

## **Reflection | Blending light earth and timber frame techniques futureproof construction method**

AR3AE100 Architectural Engineering Graduation Studio (2023/24)

5504895 - Iris van Leeuwen - Exploring Light earth as future proof construction method

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Since the beginning of my academic career, it has become increasingly clear that a fundamental shift is needed in the way we approach building construction. The climate crisis has always played a major role, but progress in reducing its impact in the building sector seems slow. Personally, I find this slowness frustrating and often wonder why the transition to sustainable materials and energy within the construction sector remains stagnant. Despite claims from the industry that sustainability, affordability and architectural innovation are incompatible, I disagree. This conviction has driven my academic pursuits in this field.

In the early stages of my graduation research in the Architectural Engineering studio, I was wondering of how I could set up such a project, and in what kind of forms. Inspiration soon came after a presentation by Mo Smit, my research tutor, who talked about bio-based building with locally sourced materials from the Gooi and Vecht region. And so Crailo became my project site, where several municipalities worked together to build a new district with strict standards for biodiversity and environmental sustainability. Choosing this site gave me the opportunity to create something that could inspire architects and influence actual design practice. My aim was to develop a natural building method that would be easily applicable in contemporary housing construction. It was never my intention to reinvent the wheel, but rather to demonstrate that great strides towards a sustainable future in the construction industry can be made using the simplest, even age-old methods.

The architectural design is precisely adapted to the specific characteristics of the Gooi and Vecht region, but has potential for wider applicability. The need to take into account emissions and footprints of building components is particularly relevant for the Netherlands, in line with the 2050 circular construction target. This approach is promising for the global construction sector, which aims to reduce material consumption while improving quality and efficiency.

In exploring this natural building method within a contemporary framework, I discovered that my expectations were too ambitious. Initially, I wanted to develop both an adaptive (dismountable) construction method and an all-natural/bio-based construction method. However, I realised that choosing between the two was already an important step and therefore chose to delve into a bio-based/natural building method. Decomposing seemed unnecessary because bio-based materials produce minimal waste upon deconstruction.

The exploration of natural building methods closely aligns with the focus of the graduate studio 'architectural engineering', which emphasises technical aspects within architecture. Integrating building techniques with architectural considerations through bio-based materials holds great promise for future building methods.

To keep things 'simple' for the building industry, I looked for a construction method commonly used in residential construction, but with sufficient opportunity for sustainability improvements and potential. Timber frame construction emerged as a possibility, but my research revealed a plethora of modern timber construction methods. I included these modern techniques in my research and final design to highlight innovation and future viability. However, I chose to focus only on prefabrication of timber panel and framing and omit other approaches. To do more research on other timber structures in combination with light earth could also be very interesting.

The research and design of natural and local materials, especially the local aspect, notably straw and clay, remains somewhat vague. This is due to the inherent unpredictability of such materials. Questions about the cleanliness of clay and its ability to retain moisture in walls, or the mouldability of straw for forming, underscore the fledgling stage of working with this method, despite its supposedly ancient origins. Nevertheless, this graduation project convinced me of the immense potential of this technique, especially considering the ubiquity of fibres and earth materials worldwide. Further development in this field undoubtedly deserves attention and investment.