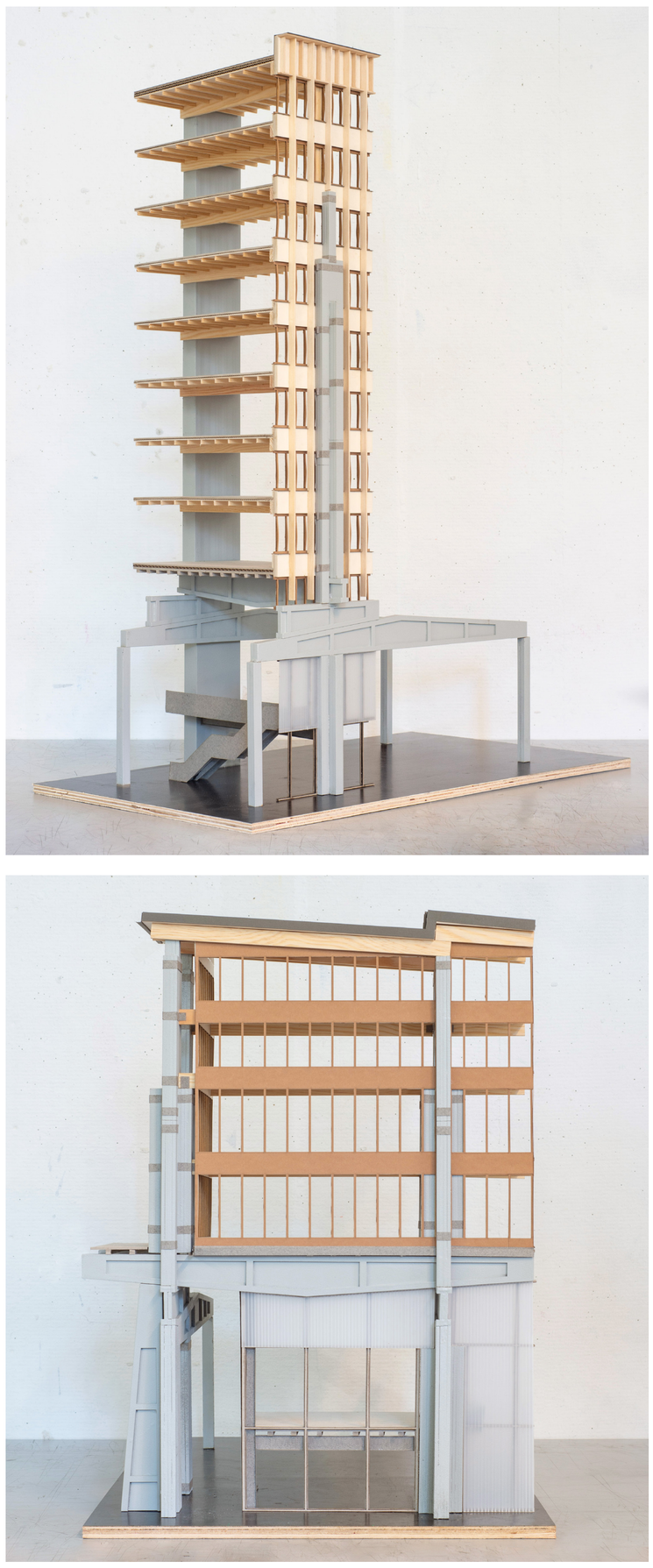
REbuild

Adaptive reuse of an industrial structure



1:50 model, showcasing the new stacked structure existing out of reused concrete prefabricated elements and new CLT beams and floors.

Introduction

What to do when a new building is needed but there is already a structure present?

The field of architecture is increasingly challenged with such questions, as the construction industry is one of the largest polluters. The conventional way of building, where demolition and new construction are at the heart of the business, is becoming more and more unjustifiable.

Lacaton & Vassal's mantra "Never demolish, never remove or replace, always add, transform and reuse!"offers an answer to this, and that philosophy reverberates loudly throughout this master's thesis. This awareness can be seen as one of the more recent developments within the field of architecture.

When applying this mantra to architectural interventions, the methodology will always be different because there is no one-size-fits-all solution when working with pre-existing structures. Each intervention will have its own parameters and limitations set by its unique environment. On top of this, what a culture decides is worthy of preserving varies wildly and further complicates things.

When we investigated the existing industrial structures dominating the Mexico Island in Antwerp, we were immediately intrigued by the pre-fabricated concrete beams, columns and tt-beams. We decided that we were going to radically preserve the part of this structure found on our building plot. The part of the structure that fall outside of our plot will be dismantled and become building blocks for the rest of the design. Using existing salvaged parts and the existing grid provides a predetermined dimensions and a catalogue of building elements that will help shape further interventions.

First of all, additional floors are needed. The original one storey structure was not designed to support eight more additional floors. We search for structural principles that connect and stack the prefabricated concrete elements using the existing grid. Columns are combined to carry more loads by tying them together with steel belts. The load bearing capacity of beams is increased by stacking them on top of each other. The original 11-metre-high factory hall becomes the plinth of a new high rise. Situated on the corner of two quays, the new high-rise serves as a beacon of recognition of the new neighbourhood.

All these interventions are creating a structural language that is created not by its designer but by itself. The columns that are tied together are reminiscent of both massive church pillars and the famous Mies column, while the hierarchy of the stacking appears to be classicist. The language is full of contradictions: the refined versus the robust, gothic versus modernist. We function not as a designer but as a medium to reassemble an existing puzzle: the building rebuilds itself.

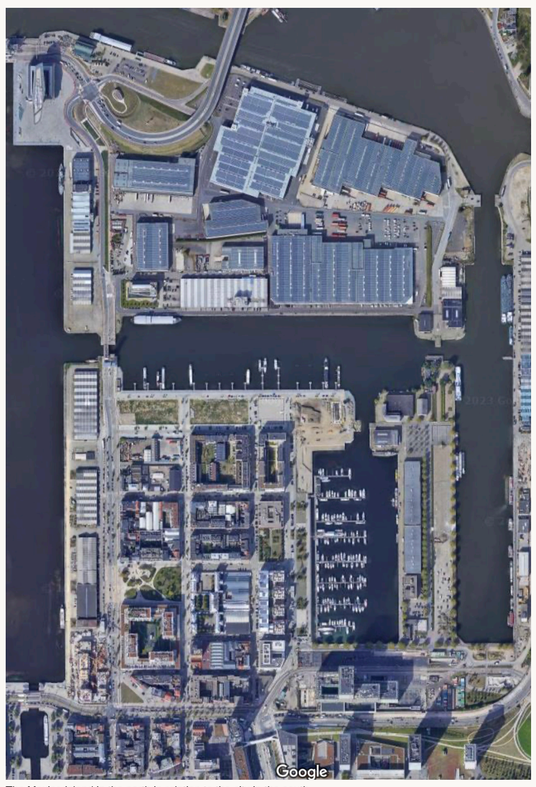
The original plinth is used to house two medium sized productions units, several studios and a cultural centre. A mix of public and private functions as suggested by the study of AG Vespa. Above the plinth, office units for large and small firms are housed. These can evolve into mixed-use or residential units due to their open plan. The open plan and adaptive structure made the building resilient to future change of function.

This project offers a solution for preserving pre-exisiting structures not solely for their historical or cultural value, but for the potential to create something greater out of it by reassembling common elements found in commercial architecture.

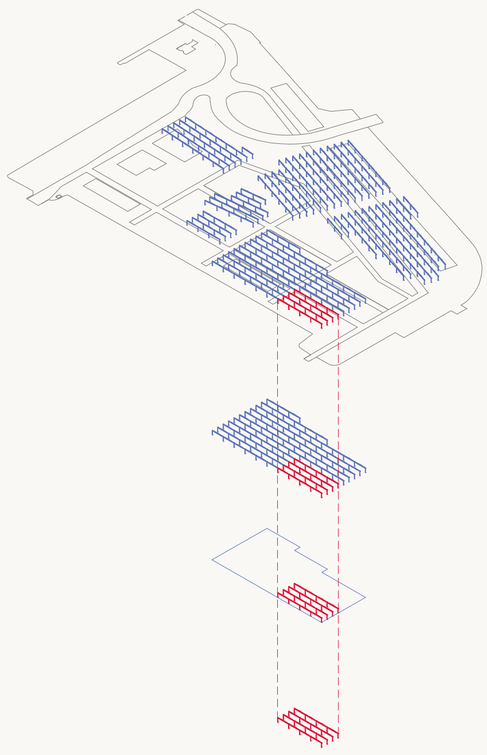
1:50 model, showcasing how the two sections of the new building relate to the old structure they are built on top of.

ID-code: SJ200. Panel 01

Context & Dismantlement

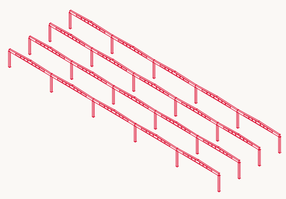


The Mexico Island in the north in relation to the city in the south.

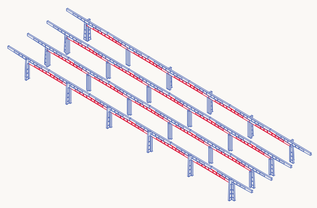


The to be dismantled structures shown in blue, and the to be preserved structures shown in red.

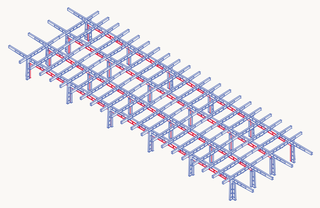
Reassembly



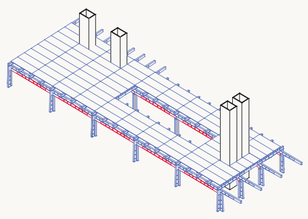
1.The preserved grid (red) of 4 by 6, with a column height of 8 meters and beam length of 24 meters.



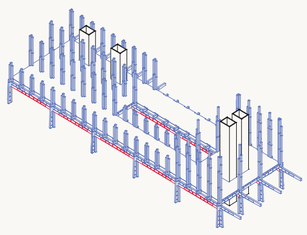
2. Each column is fortified by adding 4 spare colums around it. The bearing capacity of the beams is increased by stacking spare beams on top: upside-down, saw tooth wise.



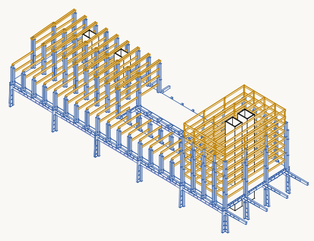
3. More spare beams are added on top in the other direction, spanning between the main beams. They are placed upside-down to create a flat surface.



4. Concrete cores are added for circulation and for stabilization. The salvaged TT-slabs span between the new beams. Cantilevering beams outside of the plot are cut off, except at the main entrances to emphasize them.

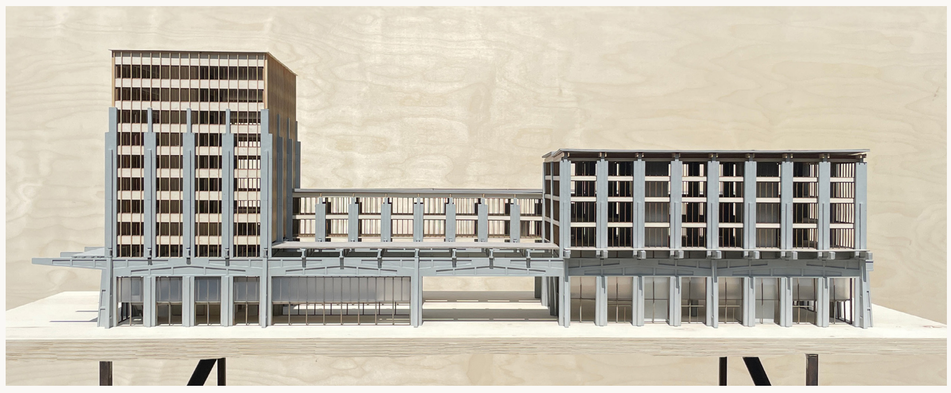


5. Spare colums are stacked on top of the existing grid to carry the additional floors.



6. CLT beams span between the new columns.

Two Palazzi as an urban block

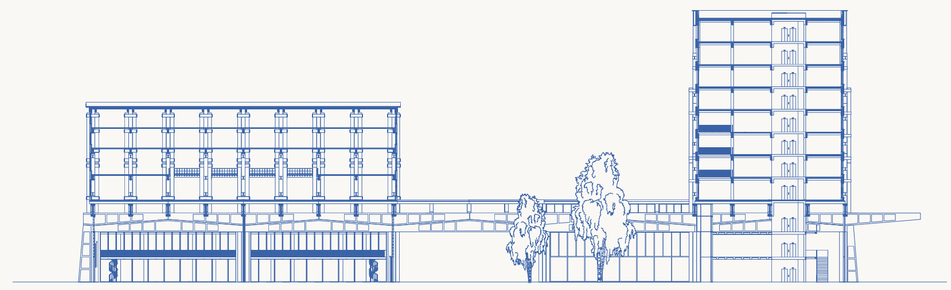


A sustainable building is one that is flexible and has the capacity to change its function throughout time. Therefor a lot of refining went into the composition of the building itself and the positioning of the building within its context.

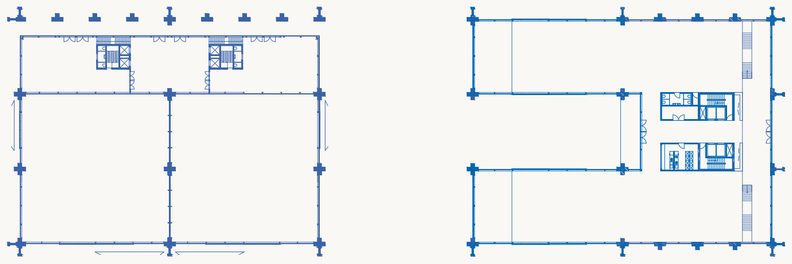
In search for a clear identity, we turn to Italy for inspiration. The urban palazzo will be the object of study. The original palazzo was constructed to house a range of offices and trades on the ground and a large family on the upper floors. Typically, these lively activities were centered around a spacious courtyard. They distinguished themselves by a generous system of shared circulation and stairs. By re-drawing the palazzos, a first step is taken to understand how they functioned and what produces their extraordinary quality.

The typology of the Italian palazzo provides us with a tool to organize the vast amount concrete elements that we aim to reuse. This classicist typology functions as an underlaying structure that organizes the plan and design of the building. Concepts such as a central cortile, symmetry, hierarchy in the facade and inner circulation bring logic to the project.[7]

We focus on the adaptation of the found types to accommodate the program within the primary structure developed as an open resilient frame. An economic and sustainable allocation of resources generates a great amount of spatial generosity.



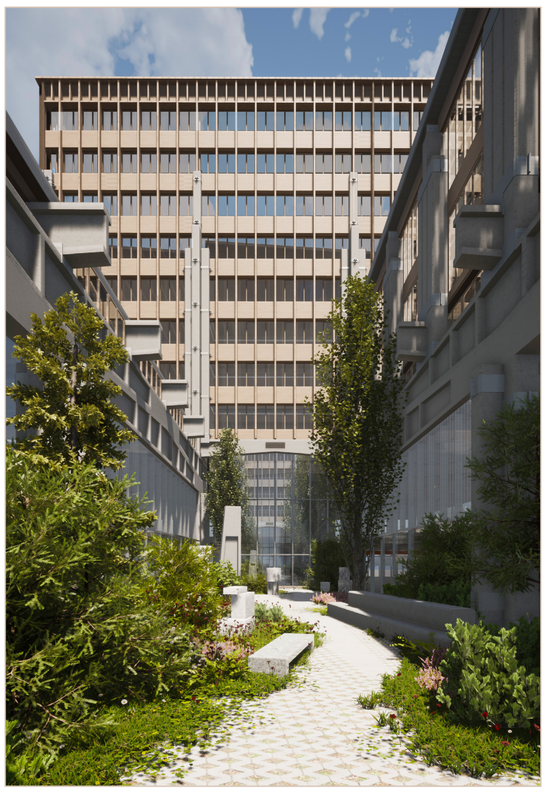
Section through the building.



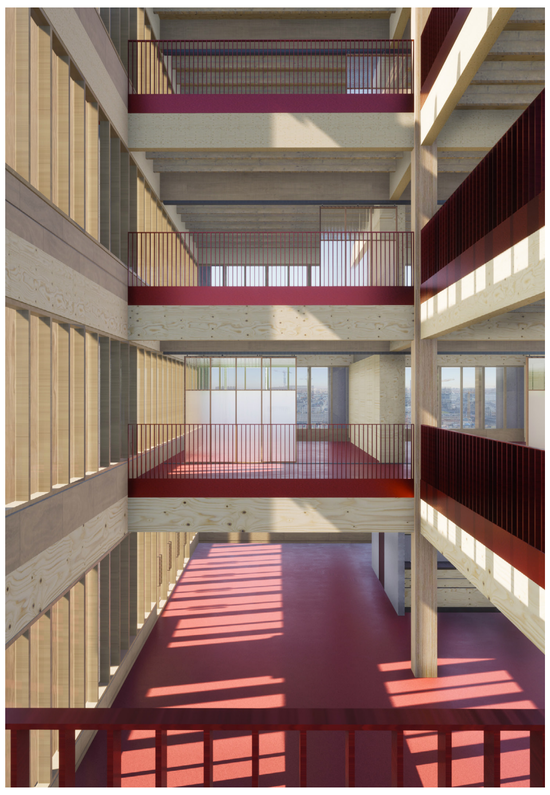
Floorplan of the ground floor, with flexible open spaces that can be used for logistics or culturals ends.

Front facade, 1:100 model.

Rendering of the interior, showcasing how the stacked structure shapes the spaces inside.



Rendering of the inner courtyard.



Rendering of the inner lobby in the tower volume.