The Luxor Theatre project

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The Luxor Theatre project
A Case Study
ADMS-reeks

Dit boekje is een deelproduct van de post-doctorale technologische
ontwerpersopleiding Architectural Design Management Systems (ADMS). De kern van
dezelfde 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.
The Luxor Theatre project

A Case Study

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Besides them we like to thank all the other participants of the project who helped us to get insight in the project by providing information and their time.

We also like to thank Paul Nicholson and Colin Gray (Reading University) who assisted us for two days as guest lecturers by making the start up for the redesign work, and the Stan Ackermans Institute who provides us with the money which made it possible to invite them.

The Case Study Program
The Case Study is the final part before the examination project of the two years post-graduate course in Architectural Design Management Systems. The Case Study aims to integrate all acquired knowledge and skills during the ADMS course until so far, on how to design and manage the design process of a building project.

Roughly the program for the course members of the case study project can be divided into four steps:
• A short description of the object to be realized
• A description of the design process (how it was planned (process design) and actually done)
• An analysis of the planned and executed design process (why it was done in a specific way)
• Redesign proposals based on description and analysis.

In the report the course members made, these four steps can be clearly identified in the chapters:
step 1: chapter 1
step 2: chapter 2 and 3
step 3: chapter 4
step 4: chapter 5 - 11.
The first part of the program consisting of steps 1-3 is executed as teamwork by the six ADMS course members within a period of three full weeks. The redesign proposals are made individually in two weeks time.

_Evaluation of the project as a whole_

The Luxor project on the moment is just hand over to the main contractor and has a history of almost ten years. Due to it's long history, the 'multiple client' and the complex decision structure, the building volume and the complexity of the program, it appeared to be difficult for our course members to gain full insight in and understanding of the project. Given the time constraints not all the feedback given to the course members by the project participants and the lectures has resulted in a full revised final version. Given the available time however we are satisfied we the result reached.

Although there still are evident opportunities for improvement, we think as a whole that the work done is of value for the development of the ADMS course, as well might be of interest for practitioners working in the field of design management, building project management and architectural design.

_Evaluation of the process description and the analysis_

Given the complexity of the Luxor project, as mentioned above and the time constraints we think the description of the design process is of a reasonable level. However, given the availability of the Quality Handbook and the Project Plan, a higher level must had been possible according to our opinion.

We consider it a serious lack, that the exact decision structure still isn't described accurately. This has had its effects on the quality of the analysis and the redesign work.

The way the description of the process is given on specific points could have been more politically formulated. We consider such ability as a necessary personal skill of a young design manager, which thus is a point to be worked on by our course members.

In the analysis the 'why question' isn't fully addressed. According to our opinion it is a too much generic description on project management issues which add to the description without really clarifying why certain choices were made. The analysis in it's current form also could have been much shorter and more to the point.

The group work could have been done more accurately given the available time. A clearer division of tasks between collaborative work and individual work would have been improved the results.
Evaluation of the redesign work

Chapter 6
Within the Luxor project the user in form of the managing director of the Luxor theatre or one of his staff members is at all formal decision levels involved in the decision making structure. In this chapter it is investigated how user’s needs and wishes can be formally brought in the process by alternative ways of executing the briefing process.

After having specified the way the briefing was done in the Luxor project in general, three alternative types for the briefing process are discussed and evaluated for their appropriateness for the Luxor project. It’s a pity that the concept of the multi-stage brief isn’t fully understood properly. However the way the process is decomposed in steps to be made for the different kinds of briefs distinguished is worthwhile to consider.

The relation of the different types of briefs to phase documents deserves more attention, the same can be stated for the connection of the distinguished process steps per briefing type to the parties involved. The concept of the growing brief is only realistic to think about when architect and advisors are paid on an hourly basis in stead of on a normal fee.

Chapter 7
In most building projects costs in use (life cycle costs) are hardly considered during the briefing and design stage. This chapter starts with some examples of the harm that can result in neglecting this cost aspect. A simple but elegant model is presented how to deal with costs in use at different levels. Also it is worked out how this model could have been used as basis for decision making in the several stages of the Luxor project. In a separate part of this chapter it is worked out which party has to decide on the cost in use aspects mentioned before.

Chapter 8
In this chapter an analysis is presented directed to the multiple client structure of the Luxor project. A differentiation is made in stakeholders user wishes and needs and actual clients wishes and needs.

A proposal is made to reduce the amount of decision levels within the Luxor project. A proper analysis of the reasons why in the actual project was chosen for a different four layer decision structure is lacking and would have added much added value to this redesign. According to our opinion some remarks made (for instance about the possibilities for public private partnership) aren’t accurate given the special circumstances of the Luxor project.

Chapter 9
In this chapter an elegant model is presented to rethink the division of managerial responsibilities between the levels of the project manager, the design manager and the design leader. Linking the task list to the SR ‘88 (the used standard regulations)
The Luxor Theatre project

would have added much value to this chapter. The first two exercises made aren't always fully thought through about their consequences. The relation between these exercises with the model and the proposed redesign isn't clear to us. Definition of the different types of managerial responsibilities that are distinguished would have improved the chapter.

Chapter 10
This is also an exercise directed to re-think the division of managerial tasks and responsibilities. The model presented has in itself a lot of opportunities as a basis for a redesign for the Dutch Standard Regulations. The exercise made with the model as a try for redesigning the process needs further reasoning. We think for instance that excluding a decision level doesn't always imply that all distinguished managerial responsibilities are simply re-ordered within the presented model.

Chapter 11
In this chapter a model about working levels between different building parties is implemented for the Luxor project. Derived from this model are possible alternatives for the project organization, and the consequences for the design management function is given. Adding an extra organizational variant to the ones discussed, namely the architect positioned on the level of the other advisors, with the design management function more shifting to a project management role isn't discussed.

Eindhoven, 25-11-1998,

Ad den Otter
Matthijs Prin
Preface

Post-graduate students of Architectural Design Management Systems (ADMS) finish their course with a nine-months design project in a company or institution. Before that, they make a case study of the design process of a complex construction project. Main goal of this case study is to obtain skills for describing, analysing and designing design processes. For this, the students have to apply the integrated knowledge acquired during the preceding parts of the course.

For this year's case study the Luxor Theatre project has been used. Earlier contacts with ADMS made Bureau Bouwkunde come up with this project. For its cooperation, we are much obliged to Bureau Bouwkunde, especially to ing. R.G. Goverts, ing. D.J. Hoogstad and E. de Bruin architect AvB. They have provided us generously with an introduction to the project, a lot of project information and comments on our work. Bureau Bouwkunde also requested from the other participants of the design process to give us the opportunity to interview them on this subject. The interviewed participants were:

- R. Wiegman and J. Dumas of the Luxor Theatre,
- ir. F.G.A. Meijer of Projectmanagement, Gemeentewerken Rotterdam,
- J. Yohe of Architekturbüro Bolles + Wilson,
- ir. J. Laurens of Ingenieursbureau Beton- en Staalbouw, Gemeentewerken Rotterdam,
- C.F. Griffioen of Tebodin Consultants and Engineers and

We would like to thank them for the time they made for us and the information they provided us with. Finally, we have to thank both A.F. den Otter architect AvB and dr.ir. M. Prins for the organization of the case study module and their critical evaluations of our work.

Without the contributions of all persons aforementioned, we would not have been able to acquire the knowledge and skills we have now.

Eindhoven, November 1998,

the ADMS-students from the 1997-1999 course.
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Introduction

Currently a new Luxor Theatre is being built on the 'Kop van Zuid' in Rotterdam. This theatre is an amusement theatre for mainly musicals, cabaret and opera.

The Luxor Theatre project is a complex project: the building itself is complex (geometrical and technical) but also the managerial context of the project is complex. The purpose of the case study is to improve the understanding of the design process of such a complex project. Therefore, the Luxor Theatre project is described and analysed, which resulted in subjects for the six individual redesigns.

In Chapter 1, the object to be built is described: the new Luxor Theatre. The rest of the report is divided into three parts:
- Part 1: a description of the project course and the project organization;
- Part 2: an analysis of the project,
- Part 3: the six individual redesigns of parts of the project.

A description of the Luxor Theatre project's process is given by describing the project course and the project organization in part one. In part two the process is analysed by using the information of part one. Finally, in part three six individual redesigns were made, from three different viewpoints: the viewpoint of the Luxor Theatre organization, the project manager's viewpoint and the architect's viewpoint.
1 The Luxor Theatre

1.1 The new Luxor Theatre building

The bright red Luxor Theatre will be situated at the foot of the Erasmus bridge, as part of the Rotterdam Kop van Zuid plan (see section 1.2) where it will contribute to the development of the city centre on the south bank of the river Maas. The design for the new Luxor Theatre is made by Peter Wilson of Bolles + Wilson Architekturbüro from Münster, Germany. For the project he co-operated with the Rotterdam company Bureau Bouwkunde.

The theatre building design is organised around the 1,500 seats auditorium. The new Luxor Theatre will be an omni-sided building, an autonomous object with an 'all-around' facade. Eye-catching are the 40 metres high fly tower, which accommodates the theatre services, and the internal loading bay that is designed as a bright red, metres-high frame. The loading bay can post three trucks.

The Luxor Theatre project measures a total of about 17,000 m². The project budget is about Dfl 84,6 million and the construction time will be 27 months. On this moment, construction of the new Luxor Theatre just has begun. The project has to be completed late 2000.

See page 4 and further for some of the project drawings.
[Breedveld, 1996] [Peters and Wouters, 1998] [Wortman, 1996]

1.2 Kop van Zuid

The Kop van Zuid project is undoubtedly Rotterdam's most important and largest urban renewal project. Thanks to its favourable location, the Kop van Zuid has been designated as a key project in the Fourth Report Extra on Spatial Planning (Vinex). As exponent of the Rotterdam renewal philosophy, it has to contribute to the city's attractiveness, to strengthen its economy and to improve the city as a residence. Furthermore, the Kop van Zuid will, due to its strategic position, become a diverse and modern area for residential, business and entertainment - like the Luxor Theatre - purposes with much attention given to facilities for sport, education, culture, shopping and child care.

The essence of the Kop van Zuid plan is the creation of an undivided city with its centre on both banks of the river Maas. The Erasmus bridge (Figure 1.1) connects the city centre with the Kop van Zuid. So the river Maas has become the throbbing
The Luxor Theatre project

heart of the city rather than a natural dividing line between the north and the south part of Rotterdam. The fact that the Kop van Zuid is being developed on the basis of a Public Private Partnership demonstrates that the municipality as well as the private parties are certain about the success of the project.

Figure 1.1 The Erasmus bridge

The first plan drawn for the Kop van Zuid project dates from the spring of 1987. Eventually, in September 1991 the development plan Kop van Zuid was approved by the City Council. The total plan area measures a 125 hectares and comprises the former docklands round de Binnenhaven, Spoorweghaven, Entrepotdok and the Wilhelminapier.

The programme consisted of about 4,500 dwellings, 400,000 square metres of offices, 95,000 square meters of other purposes and infrastructural and public transport works. By the beginning of the next century the expansion of the present city centre across the river, to the south bank, will have been completed. The project is expected to be completed in the course of 2010. In total it will add more than 5,300 homes, 400,000 m² of office space, 35,000 m² of commercial space, 45,000 m² of educational facilities and 30,000 m² of recreational and other facilities to Rotterdam's city centre.

[Wigmans, 1998] & [City of Rotterdam]

1.3 References


City of Rotterdam. Internetsite
http://www.rotterdambusinesspark.nl/rdamcity/english/kvz_intr.htm


*Figure 1.2 Drawing B-014: North elevation*

*Figure 1.3 Drawing B-016: South elevation*
Figure 1.4 Drawing B-001: Site plan
Figure 1.5 Drawing B-003: Plan level 0
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Figure 1.7 Drawing B-020: Section C-C

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Part I
Description
2 The project course

Luxor Theatre started the project for the new theatre years ago. The course of the project is discussed in this chapter. The entire time-span, from start till completion, is described, starting with the initiative. The rest of the chapter focuses on some points of special interest.

2.1 The initiative

Eleven years ago Wiegman, managing director of the Luxor Theatre, initiated the process for a new and larger amusement theatre. This process has taken long till 1994, when the decision to build a new theatre was finally made. During this time most of the efforts were spent creating a broad political but also social basis for a new theatre.

The new theatre which would have two auditoriums was planned at the location of the present theatre. Four architects were selected to make a design study. But soon it became clear that the realization of the theatre according to the Brief was almost impossible at this location. A new location had to be found. Finally, in July 1995 the City Council agreed on the construction of a new theatre at the 'Kop van Zuid'. A theatre with only one auditorium but more than 1500 seats.

2.2 The rest of the course

The complete process from start to finish of the Luxor Theatre project encloses about 16 years. Included in those period is the initiative and construction till completion (Figure 2.1). The process course described in this chapter is reduced to the period from July 1995 until September 1998, the official start of the construction phase.

|------|------------|-------------|--------------|------|-----|

*Figure 2.1 The entire process*

Within the process a distinction is made in definition, preliminary design, final design, preparation and construction. During each phase various events have
occurred. The events showed in Figure 2.2 will be dealt with separately in the following paragraphs.

### Figure 2.2 The project course

#### 2.3 The brief

Regarding the brief, two subjects are important: the development of the final brief and its contents.

##### 2.3.1 Development of the brief

The brief for the Luxor Theatre project was developed in two stages. Before the design contest a preliminary brief was formulated by Prinssen en Bus, an external consultant specialized on theatre engineering. Prinssen en Bus composed the brief mainly in dialogue with the Luxor Theatre organization.

After the design contest the preliminary brief was modified and added with functional requirements by Twijnstra Gudde, which at that time was involved as project manager. This final brief is regarded as the formal phase document which serves as input for the design process. This means that significant changes during the design process had to be decided on by the management team.

The final brief is approved by the City Council on October 31, 1996. In the same decision the budget for the project is approved.

##### 2.3.2 Contents of the brief

In its final form the brief consists of three parts: a functional part, a technical part and a cost estimation. The functional brief contains specifications concerning the theatre technical design, acoustics and fire-safety. Specifications concerning materials, installations, construction and theatre technical equipment are described in the technical brief. The brief is an important reference document for the phase evaluations to determine whether the quality of the building design is still conform
the demands of the Luxor Theatre organization. Dumas, as representative of the Luxor Theatre, is involved in these evaluations to determine this compliance and to indicate what ought to be changed to bring the design closer to the brief.

2.4 Design contest

While looking for another location for the Luxor Theatre, it turned out that a design contest had to be organized, according to European tendering rules for government assignments. At July 13, 1995 the City Council offered a non-public price for an amusement theatre at the Kop van Zuid location, to which eighteen architects entered.

A first selection was made by the qualification criteria in the EG-publication, which three architects did not pass. Another eleven architects were excluded based on their architectural style.

A second selection was made by conversations between architects and the jury at November 24, 1995. Out of the eight architects - four selected liked described above and four already selected on the very first design at the other location - seven architects were asked to make a design study of the theatre. One architect, Gehry, withdrew. The remaining six architects were Hertzberger, Sipek, Alliance Bolles + Wilson and Bureau Bouwkunde, Christiaanse, Hoogstad en Koolhaas.

At the end of February 1996 the seven plans were presented to the jury. The jury was advised by the 'Quality Team Kop van Zuid' and technical-financial and urban workgroups. The alliance of Bolles + Wilson and Bureau Bouwkunde won the contest at April 12, 1996, because its design approached the urban context, the brief and the budget best. The actual assignment was a fact on July 23, 1996 in the agreement between Ontwikkelingsbedijf Rotterdam and the architect.

2.5 Political decision making

2.5.1 First order of the City Council

As mentioned earlier the final brief of the Luxor Theatre project was granted by the City Council on October 31, 1996. At the same time the City Council approved the requested budget of Dfl 72,5 million. This decision was important because it gave the Luxor Theatre project its reason to exist. With this budget approval people really could start working on the project.

2.5.2 Second order of the City Council

After the City Council granted the budget based on October 31, 1996, Meijer, the project manager, has set the objective to return to the City Council only one time to demand for a budget increase throughout the whole project. The reason behind was to protect the political reputation of the Luxor Theatre project. At the point where needed savings would affect the quality of the future building, Meijer decided that
more budget would be needed. This resulted in the single return to the City Council after the tendering for contractors.

2.6 Tendering

2.6.1 Engineering tendering

The public tender of engineering started with a publication on July 31, 1996. The tender was divided into two parts: services engineering and theatre services engineering. Two participants were specifically asked to join the tender: Prinssen en Bus and Huisman en Van Muijen.

Tebodin subscribed with the lowest bid. Tebodin had already theatre experience from the Zaan Theatre and the 'Muziekcentrum' in Eindhoven and got the job. Prinssen en Bus are assigned to the project as the engineer theatre services, building acoustics and building physics, because they had the lowest offer in the tender.

IBS is assigned to the project for structural engineering. IBS is assigned to the project without tendering. Because IBS is an internal service of Gemeentewerken Rotterdam, European tendering rules do not apply in this case.

2.6.2 Construction tendering

The tender for construction started with a publication on the January 21, 1998. The tender was divided into two parts: the complete realization of the theatre with exception of the theatre equipment and variable acoustics, which was tendered apart. The tender took place on the June 19, 1998. The resulting participants were Van Hoorn Bouw B.V. for the complete realisation and Stakebrand B.V. for the theatre equipment. Thyssen de Reus and Roden Staal had offered for a lower price, but both of them didn't satisfy the required standards.

2.7 Delays

2.7.1 First delay

With the establishment of the brief and the available budget the preliminary design has started on October 31, 1996. At the end of the preliminary design it became clear that the budget for the structural part estimated by Twijnstra Gudde was not sufficient. At that point the process was frozen and all participants had to economise. To stimulate the effort to economise the fees were also frozen at that point. Some participants even got an extra bonus for the extra efforts they had to make.

This process of redesigning and cutting down expenses took about 3 months. Finally the phase was closed with the Phase Document Preliminary Design, approved by the steering committee at the 29th of May 1997.
2.7.2 Second delay

Site preparation was planned parallel to the progress of the project. However the site was not ready in time. Additional preparation activities took about half a month. The contractor did not start his activities until the site was completely ready. At this moment parties are discussing whether or not the main contractor was able to start building during the last site preparations and whether or not he is responsible for this delay according to the UAV '89 on which the formal agreement is based.

Because of the resistance of neighbouring people the building license procedure had to be carefully followed. This required additional time. But due to the extension of preparation activities carefully following procedures did not delay the project.

2.8 Completion date

The construction phase has started on September 7, 1998 by driving the first pile into the ground. Completion of the building is scheduled in the end of the year 2000. The original completion was planned in March 2000. Postponing of the completion date is caused by the three-months delay in the design phase and by a too tight schedule of the construction phase. The theatre has to be completed before 2001, in time for Rotterdam being Cultural Capitol in 2001.
3 Project organization

This chapter discusses the project organization of the Luxor Theatre project during the design phase. Essential parts of the project organization are the client, the decision making structure and the way the project is managed.

3.1 The client

In a political project such as the Luxor Theatre a broad client area can be recognized. In the first instance there are only two clients, but they operate within a political context.

3.1.1 Client structure

The client structure of the Luxor Theatre project consists of two participants: the Luxor Theatre and Ontwikkelingsbedrijf Rotterdam.

Luxor Theatre

The Luxor Theatre organization is the future user of the new theatre. Two representatives of the Luxor Theatre are present in the project: Wiegman and Dumas. Wiegman is the director of the Luxor Theatre; Dumas is the head of technical services.

Ontwikkelingsbedrijf Rotterdam

Like Luxor, Ontwikkelingsbedrijf Rotterdam (OBR) is a department of the City of Rotterdam. It has the financial responsibility for the Luxor Theatre project. The managing director of OBR, and responsible for the Luxor Theatre project, is Beijer. Beijer is primarily responsible for the entire building process, including costs and time. Being the formal client, OBR also contracts all participants.

OBR has taken on Meijer of Projectmanagement Gemeentewerken Rotterdam to represent it as delegated client.

3.1.2 Political context

The Luxor Theatre project is a project of the City of Rotterdam. Therefore, it has a broad political context. The political responsibility for the project is assigned to the city's chairman of Arts and Culture, Kombrink.
3.2 The decision making structure

The political background of the Luxor Theatre project complicates the organization of the project. It necessitates a lot of parties to be involved in the project organization. This has led to a rather complicated decision making structure.

3.2.1 The structure

The decision making structure exists of four levels: steering committee, management team, project team and design team (see Figure 3.1). These levels correspond with the different persons responsible for the project Kombrink (City of Rotterdam), Beijer (OBR) and Meijer.

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<tr>
<th>Chairman Kombrink</th>
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<td>Steering committee</td>
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<td>• Department of Culture and Arts</td>
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<th>Project team</th>
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<td>• Head TS Luxor (ad hoc)</td>
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<td>• Dir. Luxor Theatre (ad hoc)</td>
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![Figure 3.1 Four levels of decision making](image)

3.2.2 City Council

The City Council has to approve a project if the required funds for a project exceed the budget mandate of the director of the municipal department involved. In the Luxor Theatre project the City had to approve the brief and the project budget.

3.2.3 Steering committee

The steering committee determines the main objectives regarding time, costs, quality, information and organization. It also has to approve the different phase documents.
3.2.4 Management team
The management team has an overall supporting task. Its main task is to release and control the allocated project budget. Other tasks involve determining a policy regarding control aspects, preparing and approving the phase documents, approving mutations in formal documents and the contracts with the different participants.

3.2.5 Project team
The project team is in charge of controlling the design and construction process. It monitors the design process and tests the design activities against the formal documents and design principles. It also advises and supports the management team in decisions regarding design and construction issues.

3.2.6 Design team
The design team meets every two weeks to discuss design issues. The team has the competence to make all the design related decisions, as long as they are within the limits of the brief and the budget. Participating in the design team are the architect, the Luxor Theatre organization and the engineers.

The architect is a cooperation between Bolles + Wilson and Bureau Bouwkunde. In the design phase it is represented by Wilson. His responsibility is the project's design is made, the detailed design is worked out in dialogue with Bureau Bouwkunde and to coordinate the design process in the preliminary design and detailed design phase. In these phases Wilson is the chairman of the design team. In the preparation phase the architect is represented by De Bruin. She is responsible for the making of the specifications, construction drawings and detail drawings. She also coordinates the activities of the several members of the design team in the preparation phase, the engineers' and surveyors' activities and their feedback to the delegated client.

Ingenieursbureau Beton- en Staalbouw (IBS), a part of the municipal department of public works, is the structural engineer of the Luxor Theatre project. In the project, IBS is represented by Laurens. He is responsible for the structural design and for controlling costs, time and quality of the structural design.

Tebodin Consultants and Engineers (Tebodin) is the services engineer of the Luxor Theatre project. In the design phase Tebodin is represented by Cometh. He is responsible for the design and construction of the mechanical and electrical services.

Prinssen en Bus Raadgevende Ingenieurs (Prinssen en Bus) is the engineer theatre services, building acoustics and building physics of the Luxor Theatre project. Prinssen en Bus is represented by Prinssen. He is responsible for the design of the theatre services. Prinssen en Bus was already involved in the Luxor Theatre project before the design phase. It developed the brief and was consulted by several participants of the design contest.
3.3 Project management

Ontwikkelingsbedrijf Rotterdam charged the project management department of Gemeentewerken Rotterdam with the Luxor Theatre’s project management. As specifically requested by both Ontwikkelingsbedrijf Rotterdam and the Luxor Theatre organization, Meijer was appointed to the project. During the definition phase of the project Meijer was not yet available for the project. Therefore in that period project management tasks were carried out by Twijnstra Gudde. At the end of 1996 Meijer was released from the Erasmus bridge project. By that time he took over the project manager’s role.

Responsibilities and authorities

As stated in the project plan (see below), Meijer’s responsibilities are:

- the actual realisation of the project,
- the provision of information to the management team,
- the approval of the design by the users,
- the coordination of information exchange.

Meijer’s authorities are also mentioned in the project plan:

- direct contact with Kombrink,
- interference with the control of the project,
- assignments under Dfl 200.000,-.

The quality handbook

The way the project was managed, was guided by the project’s quality handbook. The quality system of Projectmanagement of Gemeentewerken Rotterdam requires this. Meijer selected from Projectmanagement’s standard procedures those that were of use for this specific project. Most important procedures in the quality handbook were those concerning the project plan and the phase documents. Other important procedures concerned design changes, cost estimations and time control. The contracts of the designing firms did not state they had to work according a quality handbook. Therefore Meijer requested from the designers to comply with the quality handbook during the first design team meeting, with which all agreed.

The project plan

Following the quality handbook Meijer drew up a project plan at the beginning of the preliminary design phase. This project plan stated the relevant principles and agreements concerning all control aspects. At the start of every following phase it was brought up to date. All designers agreed to comply with the project plan also.

Phase documents

At the end of every phase the architect had to hand over the integrated design results, consisting of drawings, calculations, reports and cost estimates. This had to enable Meijer to evaluate the design. He had to check whether the design complied with the brief and whether the designing firms had delivered the results they should have. The evaluation resulted in a report, in which improvements for the next phase could be put down. Together with the design results, this report
made up the so-called phase document. All phase documents needed the approval of both the management team and the steering committee.

Together with the phase document, Meijer produced a list of deliverables for the next phase for every participant.

**Time control**

As required by the quality handbook, Meijer made an overall time schedule for the project and this schedule was updated every phase. Both these schedules and progress reports were sent to the management team.

Within the limits of this overall schedule, all designing firms had to schedule their own activities. Furthermore, they had to send their schedules to the project manager and they had to report on their progress every month. Any departures from the schedule had to be mentioned in the design and project team meetings.

**Cost control**

Every design field had a budget for the related construction costs. At the end of every phase a cost estimation was made and compared to the budget. If the costs exceeded the budget, the design should be made less expensive. Owing to an inadequate initial budget, some problems occurred during the design. This will be discussed in chapter 4.

### 3.4 Design management

The project's design management was assigned to the architect, the partnership between Boiles + Wilson and Bureau Bouwkunde. The partnership appointed Wilson and De Bruin as design managers: Wilson lead the design team during the preliminary and final design phase, De Bruin during the construction preparation phase.

Design management and project management together manage the design process. The project management tasks and responsibilities were clearly defined and supported by authorities. The design management however, had to be carried out with task and responsibility descriptions and according to SR '88, this means that no formal authority was granted to the design manager.
The Luxor Theatre project

Project organization

Figure 3.2 Management of the design process

Primary objective of design management is making sure the individual designs fit together. For this purpose De Bruin scheduled and controlled the exchange of design information. At the end of every phase she also collected the design results and put them together.

To support the integration of individual designs, De Bruin provided the engineers with guidelines for their (digital) drawings, such as drawing templates. She also gave every design field its own drawing 'layer'. Furthermore, arrangements were made concerning the use of hardware, the use of software and the ways and formats to exchange drawings.

De Bruin also took care of the building licence and the environmental licence.
Part 2
Analysis
4 Analysis

4.1 Introduction

In the previous chapters the current situation of the Luxor Theatre project is described. In this chapter the project's current situation is analysed to find out the reasons for specific choices and to assess the possible areas for improvement.

Generally it is difficult to determine whether certain decisions are the right ones for the project's overall wellbeing, due to the various perceptions and objectives of the participants. Therefore three viewpoints of project participants are chosen. From each viewpoint the project is analysed on the control aspects time, costs, quality, organisation and information. By comparing the outcomes of the three analyses, similarities and differences are found. Different perceptions of certain aspects of the current situation indicate the potential areas for improvement.

The chosen viewpoints are those of the Luxor Theatre, the project manager and Bureau Bouwkunde. Despite the fact that Bureau Bouwkunde is incorporated in the architect partnership, it is regarded as an individual viewpoint.

The three viewpoints are mainly determined by the objective of the participant concerned. Before analysing the current situation in the following sections, the objectives are summarised.

4.1.1 Luxor Theatre

Luxor Theatre's main objective is to realise a theatre 'worthy to the city'. In order to achieve this objective, the managing director of the Luxor Theatre, Wiegman, has chosen to take up position as user rather than as (financial responsible) client.

Besides this, Luxor Theatre has the purpose to realise a second Luxor Theatre with a medium-sized auditorium at the present Luxor Theatre location. It is clear that a second theatre needs large political basis, because again there will be a lot of money involved. Creating political basis for this second theatre probably depends largely on the success of the current project.

4.1.2 Projectmanagement Gemeentewerken Rotterdam

For the good course of the project, Projectmanagement of Gemeentewerken Rotterdam (PM-GWR) was contracted by Ontwikkelingsbedrijf Rotterdam (OBR).
Meijer operates as delegated client in the Luxor Theatre project. However he is delegated by the financially responsible client, Ontwikkelingsbedrijf Rotterdam. This means that the user’s wishes and demands are taken care of by the Luxor Theatre itself. Meijer solely takes care of the project’s coordination. In this role he aims for two objectives:

- to represent the client’s interests as good as possible,
- to leave the (managerial) activities within the design and the construction processes to the designers and contractors (in particular the architect and the main contractor).

Only when this ‘hands-off’ management threatens to run out of hand and conflicts with the client’s interests, Meijer will interfere.

4.1.3 Bureau Bouwkunde

Bureau Bouwkunde is involved as the Luxor Theatre project’s architect, in a partnership with the architectural office Bolles + Wilson. The partnership’s objective is the realisation of the project. Another objective is the prestige of the project for both companies, an important marketing instrument for future projects. The objective for the cooperation is explicitly registered: in the cooperation Bolles + Wilson and Bureau Bouwkunde, Bureau Bouwkunde is a facility company that has the registered purpose of giving organisational, technical, economic, and business support in the area of constructional advice to architects, all in the broadest sense of the word [Agreement for cooperation BW / BB, 1997].

In addition Bureau Bouwkunde has several implicit goals. Part of its strategy is to realise ‘architecture with a capital A’. In this case this is accomplished by cooperating with a first class architect.

4.2 Organisation

The structure of the project organisation can be divided in a decision making organisation and an executive organisation, both are formally laid down. Despite this formal structure, the Luxor Theatre project’s course is strongly influenced by (inter)personal aspects as well.

4.2.1 Personal and interpersonal aspects

Wiegman’s principles

Already in an early stage of the project Wiegman was aware of the fact that (inter)personal aspects would play an important role in his project. This was a result of the experience he got from the Rotterdamse Schouwburg project. He had in mind a few principles that - when put into practice - would influence the course and the final result of the project positively. Those principles were:

- to limit the number of participants,
- to bring in the right persons,
- to create the right conditions for the participants.
The first principle is a well known principle for designing effective teams. It improves a team's collaboration and communication.

The second is even more obvious, but it was one of the most important reasons for the remarkable good course of the project. The 'right persons' firstly were Dumas and Meijer. Wiegman had had a good experience with both in the Rotterdamse Schouwburg project. Dumas possesses a lot of technical expertise concerning theatres and Meijer was a project manager who proves to be capable of managing a delicate project like a municipal theatre. But they are not only the right persons from a technical viewpoint. Wiegman also knows he could get along with them very well. The division of tasks between them almost is evident and would not have to be discussed. Further, Wilson, De Bruin and Laurens fit in the project well. Laurens also was involved in the Rotterdamse Schouwburg project.

The third principle comes down to providing enough time and money for the project participants to enable them to do a good job. Also this obviously has a positive effect on the contributions of the participants. But for participants that had to be tendered publicly a reasonable fee is hard to achieve, because of their urge to make a competitive offer.

Enthusiasm
Another important aspect of successful teams is the enthusiasm brought in by the participants. The Luxor Theatre project is in itself an appealing project. But also the good relationship which exists between the project and design team members, increases the enthusiasm. In this, Wiegman also plays an important role as he is very enthusiastic himself.

4.2.2 Decision making organisation
The client structure, which forms the project's decision making body, is clearly divided in disciplines and hierarchical levels. This subsection states the reasons for this particular structure.

Disciplines of the client structure
In the Luxor Theatre project the client's tasks and responsibilities have been divided over three participants: the Luxor Theatre, Ontwikkelingsbedrijf Rotterdam (OBR) and the project management department of Gemeentewerken Rotterdam. Each participant is selected for his role based on his skills on the specific discipline.

Wiegman and Dumas of the Luxor Theatre have expertise in developing a new theatre. They were involved in the 'Rotterdamse Schouwburg project' as representatives of the user of the new building. In the Luxor Theatre project they have a similar position, to bring in their knowledge of user aspects of a theatre.

Meijer is a well experienced project manager who knows how to manage a project, especially when the municipality is involved. He was specifically favoured by both the Luxor Theatre and Ontwikkelingsbedrijf Rotterdam, to become the project
The Luxor Theatre project

Analysis

manager for the Luxor Theatre project. Meijer represents the coordinating discipline of the client.

Ontwikkelingsbedrijf Rotterdam carries the financial responsibility for Luxor Theatre project because it is used to being in this position in a building project. It is represented by its managing director, Beijer.

Apart from these three disciplines of the client, which can be clearly recognised, a fourth discipline can be identified. The political responsibility is part of the client's responsibilities, which is carried by Kombrink, who is the Chairman for Arts and Culture.

Wiegman only wanted a partial client role, because: 'we want to be user and not client to get the things we actually want'. This role keeps them from formal responsibilities regarding costs and time. But to ensure the desired quality of the building, he made sure the Luxor Theatre had a lot of informal power, by:

- direct and frequent contact of Dumas and himself with Wilson,
- regular though informal meetings with Bureau Bouwkunde and OBR and
- attending the design team whenever necessary.

The frequent contacts with the design team enable Wiegman and Dumas to be intensively involved in the development and quality of the design. This involvement also had a positive effect on the progress of the design process.

It is questionable what meaning the formal division of task has had on the project so far. Because of the former cooperation of several participants, they probably implicitly knew from each other who would do what. Still especially the position of Dumas is somewhat unclear. His task to monitor the design as a member of the design team is not supported by any formal authority. Dumas may influence the design team by communicating his ideas, which than could be incorporated in the design, without approval of the project manager.

Hierarchy of decision making levels

For the Luxor Theatre project four levels of decision making were introduced, for a number of reasons. Firstly, the hierarchy has enabled the departments of the municipal civil service concerned, to take position at an appropriate level of the decision making body. Secondly, the decision making body, on its turn, has kept the departments involved, informed about the course of the project. Thirdly, perhaps the most important reason for this hierarchy was to create the necessary support of the municipal bureaucracy throughout the project. This support often turns out to be an important factor in a project's success.

Above these three reasons for setting up the hierarchy of the decision making organisation, it also makes it easier for alderman Kombrink to convince the City Council if he is backed-up by the civil service.

The members of the steering committee, the management team and the project team were chosen consciously. The three formal clients Kombrink, Beijer and Meijer
chair the body on their level. The other members are picked from the appropriate levels of the departments involved.

Wiegman and Meijer have held position in all the meetings, but also broadened the basis for the project in the municipality during less formal meetings. They both know their way into the civil service. As Meijer concerns, two reasons for Wiegman and Beijer to bring him in, were partially to improve the ease with which decisions would be made. The first was Meijer's experience with this kind of sensitive projects with the City Council in a client role. The second was the kind of project manager Meijer is, not rough enough to come into conflict with bureaucracy but suitable for a project in a municipal setting.

It is unclear how the actual decision making took place. Perhaps the chairman just took the decision after consulting his deliberative body. Perhaps the decision had to be taken unanimously. But somewhere in between those extremes is more plausible.

4.2.3 Executive organisation

Cooperation between Bolles + Wilson and Bureau Bouwkunde

When Wilson got involved in the Luxor Theatre project, he decided he wanted Bureau Bouwkunde to join him. He worked with Bureau Bouwkunde in a project in Hengelo and considered that as a positive experience. As it appears this decision by Wilson had a positive effect on the project. Bureau Bouwkunde knows the Dutch situation (building process, regulations) and how to coordinate the design process. The question remains what would have happened if Wilson had not decided to bring in Bureau Bouwkunde but to do the job on his own. Maybe Meijer or someone else could come up with the idea, but in the end the architect has to agree on it. If he thinks he can do it alone there is not much one can do about it.

Apart from the fact that Bureau Bouwkunde got involved in the project by Bolles + Wilson, also the coordinate position between them is an issue. This meant both had a say in the project and both could be addressed directly. When it is clear whom to address when, this will not have to be a problem. Formally it was the cooperation which got the assignment. So when problems would occur the cooperation could be tackled about it. Therefore it can be concluded that it was both practically and legally a sound construction.

Tebodin

The way Tebodin played its role of services engineer in the project has been discussed a lot. In fact, this entire discussion comes down to a difference between what Tebodin delivered and what other participants thought they should deliver. A number of possible causes is discussed in the case study. The discussed deliverables were their design output and the amount of supervising they had to provide during the construction stage. It was primarily a discussion between Bureau Bouwkunde and Prinssen en Bus on one side and Tebodin on the other. Meijer kept his hands off it as much as possible but he was aware of the fact that
something was going on. The only thing he thinks he himself should do is to stick
the team members to the agreements he made with them. For this particular case,
the rest is mostly Bureau Bouwkunde's concern, since it is responsible for the
coordination of the design. Bureau Bouwkunde thinks it should ask for high quality
of the design output to avoid problems during the construction stage.

Regarding the required amount of supervision, the discussion is about what is
meant with '(daily) supervision'. Tebodin's contract is based on the RVOI, which
states the required supervision in this way. Bureau Bouwkunde thought they could
count on full-time supervision by Tebodin, regarding the electrical and mechanical
services. Tebodin did not agree with this. It thought it had to supervise as much as
needed. Again it is possible that Bureau Bouwkunde deliberately was very
demanding to get the most out of the project, where Tebodin tries to deliver exactly
what is agreed upon.

**Tendering**

Of the tendering of the construction, three issues should be discussed: the choice
for traditional contracting, the absence of co-contractors for the mechanical and
electrical services and the high minimum requirements.

Traditional contracting is by all participants regarded as best in this case. All other
contracting forms combine less adequate with a public tender and the contractor's
contribution during the design is not rated very high.

Apart from the theatre services the construction was tendered as a whole. For
Meijer the reason for this was that he wanted as few contractors as possible to
address, in particular in case of difficulties. A bit harsh formulated his intention
was to end the project with maximally one lawsuit, not with several lawsuits.
Bureau Bouwkunde on the other hand, rather had had tendering of the services
separately. In that case it could have performed its role as main supervisor better,
because it would have been able to give directions directly to the services co-
contractors.

To be able to contract outstanding contractors, Meijer put up, in collaboration with
Bureau Bouwkunde, a set of high minimum requirements. The main reason for this
that they absolutely wanted the project to be completed in time in the end of the
year 2000 and for that they needed very capable contractors. Meijer realised this
would probably lead to higher bids, but he took that for granted.

**Information**

The control aspect information can be seen in two different contexts. In the first
place, there is information in the decision making context. This context is formed by
the client and the design team. Here, information is with regard to the progress of
the design. In the second place information is within the context of the designing
participants. This means the way information about modifications and executions is
handled in the design stage.
4.3.1 Decision making

As user the Luxor Theatre holds an important position in the project. This role keeps the Luxor Theatre from a lot of responsibilities. Its main responsibility is to provide user information to the design team. Formal, Wiegman and/or Dumas are ad hoc members in the design and project team. Not clear is to what extent Wiegman and Dumas have authority in these meetings. Attending these meetings is important in order to be informed. Also very important is the bilateral 'coffee meeting', a frequent contact between Wiegman, Dumas and Wilson, that enables the Luxor Theatre to be highly involved in the development of the design, the quality of the design and the financial feasibility of the project.

The exchange of design information in this context is limited. As long as the design stays within the limits set by the brief, everything concerned with the design is handled by the design team.

4.3.2 Designing context

In the design stage it's of vital importance to exchange information properly. The coordination of information exchange was a task of Bureau Bouwkunde. The participants in the design team met every two weeks in the design meeting. In the construction stage they also meet every two weeks to exchange information. With this difference that in this stage the designers have become surveyors. Completed with the contractors they form the construction team.

Especially in the design stage the right information at the right time is essential. For every participant, information is the input for their task. Without the right input it's impossible to produce the right output. By planning the drawing information, Bureau Bouwkunde managed on output. For this purpose it formulated a procedure based on a general drawing procedure. To ensure the exchange of information, agreements on hardware and software have been made. In spite of contractual terms, problems with exchanging formats and used design software have occurred in the design process.

Bureau Bouwkunde had the responsibility with regard to problems in the exchange of information. It had the task to coordinate the cooperation within the design team, which consisted of Bolles + Wilson, Prinssen en Bus, IBS and Tebodin and Bureau Bouwkunde itself. Contradictory to this coordination task is the responsibility without suitable authority for Bureau Bouwkunde. There existed a cooperation problem between Bureau Bouwkunde, Prinssen en Bus and Tebodin. Maybe, Meijer should have been monitoring the design team more closely. His efforts to improve the information flows would have been more effective than those of Bureau Bouwkunde, because he has a more powerful position in the project organisation. However, Meijer's view is clearly based on the principle not to interfere with the design process itself as long as this is really unnecessary.
4.4 Quality

Quality can be defined from an transcendental viewpoint, from the viewpoint of the product, the value of the product, the user, and the production [Van der Bij, Broekhuis, 1998].

With concern to the participants' objectives towards the notion quality, several viewpoints can be distinguished. For the Luxor Theatre, quality is understood as the product and user quality of the theatre building. This means the new theatre should be worthy to the city Rotterdam and it should be tuned to the theatre's program. The project manager's main quality interest is in a good quality of the design and building process. The architect takes an interest in both the process and the product quality. Bureau Bouwkunde's goal is to coordinate the design and construction process and to realise 'architecture with a capital A'.

4.4.1 Quality management

To support the process quality, Meijer clearly separates the user’s and the architect's involvement and his own coordinating role in the process. This so-called hands-off policy depends largely on Dumas' and the architect’s expertise and the project manager is supported in his hands-off policy by the fact that Wilson is the kind of architect that is able and willing to absorb a huge and continuous flow of design input from the user.

So Luxor Theatre's task is to communicate the user aspects and the architect's task is to coordinate the design process. Meijer also stimulates the informal communication between Wilson and Luxor Theatre. Despite his trust in Dumas' expertise Meijer has to keep in touch with the way the project develops during the design stages. At the end it is his responsibility that the project progresses in the right direction.

Till now Meijer's hands-off strategy seems to be effective within the Luxor project. Dumas and Wiegman have an important role in determining the product and user quality. And the architect has an important role in coordinating the design process. Meijer's hands-off strategy enables the participants, to take as much as possible their own responsibility and raises the involvement of the architect and the user of the new theatre.

However, there are some drawbacks to the position taken by the architect within the design team. The architect and the engineers are contracted by OBR. So, although the architect coordinates the design process, in case of serious problems between members of the design team, OBR gets involved in the conflict. This can have a negative impact on the process of the project.

To achieve the highest possible quality, Luxor has set higher goals than necessary. They know exactly what they want and they are experts in their field. It is possible to archive this high quality because they have had a 100% influence on the project. In the first place because, about eleven years ago, Wiegman was the initiator of the project. In the second place, there was a dialogue between Wiegman, Dumas and
Prinssen + Bus during the formulation of the brief. In the third place there was direct and frequent contact between Wiegman, Dumas and Wilson. And in the fourth place during the project they are monitoring the participants' output.

However there is also a drawback to the high influence of Luxor: there is a lot of time involved with the frequent monitoring of the participants' output and the monitoring involves the risk that Luxor Theatre becomes responsible for design and technical choices.

4.4.2 Quality handbook and project plan

Project managers working at Gemeentewerken Rotterdam, have to work according to the quality procedures. Therefore, Meijer, the project manager of the Luxor project, put together a quality handbook for this particular project. In this project, the quality handbook is an important tool to achieve a better process quality. This handbook comprises a lot of procedures but the most important implication for the project was the strict phasing of the project. For every stage Meijer had to draw up a new (or adapted) project plan and lay down each participants' deliverables for that stage. Furthermore he determined at the end of every stage whether participants had produced the deliverables they should have and what was still lacking.

The use of the quality handbook wasn't stated in the team members' contracts. Meijer convinced the other team members to work according to the quality handbook. By doing this Meijer has an important tool to control the project and the design team members know exactly what they have to produce. Although it's not possible to exclude team members' failures, the handbook will be useful to state the failures. Therefore the quality system will have a positive effect on the project and it will also help the architect to coordinate the design and construction process.

It was Meijer's responsibility to check whether the design and the construction specifications were in conformance with the brief. But he left this largely to Dumas because Dumas was far more involved with the actual design than he was. This means that Meijer has to monitor Dumas' work. But at the end it was Meijer's autograph under the stage document.

4.4.3 Change management

Changes in the design within the limits of the brief are not of importance to Meijer. Within the design stage of this project, design changes are only seen as relevant changes, if the change means a deviation from one of the brief's specifications.

Changes compared to the brief, in the design process, will be discussed in the project team and have to be approved in the steering committee.

In the Luxor project, an occasion can be mentioned, in which a change in the design meant a deviation from the brief's specifications. During the design process, Luxor decided they also needed a conductor room. This room was not noted in the brief. In order to fulfil this need, some storeroom was replaced with a conductor room.
4.5 Costs

With regard to costs, the common goal for the participants involved is to not exceed the budget. After all, the budget is restricted and the project can't be realised if it goes beyond restrictions. However, participants have different reasons to stay within budget. Derived from its main goal, Luxor Theatre's interests are to secure social and political basis. Large budget exceeding certainly will have negative impact towards social and political basis and so towards the possibility for a second Luxor Theatre.

Luxor Theatre is responsible for the payments. This is conflicting with the separation in user and financial client. OBR is in this separation expected to be responsible for payments. Meijer gives two reasons for the Luxor's responsibility in this: tax-advantages and to facilitate OBR, to hand over the Theatre possibly to the Luxor Theatre in the future.

Bureau Bouwkunde - together with Bolles + Wilson - has a more trivial reason: it committed to the budget for the architectural works, so in order to carry out their assignment and responsibility it has to stay within budget. Meijer combines the reasons given. He is responsible for outlining and controlling the architect's and engineers' budget limits and for defending the client's interest as well as possible.

The last indicates the two sorts of interest of cost aspects. One in the interest of decision making, so in the client's interest, and one in the interest of the execution of the design, so in the designers' interest. In the next two sub-sections these two interests will be described.

4.5.1 Decision making

Usually, the highest level of the project organisation is taken by the client. As described in Chapter 3, the client structure in the Luxor Theatre project is more complex. Luxor Theatre is involved as user, therefore it is not responsible for cost management. However, Luxor Theatre has its own special interest in budget control. Important issues in concern with this interest were:

- initial under-estimation of costs by Twijnstra Gudde;
- only one (official) request for extra budget by Meijer.

Twijnstra Gudde's estimation

Besides management, Twijnstra Gudde was involved in the estimation of costs. The initial cost estimation that accompanied the brief was revised by Twijnstra Gudde in 1996, based on input from Prinsen en Bus and other engineers. This estimation appeared low, caused by the absence of two building layers in the calculation. This could have been a simple but important fault. However, it soon was clear the project never could be realised within this estimation. Therefore savings had to be found by the design team. Eventually this resulted in a total saving of Dfl 2 million.
Request for extra budget

However OBR is the formal client, the funds for the realisation of the Luxor Theatre are provided by the City of Rotterdam. To protect the political reputation of the Luxor Theatre project, Meijer only wanted to come to the City Council with a request for money twice: once at the start of the project and once after the project had been tendered.

This distinct process choice was undoubtedly important, because it avoided constant political focus on the Luxor Theatre project budget, too many discussions about the necessity of the large project budget and the fear that repeatedly demand for extra budget would result in interminable exceeding. Coupled with protecting the Luxor Theatre interests in not endangering political basis is protecting the responsible alderman Kombrink. On this point Meijer showed to defend the interests of the client, in this case personified in both Luxor and alderman Kombrink.

Useful arguments for budget increase - after assigning the contractors Dfl 12 mln. - Meijer found in the price difference between 1996 and 2000. The price level of the initial fund was that of February 1996 but the project would be completed in the end of the year 2000. Another argument found, was the first City Council Order that mentioned tender risk being an exogenous factor. This was one of Meijer’s reason to wait for the construction contracts.

The single final trip back to the City Council, enabled rather fast political decision making. Trivial to mention is that the fast decision making is of important interest for all participants at all levels of the project organisation. Drawback for the project and of course for Luxor Theatre itself was the risk City Council wouldn’t grant extra budget. This would have frustrated the project enormously.

Meijer and the complex client structure

Remarkable is that Meijer not only represents OBR’s interests, but at certain moments also protects the Luxor Theatre’s and alderman Kombrink’s user’s interest. Even more, he turned to OBR for extra budget in order to protect the user’s wishes. Questionable is whether this was directly in the client’s interest. This indicates important informal forces influencing the project. To mention are specific informal forces as the Luxor Theatre and city politics, amongst others represented by alderman Kombrink.

4.5.2 Design execution

At the level the architect operates, primary responsibility towards costs is to keep design within budget. Most important issue at this level were savings to be found because of under-estimation of costs by Twijnstra Gudde.

Savings

At the start of the Preliminary Design, Meijer wanted to have every designer committed himself to the budget of his part of the building. Laurens, the structural engineer of IBS, refused. He already had the feeling his budget was far from
sufficient. This feeling turned out to be right in the conceptual Preliminary Design. In stead of Dfl 10 million the cost estimate for the structure was Dfl 17.5 million. Meijer decided to continue with the Detailed Design and solve the problem during that stage. He also consulted PRC Bouwkostenmanagement for a second opinion on the cost estimation of the entire building. Their estimation hardly differed from the designers’ estimation. Finally the Preliminary Designed was estimated at 15.7 million.

Meijer asked every discipline to look for savings, because he did not want to request for more budget without having tried everything to stay within the original budget. Bureau Bouwkunde and the other engineers, besides IBS, were not enthusiastic about this. However, after the second opinion, they realised the structural budget exceeding was a common problem that they had to solve as a team.

To motivate the designers Meijer decided to fix the fees so savings would not lead to decreased fees. He even granted some of them a bonus. Initially the designers’ fees were a fixed percentage of their partial budget. Eventually this resulted in a joint effort and the above mentioned total saving of Dfl 2 million. Meijer's role as intermediate between the client and the design team is illustrated here. The original idea of commitment to the budgets was not a wrong idea. But the fact that opposition occurred should have given him the idea that there could be something wrong with the stated budgets. When the problem really occurred he had to make trade-offs between progress, quality and cost control.

4.6 Time
The interests of the Luxor Theatre project’s participants concerning time control, are somewhat diverse. Luxor Theatre is mainly interested in achieving the completion in the end of the year 2000. Meijer’s interest on time control is derived from Luxor Theatre’s interest, because achieving the agreed completion date requires a reliable course of the project, where any delay has to be prevented. On operational level, Bureau Bouwkunde is concerned with the same fact, that any delay in the construction period is unacceptable.

4.6.1 Planning
Project time control is mainly concerned with good planning. This implies, that the project manager should develop a time schedule, which contains all necessary activities, decision points and division of tasks, responsibilities and competencies to bring the project to an end. The schedule should be based on realistic assumptions concerning required time per activity, and should give insight in the critical path of the project. All this should prevent significant delay and unexpected events.

4.6.2 Delay
In the Luxor Theatre project, Meijer is assigned to take care of the project management. However, he was not involved from the first moment due to his occupation in the Erasmus bridge project. Twijnstra Gudde had taken care of the project management of the Luxor Theatre project up to the moment that Meijer
joined. He inherited the overall schedule of Twijnstra Gudde. This schedule appeared to be based on probably somewhat too optimistic assumptions. The most important difference with Meijer's planning concerning the time aspect was the construction duration, which Twijnstra Gudde calculated at 24 months. During the design stages it turned out that this would be at least 27 months. So Meijer had to incorporate an additional three months time in the schedule. Also the completion date was shifted three months further.

Another three months delay was caused by budget exceeding, which had to be corrected. In an early stage of the project, it had calculated budgets based on incorrect assumptions as already described earlier. In the design stages, Bureau Bouwkunde, as the coordinating body, was confronted with the budget exceeding. Bureau Bouwkunde requested all participants to cooperate in achieving the necessary savings.

In the construction stage, Bureau Bouwkunde is given the responsibility of main supervisor, which means that Meijer depends largely on Bureau Bouwkunde in controlling time during the construction stage. In his hands-off policy, Meijer monitors the process from a distance and is mainly interested in changes, which influence the time schedule. He is updated on changes periodically and is contacted incidentally in case of significant changes.

As long as delay leads to postponement of the completion date this has hardly any effect on Bureau Bouwkunde's activities concerning the Luxor Theatre project, because the remaining activities can take place on an unchanged time-span. However the additional time spent on the Luxor Theatre project has an adverse effect on other projects which at it's turn may have a negative effect on Bureau Bouwkunde's results.

In case that delay has to be caught up during the remaining part of the project activities have to take place in a shorter period. This puts pressure on Bureau Bouwkunde's coordination task of the design and construction teams. It may become necessary to make use of concurrent engineering, which means that participants work parallel. This requires more intense coordination because participants can no longer wait for each other's results and have to keep in touch with changes made by others.

Below, some specific delay aspects are analysed, because these affect the three participants described in different ways.

**Construction duration**

As mentioned above, the Luxor Theatre has to move into the theatre in the beginning of the year 2001. Due to the six months delay that already occurred, the construction duration simply can not extend. Meijer is aware of this. To prevent further delay during the construction stage, he has not laid down the construction duration in a number of workdays. An agreement is made with the main contractor on the completion date, in the end of the year 2000. Meijer is still looking for possibilities within the contracts, to speed up the construction process in case of
difficulties. In this area, he depends largely on the flexibility and willingness of other participants, mostly contractors, to speed up their particular processes in whatever possible way. An example is working in double shifts, an option which is not mentioned explicitly in any contract, but may be necessary.

In case of speeding up the construction process, Bureau Bouwkunde will play an important role in mutually adjusting all contractor's activities. Also, the adjustment with the other supervisors of the involved consultants is of crucial importance. These supervisors take care of their particular part of the construction activities. Speeding-up the process means that these activities will occur simultaneously, which can easily lead to conflicts. Bureau Bouwkunde is responsible for preventing these kind of undesired situations.

**Budget exceeding**

The primary causes for delay is the budget exceeding during the design stages. Achieving design savings took additional time, which postponed some base-line passages. Meijer had to make a trade-off between budget control and the progress of the process. This means that he sometimes had to decide to move over to a next stage without having fully achieved the required savings. He also sometimes decided to move over to the next stage without having the formal approval of the previous stage, in order to save time. For Bureau Bouwkunde this means that preparation of the coordination of the oncoming stage had to be speeded-up.

**Postponing decisions**

One of the success factors of the Luxor Theatre project is the fast decision making, as well in the political field and in the project itself. Still some decisions are postponed consciously by Luxor Theatre. For example decisions about the interior design, theatre seats and future exploitation of the theatre cafe and shops. For Luxor Theatre this is important because this way they can focus on the first important issues. It is Meijer's responsibility that in the end all decisions are made. He has set deadlines for the unanswered questions to ensure all decisions are made in time.

**Building license**

Meijer mentioned obtaining the building license as a cause of delay. Neighbouring students who were acquainted with the legal building licence procedure, article 19 from the Dutch law of environmental planning, have done everything to obstruct the permit of the building license. Meijer decided to strictly follow the article 19 procedure in order to ensure a reliable license procedure which, as a consequence, required more time.

**Hierarchical time schedule**

Meijer based the overall time schedule on the quality handbook procedure PM55P, which requires the production of an overall schedule and a detailed schedule of the oncoming stage. Per discipline a production schedule is to be provided by the design participants. These individual schedules leave a certain degree of freedom for the participants to plan their activities within the overall schedule. This hierarchical
schedule enables Meijer not to interfere too much in the detailed planning of these participants. This is in line with his objective not to be too much involved with the design and construction participants' activities. Bureau Bouwkunde has successfully translated the overall schedule to their particular detailed planning.
Part 3
Redesign
5 Introduction to the redesigns

The previous chapters described and analysed the Luxor Theatre project. The next six chapters give possible redesign of parts of the analysed process. Redesigned subjects are:

1. ensuring the functional quality of the future building;
2. controlling of future utilization costs during design;
3. involving the client and the user;
4. dividing the tasks between project management and design management;
5. organizing the project organization and design management;
6. coordinating the design process.

Each redesign subject is put into a different participant's perspective. The numbers in Figure 5.1 represent the above redesign subjects.

![Figure 5.1 Position of redesigns](image)

Figure 5.1 shows the relation between the redesign subject and the design process. Redesigns 3 looks from the project management's viewpoint at the relation between project management and user. Redesign 4 looks from the same viewpoint at the relation between project management and design management. Redesigns 5 and 6 are from the design management's viewpoint. Redesign 5 elaborates the relation between design management and project management. Subsequently redesign 6 elaborates the relation between design management and designers.
Redesigns 1 and 2’s relations to the design process differ from the other redesigns. They propose on how to control future qualities of the building as an integral theme in the design process. This is done from the user’s viewpoint.
6 Towards a usable building

ir. Monique van Liebergen

A usable building is essential to the functioning of any organization. A usable building is one that supports the activities inside and that lives up to the expectations and demands of the client and the users of the building.

In the Luxor Theatre project, a building process that will lead to a usable theatre is in the interests of the Luxor Theatre. In this chapter, aspects of the building process that influence the usability of the new theatre are discussed. If necessary, redesign of these aspects will be proposed.

6.1 Achieving a usable building

Achieving a usable building from the building process, mainly involves determining and monitoring quality aspects for the new building. NEN-ISO 9000 defines quality as:

'the totality of characteristics of a product or service that are of importance for satisfying the specified demands or self-evident needs'.

For the usability of the building, determining the right quality aspects is of great importance. Even so is determining those quality aspects that are not derived from self-evident accommodation needs, but that will provide for a more supportive building.

Determining the right quality aspects usually starts with an analysis of the accommodation needs. Determining the right quality aspects ends with drawing up the brief, containing all the information necessary for achieving the usable building. In between, different steps can be distinguished (see Figure 6.1).

---

**Analysis of the accommodation needs**

**Brief**

*Figure 6.1 Steps towards a brief*

Steps that have to be taken towards drawing up the brief, and the order in which they have to be taken, depend on the project characteristics and its context. The
steps that are taken also determine the type of brief, as will be explained in Sub-
section 6.3.3.

Achieving a usable building is not only about determining the right quality aspects. It is also about controlling and monitoring the object and process quality. The way the object and process quality is controlled and monitored, and by whom, depends on the design of the project organization.

6.2 Brief and project organization in the Luxor Theatre project

Within the Luxor Theatre project, several steps that led to the brief can be distinguished (see Figure 6.2). The first idea for a new theatre is not known, but somewhere in the process a document about the civic ambition of the City of Rotterdam mentioned a new Luxor Theatre with two auditoriums. Shortly after, Ontwikkelingsbedrijf Rotterdam bought a building at the Kruiskade (the street where the present theatre is located) with the intention to build a new theatre with two auditoriums. The City Counsel gave permission, and the new theatre project started.

During the process, it became clear that the intended location was unsuitable for a theatre with two auditoriums. A new location had to be found, and was found on the Kop van Zuid, an area undergoing heavy development. This new location was also unsuitable for a theatre with two auditoriums, and the decision to build only a single auditorium theatre was taken. Adjustments to the initial brief and the project's requirements are made and finally the final brief is drawn up.

The Luxor Theatre, as the user, was present in the project team that wrote the brief. After finishing the brief, they stayed involved in the design process. With Meijer officially responsible for controlling the object (and process) quality, involvement of the Luxor Theatre is mainly monitoring the design progress. At least one representative of the Luxor Theatre is present in every level of the project organization: steering committee, management team, project team and design team.

6.3 Alternative solutions for achieving a usable building

Alternative solutions for the aspects influencing the usability of the Luxor Theatre are discussed in this sub-section.

6.3.1 Formulating starting points

For the usability of the theatre, it is important that the project and its brief are based on the right starting points. The right starting points can be obtained by thoroughly analysing the accommodation needs and tuning these to the organization strategy. Accommodation needs directly relate to the organization and its processes (see Figure 6.4). According to Kohnstamm and Regterschot [1995] an accommodation situation is only optimal when a stable balance exists between:

- the wishes and needs of the users organization (user),
- the performance of the building in terms of quantity and quality (building),
The Luxor Theatre project

Developing initial brief

Studying feasibility

Testing location

No go location

Searching new location

Adjusting brief

Go location

Design contest

Adjusting brief

Brief

Identifying bottlenecks

Defining ambition level

Creating political and social basis

Permission City Counsel for new Luxor

Analysing accommodation needs

Analysing (and revise) organization strategy

Generation of accommodation concepts

Adjustment of ambition level

Generation first initial brief

Analysing location

Location choice

Studying feasibility

Yes

Deciding for project organization

Choosing type of brief

Initial brief and execution plan

Go/no go by City Counsel

Figure 6.2 Steps towards the brief of the Luxor Theatre

Figure 6.3 Steps towards right starting points

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• the quality and facility level of the environment the building is located in (location).

The balance of the relation between these components largely depends on the products and markets of the organization. Products and markets of the organization influence the processes and functioning of the user organization and therefore also the wishes and needs of the organization towards the accommodation components, building and location.

![Diagram](image)

**Figure 6.4 Model for integral strategy building [Kohnstamm and Regterschot, 1995]**

In the Luxor Theatre project, a location choice, not based on accommodation needs, led to stagnation of the whole project process and to new accommodation conditions. A well-thought plan of steps in the pre-course of the brief can lead to better starting points for the brief and to a smooth(er) process course.

A project such as the Luxor Theatre project probably starts with the identification of bottlenecks within the accommodation. These bottlenecks can be of any type: building is not representative anymore, it is old fashioned or it is not suitable for the processes of theatre anymore. When the idea for a new theatre evolves, ideas about the prestige of the new theatre will also evolve. With these new ideas social and political basis will be sought.

After permission to start the development of a new theatre, it is important to generate the right starting points for the project. Steps that will have to be made are: analysing the accommodation needs, analysing the organization strategy, generating accommodation concepts, analysing locations and studying the feasibility.

To prevent repetitive decision making of the City Counsel on the location choice and the size of the theatre, location analysis and location choice should be based on concrete requirements, derived from the accommodation and organization analysis. In this way, corrections on already decided issues are eliminated.

Results of all these steps can be laid down in a initial brief. The initial brief can be extended with an execution plan for the coming stages of the project. The execution plan should at least include the type of project organization and the type of brief.
Based on both documents a well-founded choice whether to go ahead with the project or not can be made. Well-thought starting points and the initial brief can also serve as input for brief development. Figure 6.3 shows the steps that are advised for the Luxor Theatre project, moving towards the right starting points and the initial brief.

6.3.2 Three types of briefs

Three basic types of briefs can be recognised: the permanent brief, the multi-stage brief and the growing brief. The permanent brief is a brief that is completely developed before any design activity is started (see Figure 6.5). During the design phase, every design is tested to this brief and no changes to the brief can be made.

![Figure 6.5 The permanent brief](image)

The multi-stage brief is a brief that is developed in different stages (see Figure 6.6). After every stage the brief is approved and fixed. No adjustments to already approved briefs can be made. Early in the development of the brief, the contents of the different briefs, and the specified level of their contents, have to be defined. The brief is usually developed from overall specifications into detailed specifications. Every brief provides the input for the coming design phase.

![Figure 6.6 The multi-stage brief](image)

The third type of brief is the growing brief. This brief is mainly developed parallel to the design (see Figure 6.7). Interactions between brief and design occur. Changes within the brief can be made, but can lead to great impact on the design process.
The type of brief used in the Luxor Theatre project is a combination of a permanent brief and a growing brief. A permanent brief is delivered before the official start of the design process. However, during development of this permanent brief, adjustments to this brief were made after the outcome of the design contest, which refers to a growing brief.

6.3.3 Towards different types of briefs in the Luxor Theatre project

For the Luxor Theatre project, steps that will lead to the three different types of briefs are defined. Based on these steps, the usability of each type of brief for the Luxor project is reviewed.

**Permanent brief**

To draw up the brief, a project team has to be formed. Carefully choosing the members of the project team is important. The brief should contain all the information necessary for achieving the desired usable building. Therefore, all the required knowledge has to be present in the project team. After the brief is drawn up, it has to be tested, to be sure of its completeness. An option for testing can be comparing the brief and the desired building to similar projects. 

![Image of the growing brief](image)

**Figure 6.7 The growing brief**

The type of brief used in the Luxor Theatre project is a combination of a permanent brief and a growing brief. A permanent brief is delivered before the official start of the design process. However, during development of this permanent brief, adjustments to this brief were made after the outcome of the design contest, which refers to a growing brief.

In a project such as the Luxor Theatre project, defining a permanent brief is rather difficult. The project's complexity makes it almost impossible to predict all aspects required for a usable building. Risk of not achieving your usable building with the, in the brief defined requirements is present. The development of a permanent brief also implicitly indicates withdrawal of the users after delivering the brief. The user does not actively participate in the design process anymore, their only activity can be (but does not has to be) monitoring the design progress. It is questionable if in a project with such an ambition level, the user should be passively involved in the design process.
Multi-stage brief

Development of a multi-stage brief starts with defining the development of the brief. Which stages are going to be distinguished, what are the different aspects the brief must contain and to what level are the different aspects of the brief going be specified per stage? The use of existing briefs can be helpful here. When the required output for the different brief stages is specified, the first stage can start. After finishing this brief stage, the following design phase can start. The design of in this phase will be tested to the last stage brief and successively the next stage brief is composed. Advanced insight, coming from the design, can be taken along, as long as it is within the restrictions of the brief. Figure 6.9 shows the steps leading to a multi-stage brief.

The development of a multi-stage brief leads to a controlled process. The process can be divided in phases and information for the process is generated and put in the process at specified moments. This keeps the designers and engineers from drowning in too much information at once.

A multi-stage brief also gives the opportunity to the users of the building to include new findings from advanced insight in the brief, as long as these are within the restrictions of the brief.

Even within a complex project like the Luxor Theatre project the multi-stage brief can lead to a well-thought and complete brief, unbearable for a usable building. However, the development of the brief must be carefully planned and well-thought, in advance. If a stage brief does not give the desired and necessary input for the different design phases, the, by the client or user desired design track, can be left. This will complicate the design process.

Growing brief

Figure 6.10 shows the steps leading to a growing brief. After the project team for the brief is composed, the initial brief will be further developed. During development of the brief, the design process is also started.
The Luxor Theatre project

Towards a usable building

Figure 1.2

Composing project team for brief

Defining brief development

Brief for design contest

Design contest

Testing contest design to brief

Go/ no go

Designing PD brief

Preliminary design brief

Testing preliminary design to brief

Go/ no go

Designing FD brief

Final design brief

Testing final design to brief

Go/ no go

Designing final brief

Brief

Figure 6.9 Steps for a multi-stage brief

Figure 6.10 Steps for a growing brief

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The Luxor Theatre project
Towards a usable building

To control the process, the design is divided in phases. At the end of every phase the design is tested to the contents of the brief, available at that time. In between these formalised phases, interaction between design and brief takes place: the brief is tested to the design, and the design to the brief. Advanced insights can be taken along, involvement of the client or user in this process is high.

With a growing brief the design can be coached along the process to the desired usable building. Before starting the design process, the user does not has to have total knowledge of the new building. This suits well for a project like the Luxor Theatre.

However, interaction between design and brief can lead to a brief derived from design instead of the other way around, as it is supposed to be. This can result in a brief, in which is deviated from the original starting points. Complications in the process caused by a review of earlier established requirements can also occur, because the brief is not fixed.

6.3.4 Position of the Luxor Theatre in the project organization

Although the brief itself is a very important step towards a usable building, the outcome of the project being the desired usable building, is not guaranteed, of course. By involving the Luxor Theatre in the project organization during the design process, the usability of the theatre can be secured.

In the current situation the Luxor Theatre is present at every level of the project organization: steering committee, management team, project team and design team. Presence at all these levels takes up a lot of time and when the brief is well-developed, it is only needed as an extra back-up for a usable building.

Table 6.1 Tasks concerning usability per team in the present project organization

<table>
<thead>
<tr>
<th>Teams</th>
<th>Tasks concerning the usability of the theatre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steering committee</td>
<td>• approval of baseline documents</td>
</tr>
<tr>
<td></td>
<td>• definition of overall principles regarding control aspects</td>
</tr>
<tr>
<td>Management team</td>
<td>• preparation of baseline documents</td>
</tr>
<tr>
<td></td>
<td>• determination policy towards control aspects</td>
</tr>
<tr>
<td></td>
<td>• approval of mutations</td>
</tr>
<tr>
<td>Project team</td>
<td>• controlling and testing process and object quality</td>
</tr>
<tr>
<td>Design team</td>
<td>• coordination of design activities</td>
</tr>
</tbody>
</table>

To secure the usability of the theatre, the Luxor Theatre should be able to monitor the design progress and to interfere when the course of the process endangers the
desired usable building. Therefore, the Luxor Theatre has to be positioned in the project organization, in a way that it is able to do all this.

In the present project organization, the different teams have their own tasks. The tasks of the different teams that concern the usability of the theatre are shown in Table 6.1. The steering committee specifies the overall principles regarding quality, time, costs, information and organization. It also approves the different baseline documents. The management team prepares the baseline documents. Its most important task (concerning usability) is approving changes within formal documents, which also concerns the brief. The project team monitors the project process and tests the activities in the process to the principles, set by the steering committee. Within the design team, design issues are discussed and the different activities are coordinated.

The Luxor Theatre can, by participating in the design team, directly control and monitor the design progress. However, direct involvement of the Luxor Theatre in the design team can unnecessarily influence the design course. It can also frustrate the process because the Luxor Theatre cannot demand changes in the design that also affect the brief without formal agreement. When design issues are directly put to the Luxor Theatre, Meijer can lose the overall view on the project.

By participating in the project team, the Luxor Theatre is able to monitor the design progress from a distance, while still being informed about issues concerning usability.

The management team has a lot of tasks that do not concern usability, but they do approve changes in formal documents. However, the Luxor Theatre does not necessarily have to participate in the management team. Given their presence in the project team, the Luxor Theatre can use Meijer to plea for changes regarding usability in the management team.

In the steering committee, the Luxor Theatre is able to set the principles regarding quality. Participation in the top level of the project organization also gives it, in case of extremities, the opportunity to take usability issues into the steering committee.

6.4 Recommendations

For achieving a usable building, several recommendations to the Luxor Theatre project can be given.

Formulating starting points

For the development of the brief, the right starting points for the project must be obtained. The proposed steps, necessary for formulating the right starting points in the Luxor Theatre project, are shown in Figure 6.3.

Type of brief

Two types of briefs are combined in the Luxor Theatre project: the permanent brief and the growing brief. Subscribing a design contest before finishing the permanent
brief leads to more insight into the expectations of the final theatre. It can also be used to verify the contents of the brief. But within the Luxor Theatre project, it is questionable if this has lead to a real permanent brief. The Luxor Theatre still had to involve themselves deeply in the design process after finishing the brief.

The recommend type of brief for the Luxor Theatre project is the multi-stage brief. The multi-stage brief allows the Luxor Theatre to take along advanced insight into the project in the brief, which decreases the risk of not achieving your desired usable building. The multi-stage brief also allows a checkable process, leading to fewer risks regarding time and costs. In time the definition process can last longer, although time spend in the definition phase, composing a permanent brief, can in case of a multi-stage brief be partly divided over the different stages.

Position of the Luxor Theatre in the project organization
Involving the Luxor Theatre in the project organization during the design process, can serve as an extra back-up for a usable building. To be able to monitor the design process and to interfere, when the course of the process endangers the desired usable building, the Luxor Theatre must at least be participating in the steering team and the project team.

In the steering committee the Luxor Theatre can set principles regarding the usability of the theatre. In the project team the Luxor Theatre can monitor the design progress. In case of extreme disagreement on the approval or disapproval of the management team regarding changes important for achieving the usable building, the Luxor Theatre can run these issues through the steering committee.

6.5 References


7 Making utilization costs a design effort

ir. Davy Demmers

As the future user of the new theatre, Luxor Theatre's main concern in the Luxor Theatre project is that it results in a 'useful' building. 'Useful', in this case, means as the actual fitness for use of the theatre building and as the use of the building without outrunning the annual Luxor Theatre's budget. The fitness for use is largely determined by the quality of the building. This was discussed in the previous chapter.

This chapter is, from the Luxor Theatre's viewpoint, about those financial issues concerning the use of the new Luxor Theatre building that can be influenced during development of design. It gives the steps to control utilization costs and describes possible impact on the present Luxor Theatre project.

7.1 Need for utilization costs control

In the Luxor Theatre project, cost control mainly refers to control of the once-only investment costs of the building. Project manager Meijer and client OBR are responsible for control of these costs. After the project will be completed, the Luxor Theatre will be responsible for running its theatre business. This involves a lot of money and is not without risk. Two cases that were recently in the news illustrate such risk: the large new Metropolis science centre project in Amsterdam and the smaller project social-cultural centre 'Het Klooster' in Nuenen, a village near Eindhoven.

New Metropolis has debts of 8 million DFL. This due to an overrun of the building costs and a disappointing number of visitors. To avoid bankruptcy new Metropolis needs an annual municipal contribution of 2 million DFL. [NOS Teletekst, 1998]

In Nuenen, the position of one of the city councillors is at stake because of the running costs of the village's new cultural centre. Three years ago, when the Nuenen City Council approved to the cultural centre, the future running costs would meet the allocated financial resources. However, last year annual running costs proved to be 50,000 DFL over budget. At this moment the overrun even seems to add up to 700,000 DFL. [Eindhovens Dagblad, 1998]

For the Luxor Theatre, a proper focus on future utilization costs during the design could prevent the above illustrated problems. Control of utilization costs offers more certainty over the overall feasibility of the new Luxor Theatre.
However, achieving a target for utilization costs was not seen as priority. Clearly politicians, Luxor Theatre organization, OBR, project management, all other decision makers and designers aimed to design a usable building. But decision making was primarily influenced by considerations of prestige, architectonic expression and grandeur.

7.2 Utilization costs

The financial burden of running the Luxor Theatre, consists of costs that are and are not caused or influenced by the building. Costs not caused or influenced by the building include performances, personnel wages and advertising. Costs caused or influenced by the building include energy consumption, maintenance and alterations.

This chapter discusses the latter category of utilization costs. These utilization costs are largely determined during the design process of the building. Central issue is how to control the utilization costs during the development of the design?

7.2.1 Outline of utilization costs control

Control of utilization costs should start in the earliest stage possible. Figure 7.1 shows the proposed outline of utilization costs control for the Luxor Theatre project.

![Figure 7.1 Outline of utilization costs control](image)

The utilization costs proposal shown in Figure 7.1, will be elaborated in the next sections. First in Subsection 7.2.2, a theoretical decision making model will be given as a tool to decide on utilization costs and utilization costs control. In Subsection 7.2.3 the difference between expenses and cost is described.
7.2.2 Division of annual resources

Figure 7.2 is a theoretical model to decide on the division of the annual resources over building related costs and other costs. The model is an interpretation of a model by Ruokolainen [Tempelmans Plat & Ruokolainen, 1997] used as a 'budgetgame' for future home-owners.

![Decision making model diagram]

**Figure 7.2 Decision making model**

Essence of the model is that the annual resources are limited and have to be sufficient to cover housing costs and other costs. In the model, decision making over the division of the annual resources takes place in decision box 1. In decision box 2 the building related costs are linked to different building qualities, the attributes. Attributes are materials, need for maintenance, energy consumption and area for own use or lettable area. Attributes also can be more abstract things like flexibility and architectonic expression and prestige.

The combination of attributes results in the annual utilization costs. When the calculated total shows that the annual resources are overrun, a new decision round (decision box 2) has to result in less expensive attributes. Also can be looked for extra housing budget in decision box 1.

7.2.3 Expenses and costs

Tempelmans Plat [1997] states that for decision making it is preferred to take into account all expenses over the expected period of use, for as far as they can be foreseen. For this, the first step is to determine a decision making unit of the expenses related to the realisation of the design. Here the decision making unit annual utilization costs is introduced. With this is meant the annual total of the contributions to periodical building related utilization expenses.

The definition of building related utilization expenses is covered in Prins' [1992] definition of expenses: expenses are actual money flows in order to bring about and keep up a desired state of a building, in every phase of design, realisation and, maintenance, accounted to material, labour and aids, according to a scheme of investment expenses, maintenance expenses and adjustment expenses.
The distinction between expenses and costs is that costs are the in actual money measured offered values [Blox et al, 1992]. The following example will make the distinction clear. Suppose a building owner needs to take care of maintenance every ten years. So every ten years he has to pay a certain amount of maintenance expenses. In order to pass on these expenses, the owner charges the user an annual maintenance contribution or maintenance costs.

Note that this distinction is not always made consequently. Even sometimes the two expressions are used as equivalents.

7.3 Steps of utilization costs control

Adequate utilization costs control implies making utilization costs a project priority. In the next subsections the steps are described for utilization costs control in the subsequent phases of the design process.

7.3.1 Initiative phase

The first step in utilization costs control is to gain insight in how the theatre will be financially conducted. Figure 7.3 illustrates the affected area of the decision making model in the initiative phase of the Luxor Theatre project.

![Figure 7.3 Affected area in the initiative phase](image)

**1,500 seats auditorium**

Initial decisions influence the Luxor Theatre annual resources. For example the decision of the 1,500 seats auditorium makes it possible to perform opera and big musicals. These can be new sources of income sources, but include the risk that smaller productions will be less profitable.

In order to control utilization costs it is important to understand the utilization cost consequences resulting from the every decision. In the Luxor Theatre case, fact is that other issues than the feasibility influenced decision making. Political involvement has been large.
Redesign recommendation is to make sure there is an understanding of the utilization cost consequences, risks and opportunities resulting from the decisions that are made or those that are going to be made. Avoid political decision making.

Client and user

In the first chapters of this report, the distinction came forward between the client and the user of the Luxor Theatre - OBR and Luxor Theatre respectively. This might not directly influence the total amount of utilization costs. It influences who pays for which part of the utilization costs. The distinction is made due to Wiegman's desire not to be financially responsible for the project, so not for the investment.

For the issue of utilization costs control it is important the look beyond of the scope of the project. The question should be answered whether this client structure is the desired structure once the building will be in use. Figure 7.3 can help to decide who wants to pay for which part of the utilization costs once the building is completed. The utilization costs Luxor Theatre does not want to be responsible for have to be covered by OBR.

With concern to the above the redesign recommendation is to look beyond the scope of the project and decide which utilization costs the Luxor Theatre wants to be responsible for.

To mention is that, in this case, the Luxor Theatre has to take care of performances, but it also represents a social and cultural value of the City of Rotterdam and its regions. This social and cultural value means that the investment in the new theatre building does not necessarily have to be in accordance of profits like on the commercial market.

Also in case of such specific user wishes like in the Luxor Theatre project, it can be possible to distinct the costs for the building and the costs for the specific theatre use. Cost for the building are construction and services cost. Cost for the theatre use are, amongst others, costs for stage lighting and acoustical measurements. If parties agree, each can pay its own part of the investment.

What is known from De Bruin van Bureau Bouwkunde, is that costs for and profits from the commercialisation of the theatre cafe and shops are for OBR and not for the Luxor Theatre. Also known is that some of the extra budget granted by the City Council to make realisation possible, is to the account of Luxor Theatre's annual municipal contribution. This affects the area lit in Figure 7.3.

7.3.2 Definition phase

In the definition phase, the Brief is made. Figure 7.4 illustrates the affected area in the definition phase.
The Luxor Theatre project

The Luxor Theatre project

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Figure 7.4 Affected area in the definition phase

The Brief is the instrument to lay down the utilization costs. Before this can be done, a user business case has to give insight in the expected annual resources of the Luxor Theatre and how it will be run financially.

User business case

A user business case gives the organization's big targets. Part of the business case is how the organization deals with financial affairs and so how the annual resources are divided (see decision box 1 in Figure 7.4). The Luxor Theatre business case would have concerned a special and unique business. This demands special interest for the user's statement of need. At building level the user has to point out what it aims with the building: the kind of performances, the outline of the operation of the building and the architectonic expression and so on. [Gray et al, 1994] & [Gray, 1998]

Redesign recommendation is to base the Brief on a user business case in which utilization costs are explicitly apportioned.

Making of the Brief

Emphasised is that both OBR and Luxor Theatre are responsible for setting the financial outlines of the project. For the Luxor Theatre this means that it has to indicate its annual budget to cover the annual utilization costs, as described in its user business case. This has to be the starting point for making the Brief. By laying down the utilization costs in the Brief, utilization costs become a key control aspect during the design phase.

With concern to the above redesign recommendation is to lay down the utilization costs in the Brief in order to make them a key control aspect during the design phase.

What to lay down in the Brief?

The building related costs should be allocated to separate items. For the Luxor Theatre project are as such items to mention:

- construction parts and its maintenance;
- general services and its maintenance;
- theatre services and its maintenance;
• adjustment and flexibility.
For the user perspective these items also include costs for energy consumption and cleaning. Besides the separate utilization costs items, the Brief has to lay down how to calculate the annual utilization costs. [Gray et al, 1994]

With the Brief the pattern is set for the subsequent design activities. The affected area in the briefing process is the area lit in Figure 7.5. The attributes are described in quantitative and qualitative terms and cost limits are set.

![Figure 7.5 Affected area in establishing the Brief](image)

At the end Luxor Theatre has to approve of the Brief. This makes it responsible for the content of the Brief and so for their indicated annual utilization costs limits.

Redesign recommendation is to allocate the utilization costs in the Brief to separate items.

Other redesign recommendation is to lay down how the annual utilization costs should be calculated in order to control utilization costs.

### 7.3.3 Utilization costs control during the design phase

The Brief is the main input for the design phase. During the design phase the actual utilization costs are largely going to be determined: the designer makes the functional building layout and materialises its design. The challenge is to achieve the optimum quality within the maximum available budget, but also to control the choices that cause the future utilization costs.

**Who decides on the attributes?**
The designers are the ones that translate the attributes into concrete elements. Figure 7.6 shows the hereby affected area of the decision making model.

The designers are responsible for making the design, so for the initial control of the utilization costs consequences of their choices. Stated is that this only can be done well if utilization costs are one of the terms set in the Brief.
Redesign recommendation at this level, is to make the designers responsible for the initial control at the utilization costs consequences of their design choices.

Who estimates the utilization costs?
Two categories of utilization costs exists; utilization costs that can then be estimated by the designers and utilization costs that can't be estimated by the designers.

The first category concerns the kinds of cost that are inherent to the chosen elements, such as:
- contribution in the total investment;
- need for maintenance;
- energy consumption.

As the designers are competent to estimate the inherent utilization costs of his choices, they should be the ones to do so. Additional effect is that the designers gain insight in the consequences of their choices and if necessary make other choices. The latter is illustrated with the feedback loop in Figure 7.7. Note that in the Luxor Theatre case, the costs that can be calculated by the designer are the costs most of interest for OBR: the investment and the maintenance costs.
Utilization costs that can’t be estimated by the designer are the ones ‘caused’ by the expected functioning of the design. Such costs are costs like logistics costs and costs for marketing the building. These costs can be estimated by the client and/or user. In the Luxor Theatre project, the people of the Luxor Theatre are experienced participants. They can be made responsible for the ‘user’ part of the annual utilization costs estimation. Client and user also can be advised by a property and facility advisor.

First redesign recommendation at this level, is to make the designers responsible for estimating those utilization costs they can estimate competently.

Second redesign recommendation at this level, is to make the user or his delegate responsible for estimating of those utilization costs he can estimate competently.

Who controls the utilization costs?

The feedback loop of Figure 7.7 illustrates the utilization costs control by the designers. In case it appears not to be possible to achieve the utilization costs requirements of the Brief, the designers have to report this to the client and/or user.

The client/user’s task in utilization costs control is illustrated in Figure 7.8 User control of the annual utilization costs.

Figure 7.8 User control of the annual utilization costs

When it becomes clear that user requirements or additional user requirements cause an overrun of the annual utilization costs, action has to be taken. This can be done on different levels. The ‘lowest’ level is the level of decision box 2. The Luxor Theatre could adjust its demands and so decrease the annual utilization costs. This control loop affects the design: for example in the actual project some of the desired quality and prestige had to be given up.

The ‘higher’ level is the level of decision box 1. On a higher level the Luxor Theatre has to look for extra resources to cover the increase in utilization costs. Emphasised is that the feedback loop in the direction of decision box 1 will cause a
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major process disturbance. There has to be looked at new resources or a new division of resources, which at least will take time. Noted here is that this feedback loop will be the result of advancing insight of the user or of a wrong Brief. It is obvious that this has to be avoided as much as possible.

Redesign recommendation is to make responsible for the control of utilization costs the designers at a lower level, the user/client or his delegate those at a higher level.

7.4 Impact on current Luxor Theatre project

Several times, this report has suggested that control of utilization costs is not an explicit priority in the Luxor Theatre project. However, a Luxor Theatre commercialisation plan has been made in the project’s initiative. Amongst others it resulted in a number of lockable foyers, lodges and a VIP-bar. Also are costs of and profits from the commercialisation of the theatre cafe and shops allocated at OBR and not at the Luxor Theatre itself.

To elaborate how utilization costs control can be redesigned for the current Luxor Theatre project, first the possible risks in running the Luxor Theatre will be looked at. The most important risk is that the Luxor Theatre will not generate enough income to - together with the fixed annual municipal contribution - cover its annual expenses. The causes of this risk are diverse, but include:

• a disappointing number of visitors;
• high performance costs;
• higher use of the building than expected;
• the theatre cafe and shops don’t bring in as much revenue as expected
• the theatre building appears to be badly usable;
• the theatre project was based on the wrong decisions.

This redesign will be elaborated according to a classification of non-building related risks and building related risks.

7.4.1 Non-building related risks

Non-building related risks are the risks that can occur however the project resulted in the right, usable new Luxor Theatre building.

The exploitation costs of the Luxor Theatre consist of, as discussed, two categories of costs (see Section 7.2):

• costs not caused by the building: - costs of performances
  - personnel wages
  - advertising/public relations

• costs influenced by the building: - investment costs
  - maintenance costs
  - adjustment costs
  - costs of energy consumption
  - cleaning costs

The enumeration is not finite.
Opposite the costs are the revenues: ticket sales, lettable area and municipal contribution.

When at this point is posed that the design resulted in the right, usable building, a disappointing number of visitors and too high costs of the performances cannot be caused by the building itself. So there would be no impact on the Luxor Theatre building project. If solvable, solutions have to be found by measurements like increasing the price of tickets, increasing municipal contribution or management measurements like increasing effectiveness of the Luxor Theatre's organization, increasing advertising or different programming of performances.

Connected with the number of visitors are the kinds of performance: classical theatre, cabaret, opera, musicals and so on. The different performances attract different audiences. What is more important, they differ in the size of their audience so in their commercial value: large audience results in large revenues from ticket sales. However this does not always agree with the supposed cultural value of the theatre. This might be a good argument to persuade the City Council to increase its annual contribution.

7.4.2 Building related risks

Building related risks originate from the fact that somehow the project did not result in the building the user actually needed. To avoid or at least lower such risks, control should be built in during project process. As described in the previous chapter, this can be done on different moments: during design phase, during definition phase, during initiative phase. Clear is that early control will have the most impact on a project. Here this will be discussed in the context of the Luxor Theatre project.

Design phase

Building related risks mainly are related to the costs caused by the building. Referring to the Subsection 7.3.3, Table 7.1 gives the proposal of the division of tasks to control such risks in the design phase.

Table 7.1 Utilization costs related tasks during design

<table>
<thead>
<tr>
<th>Task</th>
<th>D</th>
<th>U</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making of design proposals</td>
<td>P</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Looking at the utilization costs of the design</td>
<td>P</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Estimating of the utilization costs of the design materialising</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimating of the utilization costs of the design functioning</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Controlling the utilization costs (design level)</td>
<td>P</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Controlling the utilization costs (client/user level)</td>
<td>S</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Advising on the approval of the design and its consequences</td>
<td>M</td>
<td>P</td>
<td>P</td>
</tr>
</tbody>
</table>

D = designers; U = Luxor Theatre (user); PM = OBR's project manager
P = primary task; S = secondary task; M = monitoring task
Control of the functioning of the building and the functioning related costs is covered in the task assignment.

**Definition phase**

Emphasised is that utilization costs are the result of the total of, amongst others:
- investment costs;
- maintenance costs;
- adjustment costs;
- costs of energy consumption;
- cleaning costs.

Utilization costs control so concerns the control of the costs above in time.

It is difficult to control utilization costs during design if utilization costs have not been an issue before the design phase. So is recommended to make utilization costs a control aspect by putting down in the Brief the total of utilization costs and the division over the different items (see Subsection 7.3.2).

Focus on utilization costs control during the establishing of the Brief would have resulted in the task assignment of Table 7.2.

**Table 7.2 Utilization costs related tasks during establishing the Brief**

<table>
<thead>
<tr>
<th>Task</th>
<th>C</th>
<th>U</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making of business case</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Outlining the annual budget to cover the utilization costs</td>
<td>P</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>Laying down in the Brief logistical demands for design</td>
<td>P</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Advising on attributes and items of utilization costs in the Brief</td>
<td>P</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Advising on the approval of the Brief</td>
<td>P</td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

C = briefing advisors; U = Luxor Theatre (user); PM = OBR's project manager
P = primary task; S = secondary task; M = monitoring task

Here it is superfluous to mention that a well-elaborated Brief decreases the risk that the project will result in an unusable, wrong-functioning building. This was discussed in the previous redesign chapter. The business case as basis for the Brief, can give insight in requirements for the functioning of the theatre and the related theatre cafe and shops.

**Initiative phase**

In the definition is described the initial idea that there is a need for a new building, in this case a new theatre building. In the design phase the initial idea is worked out in a design. To describe and design activities can be assigned to individuals as described in the previous subsection. The initiative phase is different. It is the phase where the project originates. In the Luxor Theatre case this was done by a small number of people, who's main objective was to create the basis to make the project possible. Utilization costs control in this early stage could have had an interesting impact on the project.
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Utilization costs control in this phase is the understanding of the utilization costs consequences, risks and opportunities resulting from the decisions that are made or those that are going to be made (see Section 7.3.1). In this perspective the decisions to agree on a new theatre with a 1,500 seats auditorium on the Kop van Zuid will be described.

The decision to agree on a new theatre with a 1,500 seats auditorium on the Kop van Zuid, does not match the initial idea of building a theatre with two auditoriums on the Luxor Theatre's present location. This decision is based on a number of reasons:
- the present Luxor Theatre location was not large enough for the initial programme;
- cultural activity on the Kop van Zuid had to make this area more attractive;
- the new Luxor Theatre location also was not large enough for the initial programme;
- the cultural meaning of an important theatre for the City of Rotterdam;
- opera and musical had to be performed.

To make the latter possible a huge auditorium - a large amount of visitors - is needed. This indicates some attention for the financial feasibility of the new theatre. However, the other reasons do not illustrate a special interest in future exploitation. Furthermore the illustrate large political involvement. Here it would be interesting to analyse what the actual affect is towards the future utilization costs. This paper restricts itself to questioning whether the decision makers have had a detailed understanding of their decision's consequences.

In relation to the situation described here, fact is that a second, medium-sized Luxor Theatre on the present Luxor Theatre location is proposed. This even more questions the first decision. Not very difficult to asses is that one large theatre building would be less expensive to build and to use than two smaller ones are.

In this perspective, when utilization costs controls were priority from first initiative, the Luxor Theatre project would have been an entirely different project. To summarise, at least it would have resulted in:
- a different location;
- a different design;
- a different building;
- a different amount of investment costs;
- a different use of the building.

Besides this the above, will have impact on:
- the decision making;
- the client structure;
- the project structure/organization.

Of course, it is not possible to view a project like the Luxor Theatre on one aspect only. Especially during initiative, political decision making influences the project's
attainability far more than the issue of utilization costs. Also the Luxor Theatre’s cultural value and value for the City of Rotterdam have to be put into perspective.

7.5 Utilization costs control recommendations

Utilization costs control means making utilization costs priority in the project. Put the utilization costs in the perspective of other ambitions, like value for the City of Rotterdam, improvement of the location, cultural value and architectonic expression and grandeur.

Best is to start utilization costs control at the earliest moment possible. Control should be done on the baseline moments:

- at the political approval to the project;
- at the approval of the Brief;
- at the approval of the design contest design;
- at the approval of the preliminary design;
- at the approval of the final design.

Besides control, utilization costs should be a design effort. The Brief lays down the utilization costs and so makes them a key control aspect during the design phase.

Table 7.3 summarises the utilization costs control recommendations of this chapter.

Table 7.3 Summary of utilization costs control recommendations

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Make sure there is an understanding of the utilization costs consequences, risks and opportunities resulting from the decisions that are made or those that are going to be made.</td>
</tr>
<tr>
<td>• Avoid political decision making.</td>
</tr>
<tr>
<td>• Look beyond the scope of the project and decide which utilization costs the user and/or the client want to be responsible for.</td>
</tr>
<tr>
<td>• Base the Brief on a user business case in which utilization costs are explicitly apportioned.</td>
</tr>
<tr>
<td>• Lay down the utilization costs in the Brief in order to make them a key control aspect during the design phase.</td>
</tr>
<tr>
<td>• Allocate the utilization costs in the Brief to separate items.</td>
</tr>
<tr>
<td>• Lay down how the annual utilization costs should be calculated in order to control utilization costs.</td>
</tr>
<tr>
<td>• Make the designers responsible for looking at the utilization costs consequences of their design choices.</td>
</tr>
<tr>
<td>• Make the designers responsible for estimating those utilization costs they can estimate competently.</td>
</tr>
<tr>
<td>• Make the user or his delegate responsible for estimating those utilization costs he can estimate competently.</td>
</tr>
<tr>
<td>• Make responsible for the control of utilization costs the designers at a lower level, the user/client or his delegate those at a higher level.</td>
</tr>
</tbody>
</table>
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8 The client structure reconsidered

ir. Rogier Woudsma

In a building project, the client has to make sure he takes all his responsibilities. Firstly, all the project related decisions have to be made. Secondly, all required information from the client's side should be brought into the project. One of the characteristics of the Luxor Theatre project is the high complexity of its client structure. The client structure is made up of several participants. Together, these participants have to make sure that all the client's responsibilities are taken and are properly divided over the participants.

In this chapter, the organization of the client structure of the Luxor Theatre project is reconsidered. The purpose is to set-up a client structure, in which all client's responsibilities are sufficiently covered, without being unnecessary complex. The client structure is reconsidered from a project manager's viewpoint.

8.1 Reasons to reconsider the client structure

The complexity of the client structure in the Luxor Theatre project is caused by a number of factors. Together, these factors give reason to question this complex client structure, and to reconsider alternative ways of setting up the structure.

Delegated client

To have the Luxor Theatre project properly managed, a project manager has been assigned, who is regarded as the delegated client. The delegated representative of the client can be the focal point for the executive organization of the project. However the project manager, Meijer of Gemeentewerken Rotterdam, is the coordinating part of the client structure. This is something different than representing Ontwikkelingsbedrijf Rotterdam (OBR), which carries the project's financial responsibility. The managing director of Ontwikkelingsbedrijf Rotterdam is directly involved in the project himself by chairing the management team. Also, the main user, the Luxor Theatre, is directly involved in the project, and is represented at all levels of the project organization. Therefore the complexity of the client structure is still present in the project in the form of perhaps too many participants involved at various levels of the organization.

Formal structure

In the Luxor Theatre project, the user input is brought in by means of a complete brief which is drawn up in advance of the design process. This brief is a formal document which is a communication channel between the client and the design team. Theoretically, this brief makes further client involvement during the design
process unnecessary. However, in this project many decisions are made on a more informal basis, partly because of Dumas' intensive involvement in the design team. The informal way of making decision seems to turn out to be successful. Yet this could have turned into an uncontrollable situation in case of conflicts. Falling back on the formal agreements is a way out in these instances. Yet, rectifying conflicts takes time and money, which endangers the project's progress and even may lead to a failed project.

User's involvement at all levels of the project organization

From the project manager's perspective, the user part of the client structure forms an important source of input for the project's design phases. However, this input should be brought into the project in a way that the design team can do its work autonomously, without too much interference from users who stand watching from the side-lines. Yet, Wiegman and Dumas of Luxor are involved in the project at all levels of the organization and thus directly involved in the design process.

Wiegman is represented at all three decision making levels, which enables him to have influence on all kinds of issues. In this way he aims to achieve the building he personally has in mind. At the one hand this high commitment can be seen positively. On the other, there is a danger that the building will mainly serve Wiegman's personal needs, where more general needs may not be addressed.

Dumas is actually a member of the design team. For a user, this is a rather unusual way to be involved in a project. Because he is so intensively involved in the design process, there is a chance that he will influence design decisions, without actually having any formal authority to do so.

8.2 Purpose of a reconsidered client structure

The purpose of this chapter is to set up a reconsidered client structure for the Luxor Theatre project from scratch, based on these reasons described in the previous section. To give the redesign of the client structure direction, a problem statement is formulated:

How to set up the client structure and integrate it into the project organization so as to best meet the client's needs with optimum client involvement in the project?

In the analysis of the case study, a distinction is made between the decision making organization and the executive, operational organization. For this redesign a similar division is chosen. On the one hand, the client structure makes decisions at various levels. On the other, the client structure has to deliver input to the various phases of the project, to make sure the final building will meet the client's needs on all relevant aspects. Based on this division, two questions have to be answered to assess the desired client structure and its involvement in the project.

1. Which decisions does the client have to take?
2. Which participant of the client structure provides which part of the required information for the project?

The reconsidered client structure is described in three sections. In Sections 8.3 and 8.4, the two questions above are answered separately. The outcomes of these two sections are combined in Section 8.5, which describes the client structure in its reconsidered form.

8.3 Client as the decision making body

The decision making organization of a building project is inseparable from the client structure. The client is responsible for making most of the necessary decisions at various levels of the project organization, to make sure the project heads in the right direction. In case of the Luxor Theatre project, there is no single client who is responsible for all decisions. This means that the client has to organize itself in a structure, in which decision disciplines are assigned to the most appropriate participants, and in which decisions are made by these participants at the right moment. This section assesses how the various decision disciplines have to be assigned, in case of a revised client structure of the Luxor Theatre project.

8.3.1 Decision disciplines

The decisions that have to be made by the client can generally be grouped in three disciplines. These disciplines should be properly assigned to the various parts of the client structure. All three decision disciplines are discussed, specifically for the Luxor Theatre project.

Financial decisions

In the current situation of the Luxor Theatre project, the main user, the Luxor Theatre organization, initiated the project. However, the organization apparently was unable to finance the project itself. Therefore a financial sponsor was needed to carry the financial risk, which turned out to be the City Council of Rotterdam. In case of this redesign, alternative ways to finance the project should be considered. The financial sponsor could be a private investor, the public service or a public-private partnership. The Luxor Theatre project is a prestigious project of great importance to the City of Rotterdam. Therefore, it is assumable that the City Council of Rotterdam prefers to finance the project. Yet, if the City Council is not able or willing to carry the full financial risk, a public-private-partnership may be a good alternative. Public-private partnerships are currently favoured by the Dutch national government, as recently emphasised by the Minister of Finance.

The financial sponsor will probably want to have control over the project by taking a position in the decision making organization. However the project manager should limit this influence to a high level of the decision making organization where financial decisions are made. Once these decisions are made, the influence of the financial sponsor will not have added value to the project. Still the sponsor will want to monitor whether the project is progressing within the financial restrictions.
The Luxor Theatre project

Therefore lower decision making levels will have to report to the decision level concerned.

In case the City Council will be the project's financial sponsor, it has to determine and approve the available budget. Therefore the responsible councillor should be represented at the highest decision making level of the project. However, the City Council may decide to shift the financial risk to an autonomous body. This could be an autonomous public service, such as the Ontwikkelingsbedrijf Rotterdam or a private institution. In both cases, a representative of this body has to replace the councillor at the highest decision making level. In whichever way the project is supported financially, the supporting body should be represented at the highest level of the project organization.

**Coordination decisions**

The coordination discipline covers the choice of the project organization and the way the project is coordinated. The most appropriate person to take care of this discipline is an independent project manager. In the current situation of the Luxor Theatre project, the project manager does not have the required independence. In fact, he is the delegated representative of Ontwikkelingsbedrijf Rotterdam. Ontwikkelingsbedrijf Rotterdam takes care of the financial discipline. This means, that no clear distinction can be made between the coordination discipline and the financial discipline.

Compared to other participants, an independent project manager is probably better able to balance the various interests of parties involved. In an independent position, he is not a delegated client, but a recognisable third part of the client structure, which takes care of its own specific discipline. This project manager should be member of the highest decision making level of the project. He has to translate the policy and basic principles, formulated at this level, to a second level. At the second level, the operational activities of the project are coordinated. The project manager should chair this second level.

**User decisions**

The user decision discipline is largely object related, because users are generally interested in the quality of the final building and less concerned with the course and financial aspects of the project. Therefore this decision discipline has to cover all decisions, which determine and influence the object quality of the building seen from the user's perspective.

The project manager has to recognise who are the actual users of the new building, in order to assess a representative picture of the overall user needs. For the Luxor Theatre project, a variety of users can be recognised. To give an indication of this variety the different interests are summarised.

- **Luxor Theatre**
  The Luxor Theatre organization is one of the most important users, because it will run the new theatre. The Luxor Theatre can bring in the project its great knowledge of theatre issues.
The Luxor Theatre project

The client structure reconsidered

- **Theatre artists**
  Besides Dumas' knowledge as stage manager of the Luxor Theatre, the input of artists could be valuable, as they regard the theatre from another user viewpoint. Artists know probably more about the quality of the building, for example: changing room capacity, backstage running lines, ambience and so on.

- **Theatre audience**
  The audience of performances represents another very important user group. This group will judge the theatre largely on issues like ambience, expression and facilities, but also on details, such as legroom in the auditorium and the number of toilets.

- **Catering specialist**
  Catering is a specialised discipline for which a detailed plan has to be developed early in the project. A consultant in catering can make a reliable plan for the required catering facilities (for example type of restaurants, bars, capacity).

- **Commercial specialist**
  In the 'plinth' of the building, a number of shops will be located to give the building a vivid expression during the daytime. For these shops, a detailed plan also has to be developed. A commercial consultant can make a sound business plan in which all important aspects are covered, such as shop size and commercial need for certain kinds of shops.

- **Citizens of Rotterdam**
  Indirectly, the theatre is financed partly by the community of Rotterdam. This community may have certain expectations of the new theatre, for example the kind of performances (opera, drama, classical music) or other facilities offered by the building (for example, conferences).

This overview of user groups is possibly incomplete. However, it indicates that interests of many different user groups have to be integrated in one brief. All these user groups should not be involved in the client structure directly, as this will possibly obstruct the decision making process. Therefore the users have to be represented by an accommodation consultant. This consultant has to have the expertise of translating the requirements of multiple user groups into an unambiguous document. This consultant should be member of the highest level of decision making in the client structure.

The accommodation consultant has to make sure that all user needs are formulated in a brief, regardless what kind of brief is used in the project (for example an incrementally developed brief parallel to the design process or a complete brief in advance of the design process). Once these needs are laid down in the brief, the consultant does not have to be involved in the project organization. Yet, he has to make sure, whether the design does not deviate from the brief. Therefore, regular feedback points has to be included in the project course. At these points, the consultant has to decide whether the design still meets the user needs or that changes are needed. If problems occur in interpreting the brief, the consultant may temporarily involve the user concerned, to clarify the brief.
8.3.2 Dimensioning the decision making organization

The three decision disciplines described in the previous subsection have to be incorporated into a client structure in which all decisions can be made effectively.

The blueprint for a client structure can be characterised on two dimensions. The first dimension is the number of hierarchical decision making levels. This can be seen as the vertical dimension. Logically the vertical dimension should be kept as small as possible. Otherwise decision making tends to take too much time and becomes unnecessary complex. Decisions also can be made more quickly, because not every decision has to be sent up the hierarchical ladder. Therefore each participant should be positioned at the lowest possible level so as to make as many decisions close to the operational process as possible.

The second, horizontal dimension is the number of people involved at each level, which also should be kept to a minimum. This means that each participant should be represented at the level at which he can optimally reflect his interests in the project. Further each participant has to be present at another level to monitor, whether or not his interests are being served.

Based on the outcomes described in Subsection 8.3.1, a first outline for the decision making organization can be made. The three decision disciplines have to be represented in the decision making organization. These disciplines do not have a specific hierarchical relation. Yet, there has to be one discipline, that carries the project's final responsibility. Since the financial discipline depends the most on the well-being of the project, it is appropriate that this discipline's representative chairs the highest decision level. An appropriate name for this level is the management team.

In its leanest form, the management team consists of three persons, one for each decision discipline. For the user discipline, this should be an accommodation consultant, who represents all user groups and brings in all the relevant information and knowledge from these groups. For the coordination discipline, it is appropriate to assign an experienced project manager. The financial discipline should be represented by a decisive person from the financial sponsor, since he or she carries the project's final responsibility.

A second decision making level is required, at which the policy of the management team is translated to actual project objectives, and to make things happen. This second decision level, which can be called the project team, should be chaired by the project manager. He or she is member of the management team, and therefore ought to be able to set up an appropriate project organization. In this project team, no other participant of the client structure should be involved. The project manager periodically reports to the management team. This feedback gives the other disciplines of the client structure the possibility to monitor, whether the project develops in compliance with the stated budget and the specified user needs.
In its most basic form, the client structure has a vertical dimension of two levels and a horizontal dimension of three participants at the highest level. In Section 8.5, the client structure will be completed, based on this basic client structure and the outcomes of Section 8.4.

8.4 Client as input generator

Besides the responsibility of the client structure to make all necessary decisions throughout the project, it has to deliver the required input to the design process at the operational level. This input can roughly be divided into two categories: user needs and financial restrictions.

8.4.1 User needs

As described in Section 8.3, various user aspects have to be incorporated in the Luxor Theatre project, to make sure the future building will meet the needs of a broad user group. This input is mainly needed during the design process. The design process will be severely obstructed by the different users having to deliver input to the design process themselves. Therefore an accommodation consultant should be assigned who analyses and consolidates all the user's needs into one clear brief. The consultant then becomes the focal point for the design team. This focal position prevents the complex user structure from impeding the design process.

The accommodation consultant has to determine which users are to be involved in the formulation of the brief. Therefore he has to assess the importance of each user group's contribution, to obtain a brief that sufficiently addresses the user aspects. In theory, all users, defined in Section 8.3, should be involved in the development of the brief. In case of conflicting user interests, the consultant has to decide, which interest should be preferred for the project's overall benefit.

The project manager has to choose the type of brief and adjust the project coordination to this brief. For the Luxor Theatre project, two alternative types of brief are discussed below.

Complete brief

The design team members would probably like to have a complete picture of the user needs at the beginning of the design process. In this case, the accommodation consultant has to generate a complete brief, before the design process is started. This brief has to contain all detailed user needs, and should enable the design team to design a building without any further involvement of the user groups. The client then only has to judge and decide upon each phase's result.

The variety of user groups of the Luxor Theatre and the complexity of the building make the development of a complete brief in advance of the design process probably an impossible exercise. Therefore, additional user information has to be provided to the design team during the design process. The project manager should define interfaces at specific points in the design process, at which the accommodation
consultant and the project team can interact. In this interaction, the consultant provides new user input to the design process. At the same time, the project team can ask for additional input, in case the design team copes with difficulties.

*Incrementally developed brief*

To take away the necessity of formulating a complete brief at once, the brief can be developed stepwise during the design process. Similar to the design process, the brief should be generated in phases. The design process should not be interrupted, because of lack of information. Therefore, the brief should always be one step ahead of the design process. Each phase, the contents and level of detail of the brief have to be laid down. The project manager and the accommodation consultant have to set up this plan. The design team should advise, which information at each phase of the design process has to be available.

For the Luxor Theatre project, the complete brief seems to be the most appropriate alternative, because of the complexity of the building. At the start of the design process, the architect probably wants to have a rough picture of all the user's needs. To achieve this, no major aspects should be missing in the brief at this stage. During the design stage all aspects are of the brief are filled in more detailed.

**8.4.2 Financial restrictions**

Of course it is important to have a clear picture of all the user's needs for a new building. However, the design team will have to know which solutions will be financially feasible with regard to the client's available budget. Therefore, the design process requires a second input flow, in which the available budget is laid down. If necessary, the budget can be decomposed to parts of the design (for example an allocation of available budget for the building's facades). It is the project manager's responsibility to make sure the design stays within the approved budget.

**8.5 Revised client structure**

In Section 8.3, a client structure is sketched for the Luxor Theatre project. This structure should support the decision making. Also, it has to support the coordination of information flows from the client into the project. These information flows are described in Section 8.4. In this section, the an elementary client structure is set up, based on the sketched structure, and the information flows this structure has to deal with.

**8.5.1 Decision making organization**

Figure 8.1 shows the client structure as the Luxor Theatre project's decision making organization. The vertical dimension and horizontal dimension of this structure are clearly recognisable. Only two levels of decision making are needed. The second level, the project team, already interacts with the executive organization. The three decision disciplines are represented at the highest level, the management team. The management team is chaired by the representative of the financial discipline.
The Luxor Theatre project

The client structure reconsidered

Figure 8.1 Involvement of client decision disciplines in decision making

The two decision making levels are illustrated with the dark horizontal bars. The figure shows, which decision discipline is represented at each level, and which decision discipline representative chairs each decision level.

From the client structure, only the project manager is represented in the project team. He is the linking pin between the decision making organization and the executive organization. This linking pin principle prevents the client structure from interfering in the core process of the project. The design manager of the executive organization, assumable the coordinating architect, is the other member of the project team. The design manager chairs the design team, where decisions are put into practice. By being member of the project team, he understands the background of the decisions made.

8.5.2 Adding information flows to the client structure

As described in Section 8.4, there are two important input flows for the design process, concerning financial information and user needs. For the Luxor Theatre project, it is preferred to make use of a complete brief in advance of the design process, with periodical feedback points. In case of this type of brief, two situations should be distinguished: the situation before the design process is started and the situation during the design process.

In the first situation, before the design process is started, the brief is specified by consolidating all user needs into one document. After the management has decided upon the brief, the design process is started. The project manager has to make sure, that the brief is handed over to the executive organization. Figure 8.2 shows for this situation, where the required information comes from, and how it is provided as input to the design process.
The arrows in Figure 8.2 show where both the financial information and the user information come from. Once discussed and approved in the management team, the information is handed over to the executive organization by the project manager.

In the second situation, when the design process is started, the additional information should be provided to the design process, without constant involvement of the management team. To prevent this involvement, the accommodation consultant should have direct contact with the project team, as an ad hoc team member. By scheduling regular feedback meetings, the project team and the accommodation consultant can discuss the progress. The accommodation consultant can also provide extra input, if this is required. As an ad hoc project team member, the accommodation consultant can advise the project team, but cannot take part in the decision process. When the project team and the consultant cannot solve a problem, it has to be dealt with by the management team.

8.6 Conclusion

The reconsidered client structure from Section 8.5 represents all three client’s decision disciplines on a more or less equal basis. The highest decision making level of the management team, decides over input documents, like the brief. Once these
documents are approved, the management team is only involved if the executive organization and the accommodation consultant cannot solve problems within the financial restrictions or the margins of the brief.

Perhaps the most important advantage of this reconsidered client structure, is the linking pin position of the project manager. The project manager is the client's only focal point towards the executive organization. This keeps the complexity of the multiple client out of the project's executive organization. In this way, the executive organization can do its work, without the involvement of various participants of the client structure. The client structure is only involved at points, where the design team explicitly asks for it. In all other instances, the project manager acts as the delegated representative of the client structure.
Reconsidering the division of management tasks

ir. Emiel Stal

Most of the participants of the Luxor Theatre project regard the project a success, at least so far. This success is partly due to good management. However, during the redesign part of the case study the question is: could it have been done better? The management of the Luxor Theatre's design process was divided between the project manager and the architect. This division of management tasks has not been given many thoughts; the tasks were divided just as usual. Perhaps another division of tasks would have been more appropriate. Therefore, in this chapter the division of tasks between project manager and architect is reconsidered.

9.1 Background

Architekturbüro Bolles + Wilson from Germany designed the new building for the Luxor Theatre in Rotterdam. On the project, it cooperated with a Dutch firm, Bureau Bouwkunde. The latter had to support the first in a number of ways, such as by making drawings, coordinating the design process and supervising the construction activities. In fact, Bureau Bouwkunde carried out almost all non-design activities.

Although the future user of the building is the Luxor Theatre organization, Ontwikkelingsbedrijf Rotterdam is the project's client. Therefore, Ontwikkelingsbedrijf Rotterdam contracted the designing firms. Apart from the partnership between Bolles + Wilson and Bureau Bouwkunde as the architect, Tebodin was contracted for services engineering and Prinsen en Bus for theatre services engineering. Ingenieursbureau Beton- en Staalbouw joined the project to do the structural engineering, but wasn't tendered, because both Ontwikkelingsbedrijf Rotterdam and Ingenieursbureau Beton- en Staalbouw are part of the City of Rotterdam.

The partnership Bolles + Wilson - Bureau Bouwkunde had to coordinate the activities of the four designing firms. However, the partnership's contract with the client hardly stated what this design coordination, or rather design management, implied. The client also appointed a project manager, from the project management office of the city's department of public works.

The question to be answered in this chapter is whether or not the division of tasks between the project manager and the design manager was optimal, from the project manager's viewpoint.
Besides project and design management, another level of management can be distinguished. At this third level, the managers are referred to as the design leaders.

The three management levels differ in the following way. The project manager manages the design process as a representative of the client: he is "on the client's side". The design manager also manages the design process as a whole, but is on the "designers' side". Finally, the design leader manages the design in just one field; every design field is served by a different firm.

![Diagram of management levels]

**Figure 9.1 Management of the design process**

To find the answer to the question 'What is the optimal division of tasks between the project manager and the design manager?' the following approach was used. Firstly, a list was compiled of the major managerial tasks involved in the design process. Secondly, these tasks were assigned to the management levels. Finally, some conclusions were drawn from the differences between the original and the reconsidered division of tasks.

### 9.2 Management tasks involved in the design process

Demmers et al. [1998] distinguish two general managerial tasks: leading and controlling. In other literature, management also contains planning and organizing, but Demmers et al. consider those as a part of controlling. Furthermore, controlling is usually seen as comprising five aspects: quality, cost, time, organization and information. With this division as a guide, the management tasks of the Luxor Theatre design process were identified. The following table shows them, in no particular order. The next subsection describes how these tasks were assigned to the management levels.
Table 9.1 Management tasks involved in the design process

| Quality control tasks                  | • testing the design against the brief  
|                                       | • compiling the phase documents     
|                                       | • watching over the integrity of the design  
|                                       | • obtaining additional design input from client and user  
|                                       | • testing the design against the building regulations  
|                                       | • assessing the quality of the design output  
| Cost control tasks                    | • adapting the construction budget  
|                                       | • testing the design against the construction budget  
|                                       | • testing the design against the budgeted utilization costs  
|                                       | • controlling the design costs  
| Time control tasks                    | • testing the design against the construction schedule  
|                                       | • scheduling the design activities  
|                                       | • controlling the progress of the design activities  
| Organization control tasks            | • contracting the designing firms  
| Information control tasks             | • chairing and minuting meetings  
|                                       | • providing required information  
|                                       | • scheduling and controlling the exchange of design information  
| Leading tasks                         | • motivating team members  
|                                       | • handling inter-personal conflicts  
|                                       | • tackling design problems  
|                                       | • handling goal conflicts  
| Other tasks                           | • applying for licences  

9.3 Assigning the management tasks

In the previous subsection, the management tasks involved in the design process were presented. This subsection describes three ways in which these tasks can be assigned to the identified management levels: project manager, design manager and design leaders.

Project manager, design manager and design leaders refer to real persons. However, these persons do not necessarily carry out all tasks assigned to them. In particular, project manager Meijer and design manager De Bruin were supported by assistants, who took over some of their tasks. Moreover, some of the design management tasks were partially performed by the project architect Wilson. For the sake of simplicity though, this complication is ignored in this chapter. All tasks are assigned to a single project manager and a single design manager. Furthermore, since the focus is not on the design leaders, their task assignments will not receive much attention.

9.3.1 The actual division of tasks

Table 9.2 presents the project's actual division of tasks. This table discriminates between primary tasks, secondary tasks and monitoring tasks.
The Luxor Theatre project
Reconsidering the division of management tasks

Table 9.2 The actual division of tasks

<table>
<thead>
<tr>
<th>Activity</th>
<th>PM</th>
<th>DM</th>
<th>DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing the design against the brief</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compiling the phase documents</td>
<td></td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Watching over the integrity of the design</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Obtaining additional design input from client and user</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing the design against the building regulations</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Assessing the quality of the design output</td>
<td></td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Adapting the construction budget</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing the design against the construction budget</td>
<td></td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Testing the design against the budgeted utilization costs</td>
<td></td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Controlling the design costs</td>
<td></td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>Testing the design against the construction schedule</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Scheduling the design activities</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Controlling the progress of the design activities</td>
<td>M</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Contracting the designing firms</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chairing and minuting meetings</td>
<td>P</td>
<td>P</td>
<td></td>
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<tr>
<td>Providing required information</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Scheduling and controlling the exchange of design information</td>
<td></td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Motivating team members</td>
<td>S</td>
<td>P</td>
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<tr>
<td>Handling inter-personal conflicts</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Tackling design problems</td>
<td>S</td>
<td>P</td>
<td></td>
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<tr>
<td>Handling goal conflicts</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applying for licences</td>
<td></td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

PM = project manager; DM = design manager; DL = design leader
P = primary task; S = secondary task; M = monitoring task

A few remarks concerning this division of tasks are appropriate. Both checking whether the design complied with the brief and obtaining additional information about the client's and user's requirements, did not receive much of Meijer's attention. These tasks were left to the Luxor Theatre representatives, the project architect and the design manager. Also, Meijer left the testing of the design against the construction budget and schedule largely to the design manager. Finally, the control of the building utilization costs received nobody's full attention.

9.3.2 As many tasks as possible assigned to the project manager

The project manager is primarily responsible for the project, so in the first instance all tasks are his. Therefore, the division of tasks investigated first is that in which as many tasks as possible are assigned to the project manager. This division is shown in Table 9.3. If it is put into practice, a design manager will not be required: all management tasks that go beyond a single design field are carried out by the project manager.
The Luxor Theatre project  Reconsidering the division of management tasks

Table 9.3 As many tasks as possible assigned to the project manager

<table>
<thead>
<tr>
<th>Task</th>
<th>PM</th>
<th>DM</th>
<th>DL</th>
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</thead>
<tbody>
<tr>
<td>Testing the design against the brief</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compiling the phase documents</td>
<td>P</td>
<td></td>
<td></td>
</tr>
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<td>Watching over the integrity of the design</td>
<td>S</td>
<td>P</td>
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<tr>
<td>Obtaining additional design input from client and user</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing the design against the building regulations</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Assessing the quality of the design output</td>
<td>P</td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>Adapting the construction budget</td>
<td>P</td>
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<tr>
<td>Testing the design against the construction budget</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Testing the design against the budgeted utilization costs</td>
<td>P</td>
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</tr>
<tr>
<td>Controlling the design costs</td>
<td>P</td>
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<td>P</td>
</tr>
<tr>
<td>Testing the design against the construction schedule</td>
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<td></td>
</tr>
<tr>
<td>Scheduling the design activities</td>
<td>P</td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>Controlling the progress of the design activities</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contracting the designing firms</td>
<td>P</td>
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<tr>
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<td>P</td>
</tr>
<tr>
<td>Scheduling and controlling the exchange of design information</td>
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<td>Motivating team members</td>
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<td>Handling inter-personal conflicts</td>
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<td>Handling goal conflicts</td>
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<td>Applying for licences</td>
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PM = project manager; DM = design manager; DL = design leader
P = primary task; S = secondary task

One problem with this task division is that a wide range of tasks is assigned to the project manager, from high level managerial tasks to tasks very closely related to the design. This wide range of tasks has to fit the competencies of the project manager. However, the major problem is the mixed role of the project manager, being on the client’s side but also very involved in the design. Therefore, this division of tasks is only suitable when client and designers are from the same organization. Examples are projects executed by Rijkswaterstaat, the Dutch national department of civil works. Assigning almost all management tasks to the project manager is not suitable in multiple-participant projects, such as the Luxor Theatre project.

9.3.3 As many tasks as possible assigned to the design manager

Another possibility is assigning tasks to the design manager as much as possible. Table 9.4 shows this assignment of tasks. In this case there is no need for a project manager. All responsibility for the project is with the design manager and she reports directly to the client. She even has the authority to contract the designing firms.
Table 9.4 As many tasks as possible assigned to the design manager

<table>
<thead>
<tr>
<th>Task</th>
<th>PM</th>
<th>DM</th>
<th>DL</th>
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<tbody>
<tr>
<td>Testing the design against the brief</td>
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<tr>
<td>Compiling the phase documents</td>
<td>P</td>
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</tr>
<tr>
<td>Watching over the integrity of the design</td>
<td>S</td>
<td>P</td>
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</tr>
<tr>
<td>Obtaining additional design input from client and user</td>
<td>P</td>
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<tr>
<td>Testing the design against the building regulations</td>
<td>S</td>
<td>P</td>
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<tr>
<td>Assessing the quality of the design output</td>
<td>P</td>
<td>P</td>
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<tr>
<td>Adapting the construction budget</td>
<td>P</td>
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<tr>
<td>Testing the design against the construction budget</td>
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<tr>
<td>Testing the design against the budgeted utilization costs</td>
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<tr>
<td>Controlling the design costs</td>
<td>P</td>
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<tr>
<td>Testing the design against the construction schedule</td>
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<tr>
<td>Scheduling the design activities</td>
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<tr>
<td>Controlling the progress of the design activities</td>
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<tr>
<td>Contracting the designing firms</td>
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<tr>
<td>Chairing and minuting meetings</td>
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<td>Providing required information</td>
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<td>Scheduling and controlling the exchange of design information</td>
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<tr>
<td>Motivating team members</td>
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<td>Handling inter-personal conflicts</td>
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<td>Tackling design problems</td>
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<td>Handling goal conflicts</td>
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<tr>
<td>Applying for licences</td>
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</table>

PM = project manager; DM = design manager; DL = design leader
P = primary task; S = secondary task

By transferring all tasks to the design manager, the client loses control of the design process. Still he has somehow to make sure he will receive the building he requires, in time and for a price he is willing to pay. One way to make this sure is by writing a 'complete' brief: a brief which exactly tells the designers what building to design, what it should cost and when it should be completed. This brief has to be accompanied by a contract with a fixed price and a penalty in case the building is completed too late. If a client concludes such a contract with the design manager's firm, this firm in fact becomes a so-called 'turn-key organization'. However, the major problem with this way of organizing a project is to include all user's and client's requirements in the brief. In the Luxor Theatre project this would have been impossible, because not all requirements could be stated clearly and unambiguously at the start of the design.

9.3.4 The reconsidered division of tasks

Above, two divisions of tasks were investigated: a division with nearly all tasks assigned to the project manager and one with nearly all tasks assigned to the design manager. These extremes turned out to be unsuitable for the Luxor Theatre project. Therefore, the optimal division of tasks had to be found somewhere in between.
The Luxor Theatre project

Reconsidering the division of management tasks

From the arguments against the previous divisions of tasks, two principles were derived. Firstly, to the project manager those tasks should be assigned through which he can protect the client's and user's interests. Secondly, to the design manager and design leaders the tasks should be assigned for which they are better suited, taking into account their competencies and abilities. These principles were used to find an optimal division of tasks for the Luxor Theatre project, which is presented in Table 9.5.

**Table 9.5 The reconsidered division of tasks**

<table>
<thead>
<tr>
<th>Task</th>
<th>PM</th>
<th>DM</th>
<th>DL</th>
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<tbody>
<tr>
<td>Testing the design against the brief</td>
<td>P</td>
<td>P</td>
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<tr>
<td>Compiling the phase documents</td>
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<tr>
<td>Watching over the integrity of the design</td>
<td>S</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Obtaining additional design input from client and user</td>
<td>M</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Testing the design against the building regulations</td>
<td>S</td>
<td>P</td>
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<tr>
<td>Assessing the quality of the design output</td>
<td>P</td>
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<tr>
<td>Adapting the construction budget</td>
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<tr>
<td>Testing the design against the construction budget</td>
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<td>P</td>
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<tr>
<td>Testing the design against the budgeted utilization costs</td>
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<tr>
<td>Controlling the design costs</td>
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<tr>
<td>Testing the design against the construction schedule</td>
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</tr>
<tr>
<td>Scheduling the design activities</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Controlling the progress of the design activities</td>
<td>M</td>
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<td>P</td>
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<tr>
<td>Contracting the designing firms</td>
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<tr>
<td>Chairing and minuting meetings</td>
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<td>Providing required information</td>
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<td>Scheduling and controlling the exchange of design information</td>
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<td>Motivating team members</td>
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<td>Handling inter-personal conflicts</td>
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<td>Tackling design problems</td>
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<td>Handling goal conflicts</td>
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<td>Applying for licences</td>
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</tbody>
</table>

PM = project manager; DM = design manager; DL = design leader
P = primary task; S = secondary task; M = monitoring task

Why a task was assigned to a particular manager, is discussed below.

*Testing the design against the brief*

It is important that Meijer checks whether the design complies with the brief. In general it is the project manager's primary responsibility to make sure the client receives the building he requires. Therefore, he has to test the design against the brief himself. In the Luxor Theatre project this is even more important, because Meijer is the only one who should make trade-offs between the client's interests and the user's interests. He can ask for advice from the client and the user, but the final responsibility stays with him.
Compiling the phase documents and watching over the integrity of the design

To be able to assess whether the design complies with the brief, Meijer has to evaluate the design output. This design output is presented to him at the end of every phase (preliminary design, final design and preparation) in a 'so-called' phase document. Compiling this document is a task for the design manager, De Bruin, because she represents the designers and is responsible for the design being integrated. Making the individual designs fit each other, is a task for the design leaders.

Obtaining additional design input from client and user

Not all requirements of client and user are stated in the brief; still it is very important they receive the building they require. Therefore, the design process has to allow for additional input, in particular from the user. Since this input is difficult to transfer in written form, there has to be direct contact between the Luxor Theatre representatives and the design manager. Nevertheless, Meijer has to monitor what has been discussed, for it may have repercussions on the project.

Testing the design against the building regulations

The building regulations apply for both the individual designs and the integrated design. Therefore, both the design leaders and the design manager have to check whether the design is in accordance with these regulations. It is primarily the design leaders’ task, because they are actually involved in the designing. Yet the design manager also has to make sure the design complies with the building regulations, the individual designs as well as the integrated design.

Assessing the quality of the design output

Design quality is what all managerial levels have to monitor, but with different frequency and different definitions of quality.

Project manager Meijer can limit himself to assessing the quality of the design output at the end of every design phase. Apart from checking the compliance with the brief, assessing design quality for him implies checking whether the designing firms have produced the deliverables they should.

For design manager, De Bruin, a relatively high frequency is required. To make that possible the flow of drawings must pass her office a few times per phase. She will then be able to both assess the quality of the design output and act upon shortcomings. Quality for her means technical quality and suitable to be used as design input by other designers.

Design leaders, finally, should monitor every piece of design output of their designers, for example by examining a draft version and a definitive version.

Adapting the construction budget

While the design is in progress, it may be necessary to adapt the construction budget. This is clearly a client's task, so it should be situated at the project
management level. Meijer cannot raise the budget himself, but he is the one who should ask the City Council to increase it.

Testing the design against the construction budget and schedule
A designed building should be able to be constructed for the stated budget and within the scheduled period. Whether this is possible, depends on the design. Therefore, De Bruin should make sure the design fits budget and schedule.

Still the risks for Ontwikkelingsbedrijf Rotterdam and the Luxor Theatre organization are high. What will happen when no contractor can be found to build the building for a price somewhere near the estimation? Then it is too late to change the design without large extra costs. Therefore, Meijer must either carefully examine the cost estimation or estimate the construction costs himself but in less detail.

Testing the design against the budgeted utilization costs
Apart from the construction costs, also the building-related utilization costs are important to the Luxor Theatre organization, perhaps even more. How to get a design that corresponds with the budgeted utilization costs, is discussed in another chapter. In this chapter it is enough to state that testing the design against this budget should be divided between project and design manager like the previous task.

Controlling the design costs
Carrying out design activities results in costs for the designing firms. The design leaders will have to control these costs themselves.

Scheduling and controlling the design activities and the exchange of information
At all levels the design activities have to be scheduled. For Meijer it is enough to schedule the design phases and monitor the progress from a distance. De Bruin has to schedule activities within a phase, to enable timely exchange of design information. If she lets the results of all activities pass her desk, she can control design quality and progress in the meantime. Finally, the design leaders have to schedule their activities within the limits set by the design manager.

Contracting the designing firms
Ontwikkelingsbedrijf Rotterdam contracts the designing firms. Meijer though, should be able to influence the contents of the contracts, because these contents affect the way the project can be managed.

Chairing and minuting meetings
Who should chair and minute the different meetings, depends on the type of meeting. From the division of tasks can be derived which meetings should take place, who should attend them and who should chair them. This will be discussed in this next subsection.
The Luxor Theatre project  Reconsidering the division of management tasks

Providing required information
Providing information is everyone's task. Downwards the required information is mainly about the decisions made. Upwards the required information is about the design and its progress.

Leading a team
As shown by Figure 9.1, Meijer does not lead a team. Therefore, leading tasks such as motivating team members, handling inter-personal conflicts and tackling design problems are not his. Those are tasks for the design manager and design leaders. Nevertheless, Meijer has to be aware of what is going on at the levels beneath him and interfere when the design process becomes disrupted.

Handling goal conflicts
Sometimes during the design process problems appear which involve different control aspects. Then a decision has to be made which aspect is the most important in that particular case, for example whether less quality should be accepted to meet the budget or the budget should be increased to obtain the quality requested. Meijer has to make these decisions, because they affect the client's and user's objectives regarding the new building.

Applying for licences
One could argue that applying for building and environmental licences is a client's task. However, it is very closely related to the design of the building. For that reason it is more appropriate to let De Bruin perform this task.

9.4 Recommendations to the project manager
From the reconsidered division of tasks a few conclusions were drawn, which are presented in this subsection. These conclusions are formulated as recommendations to the project manager. For the Luxor Theatre project these recommendations come too late and even if they would have been given in time, Meijer probably would not have been able to act upon them. These types of decisions could have been beyond his authority. They also could have been already made when he entered the project. Still the recommendations are useful, for future projects.

9.4.1 Differences between actual and reconsidered division of tasks
Comparing the reconsidered division of tasks with the actual division of tasks revealed some differences. These differences are discussed below.

Testing the design against the brief
Meijer had to verify whether the design complied with the brief, but he relied for this largely on Dumas of the Luxor Theatre organization. Meijer already had worked together with Dumas on a similar project and because of this former experience he had the idea he could trust Dumas. Nevertheless, he should have had absolute certainty about the design complying with the brief, because he also had to protect
The Luxor Theatre project                                                                 Reconsidering the division of management tasks

the interests of Ontwikkelingsbedrijf Rotterdam. Although it seems to have worked out well, Meijer is advised in a future situation to rely less on good faith.

 Obtaining additional design input from client and user
 In the previous chapter has been discussed in what way the additional requirements of client and user should be brought into the design process. Whatever way used for this input though, Meijer should have monitored it more closely than he did. There are two reasons for this. Firstly, he had to protect the interests of Ontwikkelingsbedrijf Rotterdam too. Secondly, some input might have had negative consequences on the design process. There is an easy way in which Meijer can monitor the additional design input. This way is to (strictly) use the project team meetings for the exchange of this kind of information.

 Testing the design against the construction budget and schedule
 The designers had to make a design that fitted construction budget and schedule. For this, De Bruin had to estimate construction costs and time. Nevertheless, Meijer had to be absolutely sure De Bruin's estimates were right. As far as the budget is concerned, Meijer only questioned the correctness of the estimate when it exceeded the budget largely. Therefore, regarding this task, again a more hands-on project management is recommended.

 Another related issue is worth discussing. Meijer considered controlling the construction budget a task for De Bruin. He also asked the design leaders to commit themselves to the budget for their part of the construction costs. By asking this, he passed De Bruin. He should have left it up to her, how she wanted to control the construction budget. He could have done this by granting her the authority to ask budget commitment from the design leaders. He should even have considered involving her in contracting the other designing firms.

 Testing the design against the budgeted utilization costs
 This task has not been carried by neither the project manager nor the design manager. However, it is a task for both.

 Leading the team
 Regarding the team leading tasks there was no real difference between the original and the reconsidered division of tasks. Nevertheless, a remark has to be made. It is unusual to assign tasks such as motivating, conflict handling and problem tackling formally. To illustrate this, the architects' standard regulations SR '88 only mention 'promoting good progress'. Still it is an important part of team management and for this reason it is advised too be more explicit about these tasks.

 9.4.2 The composition of project team and design team meetings
 Once the tasks are assigned, the composition of the project and design team meetings logically follow.
The Luxor Theatre project
Reconsidering the division of management tasks

The project team
The project team is primarily a meeting of project manager Meijer and design manager De Bruin. These are the only two that have to attend every project team meeting, which is chaired and minuted by the project manager. When they are required to give or receive extra information, other members should be called in. These additional members can be the design leaders and Wiegman and Dumas of the Luxor Theatre organization.

The design team
One level beneath the project team, the design manager and the design leaders meet, in the design team. The design manager chairs and minutes this meetings.

The only difference with the actual project and design team meetings, is the less important role of Wiegman and Dumas.

9.4.3 Final remark
As remarked in the introduction of this chapter, the Luxor Theatre project has been managed well so far. Nevertheless, it could have been managed even better. Meijer managed too much ‘hands-off’ to be absolutely sure the project course would stay on the right track. Therefore, in the reconsidered division of tasks, a few tasks more are assigned to him. The risks of the project not resulting in the theatre the client and user required, within budget and schedule, would have been smaller if the reconsidered division of tasks had been used.

9.5 References
10 Design management and the project organization

ir. Bas van Stratum

Management of a building process can mean design management as much as project management. The difference between those is difficult to define. In this chapter, the design of the Luxor Theatre project's process is examined. A critical view results in alternatives for the current organisation design, design management will be view. Influence of the project organization on the design management is emphasized. Basic principle of the approach is the architect's task. The way this task relates to the higher sections in the project organisation. Important in this relation is the way and the strength of influence on the task. A revision leads to alternative designs of the process. The revision is restricted to the task within the design phase. Finally, the revision leads to a shift of responsibilities from project manager to the design management, the architect.

10.1 Background information

Within the Luxor Theatre project, Bureau Bouwkunde and Architektur Büro Bolles + Wilson fulfil jointly the role of architect. In this partnership Bolles + Wilson is registered as architect. Bureau Bouwkunde is the supporting company whose purpose is to give organisational, technical, calculating and business support to architects. In this report, 'the architect' means the partnership. Chapter 3, "Project organization", shows the architect's position in the project organization.

figure 10.1 shows the architect's task on management: design management. Design management and project management can be identified. These two cause a double role in management. The design management focuses on the object, the building, and the project management focuses on the process. In this report, the following definitions will be used [Gray 1994]:

- Project Manager: a manager within any organisation who has total responsibility for delivering the project, within time, cost and quality parameters of the project.
- Design Manager: the manager responsible for coordinating the design task to ensure that information of the appropriate quality is delivered within the project time-scale to meet the needs of the design, manufacturing and construction.
The Luxor Theatre Design management and the project organization

Figure 10.1 Project and design management

The project manager designs the Luxor Theatre's process. The way the process progressed was not always according to this design. To get the process course more specific on the task of the architect, the following approach is applied. Firstly, contracts and information existing in the organisation are stated clear. Secondly, a survey of the architect's activities and an overview of the decision making structure is made. Afterwards, answers of the following questions can be found. What is the best way to handle the project organisation? How is the dual role of management working out? What is the added value of Bureau Bouwkunde's core competencies? Who is in control of which aspects?

10.2 Risks within process course

During the design process different risks with the activities occur. The main risks within the working area of the architect are the risk of unclear information and communication, and the risk of design failures. These risks can result in an undesirable outcome of the process. The most important aspects in these risks are contracts, information and decision-making.

10.2.1 Contracts

Risk for the one participant does not necessarily infer a risk for another participant. Gray [1998] defines internal and external risks: internal risks you can insure against, pass, accept or manage yourself; external risks are laid down in contracts. In the Luxor Theatre project, Ontwikkelingsbureau Rotterdam contracts all participants. It is responsible for the financial aspects and carries all financial risk, which is not protected in the contracts with the participants.
10.2.2 Information

Information is held in a formal and an informal information system. The project manager sets up the formal system of information. This system is composed of meetings, documents and letters. Procedures control the risk of unclear information in the Luxor Theatre project. The Project manager wrote down these procedures in the Quality Handbook and the Project Plan. Besides this formal system there is an informal system comprised of things as telephone calls and E-mails. This informal information is related to the design and for that the responsibility of the architect. Figure 10.2 shows the informal decision information passing by the project manager. To avoid losing information, there has to be a system-type to bring the informal information into the formal system.

Communication

Communication is part of the information system. Unclear information is caused by communication problems. These potential communication problems are shown in the scheme “Levels of Work” [Gray 1994]. The decision making structure is drawn up with the help of this scheme.

The communication is an essential aspect in the transfer of information and in the decision making process. Within the decision making process, essential is that information going from one section to a higher section in the decision making structure is strained in the right way. This means adjusting the information to the approached person or section.

The Design Manager, Project Manager and the different organizations control planning and organisation of coordination. However, they must ensure that communication occurs across levels horizontally and not between levels, to avoid confusion and frustration [Gray 1994]. The same applies for the decision making.
The decision making structure in the Luxor Theatre project needs to be tuned to the information streams and communication lines.

10.3 Impact on architect's activities

The project organization of the Luxor Theatre is an extensive one. The strong involvement of Local Authorities and the complexity of the building itself cause this. Participants in higher organization-sections than the architect influence its activities. Controlling an organization and a decision making structure like the Luxor's is difficult. How is it possible to get more insight and control over this? Two steps have to bring clarity: firstly, detailed insight in the activities of the architect is necessary; secondly, insight in the decision making structure is required. With these insights, visualisation of the impact of the project organization on the architect's activities is possible.

10.3.1 Architect's activities

The standard regulations SR 1988 give detailed insight in the activities of the architect. However there are more recent standard regulations, as the SR 1997, the SR 1988 is applied because the assignment between client and architect is based on this one. The activities of the architect are based on a 100 per cent completion of the SR 1988. The architect's fee is based on a building, classified in building class five -- building projects, which require more than the average quantity of the architect's activities caused by a large extent of complexity. On top of this, a few extra tasks are included into the assignment:

- Analysis, coordination and recommendations about the construction process order; and drawing up of Safety & Health document (V&G plan);
- making revision drawings;
- extra coordination activities.

The SR 1988 provides in a detailed list of the architect's activities. Table 10.1 shows a survey of the architect's activities within the Luxor Theatre project. The architect's work is broken down into activities; the break down structure is based on the phases within the building process.

10.3.2 Project manager's activities

The architect as design manager and the project manager both operate in management. Stating the project manager's activities next to the architect's activities stresses these two management fields. What is the project manager doing on top of the architect's activities?

The project manager is responsible to realise the project. He provides OBR and the management team with project information, realises the Luxor's initial brief in the wished results, and coordinates and supports the exchange of information. The project manager supports in project control:

- cost control: based on the consultants' and architect's cost prognoses, every two months the cost controller of GWR produces a review of the investment costs;
- time planning: the project management makes the project time plan and project progress reports;
- secretary activities: project management takes care of all secretary activities related to the Luxor Theatre project, except the steering committee activities; also, the project management records the project file.

10.3.3 Impact of decision making structure

The decision making structure is based on the "levels of work". This is composed of working levels that are qualitatively different from one another [Gray 1994].

<table>
<thead>
<tr>
<th>City Council</th>
<th>Steering committee</th>
<th>Management team</th>
<th>Project team</th>
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<td>VI</td>
<td>A</td>
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<tr>
<td>City councillors / Aldermen</td>
<td>Chairman</td>
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<tr>
<td>Dir OBR (Beijer)</td>
<td>Dir Dep A&amp;C</td>
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<td>Dir Luxor (Wiegman)</td>
<td>Dir GWR (De Wij)</td>
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<tr>
<td>Projectman GWR (Meijer)</td>
<td>Projectman GWR (Meijer)</td>
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<tr>
<td>Architect (Wilsoo)</td>
<td>OBR (Zee)</td>
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<tr>
<td>Architect (Wilsoo, De Bruin)</td>
<td>GWR (Bras, Giele, De Leeuw, Meijer)</td>
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<tr>
<td>Project coordinator (De Bruin)</td>
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</table>
10.3.4 Impact on architect’s activities

Importance of the different sections in the decision making structure is considered towards the architect’s activities. Table 10.1 contents the survey in which this relation is shown. This survey is restricted to activities surpassing the section of the design team. Vertical, activities, numbered by their original SR 1988 article number, are restored; horizontal, the different sections in the decision making structure are restored.

Each section, from design team up to City Council, has a certain influence on the different activities. Different tasks in management of project information represent this influence. De Jong [1997] defines various tasks in this management. A strong relation between information and decision making leads to the use of some of these tasks. The following list shows the usable tasks.

- **M** make: contribution operations to activity, including the possible changes;
- **F** accept and authorize;
- **T** test: testing or verifying the result of an activity to earlier decisions;
- **D** distribute;
- **R** responsibility: contributes also in the activity;
- **A** advise: here advise from one level to the level above.

Dividing responsibilities, related to the activities, is according to the definitions of Gray [1994]. In table 10.1 a division of process and object responsibility is shown. This division is consistent with Gray’s definitions. In preliminary design, final design and preparation, the project manager is responsible for the project team meetings. In the tender his responsibilities are restricted to process-orientated activities, for example: making tendering known; inviting candidates to subscribe or submit an offer; and receiving subscriptions for offers.
Table 10.1 Impact on architect’s activities

<table>
<thead>
<tr>
<th>nr. SR</th>
<th>activities</th>
<th>general</th>
<th>preliminary design</th>
<th>final design</th>
<th>building operations</th>
<th>services with respect to the building contract</th>
<th>general supervision during construction</th>
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<tr>
<td>18.1d</td>
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<td>T,A</td>
<td>A</td>
<td>F</td>
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<tr>
<td>20.1d</td>
<td>making specifications, records and drawings available</td>
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<td>R</td>
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<td>20.1f</td>
<td>providing information and/or keeping records and making memoranda or relevant reports</td>
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<td>M,F</td>
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<td>20.1g</td>
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<td>drawing up the tender reports</td>
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<tr>
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<td>T,A</td>
<td>A</td>
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<td>T,A</td>
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<td>22.c</td>
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<td>23</td>
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<td>28.h</td>
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</tbody>
</table>
The Luxor Theatre

Design management and the project organization

25.1 approx. estimates / plan modification  R  F
25.2 modifications to specifications (ordering of deliveries  A  R,A  F
within 2% of contract sum
26.1 supervisory staff  R  T

extra activities

Analysis, coordination and recommendations regarding  R
the construction process order; and drawing up of Safety
& Health document (V&G plan);
28j making revision drawings;  R
28h extra coordination activities.  R  T

A - architect, PM - project management, GMT - management team, ST - steering committee, CC - city
council

A - advise, R - responsibility, M - make, F - accept/authorize, T - test, D - distribute

10.4 Alternatives

The retarding influence of the decision making structure on the architect's activities can be reduced. This can be done in three ways. Three alternatives to improve this negative influence of the decision making structure are possible. Firstly, leaving out the management team to reduce the size and complexity of the organization. Secondly, the architect anticipates on the large decision making structure within the opportunities of activities. Finally, shifting the responsibilities 'downstream'.

10.4.1 Leaving out the management team

The management team does not contribute to the architect's activities. Leaving out the managing team will in contents not influence the process nor the object. Reduced number of sections in the decision making structure will result in a faster process.

The conclusion can be drawn that the members of the steering committee and the management team are almost the same. The represented organizations only differ in the financial director of the city of Rotterdam, who is not represented in the management team. The architect has for a special purpose an informing role in the management team. Leaving the management team away does not influence the represented organizations. Result of leaving out the management team is the more extensive task the steering committee will get. Possibly they will need more often meetings. Table 10.2 shows an example of the mentioned result, table 10.5 in the Appendix shows a survey. The former tasks of the management team are displaced up or down in the decision making structure. Executive tasks can be displaced down in the structure, decision making or testing tasks have to be displaced up.

Table 10.2 Displacement of tasks

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<td>preliminary design</td>
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</table>
Changing of communication is effect of leaving out one section in the decision making structure, according to the "levels of work" (10.2.2). The sections of the decision making structure differ, in the new situation. The levels are less strong possessed. This means the director of Luxor and the Project Manager are responsible for this information transfer from the project team to the steering committee.

10.4.2 Internal opportunities

Besides the organizational approach, an alternative is found in the activities of the architect within the design team. The architect is responsible for these. The added value of Table 10.1 is the clear view of the influence of the decision making on a specific activity of the architect. By knowing these activities, the design team can manage on these activities. Table 10.3 gives an example of an activity which has to be accepted and approved by the management team. Table 10.5 shows an overview of critical activities. Depending on the activity, the frequency of informing higher sections into the decision making structure is restricted to minimum. This frequency will be tuned to the frequency of project team and management team meetings.

The design management can be of added value by managing conscious on these activities. The design manager's task is strong management on information. When is which information going further up to higher sections? Managing on these activities in an effective way speeds up performance of the process.

In the Luxor Theatre project is managed more or less conscious on such activities. For example, the architect added the conductor's room later in the process, without formal consulting of the project manager to prevent delay.

Table 10.3 Internal opportunities

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<td>R,D</td>
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<td>coordination meeting</td>
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<td></td>
<td>consultation, representation and monitoring</td>
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10.4.3 Shifting responsibilities

The project manager of the Luxor Theatre project applies a hands-off policy as a management tool. Still he is strong involved with influence on architect's activities. This involvement should be less. The design management should have more responsibilities in time and cost control, as long as the completion date or investment costs are influenced. Now, the project manager's task is focused on
approving, it should be focused more on testing. This means that as long as the project passes by satisfactory, the project manager does not need to be consulted. The design manager is responsible and can decide. To realise this, responsibility in activities is shifted down from project management to design management. Table 10.4 shows this shift of responsibility for the activities. Mainly, this means more responsibility in changes, influencing cost and time, for design management.

**Table 10.4 Shifting responsibilities**

<table>
<thead>
<tr>
<th>nr. SR</th>
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<th>MT</th>
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<td>M</td>
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<td>F</td>
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<td>T</td>
<td>A</td>
<td>F</td>
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<td>R</td>
<td>F</td>
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<td>23</td>
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<td>25.1</td>
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**10.4.4 Recommendation for the process**

Considering the applicability and the effect of the proposals, internal opportunities should be used in all projects. In the Luxor Theatre project, both the architect and the project manager do this. A preventive way to manage activities with strong influence from the decision making structure is to specific them in advance.

Leaving out the management team should be recommended for different reasons. The alternative is based on a compact organization. To prevent a complex decision making structure keeps the organization flexible. However, a compact organization can cause problems in the communication if the different levels of work (10.2.2) are occupied unsatisfactorily. The organization design needs to be tuned to the situation. In this project the situation is complex. From the architect's viewpoint it is favourable to leave out the management team. Shifting responsibilities between design management and project management is an effective way to define these. Depending on the circumstances the responsibilities can be defined different. In the Luxor Theatre project more responsibilities should be given to the design management.
References


### Appendix

#### Table 10.5 Without management team and internal opportunities

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<tr>
<td></td>
<td><strong>general</strong></td>
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<tr>
<td>16.1</td>
<td>standard operations:</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
</tr>
<tr>
<td></td>
<td>preliminary design</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
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<tr>
<td></td>
<td>final design</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
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<tr>
<td></td>
<td>building operations</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
</tr>
<tr>
<td></td>
<td>services with respect to the building contract</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
</tr>
<tr>
<td></td>
<td>general supervision during construction</td>
<td>R</td>
<td>M</td>
<td>A, M, D</td>
<td>T, F</td>
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<td></td>
<td><strong>preliminary design</strong></td>
<td></td>
<td></td>
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<tr>
<td>17.1a</td>
<td>drawings, global representations of project</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.1b</td>
<td>provisional estimate of building costs</td>
<td>R</td>
<td>A</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>17.1c</td>
<td>Global insight into the structure of investment costs</td>
<td>M</td>
<td>M, A</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td></td>
<td><strong>general</strong> Attending meetings:</td>
<td></td>
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<tr>
<td></td>
<td>project team meeting</td>
<td>M</td>
<td>R, D, A</td>
<td>T</td>
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<td></td>
<td>design team meeting</td>
<td>R, D</td>
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<td>coordination meeting</td>
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<td></td>
<td>consultation and monitoring</td>
<td>R</td>
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<td></td>
<td><strong>final design</strong></td>
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<tr>
<td>18.1a</td>
<td>drawings 1:100 or 1:200 ground plans, facades, etc.</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.1b</td>
<td>description of construction materials, finishing, colours</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.1c</td>
<td>element estimation cost for constructional work</td>
<td>R</td>
<td>A</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>18.1d</td>
<td>determining area and volume</td>
<td>R</td>
<td></td>
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<tr>
<td></td>
<td><strong>general</strong> Attending meetings:</td>
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<td>project team meeting</td>
<td>M</td>
<td>R, D, A</td>
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<td>design team meeting</td>
<td>R, D</td>
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<td></td>
<td>coordination meeting</td>
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<td></td>
<td>consultation and monitoring</td>
<td>R</td>
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<td></td>
<td><strong>preparation</strong></td>
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<tr>
<td>19.1a</td>
<td>preparation drawings</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.1b</td>
<td>specifications</td>
<td>R</td>
<td>T, A</td>
<td>F</td>
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<td></td>
<td><strong>general</strong> Attending meetings:</td>
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<td></td>
<td>project team meeting</td>
<td>M</td>
<td>R, D, A</td>
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<td></td>
<td>design team meeting</td>
<td>R, D</td>
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<td></td>
<td>coordination meeting</td>
<td>R</td>
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<td></td>
<td>consultation and monitoring</td>
<td>R</td>
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<td></td>
<td><strong>tender</strong></td>
<td></td>
<td></td>
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<tr>
<td>20.1a</td>
<td>making proposal manner of contractants to be invited</td>
<td>R</td>
<td>T, A</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>20.1b</td>
<td>making tendering known</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>20.1c</td>
<td>making motivated proposal</td>
<td>R</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.1d</td>
<td>making specifications, records and drawings available</td>
<td>R</td>
<td></td>
<td></td>
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<tr>
<td>20.1e</td>
<td>inviting candidates to subscribe or submit an offer</td>
<td>A</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.1f</td>
<td>providing information and/or keeping records and making memoranda or relevant reports</td>
<td>R</td>
<td>M, F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.1g</td>
<td>receiving subscriptions or offers</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>drawing up the tender reports</td>
<td>R</td>
<td>M</td>
<td></td>
<td></td>
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<tr>
<td>20.1h</td>
<td>advising client regarding allotment of work</td>
<td>R</td>
<td>T, A</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>20.1i</td>
<td>conducting price negotiations with contractor</td>
<td>R</td>
<td>T, A</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>drawing up draft letter of allotment/acceptance contract</td>
<td>M</td>
<td>R, A</td>
<td>F</td>
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<td></td>
<td><strong>universal articles</strong></td>
<td></td>
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<tr>
<td>22.a</td>
<td>permits</td>
<td>R</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.b</td>
<td>providing client with technical information</td>
<td>R</td>
<td></td>
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</tbody>
</table>

100
The Luxor Theatre project

<table>
<thead>
<tr>
<th>Task</th>
<th>R</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.2 providing client with financial information</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23 design coordination</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>24.1 project coordination</td>
<td>R</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>24.2 more than normal coordination activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.1 approx. estimates / plan modification</td>
<td>R</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>25.2 modifications to specifications / ordering of deliveries</td>
<td>A</td>
<td>R</td>
<td>F</td>
</tr>
<tr>
<td>within 2% of contract sum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.1 supervisory staff</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
</tbody>
</table>

**extra activities**

<table>
<thead>
<tr>
<th>Task</th>
<th>R</th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis, coordination and recommendations regarding the construction process order; and drawing up of Safety &amp; Health document (V&amp;G plan);</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28j making revision drawings</td>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28h extra coordination activities.</td>
<td>R</td>
<td>T</td>
<td></td>
</tr>
</tbody>
</table>

A - architect, PM - project management, MT - management team, ST - steering committee, CC - city council

A - advise, R - responsibility, M - make, F - accept/authorize, T - test, D - distribute

**Explanation**

In table 10.5 the management team is left out -- indicated with a grey bar. The task's of the former management team are shifted down to the project team or up to the steering committee. This is indicated by a strikethrough; the task is already added to the higher or lower section. Internal opportunities, as described in section 10.4.2 are indicated with a horizontal grey bar.
The coordination of the design process

ir. Erwin Horstink

All participants involved in the design process should deliver the demanded services. These services, which will be termed output, should be delivered in time, complete, correct and compatible. Within this project it's the architect's task to coordinate the exchange of design output between the participants involved in the design process.

The Luxor project is an complex project. Like in all other complex projects, the desired design output sometimes wasn't delivered. In other words: sometimes an participant didn't deliver the design output the other participant(s) thought he should deliver. To investigate the options to improve the participants' output, I will first analyse why the involved participants didn't deliver the desired output. To do so, the architect's position within the design organisation, and the input and output of the design process will be analysed.

Secondly, two alternative organisational structures and one alternative coordination of the design process will be compared with the current organisational structure and coordination form. Comparing these alternatives, I will investigate how within this project, in the design process, the coordination of exchange of information between the architect and the engineers can be improved.

11.1 Organisational structure

11.1.1 Description of the organisational structure of the Luxor project

The figure on the next page, Figure 11.1, shows the levels of work within the project.

There are six levels of work:
- level IV, Government
- level V, project director / senior partner;
- level IV, architect / project manager;
- level III, associate / package manager;
- level II, first entry professional;
- level I, technician.

The description of these levels is given in Figure 11.2 [Gray, Hughes, Bennett, 1994].
### Figure 11.1 Working levels and design organisation
In Figure 11.1, only the participants involved in the design process are shown. The involved participants are:
- The City Council of Rotterdam;
- The Steering committee, Management team and Project team;
- The Architect and the engineers.

<table>
<thead>
<tr>
<th>Level</th>
<th>Designer's and managerial work during the design phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Responsible for making available the project’s resources. Representing the community. Political responsibility.</td>
</tr>
<tr>
<td>V</td>
<td>Senior partner (designer’s work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for acquisition, the presentation of the project design and the development of new concepts of buildings.</td>
</tr>
<tr>
<td>V</td>
<td>Project director (managerial work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for the direction and the presentation of the project.</td>
</tr>
<tr>
<td>IV</td>
<td>Architect (designer’s work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for conceptual design (of overall framework) and developing alternative solutions for client problems.</td>
</tr>
<tr>
<td>V</td>
<td>Project manager (managerial work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for profitability of project.</td>
</tr>
<tr>
<td></td>
<td>Representing the client.</td>
</tr>
<tr>
<td>III</td>
<td>Associate (designer’s work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for designing systems to make the concept work and coordination of component design.</td>
</tr>
<tr>
<td></td>
<td>Package manager (managerial work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for optimising available resources to meet time and cost constraints.</td>
</tr>
<tr>
<td>II</td>
<td>First entry professional (designer’s work)</td>
</tr>
<tr>
<td></td>
<td>Responsible for detailed design of component parts (for production work).</td>
</tr>
<tr>
<td>I</td>
<td>Technician (designer’s work)</td>
</tr>
<tr>
<td></td>
<td>Prescribed output as defined by those at higher levels, eg drafting.</td>
</tr>
</tbody>
</table>

**Figure 11.2 Working levels in architectural practice**

In "Successful management of design", five working levels of managerial and designer’s work are described [Gray, Hughes, Bennett, 1994]. To describe the organisational structure of the Luxor project, a sixth level has been added. Because in projects like Luxor, there is also a participant involved with a political responsibility to the community: the City Council of Rotterdam.
Description of the internal relationships

Most architectural firms don't have an associate (Figure 11.2) at level III. People working at level IV and II have to do level III tasks. This can cause problems, because people often don't have the skills to do this work, or they have to do work at a lower level of complexity in decision making. Another problem that can occur is a more difficult communication between the first entry professional at level II and the architect at level IV. Therefore, all levels of work within an organisation should be occupied by employees with the proper skills to do their job.

Within this project, the architect is represented at four successive levels: level I, II, III and IV. Wilson, the architect, is responsible for the design of the theatre. De Bruin, the project coordinator, is responsible for the coordination of the several system designs, to make the concept work. So in this project the architect's tasks are executed by employees with proper skills at four successive levels.

Figure 11.1 shows us that the boxes at level II and III of the services engineer's organisation are reproduced as grey boxes. This is because, the engineers working at level II (working on the electronic devices, transport devices, sprinkler installation and mechanics), didn't always agree with their project engineer working at level III. It also turned out that the several engineers were not always well informed about each others work and appointments that were made during the design team meeting [Wouters, 1998].

Figure 11.1 also shows us, that level II of the theatre services engineer's organisation is reproduced as a black box. This is because, the design and project leader of IBS, has the internal responsibility for the Luxor project. As design leader, his responsibilities are within the field of the design, as project leader within the field of costs, schedule and quality control. So the project engineer of Prinssen + Bus is responsible for designing the systems (level II) and for making the detailed design of components parts (level III). During the design phase this caused no problems, because of the project engineer's skills and the small and flat organisation of Prinssen + Bus.

The participants' output during the design process can be improved, if all organisations involved watch closely that the persons involved in the project and working at a particular level are capable to handle their level of work.

Relationships between organisations

The exchange of information between firms need to be at the same level, because: at the same level individuals of different organisations approach the problem at the same level of awareness and decision making ability.

The figure shows us that all the connections between the organisations, involved in the design process, are horizontal. But there is one exception: The engineers (of the mechanical & electrical services engineer) working at level II, didn't always agree with their project engineer working at level III. This caused problems in the communication at level III between the engineers and the architect. In this
situation, the exchange of information could be improved by solving the internal problems that occurred within the organisation of the mechanical & electrical services engineer.

The exchange of information between participants at level IV and higher levels, (Figure 11.1; relationship A, B and C) will effect the information input into the design team, but won’t effect the exchange of information at level III and II (Figure 11.1; relationship D and E). In other words: I will only investigate the way information is exchanged between the several organisations. So, given the three engineers of this project, I will investigate alternative organisational structures of co-operation between Bolles + Wilson and Bureau Bouwkunde.

11.1.2 Alternative organisational structures

To investigate which organisation structure is best to improve the design output of the engineers and architect, I will look at the coordinating role of the architect (or Bureau Bouwkunde), the intern and extern exchange of information, and finally the position of the designing architect within the design team.

Organisational structure of the Luxor project

In the current organisational structure, within this project, Bureau Bouwkunde and Bolles + Wilson entered into a co-operation.

Figure 11.3 Co-operation of Bureau Bouwkunde and Bolles + Wilson

The advantage of this organisational structure is that the new contemporary organisation is represented at four successive levels of work. Looking at Figure 11.3 we see what this means: proper conditions for the (internal) exchange of
information within the co-operation of Bureau Bouwkunde and Bolles + Wilson, and proper conditions for the (external) exchange of information between the engineers and the architect.

In this organisational structure the position of the architect within the design team can be described as the so called (classical) master builder. For the architect this can be useful to achieve his goal: 'architecture with a capital A'. On the other hand, the position of the architect will effect the co-operation within the design team. For example, during an interview with an engineer, it has been indicated that the architect's attitude is sometimes too dominant towards the other members in the design team and that several design changes by the architect have led to repetitive work.

**Alternative organisational structure 1**

An alternative organisational structure is that Bureau Bouwkunde will facilitate Bolles + Wilson, but that the two companies won't enter into a co-operation. The division of tasks of this first alternative structure corresponds with the division of tasks of the organisational structure of the Luxor project.

![Organisational Structure Diagram](image)

**Figure 11.4 Bureau Bouwkunde and Bolles + Wilson: two separate organisations**

As shown in Figure 11.4, there will be a gap in the organisation of Bolles + Wilson. This doesn't have to be a problem, because this gap can be filled by people within the architect's organisation, with skills at two successive levels. But, it can be a problem, because when the gap isn't filled with skills of people working at other organisational levels, it will influence the internal communication within the architect's organisation. And this will more than likely influence the output the architect delivers.
In this organisational structure, the architect's position within the design team tends to be less dominant than in the current organisational structure, because the co-operation with Bureau Bouwkunde (facilitating the architect and coordinating the design process) is different. In this situation there are two companies with more different goals. The less dominant position of the architect can be positive for the design process. But this will also depend on the project's objectives.

Alternative organisational structure 2

A second alternative organisational structure can be a partial co-operation of Bureau Bouwkunde with Bolles + Wilson (Figure 11.5). This co-operation will perform the same tasks as the current co-operation. There is one exception: the coordinating task is excluded. For this task, Bureau Bouwkunde is responsible.

The advantage, in comparison with the first alternative, can be a better exchange of information, at level II and I, between the two co-operating companies. But like the first alternative, there's a level missing in the organisation of the architect (co-operation Bureau Bouwkunde and Bolles + Wilson) at level III and also like the first alternative, the architect's position within the design team tends to be less dominant than in the current organisational structure of the Luxor project.

Figure 11.5 Partial co-operation Bureau Bouwkunde and Bolles + Wilson

Best organisational structure

Which structure is best to improve the design output of the engineers and the architect, depends on the project. In the Luxor project an important goal is to create a building with cultural and architectural value: a so called "architecture with a capital A". To achieve this, the architect as 'master builder', as described in the current organisational structure, can be very useful. The current structure is also
preferred, because the co-operation between Bureau Bouwkunde and Bolles + Wilson is a temporary organisation which is represented at four successive levels of work.

11.2 Input and output of the design process

11.2.1 Quality handbook

The participants of the design process are working according to the quality handbook of one of the Civil services of Rotterdam, called "Ontwikkelingsbedrijf Rotterdam" (OBR). This handbook contains a number of procedures to control the way the participants work together, but especially a strict phasing of the process. Every phase has his own project plan. In this plan each participant's deliverables are laying down. At the end of the phase this document can be used to manage on output.

By doing this, the project manager has an important tool to control the project and the design team members know exactly what they have to produce. Although it's not possible to exclude team members' failures, the handbook will be useful to state the failures. Therefore, the quality system will have a positive effect on the project and it will also help Bureau Bouwkunde to coordinate the design process on output.

During the whole design process, there will be an exchange of information and a need to manage this. It's the architect's task to coordinate this exchange. Therefore, every two weeks there is a design team meeting of which the architect is the chairman.

11.2.2 The exchange of information

As indicated before, Bureau Bouwkunde manages the project on output. The several participants know what output they have to produce during the project. But to be able to produce the desired output, the members of the design team should receive the desired input. The output of an activity can be the input of another activity. This is shown in Figure 6.

Figure 6 also shows, that it is possible to identify three kinds of input/output relationships. The three relationships are described below.

- Dependent relationship within a single organisation. For its input activity b depends on the output of activity a, and both activities take place within a single organisation (involved in the design process).
- Dependent relationship within two organisations. For its input activity e depends on the output of activity b, and the activities take place within different organisation (involved in the design process).
- Independent relationship. For its input activity c doesn't depend on the output of another activity.
To produce the desired output, the input should be:
- on time,
- completely,
- correct,
- and compatible.

To ensure a proper exchange of information, Bureau Bouwkunde provided the parties with standard drawing templates, which they could use for their drawings production. To achieve this full integration of all produced drawings, parties had to make drawing agreements but also agreements on hardware and software, exchanging formats and the way of exchanging drawings.

One of the engineers noticed problems in this mutual adjustment of hardware and software, specifically concerning the used design software and the lack of proper e-mail facilities. So possibly, this can be improved in the future.

Subsets of activities
Within the Luxor project there are subsets of activities in which the activities depend on each others output and are divided over several organisations. In Figure 6, an example of a subset is shown within the dashed box. Within the design process this means that the involved organisations have a more urgent need to work together and to coordinate the exchange of information.

11.2.3 Coordinating the formal exchange of information
Within this project, the architect is responsible to coordinate the exchange. So all the formal exchange of information will be coordinated by the architect. But it is also possible, to delegate this coordination task to the organisations involved. This alternative coordination of information during the design process will be discussed and compared with the coordination of information within the Luxor project.

Coordination of information within the Luxor project
Within the Luxor project, all formal exchange of information will be coordinated by the architect. This is shown in Figure 11.7.
The Luxor Theatre project  The coordination of the design process

Alternative coordination of information

An alternative coordination of information can be that there will be a formal exchange of information with and without interference of the architect. This means, most of the time, the formal exchange of information will be coordinated by the architect, but there will also be a formal exchange of information between the engineers involved in the project without interference of the architect.

As indicated before in paragraph 1.2.2, within the Luxor project, there are subsets of activities in which the activities of several organisations (engineers) depend on each other's output. In these cases, there is also a more urgent need to coordinate the exchange of information and the involved organisations need to work together more closely.

In case there are many subsets of work between engineers involved in the project, it is better to decide that there will also be a formal exchange of information between the engineers involved in the project without interference of the architect. Doing this, the formal exchange of information can be accelerated and the architect's work will be reduced.

It's important that the coordinating architect doesn't lose grip on the exchange of information. Therefore it can be useful that, during the design team meetings, the architect will get informed about the exchange of information that has taken place between the involved engineers.
11.3 Conclusion

The organisational structure used in the design phase of this project, is a good one. This structure is better than the alternatives I investigated and shows a good point of departure for the coordination of exchange of information between the organisations involved in the design process and the exchange of information within organisations.

Within the Luxor project, the exchange of information can be improved, if all organisations involved, watch closely that the persons involved in the project and working at a particular level are capable to handle their level of work.

Finally, within the Luxor project, the coordination of exchange of information can be improved by permitting also a formal exchange of information between the engineers involved in the project, without interference of the architect. Doing this, the formal exchange of information can be accelerated and the architect's work will be reduced.
11.4 References
