

REFLECTION PAPER

Harvest Hub: building with the existing

Reflection paper

The Harvest Hub

The Harvest Hub:

Building with the existing;. showcasing the potential of reusing depleted building components in architectural design.

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This paper is a reflection on the process of my graduation project at the graduation studio Architectural Engineering. It considers the influence of thematical research on the architectural design proposed at my graduation. The graduation project is about the potential use of reclaimed components in architectural design. It investigates as well a programme that stimulates people to become aware and learn about sustainable design principles including the reusing the existing built environment, as well the technical and logistical obstacles that occur during the process of reusing materials.

- Maaïke

1. The relationship between research and design

The Architectural Engineering (AE) design studio starts off with defining a fascination. This fascination is translated into a research theme which will later on shape the design. To me this meant focussing on a circular building method, since the linear waste system we live in has bothered me for quite some time. During my graduation I had the opportunity to learn more about alternative ways to approach the shaping of our built environment. The AE studio proposed the neighbourhood Amstel III in Amsterdam as a project location seeing that the municipality of Amsterdam envisions this office area to be transformed in a mixed-use residential area by 2030. This gave me the opportunity to think about a strategy that proposed a circular redevelopment. The plans made for Amstel III described that 26 office buildings had to make place, which would result in over 220.000 tons of waste if the redevelopment was carried out along linear system. For this reason, I focussed my research on how the existing built environment could become of use instead of generating enormous amounts of building waste. This has led to the following research question: How can reclaimed building components from office buildings dating from 1980-2000 be implemented in architectural design?

At the beginning of my graduation project I had not yet a design goal or question. I planned to research the urban mining process and the potential of the materials and components, before defining a program and formulating a design question. The conceived results of the research were a database of available components and a value assessment of their quality and potential, which could be translated into a decision tool (flowchart). I opted these results to be a significant starting point for design. However, throughout the research process I found out that I needed additional research and a different way of thinking to come to my design programme and design concept; the technical could not provide an outcome for all design decisions that needed to be made. After the decision to focus my design programme also on a chain in the process of urban mining, I started a more in-depth research into the site, programme and social influences. By this, the initial research became complemented with side research into education facilities, community centres, storage systems, routing, experience and many others. In the diagram below (see figure 1) an overview is given of the several research topics and its influence on the design process. A distinction is made between initial plans and added research and influences.

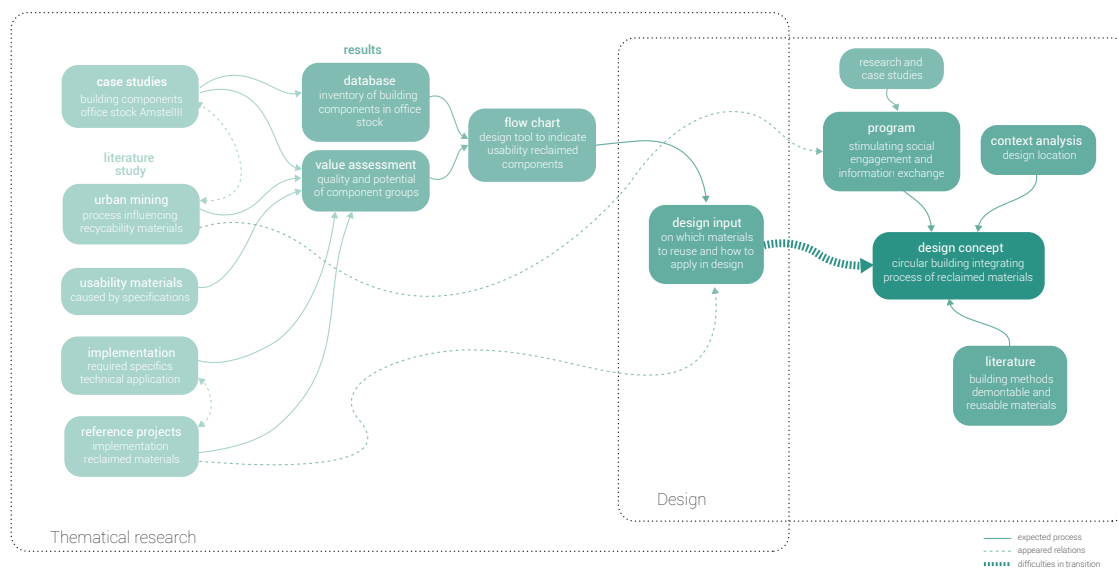


Figure 1: relation between research and design. (own image, 2019)

In general, can be concluded that research has been very important during my graduation project and of significant influence on the design. The general research about the urban mining process has affected my decision for a design goal and programme, while the initial thematical research was consulted in a later phase of the design through consulting the inventory of components and making use of the toolbox I developed.

2. Relationship between graduation topic and the AE studio

The decision to join the AE studio for my graduation is originated in a frustration that during my education sustainability has only received very superficial attention. While my interests during the master programme moved more in the direction of architecture in practise and the future of our built environment, several obligated courses solely focussed on the poetics and aesthetics of architecture. The AE studio provides the opportunity to put a sustainable focus first, or at least position it in on the same level as the use and aesthetics of a building design. This means that sustainable design tools are not put into the design in the end to make the numbers right, but guide the design and make it possible to great a truly integrated sustainable and innovative design.

The studio starts off with a pitch, in which I focussed on reuse and recycling of plastics. In the second week, the graduate students have to define a thematic fascination, program and context. As shown in figure 2, I was not yet sure where to focus on specifically. I was determined it should relate to reusing the resources within the area of Amstel III (figure 3). I knew nothing yet about the urban mining process, but was highly triggered by the introduction lecture on this topic given by a previous graduation student. My technical research became more specific, while my programme was not yet defined. As previously mentioned, the decision of the programme followed later when I learned more about the struggles and needs of the urban mining process. This resulted in a programme that intended to stimulate the transition to a circular built environment making use of the urban mining process. The design would give place to the component streams within the area and would create a place to exchange knowledge among professionals in the building sector and within the local community.



Figure 2: technique, program and context (own image, 2019)



Figure 3: reusing resources in Amstel III to stimulate redevelopment (own image, 2019)

3. Research method and approach in relation to the graduation studio

The Architectural Engineering studio divides the graduation project in two parts: (1) the thematical research, which takes place in the first semester, and (2) the design, which starts at the end of the first semester and continues in the second. A quite harsh distinction, while in reality the relation between research and design is not always perceived linear; design and research stimulate and improve one another. Although it gives a certain freedom to just research without considering design implementations and solutions, it might also result in a bunch of information which is hard to incorporate later on in the process. Therefore, I regret not knowing earlier my design direction and incorporating the research topic better as part of the design process.

My thematical research can be divided in different phases, which are presented in a certain order, but has been researched parallel: (1) creating inventory of components, (2) defining conditions of components, (3) studying potential implementations along case studies, (4) defining potential value of components and (5) creating a tool to determinate potential of building components. These steps resulted in determination which components are highly valuable to reuse. The flowchart was designed as a tool to use when considering an individual component for its reuse potential.

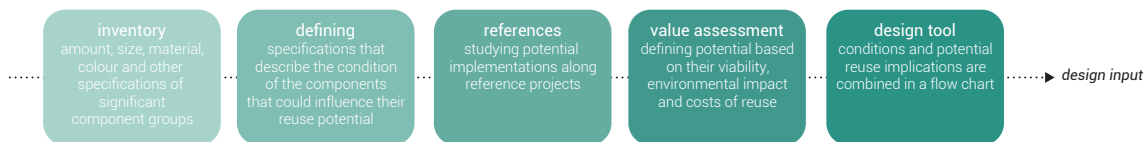


Figure 4: phasing of thematical research

Personally, I had a hard time to start of designing with this information. This, because the information about the components was still quite generic and therefore the implementation possibilities numerous. At P2 my design therefore was lacking a clear direction and had to be reconsidered. A better starting point I found in the existing IKEA building located in Amstel III. This was not yet proposed to be demolished, but one can expect it has to make place for a green park considering plans of the municipality for the area. The Ikea building provided a framework, which helped me to formulate design goals and find parallels between my thematical research and design. Looking back, I think it has been a good decision to retake my P2, since it made me decide quite early upon a design location, shape and vision, which speeded up the design process in the second semester.

Through the use of case studies and looking at references regarding schools, educations centres, storage facilities and other programmatic aspects, an impulse was given to further specify the meaning of the programme. Towards P3 I sketched several floor plans and did mass studies on how to implement the large programme I envisioned and to find a balance between the enormous building and the human scale. At this phase, I experienced it as very difficult to let the reclaimed components guide me in the design. It felt a bit like I was waiting for the pieces of the puzzle fall together out of nothing. After P3 I tried to change the way I approached the use of reclaimed components; no longer I tried to incorporate all components, instead I looked from the perspective of the needs of my design. This was the step I needed to design really with the reclaimed components and to apply them in creative solutions. I defined the character of the building and what the experience for the different users had to be along a storyline. After, I explored in what way I could answer to this in terms of reused components and their creative exposure. This way the reuse of components was not anymore just for the sake of reuse, but took more a facilitating role for the architectural ambition. I learned that through the combination of elaborating on the users, the experience and incorporating this with technological aspects, the design becomes more elaborated. Looking back, I think these two approaches were both needed in the process, but the transition turned out difficult and it really felt like walking through a maze full of error and trial.

4. Relation to the wider social, professional and scientific context

In the recent years, sustainability has become more and more an urgent topic. Higher needs and standards are requested while resources are running out. Overall can be stated that the building sector is one of the largest users of natural resources; it is responsible for half of the material consumption in The Netherlands and worldwide responsible for a third of the CO2 emission ¹. For the building sector this means that there is a need for change in design and constructing methods.

Therefore, my research focussed on how the built environment can improve and develop, while taking its consumption of natural resources into account. The regularly changing needs and wishes of the users, together with the developing building regulations, reduce the functionality and shorten the lifetime of a building. To make place for designs that do suit new standards and preferences, parts or sometimes complete structures are demolished. Unfortunately, this results in enormous amounts of buildings waste, while the components of these buildings although they don't serve the needs in their current composition, might still suit a new function, place or typology. My graduation project focusses on the potential of these building components and how this might contribute to reducing the buildings sectors impact on the environment.

The process of harvesting components from buildings is known as Urban Mining. The process is developing and becoming a larger part in the demolishing and deconstruction sector. However, the process is not yet fluent and there are several barriers to concur from the moment of selection until the moment of reapplication, regarding among other logistics, such as deconstruction, transport and storage, knowledge regarding materials and design approach. With my graduation project I strive to create a place where barriers can be united and used in advantage. Additionally, the project brings the opportunity to display experimental ways of reapplication of components. In the design is shown how one could design with components of which the exact details are unknown and performances can be questioned. Furthermore, the way reuse is shown in the design opts to interest and involve as well professionals in the building sector as the casual passenger. It strives to make people aware of their direct (built) environment and the effort needed to transform it.

In conclusion, with my graduation project I would like to aim to change currently the way how we think about the materials used in the built environment in the Netherlands. I want to showcase as well the technical and social struggles that currently surround the urban mining process and propose suitable design solutions. I really believe that new (building) designs can be based on resources that are already in the loop.

[1] Ministry of infrastructure and the environment and the ministry of economic affairs (2016). *A Circular Economy in the Netherlands by 2050*.

5. Discussion of ethical issues during the research and design

Designing with reclaimed components includes a significant design issue; often it is unknown what the exact specifications of components are regarding performance, measurements and connection elements. Also, components can't be custom made or easily adapted as appears in normal design. This means that you have to design with limitations and guidelines, which on its turn requests a certain implementation of flexibility. Regarding my own design, multiple times the question arose: does this element need to be specifically in the way I propose. It does not. Nothing can be regarded specifically when designing with reclaimed components. Diagrams and annotations are more defining the design than the final drawing will be, since this can change up until the moment the reclaimed components are physically at the building site. To allow these changes, the design needs to incorporate a range of sizing and aesthetical imperfection has to become part of the design.

During the design phase, additional questions arose regarding the social impact of the building. The first and main question was how the design could provide a space not just for materials and the logistical process, but also become a place for people where they can meet and improve their interest and knowledge regarding sustainable topics. This question related to how the building could use the future neighbourhood and how it could give something in return. The answer to this came in a varied program, which allows people of all kinds of interest into the building on different times of the day. The flexible usability of the spaces allows different event to happen and invites people to take over the spaces for their own interests. This way the building can transition with the development of the area.