

Glasspalace "Schunck" Heerlen

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ADMS publicatie 12

**casestudy glasspalace
'schunck' heerlen**

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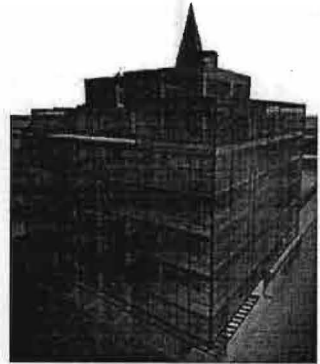
Glasspalace "Schunck" Heerlen Case Study



THE PAST



THE PRESENT



THE FUTURE

ADMS

Glasspalace "Schunck" Heerlen Casestudy

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Architectural Design Management Systems
Stan Ackermans Instituut
Technische Universiteit Eindhoven

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APPENDIX 1: DEFINITION PERFORMANCE REQUIREMENTS

APPENDIX 2: PLANNING CHART RE-DESIGN

Preface

The post-graduate students of Architectural Design Management Systems (ADMS) finish their course with a nine-months design project in a company or institution. Preceding this final stage, the students join a case study in which they design a process for of a complex construction project in practice. The report presented here is about this case study. The main goal of this study is to integrate and apply the describing-, analysing- and designing-skills concerning the building processes obtained during the total course.

For this year's case the Glass-palace "Schunck" in Heerlen has been object of the study. The case is a result of earlier contacts between ADMS and Bureau Bouwkunde in Maastricht. For its co-operation, we are much obliged to Bureau Bouwkunde, especially to Mr. W. Ummels. He has provided us generously with an introduction to the project, a lot of project information and comments on our work. Bureau Bouwkunde also requested other participants of the project to give us the opportunity to interview them on this subject. The interviewed participant in this case is Mr. K. Seijben, chairman of the council committee Heerlen. For advise concerning the participation of a future contractor in the project on behalf of the Technical University Eindhoven Mr. M. Vissers and Mr. G. Maas were also interviewed. Necessary feedback for this case was well given by Mr. C. Gray of the Reading University (U.K.)

We would like to thank all persons for the time they made free for us and the information they provided us with. Finally, we have to thank both Mr. A. den Otter and Mr. R. van Zutphen for the organisation 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 1999,

On behalf of the ADMS3 group 1999-2000
Ir J. Reinarz

Introduction

The Glasspalace is built in 1935 in the centre of Heerlen and is designed as a department store by the architect F.P.J. Peutz. The building was originally surrounded by a facade of huge glass sheets mounted in thin steel profiles explaining its nickname "Glasspalace" and was quite revolutionary for that time. Currently the building occupies a position in the top 1000 list of the worlds most important architectural buildings. However during the transformation of the building into a shopping centre in 1972 most of its unique architectural qualities was lost. Because of poor maintenance in the 80's and 90's the situation got even worse. Nowadays the building is completely desolated and is a meeting point for drug-users.

In 1997 the City of Heerlen decided to acquire the building and restore its original appearance to counteract the imminent deterioration of the city-centre of Heerlen and to house a new set of users. Meanwhile a combination of architects has been commissioned to make a new design for the Glasspalace. However the way the architects demand to work and the obliged regulations of the European Community are stipulating some specific conditions to the project that brings in some complexities in the managerial context. This report will discuss the main bottlenecks of the existing process and will propose a new process design.

The report is split up into two parts: the first part will deal with the existing process design, the second part is about the redesign proposed by the ADMS-group.

In the first part, after a short historical overview is given in chapter 1, the existing design for the building process is discussed in chapter 2. Chapter 3 deals with risks analysis from different viewpoints and will finish with tables in which the risks to the different participants of the project are allocated.

Part two will start with the definition of the problem, the delimiters and a strategy for the redesign in chapter 4. In the next chapter, chapter 5, the making of the redesign will be continued with an overview of different options concerning contractual, tendering, and collaboration form aspects. The chosen organisation will be described in chapter 6. The management of information, budget and time in the redesign will be discussed in the chapters 7, 8 and 9. The report will close with an epilogue in chapter 10.

1 History

1935

The 'Glasspalace' is designed by the architect F. P. J. Peutz as department store 'Schunck'. It is completed in 1935 and for that time was quite revolutionary for the town of Heerlen. Its curtain wall façade surrounding the whole building consisted of huge glass sheets mounted in thin steel profiles which explains the origin of the nickname 'Glasspalace'.

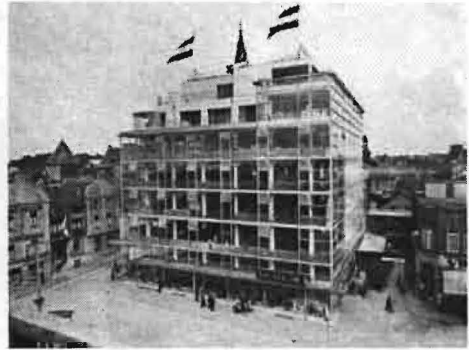


Figure 1.1: The Glasspalace in 1935

1972

The former department store is transformed into an office and shopping centre. The major feature of the building its curtain wall façade suffers most with these alterations. Furthermore it is extended to the south which also has a negative impact on the building's quality.



Figure 1.2: The Glasspalace under construction



Figure 1.3: The Glasspalace, the roof apartment

1995

The Swedish owner of the building gives the architect Jo Coenen the commission to carry out a feasibility study for redevelopment and rehabilitation of the Glasspalace.

At this point the town council of Heerlen is looking for a new location for an art and music centre that should house a set of users. The users are:

- The music school of Heerlen
- The town gallery
- 'Hee-Art' (a centre for applied arts)
- The 'Vitruvianum' (a local architecture museum)
- The 'Filmhuis' (an alternative cinema)
- The 'Grand Café'

Because of the feasibility study the town council of Heerlen gets interested in the idea of using the Glasspalace as location for the new art centre. At the same time another architect Wiel Arets hearing of the possible redevelopment plans of that building simultaneously carries out his own feasibility study, in order to get the job.



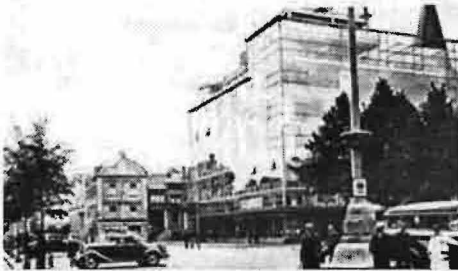
Figure 1.4: The Glasspalace 1935

1996

The town council commissions 'Bouwfonds Vastgoedontwikkeling bv' with the realisation of a feasibility study with the aim to integrate the programme of the art centre into the renovated Glasspalace. The 'Bouwfonds Vastgoedontwikkeling bv' is also responsible for other town planning projects. They subsequently bring in architect Jo Coenen to do the feasibility study.

1997

After a short debate architect Wiel Arets as well is admitted to the team. At the same time also Wil Ummels from Bureau Bouwkunde is invited by Jo Coenen to join. Together they continue to carry out the feasibility-study.



imminent deterioration of the area.

Figure 1.5: View Glasspalace from the market square

Finally the town council decides on the acquisition of the building. The two major reasons for this decision are:

- The town council has committed itself to the execution of an art centre housing the above named users.
- This part of the city needs an impulse to counteract the

The management consultancy Twijnstra en Gudde is commissioned to write a new programme of requirements resulting in a technical programme and a building programme. These two documents and the budget of 32 million guilders are decided on by the town council.

1999

The town council gives the commission to ABBC a co-operation formed by the two architects Jo Coenen and Wiel Arets and the technical service office 'Bureau Bouwkunde Zuid vof'. The budget however is found to be unrealistic and can only be financed if commercial activities can be accommodated as well. Furthermore

there is the possibility for a European subsidy of 4 million guilders if one complies with European regulations.



Figure 1.6: The Glasspalace in 1999

The architects are selected by a public procedure with a pre selection. On the basis of a list containing 25 criteria six architects were chosen to present their ideas. After this presentation the co-operation ABBC (Arets-Bureau Bouwkunde-Coenen) was chosen. Eventually on the 16th of July 1999 ABBC was officially given commission. The final choice for ABBC was maybe not quite surprising since they were already working on the project before official publication. Some non chosen architects claimed that the selection procedure was doubtful and not in accordance with de European regulations. Nevertheless although the 25 selection criteria were very strict, they were not discriminating, and ABBC simply satisfied most to them.

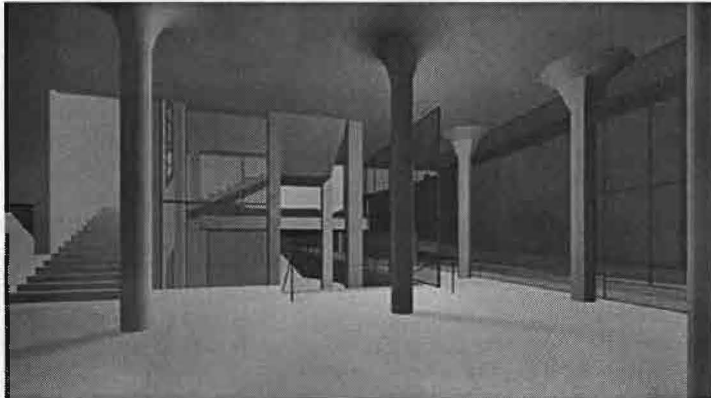


Figure 1.7: Computer animation for re-design

2 Current process design

2.1 Introduction

After the assignment was awarded to the architects, mister Ummels had to design a process in order to deliver the building in November 2001. A couple of aspects of this process design will be discussed in the following paragraphs. The subjects of these paragraphs will be: the time planning, the organisation form and the co-operation in the design team.

2.2 Time planning

The assignment for the design of the Glasspalace was granted on July the 16th. After this date the first version of the time planning was designed by Bureau Bouwkunde (time schedule 01.09.99, Bureau Bouwkunde). The most important restriction was the fact that the construction works had to be awarded before week 52. The subsidy of EFRO, an institution of the European Community, would only be given if the tendering was completed before the end of 1999. It was not acceptable for the city council to miss this large subsidy, despite the fact that mister Ummels warned that it's a large risk to tender that early. There is no time needed for a city council decision, because the steering committee is allowed to grant the project if the project will be within the budget of 14,5 million Euro.



Figure 2.1: Glasspalace 1935

Because of the Dutch construction holiday from week 30 to 32, the design process could not start earlier than week 33. So there were 19 weeks available to design the building and contract the builder. The tendering procedure must follow European procedures, which will take 17 weeks in the chosen form. It is possible to shorten this period, but other conditions apply in that case. The important point of time in this tendering procedure is the week in which the tender documents have to be

sent to the builder. In this case this must happen in week 43, if the allocation to the lowest tender has to take place in week 51.

The time available for the design of the Glasspalace is due to these restrictions exactly 10 weeks. According to mister Ummels this is much to short to make a complete design with specifications. It is even difficult to have a preliminary design ready at that time, but to have something to tender on, it is decided to tender on a preliminary design, possibly with some additional documents. Because of the time necessary for decision making of the city council and for estimating the costs, two weeks are needed after the finishing of the preliminary design. Also two weeks are necessary to do some additional research on the current situation and the brief. So six weeks are left to come to a preliminary design (see also the planning in appendix 2). Mister Ummels wants the final design to be ready before the building assignment is awarded, so seven weeks are left for this part of the design. The short time for preliminary and final design makes more time (22 weeks) available for the construction preparation phase, in which phase it must be possible to make design changes. This becomes necessary because of the very short periods of the first design phases.

The advantage for ABBC is the feasibility study they made in March 1997. Because of this study, carried out under different assumptions, they have much knowledge of the building and it's surroundings. Therefore the time needed tot come to a preliminary design is less than normal.

2.3 Organisation form

The organisation of the project consists of several layers (fig. 2.2). The highest organ is the mayor and the city Councillors (B&W). This organ is not concerned with the contents of the project, but makes the important decisions about the go/no go points and the budgets.

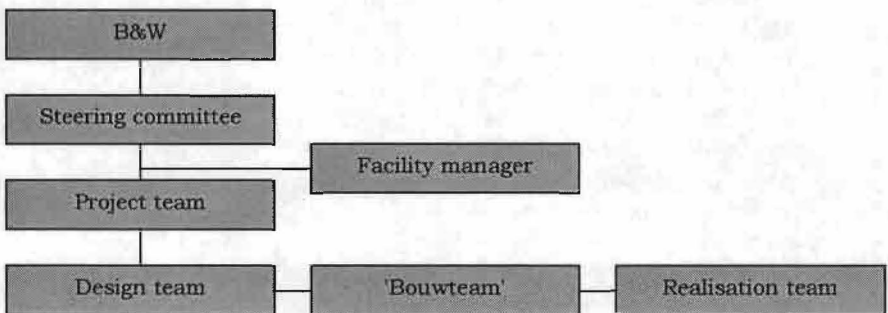


Fig. 2.2: organisation form at the Glasspalace project

2.4 Steering committee

The Glasspalace renovation is a project of the City of Heerlen. Therefore, it has a broad political context. Directly under B&W is the steering committee which represents the City and determines the main objectives regarding time, costs and quality. The committee also approves the different phase documents.

This team consists of the alderman for culture (Seijben), which is the chairman, the alderman for finance (Zuidgeest), the director finance (Broen), the project leader (Steins), the director welfare (Damen), the head welfare (Vincken) and a public servant of welfare.

2.5 Project Team

Between the Steering committee and the design team is a project team formed to make formal consultation between the project leader (mister Steins) and ABBC possible, without the necessity to consult all the members of either the steering committee or the design team. It is also possible to add other members if necessary. This project team makes smoother communication possible. In the project team project leader L. Steins is appointed to represent the City. He is the chairman of the project team and has also a place in the steering committee and the design team. L. Steins is an intermediary between the project team, the steering committee and the design team.

There is also a temporary facility manager (Dieters) that has no direct competence, but functions between the steering committee and the project team as the chairman of the users.

2.6 Design Team

There is also a design team formed. This team makes the design of the Glasspalace. The team consists of the architect (ABBC), which is the chairman of the team, the project leader (Steins), The installation advisers (Huygen) and the structural engineers (ABT). Huygen and ABT are functioning under ABBC. The other advisers like acoustics and building physics function under Huygen. Design team
For the first two design phases (preliminary and final design) a design team was formed consisting of the project manager (Mr Steins), ABBC (the architects' co-operation), Huygen RI bv (technical engineering) and ABT bv (structural engineering).

2.7 Building Team

After the tendering of the builder a building team is formed (January 1st 2000) which consists of the members of the design team and the builders. After completion of the design a realisation team will be formed to manage the construction phase.

The difference between this building team and the currently used form of a building team in the Netherlands lies in that the building contractor is already commissioned for the works. Normally the contractor acts as an advisor to the

architect with a contract to that end. Most often he gets the building assignment as well due to his input in the project and his knowledge of it. This constellation very often works in the way of pushing up the price but it assures a faster building process as for example the whole tendering process can be skipped. One of the means to regulate the bid of the contractor in the conventional form of a building team is the freedom of choice to contract another one.

In the current situation this won't be possible and cost control but also the designers role and remaining freedom will be issues that must be addressed properly.

2.8 ABBC co-operation

This co-operation was formed because the architect Jo Coenen was looking for a partner that would take care of the technical, organisational, economic and business work of the design process. The second architect Wiel Arets was accepted to the co-operation because of the knowledge he acquired over the Glasspalace as a consequence of a feasibility-study he had carried out as well.

The two architects are internationally renowned for their projects' architecture and it is well known that they put the quality of their design solutions first.

Jo Coenen who was born in Heerlen and studied architecture at the University of Technology in Eindhoven, started with his own office in 1979 which he moved to Maastricht in 1990.

Bureau Bouwkunde in person of W. Ummels is responsible for the smooth co-ordination of the design and tendering activities and also for the budget control. 'Bureau Bouwkunde Zuid vof' is a sister of 'Bureau Bouwkunde bv' in Rotterdam and is established in Maastricht. It is with five employees a fairly small general and technical services company. W. Ummels is trained as an architect and specialised in construction management. Bureau Bouwkunde bv in Rotterdam is committed to realise an 'architecture with a capital letter A' and it may be assumed that its sister in Maastricht aims at the same goals.

Mr Ummels acts in this co-operation as design co-ordinator but as often as not as partner or umpire between the two architects.

The co-operation ABBC is going to be established as a company acting as partnership (v.o.f.). The responsibilities and liabilities have also still to be assigned. However ABBC is contracted as an architect (general conditions of the SR 97 apply) which means that the liability of ABBC is limited.

Every 14 days there will be a design team meeting and every 7 days a ABBC meeting. The architectural design is not divided in parts, in a way that each architect designs a part of the building. The architects make their design proposals in turn. Every time one of the architects has a proposal the other takes it over and makes his proposal based on the proposal of the other. The advisers will work under these architects and have to work out their ideas.

3 Risk analysis

3.1 Viewpoint of the architects

3.1.1 Introduction

In this project the design phases are virtually fitted into a framework of crucial deadlines that are of vital importance to the realisation of the project.

Owing to the official tendering procedures that have to be followed the preliminary design must be completed within six weeks allowing for an additional two weeks for decision making of the city council and cost assessment.

The final design needs to be accomplished before the building assignment is awarded in order to have any effect on it. That leaves seven weeks for the actual design process and another two for decision making of the city council.

The short time for preliminary and final design makes more time (22 weeks) available for the construction preparation phase, in which phase it must be possible to make design changes. This becomes necessary because of the very short periods of the first design phases.

The architects are thus faced with the following unique situation:

- Firstly the tendering process already starts after the preliminary design phase which is rather early and quite unusual.
- Secondly, the time allowed for this design phase (six weeks plus two weeks for decision making) is fairly short as well.
- In the third place the architectural design is done by a co-operation of two famous architects who normally work alone.
- The possibility to work out the final design in the construction preparation phase was granted to the architects. However this will be complicated by the fact that the building contractor will already be chosen and contracted in this phase.
- The budget of 32 million guilders of which a little more than 15 million guilders are building costs, is agreed upon by the town council but the realisation of the



Figure 3.1: Design by Jo Coenen



Figure 3.2: Design by Wiel Arets

project within this budget is found to be fairly unrealistic by the design manager W. Ummels. In a discussion with the ADMS group C. Gray¹ stated that he as well found this sum (15 million guilders) fairly low for a project of that size and complexity.

3.1.2 Objective

According to the feasibility study made in 1997 the Glasspalace is playing a crucial role for the centre of Heerlen. The architects' goal is to restore the building in the spirit of its architect while accommodating quite different functions in it. To make it meet with current building regulations as well as monument regulations the costs for a renovation are hard to estimate.

Another issue can be found in the continuing changes being made by the architects to the distribution of spaces. As this building is intended to become a focal point in the city of Heerlen the architects strive to find the best architectural solution for it. This implies that owing to the short time scheduled for preliminary and final design some changes in the design will still be introduced by the architects in later phases.

3.2 Viewpoint of management

3.2.1 Introduction

Management's knowledge and understanding of risks are the core competencies of process redesign. Through supporting the risk management of the client, the challenge is to deliver business advantage helping the client understand and manage his risks in order to reduce operating cost, increase plant uptime and secure the optimal return on their physical and human assets in a safe and effective manner.



Figure 3.3: managers

3.2.2 Objective

Helping the client to comply with corporate and external legislative requirements and developing an understanding of the client business drivers and value chain is critical in delivering solutions of lasting value. This requires a detailed understanding of the clients' operations, and identifying where we as managers can contribute to building process.

¹ C. Gray from Reading University is co-tutoring the case-study. The discussion took place during a meeting on oktober 18th 1999.

Managers actively support clients decision making-processes by consultancy. This provides key input to the clients` risk management process but takes further steps by suggesting and implementing solutions that provide real and measurable value.

Advising the client (the municipality) about how to collaborate with other participants in the design and building process, depends on the analysed demands of the client and users. The client supported by management consultancy has to look after what can be self-done and what has to be procured. Depending on this knowledge the collaboration form can be established.

Because of the serious future consequences of the decisions made in the first phase, the redesign of the process has to be seen in a long scope over the total design and building process

Table 3.1 : Analysing Risks caused by management advice

Risks	Who		
	P	M	H
By <u>not</u> analysing the ability and the capacity of the client to co-operate fully in the process.			
Increase in unnecessary costs because of not using the full capacity of the client (municipality Heerlen)			H
Losing control on the process			H
Losing opportunity of getting more experience of own personnel			H
Losing time because of transformation of information to another participant	P		
Losing control on budget			H

P= Process, M= Management, H= City council of Heerlen (client)

Table 3.2: Risks by Management consultancy

Risks by not choosing the right Collaboration form	Who		
	P	M	H
Difficulty of communications.	p		
Repeating the same work by another participant	p		
Difficulty with defeat (adjust) participants contributions	p	m	
Interruption of information stream (Design information is not on time)	p		

Table 3.3: Risks by Management consultancy

Risks by not choosing a suitable tendering form (-by fault formulating the advertisement -by fault formulating the selection criteria) - by fault formulating the awarding criteria, Getting the wrong participants.	Who		
	P	M	H
Difficulties with team communication	p	m	h
Possible arbitration lost of time, money,	p	m	h
No good quality result			h
Getting unwanted bidder	p		

Table 3.4: Risks by Management consultancy

Risks by fault determining the contract	Who		
	P	M	H
No clear liabilities by conciliation (arbitration)			h
Losing rights			h
Getting unwanted quality result			h
Losing control and ability to steer the process			h

3.2.3 Risks

The tables on the previous page contain the risks for the management:

- Risks by not analysing the ability and the capacity of the client to co-operate in the process.
- Risks by not choosing the right organising form
- Risks by fault determining the contract
- Risks by not choosing a suitable tendering form
- Risks by fault formulating the selection criteria (advertisement).
- Risks by fault formulating the awarding criteria

3.3 Viewpoint of Heerlen

3.3.1 Introduction

The renovation of the Glasspalace is a project of the City of Heerlen. The city of Heerlen is the actual client and however the City is more often a client of complex projects it can't be seen as a professional client. This is mainly because the people from the City who are involved in the management organisation of the project are politicians with a limited knowledge of construction management.



Figure 3.4: City Hall

In a project such as the Glasspalace where the final commission over the brief and the budget is given by the politic, the City Council, a complex client area can be recognised. In the actual building process there was no clear strategy to identify risks so problems in the future could be avoided. This analysis is made to identify the risks that are necessary to make suggestions for a redesign of this building process. Risks are problems that can occur and which obstruct the objectives of the City in this project.

In this chapter the building process is analysed from the perspective of the City of Heerlen. First is investigated what precisely the objectives of the City are, then the three most important documents for the City to manage this building process are analysed: the brief, the budget, and the contracts with the participating parties. The risks that come out of the analysis are then recorded in a tables at the end of this chapter with solutions to reduce the risks. Together with the risks identified out of the analysis from the other viewpoints it forms the basis for the redesign. The information for the analyse came from interviewing the chairman of culture R. Seijben, the project manager W. Ummels (from ABBC) and collecting data from the public information point of the City of Heerlen.

3.3.2 Objectives

The city centre has a lot of problems such as unoccupied buildings, drugs, deterioration which all leads to an unattractive image of the centre and even of the whole town. In 1995 the city has taken on a commitment for exertion to co-operate in the redevelopment and rehabilitation of the city centre.

The city sees the renovation of this monument as an opportunity to create an ambitious architectural project that gives an impulse for the revival of the city centre. With the alteration in 1972 and the disrepair of the Glasspalace it now looks ripe for demolition. The beauty of the building from the outside is totally gone and much of the citizens of Heerlen would like to see the building demolished. Also not everyone in the City Council was convinced to preserve the Glasspalace because of his special architectural value.

In the past view years however the Glasspalace got international recognition. This creation from Peutz is included in a book in which the thousand most important architectural buildings of the world and from this century are listed. Wiel Arets from ABBC has also a work listed in the 1000 most important buildings namely his Academy of Arts in Maastricht.

With a publicity campaign for the Glasspalace the chairman of culture R. convinced the City Council and citizens that it is a matter of great significance to preserve the Glasspalace. The international recognition was a encouragement for the publicity campaign. It also played some role that two architects with international fame Wiel Arets and Jo Coenen are designing the renovation of the Glasspalace and that they both were born in Heerlen just as Peutz.

With the publicity campaign and after several studies, designs and visits from the Secretary of State and members of the Provincial Executive the City Council was finally convinced and approved on 8 April 1997 with the acquisition of the building. In the near future the Glasspalace will have to be the cultural heart of the city. Therefore it is important that it is a public building which attracts people around the clock. The five cultural users mentioned before for which the City searched new accommodation are attracting people around the day. In that way the five users with also a strong (financial) relation with the City match with the concept of a public building.

3.4 Viewpoint of the contractor

3.4.1 Introduction

In this chapter the viewpoint of the contractor will be discussed. One of the defined problems was that the contractor has to be awarded before the end of the year 1999 on the base of a preliminary design. With regard to the subsidy of 4 million guilders there is little chance that he will be dismissed after the moment he is being contracted.



Figure 3.5: The contractor

Although this seems to create for him a very favourable point of departure, the project also contains a pitfall which should not be overlooked too easy. The problem in this case is that the contractor is supposed to submit a cost estimate with the knowledge that the architects possibly still want to change the design radically after the work is awarded.

If we want to find a contractor who is willing to join this project under the conditions mentioned above it is important to have a clear view of his interests. Therefore paragraph 3.4.2 will deal with his objective. Once the objective is known a list can be made containing possible unwanted events who threaten his objective; the risks (paragraph 3.4.3). Finally a proposal can be made with conditions which make it also for the contractor acceptable to join this project.

3.4.2 Objective

The reason why a contractor decides to join a project is because he expects to gain profit of it, taking into account that the risks of suffering losses are not unacceptable high:

- To objective of the contractor is to make money now and in the future

On the base of the identified work and the potential risks the contractor submits a cost estimate. To make a good estimate of the opportunities and the risks the contractor needs in advance as much information about the project as possible. In the case of the Glasspalace "Schunck" there is only a preliminary design which still could be changed radically after the work is rewarded to the contractor. Moreover the architects in this case are well known for there ever lasting design changes and their low consideration for budget control. In total this makes the estimate of the total costs of the work a very diffuse process. However if the contractor can not get a clear view of what is supposed to happen, then it is even more difficult for him to

get a view of the unwanted things to happen. The latter information is indispensable for a proper risk analysis. In view of these experiences it can be concluded that it is very unlikely that in the case of the Glasspalace "Schunck" a contractor can be found who is willing to make a bid with a fixed price in advance.

If we focus again on the definition of the contractors objective it is logical to assume that the he does not only wants to make money today but also in the future. In other words he does not only wants to make money in this project but also in future projects. From this point of view another secondary objective can be derived:

- The contractor needs a surviving organisation.

This means for the contractor, and fortunately for the client, that besides the fact that he has to do make his work profitable he should also come up with a result enough satisfying for the client to make sure that he keeps up his good reputation needed for finding new clients in the future.

To ensure *profit* the contractor needs:

- Favourable preconditions
- An efficient process

To ensure a *satisfied client* the contractor needs to deliver:

- On time
- Quality

Favourable preconditions

The major actions for creating favourable preconditions are covered by contracting only profitable works and making clear contractual agreements. In the Glasspalace-case a lot of risks are involved since there is still a lot unknown. A tender with a fixed price in advance is as mentioned before out of the question since the risk can almost not be quantified. To make this work favourable the major potential risks should be taken out by reimbursement costs who are difficult to fix in advance. More about this subject will be discussed in the last paragraph of this chapter. The situation could still become very unpleasant for the contractor since time and quality of the construction work are depending in this project strongly on the efforts of the architects and especially with architects like Coenen and Arets. Therefore it is most important to make a contract with clear distinctions between responsibilities for different activities concerning time and quality aspects.

An efficient process

Obviously the extent in which the contractor can make his process efficiently is qualifying the extent of profits. He is fully responsible for the way his own organisation works, but since this concerns a project independent matter and the contractor in the current situation is still unknown this subject will not be discussed further more.

Time

The lack of a total overview of the work hinders the contractor in estimating the time needed to fulfil the work. With regard to this it is possible that he cannot commit himself to a certain time constrain at all. There are two possible scenario's to deal with this problem:

- The contractor promises to deliver the work at the completion date and will be compensated for all extra capacity he mobilised to meet this condition.
- The contractor will not be committed to a completion date, but as an incentive to move on with his work he will share in the total project profits/losses if the work is finished before/after this date.

Crucial in this project could be the control of time if the architects keep on changing the design during the construction process. With architects like Coenen and Arets this is very likely to happen. It should be avoided at all times that delays caused by these actions have an adverse effect on the contractors work (budget, time schedule and quality) and the clients perception of the contractor. Therefore it should be stated in the contract very clearly what the consequences of interference's of the architects during the construction process are going to be. It is advisable to make in advance change procedures containing rules under what conditions architects can put trough design changes and how the contractor is going to be compensated as a result of these actions. Finally the client must be able to verify afterwards simply on the basis of a recorded document what delays are caused and by whom.

Quality

The quality of construction work could be significantly enhanced if during the design process construction methods of the contractor are taken in consideration. The extent in which this occurs is mainly depending on the extent the architect are interested in doing this. The quality for which the contractor is held direct responsible should not suffer under imposed time and budget constrains. Agreements in the contract should guarantee enough room for the contractor the meet the quality standards. It should also be stated how the quality is going to be measured.

Finally: a higher quality standard does not imply automatically higher costs. A flexible, effective, efficient and creative organisation will do most of the work.

Since there is now a clear view about the contractors objectives the next step in this analysis is to identify the possible events which can seriously threaten the desired outcome; the risks.

3.4.3 *Risks*

The contractors mission is to execute the work within the agreed budget, the time schedule, and the quality standard. On the base of these conditions there can be three types of risks identified: the risks concerning overrunning the budget, the risks concerning overrunning the time schedule and the risks concerning not meeting the quality standard.

Overrunning the budget

Specific in the Glasspalace-case a lot of the work can not be defined in detail since a big part of the design is still unknown during the tendering process. With regard to exceeding the approximate cost estimates of the work not defined in detail, it is reasonable to award this risk to the ABEC-combination since they make the final design-decisions and also can influence the costs in this matter. Other risks are mentioned in the tables at the end of this chapter.

Overrunning the time schedule

To avoid the overrunning of the time schedule a lot of precautions can be taken in advance by the contractor, like investigating potential capacity-problems, how to get permits, how to get the materials on the site etc. As was mentioned before the architects should be held fully responsible if design changes result in delay in the time schedule. Assumed is that they probably also want to have the privilege of subscribing building materials which means that they can also be held responsible for the delivery on time (see the risk tables in 3.6). Discussions about money or quality should be avoided as much as possible (effective prevention should be made in the contract) but if they do appear they can cause serious delay. In the case nobody can be held responsible it should be stated in the contract in advance to which commission of arbitration (for fast decision making) the dispute will be submitted.

Not meeting the quality standard

Most important of all is to make sure that there is agreement about how the quality is going to be measured. The way the contractor has organised his people, the organisation of the site and the way information is exchanged is furthermore related strongly to the final reached level of quality.

3.4.4 *Redesign requirements*

Specially in the Glasspalace case and with regard to the objectives mentioned above and the possible risks the contractor is prepared to contract the work under the following main conditions:

- A clear separation of the work clearly defined now (a fixed budget and time schedule including risks for the contractor) and the work defined later after the architects made their design decisions. (for this an approximate cost-estimate, time estimate later to be corrected).
- Prearranged procedures about how to come to an agreement later in the process about the reimbursements of costs. In advance the contractor gives a full overview of his cost structure. Also should be mentioned which commission of arbitration is going to be brought in case an agreement can not be made.
- A special procedure in which the architect can change the design during the construction process under certain pre-agreed conditions.

3.5 Viewpoint neighbourhood, interest groups & users

3.5.1 Introduction

In this paragraph the position of the neighbourhood, the interest groups and the users will be discussed. Their goals and interests will be considered and they will also be related to the risks they form for the Glasspalace project. In the following paragraph the possible response of the neighbourhood will be analysed. In the subsequent paragraph the interest groups will be considered and after that the users will be discussed. Finally the risks and the redesign requirements will be explained.



Fig 3.6: Prins Carnaval

3.5.2 Neighbourhood

The neighbourhood is the people living around the Glasspalace, the cafes, the restaurants, the market people and the other businesses. It can be assumed that a new Glasspalace is good for everyone, because at this moment the Glasspalace is a rather ugly building that attracts drug addicts. This is mainly due to the renovation of the building in 1972 and the fact that the building is now empty besides the people of the 'anti-kraak' movement and a couple of stores at the first floor. The problem is nevertheless the inconvenience the renovation itself causes. The contractor needs space for his materials, machines and people. Therefore probably the space for pavement, market and streets must decrease. That can be a reason for people to complain or lodge an objection.

The neighbourhood has an influence that cannot be underestimated. It's actions can delay the process in such a way that the realisation in time can be endangered. The advantage for the project is, that the mayor influence is to be expected after the tendering. After this point, there is no return possible, because then the assignment is awarded to a construction firm and the demolishing of the building is started.

The neighbourhood has the following main possibilities to delay the project:

1. Lodge an objection to the building permit.
2. Lodge an objection to the demolishing permit.
3. Lodge an objection to the monuments permit. If the city doesn't have a monuments committee, then the minister of OCW has to make a decision about the renovation of the Glasspalace.
4. Lodge an objection to changing the 'bestemmingsplan' or to the possible art. 19 decision in case of the second building. This second building is planned just besides the Glasspalace and will change the situation for the cafes at the 'Kerkplein' and people living at the Bongerd. The building will take away the view on the church and the sun from the squares. There are many possibilities in the 'bestemmingsplan' procedure to delay the project. It can take up to two years before the 'bestemmingsplan' is changed.

5. Lodge an objection to a possible budget increase. The city council has given permission to build a Glasspalace for 32 million guilders. If this budget is not enough, the city council has to make a decision about whether or not to increase the budget. It is also possible that the city council decides not to build the second building.

Besides the neighbourhood, some influence can also be expected from the other people of Heerlen. If the project gets negative attention in the newspapers, like 'Dagblad De Limburger', then the people of Heerlen will be less behind the project and that can affect the people of the city council, if they have to make a decision about a budget increase.

3.5.3 Interest groups

The chance of finding archaeological objects in the grounds around the Glasspalace is high (in case the extension will be built). The foundations of the building are close to the old city walls and the extensions of the building may be planned on old artefacts. According to Dutch law, the construction team is obliged to stop the work in case archaeological objects are found and to make excavation possible. The losses due to this delay will be compensated, but the completion date can be delayed and through that the subsidies of DSM and the ministry of VROM (together almost a 2.5 million guilders) may be lost.

There are also the interest groups of the neighbourhood, but their aims and possibilities already have been discussed in the previous paragraph.

A group that can possibly cause delays are the people from the anti-kraak movement. These people have committed themselves to leave the building if necessary and they have already been warned, but possibly they can make objections. There are also artists living in the building and they can also delay the realisation of the building just as the stores on the ground level.

The 'stichting Peutz' that is closely related to the project can make objections to the design of ABBC and possibly have influence in that way on the design-process. They have the same legal possibilities as the neighbourhood. This group is more or less being involved in the design process by ABBC, but not in a formal way.

The European Community is also an important group. The City of Heerlen has to follow European regulations with the tendering of the architect and the builder. The work of the architects exceeds the limit of 130.000 ECU, so European tendering for the assignment of the architects is needed. The renovation of the building itself exceeds the limit of 5 million ECU, so also European tendering is obligatory. There are on both tendering forms some problems that can occur.

The architects tendering has been done after Arets and Coenen made their feasibility study which is in fact a conceptual design. They have been paid for this study by bouwfonds. Because of this study Arets and Coenen have a lot of knowledge of the design and the situation. The other architects that have joined the

tendering don't have this knowledge. This is not foreknowledge which is not allowed according to the European regulations, because they got the assignment by Bouwfonds and not by the City Council.

The construction tendering is problematic. Especially if the client, in person of mister Ummels, wants to negotiate with one or more the builder(s) after the bid. According to the two standard European procedures, the public and the non-public procedure, this is not allowed. It is however very desirable to negotiate, because in this situation very less is known at week 43 and to come to the optimal contract the client has to have the possibility to negotiate the possibilities. This is however only permitted in exceptional cases. The case that might apply in this case is explained in 'Richtlijn Werken article 7 lid 2 sub c'. This says negotiating is permitted in "exceptional cases, if it concerns works whose nature and uncertain circumstances make a proper establishment of the total price impossible." If this case doesn't apply then negotiating is not permitted and the work has to be given to the most acceptable bidding, without preceding negotiations.

3.5.4 Users

The already mentioned users of the new Glasspalace will be:

- The music school. This user mainly needs spaces for music classrooms and an auditorium. A great part of these spaces need specific characteristics like acoustics and floor elevation.
- The city gallery. This is a museum for modern art. Through the organising of special exhibitions, lectures and other events fulfils city gallery Heerlen her cultural function.
- Hee art. This user needs spaces to make their form of art. This user is in a form connected to the Music school and the city gallery.
- The Vitruvianum. This user is a study centre for architecture that needs an exposition space and some additional space for other activities. Probably the exposition space for the city gallery and Vitruvianum can be combined.
- The movie house. This user, that focuses on cult movies, needs a couple of cinema's and a foyer.
- the city hall;
- a grand cafe;
- commercial space;

The company Twijnstra Gudde has derived a brief for the building by speaking to the users (except the users of the commercial space) and they have tried to come to a conclusion that is a best fit for everyone. The architects have also spoken to all the users separately. They came to the conclusion that the brief was not without defects and that there were many opposing demands from the various parties.

All these users except possibly the grand cafe and surely the commercial space are for an important part dependent on subsidies of the city council to exist. This is very important, because this fact decreases the influence of these users. Of course

they have all kinds of wishes about their future place in one of the two buildings and of course the architects want to design a building that fits to these users, but their influence is not decisive.

Problematic can be the spaces and facilities that are needed for common use, like the building management, the office spaces and the reception facilities. It is necessary that the users agree about these items. If an agreement cannot be reached, then this can cause delays and disturbance.

The reaction of the users to the design can cause negative publicity and commotion around the project. The reason is that the best spots in the building can only be given to a couple of users and also some users have to move to the second building. It is the question if and when this building will be realised and if the magic of this building will be the same as that of the Glasspalace. The users movie house and music school are most difficult to fit in the Glasspalace. This because of the minimal elevation of the floors and the acoustic demands that cannot be easily incorporated in the Glasspalace building.

The critical point will be the commercial space. This commercial space is necessary to make the project feasible. If there aren't enough interested parties then the project will face budgetary problems and empty spaces in the building. The reasons why parties may not be interested can be the possible negative publicity, the price or the location and characteristics of these spaces in the building. A possibility to decrease this risk is to closely involve future candidates in the process and to save the best spaces in the building for this function.

3.5.5 Risks

In the preceding paragraphs the goals of the parties were explained and also which problems could be caused by these parties. In paragraph 3.6 all these problems will be reformulated to risks, which strategies can be used to overcome these risks and further the current owner. The next paragraph will explain these possible strategies and the requirements to the process redesign from the viewpoint of this chapter will be formulated.

3.5.6 Redesign requirements

In many cases the best strategy to cope with the risks is 'communication'. That is a word that seems logical, but what does it mean in this case? It means that there is a clear communication structure needed between all relevant parties. Not an informal one like there is now between some parties, but a formal one. In the process redesign there are four clear interfaces needed between the following parties:

- the new users and the design team, probably via the client;
- the neighbourhood and the client;
- the 'Stichting Peutz' and the design team, probably via the client;

- the design team and the EC or the 'mededingings autoriteit', probably via the client;

These interfaces make the communication lines and moments clear and also the goals, the powers and the responsibilities of the parties are defined. Maybe a separate interface for the commercial users is needed, because these users are more critical for the process than the other users.

Another major risk is the possible budget increase. This risk is lowered by the splitting in two buildings. However if the second is not being build due to a budget shortfall, then the users that aren't located in the Glasspalace will protest against this and it depends on these users in how much problems this will result for the project. Therefore to reduce these risks and to keep the client satisfied it is important to keep the costs for both buildings lower than the budget. There is a shift in powers needed, because at this moment mister Ummels has the power to decide within the budget. It is not the question if he is capable to do so, but he is a partner of Arets and Coenen and their main goal is to make the Glasspalace again a great architectural building like it was in the time of Peutz. This is also a very important goal of Ummels, besides the goal of staying within budget. He has already warned the client that this last goal is very difficult to achieve. Therefore the goal of the architects can conflict with the goal of staying within the budget.

3.6 Risk tables

The risks identified in the analysis from the different viewpoints are presented here in tables. Three types of risks can be distinguished: the risks concerning overrunning budgets, risks concerning overrunning time and the risks concerning not meeting the desired quality.

In the middle column actions are mentioned to reduce the risks.

The size of the risk is marked here with the number of + symbols in the most right column. The size is determined here on a more intuitive base and whereas risk is considered as a product of the magnitude of adverse impact, the chance it will occur and the extend in which something can be done about it if it occurs.

The information about the size of the risks will be used in the next paragraph to make the allocation of the risk to the different participants more visual.

Budget risks	Actions to reduce risk	Size
Contractor		
Damage to the work caused by theft and vandalism	Fence off area	+
Exceeding the fixed prices stated in the contract	Bring in sufficient cost expertise, monitor cost-development, only give fixed prices for clear defined activities	+++
Problems of liquidity	Make a liquidity-budget in advance	+
Bankruptcy sub-contractor	Contract reliable sub-contractors	+
Bankruptcy client	Demand bank-guarantees	+
TOTAL		7

Budget risks	Actions to reduce risk	Size
ABBC		
The preliminary or final design does not comply with the specified budget. Another design must be made.	Make cost consequences of design decisions visible immediately Downsize the project as to complexity or number of users and functions respectively	+++
Costs arising as consequence of postponed design decisions	Make absolutely clear which decisions have to be taken at certain moments (no turning back)	++
Architects alter the design fundamentally	Make it totally clear under which circumstances the architects still may introduce changes to the design and who can decide about them	++
Costs caused by additionally requirements to get a building permission, a monument permission or other necessary permissions	Work closely together with authorities	+
Rising costs caused by necessary unforeseen changes in design	Allocate cost control either outside 'building team' or with the contractor Let contractor check design solutions on feasibility and costs Let contractor work out difficult parts of design	++
TOTAL		10

Budget risks	Actions to reduce risk	Size
City council of Heerlen		
Contractors give a calculation that exceeds the 15.5 million guilders	Divided the project in two phases, one for the Glasspalace and one for the extension.	++++
A final design according to the program of requirements reveals that the project can not be realised for the specified budget	Reduce the costs by cutting down a piece from the program of the extension. Negotiate with the contractor to find ways to save money or less work.	++++
The exploitation costs are to high	Think carefully what effect the chosen design solutions have on the exploitation costs in the future. Make different variants, which give insight what happens with the exploitation costs when a certain user is accommodated in the extension.	++++
There are not enough commercial users, necessary for the exploitation because there is no place for them or because they are not satisfied.	Have a clear insight in the different objectives of the participants.	+++
The four million guilders in the budget which the city expects to get from the monument institute, province and State is not granted.	Make sure to get as soon as possible certainty from the different organisations how much en when they are going to give money.	+++
Disposal of harmful waste products during the demolition	Investigate building before start execution, prearrange be paid expenses	+
Increase in costs of materials, wages, overhead(caused by inflation)	State settlement for variable costs in contract	++
Lost productive days caused by suspension project	State compensation for this event in contract	+
TOTAL		22

Time risks	Actions to reduce risk	Size
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Contractor		
Starting later with the work then supposed, because of other work has to be finished.	Establish demanded and available capacity in advance	+
Non-productive days caused by bad co-ordination on site	Make planning in advance and monitor	++
Not enough equipment available to start execution	Examine equipment capacity in advance, make a planning	+
Not enough personnel available to start execution	Examine personnel capacity in advance, make a planning	+
Delay caused by sub-contractors	Only contract reliable sub-contractors	+
Permits concerning execution are not released on time (nuisance, safety, labour-laws)	Examine in advance if the situation complies with the regulations. Submit the request for permits in plenty of time.	+
Logistic problems (how to get the materials on the site)	Investigate potential logistic problems in advance	+
Accidents and mistakes on the site	Bring in good trained personnel	++
TOTAL		10

Time risks	Actions to reduce risk	Size
ABBC		
Design changes by the architects	Strict co-ordination by Design manager	+++
Building materials are not delivered on time (prescribed by ABBC)	Investigate in advance	+
Building materials are rejected (prescribed by ABBC)	Investigate in advance	+
Disagreement between the architects	Form one office with staff from both offices, let them work together through the project Make them work together in the preliminary phase and then let them work out different parts according to accurate agreements	++
Too little design capacity	Provide for enough staff to be available Hire in extra capacity Design process according to present capacity	++
Design information is not delivered on time	Provide a design process without any hold-ups and give the architects as much time as possible Include incentives in contracts to stimulate faster work	++++
Design is rejected by the authorities (doesn't comply with the regulations)	Work closely together with the authorities trying to get approval for parts of the project as soon as possible Check design decisions as soon as possible on their viability regarding regulations	+
Disagreement between architects and the contractor	Make it totally clear in the contract who has the decision power in the various phases Signal disagreement early and solve it immediately	+
The contract with the building contractor is not according to the European rules.	Make sure that the concept of the contract is controlled by someone who has the knowledge about European tendering.	+
Not enough contractors or no contractor at all responds on the tendering	Make reasonable proposal	+
Problems with the beauty commission, monument institute, etc, which lead to delays and even to a later completion-date.	Inform these institutions on time and lobby for the plans. Guide the architects so they are standing stronger.	+
Difficulty with defeat (adjust) participants contributions		+
TOTAL		19

Time risks	Actions to reduce risk	Size
City council of Heerlen		
Building permit is not released on time		+
Non-productive days caused by strikes	Create good labour-conditions	+
Temporary suspension of execution caused by late payment of client	State in the contract agreements about the periodic payments and ask bank guarantees	+
During execution it appears that the existing building has defects	Investigate in advance	+
Discussions about costs	State in the contract a clear overview of the (contractors) cost structure and prearrange compensations in advance	+++
Discussions about quality	State in contract how to measure quality	++
Design is rejected by client	Good communication	+
Design is rejected by the users	Include users early in the process and define their input/task in this process clearly	+
No approval from the council for a budget raise	A part of the program can not be realised, probably for the extension. Make sure that the Glasspalace is still a success and the users are satisfied.	+++
Objections of the neighbourhood to the construction inconvenience.	Reduce inconvenience as much as possible	++
Objections of the neighbourhood to the changing of the city plan or the decision to follow the art. 19 procedure.	Involve the neighbourhood in the decision making process as much as possible	++
Objections from the people of Heerlen to a possible budget increase.	Avoid budget exceedings Make the people aware of the importance of the project	+
Finding of archaeological objects	Do research in advance	+
Troubles with the leaving of the current users of the Glasspalace (anti-kraak, artists, shops).	Remove the elevation; it will be very cold during wintertime	+
TOTAL		21

Quality risks	Actions to reduce risk	Size
Contractor		
Low useful life delivered building materials	Call in only reliable suppliers	+
Bad organisation on site causing mistakes, failures, etc	Appoint a supervisor who is capable of doing the work	+++
Personnel on site is not motivated	Good labour-conditions, sufficient safety-precautions and comfortable conditions for workers on the site (toilet, canteen, etc)	++
Poor documentation/ records of the execution process	Assign one person responsible for keeping records	++
TOTAL		8

ABBC		
The design is technically difficult to realise	More communication between designers and contractors during the design process	++
The design results in a complex way of execution	More communication between designers and contractors during the design process	++
Misunderstandings between all parties	Make communication/information plan, have regular meetings with all parties	++
The output of the different design phases is inconsistent	Allow for enough time to review and check the design proposals from the architects Define input and output of the various phases clearly	++
The output of the different design phases are incomplete	Define the crucial decisions to be taken and don't allow postponement of them	++
Result does not commit to the defined program of requirements	Make sure that the users' considerations are understood and taken care of by the architects Inform users/clients regularly and make sure they get your point	++
Design decisions are ruled by time considerations	Provide for a design process without any hold-ups so giving the architects as much time as possible Reduce iterative design loops by defining clear objectives and point of departures	++
TOTAL		14

Quality risks	Actions to reduce risk	Size
City council of Heerlen		
Design decisions are ruled by cost considerations	Create conditions for a fair 'trade of' between cost and architectural quality Include incentives in contracts to stimulate faster work	+++
Program of requirements is not suitable to solve the problems of Heerlen resulting in a project that ends up with something the city council of Heerlen does not want.	Bring in professional advisors in advance	+++
No clear liabilities can be identified (fuzzy structure)	Bring in professional project manager	+
Losing possibilities to put claims on parties	Bring in professional project manager	+
Losing control and ability to steer the process	Bring in professional project manager	+
Users feel excluded from the project.	Bad publicity and a negative attitude towards the project. Client not satisfied.	+
TOTAL		10

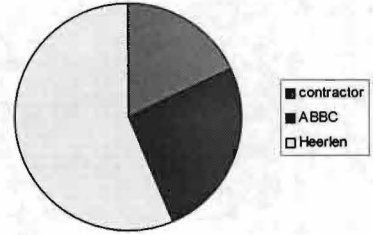
3.7 Visual distribution of risks

In this paragraph a visual overview is made from the sizes of the risks mentioned in the tables in the previous paragraph.

3.7.1 Budget

Here it can be concluded that a considerable part of the risks concerning the budget is allocated to the City council of Heerlen. The redesign in the next chapter will show that it doesn't have to be this way.

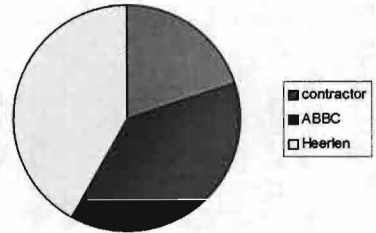
Budget



3.7.2 Time

The ABBC combination is responsible for the planning and therefore they also carry most of the risks concerning the time-aspect.

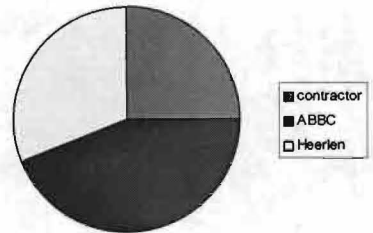
Time



3.7.3 Quality

The risks concerning quality seem to be distributed equal to the different participants.

Quality



4 Strategy

4.1 Problem definition

To receive the European subsidy of 4 million guilders the work must be awarded to the contractor before the end of the year 1999. Under these circumstances and deviating from the usual privileges it is intended here not to dismiss the contractor from his work after this date. The short interval before this moment allows the architects to complete only the preliminary design. Therefore the problem can be formulated as follows:

At the moment of the award of the work only the preliminary design will be finished and on the basis of these documents the contractor must be committed to bonds preventing abuse of his unique position: once he is awarded the work he can not be dismissed.

Moreover it is to be expected that the architects want to keep privileges to change the design during all phases of the process.

In case at the end appears that the result according to the program of requirements unavoidable exceeds the budget of 32 million guilders, then the architects can not be held responsible. The city council should in this situation consider to change the design or to raise the budget.

Here it should be emphasised that in the current situation a lot of risks, especially financial risks are allocated to the city council of Heerlen. The risk analysis in the previous chapter already confirmed this statement. This unbalanced distribution of (financial) risks could give a lot of problems during the building process. Especially a possible necessary raise of the budget could cause a lot of discussions within the city council and could also result in delays. In the worst case it could result in a situation in which the city-council is not able to complete the project at all. All participants of this project must be aware of the fact that if the problems described above occur, although most of them will be for the city-council, the project as a whole will suffer, and with that also their own position. Therefore we should mention here for the redesign the unbalanced distribution of the risks as a second problem:

To many risks are in the current process design allocated to the city council.

4.2 Delimiters

4.2.1 Starting point

For the redesign the moment the architect combination ABBC got the commission (16 July 1999) is chosen as the point of departure. As a result:

- The same conditions as mentioned for the current design (see chapter 2) are valid for the redesign. Therefore the redesign has to deal with the same time restrictions as the real process design. In this way the redesign has to deal with the same problems which can be considered challenging and realistic.
- For the redesign nothing has been changed to the juridical collaboration form ABBC which has been chosen at the point of departure.

4.2.2 Tender

The project must be tendered according to the European Community Law concerning "works". This law aims for an improvement and increase of the transparency of the governmental tendering process on European level and is implemented in the Dutch uniform tender regulations UAR-EG 1991. The regulations are obliged for all works of the supreme government, and for works with value > 5 million Euro of lower governmental bodies on city and province-level.

4.3 Strategy for the redesign

The strategy used in the process redesign can be defined as the whole of necessary decisions to be taken by the project manager aiming for a process that meets the specified conditions (as mentioned in this chapter) and distributes the risks over the participants in a more acceptable way in order to avoid discussions during the process and a bad reputation for all participants.

Decisions such as choosing the collaboration form, tendering form, contract form, and how to manage information, budget and time will be made according to this strategy.

In order to redesign the process of the 'Glasspalace' a framework will be made where different alternatives can be compared. Comparing possible decision-alternatives by analysing the consistency and fitness between them according to the available information, reduces the risk making a wrong decision and gives an instrument to compare the pay-off of each possible decision alternative.

5 Contracting

5.1 Introduction

Complying with the strategy and considering the risks and the restrictions, the collaboration form has to be established. This means also that a decision has to be made about how the client (the City Council Heelen) must collaborate with other participants in the building process.

5.2 Collaboration form

Establishing a suitable collaboration form is needed to organise the participants efforts in the design and the building process to get their best possible performance concerned the quality of the result, the time and the available budget. Making this decision in the very early stage is the most important decision the client has to make supported by his management adviser (the project-manager).

Using a reference gives direction towards the possible desired process and reduces the difficulty and risk involved in the process of eliminating choices.

5.2.1 *Restrictions:*

- In order to receive the European subsidy the commission has to be awarded before the start of the year 2000.
- That only the preliminary design expected to be finished at the day of the pre selection of the candidates.

Complying with the European regulation we need to compare the following possible alternatives Collaboration forms:

- 1- Traditional.
- 2- Bouwteam.
- 3- Management contracting
- 4- General contracting.
- 5- Design and build.

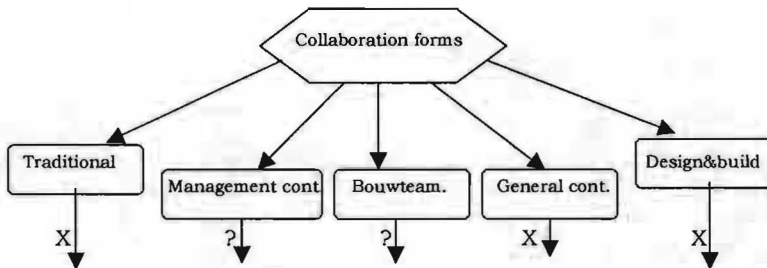


Fig. 5.1: Collaboration forms

5.2.2 Comparing

Because of time restrictions the integration of both design and construction phases is desired. On average non-traditional techniques of management tend to be quicker. In other words, they produce a reduction in the risk of time overrun, and that did not necessarily lead to additional costs (raport6: Faster Building for industry). For the reasons mentioned above the Traditional form can be eliminated.

If the client is not able to deliver content contribution to manage, design or to build and he dose not want to run any risk related to the process, then he has to choose for less participant forms as General contracting or Design and build. As input information the client has to define the wanted result functionally and technically very professional. Steering the process by the client or finding a contractor to sign a contract while the input information needed to define the wanted result is not jet definitive is not possible therefore the General contracting and Design & build is less likely to be used.

If the client is able to deliver content contribution to manage, design or to build then he has to choose for moor participant form.

Because of the special requirements of this project it can be expected that the client does not have the needed expertise to manage, to design or to build but still wants to steer the process.

Depending on how much knowledge the client has over the type and the content of the project and on how much expertises he has, a management advice can be given to the client how to engage the process. In other words a decision can be made about which collaboration form is the most suitable.

If the client is not able to deliver content contribution to management, design or build, but still wants to steer the design and the building process, then he has to choose for the less participant form that gives the possibility to stay in picture and when necessary to control and steer the process. In this case the Management contracting is to be recommended. Appointing an extern management consultancy is necessary. Consultancy is a mean by which managers today actively support clients` decision- making processes.

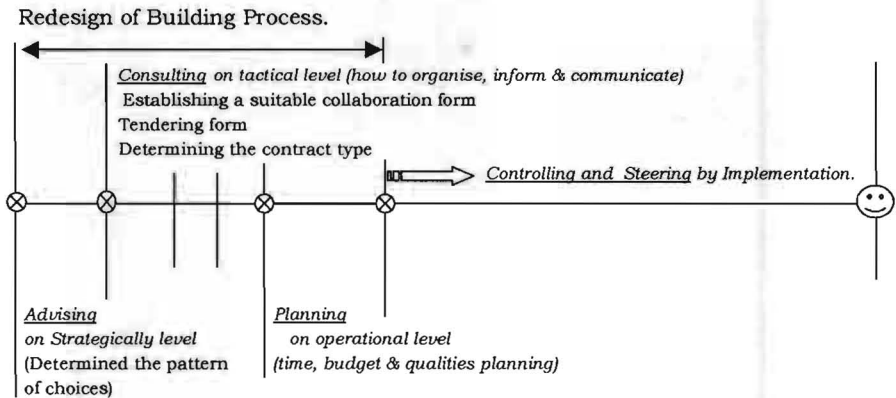


Fig 5.2: Project management role during the design and the building process.

To increase the ability and the capability of the client to co-operate fully in the process he must analyse in advance the risks concerning:

- Increase of unnecessary costs because of not using the full capacity of the human resources of the client (municipality Heerlen)
- Losing opportunity of getting more experience for own personnel.
- Losing time because of transformation of information to extern management consultancy.

In this situation it will be recommended to use clients' (municipality Heerlen) own expertise by establishing the Bouwteam. See Figure 5.3.

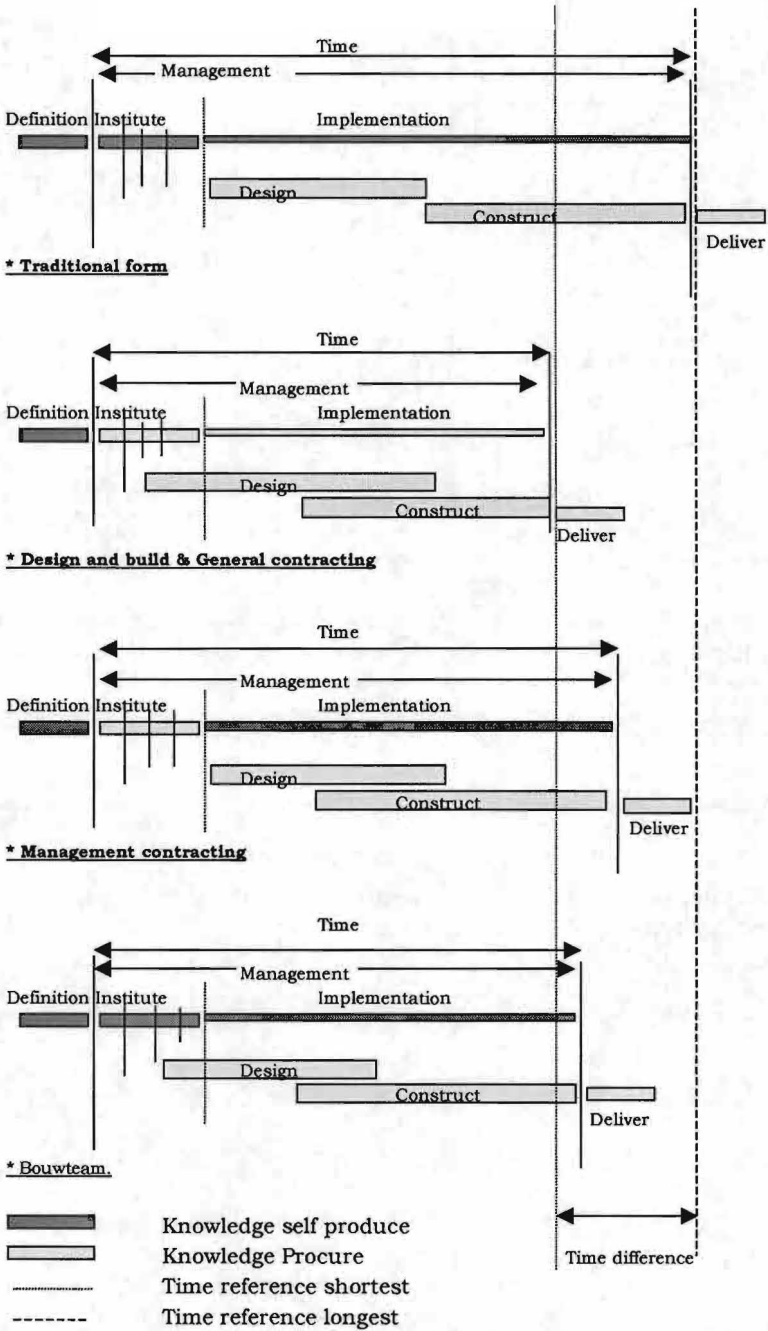


Fig 5.3: Comparing alternatives Collaboration forms on base of Knowledge & Time available by the Client.

5.3 Tendering form

The tendering form depends on the available information and documents needed for builders to make calculation and estimation of the costs.

5.3.1 Restrictions

Choosing tendering form taking in consideration the following restrictions:

- The work has to be awarded complying with the European regulation.
- In order to receive the European subsidy the work has to be awarded before the start of the year 2000.
- That only the preliminary design expected to be finished at the day of the pre selection of the candidates.
- That Bouwteam is the chosen collaboration form.

We need to compare the possible tendering alternatives:

- 1- Public tendering.
- 2- Closed tendering.
- 3- Negotiated tendering.

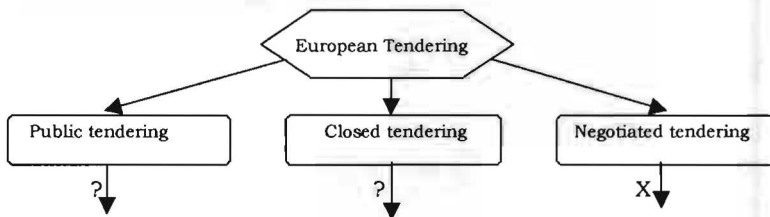


Fig. 5.4: Tendering

5.3.2 Comparing:

Negotiated tendering is not possible because of the strict limitations by using this form. In case of failing to find a bid by using the Public or the closed tendering or in case of failing to get to an agreement with the bidders of already done public or closed tendering.

Public tendering is a possible tendering but gives less guarantee to find the suitable candidate to participate the building process and cost more time to study every bid. Because of the limited amount of information the client can offer before the tendering it will be high risky to make a bid by the professional bidders and we run a risk to get bids from adventurers.

Closed tendering is the most suitable to use in our case because of the possibility it gives to choose and to select a bid from the most specialised offers based on quality.

Formulating the selection criteria

In order to give a chance to every capable tender to participate the design process and at the same time to get the best possible offer.

Formulating the awarding criteria

To be sure that the capable future participant understands exactly his task and his role within the team, and that he is aware of the surrounded circumstances and he can finish his work on time with the expected quality.

5.4 Contract type

The contract type should contain incentives for good performances and emphasises good management with respect to give the client and the users a guarantee that they get at the end of the process the quality they asked for within the budget and time.

Each collaboration form allocates risks differently. In order to choose the type of the contract the client supported by his project manager chooses how the responsibility for design, construction, supervision, construction and management of the design and construction is to be divided and integrated.

Determining the contract type is the translation of what already has been decided and formulated before, putting the chosen collaboration form, the tendering form, the selection criteria and the awarding criteria in an official document which can be used in a situation of arbitration.

5.4.1 Restrictions

Determining contract type in our case has to take in consideration the following *restrictions*:

- The commission has to be awarded complying with the European regulation.
- In order to receive the European subsidy the commission has to be awarded before the start of the year 2000.
- That only the preliminary design expected to be finished at the day of the pre selection of the candidates.
- That Bouwteam is the chosen collaboration form.
- Closed tendering is the chosen tendering form.

5.4.2 Risks

Determining contract type has to take in consideration the following *risks*:

- No clear liabilities in case of arbitration.
- Getting unwanted quality result.
- Losing control and ability to steer the process.

Taking in consideration the *restrictions and the risks* we need to compare the following possible contract type alternatives:

1- *Price based contract*: like lump sum (fixed price), unit price contract (using bills of quantities or schedule of rates). Payment is based on prices or rates submitted by the contractor in his tender.

These prices are deemed to include all costs, overheads, risk contingencies, and profit.

2- *Cost based contract*: the actual costs incurred by the contractor are reimbursable and in addition a fee is paid to cover profit.

3- *Target cost contract*: There is an additional payment which are a share of the difference between actual cost incurred and a pre-set target cost for the work.

4- *Multi phase Performance requirement contract*: The available information (preliminary design) with basic description with *functional specifications* about the needed performance has to be delivered by the designers as input information. The bidders as experts come with the best *possible technical solution* to satisfy the functional specifications. The awarding of the commission goes to the best economical solution.

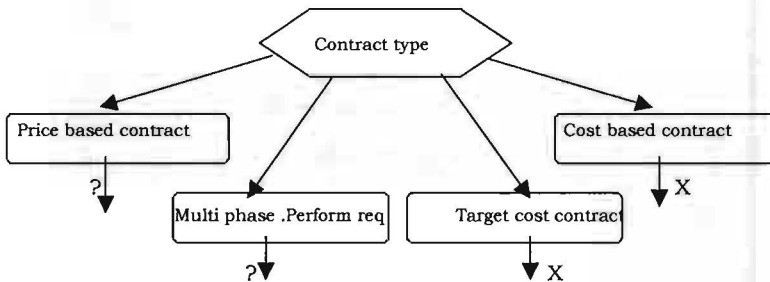


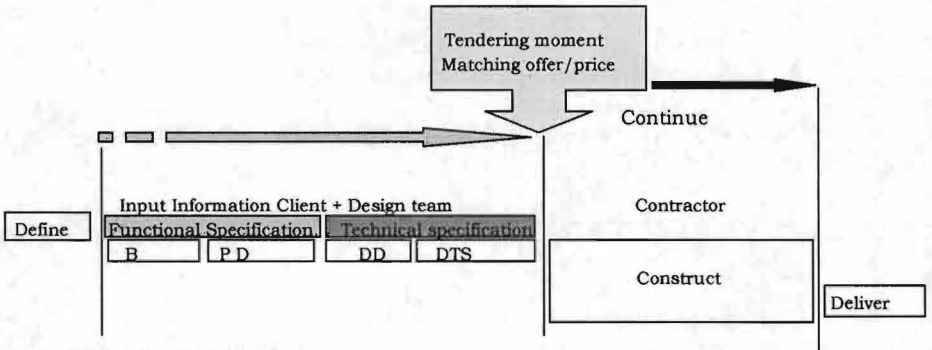
Fig. 5.5: Contract type

5.4.3 Comparing

Lack on information at the moment of tendering limits the possibility to estimate the costs (only the preliminary design at the day of the pre selection), therefore it is difficult to choose for a price-based contract. For the same reasons the target cost contract is less suitable to use.

Because the work has to be awarded complying with the European regulation it will be unacceptable to determine a cost based contracts.

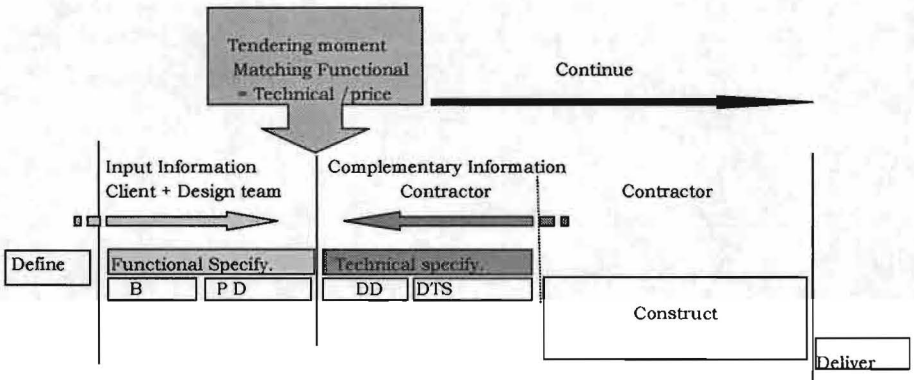
The multi phases performance requirements` contract therefore could be the best possible available alternative. With this contract we cope with the risks of giving a wrong estimated total fixed price by dividing the commission into smaller parts following the activities in the phases of the building process. At the same time we are able to give a price in a situation where an accurate calculation is not possible due to lack off detailed information. See for a total overview figures 5.6 and 5.7.



Price based Contract

Moor suitable for:

Traditional / Open Tendering / Awarding to the lowest price.



- B = Brief
- P D = Preliminary Design
- D D = Definitive Design
- D T S = Design Technical Specifications

The Multi phases Performance requirements` contract

Moor suitable for:

Bouwteam / Closed Tendering / Selection bidders on quality / Awarding to the most economic technical solution.

Fig 5.6: Information / Contract type relationship. The effect of the Collaboration form, Tendering form, Selection & Awarding criteria on contract type.

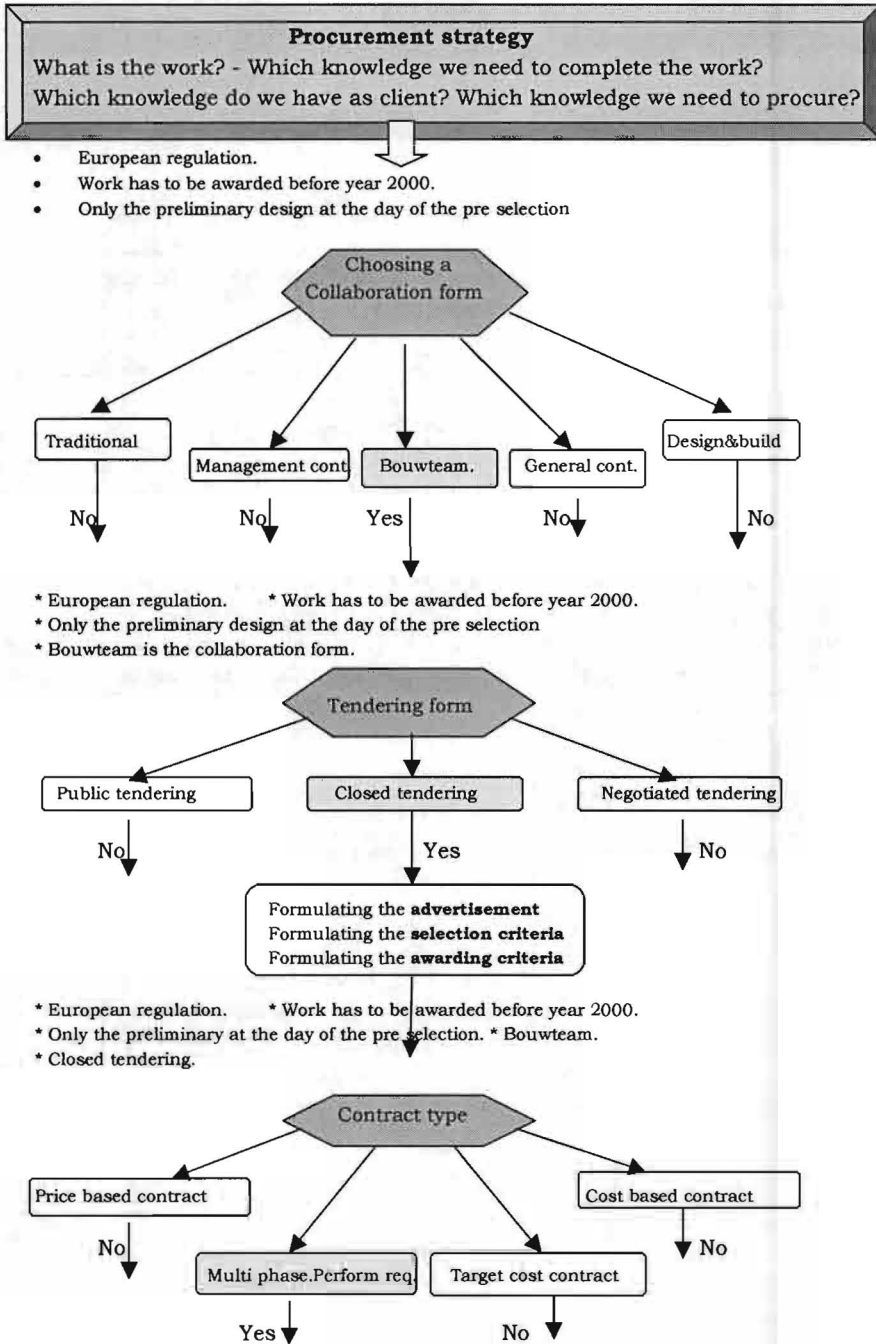


Fig 5.7: Translation of the Procurement strategy in a Structured Systematic Approach used as a reference for management decision making.

6 Organisation structure & management

6.1 Introduction

In this chapter the organisation structure redesign will be discussed. Under organisation structure the following is meant. The communication lines between the parties, the contractual lines, the distribution of responsibilities, the distribution of powers and the main tasks.

In the analysis the current organisation was discussed. Also some reasons were given that caused the idea to redesign the structure. A short summary of these most important reasons will be given in the next paragraph. In this chapter an organisation structure will be created that is more suitable to the main aim of the process redesign, namely a optimal distribution of the main interests to create a common goal and an optimal project result for the city of Heerlen.

The description of the organisation structure is organised in the following way: after summarising the reasons to reconsider the structure, the main alternative structures will be discussed, followed by the chosen organisation before tendering. Special attention is given to the distribution of management tasks. Finally the changes in this organisation from the moment that the contractor is involved are discussed.

6.2 Reasons to reconsider the structure

Because of the following main reasons, the organisational structure will be redesigned:

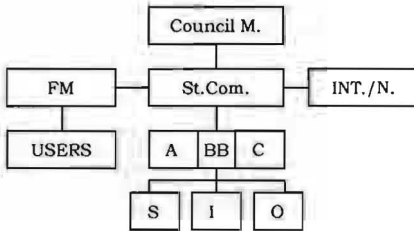
- Mister Ummels has very much influence on the project. He is a representative of ABBC and this situation is not optimal to get balanced interests.
- The exact distribution of powers and responsibilities is unclear.
- The risks are not optimal distributed over the parties.
- The role and position of the neighbourhood and the interest groups is unclear.
- There are unclear formal communication lines to some participants. Examples are the neighbourhood, the users and the interest groups.

6.3 Alternative organisation structures

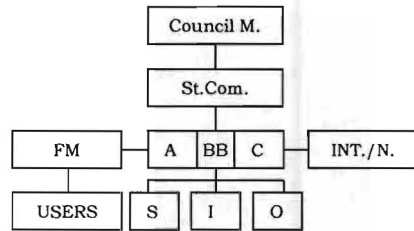
Point of departure is the fact that the architects Arets and Coenen are contracted together with mister Ummels of Bureau Bouwkunde bv (ABBC). In this study it is assumed that the contractual arrangements between the client and ABBC are not yet recorded. The other parties that will be included in the organisational structure are: the city council, the steering committee, the users, the interest groups and the neighbourhood and the other members of the design team, like the structural engineers, the installation advisers, the acoustics advisers and the building physics advisers.

The steering committee won't be replaced by another form of internal client organisation. The reason is that in a political context the steering group is the only organisational form that is suitable for the preparation and development of the decisions taken by the council meeting. All the decisions for this building project cannot be prepared and developed by only one alderman, because the project has common grounds with the cultural, financial and welfare department. All these departments have to be represented.

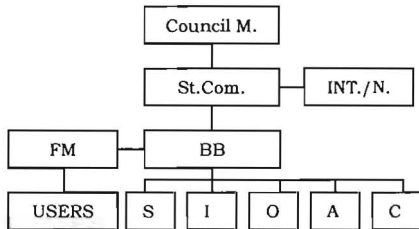
The following alternatives were developed:



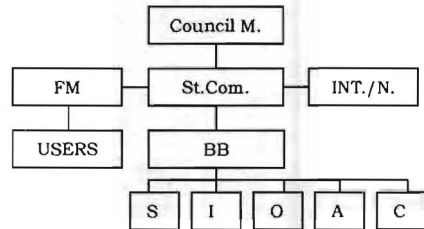
Alternative 1



Alternative 2



Alternative 3



Alternative 4

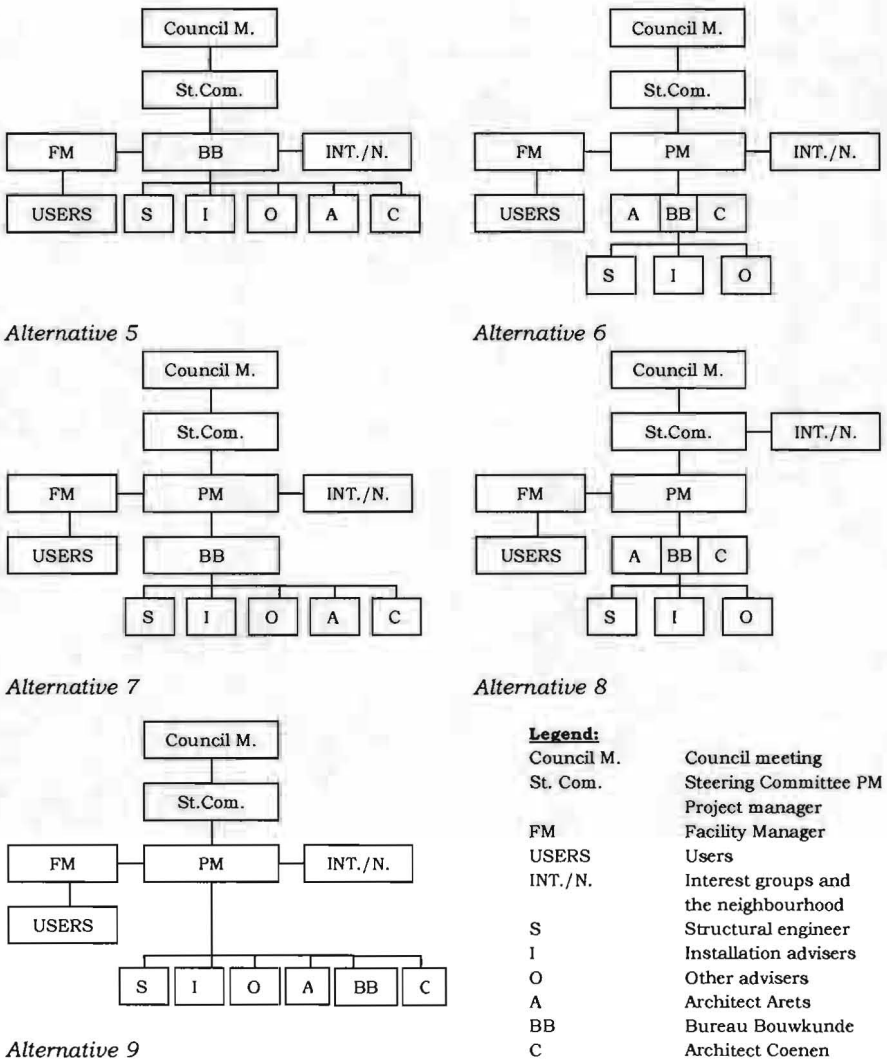


Figure 6.1: the alternative organisation structures

6.4 The organisation before contracting the builder

6.4.1 The choice

Alternative 7 is chosen as the best option for the redesigned organisational structure. The main reason is that the influence of Bureau Bouwkunde by is restricted to the design of the Glasspalace. This will lead to a better situation for

the balancing of the interests. The project manager must be seen as a delegated client in this project and therefore with alternative 7 it is possible for this person to balance the interests. In all the situations where Bureau Bouwkunde bv has to balance the main interests (alternatives 2, 3, 4 and 5) this is less the case, because it has more or less the same goal as the architects have. Bureau Bouwkunde bv is a company that assists architects with their co-ordination works and this company, Arets and Coenen together got the design assignment.

Further the users and the neighbourhood are directly connected to the Project manager. It is better not to let them communicate directly with the steering committee (Like in alternatives 1, 3, 4, 8). There are two reasons for this. The first reason is that the steering committee has meetings that are ones in three weeks and the strong time pressure on the project makes it necessary that the users can communicate more often to a project member about the project. The second reason is the fact that the steering committee only steers the project on its outlines. The issues that are important to the users, the neighbourhood and the interest groups are not necessarily known to the steering committee. For example the exact placement of the materials of the contractor and the inconvenience this causes are not an issue for the steering committee, but they are for the Project manager.

The design team is communicating through Bureau Bouwkunde bv, however mister Arets and Coenen are not located together with Bureau Bouwkunde above the other participants (like in alternatives 1, 2, 6 and 8), because then it is unclear who is responsible for the co-ordinating works. It is then unclear if mister Arets is responsible or mister Coenen or mister Ummels. An important point of departure is to make only one person responsible for particular tasks and in the organisation structure it is better to make Bureau Bouwkunde responsible for all the co-ordinating works, because that is his specialisation. All design participants communicate formally via mister Ummels. In the following this is further explained.

6.4.2 Main structure

If the structure is simplified, four main elements can be identified. Between these elements is the project manager that has the job to balance these interests in order to get the optimal result. In figure 6.2 this is showed. These elements are now discussed in the next paragraphs.

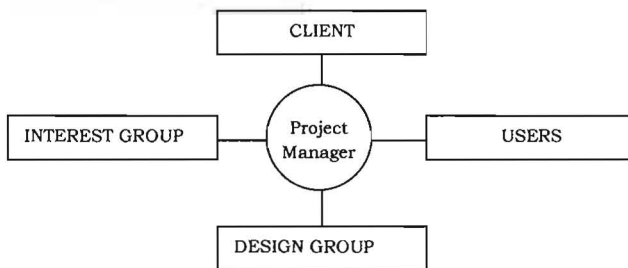


Figure 6.2: Main structure of the redesigned organisation

6.4.3 *Project manager versus design manager*

In this redesign there are three managers just like in the original process design. These managers are the project manager, the facility manager and the design manager. The role of the facility manager stays like it is now and won't be discussed here, but in paragraph 6.4.5. The roles of the project- and design manager will be changed, because of the reasons mentioned in 6.4.1. In the current situation Mr Steins is the project manager and Mr Ummels is the design manager. The project manager is the central person in the redesigned organisation. This person is the point where all information comes together and all decisions are taken or sent through. In the current design this is formally also the case, however the difference is that mister Ummels plays for a major part the role of the project manager. In the current situation mister Ummels seems both the project manager and the design manager. In the redesigned situation this division is made much clearer in order to get a clear division of tasks, responsibilities and powers and a clear difference between client and design.

The main tasks of both managers in this project are being summarised in table 6.1. Both the original divisions of tasks as the redesigned division of task are shown. In the following the main differences between the original and redesigned situation are being explained. It is the question if the current project manager is able to do the tasks related to construction. In our opinion it is better to get an external adviser for the tasks he can't carry out or to get a professional project manager than to let the design manager do all these tasks. In the latter case the optimal balancing of interests is not guaranteed. It depends on how good the design manager is able to switch hats if necessary.

In the redesign some of the tasks concerning authorisation and acceptance are allocated to the steering committee. This explains why in Table 6.1 some of these tasks are not present any more in the two most right columns.

Testing the design against the brief and additional design input

The design manager does not carry out this task, because he is responsible for the design and therefore not the right person to make the trade off between the users, the client and the architects. To protect the client's interests it is ideal to let the project manager do this test. He is also the main contact person of the users through the facility manager and of the client. So he is the one that is able to make a good balanced decision about the design.

Establishing information plan

At the moment the project doesn't have an information plan, due to the time restrictions. It is important to have one like is discussed in chapter 7. In case an information plan is established, the project manager is the right person to do so, because he is the central person in the project organisation.

Scheduling project milestones

In the current process the project milestones are established by the design manager in person of mister Ummels. It is better to let the project manager make the

milestones clear, because he has an overview over the whole project in the redesigned situation.

Main tasks	Original		redesign	
	PM	DM	PM	DM
Testing the design against the brief and additional design input	√	*	*	
Establishing main budgets	*		*	
Establishing information plan			*	
Scheduling project milestones	√	*	*	
Compiling summaries users, design, interest groups, tendering			*	
Compiling phase documents	√	*	√	*
Watching over the integrity of the design		*		*
Obtaining additional design input from council group and users	√	*	*	
Testing the design against building regulations		*		*
Assessing the quality of the design output		*	√	*
Adapting the construction budget	√	*	*	
Testing design against construction budget		*	*	
Testing the design against budgeted utilisation costs			√	*
Controlling the design costs		*	√	*
Testing design against construction schedule	√	*	*	
Scheduling the design activities	√	*	√	*
Controlling the progress of design activities		*		*
Contracting and contracting of the builder	*		√	*
Tendering and contracting of the builder	√	*	*	
Controlling Information between main teams			*	
Scheduling and controlling the exchange of design information		*		*
Motivating team members	*	*	*	*
Handling personal conflicts	*	*	*	*
Handling goal conflicts between teams	*	*	*	
Applying for licences		*		*
Anticipating on procedures			*	
Carry out a risk analysis			*	
* = make/responsibility √ = accept/authorise				

Table 6.1: Tasks of the project manager and the design manager

Obtaining additional design input from council group and users

To get control over the design input besides the brief, it is best to let the project manager control this. It is possible to establish contact between the facility manager and the design manager, but only with permission of the project manager. In this manner the design team is shielded from frequent interruptions and is it possible to take into consideration all the interests in case extra demands are added to the brief. (In this task are also the important demands from the interest groups and neighbourhood included.)

Adapting the construction budget

All the tasks relating to construction should be assigned to the project manager. It is clearly a client's task, not a design task and therefore it should be located at project management level.

Testing design against construction budget

It is an important task for the design manager to make a design that can be realised within the construction budget. To make sure this is the case the project manager must control this and therefore it is his job.

Testing the design against budgeted utilisation costs

The feasibility studies [3] made clear that the estimated utilisation costs just fit the available budgets if enough commercial space can be created. To make sure this will be the case in reality the design manager must prove this in his phase documents that will be accepted by the project manager and approved by the council group.

Testing design against construction schedule

In the current situation the design manager tests the design against the construction schedule. Like already noted above it is important to let this task carry out separately from the design team. The project manager is better able to make the ideal trade off between design and construction interests than the design manager because he is part of the design team.

Contracting the designing firms

The design firms are now contracted by the city council of Heerlen. This is done by the project manager with advice of mister Ummels. It is also possible to give the complete design assignment to ABBC and let them contract all the other design participants on their risk (see also paragraph 6.4.7).

Tendering and contracting of the builder

This task is now assigned to the design manager. In the redesign the project manager is responsible for this task. The reasons are the same as with the previous construction related tasks.

Carry out a risk analysis

This project is a project with enormous risks for the city of Heerlen. These risks were identified in the analysis in chapter 3 . In the current process design no explicit risk analysis has been carried out. The design manager knows very well how great the risks are, but it would have been better if the project manager would have made a risk analysis before the contracting of the architect, because in that case better anticipation on those risks would have been possible and the client would have known better what the dangers were.

6.4.4 Council group

The council group consists of the city council and the steering committee. The role of this team stays the same in the redesign. Its main task is to accept and authorise. All decisions are taken in the council meeting, but the council meeting gives the steering committee the boundaries within which they can make decisions.

6.4.5 User group

The user group consists of representatives of all users and the facility manager. Problematic in the current situation is the late appointment of the facility manager and therefore a temporary manager had to be appointed. Of course this is not an optimal situation. It would have been better to appoint the facility manager at an earlier point.

6.4.6 Interest group

In the interest group are the representatives of the neighbourhood and the interest groups. In the current situation these groups are not formally related to the project. This is not optimal, especially because of the necessary art. 19 procedure for the second building and the disturbance during construction. If these groups are treated very seriously, the chance that they will delay the project will decrease. Therefore a meeting schedule is necessary. This meeting will be chaired by the project manager and he will inform these groups and will ask what their demands are. He will try to fulfil their demands, because in that way the chance of delays caused by legal procedures will decrease.

6.4.7 Design group

The design team is now organised in the way described in figure 6.3 a. In figure 6.3b the new organisation is showed.



Figure 6.3: current and redesigned design organisation

At this moment the contracts are all between the partners and the client. In the redesigned situation this is not the case. All the contracts are between Bureau Bouwkunde bv and the other partners. Bureau Bouwkunde has one contract with the City of Heerlen for the total design. The responsibilities are very clear in this way and in case of claims the city only has to go to Bureau Bouwkunde bv. The risks for a bad design are in this way at the point where they can be best managed, namely with Bureau Bouwkunde.

6.4.8 Meeting structure

The meeting structure of the project in the redesigned situation will only be slightly different from the current situation. There will be the following meetings:

- City council meeting. This is the normal city council meeting that has to make all major decisions that are made by the city of Heerlen.
- Steering committee meeting (this meeting is the same as in the current situation).
- Users meeting. In this meeting only the representatives of the users and the facility manager are present.
- Project team meeting. In this meeting the project manager is chairman. The other members of the meeting are the design manager, the facility manager and if necessary a representative of the interest group.
- Design team meeting. The design manager is the chairman of this meeting. Other members are the representatives of the design firms and the architects Arets and Coenen. If necessary the project manager will attend these meetings.

6.5 The organisation after tendering

6.5.1 The changes in the organisation

After the tendering has taken place, a contractor will be added to the design team that will complete the phases after final design. This group will function as a building team. Due to the time pressure on the design team during the preliminary and final design phase, it can be expected that this final design will be changed. For the parts of the building where the contractor works on cost reimbursement base this is not a bad situation, because the contractor can show to the architects what their choices cost and he can come up with alternatives. For the parts of the building that are based on a fixed price, the contractor will come up with extra costs if this alternative is more expensive for him. How to cope with design changes in this phase is being explained extensively in chapter 7.

The main structure of the organisation stays the same, but the influence of particular parties will decrease. The users for example, are informed about the way the design develops, but they aren't allowed to make major changes in their demands anymore. The major difference in the organisation is the adding of the contractor to the building team. The main characteristic of a building team is the even distribution of powers. Together the team has to come to an optimal solution. This means that all the leaders of the design partners will have an even right to come up with ideas and remarks. Every team needs a chairman to make the meetings effective and that will be the project manager. The project manager has the role of the client in the team and is in the course of the project used to the balancing of interests. It is also possible to make the design manager or the leader of the construction party the meeting chairman, but this can possibly lead to a situation where the client doesn't have grip on the process. The co-ordination of design information between the parties stays in hands of mister Ummels. More about this is can be found in chapter 7.

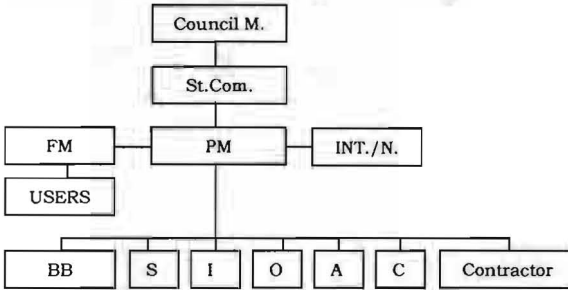


Figure 6.4: the organisation structure after tendering

6.6 Final remark

As remarked before in this chapter, the organisation redesign isn't very different of the original formal structure. The formal structure is however not the same as the real structure. A major difference in the redesign is the different assignment of the tasks to the project manager and the design manager. The reason that the tasks are distributed as they are in the real situation, is because of the specific qualities of the design manager and project manager in this case. It is not known if the project manager in the real situation wants the redesigned distribution of tasks. That is also not the main point of interest here, because that was to redesign the situation to get a optimal balancing of interests.

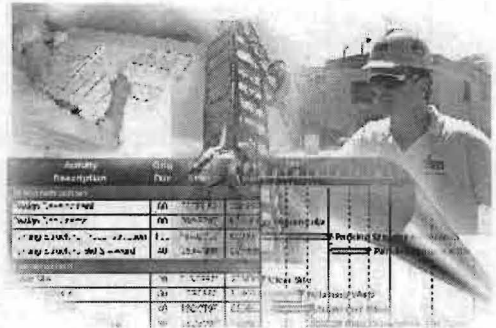
7 Information Management

7.1 Introduction

The management of information involves the handling of vast quantities of information and the dissemination of that information to a great group of interested parties: consultants, clients, contractors etc. In fact to all those concerned with the inception, design, construction, commissioning and ongoing operation and maintenance of the buildings that are the final products of the construction process.

Nowadays as buildings house more complex activities and services the range and the number of participants in the process has increased. Similarly the quantity and diversity of building-related information has expand beyond measure.

Time constraints, economic pressures, changing laws all these factors and many more, have contributed to an increase in the demand for timely and efficient collection, dissemination and storage of accurate and detailed information. Better information flows saves time and money, a better product is obtained and the client aim for value for money is achieved.



It is clear that in the outset of the project a clear strategy will be needed to define an information management framework. This should establish the pattern of information flow though the life of the project and identify the manner in which information will be managed. In this chapter a proposal is made to set up a framework for the Glasspalace. Furthermore this chapter examines how to manage the information flow and especially how to deal with alterations during the building process.

In the actual process the project manager representing the City Council is the central person in the information process. In this chapter he will also be the central person, he is designated as the information manager for the project. Defined are the conditions to manage the process in a more efficient and univocal way. Discussed

is why the single point responsibility of this task lies down with him and what the content of this task is.

7.2 Strategy

Because of the time pressure there was not made a clear strategy how to set up an information management framework. Also the confidence and the enthusiasm in the approach of the City to renovate the Glasspalace has something to do with this. It is important that someone has the overview the information flows therefore the responsibility is laid down by one person. This person must have a clear insight how the process will develop. He must have a central position in the organisation structure so he can manage all the in- and outgoing information. The project manager from the city is the best person to take the responsibility for this job as information manager. He is involved from the beginning of the project, this is also the point were the information strategy has to be determined and were the risks are identified. With the correct strategy the project organisation can avoid these risks.

The information manager has the authority to decide what information should pass. With his central position in the information framework and the fact that he is a member in the steering committee, project team and building team gives him the necessarily overview over the tasks, meetings, contracts etc. of the process. The project manager W. Ummels working by ABBC is not independent enough to make a clear overview of the risks and to solve problems in the teams or committee.

It is important to set out a strategy at the very early start of the project because if we are to make good early decisions we have the greatest chance to do the things right throughout the entire project. The information manager must understand the opportunities that are available, and the pitfalls that must be avoided, if we are to lay down the foundation for an effective information strategy.

Information management is too important 'to just happen' in a project. The client should specify, as part of the initial brief, and subsequently in various contracts throughout the project.

A good strategy will add value and reduce cost of the project by:

- know for certain that participants build new information on the correct information from other parties;
- use of the same specific standards for documents, structuring the project information logically and completely and with procedures for identifying, classifying etc. will lead to a rapid and economic distribution of information;
- eliminating errors in transcription and minimising information re-work;
- improving the quality of information, and so the quality of the actual project.

7.3 Information management

The purpose of information management is that the project outcome unambiguously is being recorded and approved and that always is known which decision documents are valid. Furthermore it must be clear how the information is distributed and how the may be altered. This information forms the basis of the information plan.

The outlines of an information plan are:

- a definition of the information that will be controlled;
- the decision and altering procedures;
- the identification, registration and distribution rules.

It's already mentioned that it is important to do this at the start of the project. Because the effects of the plan are decreasing strongly with the progress of the project and in the beginning the decisions are made with the biggest influence on the project outcome.

7.4 Tasks of the information manager

The project manager of the City will be spending most of his time communicating with many groups interested in the project. Running a project requires constant selling, reselling, and explaining the project to outsiders, clients, participant's etc. Selling the project to the outsiders is now done by the city chairman Seijben, contact with the users is done by the facility manager and the contact with architects and other engineers is done by W. Ummels from ABBC.

Still there is one central person needed who has an overview so he can identified the risks and make sure information flows from the different participants match with each other. Also because of his position he can work as a problem solver. Here is someone needed, who is maybe not full time busy with the project but who is accessible when certain problems arise. With his central position in the information structure he will be constantly informed about the latest status of the project so that he does not walk behind the facts.

7.5 Formal information flow

By the formal information flows there can be identified three kinds of input/output relationships:

- Relationship within a single organisation. All the activities takes place in a single organisation. For the outcome and the connection of the activities the project leader of the participating organisation in the Glasspalace is responsible.
- Relationship between two or more organisations in the same team. For its input activity B depends on the output of activity A, and the activities take place within different organisations. This takes place within the building team, project team and steering committee. Responsible for the co-ordination in the building team is W. Ummels, in the project team and consultation with the neighbourhood the project manager of the City, in the consultation with the users the facility manager and in de steering committee the chairman of culture R. Seijben.
- Relationships between the two teams or the teams with the committee. In the organisation structure there are three levels. Between these levels information flows from team to team or from team to committee. Every formal information input and output goes directly via the project manager of the City. From the information that comes out of the hands of the project manager one knows that the project manager is informed and that it is the correct information he can use. The project manager is responsible for the co-ordination between the teams and the committee.

These lines for formal information does not mean that informal information such as discussions, telephones, e-mails etc. follow the same routes. It must be clear that someone can not claim something out of an informal meeting or discussion. In a design process where different participants in teams work closely together there will be a lot of informal discussions. Because the project manager can not manage the informal information he must be aware of it to know what happens around him. This way he can identify problems in an early stage and solve them. Clear agreements must be made between all the participants to avoid informal information between two different teams or between a team and the steering committee. Informal information could interfere with the formal information. For a clear task division it is necessary that members in a team or the committee can trust the information they get and that it is the same for everybody.

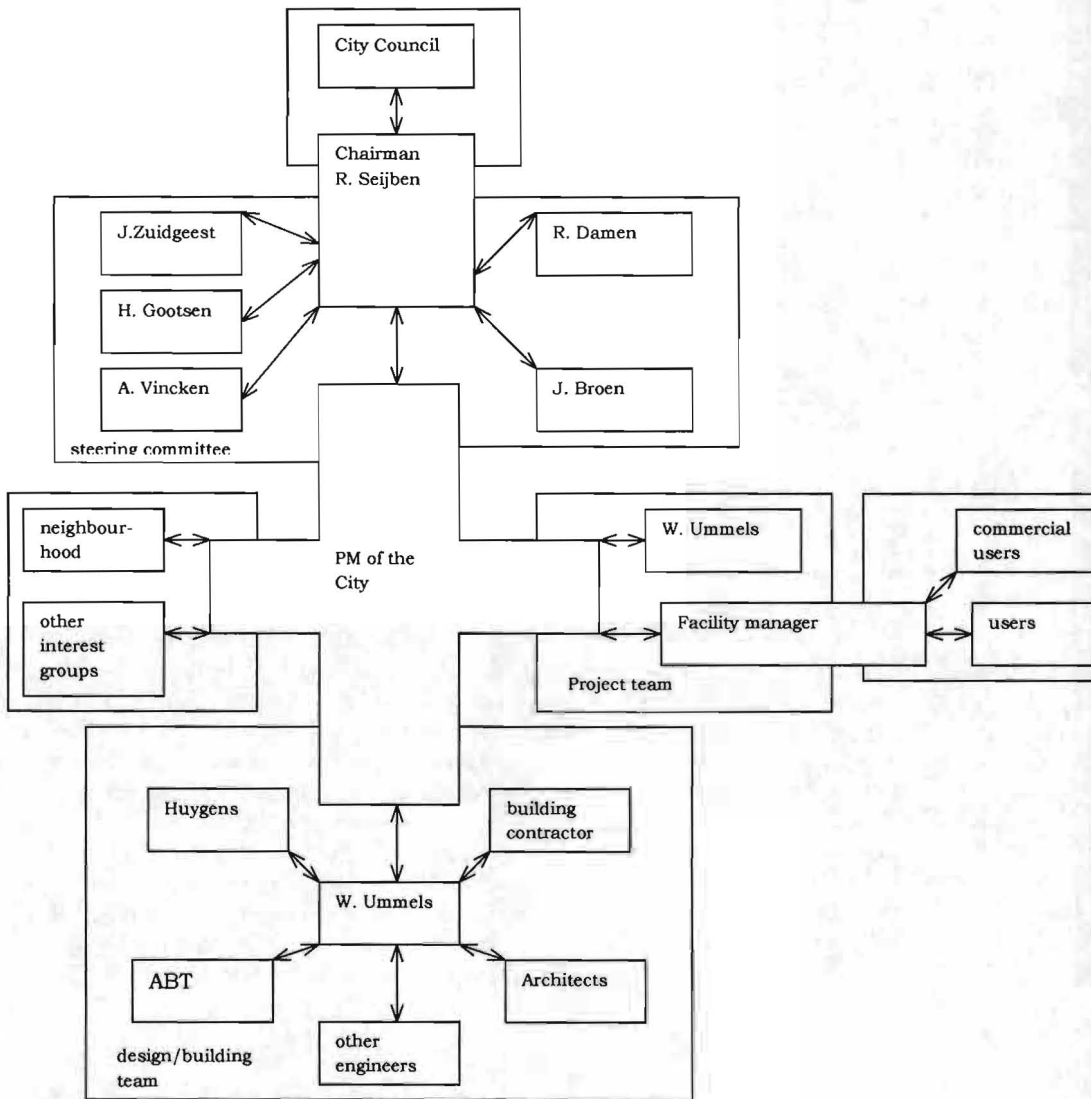


Fig 7.1: Coordination of formal information between the different groups with the PM as central

7.6 Change management

The city council gave the authority to the steering committee to realise the brief for Glasspalace within the budget of 32,6 million guilders. For any fundamental changes in the brief the steering committee will have to go back to the City Council for their approval.

It is already mentioned that there is a permanent brief, which is fixed. The advantage is that there is one document, so all the participant's talk about the same. Another advantage is that there are not any fundamental changes which can lead to adjustment of the design, which most of the time leads to delays.

The disadvantage here to use a permanent brief is that the requirements of the users at the start of the design were not on one line and that there was no feed back with the users over the brief. This leads maybe not to fundamental changes but many small changes can also lead to vague information. The handling of the changes in the brief is now done by ABBC. In this case it is the project manager of the City who is better able to balance the different interest of the participants from the side of the client. This is not because ABBC can not do it better then the project manager but it reduces the risk if there had been chosen a participant who takes no independent position.

With the correct strategy one would have identified in the begin stage that it was not possible to record all the demands and wishes of the users and client in one permanent brief by such a complex project. The reasons are:

- there was uncertainty if every user could be placed in the Glasspalace;
- it was not clear at the beginning of the project who all the users were;
- a decision was made in the preliminary design phase to make an extension were the music school would be accommodated (because the demanded noise reduction would be a problem in the Glasspalace). One could expect that this will lead to changes in the brief.

To handle progressive insight of the wishes and demands of the users and the client on a structural basis it would be better if the City Council had decided for a stage brief in two phases.

Constant contact with the users costs time and can lead to changes that on their turn costs also time. A way to translate the wishes and demands of the users in the brief that wont lead to delays is to make a two stage brief.

First stage is to develop a brief at the beginning which is detailed enough for the architects and advisors to start with the design. After the preliminary design is approved the brief is adjusted with the comment on the design and the further going insight of the demands and the wishes of the users. This brief will then be approved by the City Council and be fixed for the final design.

8 Management of costs

8.1 Introduction

Costs can be split up into investment costs and exploitation costs. The former cost type covers all costs made to actually realise the building such as ground costs, construction costs, costs for interior, also. The latter are costs incurred to maintain the building such as rent costs, maintenance costs and supply costs. Cost control has its primary goal in the realisation of the project on budget.

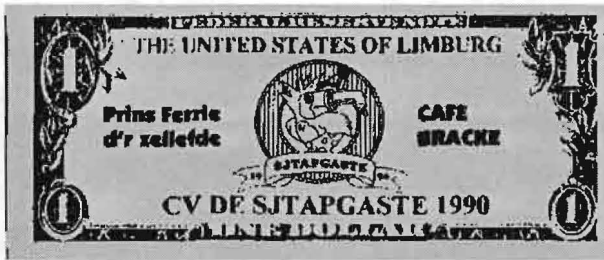


Figure 8.1: Picture of money

The budget forms the reference point which is needed to effect cost control. It is a baseline from which to measure the difference between the actual and planned use of financial resources.

There are different ways to draw up a budget. The chosen way must reflect the goal that has to be achieved with the budget. It must also fit with the way the project is structured and planned. The different ways to compose budgets are discussed in literature [De Groote et al, 1994]. There they are also related to the specific project goals and to the specific project courses. However, none of the described ways of budget composition completely fits with this project.

In this chapter a way to compose a suitable budget for this project will be presented. The composition of the budget will focus on the building costs that form part of the investment costs.

In order to compose the budget the following issues will be looked into. In order to make it clear for what end cost control is going to be used the most important preconditions that influence the composition of a budget will shortly be summarised before. Secondly a way to compose the budget will be defined. Thirdly verification moments the so called budget reports will be established. Between these budget reports costs must also be controlled which will be addressed next. In the last place will be defined who is responsible for the composition of the budgets, the budget reports and the cost control during the design phases.

8.2 Preconditions for budget composition

The following preconditions are of high importance to the composition of the budget and to the way cost control works in this project.

- In the beginning of the preliminary design phase the architects changed the design which in the feasibility had provided for an underground extension. This extension should have housed parts of the Music School and the cinema. They presented a new solution with a separate building next to the Glasspalace which should house the Music School. However this extension will probably not be developed at the same time as the Glasspalace but at a later point in time.
- The glass façade is the most sensitive element in the restoration of the Glasspalace and must be engineered with great care. This is not possible within the short time allowed for preliminary and final design.

8.3 Composition of the budget

In literature [G. P. Groote et al, 1994] various forms to make a budget are developed. The choice for a specific way to compose the budget depends mainly on what has to be achieved with it.

For example with a budget that is composed of budgets per discipline (architectural works, structural works, installations etc.) it becomes possible to control the cost per discipline. With a budget that is composed according to the project progress (foundation, structural works, finish etc.) or the place in the project (basement, ground floor, first floor, etc.) it becomes possible to control costs in the project progress.

Furthermore the choice is influenced by the way the project is organised.

Also, the way to compose the budget is according to G. P. Groote et al [Projecten leiden, 1995] dependent on the building process phase.

In order to make cost control possible there must be a clear understanding about what the budget for building costs consists of. Up to now the following facts are known:

- A budget of ~fl 15,5 million (construction works) which is assigned to the whole project (i.e. the renovation of the Glasspalace and the necessary extension).
- A reserve of about ~fl 1 mln. in case overspending becomes unavoidable.

8.3.1 The choice of the budget form

In this project due to the short design phases and the early tendering various parts of the project will be worked out to a different level in the respective phases.

Therefore the budget has to account for these differences by making a clear distinction between elements that develop at different paces and in different ways.

In the preliminary design phase (before the tendering) basically four elements of the project can be discerned that will be developed at different paces and to a different level of detail. These elements are:

- The curtain wall glass façade. It is very distinct and delicate feature of the Glasspalace which has to be restored in the original state but complying to all current requirements and building regulations. This needs a lot of engineering and it is not advisable to include the façade in the current tendering. It should remain as an approximate estimate with an own budget until it is further worked out and ready for tendering.
- The electrical, mechanical and water installations. The electrical, mechanical and water installations can be tendered with giving performance requirements which have to be specific enough as not to interfere with the architectural design in a later stage. For these installations a budget must be reserved as well.
- The construction works of the Glasspalace. As far as the Glasspalace is concerned the construction works will be tendered according to the preliminary design complemented with a program of requirements (technical, legal and esthetical). This program of requirements contains on the one hand certain elements which already are defined due to the building being on the monument list which means that the building has to be restored as it was. An example for such an element is the rendering of the walls and columns that will have to look the same as of old. A list of all these elements and constraints must be made in consultation with the monument institute and then attached to the tender documents. On the other hand the architects have to define requirements as to material use and architectonic expression and to technical performance.
- The construction works of the extension. The extension will now solely house the Music School which according to the feasibility study [Restoration Glasspalace 'Schunck' Heerlen, 1997] needs around 2300 m² floor space. For the construction works of the extension a cost estimate is made based on index numbers of the Misset Catalogue. Costs per square meter are estimated between fl 1750/m² at a low level and fl 2000/m² at a high level. This results in costs between fl 4mln (with the low square metre rate) and fl 4.6 mln (with the high square metre rate) for the extension which must be fixed in the extension budget.

The consequences for the budget of the construction works are then as follows:

Cost centre	Costs
Construction works Glasspalace, glass façade and installations	fl 11 mln to fl 12 mln
Construction works extension	fl 4 mln to fl 4,6 mln.
Total costs construction works	fl 15 mln to fl 16,6 mln

Table 8.1: new budget construction works

In the building preparation phase (after tendering) the budget will be composed of more parts to make cost control more accurate. In this phase the glass façade will be integrated into the design and will thus form part of the architectonic design. The overall budget will be composed of the following three budgets which in their turn consist of further sub-budgets:

- The budget for the construction works of the Glasspalace is divided into budgets for structural, architectonic, acoustics and environmental engineering.
- The budget for the construction works of the extension is divided into budgets for structural, architectonic, acoustics and environmental engineering.
- The budget for the electrical and mechanical equipment

8.4 Budget reports

At certain moments in the project course budget reports are drawn up which form part of the decision documents. At these moments the budget is put to the test with the cost estimates and/or the already effected expenses. These are the points in time when the budget may be adjusted and a new budget fixed or the design cut down to meet the budget.

Budget reports will be drawn up at the following points in the project course:

- At the beginning of the preliminary design
- After the preliminary design is ready (before tendering)
- After the contractors bids are available
- After the final design is ready
- After the specification of the glass façade is ready
- After the building preparation phase
- After the execution phase

The manager of the design team and later the manager of the building team are responsible for the drawing up of these reports.

8.5 Cost control between the budget reports

One of the major points of attention in this project must be the cost control during the design phases.

In the preliminary design phase the architects work with performance requirements and the cost consequences of the prescribed performances must be made clear already during the preliminary design phase. Otherwise the incoming bids may exceed the budget to a degree that may be hard to adjust. A cost expert must therefore support the design manager and regularly evaluate the design decisions and the performance requirements. This expert will also give advice as to better (cheaper) solutions.

In the building preparation phase the task of this expert is particularly important. Due to the chosen contract the building contractor will get all the costs reimbursed which exceed the bid. As laid down in the building team contract the builder must bring in his knowledge of execution in order to find the economically most advantageous solution. However he may tend to present a solution as most advantageous that is not the cheapest. The architects for example will look for the architectural best solution and in this area of tension it is useful to have a third opinion coming from a cost expert.

This expertise can be present in the person managing the parties of the design- and later building team or it can be hired in as an additional advisor.

8.6 Competence and responsibilities

The manager of the design team and in later the manager of the building team are responsible for staying within the agreed budget. These managers are responsible for the drawing up of the budget reports and are answerable for them. The budget reports have to be checked and approved by the project manager.

If cost estimates show that overspending is imminent the project manager has to be informed immediately and he has to give approval.

It is advisable to determine a certain margin within which the design manager may decide on his own about the course of action and shift with budgets.

Adjustments of the budget are only possible at the agreed moments and need the approval of the project manager. If the budget is exceeding substantially the project manager has to inform the steering committee and ask approval of it. In this case it is advisable as well to establish a certain margin within which the project manager can decide about reallocation of financial resources.

9 Time planning

9.1 Introduction

In this chapter the project planning is discussed. In the first paragraph the chosen project phasing is addressed. As this project will be contracted with a phased performance requirements contract the phasing differs from the conventional phasing and this will be looked into. Next the composition of the planning is discussed. Subsequently the moments in time of the process are established when the planning will be refined or when a new planning is made.

Then a WBS for the scheduling of the preliminary and final design phase is presented. Using these WBS a schedule for the preliminary and final design phase is made as well as an outline for the building preparation phase.

The chapter concludes with an outline of the monitoring system and with the distribution of responsibilities as far as the planning is concerned.

9.2 Phasing

The standard phasing of a building process distinguishes according to Groenveld P. J. M. between six phases [De design manager, 1998]. These are as follows:

- Initiative
- Definition
- Design
- Preparation
- Realisation
- Maintenance

Branch organisations however have tried to provide special project phasing which more or less follow the standard model but try to give more detail by subdividing some phases.

The Glasspalace project is already in the design phase and the point of departure for this report lies before the beginning of the preliminary design phase. For the subsequent phasing the model of the Dutch preliminary standard (NVN 2574) is used. But as this project will be carried out with a phased performance requirement contract the phasing of the project will be adapted in the following way:

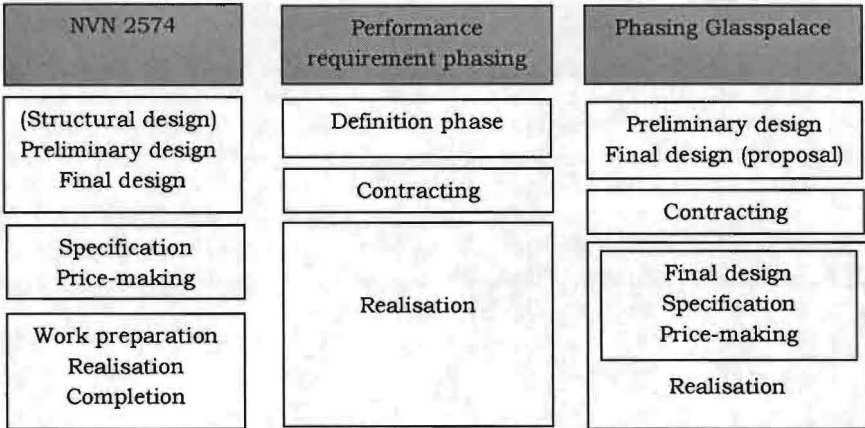


Figure 9.1: Phasing of the project

After the preliminary design is completed and performance requirements are determined the works are tendered. The design team however is going on with the final design to have a basis to negotiate over design solutions when the contractors' bids are coming in. The final design is subsequently worked out together with the contractor. The same happens in the specification phase and building preparation phase. The final contracting sum is fixed at the end of the specification phase.

9.3 Composition of the planning

In this project the project manager in co-operation with the design manager draws up a master schedule of the whole project. In this schedule the most important milestones are set down. The master schedule has also been adopted by the building contractor and other subcontractors.

Subsequently taking the master schedule as basis a planning for the design process until the completion of the final design phase is made. This planning is drawn up by the design manager who has to take into account the needs and demands of the members of the design team. In this report the time schedule for the design phase and an outline of the preparation phase are drawn up in the planning chart in Appendix 2.

The design manager also makes a draft of the planning for the preparation and execution phase which will be worked out further in co-operation with the contractors once the building team is formed.

In the next paragraph the points in time are defined when the planning are made and refined respectively.

9.4 Refinement of the planning

According to Groote et al [Procesontwerp Luxor, 1999] the planning of a project or parts of it are only to be made or refined at a point of time in the process when decisions can be made about all components of the project. This commonly occurs near milestone dates or at the end of project phases.

In this project planning is made and refined respectively at the following moments:

Moment in process	Sort of planning
<ul style="list-style-type: none"> When commission is assigned to ABBC 	Master planning + planning of preliminary and final design phase
<ul style="list-style-type: none"> When contractor is commissioned 	Adjustment of planning for final design phase
<ul style="list-style-type: none"> When final design is ready 	Planning of specification phase and outline of execution phase
<ul style="list-style-type: none"> When final contract price is determined 	Planning of execution phase

Table 9.1: Refinement of the planning

In the next paragraph is explained how the work packages are derived that are used in the schedule.

9.5 Work break down structure

In this case various parts of the project are developed at a different pace. To make scheduling possible it thus becomes important to make a 'work break down structure' which accounts for this process.

Firstly, it was chosen to split the project into the Glasspalace and the extension. The renovation of the Glasspalace forms the main point of interest whereas it is not sure yet whether the extension will form a part of the contractors assignment. The Glasspalace is then broken into tasks which fit the way it is developed (and tendered) that is to say it is broken into the tasks 'building', 'installations' and 'curtain wall façade'. The extension is only broken into 'architectonic' and 'installations'. Due to the very short preliminary design phase the extension won't be developed as far as the Glasspalace.

The following WBS was created for the preliminary design phase:

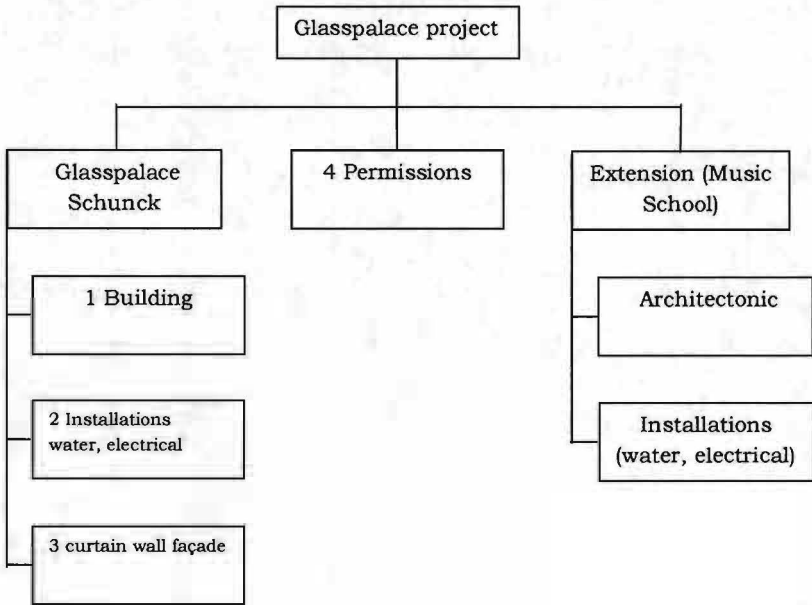


Figure 9.2: WBS of the preliminary design process

In the final design phase a similar 'work break down structure' is applied. The task structure of the Glasspalace remains the same but the one of the extension is broken into more tasks. In this phase the design for the extension will be further worked out but still will remain in a rudimentary stage. The WBS for the final design phase looks as follows:

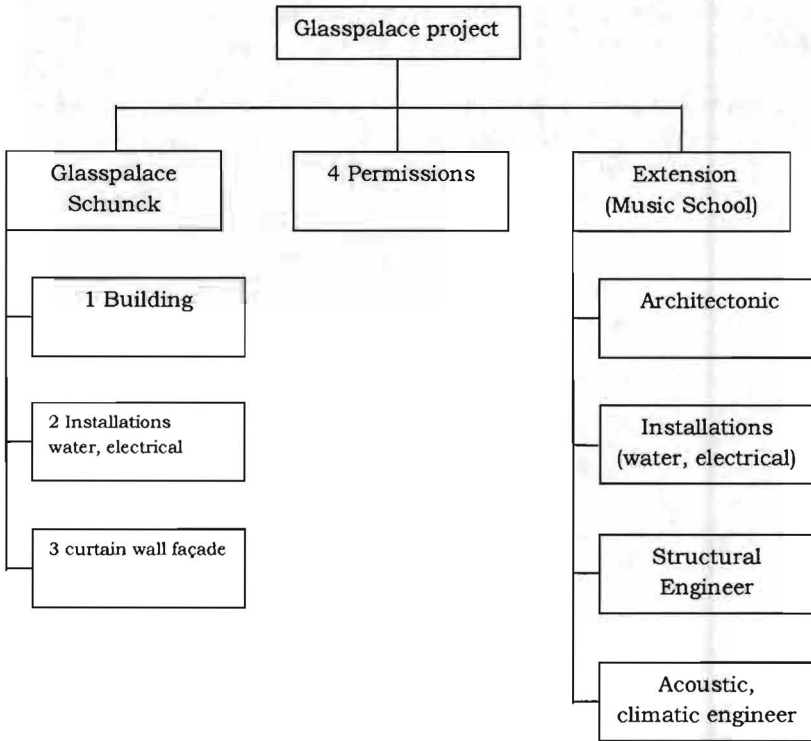


Figure 9.3: WBS of the final design phase

In the building preparation phase the building contractor and the installation contractor are members of the building team and the design will be developed with their co-operation. The 'work break down structure' in this phase uses a discipline oriented approach for both the extension and the Glasspalace. The glass façade will by then be integrated into the architectonic design.

9.6 Schedule

The planning chart in Appendix 2 represents the planning for the preliminary and the final design phase with an outline planning of the preparation phase. The planning for the final design phase will be adjusted when the building contractor is assigned the commission and joined to the building team. This adjustment however may not influence critical milestones that are laid down in the master schedule. If it does approval has to be asked for of the project manager.

Important points to point out are the investigation phase. In this phase the Glasspalace is thoroughly inspected and measured while at the same time the brief is updated and revised. After the summer holidays (of the building trade) the preliminary design can be started which will leave more time to work out the design than in the current process. The drawing up of performance requirements is also scheduled and proper attention can be paid to that important step.

The dates of the tendering and selection procedure remain the same as in the present situation so that tender documents have to be ready by week 43.

The planning of the final design phase is split into a part before contracting the building contractor and one after that. The tenders must be in by December 8th 1999 (as in the present situation) and the contractors (building works and installations and probably also the façade) must be contracted by week 51. Until the end of January the final design will be worked out by the respective participants with co-operation from the contractors. Depending on the development of the façade the application for the building permit will be possible at the end of March 1999.

The outline of the preparation phase shows clearly that enough time must be reserved for the application for a permission from the monument institute and still more important for the consultations with the different participants that can influence the decision on the monument permission.

9.7 Monitoring of progress

Until the assignment of the contract to the building contractor it is of crucial importance that the various results are delivered on time and with the right quality. The planning will help to comply with the scheduled milestones but nevertheless the project progress has to be monitored.

In the design phase (preliminary and final) it becomes necessary to determine a number of milestones when the project progress is checked. Parts of the planning that lie on the critical path will be divided in a greater number of milestones. In the specification phase the project progress is monitored by milestones as well as weekly progress reviews. This is necessary in order to guarantee a timely completion of the specification phase. Just with the specification (and the final

design) it is possible to apply for the monument permission which in its turn is compulsory for receiving a building permission in this case.

In the execution phase the project progress will be monitored weekly on the critical parts and every two weeks on non-critical parts.

9.8 Responsibilities

The project manager is responsible for the drawing up of a master schedule of the whole project. This is done in co-operation with the design manager.

The planning for the different phases are put together by the design manager. If they differ from the project's master schedule the project manager must give his/her approval first. Otherwise it is the responsibility of the design manager to see that the design is executed according to the planning and delivered on time.

The monitoring of the project progress is the responsibility of the (staff of the) project manager. Reports over project reviews have to be approved of by the project manager.

10 Epilogue

Although the redesign, with respect to the chosen collaboration form, the tendering form and the contract type looks the same as the original process design (Bouwteam, closed tendering and multi-phases performance requirements` contract) there is an essential difference: the strategy for the original design process, which should serve in the first place the interest of the City Council of Heerlen, was chosen by an external party Bureau Bouwkunde. By leaving the making of vital process decisions and the translation of them into contracts to an external party an unbalanced allocation of risks between the different participants has been the result. (See: Fig 10.1).

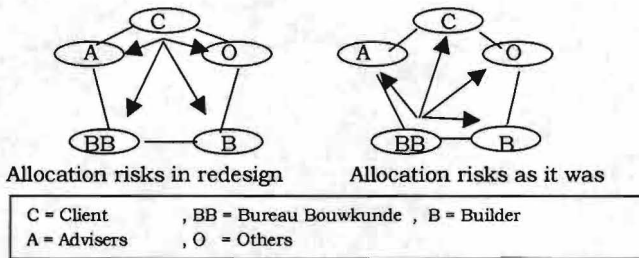


Fig. 10.1: allocation of risks

With the redesign we propose the City Council of Heerlen to bring in their own professional management expertise (by contracting a consultancy). This person must be able to form the best suitable strategy for the process in the interest of the City Council and establishes the collaboration form and other related decisions, before other participants like Bureau Bouwkunde are contracted.

Also for this reason the *organisation structure* has been changed in the redesign. The most important reason was the very strong influence of Bureau Bouwkunde in the original process. Therefore the management tasks of the project manager and Bureau Bouwkunde were modified. In the redesign Bureau Bouwkunde only has tasks that are directly related to the management of the design process. All the project management tasks are now given to the project manager. Another important change in the redesign is the direct connection of the users, neighbourhood and interest groups to the project manager. In the original process the first group has an unclear position and the last two groups don't have a formal position at all.

The way the *budget* is composed in the redesign does not differ from the way it is composed in the real project. Both budgets are split up into four parts i.e. the extension with a new part, the renovation of the existing part, the installations and the glass façade.

With respect to the *time planning* the final design phase in the redesign is divided into two sub phases, one before the contractor is awarded the work and one after that moment. The final design phase therefore takes until March next year as where in the real situation the final design must be finished already in December this year. In the redesign more time is created for the making of the final design, advise of the contractor can still be brought into the design and less time will be needed for the preparation phase.

In the actual building process there is a part time project manager of the city Heerlen responsible for the co-ordination of the information between the steering committee, the project team and the design/building team but in fact W. Ummels is the information manager. In the redesign there is a the full time project manager responsible for the information. In this central position in the organisation structure he steers and co-ordinates the information taking into account the interests of the city. For all the formal information he receives he sends a confirmation message in return and only after his approval this information is sent to other participants.

In the final presentation it was noted that Bureau Bouwkunde is an excellent qualified party for playing the role of the project manager in the interest of the client for complex building projects such as the Glasspalace "Schunck" in Heerlen. But since they had taken in this project already a partnership with the architects, an optimal balancing of interests is not guaranteed any more. Now it is all depending on how good Bureau Bouwkunde is able to switch hats if necessary.

Appendix 1

Definition Performance Requirements

Definition according to 'Bouwbesluit', the Dutch building regulations:

a regulation that is concretised in degrees or numbers, pointed on a certain quality of a structure or part of a building and must achieve a limit that unambiguously can be measured.

All the requirements in the 'Bouwbesluit' are composed in the form of performance requirements. In that way it matches with the working of performance requirements. The use of performance requirements also can have advantages for the planning permission. Through the use of the 'equal statement' one can deviate from the requirements of the 'Bouwbesluit', if one can prove that the plan complies with the objectives of the building regulations and also is equal to it. According to the method of working with performance requirements from the 'SBR' the architect makes a three dimensional design without defining materials. The desired quality of the building is described in performance requirements. In an aesthetic statement the architect can state one's aims for the aesthetic intentions. Performance requirements are matching with this process in which there is a tendering in an early stage and there is still a lot to work out in detail.

Definition according to the 'SBR' (institution of building research):

a quantitatively described quality that contributes to the function performance and that is independent from the used material or the use.

Working with performance requirements gives the building contractor the freedom to determine which materials and which building techniques will be used. This gives the building contractor more responsibility for the technical quality of the project: the obligation to make an effort shifts to an obligation to deliver the demanded result. The building contractor must have the knowledge and experience to do a reliable assumption about the costs. Because there is at the moment a lot of work for contractors it is questionable if there are any contractors who will do this. Further the contractor is taking a higher risk which he will calculate through in a higher calculation.

The contract between the building contractor and the client depends much on the risk the client wants to take and the influence he wants to keep on the design process. The greater the influence from the client, the higher the risks he has to take.

We are dealing here with a monument which appearance and structure is going to be restored as much as possible as they were originally. For building parts such as the façade, which is going to be designed in a later stage, it is still possible to register performance requirements for the tendering. Their can already be sorted out to which strength-, physical-, maintenance requirements etc., the façade must meet. Also there can be made an aesthetic statement of how the façade must look like. But architects as Jo Coenen and Wiel Arets want to hold control over the aesthetic results of the design process. This conflicts with the influence the building contractor has on the design because he makes a proposal on which he has made is calculation. The great difficulty is not the tendering of the project on the basis of performance requirements but the influence the architects still want to have in the further phases. Because a contract is being made on the basis of the solutions the building contractor makes for the performance requirements. Therefore an approximate estimate for the façade is a solution to hold the influence on the final designing in the hands of ABBC. Further there is the possibility to tender the façade traditional in a later stage when it is final detailed. However there are a lot of building parts of which in this phase no performance requirements can be determined, because there is not even a clear structural design in which it is made clear where de different users are placed. Further there are still negotiations with the users about the requirements. The users are not on one line about the lay out of the Glasspalace and the different requirements have some discrepancy.

To work with performance requirements one must control to what extent the brief fits with performance requirements.

To hold influence over the design one could:

- make use of approximate estimates and a/or phased contracts;
- in the final design phase collaboration with the building constructor one could make more detailed agreements for the design solutions;
- also there can be made not only performance requirements but also product specifications. It's important to make specifications about products that determine the visual perception of the building.

Appendix 2

Planning chart re-design



ADMS-PUBLICATIES

Dit boekje is een deelproduct van de post-doctorale technologische ontwerpersopleiding Architectural Design Managementsystems (ADMS). De kern van deze opleiding bestaat uit een aantal blokken waarin de cursisten ADMS-thema's uitdiepen. Dit kan plaatsvinden via een literatuurstudie, een workshop of een praktijkverkenning. Elk blok beslaat 10 a 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-publicaties.

ADMS is een twee-jarige postdoctorale kop-opleiding 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 TUE. 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 project-ontwikkeling-maatschappijen, organisatieadviesbureaus, grote bouwbedrijven en bouwbureaus van beleggingsmaatschappijen.

- 11 **design management**, onderzoek naar de positie van de design- en project manager
- 12 **casestudy glasspatace 'schunck' heerlen**
- 13 **kennismanagement**, efficiënt gebruik en beheer van kennis in de bouw
- 14 **projectaanpak nieuwbouw hoofdkantoor**
- 15 **modellering van het ontwerpproces**, een proces-choreografie

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