

# Reflection

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My graduation topic focused on the techniques and methods for how we can build with natural, unprocessed (or minimally processed) geological and biological materials and what sorts of architecture could result from this, which mostly relates to the “make” focus of the Architectural Engineering studio, for the master track of Architecture. It was a key interest of mine to learn about how we can push less co2 polluting materials back into the construction industry, to find more circular production processes of materials and methods of building practice.

My research brought up more questions than answers, mostly in the lack of such materials uptake in buildings from the last decade or so, particularly in developed countries of a temperate climate, it seems as though little development has really come since industrialisation pushed such materials and methods out, and where they do get used a lot is in highly technology reliant systems such as making bio-composites. Although, there are some great products which are starting to be available such as Isohemp hemp blocks and EcoCocon straw panel systems, there are still a lot of meaningful connections and explorations to be made with these natural building materials such as combining the technique of light earth with materials such as hemp shiv, flax fibres and lime for example, and few known practices, except maybe BC architects, local works studio, material cultures and IBAVI who I found to really be pushing this design, research and way of building forward. This is why it was important for my design to show that even in our temperate climate, we can easily push these forward, but that it would be more sensible to use them predominantly as infill wall elements, such as for blocks, panels and cast-walls (as well as for finishings) and that these can exist both as industrialised and non-industrialised solutions, making them highly versatile in shifting needs. For example, they can be both for self-builders and for developer-led projects. It was important for my design to highlight these wall systems so they are part of a highly-expressive wall system which shows of its structure not purely for aesthetic reasons but because it shows its ease of assembly (and disassembly). I concluded that an unprocessed solid timber structure reliant on simple bolted connections would be the skeleton for my building that would hold two inner wood-frame systems, the outer frame of sprayed hemplime resulting in a consistent outer finish and the inner frame (fulfilling the second part of the insulation needed) would act as an exhibition shelf unit—both in a figurative and literal sense—which would hold blocks, panels and cast-walls depending on the zone of the building you find yourself in.

It is so important for architects and individuals to go beyond the common business-as-usual approach in specifying materials, and so I was eager to find a way of understanding how this could be done. To do this I conducted a literature and desktop study which concluded my findings into a booklet full of housing examples with steps how it was constructed and illustrations to show representative fragments in more detail ( to show the relationship of assembly at the building scale and at the detail or building component scale). I was also fortunate to be able to attend a CIVIC Square and Material Cultures hands-on building workshop for making with straw and I went to a place where stone is processed on a small-scale, mostly for heritage renovations needed in the area of South-Limburg - Kunrader stone. After the research phase, I also decided to attend an earth discovery day organised by BC Architects every month. These methods were in conjunction with several site visits to the quarry and surrounding area I used for my design project location, in Maastricht, important for understanding the specific context and materials which lay there. When there I learned from observations but also through tours, such as through the St Pieters Fort, the underground mining caves and even a tour of the quarry site itself by the Natuurmonumenten who are currently in charge of regenerating the site. The value of such a variety of experiences led to a more holistic understanding of the problems and opportunities available. I felt that I got a good range of information by combining literature/desktop studies with field research which I knew from the beginning would be important for my project. It was not only about what is there now existing in books and online sources but about going out there and speaking to people, since architecture is always about people first. Without people, there would be no buildings.

I think the two silver bullets that I learnt, although simple, their importance resounds in my head due to their fundamentality. The first is that all these natural buildings need a good “hat and boots” (and maybe coating) for protection from the elements (but also depends of course on the ‘elements’ i.e. the specific site context). The second is that clay, lime and cement are all binders, and they are all processed to varying extents, which is one key aspect which separates them, this level of processing also aligns with their co2 implications; clays are generally crushed and ground to make them easier to handle, limestone needs to be heated in a kiln in order to become lime and cement is made from grinding raw materials such as these and then heated to much higher temperatures and then grinding the burned product (clinker) together with gypsum. The less processed however generally means the less it lasts, but of course, because the more natural the more geological or biogenic then the easier it is to biodegrade or erode, as it should do. So then maybe it isn’t a question of how to encourage new building systems through more accessibility or which one is less co2 friendly through calculations etc., isn’t it then more about changing perceptions to understand that weathering and materials susceptibility to time is a good thing? That we need to encourage maintenance and allowing for change and stop striving for immortal buildings? Of course, it would be a good thing to have something like stone or timber as the structure which can stand the test of spans of time but more so I am referring more specifically to the polluted fabrics which coat our buildings - or in Richard Brand’s term - the skin. I think it would be good to start moving towards a society where we live in more ‘planted’ buildings. Not just for ecology, or our health, but because it also means we have the power to grow and make our own buildings which also means it would be very little money, which makes it highly accessible. The only setback being time. I hoped that collating information and creating a project that highlights such issues (and solutions) to our material problem would take at least a small step in furthering awareness, or at least furthering my own to be able to make the right choices.

The result of my design project is somewhat open-ended, without definitive conclusions - it leaves some parts open for questioning on purpose - hoping that, like an art exhibition, you come to your own subjective understanding, prompted by what you see and maybe even inspired to do something similar but much better so to push the parts forward which I lacked focus on. My downfall was likely trying constantly to do too much in scope (program, design and research) and then ending up with less, barely managing to finish anything, if I had a more narrowed focus and was more specific about certain parts it would have been easier to have more finished and polished results. However, I gained a lot of insights and with a broad spectrum of research results which I tried to articulate and express as best I could, which means that they are somewhat transferrable. Since the research is broad and quite general it is very much easily related to other contexts, but the design is much more focused on the specific site conditions so might be less easily applied to other projects.

Having said that, I will endeavour to finish and polish my research and design in the coming weeks up to P5, so I can have the results that I want and that will be able to communicate better my project to anyone else who might come across it. I believe my storyline and the societal value of my project is very strong and it is just a matter of verbally and graphically expressing it. In addition to this, I need to tie up a few loose ends and to make sure I have some nice visuals to explain the 3 steps of change in time, from the initial phase of the first build, to the predominantly stone surplus material bank landscape with farmlands growing and then finally to the green oasis with all the stone mounds now gone and taken over by crop-fields in the beautiful ex-quarry turned landscape park. I also want to make some material samples to show the 3 key techniques for making the infill components proposed for my buildings, using the stone and chalk surplus I have already collected from the site, in combination with lime and clay. An assembly guide for how to assemble the housing would also be a great supplementary product but I will see how much time there is after the key deliverables are finished.