04 EPILOGUE

RISING FROM RUINS

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Title
Rising from Ruins: Reuse in Ukraine

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Students
Anders Gjesdal
Mille Sofie Hals Richardsen

Supervisors
Steffen Wellinger
Stuart Mcleod Salway Dickson

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Photo front page: Statue in Lviv, protected from shelling.

4.1 REFLECTIONS

Complexity of the Project

From the beginning, this project demanded more than design— it required constantly reevaluating what questions to ask, and how to frame the problem. Should the focus be on materials, systems, or spatial needs? Should we aim to propose something speculative, or something grounded in urgent realities?

Choosing to combine two complex themes (material reuse and post-disaster housing) introduced a double layer of difficulty. Working with salvaged materials alone would have been challenging. The same goes for adaptable housing. But tackling both simultaneously meant negotiating between structural integrity, risk factos, logistics, aesthetics, regulation, and urgency. All within one system.

At times, it was tempting to step away from the housing aspect altogether — to treat the material atlas as a standalone exploration. That would have made the project more abstract, more flexible, and perhaps easier to execute. But it would also have distanced the work from the real need: the urgent housing crisis in Ukraine.

Throughout the process, the news served as a constant backdrop. The visit to Ukraine gave weight to decisions that might otherwise have remained theoretical. Every step brought a reality check, and a reminder that this was not just a school project. It is a proposal situated in the aftermath of devastation. That complexity became the project's core: not something to solve entirely, but something to engage with honestly.

This complexity was so hard to avoid that it became the project itself.

Necessity and Opportunity

There are several reasons why we should not reuse materials from ruins in rebuilding efforts. Limitations from the legal framework, possible toxins, uncertainties regarding structural qualities, logistics, time consumption and labor requirements are just some. Combining these uncertainties from the materials with the urgent need of rebuilding risk complicating the process of rebuilding further.

Despite these limitations, we saw strong arguments for continuing. Past post-war reconstruction efforts around the world tend to produce generic, disconnected mass housing solutions that disregard local identity. There is also an undeniable environmental necessity. If Ukraine were to be rebuilt entirely with new concrete, the carbon footprint would be enormous and the hope of reaching current climate goals would be next to impossible. Therefore, we argue that reusing available materials represents an opportunity to minimize the environmental footprint of reconstruction while embedding memory and history into new constructions.

With this thesis we have tested possibilities of reusing available materials and are far from presenting any final solutions. However, the references found and testing we have conducted start showing both the structural and aesthetic potential found in reused materials.

Reuse as Design Driver

While the reuse of materials opens possibilities for circular and resilient design, it also introduces constraints that can challenge the architectural form. The irregularity, unknown history, and varying availability of salvaged materials demand a different approach to design thinking. Rather than starting from a blank slate, the process begins with what already exists, often in fragmented, unpredictable forms.

One of the clearest limitations for us came through the reuse of slabs. These precast components, dismantled from the I-464 system are often structurally viable and available, but in a fixed size, typically around 3 meters in length. As a result, the structural grid of the proposed building system had to adapt to the material, not the other way around. This dictated a 3-meter grid, which influenced not only the span and module of the structure but also the architectural language.

It would have been easier to design around a 3.6- or 4-meter grid, to ensure general and flexible rooms. However, we chose early on to use the available materials to their maximum capacity, according to the Delft Ladder and designing based on these constraints.

This shift in hierarchy, where material limitations inform design logic, stands in contrast to conventional practice. Working with reclaimed materials means accepting imperfections. However, it also allows for innovation and a new architectural language. These very constraints can become a catalyst for new typologies, tectonics, and construction methods.

Our Understanding

The entire project is shaped around insights from our trip to Ukraine. At the Kharkiv School of Architecture, we spent two weeks exploring the reconstruction challenges of Odesa. The workshop focused on dual aspects of rebuilding: both physical and emotional. This became a framework for our project, and shaped the way we thought about how identity, belonging, and security can be reestablished through design.

The collaboration with Ukrainian students and tutors left the strongest impression. Through their perspectives, we gained a better understanding of how the war has impacted everyday life, and how this shapes the priorities for rebuilding.

In Kyiv, we met key actors, getting access to information we would not have gained otherwise. At UN-Habitat, we discussed the rebuilding of Irpin, including mapping damage and resources, and involving the local community. With ReThink we explored how demolition materials can be processed for reuse, and what challenges exist around logistics, regulations, and quality control.

In Irpin, we experienced large-scale destruction for the first time. Damaged facades, collapsed roofs, and empty window openings gave us a reality check, that the war is very much present.

Sunset it Lviv, Ukraine.

Memory Through Material

Through working with this thesis, our approach to reuse has shifted. We began with a strict pragmatic focus: looking for a climate-conscious ways for rebuilding. However, the longer we worked with it, the more our focus shifted towards finding a balance between pragmatic solutions, aesthetic expression, and incorporating memory.

We acknowledge the importance of balancing the physical and emotional aspects of rebuilding. Therefore, we explored how the heavy, rough qualities of salvaged materials could be balanced with the lightness of new structures.
While maximizing reuse remained our main goal, we became aware of the risk of overwhelming visual and emotional weight. Balancing these aspects became central to our approach. Rough rubble walls next to light, wooden frames. Heavy and eroded concrete beams put together with plain, painted walls. These contrasts became key.

We believe that careful use of salvaged materials can offer both continuity and comfort. Avoiding excess is crucial to prevent overwhelming those affected by the war, while still creating environments that acknowledge the history of a place.

We do not propose living in ruins. We propose using ruins to create new living environments—living with history and memory.

Intereior render.

After a catastrophe, there is still room for beauty, innovation and humility. Indeed, it is more important than ever.

- Ester Charleswort in Humanitarian Architecture .

Scalability

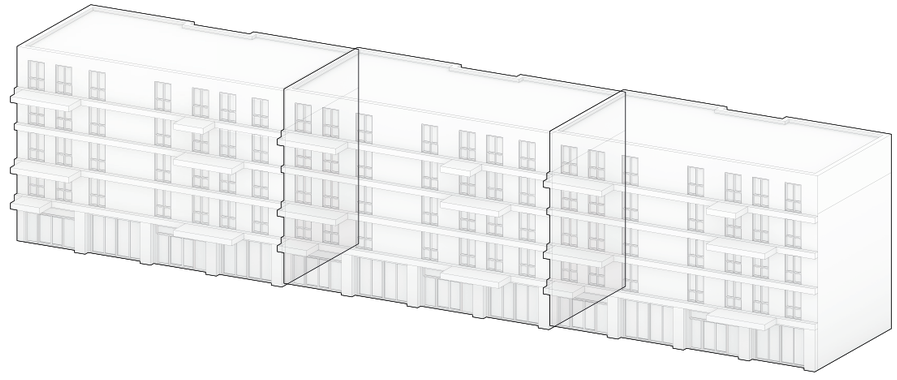
This project is tested in Irpin, a city still experiencing the effects of ongoing war. But the ideas are not restricted to one specific place. The materials found in the ruins of Irpin, such as brick and concrete rubble, steel and timber are not unique to Ukraine. They are found wherever buildings fall, whether through violence or planned demolition. The difference lies in what we choose to do with them.

The system proposed in this thesis is scalable. Its modular logic, simplicity, and flexibility make it adaptable across contexts. Though rooted in Irpin, we believe the approach can be applied wherever similar material flows exist.

The I-464 housing system is a perfect example for scalability. Built across the former Soviet Union, it used standardized components designed for repetition. A reuse strategy tailored to this typology could be replicated anywhere these buildings stand.

The same goes for brick and concrete rubble. This became evident through the construction of the rubble arches. At a construction site at Gløshaugen in Trondheim, we found rubble with similar properties to materials from ruins.

Concrete alone is among the largest waste streams in the world. Diverting even a fraction of this from landfills or energy-intensive recycling processes is not just a technical challenge, but a design opportunity.



Modules multiplied.

4.2 CONCLUSION

Conclusion

We believe that the reuse of materials from ruins can be an important part of both the physical reconstruction of Ukraine and the equally critical reconstruction of memory, identity, and collective psyche. In the face of widespread destruction, we propose an alternative approach. One that neither erases the past nor romanticizes the ruin, but works with what remains, transforming it into a foundation for renewal.

Designing with reused materials poses clear constraints. Unlike the seemingly endless possibilities of new materials, reuse demands negotiation with what already exists, adapting to irregularities, damages, and the embedded histories of each component. But these limitations create new architectural opportunities: opportunities for innovation, adaptation, and meaning. Reuse invites us to design with intent, with care, and with a heightened awareness of materiality.

We do not propose living in ruins. Rather, we explore processes of recuperation, redemption, and transcendence. By reintegrating the physical remnants of war into new spatial systems, we offer a way to live with history rather than disconnected from it. Wanting to acknowledge memory not only through monuments, but through the everyday act of inhabiting space.
This approach is as much about building futures as it is about engaging with the past. Architecture becomes both a technical and cultural tool. A tool for repair, resilience, and hope. What is broken can be reassembled, not only structurally, but emotionally and symbolically.

In rethinking ruins, we reimagine reconstruction. Not as a return to a previous state, but as a progression toward something more grounded, more conscious, and ultimately more human.

Exterior render.

4.3 APPENDIX

PRECS Reference Projects

Name	Country	Year	Notes
Middelburg	Germany	1986	Top 7 floors of an 11-story precast building dismantled. Panels reused in new 3- and 4-story apartment buildings.
Udden project	Sweden	1997	Reuse of 1,850 tons of cast-in-place concrete from two buildings to build 26 apartments. Included walls, floor beams, and foundations.
Low-rise structures	Germany	1999-2006	Residential and utility buildings (houses, garages, pavilions) using reclaimed precast panels from mass housing.
Research pavilion	Germany	2004	Panels resized and reconnected for a pavilion designed to be dismantled and relocated.
Berlin Pavilion	Germany	2010	Panels from East and West Germany combined in a building with cultural and structural relevance.
Nya Udden Project	Sweden	2000	Planned 500 apartments with reused components; 54 flats built using 400 reused precast elements. Shifted to conventional methods due to coordination issues.

[1] Kupfer, Reuse of Concrete Components.

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Possible Toxins

Asbestos
Usage: Widely used in Soviet-era construction for insulation and roofing materials. Prevalence: Approximately 60% of roofs in Ukraine contain asbestos-reinforced cement sheeting.[1]

Lead (Pb)
Usage: Found in paints, pipes, and roofing materials, especially before the 1970s. Prevalence: Lead-based paints are common in older buildings, including hospitals and schools.[2]

Polychlorinated Biphenyls (PCBs)
Usage: Used in sealants, paints, and electrical equipment between 1950 and 1977. Prevalence: PCBs are present in caulking materials, lighting capacitors, and transformers. [3]

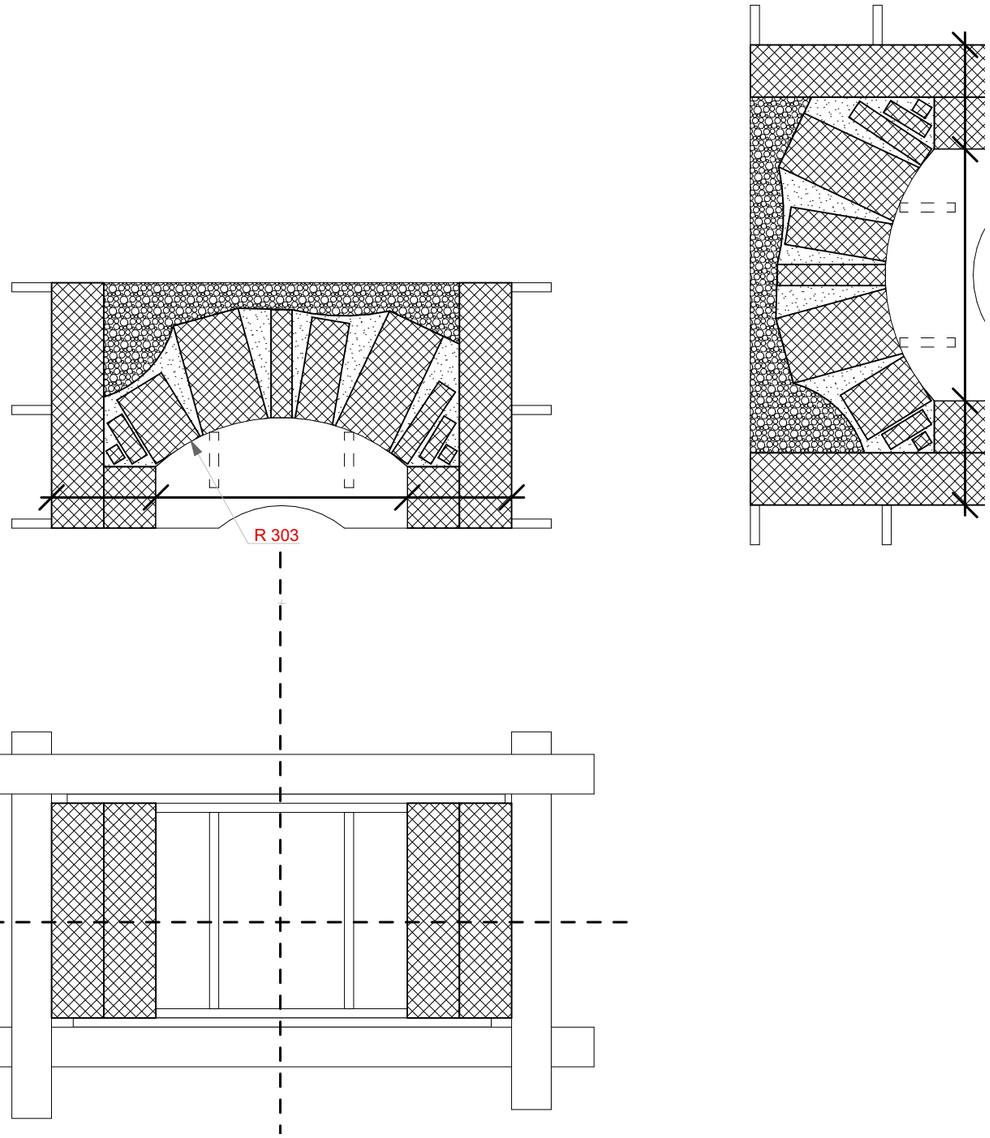
Polycyclic Aromatic Hydrocarbons (PAHs)
Usage: Found in tar-based products and bitumen used for waterproofing. Prevalence: Common in foundations and roofing materials of older buildings.[4]

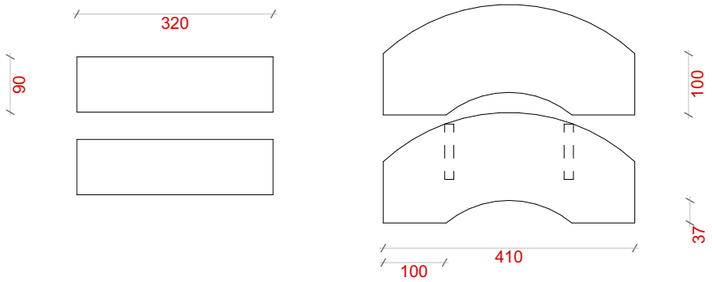
Heavy Metals
Usage: Used in pigments, coatings, and preservatives. Prevalence: Present in paints, wood preservatives, and metal coatings. [5]

Landfill in Irpin.

[2–5]Nielsen, *Rebuilding Ukraine*. [2]Interfax-Ukraine, *In Sustainable Construction*. [3–4] Environmental Site Services, *Hazardous Material Survey*.

Formwork 15.1 Parallel flat sided concrete rubble vault





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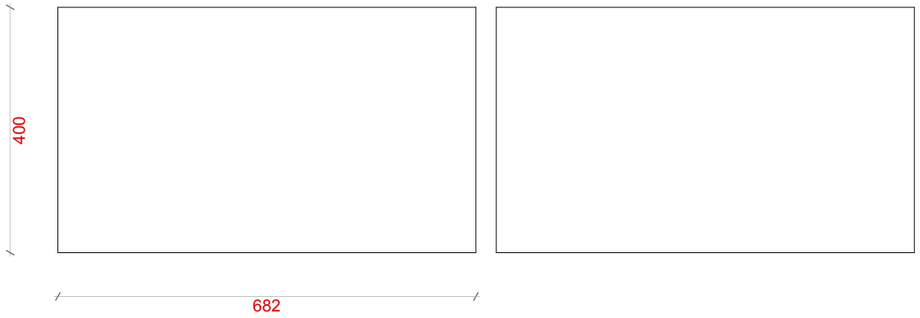

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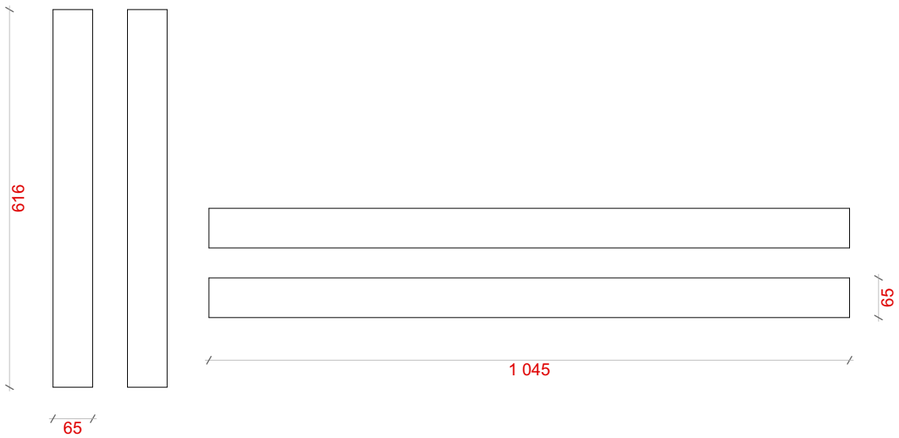
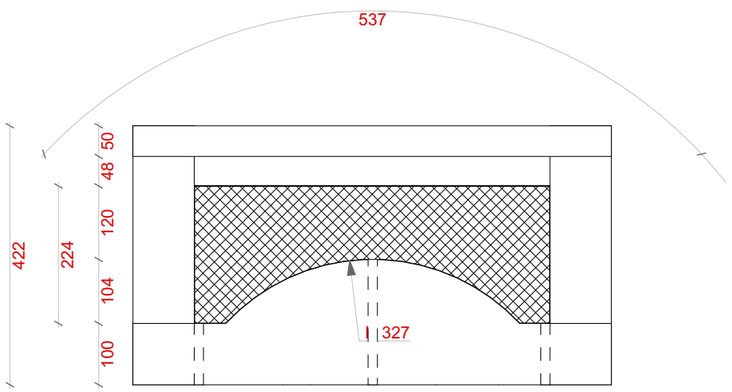
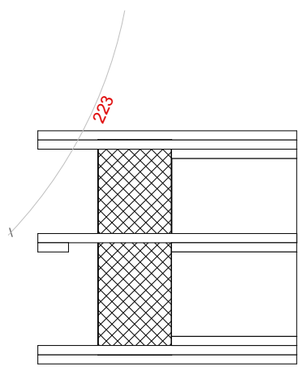
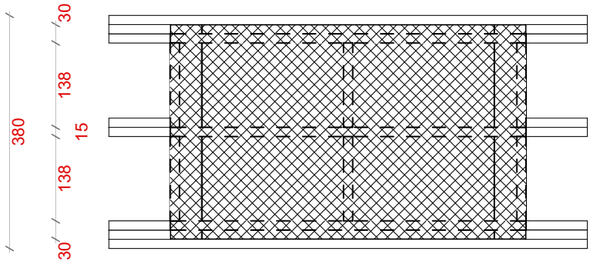
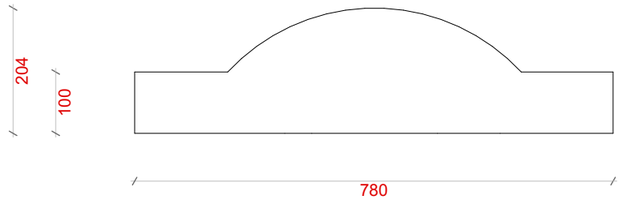


Formwork 15.2 Large concrete rubble vault









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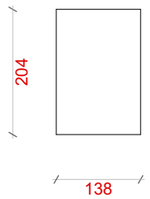

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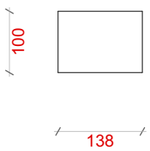

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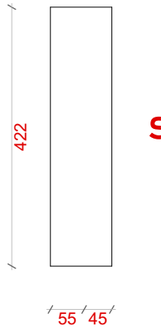

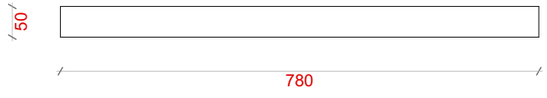

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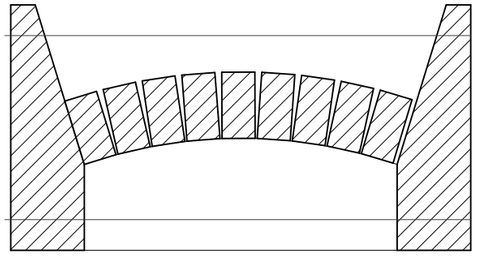
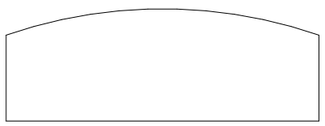
(Hud flat) x2

(Hud flat sider) x2

Formwork 15.2 Large concrete rubble vault





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Anders Gjesdal
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