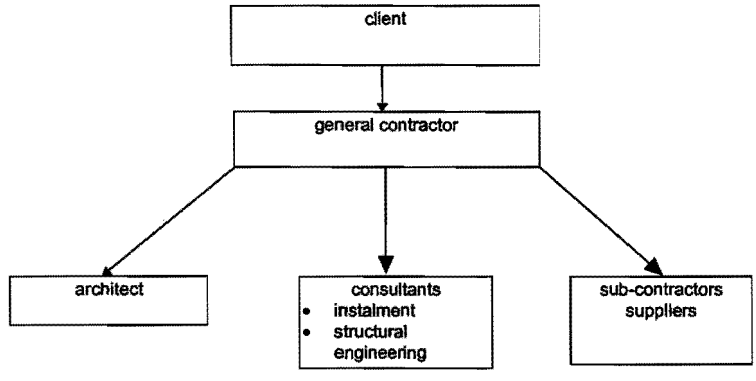

Figure 4.4: the general contracting model

advantages (for the Groenmarkt Project):
- risk and responsibility are carried by the general contractor;
- the general contractor has to obtain all licenses which are necessary for the process;
- the client doesn't have to select and negotiate with all the participants;
- the general contractor can make appointments with the client considering the price which has to be paid by the client to obtain the building;
- the legal relations between the participant are clear (if contractually written down);
- the client doesn't have to take care of the co-ordination process, because the general contractor does;
- design and construction can be integrated.

disadvantages (for the Groenmarkt Project):
- the quality of the final result is hard to control;
- introducing alternative solutions and changes causes extra co-ordination problems;
- the client has no guarantee that the general contractor will contract decent sub-contractors;
- the client has almost no possibilities to talk and negotiate with sub-contractors.

design & build:
the brief serves as a basis for the offer a constructing company or a real estate developer proposes towards the client. The development of the design will take place in co-operation with the client.

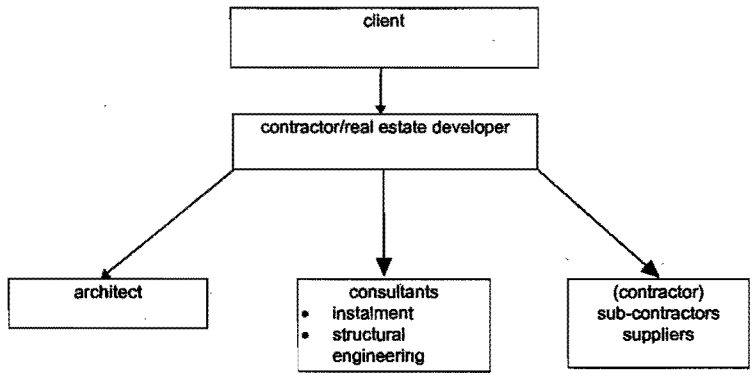

Figure 4.5: the design & build model

advantages (for the Groenmarkt Project):
- same as 'general contracting';
- the client only has to approve or turn down the offer. De decision process is relatively short.;
- 'fast tracking' is possible;
- there is no risk for the client.

disadvantages (for the Groenmarkt Project):
- same as 'general contracting';
- a relationship with the client based on trust is harder to obtain;
- the client doesn't have much influence on the control of time, costs and quality;
- the relation between costs and quality is difficult to estimate and to measure.

brochure plan:
a organisation offers the client a brochure plan, a standard plan out of a catalogue. At the beginning of the process time, costs and quality are known. The co-ordination of the design and the construction process is carried out by the organisation.

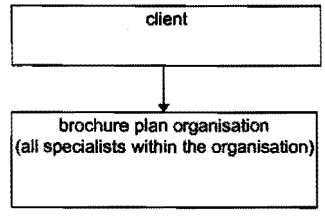

Figure 4.6: the brochure plan model

advantages (for the Groenmarkt Project):
- there's no risk for the client;
- the project can be realised in a very short period of time;
- there's only one organisation the client has to speak to;
- the client only has to approve or turn down the offer. De decision process is relatively short.

disadvantages (for the Groenmarkt Project):
- the client can 't control the process well;
- it's barely possible to change the design (expensive!).

Which project organisation finally has got to be chosen by the client (in this case MAB) depends on the project itself, the circumstances and the priorities of the individual client.
Within the different organisation forms, a lot of alternatives are possible. In the SBR report '*Kiezen opdrachtgevers het juiste bouworganisatiemodel?*'[6] (Do clients chose the right organisation form?) it is stated that there is a clear relationship between the demands of a client in regard to a construction project and the ideal organisation form. This 'fitness for use' is represented in figure 4.7. A one indicates a high fitness for use, a five indicates a low fitness for use.

CRITERIA	construction organisation models					
	segregation design/construct			combination design/construct		
	traditional	construction team	management contracting	general contracting	design & build	brochure plan
investment costs						
early certainty	5	4	4	2	2	1
optimum costs/quality	2	2	2	3	4	3
cast off realisation risk	3	3	3	2	1	1
maximum market conformity	1-5	1-5	1-5	1-5	1	2
quality						
decide in stages	1	1	1	4	5	5
market conform real estate	1-5	1-5	1-5	1-5	1	2
cast off construction risk	5	2	2	3	1	1
cast off exploitation risk	5	4	4	2	1	4
conform existing offers					1-5	1
cast off development risk	5	3	3	3	1	1
cast off performance risk	3	2	2	1	1	3
time						
short time to build	5	2	5	2	2	1
decide in stages	1	2	2	2	4	5
organisation						
limit number of participants	5	4	4	2	1	1
little knowledge required of client	4	4	3	2	2	2
clear responsabilities participants	1	3	3	2	1	1

Figure 4.7

The choice for an organisational form should be based on this scheme.

Conclusion

When we take the Groenmarkt Project in The Hague in consideration, it is now possible to decide which organisational form would have been the best one for this project. To be able to do this, the starting point for the project, formulated by MAB, has to serve as basis. MAB has chosen the design-team, but was it the best option?
Before answering this question, it is interesting to take a look a the conclusions of a research by SBR, called *'Een eerste verkenning naar kwaliteit en bouworganisatievormen'* (A first reconnoitring to quality and organisational forms). The report states the following conclusions:

If only the quality of the process serves as the starting point for the selection of an organisational form, it is important to consider the following statements [5]:

- participants who have a long-lasting collaboration co-operation, guarantee mostly the best quality of the process. The best chances for success are reached when they operate in a turn key organisational form. The client has a contract with only one participant who offers the total process and the building, so the client has only one contact;
- a client who thinks that a turn key model will be giving him too many constraints, should chose the option of the construction model. There is, however, a bigger chance that there will be problems concerning information, communication and co-ordination.;
- when the traditional model is chosen, the agreements made by the participants need to be documented carefully. Also the demands concerning these agreements need to be very high.

These statements are interesting for the Groenmarkt Project, because MAB has formulated the quality as one of the most important starting points.

When this important starting point is connected with the other starting points of the MAB and when is taken into account that MAB expects troubles during construction of the project considering the logistics, it seems best for them to have made the choice for a **construction team** as project organisation form.
The organisation models in which design and construct are combined (general contracting, design&build, brochure plan) don't need to be discussed any further, because within these organisational forms MAB almost doesn't have any possibilities to manage the development of the quality of the building during the process. These models don't permit MAB to decide in stages to be able to control the quality of the work that's being deliverd by the participants (score in figure 4.7, concerning 'decide in stages': 4,5,5)
Besides, turn key models only assure the client (MAB) certainty about process quality if the organisation which offers the project to the client, exists of participants who have been working together for a long period of time.

Selecting the architect

Three (INBO, Corsmit and Techniplan) of the four participants with whom MAB is working together on the Groenmarkt Project, are familiar with each other, because it is not the first time the are co-operating with MAB.
These collaborations will, according to Colin Gray, master at the 'University of Reading' in England on 'Architectural Management' and writer of the book 'The successful management of design' [1] often result in the most successful projects: 'The most successful projects are often those in which the client has a long term relationship with the design consultants, based on respect and trust'
In relation to this case (the Groenmarkt Project) it's really interesting to take a closer look at the procedure which has been followed to select the architect John Outram of John Outram Associates in London. MAB has never worked with Outram before, so MAB was not familiar with the way Outrams bureau is operating.
MAB has selected John Outram because of the buildings he has been designing before. So, the way his bureau operates in the total construction process didn't matter.
Colin Gray, however, says in his book that it is important to select the architect on the basis of a checklist, which also contains process related aspects.
First the client has to select a couple of architects who can be nominated to do the project. It's far to expensive to fill out the checklist for every architect who is interested in the assignment. The client can be advised by, for example, a design manager. The checklist contains the following aspects and can be used to make the final choice concerning the selection of the architect [1]:

- its experience of designing similar projects;
- the experience and background of the people nominated for the project;
- the organisational resources and management systems;
- the financial resources of the organisation and its ability to support the project.

However, before making the final choice, it is important that the client formulates some requirements which are connected with this special project. The list needs to be extended and sharpened for every project. Otherwise it won't be possible to make a well founded decision as a client.
The Groenmarkt Project demands extra skills in the field of building in the old city centre.
So, a list needs to be filled out by the client or an independent consultant to select the architect [1].
It can be desirable to enlist some specialists in the team, for example sub-architects in complex processes, sub-engineers or suppliers of products which are going to be used in the building. For example, MAB could have contracted the Belgian firm which produces the prefabricated concrete elements that are being used for the facade in the design of John Outram. The architect can co-ordinate the activities which would have to be done by the firm.

Selecting the design-team

The design-team for the Groenmarkt Project in The Hague consists of MAB, the client and projectmanager, John Outram, INBO construction consultants, instalment consultants Techniplan and structural engineers Corsmit. Like I've said before, MAB already has a long-term relationship with these participants. However, it is striking that this long-lasting collaboration is continued gratuitously for every new project.
Mark Oakly points out in his book 'Design Management, a handbook of issues and methods'[3] that a client has to think about the different methods there are to put together a design-team and about which one of them is the best for this specific project, in order to bring together a team which is made for the job.
A client also has to make a feasibility study and a risk-analysis before a team is even composed. Oakly refers to this activities as 'Design Audits'.
Design audits serve much the same purpose as financial audits, basically to review the return (or potential return) being achieved on the resources employed, to check whether the level of resources is adequate for the tasks involved and to highlight relative successes and failures.
The deliberations involved in drawing up the brief and carrying out the design audit should have resulted in a fairly comprehensive understanding of the work that the design project will entail. In turn, this will have led to an impression of the skills that must be available, an impression that must now be brought into clear focus.
Starting with design skills, a list should be drawn up of all those which the project will need to draw upon. In the first instance, no attempt need be made to quantify the skills or fit them into any time schedule: what is necessary is to see the range of design expertise which is going to be required. All aspects should be included.
Pre-project audits should be undertaken before the start of all significant design projects, particularly to compare the resources needed (quality!!!) with those available (inside and outside the client-organisation) and to assess the chances of a successful outcome.
Besides, one of the main factors which influences the success of a project, according to Oakly, is the quality of working relationships between designers and others, both inside and outside the company. This pre-project audit should in this case, as a matter of fact, be conducted by a disinterested auditor and not by the MAB itself, because the MAB has already developed a long-term relationship with most of the design team members. Therefore the MAB won't be objective anymore when carrying out a design audit in relation to the quality of the work of the team-members. So a consultant has to decide whether the participants which are audited are suitable for the project.
Next, the consultant has to review the suitability and availability of the separate designers (from inside and outside the MAB organisation) who have to perform on the team. The word 'designer' is used advisedly and in a broad sense. What is really important is the correct identification of the design, management and other skills needed for the project.
So, at that moment the skills needed for the project have been analysed. The next task is to look for organisations and firms who posses these skills. It's possible that one organisation is multi-skilled, so that this organisation can take care of a couple of tasks. However, the client always has to be careful giving more tasks to only one organisation, because in nowadays society with the technology changing day by day, it is almost impossible to have knowledge about all aspects concerning the construction process.

It's very important to select a team that consists of people or organisations who can work together well. There are a couple of fields of attention that need to be considered by all team-members to be sure the final result is satisfying for everybody, but especially for the client: in this case for the MAB.
As a responsible team member, you should[2]:

- focus on the purpose of the team;
- think less about personal goals and more about the success of the team as a hole;
- work to develop an atmosphere of trust and respect on the team;
    - treat your team-mates with respect;
    - value different ideas;
- listen more than you talk;
- communicate clearly;
- participate fully;
- make realistic commitments and then keep them.

Selecting an inspiring design- or projectmanager

Also has to be taken care of a careful selection of the projectmanager. In this case (the Groenmarkt Project) this isn't that relevant, because MAB, the client, has got its own projectmanagers. But, MAB is still able to chose one of them. MAB has chosen Eddy Bouman. We don't know what the reasons have been to chose him, but in general one can formulate a couple of criteria which can be brought into account when selecting a projectmanager. Eddy Bouman, in this case, has presented himself as 'design manager'.
The role of the design manager may be crucial in achieving successful results[3]. However, in many respects the qualities necessary in order to be effective in this job are substantially different from those traditionally expected of managers. The main requirement must be the design managers ability to deal with change and ambiguity

The design manager:
- additional skills needed to deal with ambiguity and conflict;
- knowledge based on structured updating;
- able to adapt to unpredicted events;
- many one-time decisions;
- tolerates temporary groupings;
- accepts diversity of approach;
- goal-driven;
- combines action with reflection;
- encourages team approach to problem solving .

The implication of these special characteristics associated with design management is that great attention is needed in selecting the right person to fill a post as design manager. Also, in addition to organisational skills, companies often demand a high level of technical knowledge and/or the ability to work successfully with customers or clients. It may be unrealistic to expect all of this from one person and it may be better to appoint two or more people whose skills are synergistic.
The design manager can be the one who selects the design-team and all participants who are working in the team. Then the design manager is responsible for the organisation of the team. The following tasks can be performed by the design manager[7]:
- chose an organisational form (tasks, responsibilities, liabilities, role of the client and the project (design) manager);
- set up the relationship between the project organisation and the permanent organisation;
- take care of the selection of the people and organisations in the team;
- arrange a Project Start Up to motivate the team.

Next, we will pay attention to the last item, because of its importance for inspiring leadership.

The Project Start Up (PSU)

Most of the time, many disciplines out of several organisations come together in a project. This may lead to different views about the result that should be accomplished. A Project Start Up is a tool by which adjustment and congeniality can be accomplished. The idea is to identify the participants involved and the role they play in the project. By getting them involved in the project the PSU is motivating. Not do the participants only get an idea of shared ownership, they also get insight in the project and especially their contribution to the whole.

The PSU procedure

The PSU consists of 4 steps[8]:
1. the initiative;
2. the intake;
3. the PSU meeting;
4. reporting about the results in a project assignment.

- **the initiative**

In the initiative the goals of the project will be set by the initiator.

- **the intake**

The intake is the pre-preparation on the PSU meeting.
The projectmanager collects information about the project and the conditions under which the process will take place. Therefor he meets with the initiator, future clients and participants to determine the several interests and constraints to the success of the project. It is very important to have a deeper understanding of the individual goals in order to meet the collective goals.
It is also important to have all the participants informed about what they may expect of the meeting.
The intake results in a program which will be the basis for the meeting.

- **the PSU meeting**

In the meeting the program as set up in the previous stage will be followed. This will result in a decision document in which subjects as the problem, the result of the project (in terms of object and process), risks, activities, sub-projects and the decomposition in stages will be addressed.

The goals of this PSU meeting are:

- *getting acquainted with the other team-members*:
  In this case most of the participants are already acquainted with each other, except for John Outram Associates and the construction engineer. Nevertheless, the acquaintance should go further than this. It is not the organisation, but the representative who will be worked with. So team-members should get personally acquainted.
  Therefor it is necessary to start with a meeting in which the team-members tell about themselves, their expectations, their possible contribution and their interest in both the PSU as the project.

- *a clear definition of the project:*
  The definition of the project involves next to both object and process information also discussion about how the team will operate.
  The object information shall not be detailed. Its function is to create enthusiasm among the participants about the object that will be built. In most projects the information about the object will be restricted to the ideas of the initiator. In this case the conceptual design made by MAB will be presented. It is the task of the facilitator (the projectmanager) not to end in a deep discussion about the object. Some discussion is necessary to create involvement and shared ownership, but it is more important to reach an agreement on how the process will be organised and how the team will operate. This will not be an easy task, bearing in mind that most participants will be object minded. Again the selection of the individuals who will participate in the PSU is crucial.
  In more detail the procesinformation will be discussed.
  The participants must agree upon propositions made by the initiator about the aspects of controlling the process. Therefor the decomposition in stages, how they are related to time, cost and information must be discussed by the participants. Also the measurement of quality is a very important issue. This value for money can be measured in both terms of object and process.
  The quality of the process can be measured in terms of time and cost. The quality of the object can only be measured by example [10]. Therefor the initiator should provide similar projects for a better understanding by the participants about the architecture the initiator is aiming at.
  Next to this the risks of the participants should be made clear. In this case the participants should be aware that the old building will be the risk of the client. On the other hand the new building will be the risk of the contractor until it is finished.
  The needed information should be developed bottom-up. This requirement of information on a need to know basis, leads to a 30 to 50% reduction of information exchange [9]. The participants must agree upon a procedure how to exchange the information.
  Another important issue is to reach clearness about how the team will operate. First should be pointed out that contracts say nothing about how the team will work together [9]. The number of meetings must be decided upon. An important issue to address, concerns the decisions which will be made within the team. Does every team member have a power of attorney in his own organisation? If this is not the case, which decisions can be made within the team and what will be the procedure for the other decisions to be made?

At this point also the role of specialists within the organisation of the initiator becomes a question. Are they consultants or do the need to approve decisions of design?
Research in the UK showed that management specialists have a positive impact on the time of the project[8]. Last but not least, when involved, the role of the management specialist has to be made clear.

- *stimulating the collaboration between the team-members:*
  Projects are temporarily, so also the project-team is of a temporarily nature. Extra thought must be given to the shared ownership of the project. The collaboration can also evolve out of a long-term relationship between the participants: partnering.
  Because of the elements which are addressed in the PSU meeting, the participants' influence on the project is taken serious and the enthusiasm about the project can be shared. Informal meetings are in this light crucial ("60% of all problems are solved at the bar..." [10]).
  In order to create a team, the factors which lead to teamwork, as presented earlier, should be discussed. In this way the participants become aware of the aspects which are crucial and how they are expected, and expect others, to participate.

In this case most of the participants already know each other and the collaboration will not be an issue. This is not the case for the collaboration between Outram, INBO and the other participants. Therefor, also on this subject the PSU is a tool to accomplish a good understanding.

- **reporting about the results**

The result of the PSU meeting is a concept decision document in which all decisions on the projectassignment and approach are written down. If the client approves the document, the project can start (or in this case continue).
The document should consist of all the relevant aspects for a lean project, in terms of time, cost, quality, organisation and information. Like a brief, the complexity of the project, decides whether the document is rolling or definite.

The result of this PSU should be a total commitment to the project and confirmation to the ideas presented.

The PSU team

In order to reach the goals set, it is of utmost importance to select the right people for this task.
The PSU-team should consist of the initiator (client), the projectmanager and the most relevant participants of the project. The importance of the project should be recognised by the participants. Otherwise the PSU is bound to fail.
The initiator is the right person to tell the other participants about the project and convince them about the motives behind the project. As the initiator has to agree on the decision document which is formulated at the end of the PSU, the participant must be able to ask all kinds of questions about responsibilities, aspects of control and the main goals of the project, which only he can answer.
The projectmanager will be the leader of the project. Therefore he should be the key figure of the PSU. Next to this the projectmanager gets an understanding about the participants he will be dealing with.

It is not necessary to have all participants included in the PSU. This is even impossible in bigger projects as the number of participants in the PSU is limited in order to accomplish some results. Some participants may even not be known at this time. Therefor it is necessary to have the most relevant participants present. In this the complex parts of the project should be discriminating. The PSU should result in a dominant coalition which can carry the decisions of the project team [12].
All the participants should have power of attorney so that the agreement will not be set back in al latter stage by the rank and file of the participant. The users should not be included in the PSU. They are represented by the initiator and should be involved during the actual design stage.

In the proposed project-organisation, the construction engineer will participate in the conceptual design because of the expected problem during construction and its impact on the feasibility of the project. In order to create the acceptance that this specialist should really be involved from the early beginning, a

kick-off meeting between the internal team-members of MAB and the construction engineer will be arranged
The main goal of this kick-off meeting will be the acceptance of the construction engineer as an important participant during the whole process. Decided must be upon the activities and responsibilities of the team-members and the way in which will be reported and decided.. Last but not least the aim of this stage must be made clear and the terms in which it shall be reached. Again, the internal team-members will act in this stage in a routine way.
If this stage indeed leads to a feasible plan, the preliminary design will be the next step. At this point in time the PSU meeting will take place in which also John Outram Associates, Techniplan and Corsmit will participate.

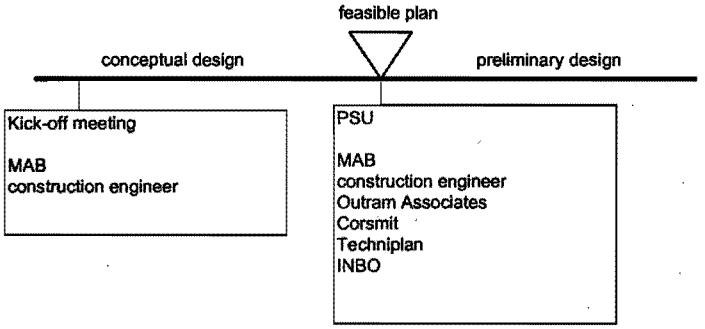

Figure 4.9: the PSU related to the projectstage

Conclusion

A successful PSU for the "Raadhuis Groenmarkt" project might have contributed to more enthusiasm and identification with the project, which would have led to less quality reduction and loss of time.
In order to have a successful PSU the participants should be enthused about the project.
To both Techniplan and Corsmit it is a relatively small project. Also MAB does not seem to have a special interest in the project, which is not strange because of the relatively small amount of money involved. If even the projectowner does not seem to be interested, the PSU is bound to fail. This also explains the involvement of John Outram Associates. They easily accept changes to the design.
So, in order to have a successful project the MAB, as projectowner, should organise a successful PSU.

Especially the aesthetic design seems in this case not of the highest value to all participants. The PSU could have arranged this enthusiasm about and confirmation to the object, so that design-changes would not have been necessary, due to a better collaboration.
Most of the participants are already acquainted, due to long-term relationships. In combination with the non-complexity of the designprocess, the project shows many signs of routine. Nevertheless, the PSU should take place, especially because one of the most important participants (John Outram Associates) is not familiar to the other participants. But the PSU-process is expected to be less complex.
During the project the commitment of the participants may decrease. In this case the projectmanager may use the PSU as a Project Fresh-Up (PFU).

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Main Task 5: How to monitor and control the project progress

The control of the progress of a project (time, costs, quality) always has to be based on agreements. Agreements which are made at the beginning of each process. Agreements between the different participants which are involved in the project. The agreements are ideally based on a model of agreements. The contracts which are concluded by the client or the projectmanager are an example of such a model of agreements. There also are agreements which are made during the process, for example during meetings, which are the responsibility for the client or projectmanager and which serve as a supplement to the contracts. These agreements can be placed on record.
However, a complex construction process needs another way of coming to agreements. Because otherwise it is almost impossible to hold people or firms liable for certain actions or mistakes.
It is also almost impossible to manage a project on the basis of contracts.
Therefore it is interesting, also for the Groenmarkt Project in the Hague, to introduce a new kind of model of agreements, that offers the possibilities not only to serve as a supplement to all contracts, but to manage time, costs and quality as well.
The basis of this model is formed by the total design and construction process and the different stages which can be found in this process: initiative, design, detailling, preparation for construction, usage. Agreements can be made for each project, each stage and each participant. Besides, these agreements can serve as basis for the management of time, costs and quality during the process.
These agreements form a model which is called the Model-IPKP, 'Integraal Project Kwaliteits Plan', translated: Integral Project Quality Plan.

The Model-IPKP [1]

An IPKP is an example of a TQS, a Total Quality System. IPKP is based on NEN-ISO 9000. The Model-IPKP can be used as guideline to creating a IPKP for a specified project. It guarantees more or less the quality of the process. It mentions the tasks which have to be performed by the different participants, who carries responsibilities for what, which participants have authority to do what, in what way the process is managed and which measures have to be taken to guarantee the project quality.
The Model-IPKP has got three functions:

- it's an instrument to make clearer communication possible; it indicates who has to communicate when with whom;
- it's a reminder; it indicates the subject which need to be discussed;
- it's a data bank; it indicates where relevant information can be found;
- it's a management tool, if the Model-IPKP is connected to tools which can be used to control time and costs (software).

Shortly summarised, the Model-IPKP gives you an answer to the next questions:

What has to be controled in which stages of the process to obtain a good adjustment between participants and which tools are appropriate to use?

It's important that the participants can reach their goals, taking into account the goals of the other participants.
The IPKP is meant for those who function as projectmanager in the team. Who will be performing this task depends on the way the project is organised.
The IPKP also offers all participants the opportunity to relate the IPKP, which is project related, with their own company quality system.
The Model-IPKP indicates the information a project quality plan has to contain and it indicates the way a project quality plan is brought into being.
The information a IPKP contains is merely meant to manage all participants on the basis of contents of their work and on the basis of their organisation structure.
The Model-IPKP can be represented by a matrix (figure 4.10). The vertical classification of categories consists of the different aspects of control.

structuur	0. in general	1.Initiative	2.design	3.detailing	4.preparation for construction	5.construction	6.usage
0.goals and starting points							
1.organisation							
2.communication							
3.demands							
4.resources							
5.purchase							
6.time							
7.finance							
8.construction							
9.experience							

Figure 4.10: the Model-IPKP

The aspects of control:

In the first cell of the column **'in general'** a description of the project can be put: a description of the goal that has to be reached by the project as a total. The following questions can be asked:

- what is the character of the project?
- who is the client?
- who are the users?
- which housing problems have to be solved?

The starting points of the project can also be formulated in this cell, including starting points considering the environment and the conditions in which people have to work. In the other cells of row 0 **'goals and starting points'**, the starting points and goals of the different stages can be formulated. Each stage will be closed with a 'decision document' and will start with a 'start document'. The 'decision document' of the closed stage is the 'start document' of the next. All participants have to agree about the amount of information which has to be contained by the documents.

In cell 0.1 'in general-organisation', the project organisation can be described: the project organisation which is chosen and the persons who are responsible. All tasks, responsibilities and liabilities have to be determined here.
In all the other cells of row 1 **'organisation'** all tasks, responsibilities and liabilities are determined for each stage. Every task has to be performed by the firm or person which or who is the most capable. It is important that all tasks that need to be done, are going to be done by someone. So, the assignment of the tasks by the projectmanager needs to be 100% waterproof. IPKP offers a possibility to check this.

In row 2 **'communication'** the structure of consultation and the starting points of exchanging information are described. Attention needs to be paid to:

- the consistency of the information, which means that the information of one kind between the stages needs to linked up in the right way. Gaps of information are not allowed to occur;
- all information of all participants (drawings, ..) in a stage need to be related in the right way to each other. The information has to be complete to close the stage and start the next;
- the way the IPKP is treated when information changes.

In the first cell of row 3 **'demands'** can be described in what way all participants will be getting, during the process, all actual information. In the other cells of row 3 this can be described for all stages separately.
This information can be:

- laws and (local) rules;

- standards, regulations and publications;
- data concerning the project, like documents, the brief, drawings,..

Row 4 **'resources'** gives an indication about the resources which will be embedded in the project. This can be people, materials, methods,..

In row 5 **'purchase/third parties'** the procedures can be described that have to be considered when contracting a third party in the process.

Row 6 **'time'** is important for this task, because all plannings are described here, for the project as a whole and for the different stages. Time has to be managed well. It is important to connect a time management tool to the IPKP.

Row 7 **'cost'** describes the budgets for all participants and the overall budget. The estimating techniques which are going to be used can also be described here. Costs have to be managed well. It is important to connect a cost management tool to the IPKP.

Row 8 **'construction'** the operational structures and procedures for the management of quality during the construction stage are described. It is important to describe who decides and controls what and when.

Row 9 **'experiences'** the experiences the participants had had during the process are described. This way it becomes possible to learn for the next stage in the same project or for other projects. 'Learning organisations' come into being this way. The project has to be evaluated after every stage.

In the next paragraph we will have a closer look at the way in which the projectprogress can be controlled.

Project progress control

In terms of aspects of control, time and cost are the aspects which determine the projectprogress, because they both are related to a maximum amount.
Time should be controlled in order to have the information available as requested in the IPKP.
Information should be controlled to make cost-control possible. Cost need to be controlled so that the budget will not be exaggerated.
In figure 4.11 this relationship is presented.

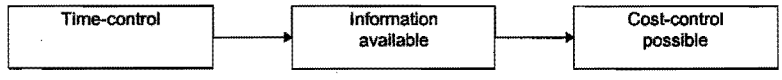

Figure 4.11: the relationship between time, cost and information

Next to this relationship, the old adagio 'time is money' still applies. There is a clear relationship between the building-cost and the building-time [2]. Time related cost come to 10% of the foundation-cost and consist of interest and lost income. It is therefor worthwhile to consider time-reducing measurements as:
- longer time for production (doing overtime);
- reducing impediment of construction;
- prefabrication.

Also the approval of external commissions can be a time consuming activity. Especially in this project, considering the construction site, should the risk of delay due to for example traffic be carefully looked at.
In the next paragraph we will look into the way time and cost can be controlled.

Time management

Control takes place by comparing the plan with the actual state of the project. If necessary this leads to reactive activities so that on a next point in time the plan again matches with the actual state.
In figure 4.12 the principle of control is shown.

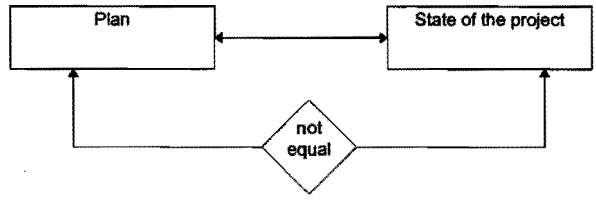

Figure 4.12: the principle of control

As seen before time should be managed to have certain information at the right time. To achieve this, a plan is made. In all projects a certain standard set of activities can be recognised[3]. Therefor the sequence as shown in figure 4.13 which also appears in the IPKP is useful.

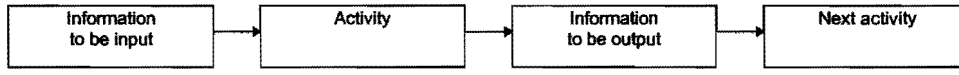

Figure 4.13: the need of information based on standard activities[3]

The plan is based upon a work breakdown structure in which all the (sub)activities, that should lead to the requested information are written down. For all these activities is estimated how much time they will take to accomplish. This is done, based on index numbers out of former projects. Conventional planning methods like networks and Gannt charts will be sufficient in the 'Raadhuis Groenmarkt Project', because of the non-complex process. In a process with parallel activities it would be a difficult job to plan by these methods. In this case one should make a rough plan which will be specified according to specific steps in the process[4].

The state of the project in terms of time appears from the connection with the calendar. If appears that the plan does not meet the state of the project reactive measures must be taken. This can be done by changing the plan or changing the planned activities. The initiator decides on this. In the 'Groenmarkt Project', the MAB decided to change the plan. However, most projects can not afford to change the plan and therefor need to change the time needed to complete the activities. This may lead to rescheduling the activities or changing the capacity of means and the workforce.

Cost management

Also in cost management the principle of control is used. The plan is now the budget set in the beginning of the process. The actual state of the project in terms of cost is now reproduced by the predicted cost. As the process makes progress the predicted cost are more accurate.
The principle of control for cost management is shown in figure 4.14.

In the IPKP the information is represented which is necessary to set the budget and to predict the cost. The budget is set by the initiator based on the starting points which he has formulated[5]. The definite budget is set in a latter stage, based on the brief.

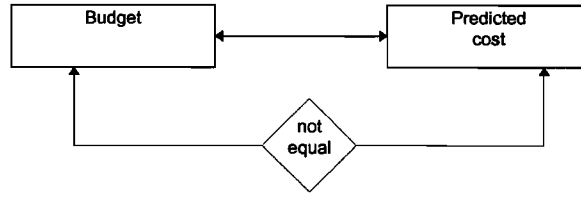

Figure 4.14: the principle of control for cost

At the end of each stage, in every decision document, the budget is compared to the predicted cost, based on the information at that time. Table 4.1 shows an overview of the information on which the cost are predicted at the end of each stage.

Table 4.1: the information needed to predict cost[2]

stage	*information needed*
initiative	• function
	• gross square meters
	• luxury
definition	• location
	• quality
	• area measure norms
preliminary design	• shape of the building
definite design	• technical brief
	• floor plan
	• facades
	• cross sections
	• quality of building part level
preparation of construction	• quanta and drawings
	• demands of construction

If the predicted cost do not match the budget set reactive measures must be taken. On one hand the initiator can approve the exceeding of the budget and set an new budget. If this is not the case there are three ways to influence the cost[5]:

- control the demand (this can mean both the brief as the restrictions by government)
- control the answer (the design and the designers)
- control the consequences (the price and the contractors).

It is the projectmanager's task to seek the best value for money for the client[3]. In the 'Groenmarkt Project' the MAB also does the projectmanagement. The cost are controlled by both influencing the cost and setting an new budget. The budget is mainly based on the exploitation cost. The cost are influenced by controlling the design. This has led to cheaper prefabricated concrete details on the surface and the removal out of the design of the outdoor lighting, which was not mentioned in the brief.

Proactive measures

Next to the reactive measures based on plan (budget) and actual state of the project (predicted cost) the participants can be motivated not to exceed the plan (budget). Therefor it is necessary to have a clear view on the scope of the project. In fact this clear view of the scope is much more important than the contract as it may create a win-win situation for all parties involved[3]. Methods like Quality Function Deployment and Project Start-Up (PSU) can tribute to this.
If the scope of the project is clear and the participants are able to do the job, they can be motivated to do the job as planned by breaking the activities into manageable parts. This means that the activities should be so detailed, that the people are reached who will take the responsibility about the activity. This can be compared to the way in which work is divided in one company.

In the 'Groenmarkt Project' project it is evident that most participants have worked together in former projects except the architect. Compared to the most important reason of delay (the architect), it is harrowing that nor a PSU nor a regular meeting was held which included John Outram.

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Chapter 5

Marianne Stolk and Bas Wouters

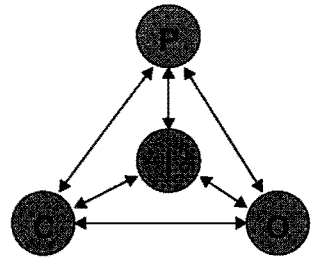
Main task 6: A Project Quality System for the "Groenmarkt" project

Scope and Goal

The goal of this section is to describe some process quality systems that can be applied to building projects and to determine which of these systems is most suited to be applied to the project "Groenmarkt" in The Hague. For the selected system indications concerning the implementation will be given.

What is process quality?

Process quality is determined by the stability of the process. Stability can be enhanced by clear agreements concerning co-ordination, communication, organisation and information. The effect of this enhancement will finally be the prevention of mistakes and disturbances during the design and building processes. The total set of agreements has the function of controlling the scope, timeliness, quality and cost of every individual project. To enable this, information has a catalyst function as shown in figure 1.



I = information, P = process structure, C = control, O = organisation

figure 1: the catalyst function of information

To reduce complexity and enhance insight into a project, phases will have to be defined. Evaluation and early correction of the development of a project can be executed using decision documents, that are drawn up at the end of every phase. These documents can also function as input of the following phase.

What is the use of process quality?

The goal of process quality is to enable the emerging of product quality. The presence of process quality does not guarantee any product quality. Achieving high levels of product quality is very well possible without any form of process quality. Process quality systems create a favourable climate for the origination and amelioration of product quality.

The goal of implementing process quality systems is the fulfilment of the wishes of the client in every aspect and the fulfilment of the own company goals and quality goals. A process quality system will ensure that the wishes of the client are not lost during the executing of the process. Apart from producing qualitative good products, the process of production should also be beneficial to the company involved. On one hand process quality is creating a favourable climate for product quality and on the other hand it also ensures the profitability of the project. In other words the use of a quality system reduces the risk involved in a design and building process.

Central aspects of quality systems are agreements. These agreements will have to be supported by all participants, otherwise these agreements become imposed laws. Imposed laws often have the characteristic that people are tempted not to adhere to these laws.

Quality systems of the participants

Before describing project quality systems, first the quality systems applied by the individual participants of the "Groenmarkt" project will be discussed.

MAB

The principal of the "Groenmarkt" project does not use any quality system. Also it is not clear whether steps are taken towards management of process quality.

INBO

The assistant architect has acquired the ISO 9001 certificate, as one of the first companies of its kind in the Netherlands. This company has some experience with project based quality plans. Unfortunately this experience is not positive. In another project in which INBO participated, a project based quality system was implemented. During the execution of the project however the used quality system was abandoned. One of the reasons for this abandoning was the amount of extra work the implementation of the system caused.

Corsmit

The structural engineer has also acquired the ISO 9001 certificate. In order to do that the existing quality system applied in this company had to be adjusted. This adjustment did not originate from the malfunctioning of the existing quality system. Corsmit specifically wanted the ISO 9001 certificate because of market demand.

Techniplan

Techniplan is concerned with the installations of the building. This company just started in implementing the ISO 9001 quality system. Better products or a better incompany process is not expected as a result of this implementation. The reason for implementing this system is the expected demand from clients.

Different types of project quality systems

Three different principal ways of creating a process quality system on the level of an entire project can be distinguished:

- imposement,
  the principal can impose the use of the quality system which he also uses in his own company. The other participants will have to adjust their systems to this system;
- combination,
  combine the different quality systems of every participant involved into one project bound system. Al participants can, to a certain extend, adhere to their own system and therefore the way of working will not change dramatically for each participant;
- creation,
  create a new quality system for this particular project.

The choice for one of these options is also affected by the way the participants are collaborating with each other. In a collaboration where the principal is very dominating, it might be very logical to use the principal's own quality system for the project. If the participants involved work together in a team and all have a substantial say, it is more logical to develop a new system with the team or adjust the current systems of the participants to each other.

In practise different quality systems exist and some of them can be applied to a building design project. Which system is most suited to be used in a particular project is dependent on the size of the project, the participants involved and the advantages and disadvantages of the system itself.

imposement

This option is to impose an existing system that is also used in the company of the principal. An example of such a system is ISO 9001.

combination

Make one system by combining the existing systems of the participants involved. To do so the Dutch IPKP-method could be used. IPKP is an abbreviation that means Integral Project Quality Plan [4]. The

IPKP has been developed by the SBR (the Dutch building research institute). The IPKP consists of a number of procedures. Those procedures can be adjusted and used to come to a shared quality approach of all participants involved. The IPKP also arranges who has to perform what duties, who has got responsibility, how project processes are controlled and which measures will be taken to guarantee quality. It is important to note that the individual participants remain responsible for the quality of their own work.

creation

Create a totally new quality system for the project. A good example of this kind of systems is created by Mr. Walta to be used on the design and construction of a railway suited for high speed trains. This system is described in the ADMS report "de ontwerp-manager" (Chapter 8) [6]. The system takes the following aspects into account:

- a clear and shared project organisation;
- a stable (conglomerate of) principal(s);
- one project management concept;
- system engineering (a method to make a design by an improving iteration of developing functional requirements and the creation of technical solutions);
- efficient production system;
- efficient knowledge acquirement;
- management of aspects concerning society (e.g. nuisance).

Another way to get a project quality system is to design a completely new system especially for this project.

For some time now (since october 1996) it has been anticipated that the new ISO 10006: "Guidelines to quality in project management" will reach its final stage [1]. Until this moment this has not happened yet. When issued, this ISO 10006 might be very useful in making and implementing a project quality system.

Advantages and disadvantages

In this paragraph the advantages and disadvantages of the systems described above will be discussed.

ISO 9001

The main advantages of this system are the official status it has and the fact that the system is widely known with companies. Contrary, this system is complex and usually takes a long time to be implemented. Implementation of this system often takes more than one year.

IPKP

This system makes it possible to base the project system upon several different quality systems. The IPKP has been drawn up according to the ISO 9001 standard. Implementation can be done in a relatively short time, because this system is meant to be used for building projects. The IPKP is an empty shell and therefore can not be used, if some quality systems are not already in use by the participants involved.

Walta

This system is especially suited for large, complex projects with a high degree of complexity and a high amount of different participants. The system is to complex and elaborate to be used in small and relatively simple projects. Using this system for small projects would result in an exaggerated workload and an overkill in process controlling and monitoring.

Own design

Creating a totally new system takes far more time than the other options. The result is a tailor made system, that has an exact fit for the project for which it has been designed. This way of creating a system is suitable for projects with unusual aspects, for example very high complexity or an enormous scale of the project.

Choice of the system to be applied

Three out of the four participants are already engaged in the implementation and/or use of ISO 9001 based quality systems. When it comes to implementing a quality system for the "Groenmarkt" project, the choice for an ISO 9001 based system is obvious, whether it is going to be a new system for this particular project or a system that consists of the combination of the systems of the participants.

Which method of creating a project quality system is preferable for the "Groenmarkt" project is largely dependant on aspects of the project. The "Groenmarkt" project is not very large and its complexity is mainly found in the actual building construction phase. This complexity should already be dealt with during the design phase, but does not impose any supplemental demands on the project quality system to be used. Because of the small scale and complexity of the "Groenmarkt" project, the Own design method and Mr. Walta's method are not suitable to use. Applying these methods would take to much time and might result in a far too elaborate system.
Applying a complete ISO 9001 system for the project also takes much time and effort, despite the fact that several participants already use ISO 9001 within their companies. In fact this ISO 9001 system is primary meant to be used for a continuing process within a company which has a longer lifespan than the duration of a project. Some participants already use ISO 9001 and therefore the project system could very well be based upon the ISO 9001 standards. The obvious solution in this case is to use the existing systems of the different participants and combine those into one project bound system. As stated above, the IPKP method could be used very well to do so.

Implementation
The process of creating a new system should be initiated by the principal. The creation of a system will initially demand extra time from the other participants and their personal benefits will probably be not clear. In the long run they will create a climate to perform a better job. The principal has the main benefits, because the process can be better controlled (one of the principals main concerns) and the client can be provided with a better product.
To make the suggested project quality system, simply the steps described in the IPKP will have to be followed and executed.
To have a successful implementation, it is necessary that all participants involved completely support the project system. The project system must be supported by all parts of the companies of the participants, otherwise it will not function properly. With regard to the "Groenmarkt" project this might cause some difficulties. The principal, being the most important beneficiary of the implementation of a project system, should be very motivated. In this case the principal hardly realises what a quality system is and what its effects might be. Therefore it is essential to motivate the principal. If this does not work out implementing a project quality system is useless. The other participants have to be motivated better, especially the installation and structural engineer. Both firms implement ISO because of market demand and not because of problems or needs from within the companies. For successful results support from within every whole company is essential. Thus lack of motivation from inside those companies will have to be prevented.
Furthermore INBO has participated in a design team before, that tried to implement a project quality system. This implementation took a lot of time and effort. During the project, the system has been abandoned. Bearing this negative experience in mind, it will be very difficult to motivate INBO. It is even possible that INBO's experience has negative effects on the possible support of the other participants.
Apart from a sound en firm motivation of every participant, all participants must have the same goal in mind when implementing a collective project system. A project start up is a suitable way to ensure this. In other words; not explicitly agreeing to the same conditions and goals will diminish the possibility of a successful result. Project start up is essential for implementation and good functioning of project bound process quality systems.

Another important note is that the success of a project quality system for the "Groenmarkt" project still could be very limited, because in the design team no specific knowledge is available with regard to the actual construction of the building. A project quality system might ameliorate the design process, but what is the use of a smooth design process if the buildability is not taken into account? For the "Groenmarkt" project this is crucial, because all participants involved already foresee difficulties during construction, especially from a logistic point of view. Incorporating a buildability advisor or a contractor in the design process might reduce these difficulties considerably.

Whenever a project quality system is implemented, care should be taken to ensure proper functioning during the entire project. A good way to monitor this, is the execution of audits. Once in a while an audit should be done to check the effective working of the system and if necessary some adjustments to the project quality systems should be made. It is preferably that the audits will be performed by an

independent multiple-disciplinary team. For this project the audit team could be formed by specialists already employed by the principal MAB. This team would not be totally independent, but still largely independent of the project. Considering the scale of the project, hiring an external audit team might very well prove to be too expensive.

Advice

As stated above, the advice for the "Groenmarkt" project would be to attract building knowledge into the design process, consequently try to motivate all participants for implementing and using a project quality system. If this motivating is successful, the next step is to create a project quality system based on the ISO 9001 systems used by the participants. A team consisting of all participants should take care of this, using the IPKP method. Then implementing should be taken care of and should be preceded by a project start up. When in use the effective functioning of the system should be monitored by means of audits, performed by a multiple-disciplinary team consisting of employees of MAB, that have no other involvement in the "Groenmarkt" project.

The feasibility is not very high, because of the size of the project and the motivation of the participants. Because of the size of the project the cost involved in creating, implementing and monitoring a project quality system are relatively high. The cost is even increased by the little motivation of the participants involved. To create this motivation an extra investment is necessary. On the basis of these aspects it is not recommended to implement a project quality system for the "Groenmarkt project".
The incorporation of building knowledge into the design process would not have very much cost consequences and should therefore be done anyway.

Complementary task 3: How to handle neighbourhood objections

During the concept deliberations the city government expressed the project as acceptable. One hour before closure of term for public objection, the neighbourhood supported by an expert lawyer, submits a sounded objection against the current project. Governmental procedures are not in favour, the project plan is half a year behind intended time schedule. Neighbourhood inhabitants are opposed against an augmenting pressure to park cars and neighbourhood business opponents are against the traffic closure during construction period.

1. Work out the consequences for the profitability of the project.
2. Work out a plan how to deal with the problems raised by the neighbourhood.
3. Investigate possibilities to enforce the continuity of project realisation by presenting the case in court.
4. Develop alternative strategies to settle the problems by gentlemen agreements.

Solution 1

As mentioned above the project plan is already half a year behind the intended time schedule. The current problems with the neighbourhood inhabitants and business opponents will probably not lead to more delay of the process, which the answer of the questions 2,3 and 4 will make clear later on. Only if the citizens do still have the problems and submit these objections after the building licence has been issued, this can cause a serious delay of the process. This only happens if the citizens succeed in obtaining a "Voorlopige Voorziening", on account of which the building licence will be suspended. As the Groenmarkt project is still in the section 19 procedure and the building licence has not been issued yet, it can be assumed that the mentioned objections will not lead to an extra delay of the process. The different strategies (see solution 4) to settle the problems by gentlemen agreements during the current stage of the process make this assumption also plausible. So at this moment the total delay of the project is still six months.

A delay of the project has direct consequences for the cost the principal has to pay for the project. The different kinds of cost which will increase when the project plan is six months behind time schedule depend on the phase in which the delay occurs. In this case the six months delay influences the profitability of the project as follows:

a loss of exploitation income of six months
Every day the building will be finished later than the principal had intended costs him a lot of money, because the future users of the building do not start paying before the building can be used. As the future users of the building and the rent prices the principal will charge are not known yet, it is difficult to say how much the loss of exploitation income caused by the six months' delay will be for the principal. But by making some assumptions, the following calculation can be made:

Total square meters for shops =	1806 m^2
Total square meters for offices =	1692 m^2
Total square meters for restaurant and catering industry (basement of the old town hall)=	990 m^2
Total square meters for public cycle store and warehouse =	584 m^2

As the marriages at the ground level of the old town hall do still take place during the construction period, this function of the building can be left out of consideration in this calculation. Assume that the rent price for the shops and for the restaurants and catering industry is the same and amounts to 1.000 guilders a year per square meter, for the offices 300 guilders a year per square meter and for the public cycle store and the warehouse 100 guilders a year per square meter [source: Mr. Deiman, De Brinkgroep]. The total loss of exploitation income for the principal, caused by a project delay of six months, amounts then to about 1,7 million Dutch guilders. The outcome of this calculation is a prove for the fact that the principal must try to minimize the project delay at all times.

an increase of the cost of personnel
A project delay can also lead to an increase of the cost of personnel, but if the construction period has not started yet, this increase will be rather small. The extent of the increase of personnel cost depends on the phase in which the project is, on the activities which have caused the delay of the project (for example a drawing which has to be done over again) and on which participant is responsible for the delay. To be able to calculate the exact increase of these cost, the causes of the project delay must be analysed and it must be determined whether this delay has lead to extra activities for some participants. As the time is too short and the information too restricted, this could not be calculated for the Groenmarkt project.

If a delay of the project occurs during the construction period the consequences are much more serious, because, except the cost mentioned above, some other kinds of cost will increase in that case. The most important increasing cost sorts are given below:

- an extra increase of the cost of personnel (construction workers at the building site, etc.);
- an increase of the cost of materials (rent of a crane for a longer period, higher risk for damaged or stolen materials at the building site);
- an increase of the store cost (materials for a longer period in stock in which capital has been invested);
- an increase of interest cost (due to the delay it takes more time to earn the invested money back, which causes a loss of interest income).

In that case it is much more complicated to calculate the consequences of the project delay for the profitability of the project.

Solution 2, 3 and 4

As the questions 2, 3 and 4 have a lot in common, the answers are integrated into one solution.

Introduction
The steps the principal can take against public objections depend on the phase in which the process and the juridical procedures are. In fact three possibilities can be distinguished:
1. the regular destination plan procedure which takes place before the building licence has been issued;
2. the section 19 procedure which takes place before the building licence has been issued;
3. the procedure after the building licence has been issued.

For a clear survey of these procedures see figure 2.

In the Groenmarkt project in The Hague the section 19 procedure is in force. At this moment the "declaration of no objection" is on the point of being given by 'Gedeputeerde Staten (GS)'. At this phase of the whole procedure citizens have only little possibilities to oppose against a plan. They can not submit an objection against the project, but they can only submit their considerations about the project to GS. So the situation as described in the exercise above is not possible in the current phase of the Groenmarkt project. In the next paragraphs the different steps are described, which the principal can undertake if problems with citizens do occur, during the section 19 procedure and after the building licence has been issued.

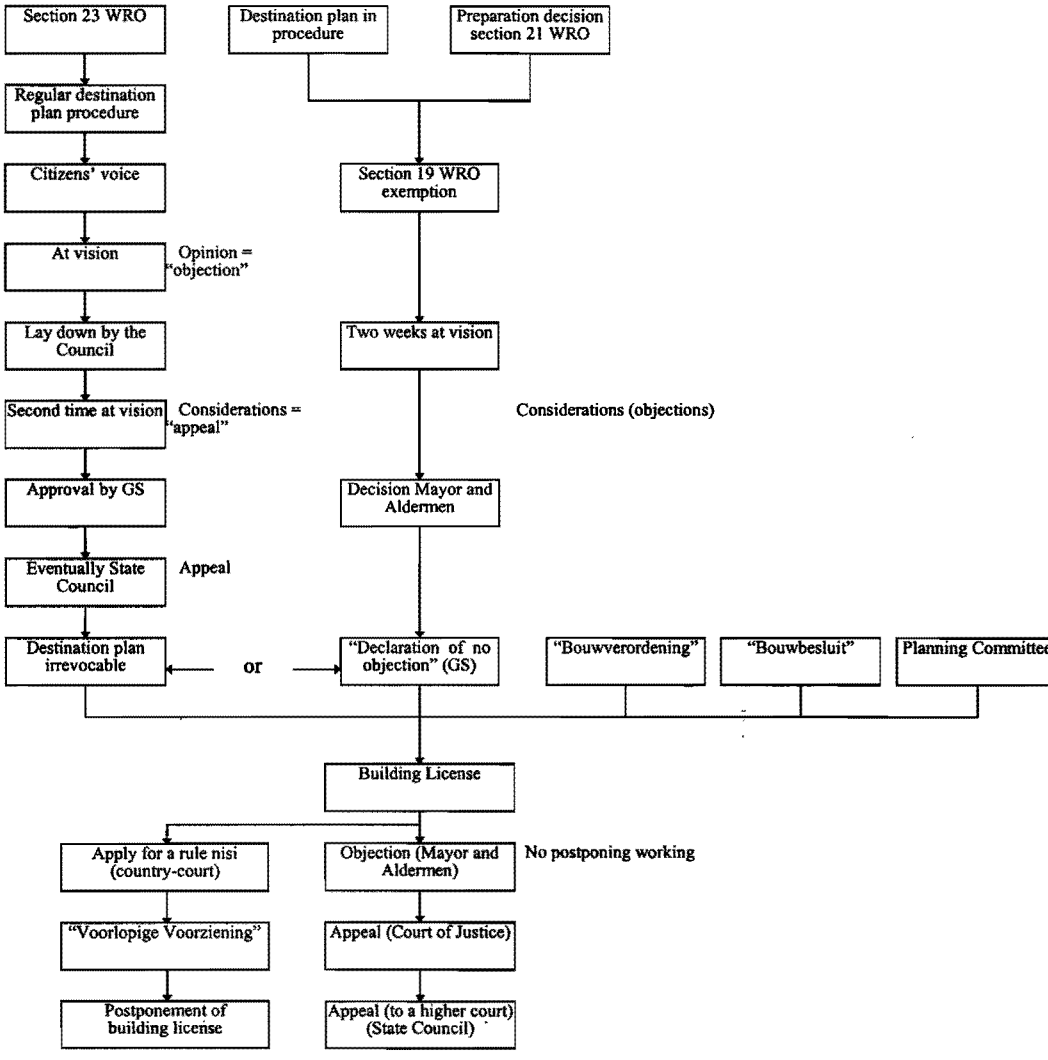


figure 2: Possible juridical procedures in the building process

Section 19 procedure

The section 19 procedure seems to have less legal guarantees than the regular procedure, because in the opinion of the judge the use of the section 19 procedure is a figurative use of the law.
For the principal it is of the utmost importance to create a good co-operation with the city government. The principal must see to it that the city government acts carefully during the entire process. He must also take care of a good co-operation between the city government and GS. The only reason for seriously delaying the section 19 procedure is carelessly working by one of the mentioned participants during the process. If the co-operation between GS and the city government is good, the chance of procuring the "declaration of no objection" by GS is rather big. The citizens' considerations about the project have to be submitted within two weeks after the plan has been in vision. These considerations are especially tested at spatial structure aspects. A lot of attention is paid to these considerations, but in most of the cases they are rejected and the "declaration of no objection" is given to the principal

without any problem. So in this phase of the process the citizen cannot bank on a good legal assistance in case of discord.
In summary no big problems need to be expected by the principal, if he takes care of a good co-operation with all participants and if he checks each of the participants separately at their careful functioning continuously. All possible objections must be analysed by the principal, because they can lead to threats for the progress of the project (see figure x.x). It is the best for the principal to meet the citizens' objections by discussing the problems with the complainers or, if necessary, by making deals with them (redemption money). If he does not do that the citizens' objections can cause a serious delay of the project later on in the process when the building licence has already been issued.

Building licence issued
The citizens' considerations during the section 19 procedure, can be submitted as objections against the building licence later on in the process. The citizens can try to obtain a 'Voorlopige Voorziening' by means of applying for a rule nisi on account of these objections. Such a 'Voorlopige Voorziening' means that the building licence will be suspended. Reasons for holding over the case can be the careless dealing with the Planning Committee, procedures for the environmental licence and/or procedures for the monumental licence.
People can apply for this rule nisi immediately after submission of the objections. So it is not necessary for the citizens to wait until consultation within the city government has taken place or until the end of the period during which objections can be submitted. The court-session takes place at the sector 'Bestuursrecht' of the county-court. It is possible that the judge decides that the building process must be postponed until the destination plan has become irrevocable.
It is in the interest of the principal to take care that the city government does not only start the section 19 procedure, but also the procedure for the modification of the destination plan. If there is no reason for holding over the case and the whole procedure has passed off properly, the building licence will nearly always be given. The principal runs the biggest risk when the result of the summary judgement process is a 'Voorlopige Voorziening', because this leads to postponement of the building licence. This can cause a considerable delay of the building process, so the principal must try to avoid such a situation at all times.

Alternative strategies
It appears from the above that the citizens' problems can only be settled by gentlemen agreements during the regular destination plan procedure or during the section 19 procedure. After the building licence has been issued, objections submitted by citizens will be heard successively by the Mayor and Aldermen, the Court of Justice and the State Council. In that state of the process it is difficult for the principal to settle the citizens' problems by making deals with them. For the Groenmarkt project in The Hague this means that alternative strategies must be developed during the section 19 procedure, when citizens make known their objections against the plan. For the case that neighbourhood inhabitants are opposed against an augmenting pressure to park cars and neighbourhood business opponents are against traffic closure during the construction period, the following strategies can be used by the principal:

during the construction period:
- analyse the problems and reduce the resistance;

The inhabitants and business opponents of the neighbourhood must be better informed about the construction period of the project and about the project itself. The positive effects of the building when it is ready and the importance of it for the neighbourhood must also be pointed out to them. By doing that the resistance of the people against the project can perhaps be reduced. After that each of the citizens' problems must be analysed as good as possible. To settle these problems the principal must try to make a compromise with them, even if this will lead to paying a considerable amount of money to the citizens by the principal (redemption money).
- a free subscription for the parking garage and a free tramway season-ticket;

One way to meet the inhabitants wishes is to give them the possibility to park their cars free of charge in a parking garage in the neighbourhood during the construction period. As this parking garage can be situated at some distance of the inhabitants' houses, a free subscription for the tramway must also be offered to them.

- parking licences;

Another solution for the inhabitants' problem is implementing a system of parking licences. Each inhabitant can get a parking licence, for a rather small price, for parking his car in the neighbourhood. By using such a system the number of parked cars there will be reduced considerably.

- better reach of the neighbourhood business opponents;

A compromise with the neighbourhood business opponents can be made by letting the supply and transport of goods take place mainly during the night and outside the shopping hours. By doing this the daily annoyance will be reduced and the buildings of the business opponents will be within an easier reach.

after the construction period:

- discount vouchers for the new shops;

To reduce the resistance of the neighbourhood inhabitants and business opponents against the Groenmarkt project, it can be helpful to give them vouchers for discount in the new shops, which will be opened after the construction of the building has been finished.

- a party in the neighbourhood when the building process has been finished;

Also the intention of organising a party for the neighbourhood when the project has been finished can contribute to less resistance of the inhabitants and business opponents against the plan and to more understanding for the current situation.

In summary it is most important for the principal to listen to the problems the inhabitants have. By providing them with good information about the project and by analysing their problems a lot of resistance against the plan can taken away in an early stage of the negotiations. After that the principal must try to make a compromise with the problem owners, even if this will lead to the payment of a considerable amount of money. The citizens' objections against a project must be tried to be solved in an early stage of the process, because in a later stage they can lead to a serious delay of the project, which causes a lot of extra cost.

Complementary task 2: tendering options

1. Evaluate at least three options for tendering constructions.
2. Work out how the existing lack of integration with construction parties may be corrected.
3. Consider within your evaluation also potential risks in terms of time, quality and cost.
4. Your evaluation should be to advice MAB (the project principal) which tendering procedure to follow (for this project specifically and future projects in general) with also a check list for selecting the contractor.

Solution 1 [2, 3, 7, 8]

Introduction

The different tendering procedures are characterised by the way in which the principal permits the contractors to tender for a special project. These tendering procedures can be considered as selection techniques. The principal's choice for a special tendering procedure influences the composition of the group of contractors allowed to the tendering market. The price formed by the market is a means for the principal to make his choice out of the permitted tenderers.
By the preference for one of the tendering procedures the principal has a method to make a qualitative selection of the tenderers. In many cases attention is only paid to the quantitative selection by means of the offered price.
The following tendering procedures are best known and most used by principals:

- the public tendering;
- the private tendering;
- the singular invitation;
- the European tendering.

Public tendering

In this tendering procedure everyone, who considers himself capable to execute the project, is permitted to do a tender, for which the principal demands an estimate. A great disadvantage of this tendering procedure for the principal is the fact that many tendering organisations are not known with the company and vice versa. Caused by this it often happens that the principal cannot give a good estimate about the contractor's capability to execute the project.
As principals are conscious of the fact that contractors do not always meet the imposed norm, a clause can be included in the specifications, which enables the principal to put away the lowest and eventually other offers. This clause is only in force if the principal suspects the tenderer not to be able to meet the imposed norm. So the qualitative selection, as a result of the choice for public tendering, can be corrected in such a way that only the tenderers who are expected to meet the imposed norms will be considered for the execution of the project.
Passing by a tenderer is not a simple matter. Although it is possible in principle to correct the result of the public tendering, it is in fact not very well to apply this method. As reasons for passing by other tenderers can be mentioned: inexpertness of the tenderer, tenderer has no financial capacity, the tenderer's estimate is too low, etc.
It is not only the tendering procedure which makes the selection, but also the name the principal has with the tenderers. The experience the tenderers have with the way in which the principal interprets the specification in practice, influences the number of candidates which finally decides to make a tender.

Private tendering

In this tendering procedure a number of tenderers selected by the principal is invited to make a binding estimate for the execution of a project as described in the specification. The specific characteristic of a private tendering is not the limited number of tenderers, but the previous qualitative selection which takes place by the principal.

In a very few cases the principal chooses for the private tendering procedure in order to get more tenderers than would be the case if he had chosen for public tendering. An important aspect of the private tendering is that the invited tenderers always make an estimate for the project, even if they are not really interested in getting the work. If they do not want to have the work, in almost all cases they will try to do an estimate which is not much higher than the lowest tender. So the preceding qualitative selection does not automatically mean a positive or negative influence of the price the principal has to pay.
For the principal the advantage of this tendering procedure is the increase of the homogeneity of the tender. The principal invites the tenderers, because he is convinced of the fact that they can do the job in accordance with the imposed requirements as described in the specification. For the tenderers this tendering procedure is also of importance, for they can suppose that only those tenderers are allowed to tender, who are able to perform a qualitative equal achievement. Another advantage of the private tendering is the fact that an element of bond is created between principal and tenderer, which is totally missing in the public tendering procedure.

Singular invitation
In case of a singular invitation only one contractor is given the opportunity to make an estimate for the execution of the project as described in the specification. In this case the principal is mostly completely acquainted with the contractor's capacities. Just this acquaintance and the demands made on the execution of the project form in most cases the basis for preferring a singular invitation. The principal's demands can be so specific, that the private tendering procedure is not an efficient enough selection method.
It is supposed that the singular invitation as a tendering procedure can be used in all cases in which the principal is convinced that his requirements can be best met in this way. So the qualitative selection is purposefully limited to only one contractor.
Qualitative selection is not the only reason for choosing the singular invitation as tendering procedure. If the principal gives the priority to the price estimate, then he is able, guided by his insight into the constellation of the market, to choose for the tendering procedure which he expects to result in the lowest price.

European tendering [5]
The "Uniform Aanbestedingsreglement EG 1991" (UAR-EG 1991) has been set up in connection with the European directives for governmental projects. The UAR-EG 1991 can be applied for projects which fall under the European directives for governmental projects or under the public utility sector. Like the UAR 1986 the UAR-EG 1991 is also applied by private principals.
In fact the UAR-EG 1991 is nothing more than a manual for public tendering according to the European directives. The UAR-EG 1991 contains four tendering procedures, based on the procedures which are dictated in the European directives:

the public tendering procedure
All interested contractors can tender directly in pursuance of the publication of the project in the Paper of the European Communities. The principal determines from these tenders, on the ground of previously published objective selection and allotment criteria, to which contractor he finally grants the project.

the tendering procedure with previous selection (the non public tendering procedure)
This tendering procedure consists of two stages. In the first stage interested contractors can report to the principal in pursuance of the publication of the project. The principal invites some of them to make a tender on the ground of previously published objective selection criteria. From these tenderers the principal chooses, also on the ground of previously published objective allotment criteria, the contractor who may execute the project.

the negotiation procedure with previous announcement
After a publication in the Supplement of the Paper of the European Communities the principal selects one or more interested candidates on the ground of previously published objective selection criteria. In consultation and by means of negotiations the contractual conditions are determined. This procedure

can only be applied in a restricted number of cases, for example in projects concerning research and development.

the negotiation procedure without previous announcement
In this procedure the principal negotiates directly with the candidates selected by himself about the contents of the contract, without previously publishing the project in the Supplement of the Paper of the European Communities. The criteria for applying this procedure are more than those for the procedure mentioned above, for example if no suited tenders have been received in a public or non public procedure.

Principals who have to stick to the European directives for the tendering of governmental projects or projects in the public utility sector are:

- the State;
- its territorial corporations;
- public law institutions;
- associations formed by one of more of those corporations or institutions.

In general the selection of the candidates takes place according to objective ability criteria which are the same for each of them:

1. In the directives some reasons are described on the ground of which tenderers can be excluded, for example when a candidate is in bankruptcy;
2. A statement of the registration in the profession register of the country of the candidate can be demanded;
3. Financial-economical criteria can be used;
4. Criteria concerning technical capacities are used.

The parties who invite candidates for tendering (the principals) must previously announce which allotment criteria they are going to use. In the first place the lowest price can be used as criterion. Beside the criterion 'economically most profitable' can be preferred, which is nearly always applied in the Netherlands. Other criteria used in European tendering procedures for selecting the contractor are: quality, safety, aesthetic character, time of delivery, etc.

In summary the European tendering procedure is only used if the principal is obliged to do that because of the European directives which have to be followed. It seldom happens that a principal chooses for European tendering while it is not necessary, because this kind of tendering procedure is more complicated and takes more time than the usual procedures. Besides the co-operation with companies from foreign countries can cause serious delays and other difficulties during the construction process of the project.

Solution 2

Consequences of the lack of integration with construction parties
In the "Groenmarkt" project in The Hague there has not been any integration with construction parties in the process until now. At this moment the project principal, the MAB is about to make a start with the tendering procedure. The lack of integration with construction parties can cause serious problems during the construction phase of the project, because probably too little attention is paid to the buildability of the building during the design process. As no construction experts have participated in the project until now, there is a rather big chance that essential aspects for the construction of the building have been overlooked during the process. It is almost sure that the other participants of the project do not have the constructive expertise which is necessary to be able to anticipate all expected problems concerning the construction of the building. The main reason for expecting problems in the construction phase is the fact that the project is situated at a difficult location within the inner part of a city which causes complicated logistics of the materials and a complex process of execution. The

existing lack of integration with construction parties as mentioned above has different consequences for the continuation of the project, of which the following are the most important:

- A number of severe demands will have to be made on the contractor to be selected by the MAB (the project principal). Due to the reasons mentioned above some problems are expected during the construction phase concerning among other things the buildability and the logistics. As the contractor is the first party being involved who possesses construction expertise, these problems will have to be solved for the greater part by this participant. Caused by this, much pressure will be brought to bear upon the contractor by the principal. As a result of the hard demands the principal has to make on the contractor it is very important that the MAB chooses the most suited tendering procedure and that he makes a well-considered selection of the tendering candidates.
- The MAB runs the risk that a lot of modifications of the design have to be made during the construction phase of the project. As there was no integration with construction parties before, this risk is considerably higher than would have been the case if this integration had taken place earlier in the process. These modifications can lead to considerable delays of the process and so also to an increase of the cost. The extent of the increase of the cost caused by a modification in the construction phase depend on the seriousness of the modification, the time necessary for the modification and the number of participants being involved in the performance of the modification. It can be assumed that most of the problems expected in the construction phase would have been prevented if construction parties had been involved in the process earlier.

Correction of the lack of integration with construction parties

As the "Groenmarkt" project is nearly in the tendering phase now, the lack of integration can only be corrected by selecting a very capable skilled contractor who has a lot of experience in this kind of projects and who can easily handle the expeeted problems. It is difficult for the MAB to assess in advance which contractor is able to fulfil all imposed requirements. Therefore it is of great importance for the project principal to pay a lot of attention to the choice of the tendering procedure to be used and to the ultimate selection of the contractor.

As mentioned above it would of course have been better if construction parties had been involved in the process earlier. But which parties should have been involved at what moment of the process exactly is not an easy question. At the beginning of the process nothing is known about for example the building method which is going to be used. As most of the construction experts have got an expertise concerning a specific field, it is difficult to choose one in an early stage of the project. So the moment of involving an construction expert in the project team must be well-considered. In fact there are two obvious options:

1. involving a construction expert from the early start of the process who has knowledge of and experience with all kinds of building methods;
2. involving a construction specialist concerning a specific building method when the design has become more concrete and the building method to be used is known.

Of course a lot of other alternatives can be mentioned which lay between these two extremes. It is also possible to involve more construction parties during the process dependent on the size of the project and the available budget.

The construction party which has been involved in the project team during the process should not influence the principal's selection of the contractor who is going to execute the project. Only if the co-operation between the principal and the construction expert is good and efficient and the principal considers the expert capable to do the construction of the project, it may happen that the construction expert becomes also the contractor of the project later on in the process by means of a singular invitation (see solution 1).

Solution 3

Potential risks in terms of time, quality and cost caused by the chosen tendering procedure
The different tendering procedures mentioned in solution 1 have of course different consequences for the potential risks concerning time, quality and cost. The European tendering procedure has been left out of consideration here, because the MAB is not obliged to stick to the European directives, so this procedure can not be seen as a real option for the MAB.

time: The time necessary for selecting a contractor will increase when the number of tendering candidates increases. So in general the public tendering procedure takes more time than for example the singular invitation, because in the public tendering the principal must first make a qualitative selection of all candidates who have tendered. As it can happen that a private tendering has more tenderers than a public tendering (although this seldom is the case), it can not be said with certainty which of these two procedures takes more time for the project principal. It can be assumed that the singular invitation takes the fewest time, because this procedure is only used if the principal is already acquainted with the contractor. Caused by this the negotiation procedure can start immediately after the contractor has been invited by the principal.

quality: Which of the tendering procedures leads to the best quality of the ultimate realised building depends on a lot of factors like the kind of project, the principal's experience with contractors, the budget of the project, the time available for the project, the principal himself, etc. Generally speaking it can be assumed that the risk of bad quality is the biggest in the public tendering procedure, because the candidates who are in fact not capable to execute the project can also tender in this procedure. Therefore it can happen that the principal selects a contractor he does not know yet, on the basis of an estimate of his capability to construct the building. In the two other procedures the principal is already acquainted with the selected contractor which diminishes the risk of bad quality to be realised.

cost: As the party who invites candidates for tendering (the principal) has not to pay anymore all tenderers for the calculation cost they made like some years ago, nothing can be said about the cost of the different tendering procedures. Only one contractor has been involved in a singular invitation, which causes the fact that this procedure takes the fewest time for the principal and is therefore probably the cheapest way of tendering. In the private tendering procedure the principal can choose how much contractors he is going to invite for tendering dependent on the project and on the importance he attaches to the selection procedure and less dependent on the amount of money he wants to spend on it. Anyway the principal should not try to save money with the tendering procedure to be chosen. To make the project succeed it is very important to select the most suited contractor, with whom money can be earned back during the building process.

Potential risks in terms of time, quality and cost caused by the integration with construction parties
The integration with construction parties earlier in the process than the construction phase, as described in solution 2, has far more advantages than disadvantages. The only disadvantages are the cost of it and the fact that the co-ordination during the process becomes more complex when the number of participants involved in the process increases. This last disadvantage is very minor, because the "Groenmarkt" project is very small, has only a few participants and a simple communication structure. So it will be clear that the disadvantages do not counter-balance the advantages caused by this integration. As the number of design modifications needed for the construction will be reduced till a minimum by an early integration with construction parties, time will definitely be saved during the construction phase. The risk of project delays will considerably be reduced by such an integration. Less modifications of the design and less project delays during the construction phase will also result in less cost. So the money, which must be paid for the construction expert during the design process, will be earned back during the building process as a result of the fact that a lot of problems could have been prevented. The integration with construction parties reduces also the risk of bad quality of the realised building, because a lot of aspects concerning the buildability are taken into consideration in an earlier stage of the process. Caused by this it will be easier for all participants to be aware during the whole

process that the original requirements as described in the specification will be satisfied. The chance of good quality also increases because of the fact that not only the contractor, but at least one more construction party cares about the construction of the building.

Solution 4

Advice to the MAB concerning the tendering procedure
As a lot of hard demands have to be made on the contractor of the "Groenmarkt" project, caused by all expected problems during the construction phase, it seems the best for the MAB to choose either the private tendering procedure or the singular invitation procedure. It must definitely be a contractor with whom the MAB is already acquainted and with whom he has good experiences from the past, so that the risk of selecting an unsuitable contractor will be minimised. Therefore the public tendering procedure is not suitable for this case. If the MAB knows only one contractor whom he considers to be suitable for constructing the work and capable to meet all imposed requirements, it is a good idea to choose the singular invitation as tendering procedure. This contractor must be invited by the principal to make a tender and after that the negotiations can start. If the MAB knows more contractors who can perhaps be able to execute the construction of the project, to satisfy the imposed requirements and to solve all problems, it would be better to choose the private tendering procedure.
As a lot of problems are expected in the construction phase which must mainly be settled by the contractor, the MAB should not select the contractor on 'the lowest price' criterion, but on criteria which say something about the capability to solve the mentioned problems, like the criteria 'quality' or 'logistic experience'. If there is more than one candidate left after having selected on these criteria, the lowest price selection must take place. So the cost are still an important element for the principal, but must not get the highest priority in the tendering procedure of this project.
In future projects, which take probably also place in the centre of a city and therefore will have the same kind of problems, the MAB can best use the private tendering procedure or the singular invitation for the tendering for reasons mentioned above. The selection criterion that must be used by the MAB to select the most suited contractor depends on a lot of project bounded aspects, like the delivery time, the imposed requirements, the budget, the location, etc. So it is difficult to give an advice about the selection criteria to be used by the MAB in future projects.

Main task 4: Acceleration of the "Groenmarkt" project

Scope and goal
This section has two goals, which both have to do with time management of a project. The monitoring and controlling of time, using WBS and network planning, are presented in main task five and will not be further discussed in this section. In this section two items will be addressed: how to prevent time overrun in general and how to accelerate the "Groenmarkt" project to reduce the time overrun that occurred.

How to prevent time overrun?
In general the prevention of time overrun has to do with the monitoring of time spent and time scheduled per (set of) activities to be performed within the framework of the project. In this case it is the task of the principal (because he is also the project manager) to assure that all participants involved adhere to the agreements that are made concerning time to be spent on their activities. To do so the project manager should have insight into the "bottle neck" activities that immediately cause time overrun of the project, if the activities take longer than scheduled. To determine those activities, a network planning can be used. Within this network planning the critical path can be determined and all activities that form the critical path together should be monitored very carefully in terms of time. Using a network planning also provides insight into the consequences of time overrun of an activity for the total project. It also indicates which activities could be changed to diminish the time overrun caused by the mentioned activity. To ensure timely finishing of activities, the project manager should use a system of milestones, that must also be explained clear to the other participants, in order to make clear to them what the consequences of time overrun are. If necessary a penalty in terms of money could be set if activities take too long.
However, it would be preferable to be able to know the progress of an activity during the activity itself, to enable timely corrections if need be. Especially during the design activities of the project this might prove quite difficult.
Within a project two sets of activities can be distinguished: activities to be performed by the city council and regional government and activities to be performed by the other participants, which are brought together into the design team in the case of the "Groenmarkt" project. The activities of the city council and regional government are described in complementary task three. The description of task three makes clear that it is essential that the project manager ensures that the activities are performed correctly and accurately. Time overrun can only be caused by not doing this or not taking citizen's complaints seriously. Those complaints can be expressed during the activities to be performed by the city council and regional government.
Main task five describes how the other set of activities can be monitored in terms of time.

Causes and prevention of time overrun that has occurred in the "Groenmarkt" project
Until this moment quite some time overrun has occurred at the "Groenmarkt" project. The total overrun amounts eight months. Most of this overrun is caused by two delays. One of these is due to the city council. It is hard to determine whether this delay could have been prevented by better monitoring and controlling the activities to be performed by the city council. The delay was caused by a special city council team, that only meets once a month. The delay of two months arose because the meeting once did not take place because of holidays and another time because of the fact that the team did not have any time anymore to discuss the "Groenmarkt" project in the meeting and postponed it until the next meeting one month later, a typical example of clerical labour ethics.
The other major delay of several months has been caused by the office of the architect John Outram. The exact reasons are not known, but probably consist of doing some "Groenmarkt" project activities too late, because other work was more important. Also because of the hierarchical decision making process that usually occurs within these kinds of architectural offices, some delay can be explained. This delay is only known by the project manager when it has already occurred. To be able to foresee these delays at an earlier stage it is necessary to acquire insight into the way of working of the architects office. This could be done by making an employee of Inbo or the MAB work in John Outram's office. This employee could facilitate communication and should be able to indicate earlier

whether delays are to be expected in order to act more rapidly upon possible delays and maybe even be able to prevent those.

How to accelerate a project?
Two different principles of acceleration are applicable. One way is to start activities earlier. Instead of performing all activities one after the other, the activities can be done partly at the same time. This way of performing activities is also known as fast tracking. Apart from doing different activities at the same time, it is also possible to make information available for the next activity before the activity from which this information originates is finished. If this process takes place repeatedly between different activities, it is called concurrent engineering. These different ways of performing activities are illustrated in figure 3.

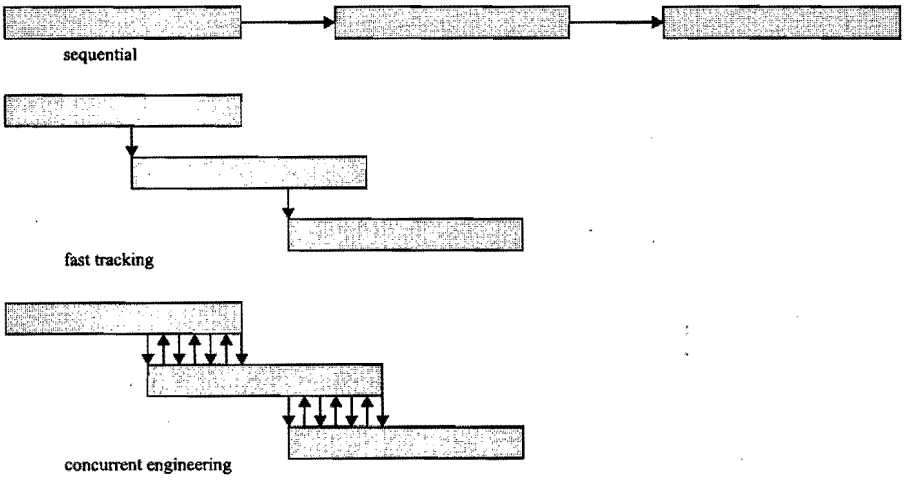


figure 3: sequential activities, fast tracking and concurrent engineering

Another way to accelerate the project is to try to speed up every activity separately. To do so first of all, for each activity it has to be determined whether it is possible to speed up this activity.
Most activities to be performed by the city council and regional government can not be speeded up. It is put down in legislation how long these activities may take. This will have to be taken into account. The only thing to be done is to prevent unnecessary loss of time within these activities. This can be done by closely monitoring the progress of these activities and assuring a good co-operation between the city council and the regional government.
The activities of other participants can be divided into activities that can be accelerated by setting in more manpower or other resources and activities that can not be performed any faster. For example, the activities during construction that have to do with cranes and lifting usually can not be speeded up.
To accelerate the project, activities on the critical path should be accelerated. It is possible that as a consequence of this acceleration the critical path changes and consists of other activities than the activities that are already accelerated. Consequently those other activities which now are on the critical path, can be looked into for further acceleration of the project.

Risks of acceleration
The acceleration of activities by setting in more manpower or other resources augments the risk in terms of cost involved. Setting in twice as much manpower on one activity usually speeds up the activity less than two times. Thus each accelerated activity will be more expensive because of the larger amount of resources needed.
When speeding up activities it is important to pay attention to the possibility that some work is done twice by different people. The risk of doing things twice becomes bigger as the acceleration is higher.

A higher acceleration means that more people work on the same activity and thus more chances emerge that different people do the same work almost at the same time.
When doing different activities partly at the same time the management of communication between different participants involved becomes more important. Higher speed and partial overlap of activities cause the effects of insufficient communication to be much more severe. In a shorter time the project evolves much further than a project that merely consists of sequential activities and therefore faults have much more and severe consequences.

How to reduce time overrun of the "Groenmarkt" project?
Design activities can be speeded up by setting in more manpower and by applying concurrent engineering. The applicability of fast tracking during design is very limited, because most design activities are interdependent. When starting another design activity before finishing the precedent one, a lot of communication is necessary between these activities until the precedent one is finished.
The "Groenmarkt" project has already been designed almost completely, so much acceleration on design activities is not possible anymore. Due to these design activities, the construction activities are already determined. Therefore applying concurrent engineering during the construction is not very useful.
Two options for accelerating the construction are accelerating individual activities and applying fast tracking. Fast tracking in the "Groenmarkt" project is for example possible by already starting on the construction of the ground floor facade, while the structural elements of the first floor still have to be constructed. During the construction of this facade more bricklayers can be used than originally planned to construct the facade faster. Of course also other activities can be speeded up or executed applying fast tracking.

Advice
- closely monitor the progress and activities of the city council and regional government;
- the project manager can employ one of his own people in the office of the foreign architect, to indicate and try to prevent possible time overrun in an earlier stage and ameliorate communication with the architect;
- accelerate activities on the critical path by setting in more resources;
  apply concurrent engineering during design and fast tracking during construction if possible.

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Chapter 6

Niels Peters

Maintask 7: The Construction-Site

Methodology

The aim of designing a construction-process is to make a construction-plan for constructing the building against minimal cost, on time and earlier assigned performance by the available knowledge, people, machinery, material and relevant constraints. The designing of the construction-process is a process of decision-making and tends forward to effective and efficiently use of the different available means. This decision-making-process leads to controlling the construction-process.

The most important means for making a construction-plan are the construction-specialist and the available means and techniques.

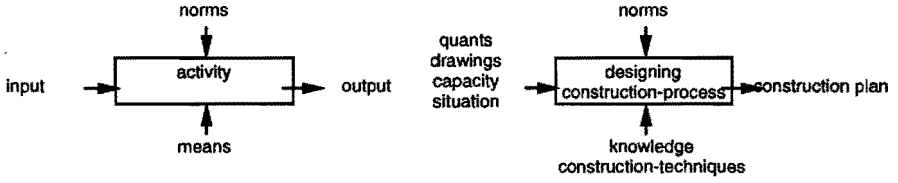

Figure 6.1: designing a construction-process

The most important stages for designing a construction-process are:

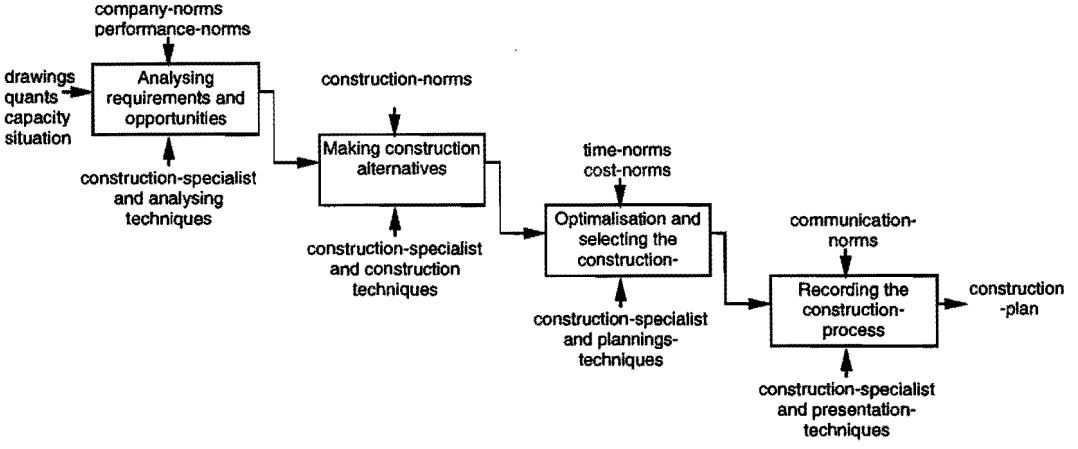

Figure 6.2: design-cycle

Analysis of needs and opportunities

The aim of analysis is to have a deeper understanding of the building-assignment and it's alternative opportunities. In the analysing phase the collecting of data and information relevant for the construction-process is emphasised. Most important aspects are:

- *Description of the project (drawings, quants)*: the aim of describing the project is to get a better understanding of the functional, structural and technical design of the building. This analysis results in the most important construction-aspects of the building. It also results in a description of the main bottlenecks and risks of the project.
- *Available capacity in the contractors organisation*: capacity is defined as the available quantity of people and machinery per unit. There are several options:
    - putting in own employees and machinery,
    - hire people and rent machinery,
    - extent the number of own employees and buy machinery,
    - outsourcing.
- *Situation (size, nature and circumstances of the construction-site)*: the aim of analysing the situation is to get a picture of the existing circumstances of the construction-site. Therefor the following aspects should be analysed:
    - the construction-site,
    - existing facilities,
    - forecasted weather-conditions.

Generating alternatives

There are two types of alternatives:

- *Product-alternatives*: They can be made out of building-parts and elements or building-segments; important are: experience, delivery-time, cost and deals with subcontractors.
- *Process-alternatives*: result in the same object but by different activities or activity-sequences. Important is to devide all activities to the main parts, elements or segments of the building.

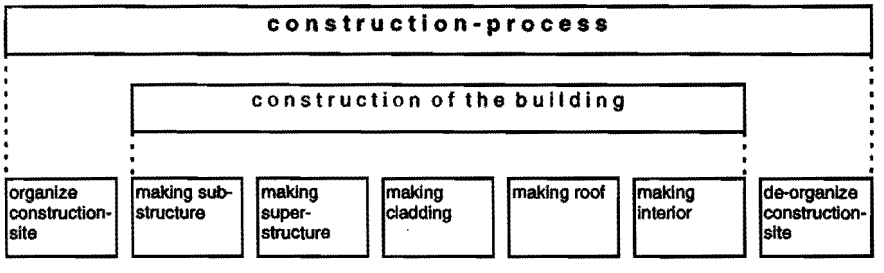

Figure 6.3: construction-process

Optimalisation and selecting

The construction-process is designed when input (what, where), means (when) and the norms (how, when) are recorded. There is no absolutely perfect solution. But based on an unambiguous criteria as for example time, there is a most optimal solution. Ultimately the construction-process which is selected should be the process of constructing the building against minimal cost, on time and maximum performance.

Performance
This must be the starting-point when generating alternatives, the different opportunities that are acceptable for the client.

Cost
The project-cost can be distinguished in five types:
- building-cost
- construction-site cost
- overhead-cost
- risk
- profit

Time
The date for practical completion is a direct constraint for the construction-plan. The penalty for exceeding this date indicates a direct relationship between building-time and building-cost. Also it's possible to express other aspects of time in terms of cost. This expression is based on working-houres and wages, cost for renting and interest. So ultimately the selection of a construction-plan is based on cost and, additional to cost, the risks of the project. By optimising the alternatives, within time-constraint, selection is required based on the following aspects:

Uncertainties: assumptions do have a kind of rate of reliability and indicates a certain risk,

Means: Time and cost of the activities within the construction-process can be provided by quantities, price-rate, delivery-times, machinery, employment, material and information. By summarising these split-time and cost, total time and cost will be known. By comparing these figures over the alternatives a selection can be made. The selected alternative can be the optimal for one of the following constraints:
- minimal cost,
- minimal time,
- minimal risk based on time and cost.

Optimalisation: the optimalisation-process is a trail-and-error-process. The design-cycle, analysis - synthesis - evaluation, should be runned on different levels and within the different main processes. Normaliter this will be a top-down-process. In this process every following step will be optimised: variation, adapting and selection will be executed every time on a more detailed level and will be producing more detailed information.

Optimalisation of the activities
After making up the conceptual design of the main construction-plan is recorded. In the detailing process the different activities and their relationships will be recorded.

Sequence: The estimated minimal building-time is defined by the estimated total time for the activities on the critical. Minimal declination of this estimated time-scale can be reached by creating as less as possible sequenced relationships between the activities. Further optimalisation can be done by variations in the accuired employment, machinery and material.

Employment: The most important constraint in the construction-process, related to employment, is to attune the workforce-gangs. This should result in a minimal of slack.

Machinery: optimalisation of allocated machinery can be done by variation of the number of machinery and the working duration of the allocated machinery.

Material: When the product-definition is set it's still possible to variate in the process of constructing that particular product. If the process also is defined logistic-variations still can make a difference. Logistic aspects of the construction-process deals with the right means in the right quantity on the right spot on the right time.

Recording

When a construction-plan has been designed it should be recorded and expressed towards the project- and process-manager of the construction-stage. By then the construction-plan must be:

- reliable
- clarity
- complete

Analysis of needs and opportunities

Description of the project

General
The "Groenmarkt" complex is located in the middle of the city-center of The Hague on a triangular square. This square is bordered by the shoppingmal "De Bonneterie", the famous terrace of " 't Goude Hooft" and the entrance of the "Passedeena Passage". The "Groenmarkt" complex is based on the original cityhall of the Hague which was build in 1564. In 1767 the complex was first extended. Recently, in the seventies, a new council-chamber and an informationcenter where added.

Functional and aesthetical
The project "Groenmarkt" can be devided into two main parts. The first main part encloses the renovation of the old cityhall. After the renovation the stories will be re-used as offices. The groundfloor still will be used for marriage-ceremonies and other representative purposes of the citycouncil. The basement of the old cityhall will be re-used for catering-services. The architectural adaptations made during the renovation of the old cityhall are very small. Most renovation activities have to do with adaptation and renovation of the mechanical and electrical installations of the building. Ultimately for all functions and building-parts it should be possible to use the installations separately and independently.

The second main part of this project encloses the building and construction of a new designed extension of the old cityhall. This extension is divided in five elements. There can be distinguished two main wings, an internal corridor, a Rotunda and a basement. The basement remains of the current but to be demolished council-chamber. In the new situation this basement will be re-used as bicycle-shed and warehouse. On top of this basement one of the main wings will be build. This main wing, situated on the "Dagelijkse Groenmarkt" (wing G), can be divided into flexible shopunits. The second main wing will be situated on the "Grote Halstraat" (wing H) and will be used the same way as wing G. In both wings together there will be realised 3588 m^2 of shoppingarea.

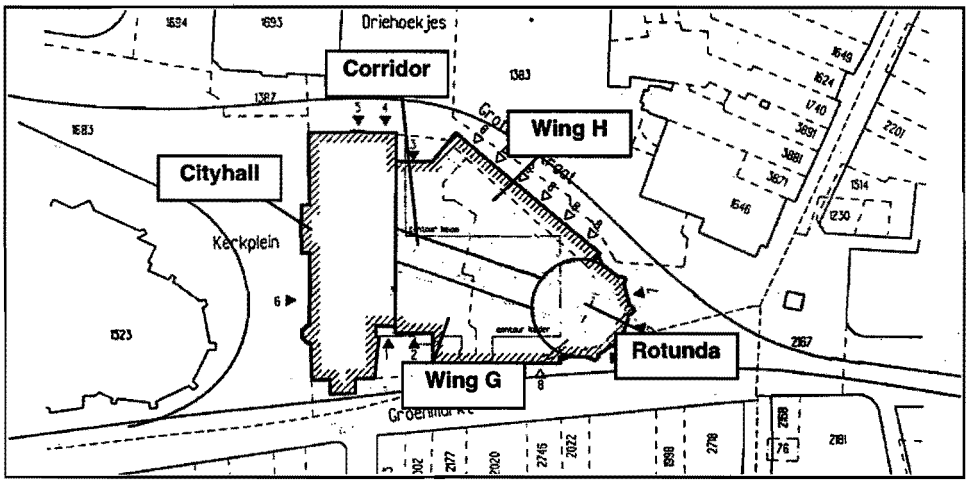

Figure 6.4: Elements of the building

Both wings are architectural connected by the Rotunda. This Rotunda will be an urban sign for recognition (Lynch) and for dividing traffic flows and urban spaces. For the new building it will function as entrance to the floors and the entresol of both wings. The internal corridor makes the connection between the Rotunda and the entrances of the shopunits on the levelled floors. But also it makes the connection between the Rotunda and the offices which are located in the old cityhall. Both, the Rotunda and the internal corridor, are an internal extension of the public shopping and pedestrian area.

Structural
From an architectural and structural viewpoint the earlier mentioned five spatial elements can be constructed out of six construction elements. There can be distinguished the foundation, the ground-floor-construction, the superstructure (floors and columns), the facade (cladding), the roof and the (mechanical, electrical and transport) installations.

Distinguished parts and elements of a building (Groenmarkt - 's-Gravenhage)

Elements	*NL-sfB code*
Construction (arch. and struc.)	
• fundament	16 / 17
• parterre	13
• first, second floor, entrosol	23
• columns	28
• roof	27 / 37 / 47
Cladding	
• cladding	21 / 31 / 41
Technical installations	
• mechanical installation	51 - 58
• electrical installation	61 - 65
• transport	66

Figure 5: NL-sfB codes for elements and parts of the building

The whole of the foundation-construction can be build up out of the adapted existing basement-construction and an extending foundation-construction. The existing basement-construction is adapted with extra supporting-points. These points where needed to construct a beamframe for supporting the groundfloor-construction. Underneath these extra supporting-points no further provisions will be made. The extending foundation-construction is constructed by piles, with no further known specifications, which are made in situ and supporting an in situ made, reinforced concrete beamframe.

Upon this beamframe the ground-floor construction will be constructed. The groundfloor is composed out of "lattice girder floor plates" (Betonson) and in situ poured reinforced concrete. The superstructure and floors should be also made out of in situ poured reinforced concrete. The floors are composed the same way the groundfloor was made. As a remarkable aspect of the superstructure can be mentioned the columns in the facade-line. They should be prefabricated and assembled on the construction site. This in contrast to the rest of the superstructure that will be made in situ.

Facade, roof and installations
For the facade there are several decorations prefabricated in reinforced concrete. The facade itself will be constructed at the construction-site. The masonry is existing out of special formed bricks. This form results in the possibility to construct exact round columns by bricks.

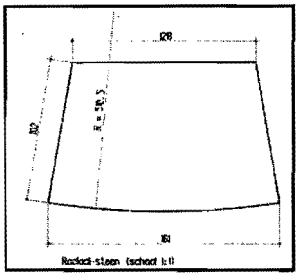

Figure 6: Radial brick

The window-frames will be placed before the masonry is made, like the normal Dutch way. At a later stage the glazing will be placed. Finally the roof-construction is composed out of a steelframe, insulated prefabricated roofing elements and ceramic tiles.

The mechanical and electrical installations will be constructed when the superstructure and cladding is finished. Every flexible shopunit does have its own indepently usable mechanical and electrical installation to their disposal.

Building related constraints
Based on the designed building and the description of the project there can be made some constraints towards the construction of the building. In the design has been chosen to make a connection, on the first floor, between the old cityhall and the new building. Due to differences in pressure there could be arise some displacements in height and levels between both buildings. By using the old cellar as part of the foundation-construction of the new building there are introduced differences in pressure in the new building as well. So the same displacements could arise in this part of the building. Extra attention should be given to the reaction of the existing basement beneath the current citycouncill. During the demolition of the superstructure there will be removed weight and pressure. When the building is demolished unprofessional there could be coming u some problems. The basement could be lifted by ground- and waterpressure. Also the basement lean over caused by asymmetric demolition of the superstructure. Finally by removing the existing groundfloor it could be possible the walls of the cellar implode by water- and groundpressure.

According to the structural engineer the mainform of the building chosen by the design-team restricts the possibilities of constructing the floors. Based on their well known knowledge the chosen in situ construction should be at lowest cost as possible in this particular case.
For constructing the columns there are two options. The first option is the chosen in situ construction of the concrete columns. The second option is prefabrication of these columns.

Other options can't make fixed connections between the columns, beams and floors. These fixed connection gives the construction its stability. In the next chapter the ins and outs of alternative options will be analysed. The last constraint for the construction-process is created by the complexity and decoration-elements of the claddingsystem. According to all details the decoration-elements are prefabricated in concrete. The masonry-columns are made in situ with the special prefabricated bricks. These columns are just fake columns. The real superstructure supporting columns are prefabricated and, by finishing the masonry-work, invisible.

Available capacity in the contractors organisation

The project "Groenmarkt" has been developed until the tender-process. All design- and management-participants hope the tender-action will take place in January 1998. So on this moment it's unknown which contractor is going to construct the building. Because of the unknown contractor it is also unknown what the available contractors capacity for this project will be. There can only be made some assumptions on the influence of the contractor on the design.

Situation

The construction-site is located in the old city centre of The Hague. It's surrounded by narrow streets, pedestrian-areas, tramway-lines and little monumental squares and buildings. Some of the mentioned constraints will be discussed in the following part.

Tramrailways
One of the constraints for the construction-site are the tramrailways. These tramrailways are enclosing the construction-site on all sides.

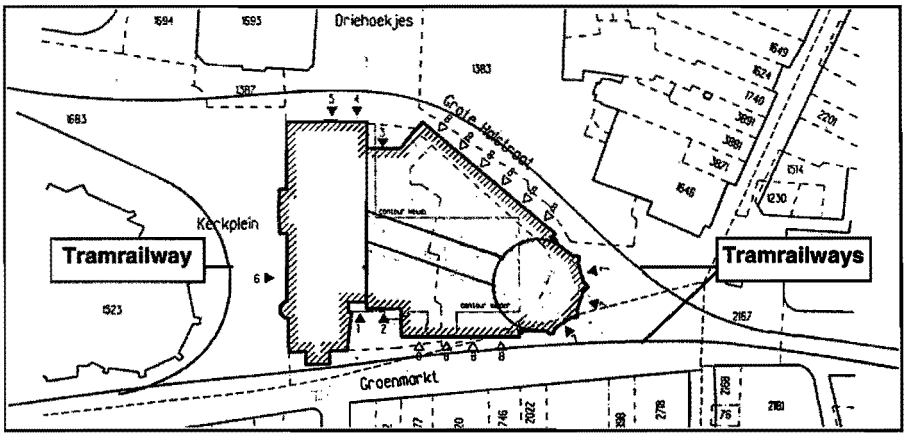

Figure 6.7: Tramrailways

Based on the maps of the tramrailway-services it could be gathered that in this situation the northern and southern line are used combined in the tramrailway-services for one line. According to this map only line 3 uses the tramrailway-infrastructure. The connecting line on the west of the old cityhall only acts as a buffer-zone. Based upon this information it could be possible to disconnect one of the two passing tramrailway-lines to increase the construction-site. By adding a trafficlight-system on the remaining tramrailway-line delay could be limited. So this system could be a solution to extent the really narrow construction-site.

After contacting the HTM (The Hague Tram Railway Services) it seemed that the use of this route temporary has a increased tremendously. Because of the construction of a tramrailway-tunnel in the "Grote Marktstraat" this route is barricade. All trams are deviated by the route "Groenmarkt/Halstraat/Gravenstraat. So the earlier mentioned opportunity no longer is an opportunity.

In this new situation the trams are running about every four minutes on both tramrailway lines. In the evening hours (after eight) the frequency is decreasing but still every seven minutes a tram is passing the construction-site. Only in night-time hours, between 1 am and 5 am, there will be no tramrailway-traffic.

At the moment there are no possibilities to deregulate or re-regulate the timetable of the tramrailway-lines. In this case the HTM won't give any co-operation until the "Grote Marktstraat" tunnelproject is finished.

Barricading the buffer-zone isn't an opportunity because the old cityhall will be normally used during the construction of the new shoppingcenter.

Steam-pipe
Not only the mentioned tramrailways are enclosing the construction-site. Also there are a number of steam-pipes that are enclosing the construction site. These steam-pipes are part of the city-heating-system.

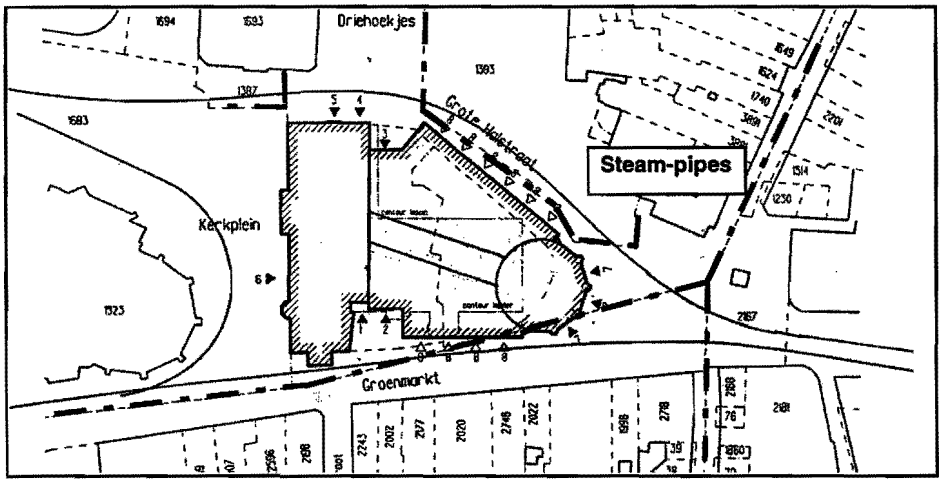

Figure 6.8: Steam-pipes

For the construction-site on the groundlevel the steam-pipes don't have any consequences. But in this "swampy" area it could be possible first sink a well to create a construction-site for the foundation. In that case extra caution and measurements are necessary.

The Rotunda and Wing G are partly constructed over the steam-pipe. For the design it wasn't that much of a problem. The foundation for this part of the building is made out of the former basement and some adding foundation-construction. The piles nearby the steam-pipe can't be rammed but should be screwed or constructed in the ground.

Narrow construction-site
Due to the extremely narrow construction-site there will be very little space to store materials, locate machinery and place building-offices. These items will be discussed separately but all do originate from the same problem, the extremely narrow construction-site.

Storage and building offices
Due to the fact that the possibilities of storage of material and machinery are very small, most of the materials will be delivered and assembled at once. Of course always some materials and machinery should be stored at the construction-site. In the next figure the possibilities for the storage space as well as space for placing the temporary building-office are reproduced.

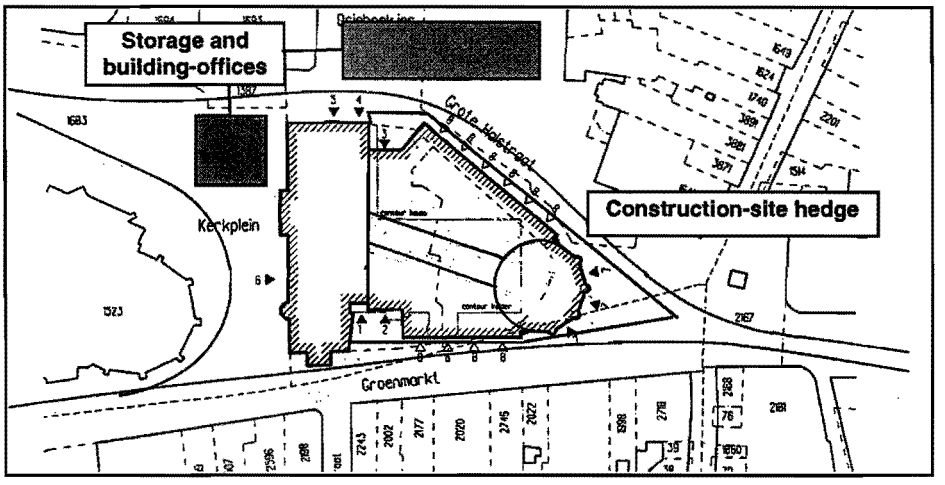

Figure 9: Storage and building-offices

Locationproblems of the crane
Of great importance for the speed of the construction on the construction-site is the number of independently operating cranes. For the independently operating of the cranes location and heights are essential. In this project "Groenmarkt" the construction-site is extremely small, so the location of the cranes should be chosen very carefully. All materials should be delivered and immediately assembled because of the narrow construction-site. The span of the building will be to big to handle by one crane of a normal size.

To construct the building as designed there will be at least needed two cranes. Total span on the whole building is needed for the lattice girder floor plates. These should be lifted and assembled by crane. One crane should be located in the middle of the building (crane A) and the other one in or near by the Rotunda (crane B). Crane A should be the highest and strongest one. For this crane a span of 25 metres is needed. The second one (crane B) can be smaller but still needs a span of 15 metres. Only by these two cranes the whole span of the building is covered by the span of the cranes.

The most important disadvantage of locating the cranes within the building is that first an extra foundation-construction is needed and secondly a small part of the building can't be build in the first place. After removing the cranes two narrow spots should be build. For crane A it will be two floors and a roof. Due to crane B only the top of the roof of the Rotunda can't be build at once. The last disadvantage of using this types of cranes is that their span doesn't only covers the building span but also covers a part of the pedestrian area and tramrailway-lines. Their will be extra measurements needed to make the surroundings of the construction-site completely safe for the regular traffic around the construction-site. These measurements should be design before building and written down in the "Veiligheids en gezondheidsplan" (Security and healthplan).

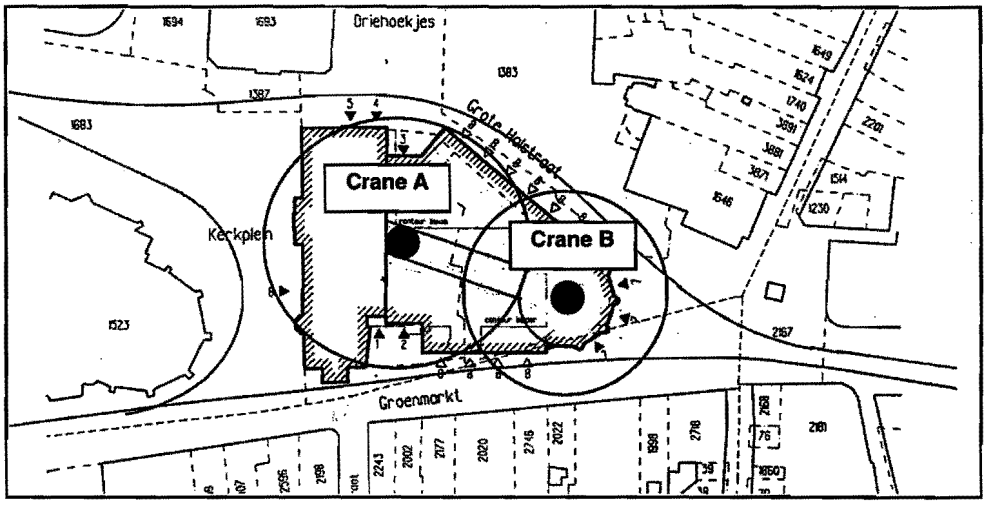

Figure 6.10: Crane location

Another option could be a crane as in the next figures. This crane could be located on the columns which are facing the corridor. By making this crane high enough and an accurate span it could also cover the span of the building. This type of crane won't exceed the building-span so no extra measurements to guarantee a secure surrounding is needed.

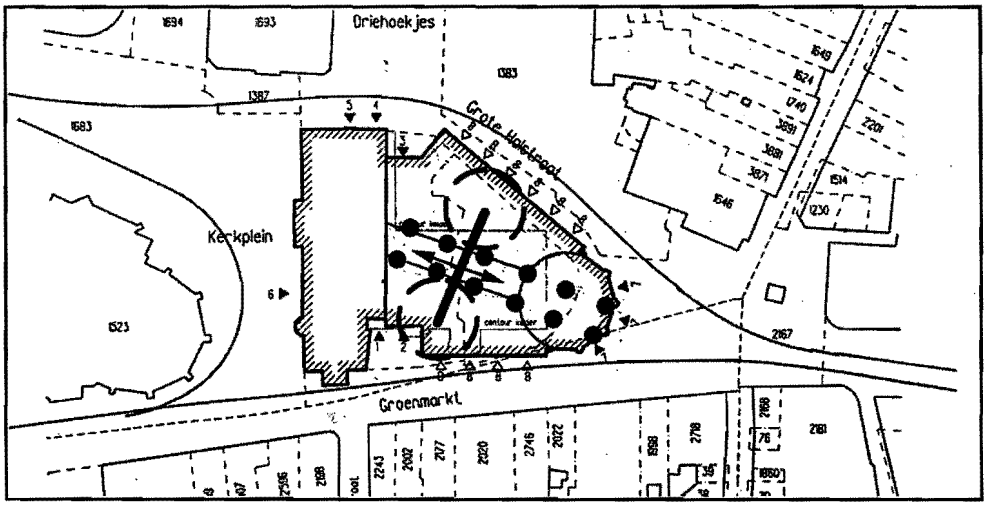

Figure 6.11: Crane system

Figure 6.12: Examples of Crane-lanes

In stead of using permanent cranes its also possible to use mobile crane when and where they are needed. Due to the extreme narrow construction-site this will give major nuisance to the surroundings. But when building in night-time it will be a useful opportunity.

Figure 6.12: Mobile crane

Supply-routes
The construction-site is situated in the middle of the centre of The Hague. Mentioning the width of the streets and lanes in the near surrounding of the construction-site big transport-trailers and machinery can only reach the construction-site on four different ways. These supply-routes are only approaching the construction-site on south, west and northern routes because the east-route is barricaded by the tunnelling project of the "Grote Marktstraat".

The main routes used for reaching the centre of The Hague can be Utrechtse baan/Koninginnegracht/Laan van Meerdervoort and Utrechtse baan/Lange vijverberg/Kneutedijk. From these two main routes finally four routes which could be an alternative to supply the construction-site with materials and machinery.

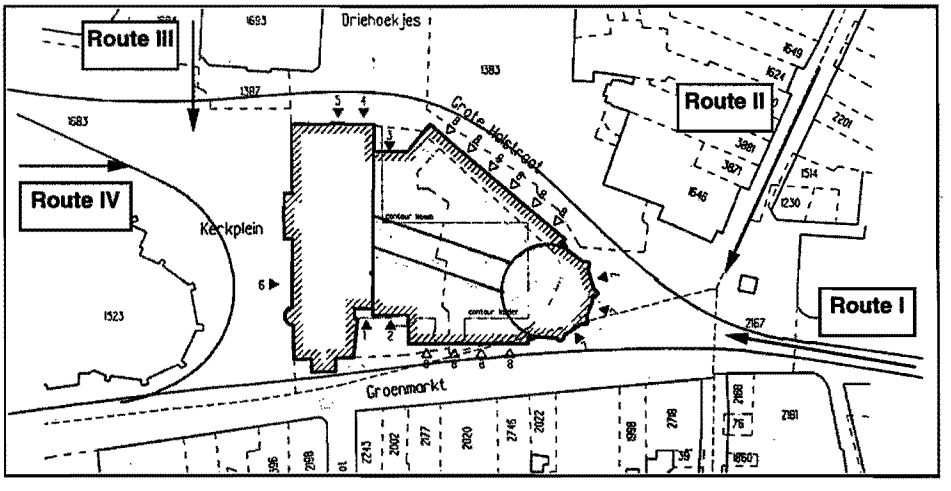

Figure 6.13: Supply routes

First route, Kneuterdijk/Hofweg/Buitenhof/Gravenstraat, can be followed from the second mentioned main route. The construction-site is approached at the Rotunda. The Kneuterdijk and Hofweg are high density traffic routes. The Buitenhof is a major square and pedestrian area. The size of the square won't be a problem for the different suppliers of the construction-site. The Gravenstraat is the main problem in this route. In this street a tramrailway stop is located. It is made of two platforms with a certain height. These platforms are partly barricading the passage of any other vehicle. Only when the tramrailway is free it is possible to pass by to the platforms. During daytimes it will be necessary to stop the trams to do so because of the high frequency of the trams in the tramrailway scheme.

The second route can be followed from both main routes. This route approaches the construction-site from the same side as route one. The main problem of this route is that it is crossing the pedestrian area for quite a long way. For the heavy construction-traffic there should be made some extra facilities. Secondly this route passes the Royal Palace. Due to security reasons this route won't be an opportunity.

The third route follows the first main route. From this main route passes the Anna paulowna straat/prinsessewal/prinsestraat. Following this route the construction-site will be approached on the west side. This route has some advantages. It doesn't cross pedestrian and shopping area and, most important, it is the route that is coming as close as possible by public streets to the construction-site.

The last route (route 4) is also a good opportunity. Comparing to route three it crosses a lager pedestrian and shopping area as well as it crosses some tramrailway-lines and ancient buildings.

Existing facilities
The main facilities for constructing a building will be power and water. Because the building is located on the basement and foundation of an existing building as well located in a city-area it is presumed there will be no problem to make proper connections to these facilities

Weather-conditions
Because no construction-planning is made yet, as well as that there is the starting-date of construction is unknown the weather-conditions won't be discussed.

Generating alternatives

Product alternatives

Concrete prefabrication
When making a reinforced concrete prefabricated construction all elements will be constructed at a the factory and be assembled on the construction-site. In the project "Groenmarkt" the prefabricated elements should be columns, beams and floors. By prefabricating these elements the construction-time on the constriction-site will be decreasing tremendously. The connection between the columns and beams are so called wet-connections. On the construction-site these elements will be fixed by normal concrete. Cause of this type of connection there is time needed for the concrete to temper . By constructing the reinforced concrete frame this way there barely needed any changes in the design made by the design team. Even the structural aspects will be the same as for a reinforced concrete in situ construction. In this frame the floors will be made. There are some different opportunities. Of course it's possible to use the lattice girder floor plates as in the original design. But then the temporary supporters will be re-introduced. Other options are the canal floor plates or the double T floor. In this case the best choice will be the canal floor plates. This floor type is mend for this kind of span. The double T floor plates are made for extreme spans and decks for bridges. A mentioned problem by prefabrication of the floor by this type of elements is the shape of the floor. It's difficult (logistic and structural) and expensive to prefabricate elements which are fitting to the floor

Steel
One option to accelerate the building speed and reducing the construction-time on the construction-site is to change the used construction for a steel construction. A steel construction should be prefabricated completely. Because of the bolt-connection-system it is possible assemble at the delivery. The structural function can be used at once. So the construction of the superstructure can continue without "temper-time" as needed by the concrete connections.

The floor-construction in this kind of frame-structure can be the same as in the reinforced concrete frames Lattice girder floor plates and canal floor plates). Additional to these regular concrete floor plates in a steel frame there is a third alternative. This floor-system is composed out of an steel plate that is connected by welling to the steel frame and by dowels to the in situ poured concrete.
The major advantage of this floor-system is that it can be made by hand. There is no need for mechanical or lifting machinery. Also it is quite easy to make the floor-system in any shape. The shape of the floor of the project "Groenmarkt" won't be a problem.

Of course the steel-frame construction has disadvantages as well. Most important disadvantage is the inadequate fire-resistance. Therefor the steel-construction must be covered by painting-systems, fire-resistant panels or "spray-concrete".

Steel-concrete prefabricated
To meet to the disadvantages of both principle but to use the advantages, fast fixing and fire-resistant capacity, both principles can be combined. This principle is called a prefabricated concrete-steel framework.

A substantial part of the reinforcement in a prefabricated reinforced concrete beam or column can be replaced by a normal steel beam or column. The elements which are prefabricated this way can be assembled at once, like the steel construction. Also this construction can be loaded directly. Their are no supporting-parts which need to temper are can't be load at once. This increases the building-speed tremendously. Also this construction is fire-resistant for the most parts at once.

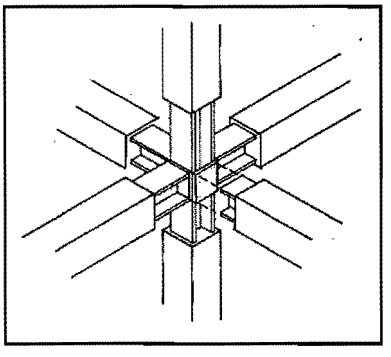

Figure 6.14: Steel-concrete construction

The construction of the floor can be the same as for normal reinforced concrete in situ and prefabricated construction.

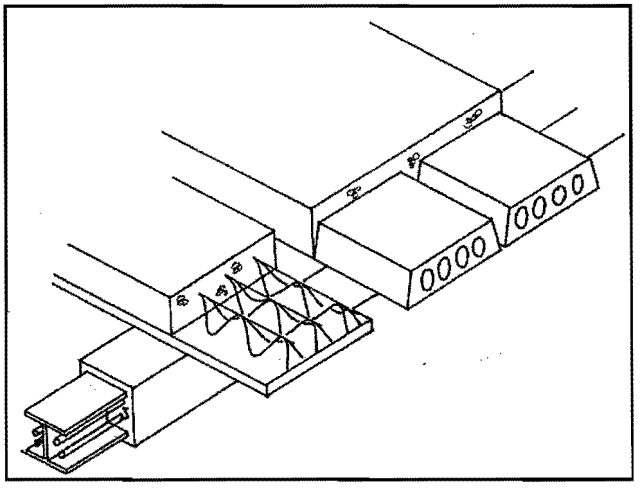

Figure 15: Lattice girder floor plate and canal floor plates on a prefabricated steel-concrete frame beam

For a consequent choice the floor-construction should be made out of canal floor plates. The steel connections in the framework will be poured in concrete at the same time as the pressure-layer on top of the floor construction. Therefor some special mould must be made. This can be done in situ because only then all connections can be poured at the same time as the floor-constructions. After the tempering of the concrete no further delay is necessary. The construction of the other parts of the building can continue.

Another advantage of this way of constructing has to do with aesthetical aspects. By using normal concrete in stead of "spray-concrete", which is cheaper, all columns can be finished with plaster at once. When using "spray-concrete" this won't be possible. Of course when using normal concrete other forms and reinforcement alternatives are possible.

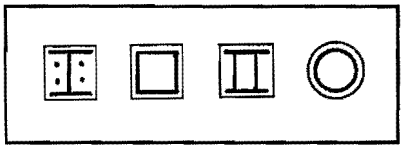

Figure 6.16: Alternatives for reinforcement and aesthetic shapes

To engage to the problem of the shape of the floor, as mentioned by the structural designer, the beams of the steel-concrete should be restyled as shown in the next figure.

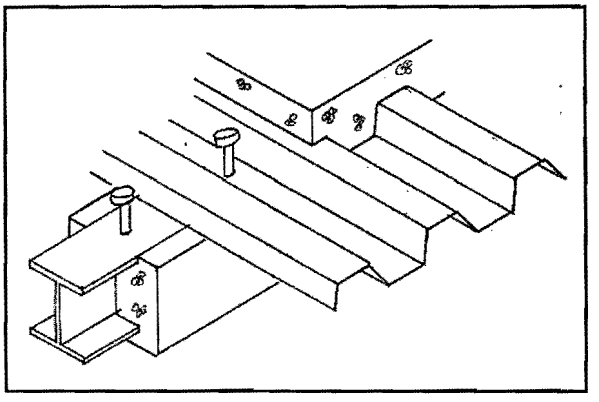

Figure 6.17: Collaborating steel-concrete frame-floor construction

By changing the section of the beams it is easily possible to create an collaborating steel-concrete frame-floor construction. The floor can be created out of steel plates and in situ concrete. The important advantage of this floor type is that it's easily to make in any shape. The shape of the floors in the "Groenmarkt"-building are now problem. A second advantage is that the floor can be made almost by hand. The cranes only have to put in the steel plates on the right height. Positioning of the plates can be done by hand. Also the welding of the dowels is done in situ and by hand. The in situ concrete is poured in a normal way.

Facade

From the description of the project "Groenmarkt" can be learned that the facade will be made in situ. To do so some special parts, for example the concrete decoration and the rounded bricks, are prefabricated. To design these parts as well as design the whole facade using these parts during the construction very little sophistication of these elements will be necessary. For assemble these elements into a complete facade scaffolding of the building will be necessary. By these scaffolding the already narrow construction-site will be decreased further. Also these scaffoldings are needed for quite some time to erect the facade.

For reducing the construction-time of the facade on the construction-site further prefabrication of the facade should be considered. Their are several steps that can be made. The first step is, next to the prefabricated decoration, to prefabricate the columns of brickwork. To assemble all these bigger elements less time is needed. So the barricade of the surroundings by the scaffolding will be shorter.

Of course further prefabrication of the facade is possible. If in the design the right supporting and fixing-points are designed it is even possible to prefabricate the complete facade in building-high elements. The mentioned fixing and supporting-points could be created in the concrete decoration (parapet) above the ground level floor.

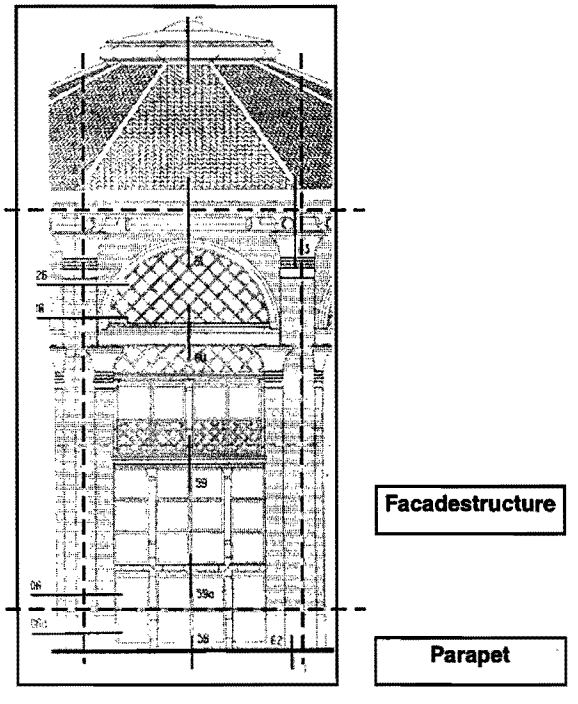

Figure 6.18: Prefabrication element of the facade

The only limitation for the prefabricated elements are transport-constraints. The height is limited by the height of bridges. So the elements can't be higher than about four meters. The length of the elements should be calculated out of the transport-route. Because of the narrow streets of the centre of The Hague not every cargo transport can reach the construction-site.

Process-alternatives

To analyse the process-alternatives for constructing the building as designed by the design-team the construction-process will be analysed in three distinguished ways:

1. Sequences of constructing the building the different building-parts as mentioned earlier: Wing G, Wing H, Rotunda, Corridor and Basement;
2. Sequences of constructing the different building-elements like sub- and superstructure, facade, roof and installations;
3. Sequences and contents of technical construction activities.

All three process-alternatives will be analysed on building-cost and time (including logistic aspects).

Sequences of constructing the building the different building-parts
Before planning and analysing the different sequences possible by sequencing the different building-parts the major advantages and disadvantages of this methodology should be mentioned. The main advantage by sequencing the construction by the building parts are:

- During the construction of the first couple of building-parts the construction-site can accommodate most of the needed storage of material and machinery. Only in the last stage the extra space mentioned in the project-description will be necessary.
- The building-part which is ready can be let out for hire. So during the continuing construction-process incoming cashflows for the client will be generated;
- It's possible to decide during the construction-process not constructing all building-parts;
- For the construction-process smaller cranes are needed;
- It's possible to recycle the mould en supporters in the different building-parts to construct during the total construction-process.

Of course there can be mentioned some disadvantages as well:

- There could arise connection problems between the different building-parts in structural, architectural and installation-technical ways;
- Because the construction of all building-parts will be sequenced the construction-time will be increasing caused by slack;
- Because all parties involved have to come back a couple of times for just another part of the building the building-cost will rise;
- There won't be an optimal use of scale and learning-effects.

According to the mentioned five elements there are 120 sequences which do lead to the same complete building. If taken in advance that there is a possibility to sequences in the third dimension as well then there are even far more alternatives. This last option won't be discussed in this paper.

For optimising the sequences first the main problem should be solved. Based upon all the information in chapter two the accessibility of the construction-site will be the major problem. The construction-site best can be reached from west and northern sides. So, by constructing the Rotunda or Wing H the route to build Wing G will be barricaded. After the demolition of the council-chamber best could be started by constructing Wing G upon the basement of the old council-chamber. To create access to the second floor of this Wing, the corridor and later on the Rotunda should be constructed. The last building-part to construct will be Wing H. Next to the remaining accessibility of the construction-site during construction also on the construction-site storage of materials and machinery is possible without needing extra "off-side" storage places.

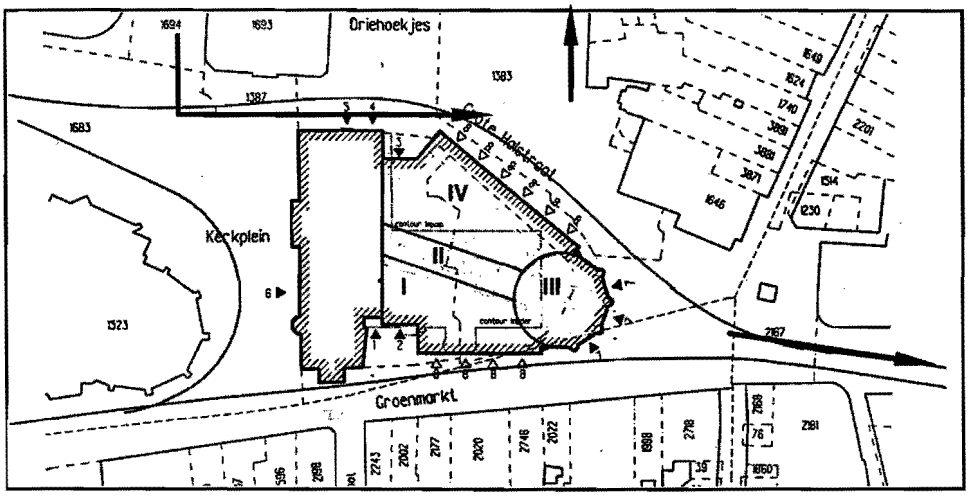

Figure 6.19: Sequence for constructing by building-parts and supply-routes

The supply-route could be running by route III. The removal route for empty cargo, should be running by route I or II.

Sequences of constructing the different building-elements
Constructing the building by sequencing the construction by building-elements could have the following advantages:

- Cost reduction because the every discipline is involved only once;
- Optimalisation of scale- and learning effects;
- No interfering activities between the involved disciplines.

The disadvantages of this methodology are:

- Extra delay because no parallel activities are planned;
- No incoming cashflows during the construction-process;
- An extremely narrow construction-site;
- Need of very large tower-cranes.

The normal sequence can be described as process I in figure X. But, for example process II has the advantage that, by first making the roof, the rest of the construction-process could take place in weather independent conditions. Therefor some extra tool, like a plastic windshield, is necessary but it could keep the construction-process for weather related delay. It is far more expensive to make a temporary roof. These better working conditions also are effecting on the quality of the construction-activities.

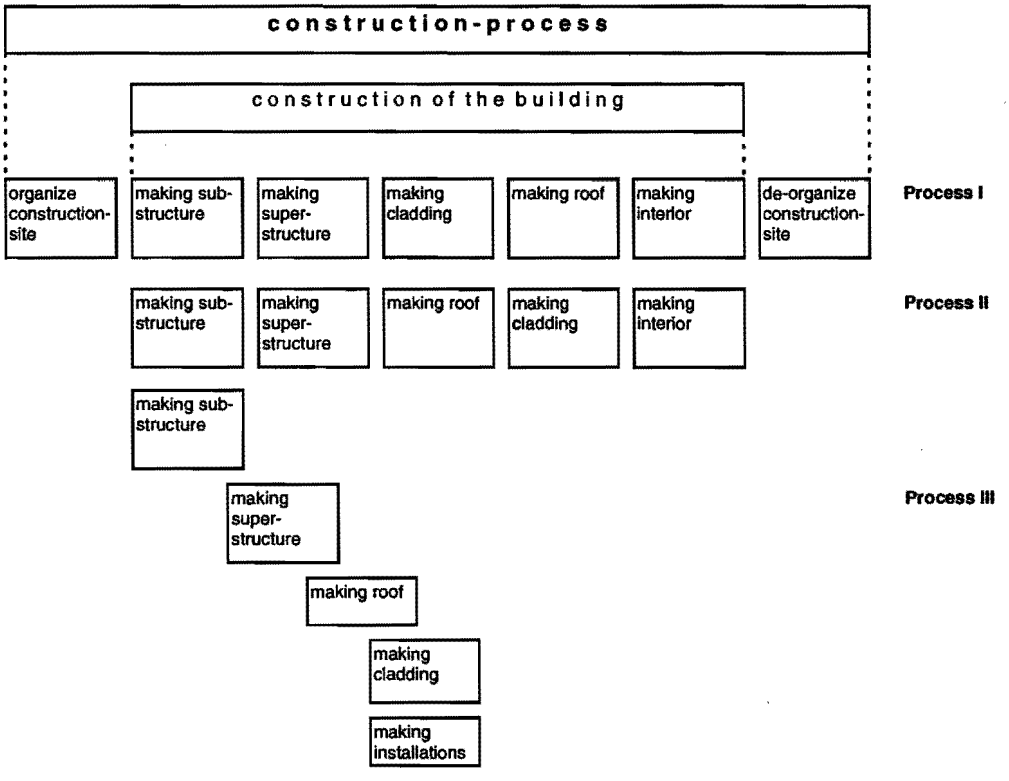

Figure 6.20: Process-alternatives

When parallellity would be introduced the construction-process could running in a continue process. This would reduce the time of the construction-process tremendously. Because the predecessor elements already can be used for further construction while the first element is about to complete.

Sequences of constructing the building the different building-parts combined with sequences of constructing the different building-elements
When the first to methodologies should be combined the construction-process could be a continue process. By the combination of the to processes most of the advantages of both separate systems still be in place.

Sequences and contents of technical construction activities
Assumed that the normal way of constructing the described building-structure in this part only activities that could be changed, in contents or sequence will be discussed.

In a normal construction-process columns and beams would be made independently sequenced. In that case twice the tempering-time for the reinforced concrete elements is needed. By setting up the mould for the column as well as the beams that both should be made in situ, the tempering-time could be halve of the time. If it is possible to add a construction to carry the lattice girder floor plates it even could be possible to pour a whole story at once. This would reduce the total needed temper-time tremendously.

In the facade construction-process in the Netherlands it should be normal first setting the window frame and then making the masonry. In normal process this only starts when the superstructure is finished. Otherwise there could be terrible damaging on these window frames. By changing the window frame for a setting frame the bricklayers could start at the moment the first story is finished. When the masonry is finished the window frames including the glazing could be set in place at once.

Optimalisation and selecting

In chapter one part 1.3 already a methodology is given for optimalisation and selecting of the construction-process alternatives is given. In this chapter only recommendations for the different aspects are given.

Recommendations:

- Due to the steam-pipes the best way to construct the foundation will be by screwed piles. These piles are less expecive than piles made in the ground but do have the same advantages as those type of piles. Rammed pile are causing to much tremor. Than there is a risk breaking the steam-pipes.

- For an optimal balance between building-cost and construction-time the best structural option is a prefabed steel-concrete structure and steel-concrete floors. The frame can be assembled at once as the frame is delivered. The steel floor-plates only have to be lifted in on the right floor. The can be assembled by hand. The welding of the dowels as well can be done by hand. The shape of the building won't be a problem. The pouring of the concrete can be done from a distance by using a concrete pump. If using steelfiber-concrete no extra activities for creating a reinforced network is necessary. All floors can be made at once. Only a one time delay for tempering the concrete will be necessary.

- The facade should be made by assembling the prefabricated elements (reinforced concrete decorations, brickwalls and glazing). Therefor scaffolding is necessary but only for a shorter time. This method will be the optimum between cost and time. Of course there are some extra measurements necessary to sure the tramrailway-traffic as well as the construction workers.

- For supplying the construction-site best route III should be used. The leave the construction-site by the heavy cargo traffic route I and II are available. If the routing will be this way loaded cargo transport uses the public routes. Unloaded cargo crosses the pedestrian area.

- The optimal crane capacity will be the alternative in which using two tower cranes. The optimal position of the cranes should be related to the supply-route.

- The best sequence for the construction-process will be the combined process in a parallel form (process III). Only by this sequence a continue process with minimum of slack in time and cost can be runned.