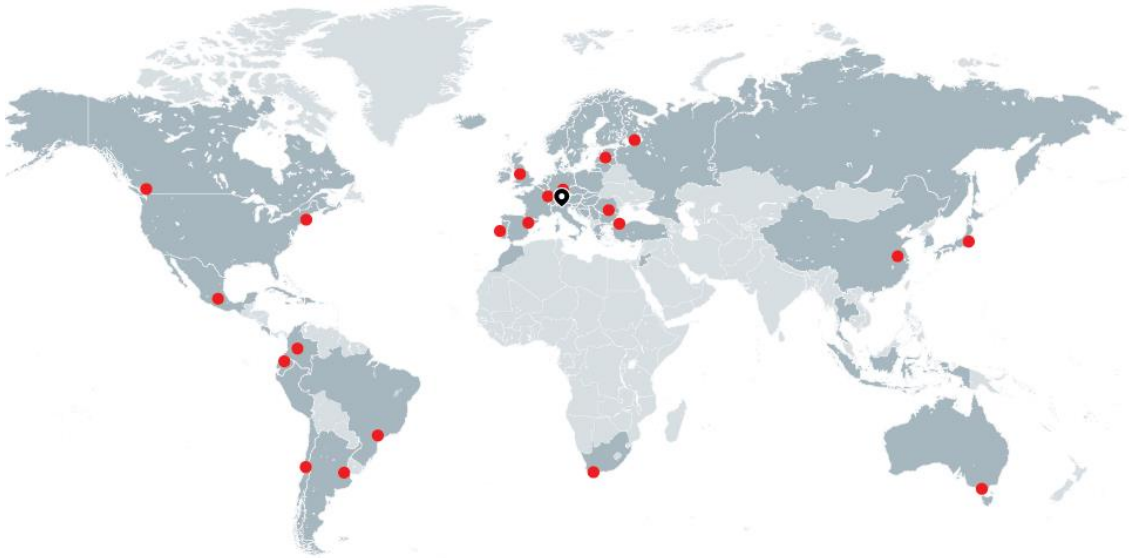
rothoblaas

Solutions for Building Technology

Our automatic Warehouse

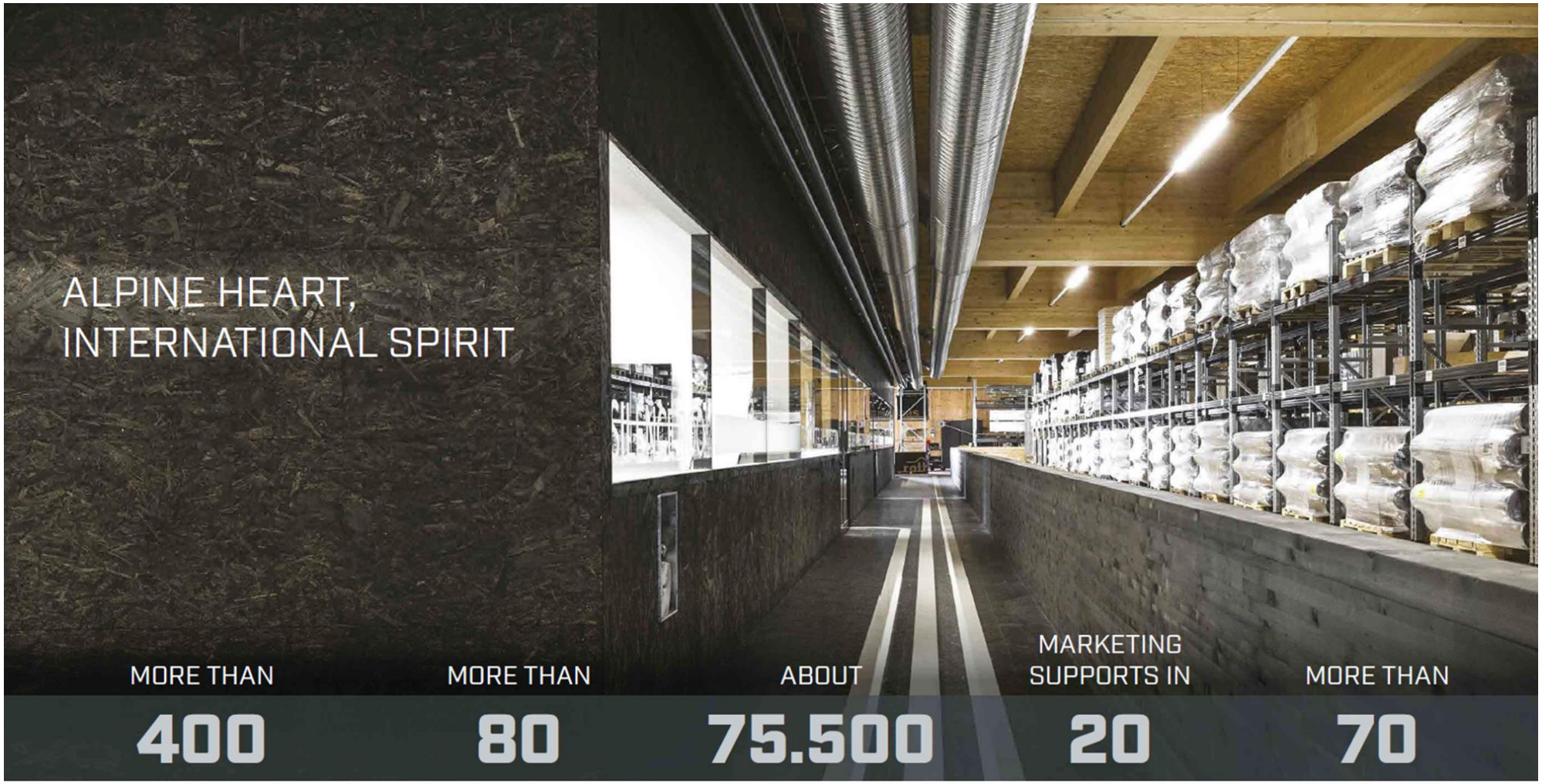
Rothoblaas HQ Builds a new warehouse – out of Mass Timber

INTRODUCTION



rothoblaas 30 YEARS ANNIVERSARY

INTRODUCTION



PRACTISE WHAT YOU PREACH

- Spring 2020: Rothoblaas began a large **warehouse expansion** project at our headquarters in Northern Italy
- This expansion will double the existing warehouse space
- Structure completely built out of **mass timber**

PRACTISE WHAT YOU PREACH

Rothoblaas is a company centered on the idea that **innovation never stops**.
Even thought period of construction of the new warehouse was not positive, linked to Covid-19 and the consequence of half of turnover, we release new products every year, and our constantly improving our existing offerings.

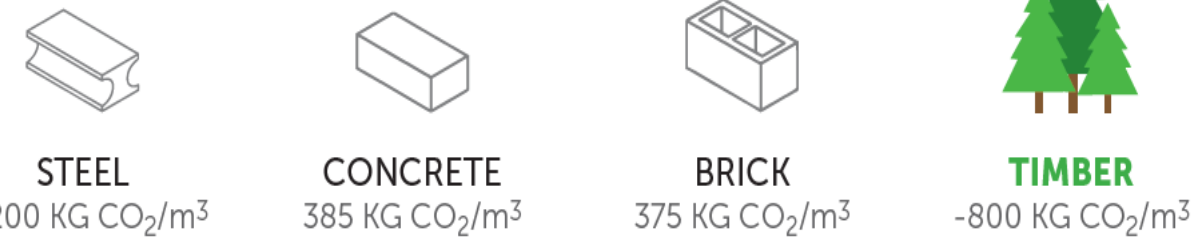
We also support and push for further growth and **development of the timber building industry**.

To prove that we stand behind what we sell, and the industry we are involved in, CEO Robert Blass decided that **timber** and **sustainability** would be key in any future expansions.

USE OF WOOD

The construction industry is targeted as a big polluter – in forms of resource extraction, processing and landfill waste.
However, building with timber, especially when it's locally sourced, immediately **lowers the carbon footprint** of the building and actually **captures carbon** in the processed wood materials – which in turn results in positive forestry practices to grow more material.

A truly renewable resource.



USE OF WOOD

PROJECT TEAM

Client:
Rotho Blaas Srl

Engineering:
Studio Merz Kley Partner
Armalam
Baucon

Architecture:
Arch. Lukas Burgauner

Automatic warehouse
Authoma

Foundations:
Geofondazioni
Unionbau

TImber builders:
Several specialised companies in the sector

TECHNICAL DATA

3200 m²
of new storage area

2000 m²
for goods handling

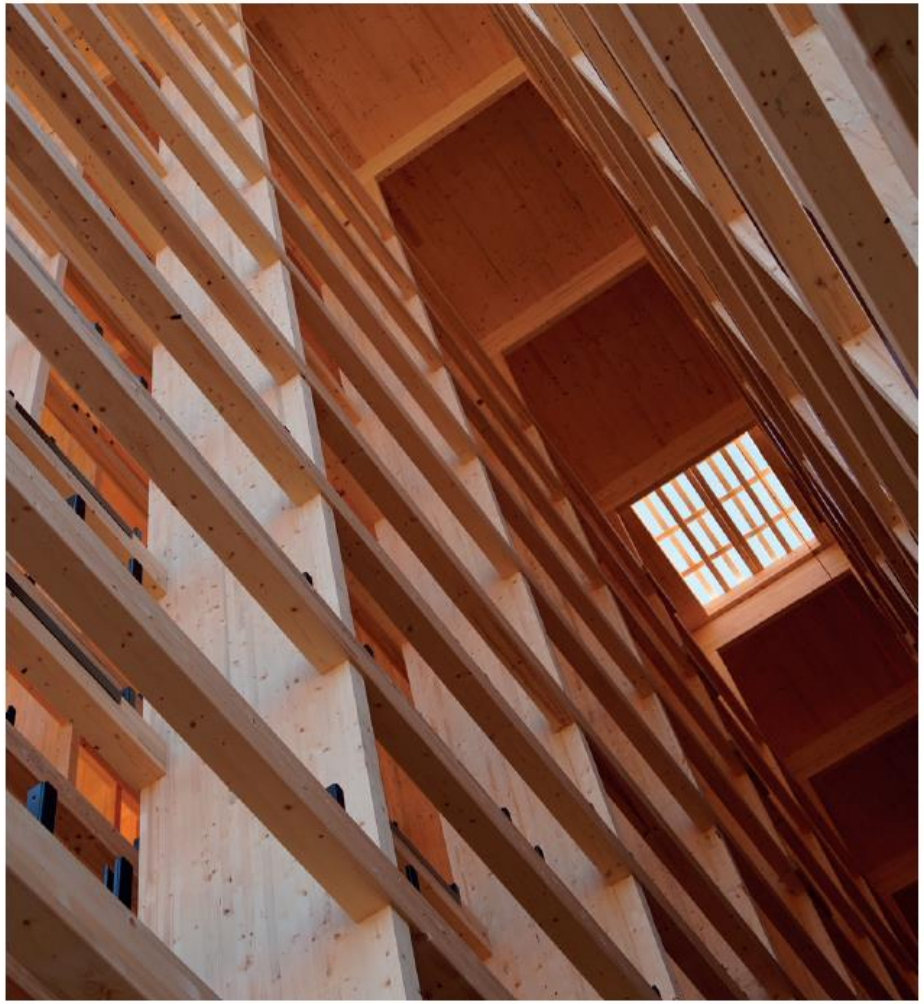
1200 m²
for new offices

40x80x20 m
total dimensions of the construction

200 Kw/P
Photovoltaic system

20 glulam
GL24 and **LVL** combined towers form the bracing system

Class R30
structure fire resistance

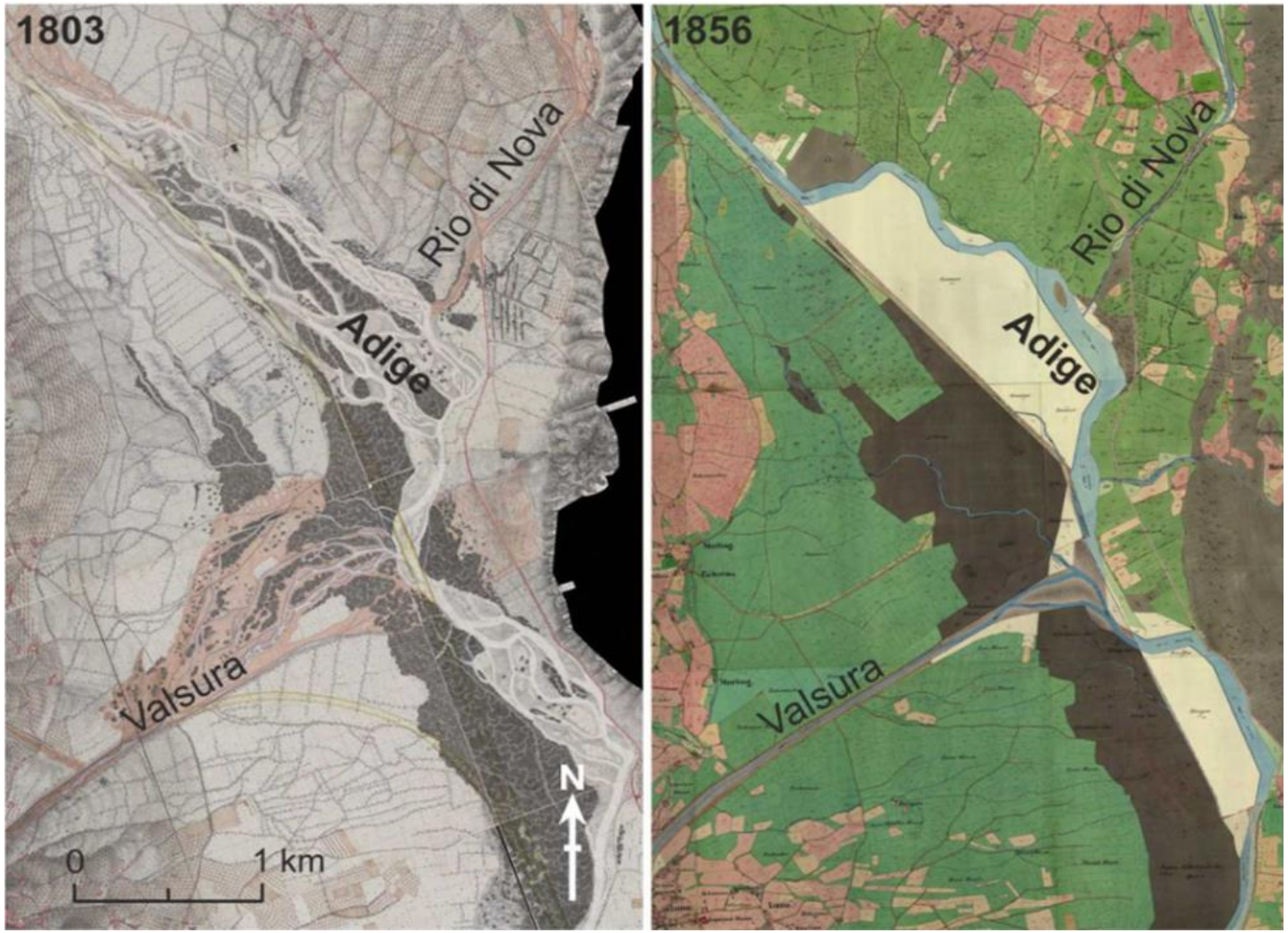


Over 34,400 square feet total, over 60 feet tall.
Local trades and suppliers used throughout.

CHANGE OF THE RIVER ADIGE BEND

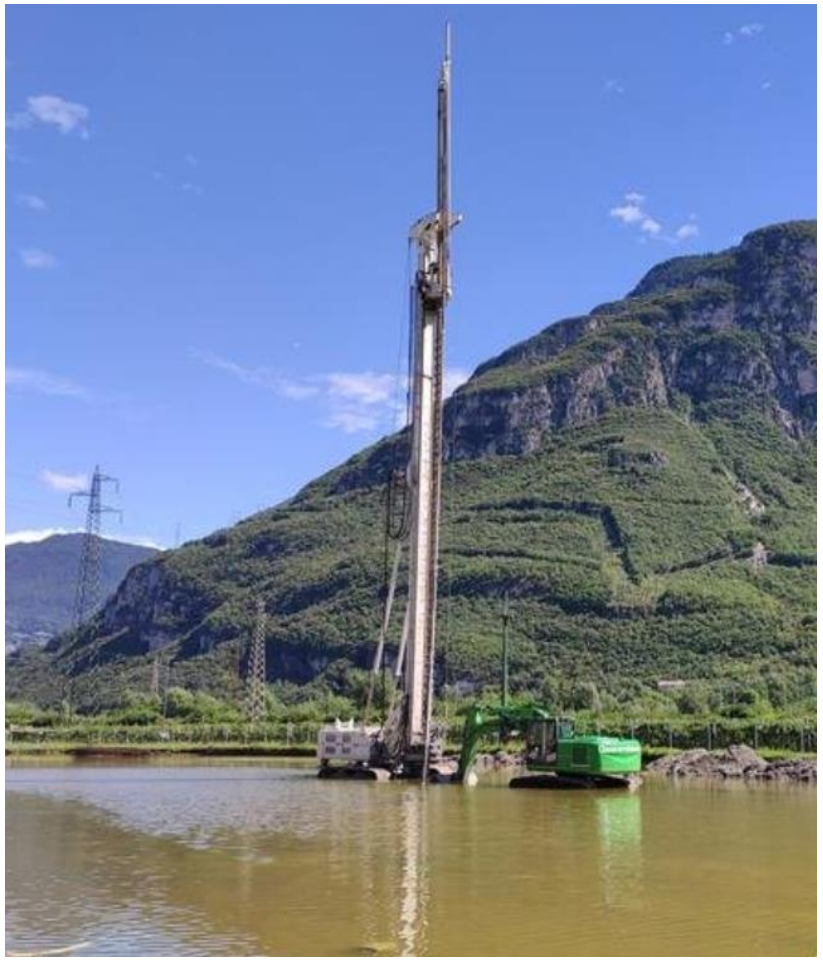
The South Tyrol region where Rothoblaas is situated is a region **full of history** both ancient and recent, and the Adige/Etsch river is central to much of it.

This portion near the city of Bolzano was diverted and channeled in the mid 1800's to prevent flooding, ease transportation and reclaim portions of this fertile valley.



CHANGE OF THE RIVER ADIGE BEND

Although this reclamation serves the local wineries and orchards very well, it is not the most suitable ground to build on. With this fact in mind the site work commenced by driving large pilings deep into the earth to support a **raft type concrete foundation**. Of course, last year's spring brough on many difficulties, not to mention record rainfall.



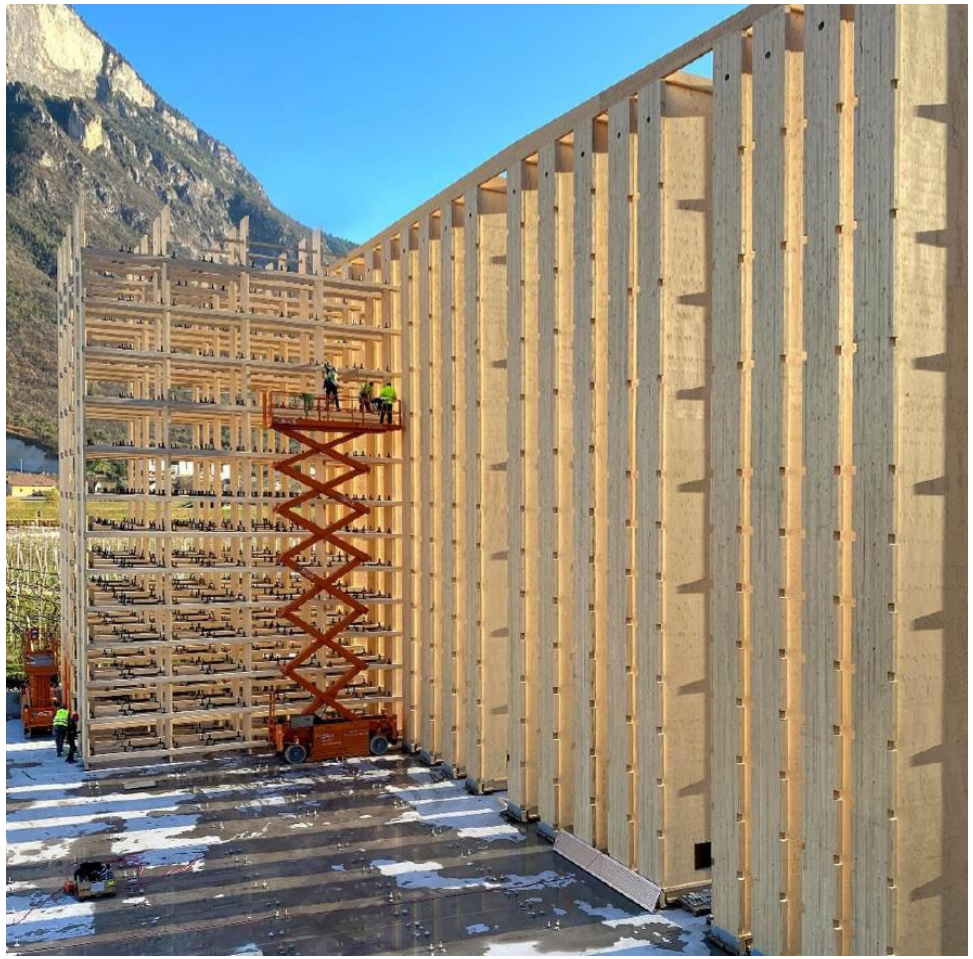
FOUNDATION PROCESS

The massive slab was tied to the pilings, a structural rebar grid added, and concrete poured.

FOUNDATION CONSTRUCTION

The building uses timber for not only the main structure, support and roof, but also the **warehouse shelving** itself.
All the CLT, LVL and GluLam was sourced **within 50 miles** of the site itself. As this region has a rich timber building tradition it was not difficult to source quality material and a trained workforce for such a project. However, building out of almost completely timber did not simplify the project and took many hours of **design and pre-fabrication effort**.

GLULAM TOWERS



20 glulam towers measuring roughly 2,4 m wide, 1 m thick and 20 m high are the main backbone to this structure.

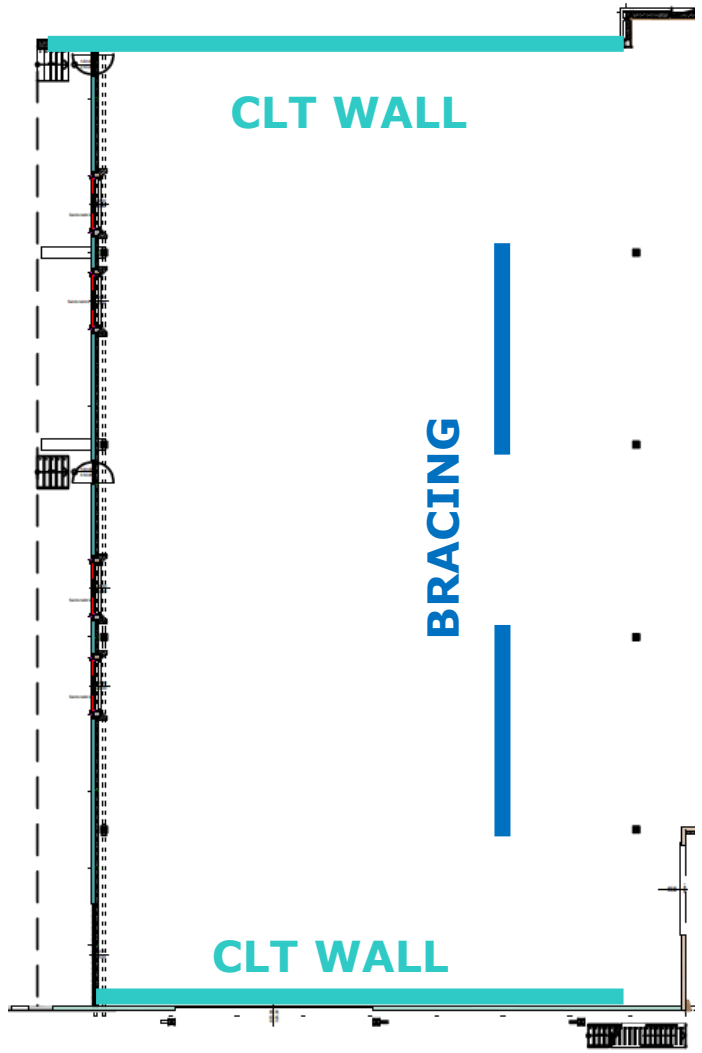
SEISMIC DESIGN - GOODS ENTRY

STANDARD APPROACH:

-2 WALLS IN NORTH-SOUTH DIRECTION

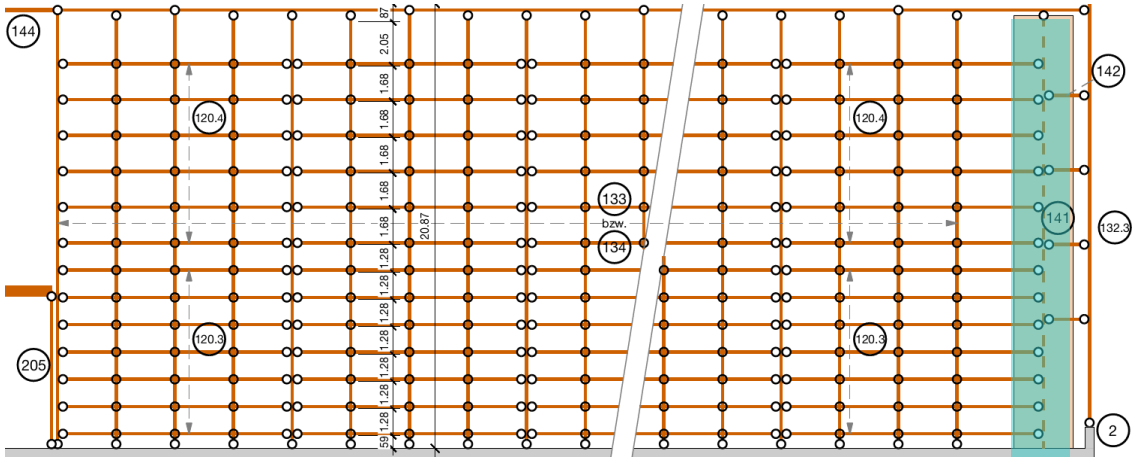
-2 BRACES ALIGNED EAST-WEST

DIAPHRAGM ROOF SLAB TO DISTRIBUTE ECCENTRICITIES

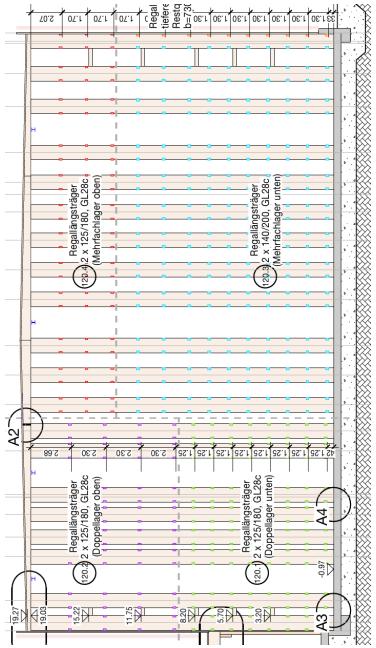


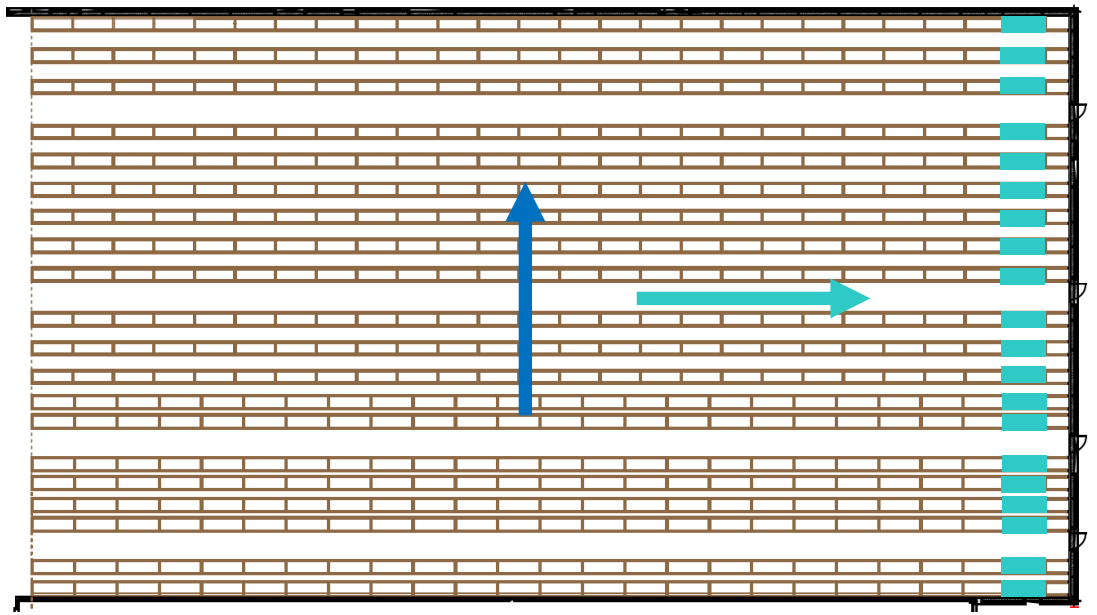
SEISMIC DESIGN - WAREHOUSE

FORCE IN DIRECTION NORTH-SUOTH



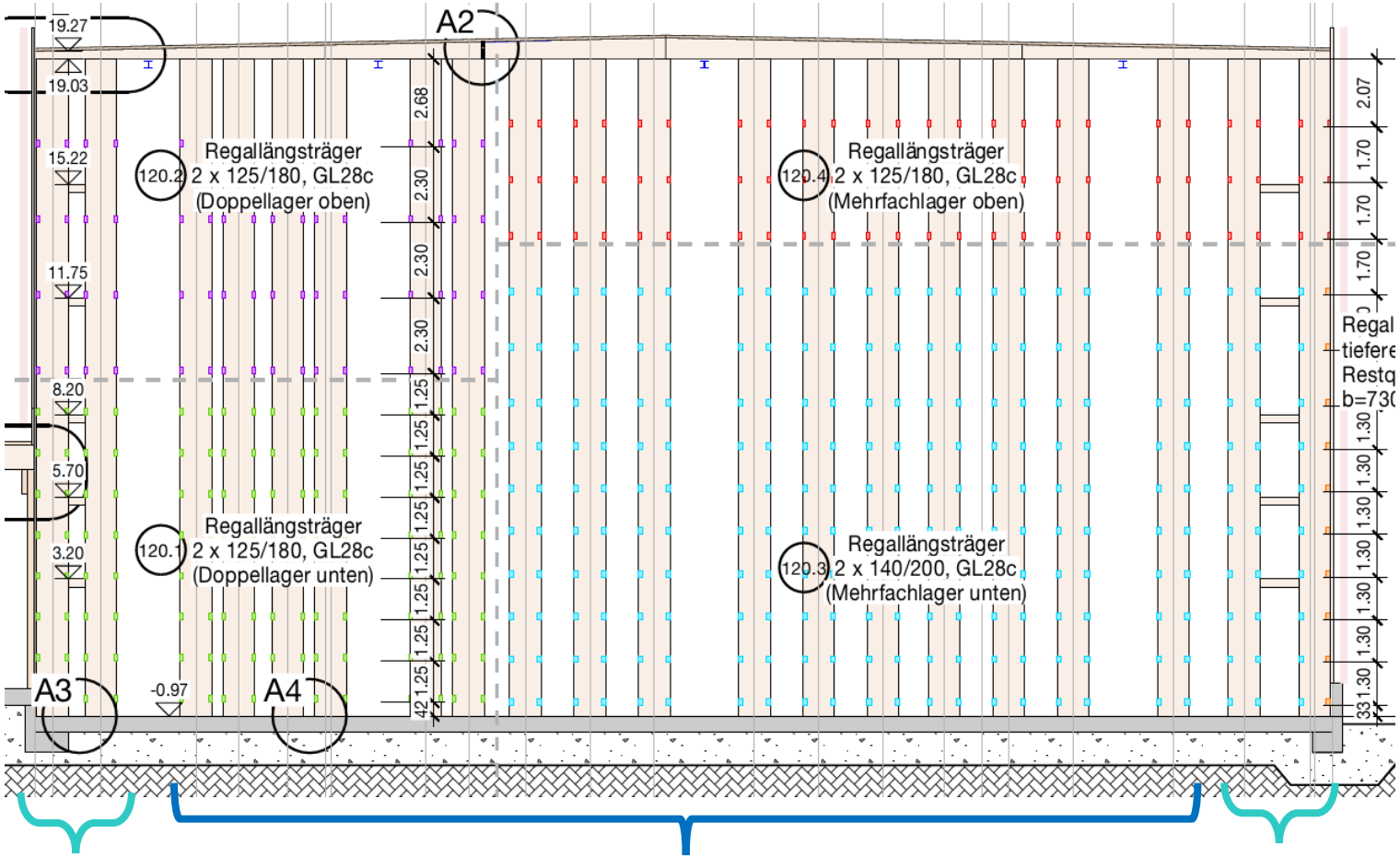
FORCES IN DIRECTION EAST-WEST





EAST-WEST FORCES - WAREHOUSE

WIND – SEISMIC ACTIONS

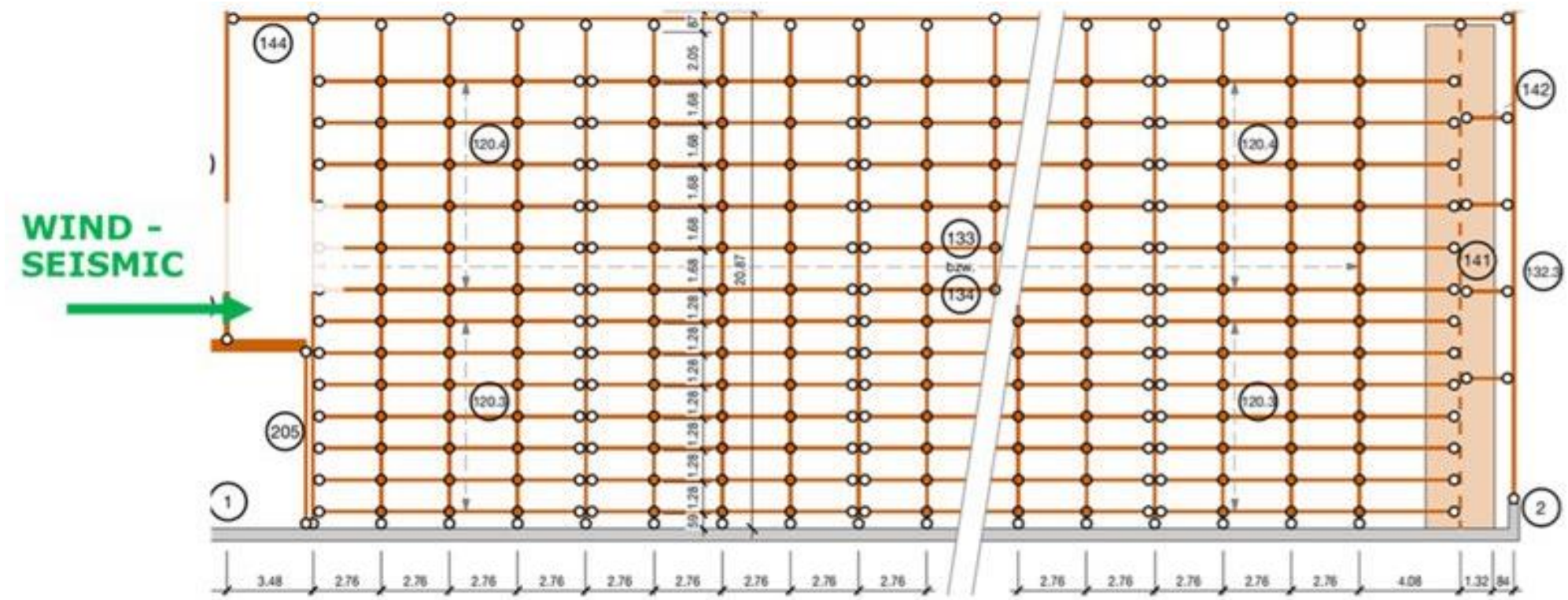


FIXED

NOT FIXED

FIXED

NORTH – SOUTH LOADS

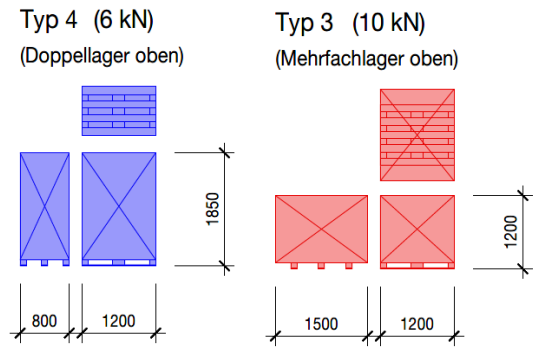


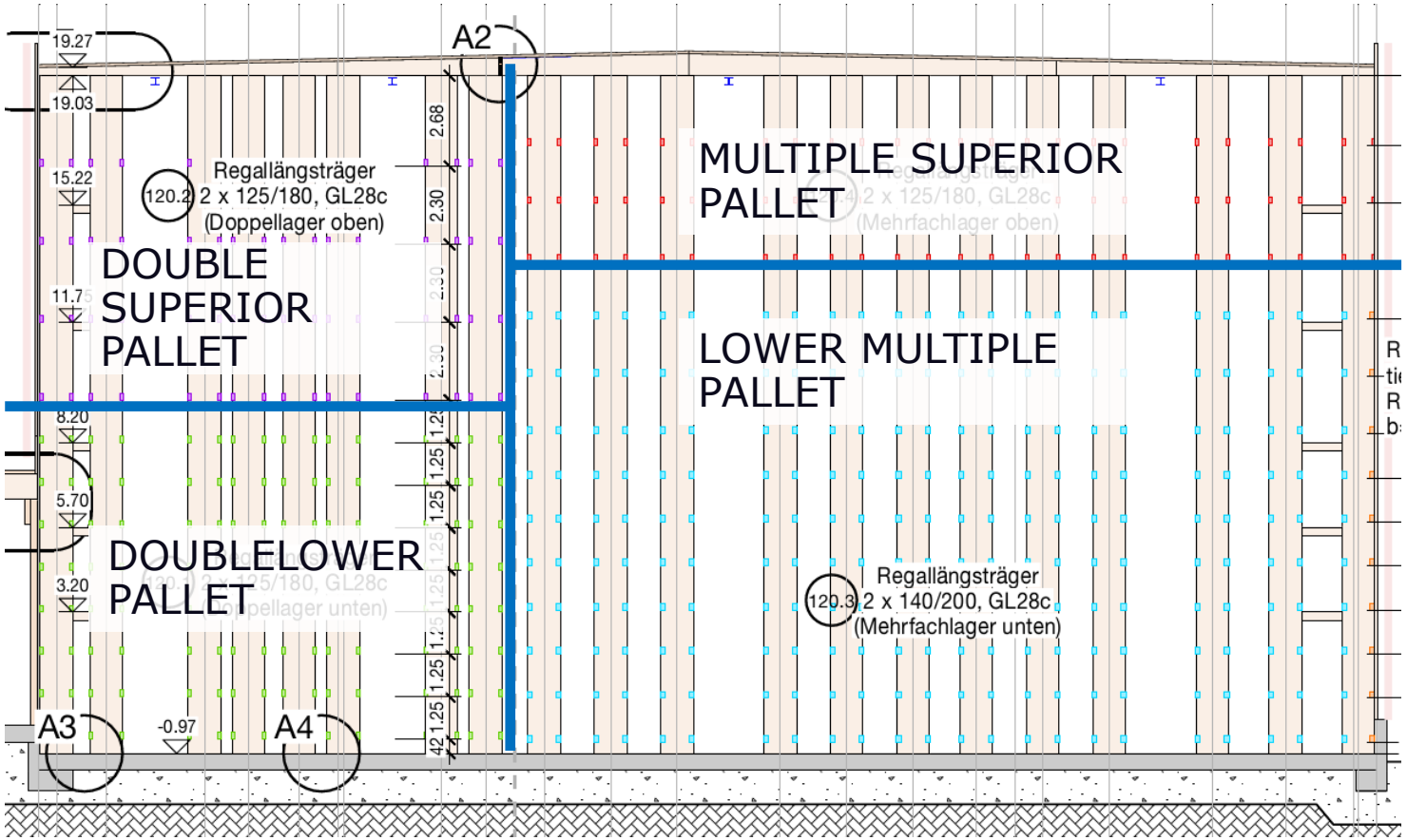
Wind and Seismic loading had to be considered on this structure

- The pillars are extremely slender (section 100x960mm).
- The beams carry the horizontal actions to the 20 bracing towers
- The towers are isostatic structures, connected at the base

VERTICAL LOADS - WAREHOUSE

THE WAREHOUSE IS DIVIDED IN 4 ZONES

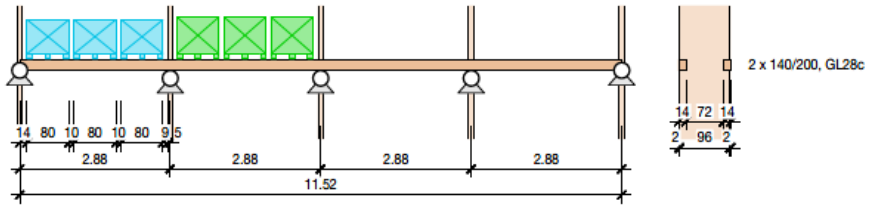




VERTICAL LOADS - WAREHOUSE

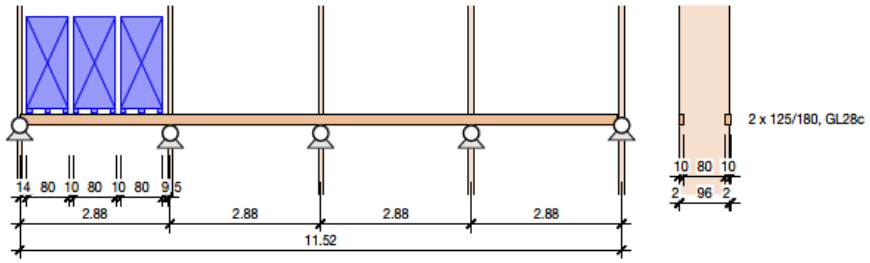
Palettenauflagerträger

Pos. 120.1: Doppellager unten M 1:100



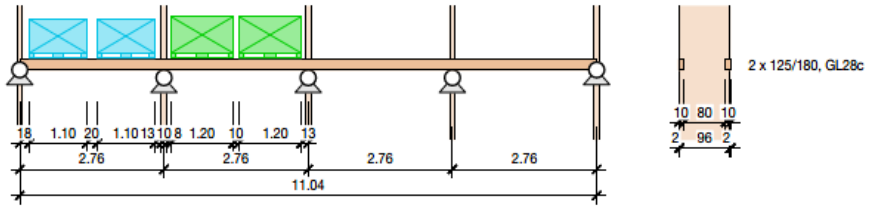
2 x 140/200, GL28c

Pos. 120.2: Doppellager oben M 1:100



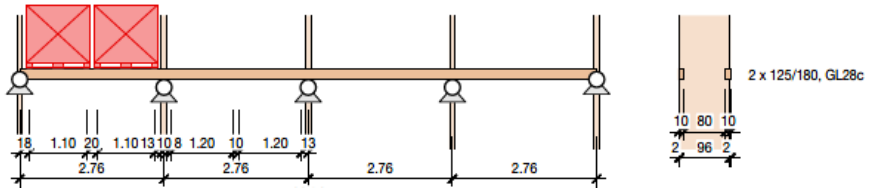
2 x 125/180, GL28c

Pos. 120.3: Mehrfachlager unten M 1:100



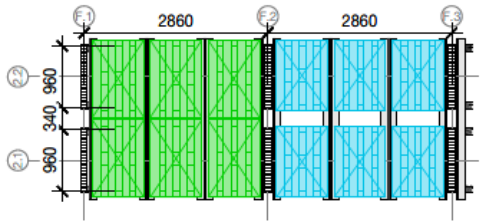
2 x 125/180, GL28c

Pos. 120.4: Mehrfachlager oben M 1:100

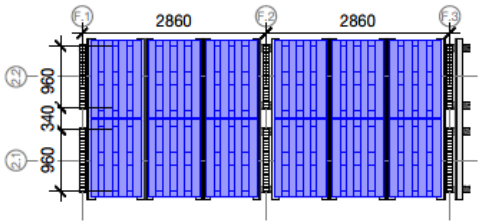


2 x 125/180, GL28c

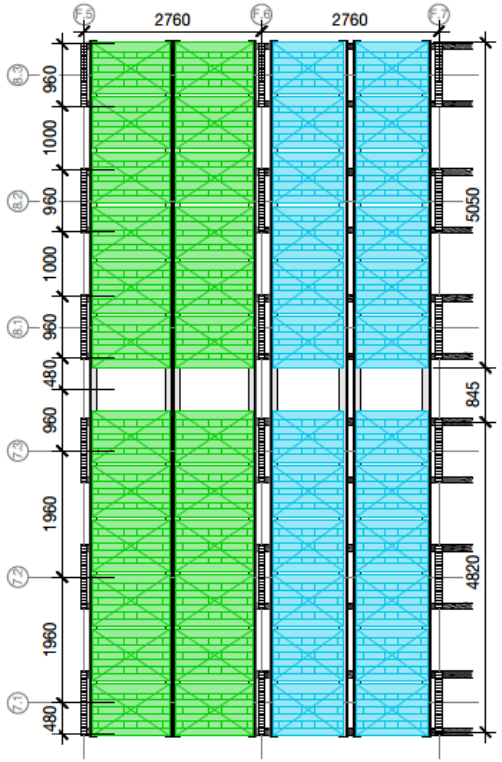
Pos. 120.1: Doppellager unten M 1:100



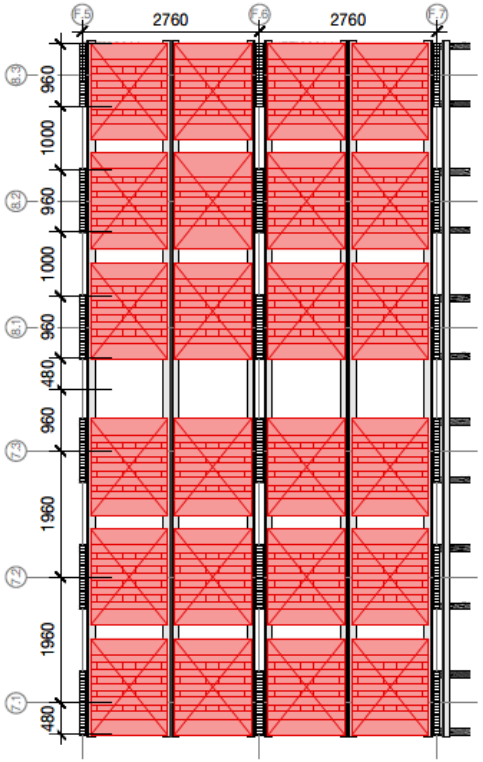
Pos. 120.2: Doppellager oben M 1:100



Pos. 120.3: Mehrfachlager unten M 1:100



Pos. 120.4: Mehrfachlager oben M 1:100



SLE - MACHINE FUNCTIONALITY

SEISMIC ACTION: NOT CONSIDERED.

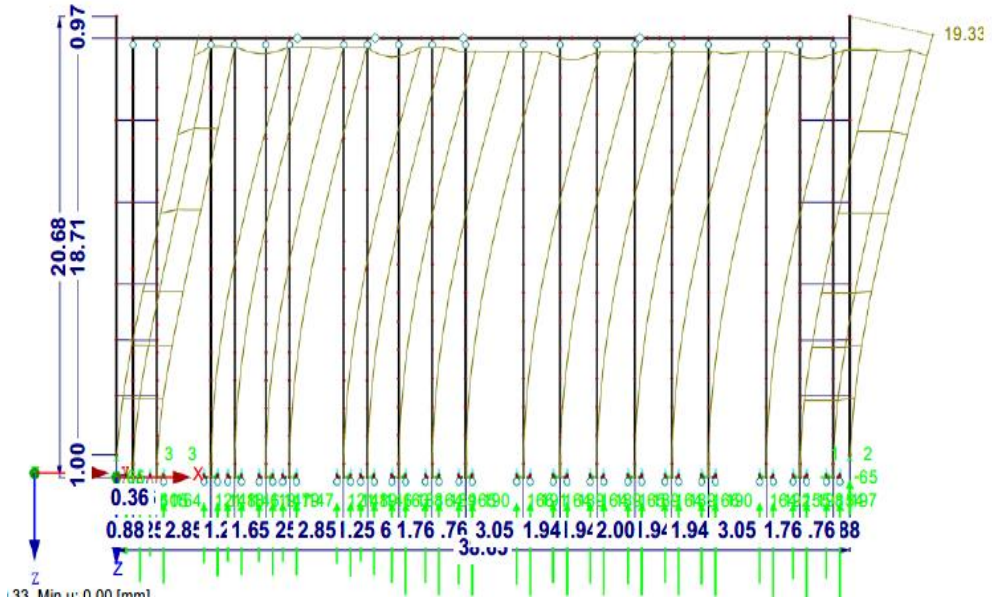
WIND ACTION:

REDUCED FROM CHARACTERISTIC VALUE (TR=50 years):
50% Fk in north-south direction;
25% Fk in east-west direction.

MAXIMUM EAST-WEST SHIFT (pillars): 19mm < 20mm

MAXIMUM NORTH-SOUTH SHIFT (TOWERS): 12mm < 16 mm

MAXIMUM SHIFT OF THE PILARS: 4mm < 15mm



CONNECTIONS

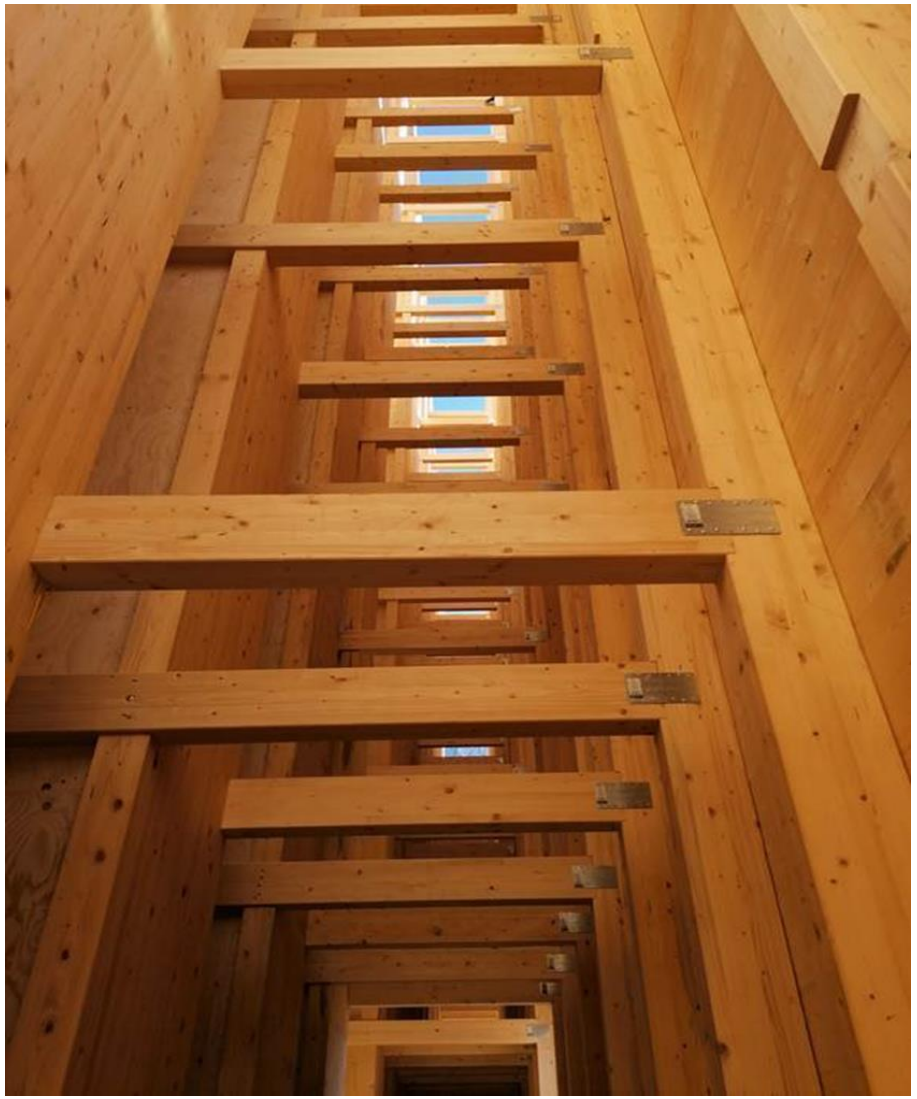
TITAN PLATE T TIMBER

PLATES FOR SHEAR LOADS

TIMBER-TO-TIMBER
These plates are ideal for the flat connection of the timber platform beams to load-bearing timber panels.

SHEAR PLATES
Shear strengths calculated with both partial and total fastening for solid timber, glulam and CLT.

CALCULATED AND CERTIFIED
CE marking according to European standard EN 14545. Available in 2 versions. TTP300 version ideal for CLT.



This type of metal shear plate was used throughout the structure.

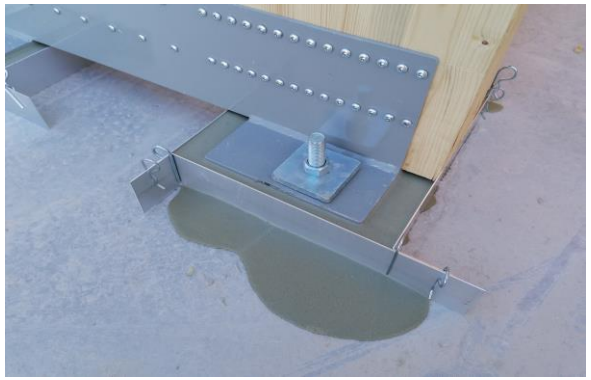
CONNECTIONS

Various **timber building methods** were used, including these ALU knife plate connections over the office portion of the building.

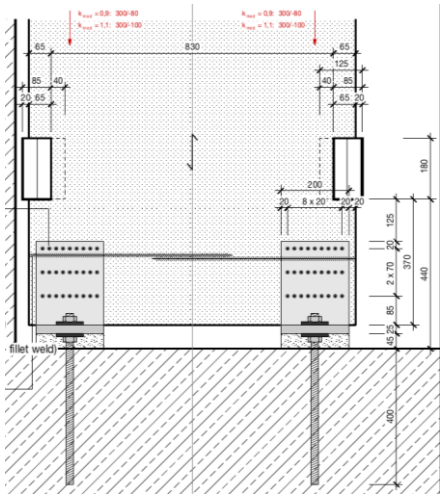
STRUCTURE

These photos show the internal grid of the building that not only acts as **structure** but as well as the **warehouse shelving support**.
You can also see the large CLT panels used to brace the building.

CONSTRUCTION DETAILS -GROUNDING OF COLUMNS

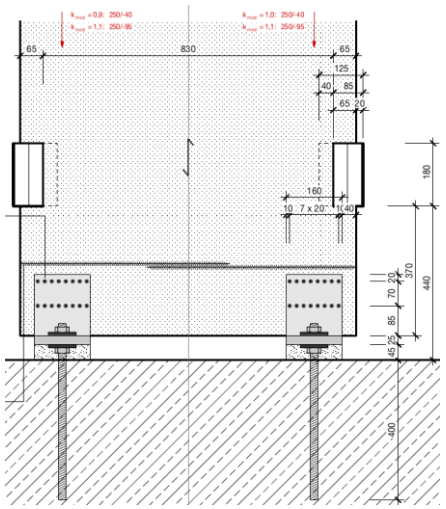


EXTERIOR PILOTS DOUBLE PALLET ZONE



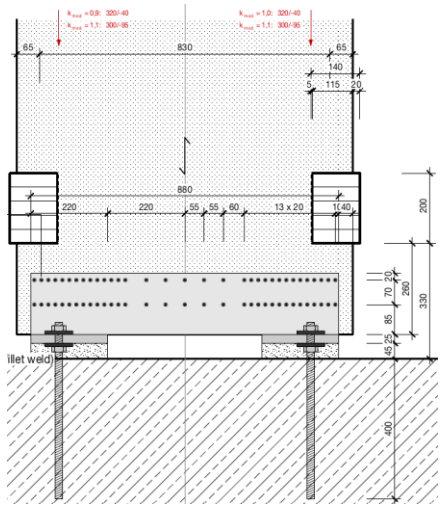
$T_{Ed,wind}$= 80 kN
$T_{ed,\ sismic}$= 100 kN

INTERIOR PILOTS DOUBLE PALLET ZONE



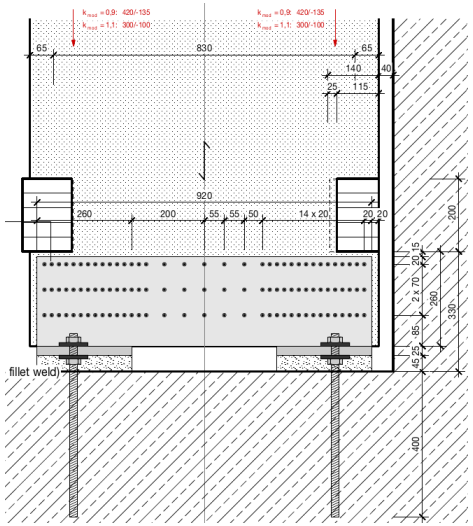
$T_{Ed,wind}$= 40 kN
$T_{ed,\ sismic}$= 95 kN

INTERIOR PILOTS MULTIPLE PALLET ZONE



$T_{Ed,wind}$= 40 kN
$T_{ed,\ sismic}$= 95 kN

EXTERNAL PILOTS MULTIPLE PALLET ZONE

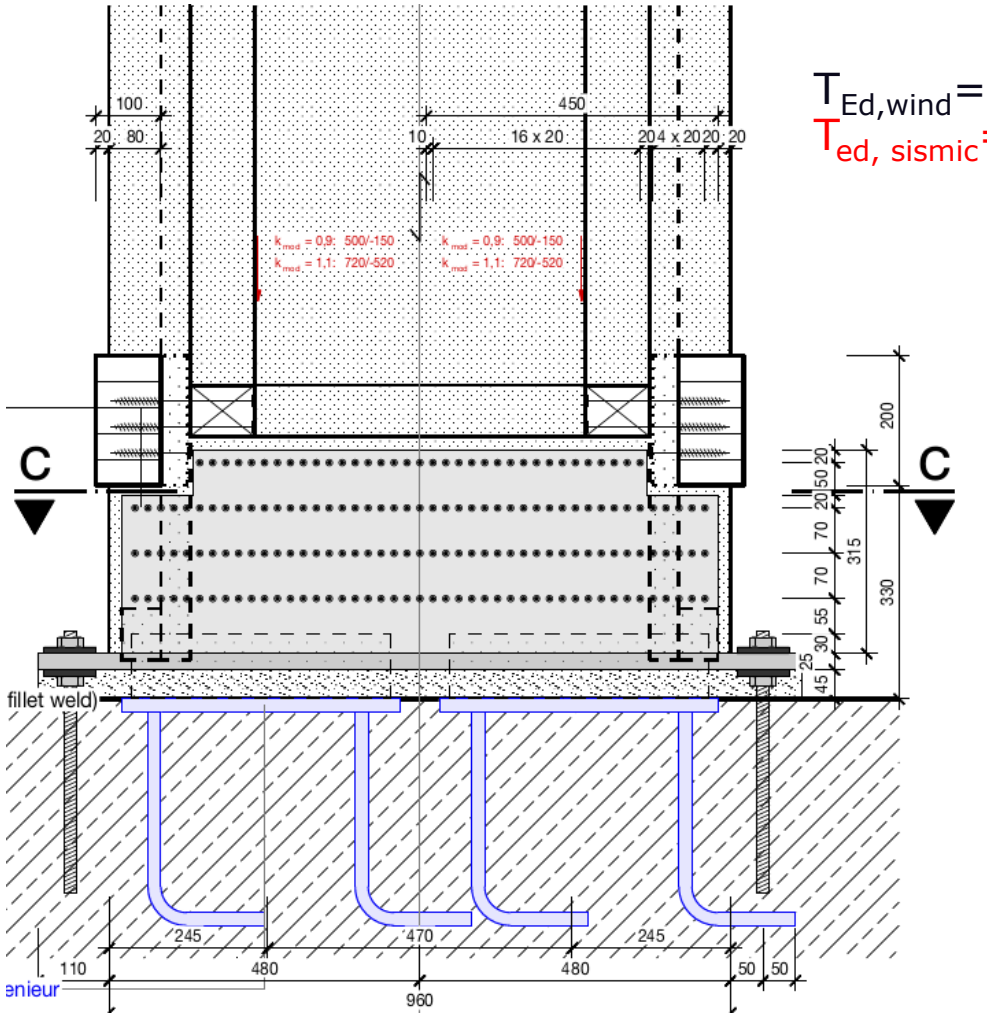


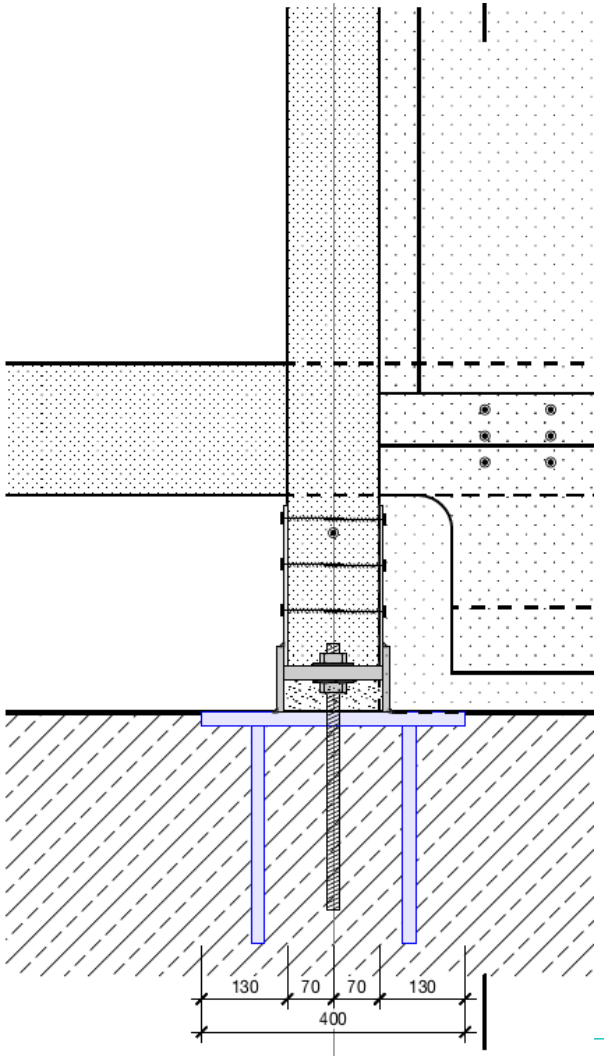
$T_{Ed,wind}$= 135 kN
$T_{ed,\ sismic}$= 100 kN

CONSTRUCTION DETAILS - GROUND CONNECTION OF BRACING TOWERS

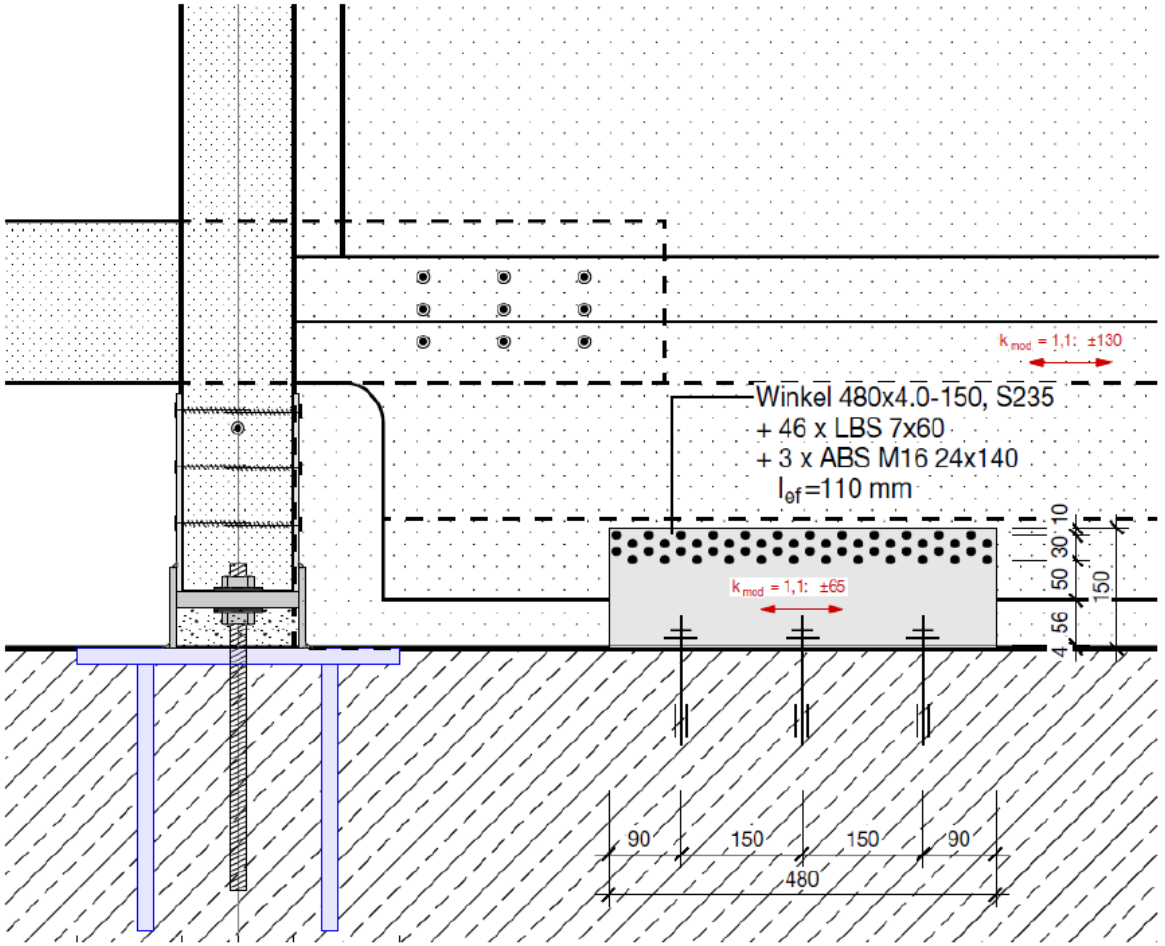
$T_{Ed,wind}$= 150 kN

$T_{ed,\ sismic}$= 520 kN





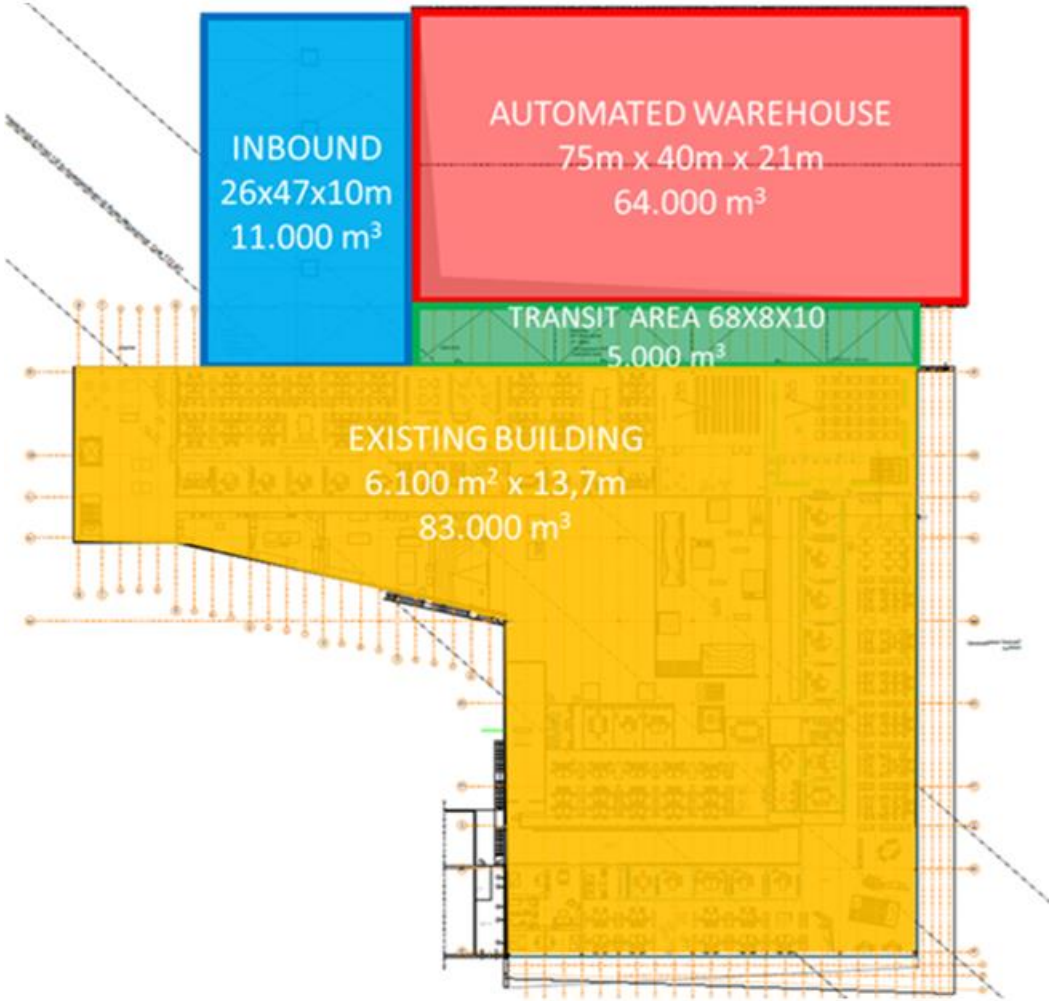
CONSTRUCTION DETAILS - GROUND CONNECTION OF BRACING TOWERS



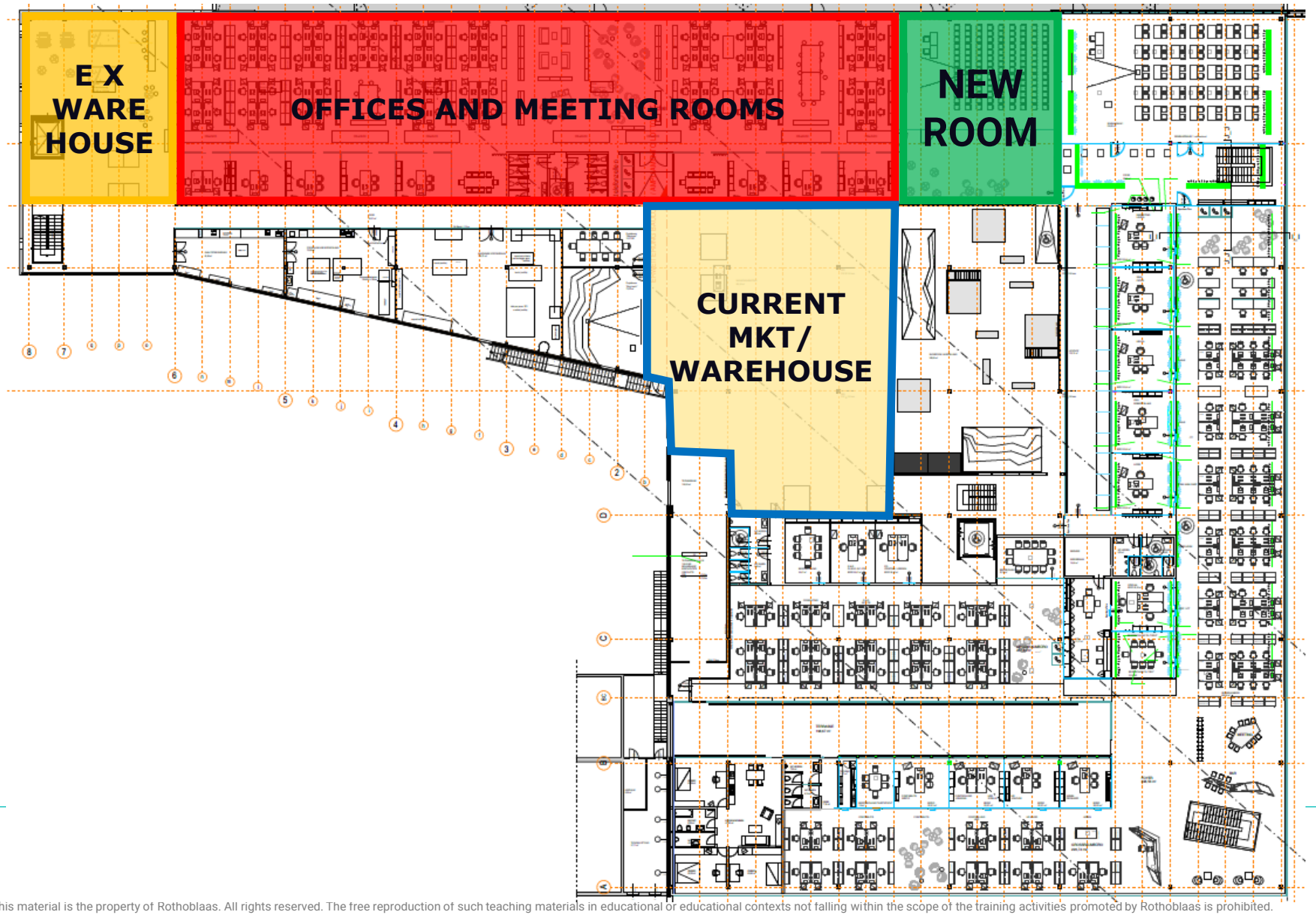
$T_{ed,\ sismic}$= 130 kN

INCREASE CAPACITY

This addition will **more than double the HQ current capacity**. Currently we can store 11,500 pallets of material, after expansion is complete, that storage will more than double at a capacity of **26,000 pallets worth of products**.

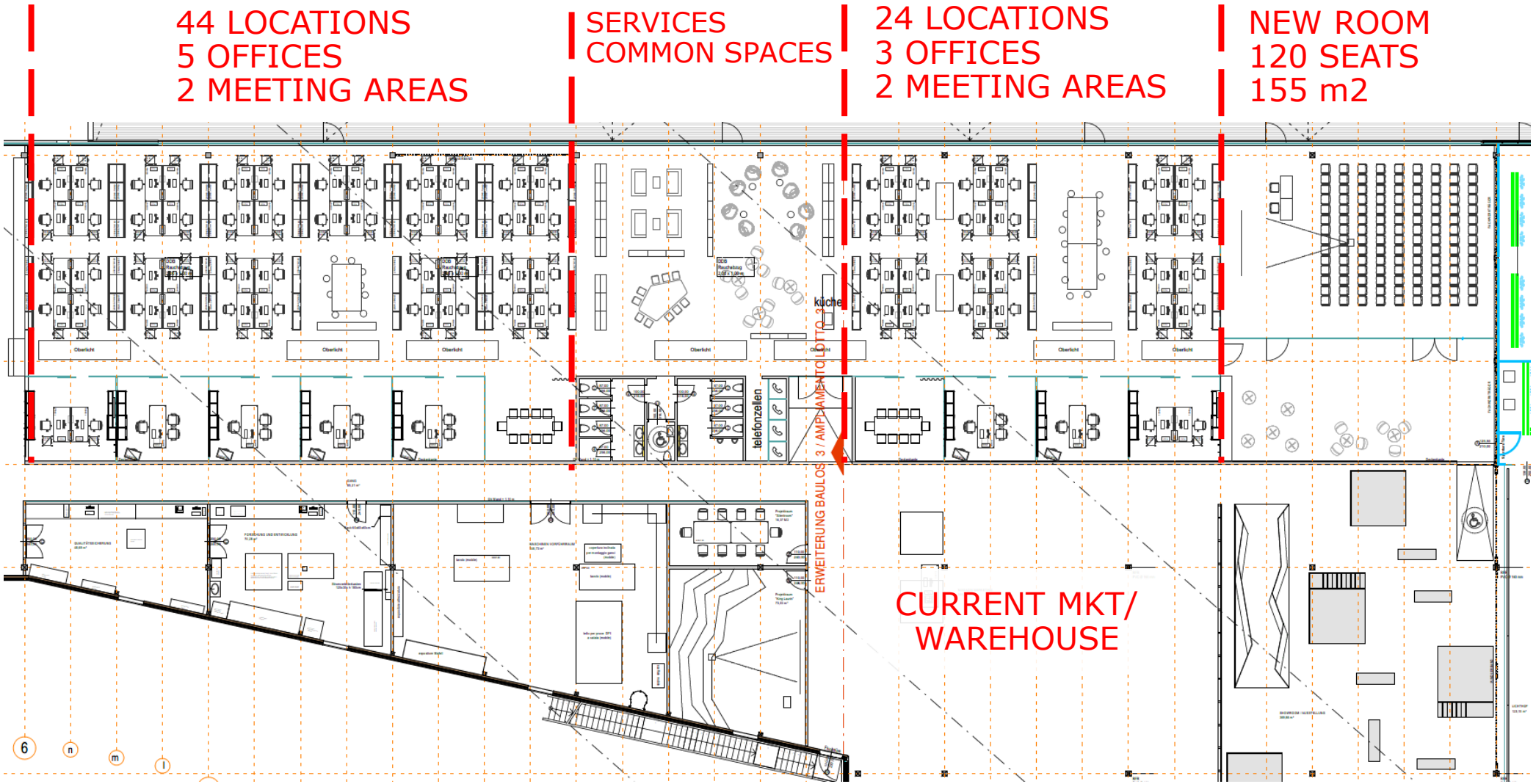


WORKS IN THE EXISTING BUILDING

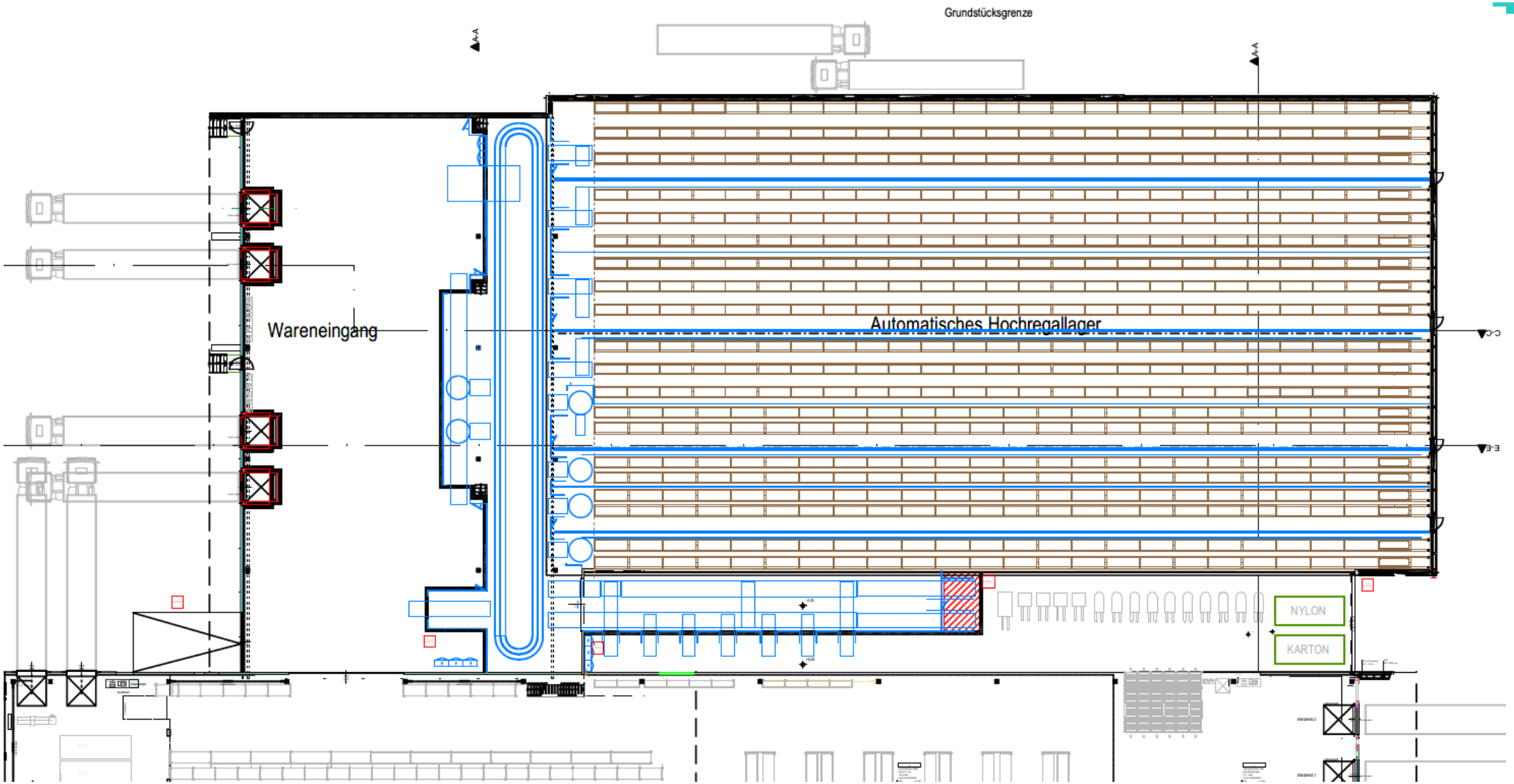


rothoschool
2021

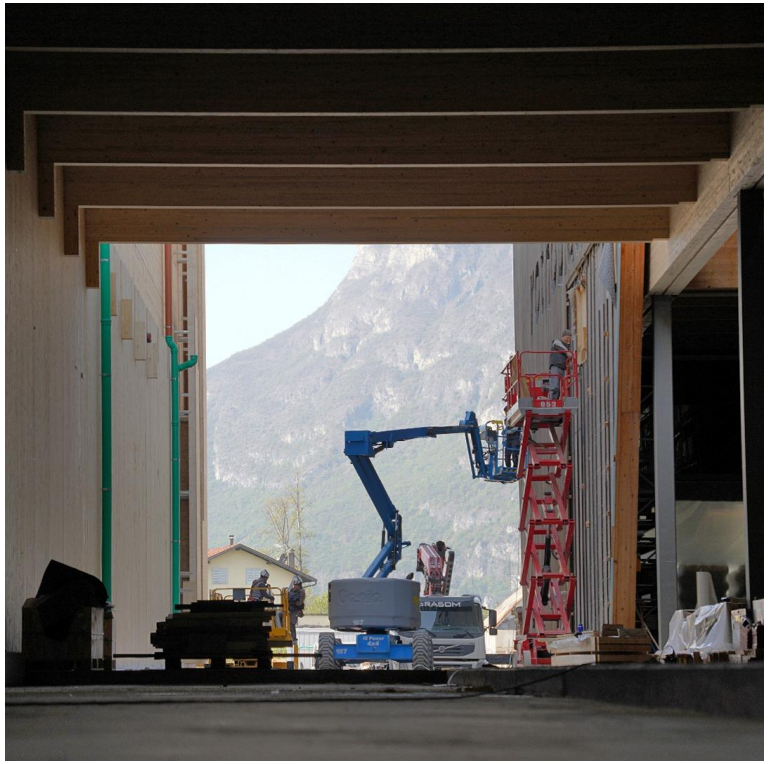
WORKS IN THE EXISTING BUILDING



MOVEMENTS OF GOODS



INCREASE CAPACITY



Tying old and new together, cladding begins.

INCREASE CAPACITY

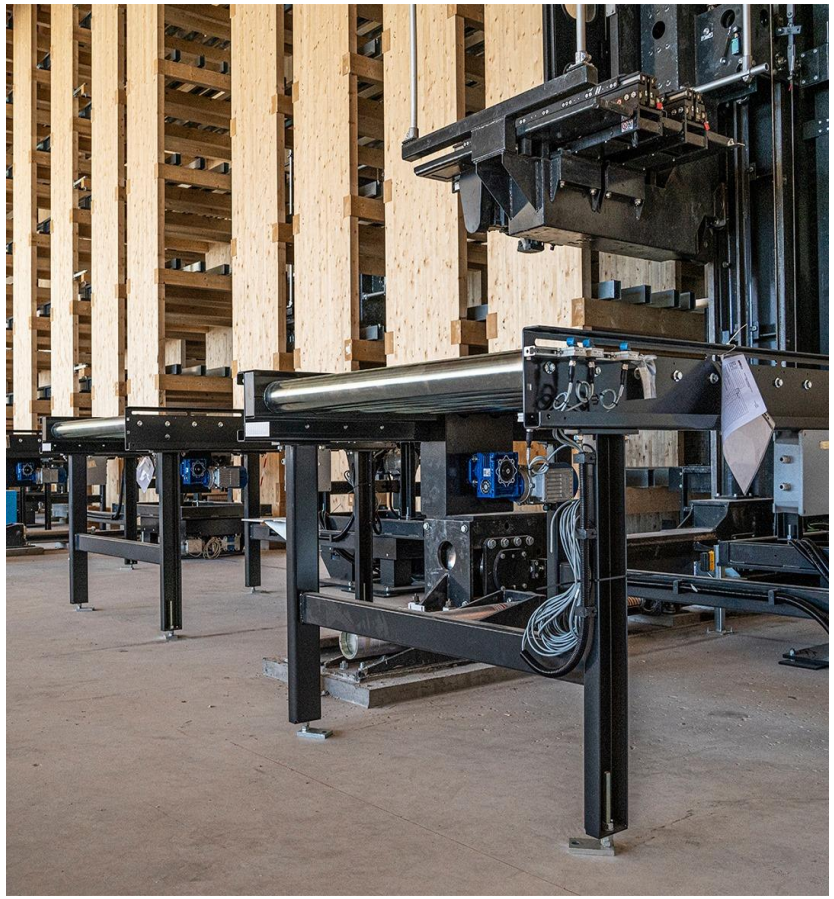
We are coming up on approximately **1 year** of this project being underway and final stages are in process.
Part of this quick timeline is in part by using **pre-fabricated timber elements**,
similar to what today's participants do.

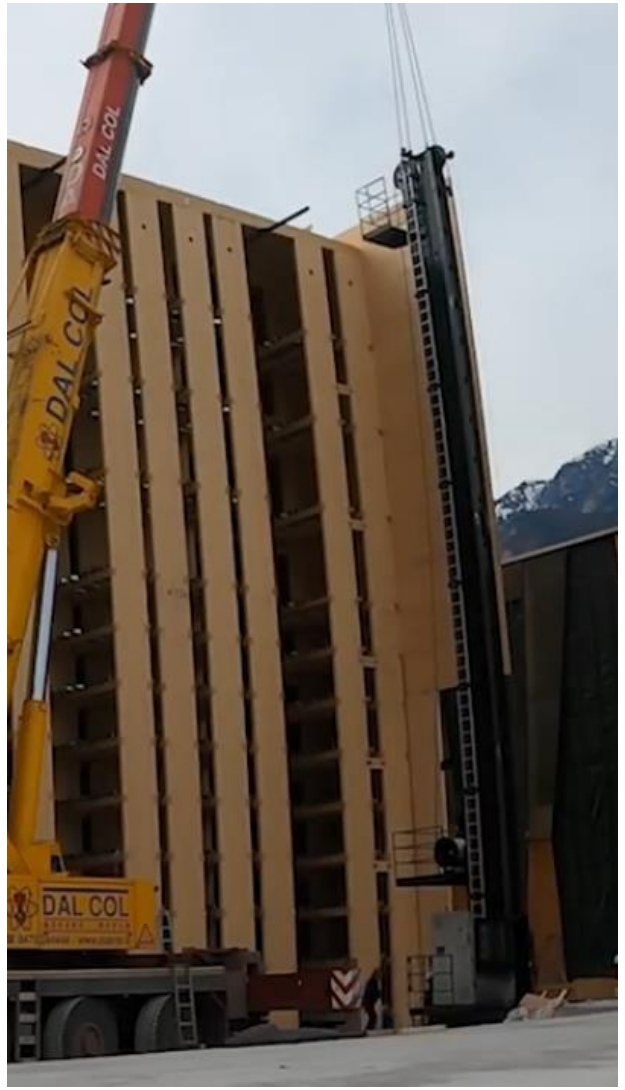
PRODUCTS USED

Those massive columns acting as the spine of this building needed some equally large hold-downs. These were custom made and fastened with our **certified LBS Anchor Screw**.

STRUCTURE

Not only is this one of the **tallest wood warehouses in Europe**, but also among the **first to be fully automated**, using conveyers, lifts and sliding shelving to speed and simplify the process.





PRODUCTS USED

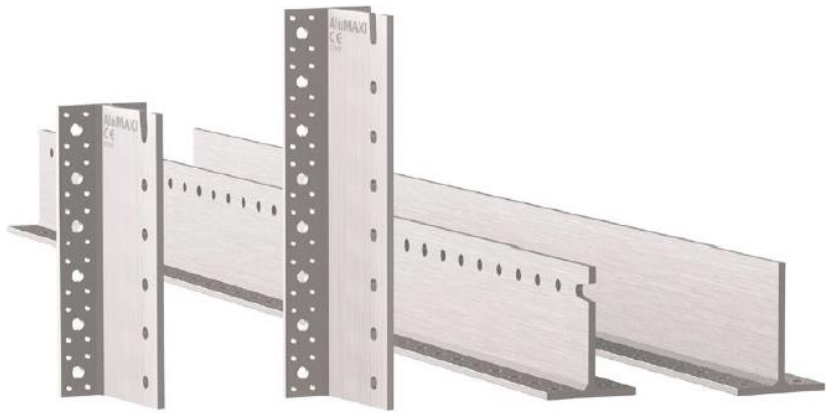
ALUMAXI

CONCEALED BRACKET WITH AND WITHOUT HOLES

SUPERIOR STRENGTH
Standard connection system developed to guarantee higher values of design strength. All values are calculated and certified.

STEEL-ALUMINUM
EN AW-6005A high strength aluminium alloy bracket, obtained by extrusion and therefore weld-free.

FAST FASTENING
Certified strengths calculated in all directions: vertical, horizontal and axial. Certified fastening with LBS screws and SBD self-drilling dowels.

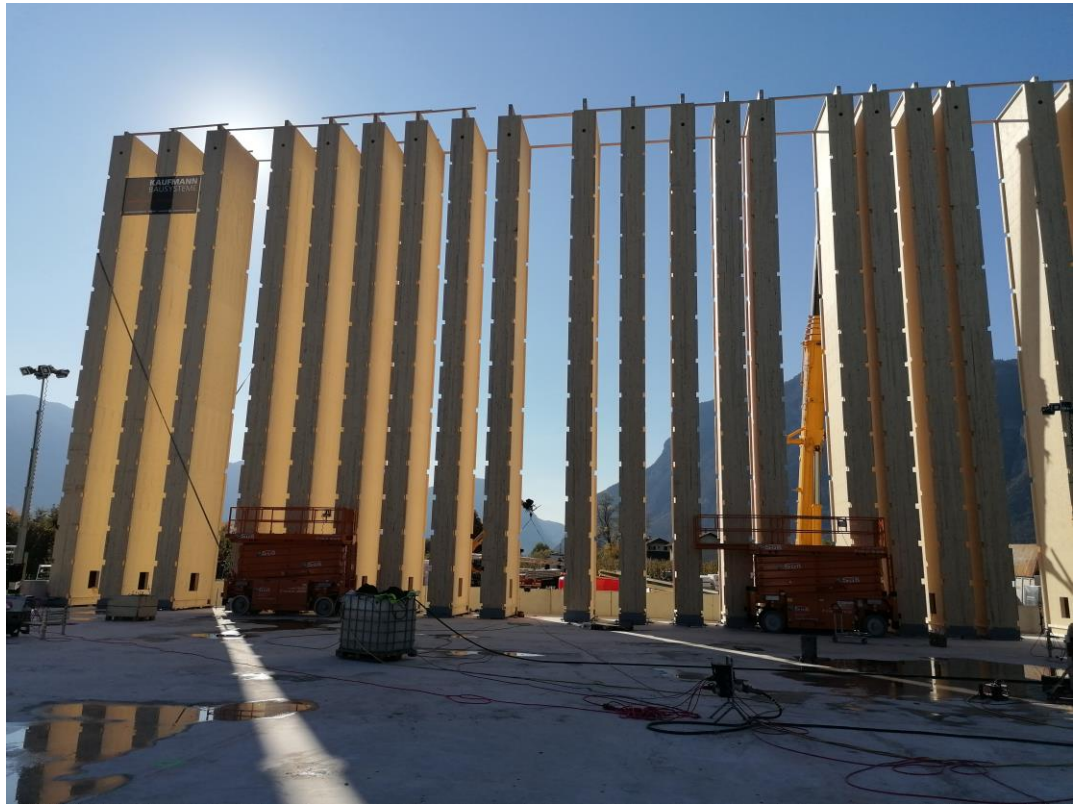


PRODUCTS USED

Various in-house products **used** on the expansion.

PREPARATION OF ANCHORS

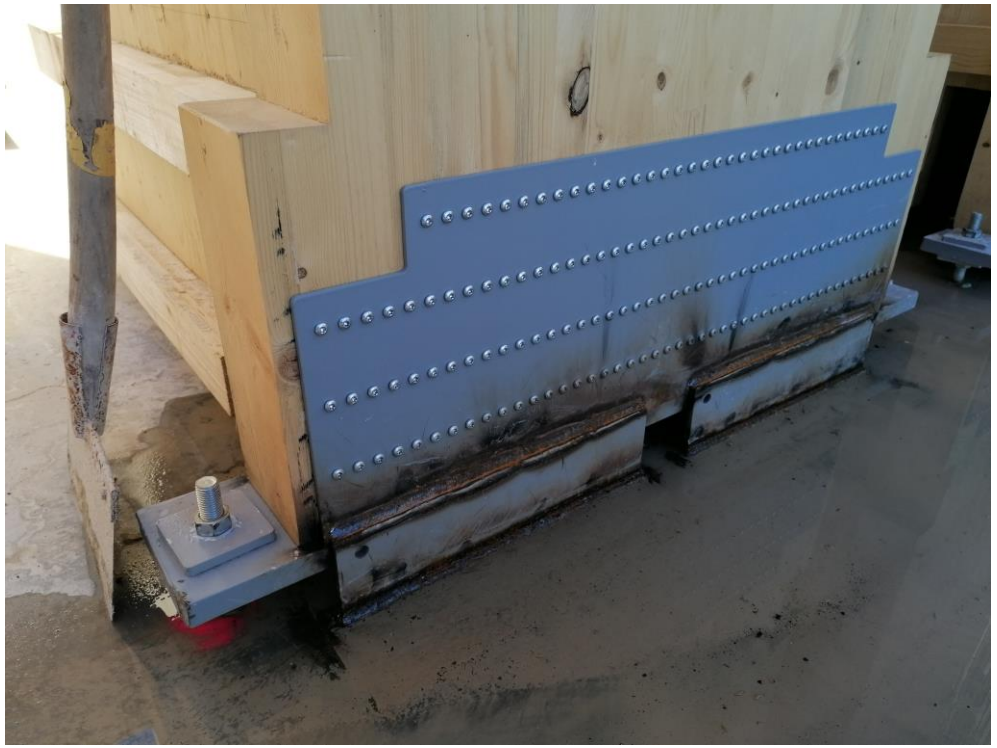
SEISMIC-RESISTANT SYSTEMS



TEMPLATES FOR ASSEMBLING SHELVES

JOINING OF PALLET RAILS

ANCHORAGE OF TOWERS



THE FUTURE

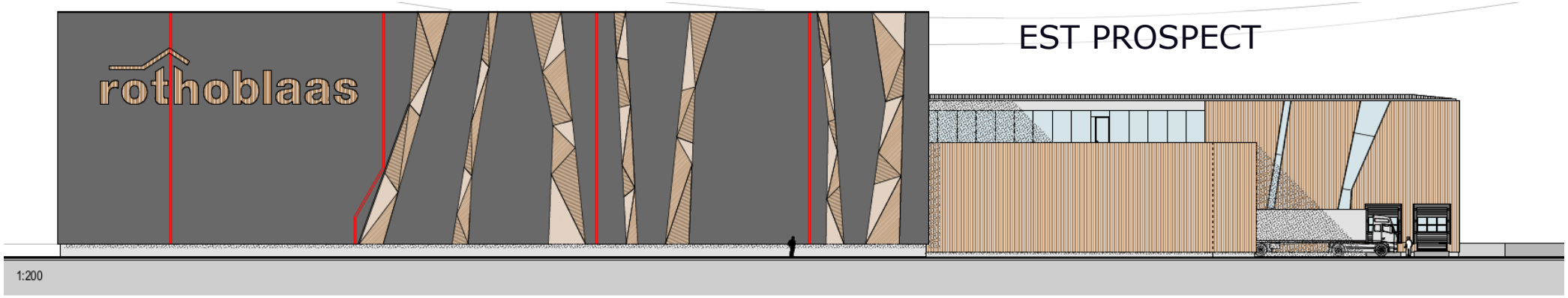
Next steps:

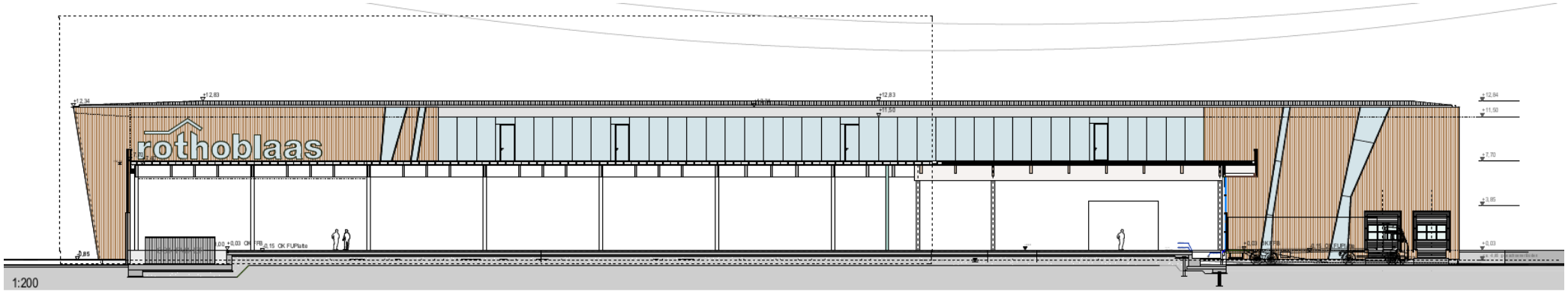
I. Interior outfitting
II. Install PV sells for electricity
III. Bring Automation Online
IV. Cladding completion
V. Move stock and people in

Through floods, a pandemic, global uncertainty, and rising material costs, this project is beginning to see the finish line, although there is still much work to complete.
We hope it serves our 22 international branches well and stands as an example of what can be accomplished with modern timber buildings. This type of construction is **completely modular** and could be duplicated anywhere to fit many users needs. As timber professionals, you may be working on similar structure soon.

ARCHITECTURAL RENDERS (arch. Lukas Burgauner)

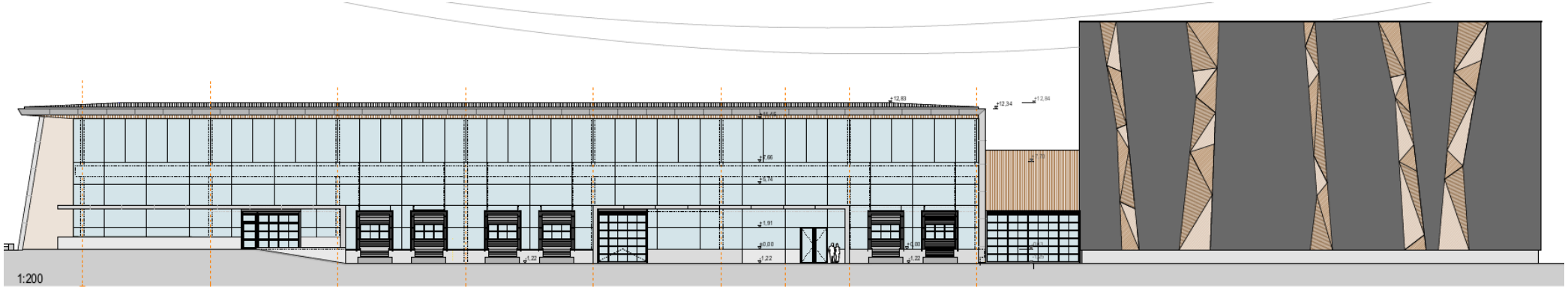
PROSPECTS AND SECTIONS (arch. Lukas Burgauner)





PROSPECTS AND SECTIONS (arch. Lukas Burgauner)

SUD PROSPECT



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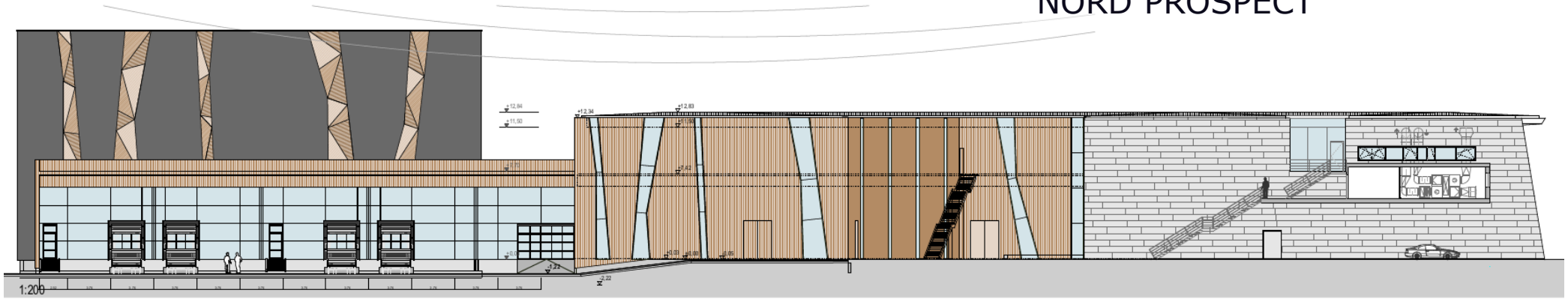

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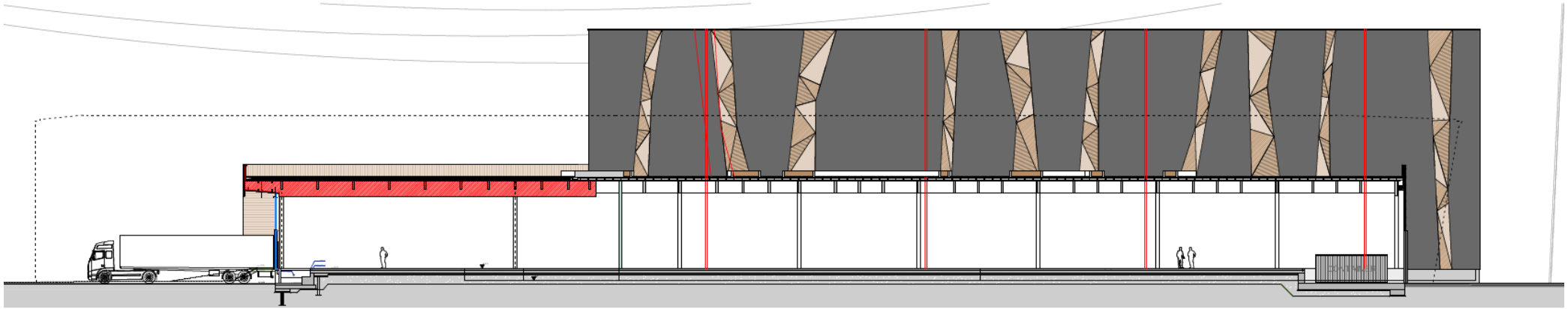
WEST PROSPECT



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Thanks for your attention

Ing. Matteo Andreottola