

P4 Reflection

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The relationship between research and design.

One of the reasons I chose the Architectural Engineering graduation studio is the strong focus of the studio on the integration of technical research and design. The choice for the topic of my graduation; the re-use and recycling of stone waste to inform a new housing typology, was inspired by some of the issues I encountered during a previous internship.

In the first semester I put the focus on mapping the existing stone building waste flows and how the building are constructed currently influences the waste output. However, it was initially not clear to me how this research into waste output could result in an architectural design. This resulted in a struggle to put more focus in my research and in the end to find clear starting points for the design phase.

The site research in Bandung, Indonesia helped greatly to (re-)formulate boundary conditions for both the research and design. The main focus was put on the local building industry within the area, instead of trying to solve it on city or state level. This meant that within the design easy to construct elements had to be made, in order to complement the local ways of building and craftsmanship. Furthermore, I was first inclined to re-use building elements as found during demolition, since it would mean that the building materials collected locally could be re-used locally. This approach proved to be challenging. The research showed that demounting buildings instead of demolition required either expensive tools or expensive manpower, due to the ways the local population build. However, by combination of simple production methods and the sharing of machinery between different kampungs.

In the end the research informed not only the design process in what kind of building elements could reduce, re-use and recycle the stone waste, but in an urban strategy as well. Main conclusion was to design and use building elements that are made out of the transformed stone waste. The research forced me to think in systems. Not only in systems of waste transformation, but the transformation, time line and system of the housing typology as well.

The relationship between the theme of the graduation lab and the subject chosen by the student.

The subject of stone demolition waste transformation fits perfectly within the graduation studio, which in the subdivision of the studio could fall either under 'make' or 'flow'. I chose to approach the subject from the perspective of a system (flow). However, in the end the project could have benefited more from a make perspective. The conclusion from the research was in the end that different (new) building elements made with stone waste had to be investigated in order to create a self-sufficient building industry in Indonesia. The 'make' approach could have benefited the design in an early phase (around p1), while the conclusions of the 'flow' research informed the design in a

later phase (around p2).

The location of Cigondewah near Bandung, Indonesia fitted the topic and me quite well. It forced me to approach the re-use of stone waste material in a different way. I needed to change the perspective from macro level solutions to local and low tech solution. It made it possible for me, as an architecture student, to investigate the role of the architect within the discourse of building waste recycling.

The relationship between methodical line of approach of the graduation lab and method chosen by the student.

The Architectural Engineering studio is a research heavy studio in which the student defines their own technical fascination and chooses their own context. This approach suits me well, since I often find myself doing a lot of research during my previous design projects. I tend to observe the design assignment broadly outside of architecture itself, mostly from a technical point of view. For me the starting point within the project was the logic of the material, what could be done with this stone waste and the resulting brick elements. I tried to gather as much knowledge I could about the material, attended several 'brick workshop' evenings and knowledge of local building conditions. This, however, hampered me in both the research and design process. The amount of knowledge I wanted to incorporate in both the research paper and the design made it difficult for me to make clear decisions and tackle one problem at a time. I found myself working in a non linear fashion. I would get fascinated with a certain detail or aspect of my design and tried to spend a lot of time trying to incorporate a certain solution within the design. In the end I had the task to eliminate the researched aspects that did not fit my story as a whole. This way of working cost me quite a lot of time and confused me during the design process. However, it also allowed me to think outside of the box and come up with new design solutions.

The relationship between the project and the wider social context.

The project investigates the potential of stone building waste transformation into a new vertical housing typology in peri-urban conditions in Indonesia. This is a hugely relevant to peri-urban areas in developing countries. The growth of people living in these areas will grow exponentially, this will not only result in a higher demand for vertical housing units in informally constructed neighborhoods, but in quality stone building materials as well. Low tech solutions to create safe, high quality, incremental vertical housing are necessary to ensure a higher standard of living for the inhabitants of these informal areas.

Given the amount of stone building waste that is produced annually there is a huge wasted potential that could be re-used in high quality building solutions. The transformation of this waste would not only result in a lower use of the existing and often limited natural resources, but in cheaper quality building materials as well.

The nature of the project would be completely different in the context of a developed country as the Netherlands. The demand in stone materials is still quite high, but there are already high tech solutions within the building material industry to recycle this waste. Therefore, an architectural solution towards this problem would be less relevant.