THE DESIGN PROCESS
Preface

This paper is part graduation studio SADD (Strategic Architectural Design Development). In this document the focus will be on showing the way of working during the design process from February 2012 till April 2013.

The design development and understanding it better is the aim in this studio. With an urban design, architectural design and the building technology this project in very wide orientated. We learned to investigate different design strategies and designs to develop our conceptual design ideas into a worked-out design with an scientific and more technical approach.

The design project in this studio is the UN Environmental Council (UNEC). This will be the Headquarters of Sustainability for the United Nations and from this location they want to coordinate the global developments on sustainability and investigate the global environmental issues.

On the following pages there is a reflection on the my design process during this design course. On the next page you will find the content with the different chapters in which I explain the project and the design process I used.
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Introduction

**UNECD - United Nations Environmental Council**

The last decennia people get more aware about their environment and the global sustainability issues. The thinning ozone layer, the rising of the water level and the shrinkage of the rainforest are just a few examples of issues people discuss about. On the other hand there are lots of developments, big or small, to solve these problems. To make it more effective and accelerate these developments there must be a powerful organisation.

The UN Environmental Council, will be the headquarters of Sustainability for the United Nations and from this location they want to coordinate the global developments on sustainability and investigate the global environmental issues. With the power and knowledge of the United Nations, the UNEC must take a leading role into the world containing the global sustainability issues and developments.

The knowledge of the UNEC are separated in four different groups which will get a place into the new headquarters:

- Collect: collect research material and publish reports;
- Produce: produce the policy for propagate and exchange of knowledge and reports;
- Propagate: propagate the knowledge to citizens, corporations and governments;
- Exchange: exchange knowledge with countries, regions, and science and commercial parties.

**Problem statement and goals for the project**

Problem statement:

- The UN Environmental Council will host different groups of visitors, like tourists, delegates and Employee's of the United Nations. How can we solve the safety issues for those groups but still making an building for all those users?
- The building is the UN Environmental Council which deals with environmental and sustainable issues. The building should represent this sustainability.
- Manhattan is characterized by high buildings. How can we design a building which is specific for this site. The structure of the city of New York is strict and the area of the United Nations is an exception to the grid structure within the city. Should we see this site as part of this grid or should we give the exception of the compound in the Manhattan grid a role into the design?

Goals:

- The urban design should give the people access to the waterfront;
- The urban design must be a valuable addition to the public life of Manhattan;
- The urban design must be a part of solving the problem of the lack of green in Manhattan;
- The UN area is autonomous and by that reason independent of Manhattan. This should come back in the urban design;
- The building should have a clear position within the urban context of the existing UN compound;
- The building should have a clear and strict division between public and private (employees/delegates);
- Because this building is headquarter of the UNEC it should be considered towards sustainable designing;
- The building should be interesting and contains unique places;
- The building character should be strong and authoritarian towards the international and local community.
Kenneth E. Boulding (1956) distinguishes in his hierarchy system different complexity levels. Characteristic with this is that the complexity throughout the different levels increase chronologically. Every higher system level carries the characteristics of all the previous system levels.

The process of allowing new and detailed influences step by step can be compared with the zooming in of a camera. A camera with zoom lens can frame a complete landscape and by zooming in can define more and show more details of for instance trees and zooming even further the branches and leaves.

The process expires from a wide field of view wherein the relations on a specific level between the different subsystems become visible, until in the end a smaller viewing field becomes clear in which the different parts are researched this however can happen at the expense of losing the overview and the consistency of the different parts. One can divide this process into different steps. In this connection one talks of different levels of aggregation. One even speaks of the aggregation stadium.

Focused on the design process this analogy of the system hierarchy of Boulding can be divided into different levels and can be ordered hierarchical compared to each other.

This means that decisions made in a certain level are used as principles for the next levels. This structuring of levels implies that the decisions made in every level, seen in time, are made after each other. This seems logical, but after closer analyses of the design processes it shows that one is hardly trusted with it.
Use of different techniques for generating solutions

Many great architects and even entire offices have their own method. The Force is in the Mind; the making of Architecture (Krashny, 2008) addresses a number of methods of various offices.

For generating principle solutions a large number of different techniques can be used. (Computer)models, (construction)drawings, diagrams or concept sketches are made with these techniques (sketching, painting, modelling, shaping with the computer). Not only the medium affects the outcome here, also the depicted image (principle sketch, plan, elevation or section).

Important is to present the alternative solutions in physical models, to make them easily readable for everyone.

Use of models during the design process

In Ontwerpsystemen, een inleiding tot de ontwerptheorie van Richard Foqué (1975), a number of models of the design process are analyzed. Foqué compares several models and names the strengths and the weaknesses. He writes about the educational value of the models: “It opens new perspectives for the designer himself, creating a critical awareness with respect to his own actions and expands his horizon.”
Basic cycle for a methodical approach

**Phase 1**
*Exploration*

- Provisional analyses, provisional starting points and goals

**Phase 2**
*Critical reflection*

- Definitive starting points, definition of the problems and goals

**Phase 3**
*Divergence*

- Generating a diversity of principle solutions

**Phase 4**
*Convergence*

- Predicting the consequences of the solutions
- Formulating criteria out of the goals

**Phase 5**
*Decision*

- Decide the best solution
- Testing the models to the most important criteria

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**Second line of working**

The attitude in the second line of working is one of reflection for the experimental working methods.
Research and development of the facade

As a case study to explain my design process I will use the facade of the horizontal part of the building.

This part of the building will be a two story high plinth of 75m by 190m and contains several functions of the three main user groups which are the visitors, delegates and employees. Behind the each facades there is an different function. These functions are located by orientation, view or the need of sunlight.

1. North: Auditoria - No need for direct sunlight;
2. East: Restaurant - View over the East river;
3. South: Meeting rooms - Sunlight and orientation to the park/square;
4. West: Exposition space - Northern sunlight and exposition for the city;

What I wanted to create was a uniform character for this plinth. For my it meant that all the facades must have the same kind of design and materialisation. But when we look at the functions behind these facades we can see a big difference of usage. So how can I make uniform facade but still got the difference of usage of these facades in mind?

Phase 1:
I started searching for all types of facades in magazines, books and on the internet. I found a lot of interesting facades which were not all immediately met my goals but I wanted to keep a wide orientation in this stage.
Phase 2:

Out all of these facades I made an selection of 9 types of facades to investigate further. Those were the most interesting facades in my opinion in relation with my goals for the character for the facade design. I used the 3D modelling program Sketchup 8 to see how these facades would react on my model. I used 3D modelling instead of handmade models because it would get a more accurate en detailed result.

Investigating interesting facades on the model

Phase 3:
With the 9 tested facades I made combinations to see if there would be an in-between form which matched better than the tested ones.

Phase 4:
The outcome of this investigation was a proposal which exposed the two stories of the plinth and also would give me the possibility to use and design it for all the sides of this horizontal element. The facade would contain horizontal bands and in between story-high elements with glass and another not at this point decided material. I researched this proposal on the ratio between open and closed. What would be the exposure on the outside and how does this react on the space inside?
Phase 5:

I found out that the inside space behind the South facade needed an extra layer. One layer of glass and one layer in front of it. To give the facade an extra layer it would give me more possibilities for a flexible program and the second layer could be barrier between the meeting rooms on the ground floor and the public square and also could provide sun shading.

The second layer would contain story high vertical fins. How big must be the distance between these fins and how deep could a fin be?

Phase 6:

This proposal worked good on the South and East facade but the North- and East facade didn’t need the shading for the sun. In these cases the vertical fins would have the same measurements as the Fins on the other two facades but the distance between the layer of glass and the layer of fins would be more closer. With this proposal the facade would get on all the sides of the plinth the same character and materialisation. But what must be materialisation of the vertical fins and the horizontal bands?
Phase 7:
For me the UN is a powerful organisation which stands for giving structure to all kinds of global issues and initiatives. This I want to expose into the whole design so also in the facades. If we talk about sustainability and the environment the nature is the first thing that comes in mind by most people. And if we ask where they thinking about if we asked them about a natural building material most of them would say natural stone and wood. I wanted to use this for the facade, because it is the first thing you will notice when entering the site. Natural stone is also used for the facades of the existing UN building in the compound. But because these building are built into the 1940’s the natural stone hasn't got the same colour anymore. For that reason I didn’t want to use this material because it wouldn’t match. What I used of this facade was the system of panelling. A recognizable structure in which the natural stone elements are put in. Because I didn’t used the stone I could search for a material what could have this structure. I also search for a more lighter material so the construction behind it could be more lighter for the reason that a lighter construction and materialisation would be more sustainable. I've chosen for white aluminium panels which will follow the same grid as the vertical fins (1200mm). For the fins I used wood. This for the natural character. Nature can through this fins also contribute to the design, because the wood would weather over the years. The building will change due to the climate. The inner layer will consist of a combination of wood and aluminum window frame containing triple-layered glass. These window frames are also part of the recognizable grid and for that reason the will be visible.
Reflection

In February 2012 I started in this studio. For me it was the fourth time I tried to graduate. It was the second time I did the SADD studio. So I did know what I could expect. I chose this studio for the second time because I missed the building technology in the other studio (RMIT two times) I did. Although the building technology semester started in the second half of the graduation year we were thinking about it just from the start. When I now look back on the whole graduation period I think it would be better for me personally when the building technology was integrated into the first semester of this studio. Because I did the SADD studio once before I also did the side-courses. For these courses I've got positive results. This meant that I could skim them this time. I've noticed the second semester that I missed some dept into the research what probably won't be the issue when I did these course in the same time with this graduation period. Besides this I had also some different difficulties in the project. When you have a great feeling about a certain part of the design and work that out and not searching for alternatives. Of course the scientific part is missing. Our architecture tutor ir. M.C. Korpershoek and also our building technology tutor ir. H. Plomp warned us about this problem and it helped me to make my design much better. Now when the graduation is finally there I am very satisfied that I did the SADD studio for a second time. I've learnt a lot of our tutors. Most of all in the way of thinking about architecture and the layers behind it. These lessons I will take into my professional life.
Notes


Research on Urban design for SADD (10-06-2012) TU Delft


Dr. Ir. I.T. Boekholt (2000), Ontwerpend leren, leren ontwerpen. Eindhoven: Faculty of Architecture