



Grochowska Tenement Row Revival

A system approach for bio-based retrofit and futureproofing of Polish inter-war masonry housing.

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When I applied to Delft, I hoped to be part of a greater positive change – dreaming of inspiring others to follow suit. I didn't yet know how that ambition would translate into my graduation work; I was about to learn a great deal, I am still learning – and always will. What I did know was why I push myself in this direction, my thinking has been shaped by the “House Europe” initiative, doughnut economics and planetary boundaries, as well as theories of effective altruism and longtermism. I see architecture as a field where I can contribute meaningfully to humanity's future, and I want to pursue opportunities where I can do the most good.

The idea of revitalising Warsaw's housing – especially the Grochowska street row – was already part of the city's agenda in recent research. Urban-level strategies have thus far focused on blue and green infrastructure for climate mitigation and adaptation, but a systematic revival of 1930s Polish tenement housing at the level of individual buildings seems overlooked or too ambitious for city-wide action.

Preliminary Results

The research concluded with an academic paper focused on how to integrate bio-based solutions in masonry building retrofitting, while considering both technical requirements and user preferences. That work informed a guidebook of possible solutions and a catalogue of biobased materials suitable for similar purposes. Both being useful during the design phase. Local site studies and openness to people's perspectives influenced my design to be more tailored to the preferences of the inhabitants and more empathetic about their needs. The design project is therefore an extension to the courtyard façade with an additional tower and a rooftop top-up for community use. It is largely designed as a biobased modular system that can be applied to other tenement buildings of a similar typology (Grochowska street). Careful interventions are planned inside the original building, mainly on the ground floor, as the residents are meant to stay during most of the construction works, minimising their disturbance.

Approach Assessment

Before I knew what exactly I would research, I knew that my fascination with the Grochowska residential row case would lead me to finding out the best way possible to tackle the “system” idea for the project. It led me to develop research methods focused on biobased refurbishment and contextual understanding. I began with literature studies to identify material criteria and refurbishment strategies, then conducted market research and catalogued bio-based materials for structured publication, or further data analysis, and LCA calculations. Site visits, interviews, and archival analysis largely benefited my work, confirming assumptions about user preferences and revealing neighbourhood complexities, making me more connected with the place and grounded.

Q 3. How do you assess the value of your way of working (your approach, your used methods, used methodology)? How and why the approach did or did not work, and to what extent?

My research approach was twofold. First was the research on biobased strategies for refurbishing 1930s masonry townhouses, supported by cataloguing biobased materials. This resulted in a research paper that informed the creation of two design-aiding booklets. I learned a fair amount during that process, and the knowledge will be helpful further in my professional work. Second, site study—despite my familiarity with the area—provided nuanced insights through focus group interviews with residents and local activists, validating some of my early research theses.

I think my approach worked well in general as it resulted in vast and useful knowledge base for me to design further. I see one questionable aspect though. While the interviews offered great qualitative data, the small sample size limits their generalizability.

An additional step was to deploy a machine learning vision model on geospatial data and aerial imagery to identify hundreds of similar buildings in Warsaw, largely of the same typology, revealing their addresses and simplifying potential funding distribution for a theoretical revival programme.

Q 2. How did your research influence your design/recommendations and how did the design/recommendations influence your research?

My design approach was influenced by research mainly in terms of how radical the maximisation of biobased materials and circularity should be in the chosen context. Solely from the engineering perspective on climate change I was at first inclined to prioritize minimizing the global warming potential of my intervention. That meant embracing full sufficiency, doing the least amount of work possible to improve efficiency of the buildings, using materials that would require frequent maintenance or be much more expensive than traditional alternatives. After more reflection however, influenced by interviews with local residents and studies on social aspects of circular retrofitting, I decided to find a better balance in my design, so it provides more to the community and can endure longer, requiring less maintenance.

While the official research phase finished before I commenced the design process, it still lingered on and I was exploring new approaches and answers to my research questions. My design process became a testing ground in some sense, making it easier for me to choose the right biobased materials and be intuitively informed about the environmental impact of my decisions, but also making me realise that some solutions may be too far off from reality in a sensible time frame.

Reflections on Feedback

The feedback I received from all my tutors helped me steer the project in a better direction on many fronts. There were cases where my mentors noticed something that I did not in my own design ideas. At times I did not see positive aspects that were already there in my design or simply took them for granted without a need for explanation, while they needed just some attention to strengthen them and be easier to notice. At other times there were qualities that needed little extra work or small changes to bring considerable improvements to the whole design. I was often absorbed in technical aspects of my project, like figuring out the timber joint system to fit various cases, overlooking the social benefits I can bring to the residents. On the other hand, I was sometimes so concerned about the reality of the context and what I learned from the on-site studies and interviews, that it blocked me from imagining bolder ideas that are still within rational possibility. Finding the limit and a balance in biobased material use was something my tutors raised multiple times, and what I struggled with throughout the design process, asking myself...

Q 6. How do I find balance in maximizing the use of biobased materials?

To reduce as much as possible the strain on the environment, we should use materials that are as raw as possible, but this also means that they require frequent maintenance or replacement. In the past homes were built with what was available in the vicinity, without much energy use apart from human and animal power. That meant the buildings were more delicate, brittle, prone to damage. Tending for the house and even building it was a part of life, a part of work. This way it was perfectly circular. In the current economic model this is simply not the case and not possible on a larger scale. Until a new paradigm in how we earn a living and provide for families is successfully introduced, people will always push for little maintenance and durability. Those considerations pushed me to find balance between biobased circularity of the design, and people's preferences towards realistic dwelling conditions in the near future. To name few examples, I opted for sturdier biobased finishing materials in the interiors and non-biobased waterproofing elements on the exterior surfaces prone to faster rain induced deterioration. While the main structure is largely designed with timber joint connections, there are steel stiffening cables placed in selected places.

Relevance and Impact

Q 1. What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master programme (MSc AUBS)?

My design and research aims are highly influenced by current research endeavours at TU Delft Architecture faculty, especially by the Architectural Engineering and Technology department on climate

responsible architecture and direct solutions for the industry. I find the meaning of my work in focusing on how to improve what's already built and prepare the building industry for upcoming challenges with climate adaptation, reducing its strain on our planet. I think I share that with many colleagues I met along the way here.

Q 4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

The design project can serve as an example of how the specific type of Polish tenement townhouses can be refurbished and futureproofed with circular biobased materials, on a scale larger than just one building. As the buildings are so similar in their typology, one proposal designed with a system approach in mind can potentially be applied easily to all of them. That could contribute to a scaled reduction of their environmental impact. And most importantly, the intervention can be much more than just an energy retrofit, enabling new dwelling possibilities and social qualities, leading to improvement of many people's lives. I hope the research and the project can be an addition to a growing body of optimistic, ambitious, and yet realistic visions for the future of Warsaw housing. No to demolition!

Q 5. How do you assess the value of the transferability of your project results?

The research and design outcomes have the potential to fill out the knowledge gap that exists in the Polish renovation practice about readily available and promising bio-based solutions in renovation or adaptive reuse. It could help make bio-based options more approachable and trustworthy from conservative designers' and homeowners' perspectives. The finished booklets I shared among fellow students already proved themselves as a helpful resource. Moreover, it can, by a large amount, be applied also to newly built bio-based architecture, which broadens the scope of potential influence.

Learnings

Residential buildings are as healthy as the community of people inhabiting them. I learned that with little extra resources refurbishment can be much more than just reducing energy bills and improving comfort, bringing a whole new quality of life that has never been there for residents. I realized that pushing for biobased solutions is way more nuanced than I initially imagined, as working in that specific context and considering scalability required me to be grounded and consider multiple factors. That led me to ask myself the following question.

Q 7. How do I define metrics on which I assess the impact of my design intervention on the world?

The balancing act of how radical one can be in that biobased design ambition is influenced by factors like material locality, embodied energy in production, the source and carbon intensity of that energy, accounting for overall global warming potential, durability of the material, maintenance ease, assembly affordance, cost, fire hazard, etc. One can try reducing it all to one value like money (PLN) or kilogram of CO₂ equivalent emissions, as in some LCA calculations. But that is not realistic, especially considering all social aspects. While I tried my best to consider all of those metrics in my work, I quickly became overwhelmed by the complexity of defining the best overall option, and thus I was forced to make intuitive decisions. I later learned that this exact problem is a subject of a large body of ongoing research, to which I, as a master student with limited time, simply was not able to contribute much.

What's next

On the finishing line of my graduation work I will focus on building and presenting the narrative of my research and design project, so it includes all beneficial and important facets I thought through. I will make sure that my ideas are clearly represented by selected drawings, diagrams, and models or other media, avoiding unnecessary work or clutter. I will experiment a bit more with some details or fragments of the project, that could still be done better, especially the affordance of space customisation for the people.

Q 8. How do I see my research and design project contributing positively beyond academia?

The urban block in which the tenement row along Grochowska street is located in, is a subject of a larger research project funded by EU called "NEEST". It tackles the issue of preparing similar typologies for upcoming climate change challenges. After a meeting with the NEEST team we concluded that what I am working on, at the building level of detail, is essentially what their project is lacking, as it focuses on a more urban scale. We came to a collaboration and hopefully my work could at least inspire someone to act towards a positive change.