

The logo for Ramboll, featuring the word "RAMBOLL" in a bold, sans-serif font. The letter "O" is stylized with a white checkmark inside it. The logo is set against a dark blue background.

Bright ideas.  
Sustainable change.

# Timber Buildings rising into the clouds

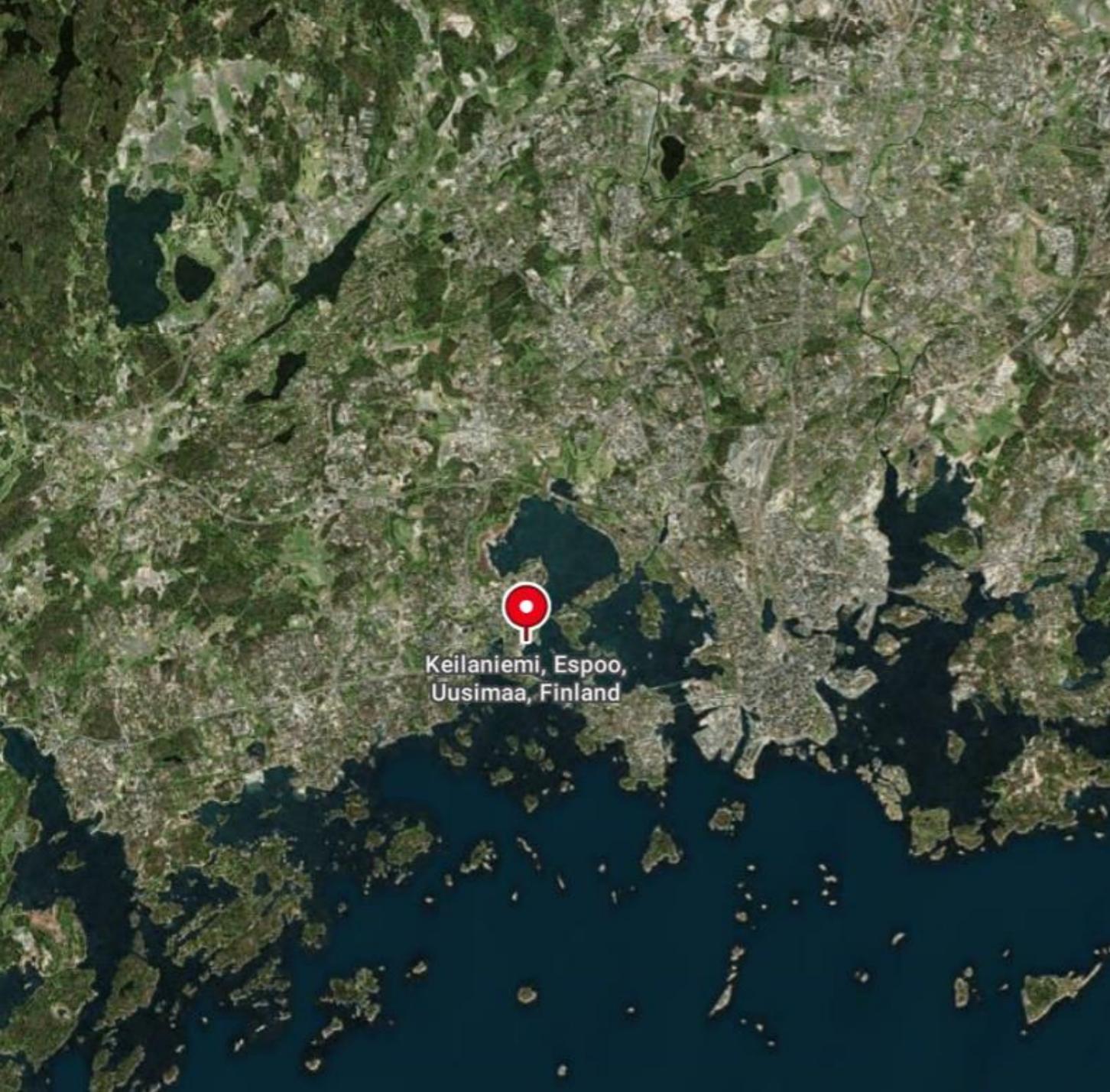
## Project: Keilaniemen Portti

High-rise Construction: International Insights – 3.2.2026



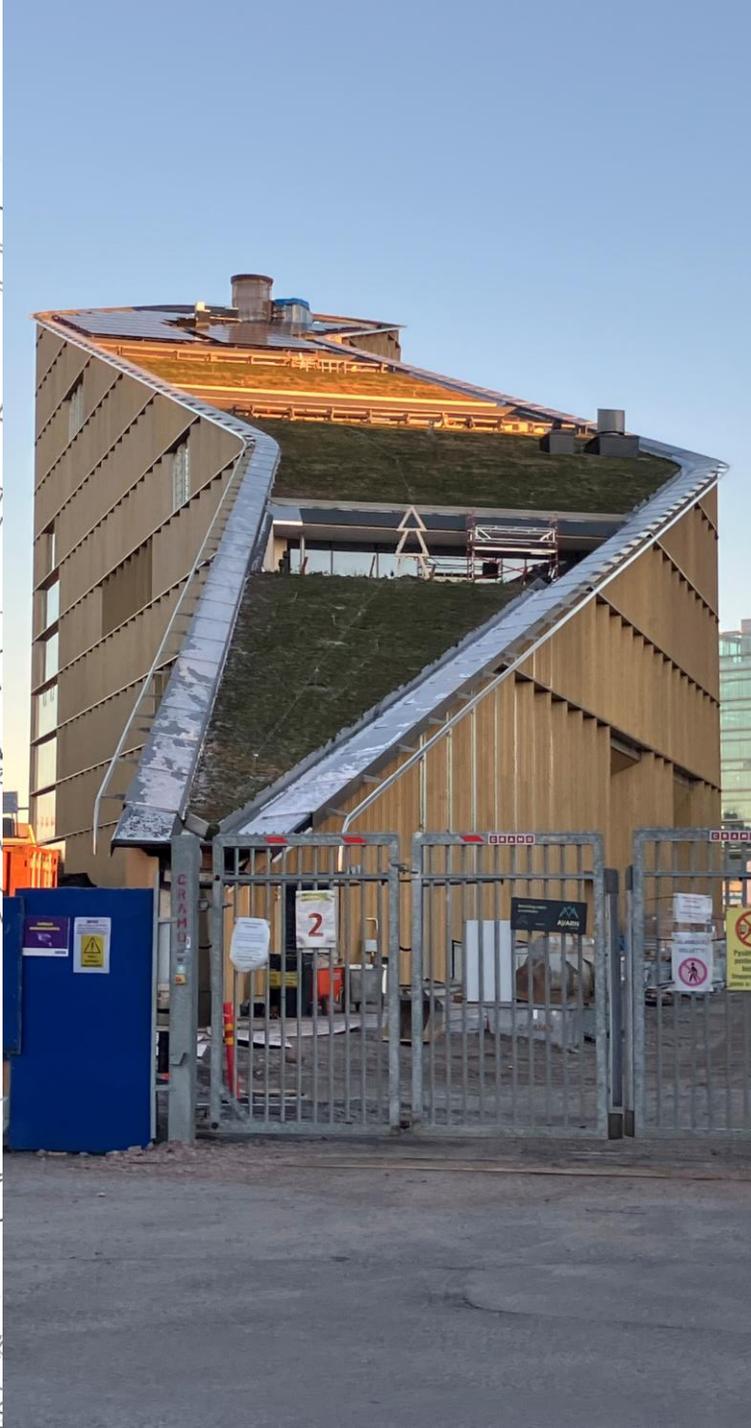
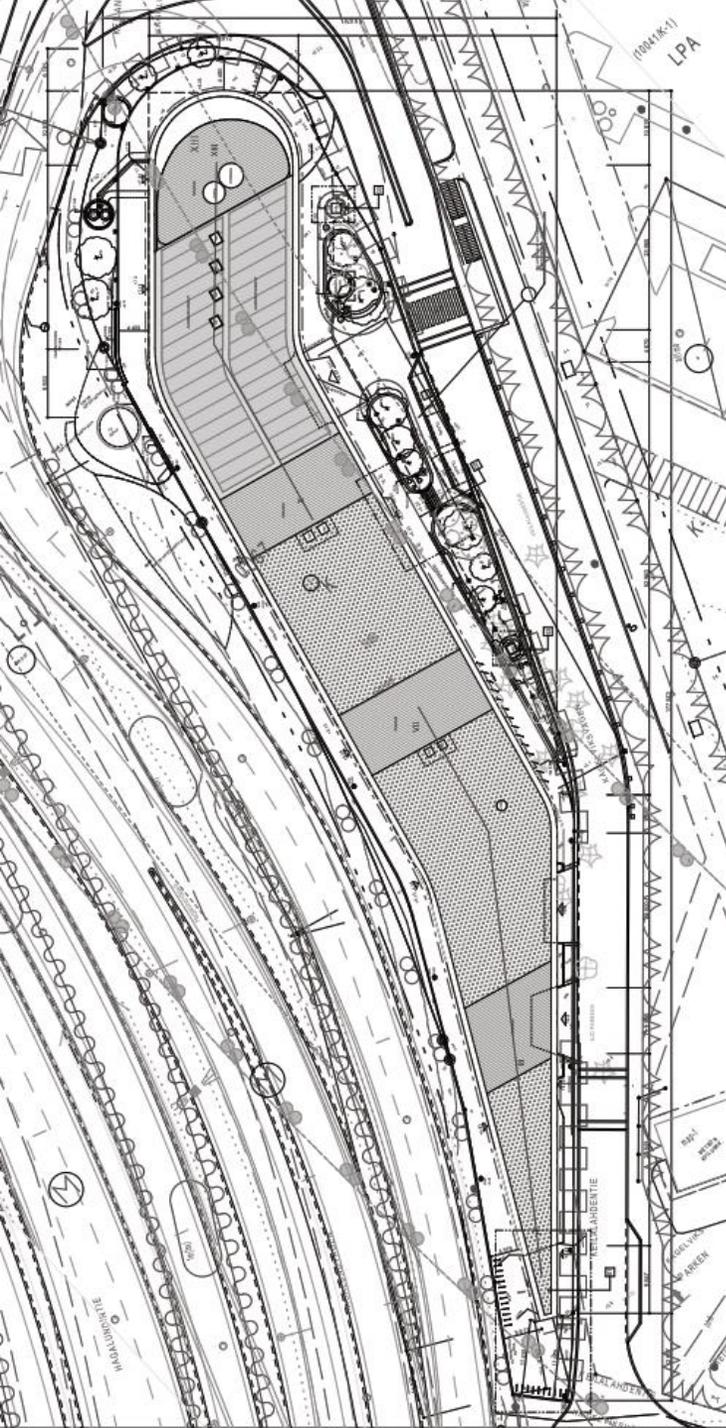
# Keilaniemen portti

- 13+2 floors
- 29400 brm2
- ~180m x ~ 21m x ~ 0...64m
- Foundations approach piles/rock
- Construction works started 7/23, completion due 8/26
- Ramboll: STR, GEO, HVAC, ELEC, ENE, BREEAM
- Other parties:
  - Client: Varma
  - Main Contractor: Jatke
  - Architect: Arco (Marja-Liisa Honkanen / Arndt Heinzmann)
  - 3<sup>rd</sup> party checker: Sweco (Juha Valjus)



# Location

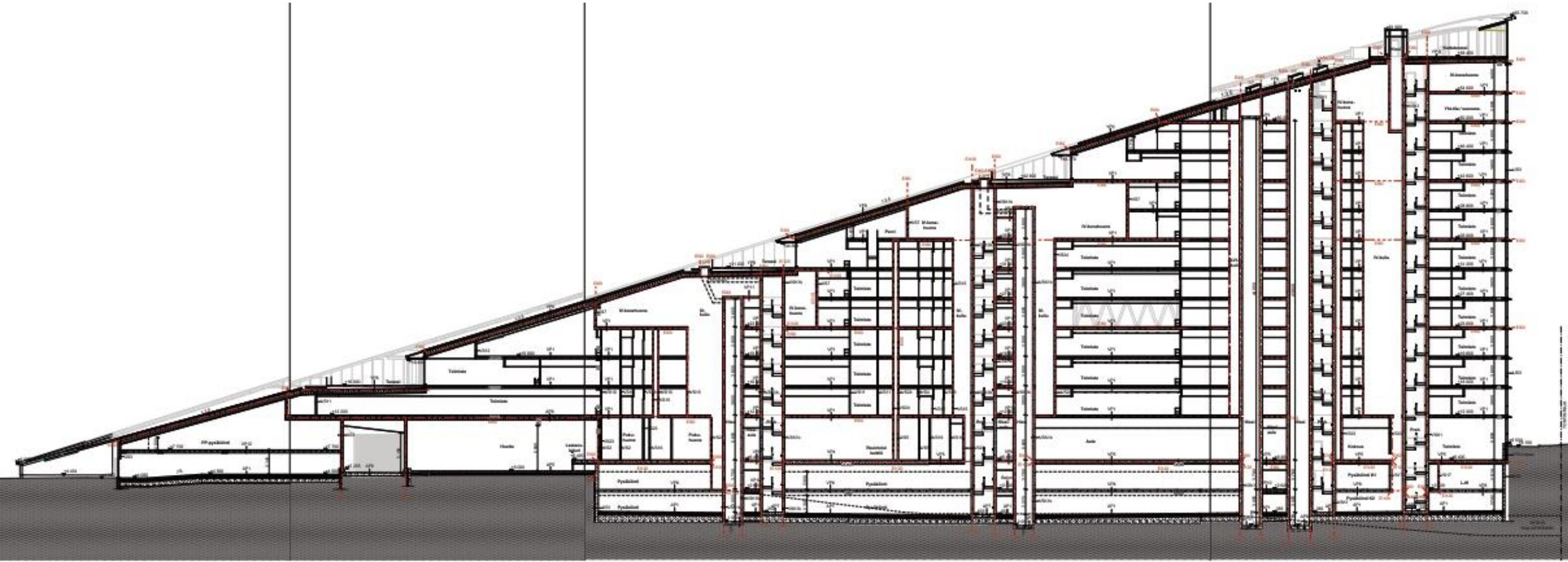
- Keilaniemi, Espoo, South of Finland
- NNE-SSW Orientation

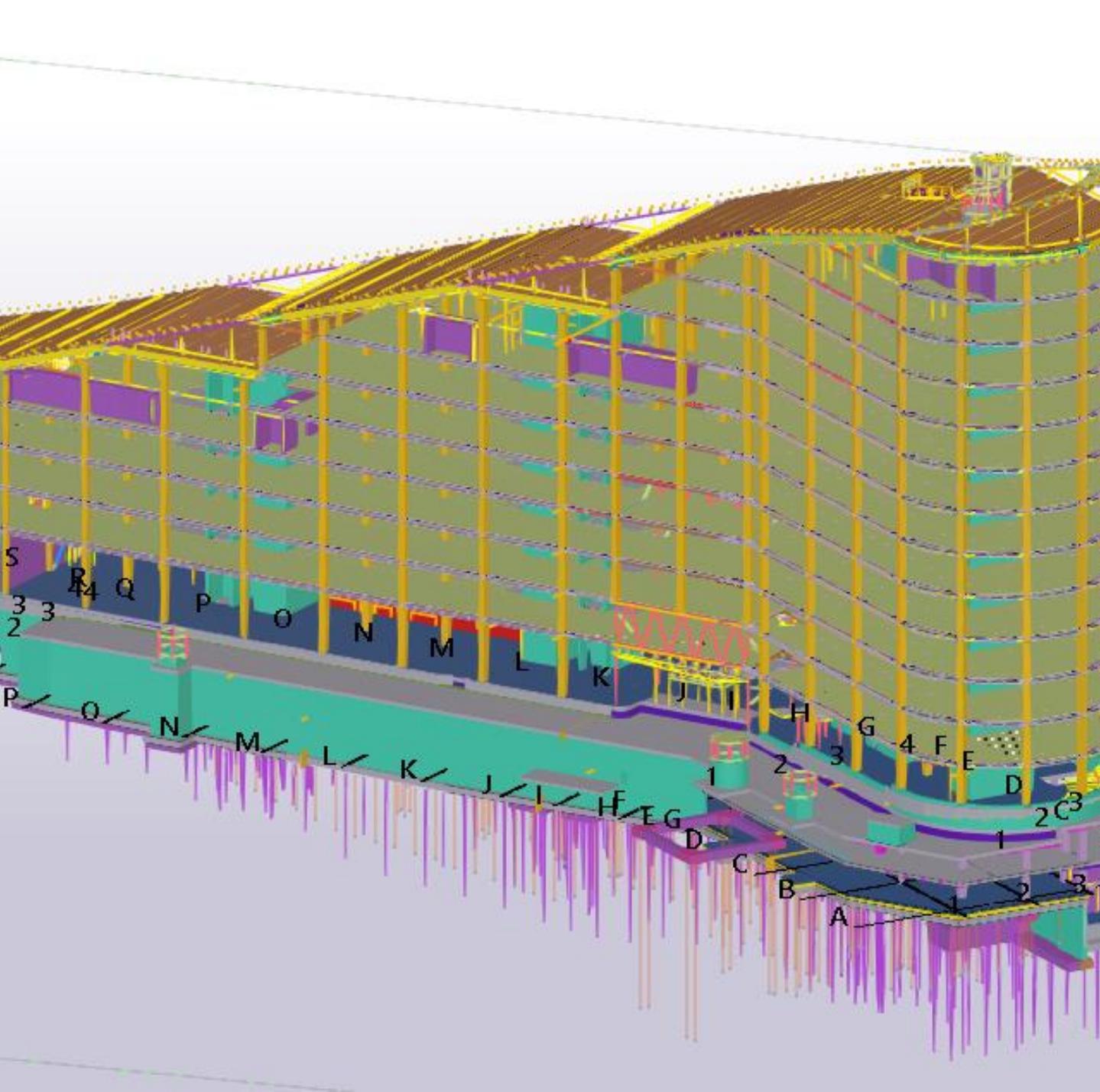


# Features

- Meandering walls offer views in many different directions
- Intermediate Terraces and Roof terrace facing South offer views towards the sea and islands
- Roof sloping towards the South
  - Green roof
  - Solar power 106,8 kWp (240 pcs 445 W panels)
  - Building heat control

# Cross Section





# Special Design Considerations

- Stability against overturning
- Long term durability
- Floor Vibrations for comfort
- Design for fire
  - R120 (roof R60)
- Design for robustness



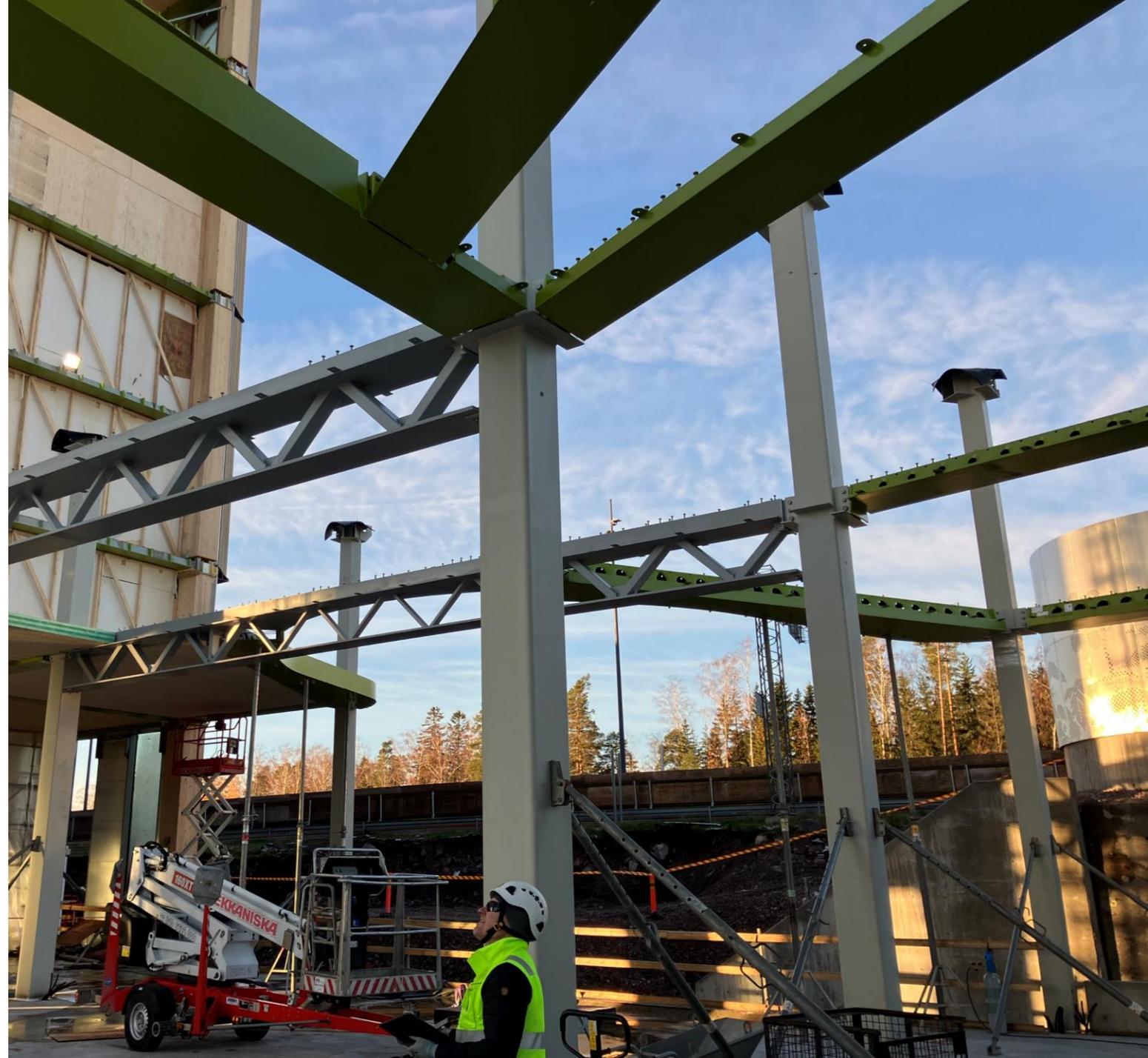
# Wind loads

- Building Permit phase: terrain category 0 wind loads
- Detailed design phase: wind loads determined from wind statistics and wind tunnel testing (RWDI)
- Based on wind statistics and wind tunnel testing wind loads shown to be about ~60% of the simplified look up table values



# Load-bearing frame

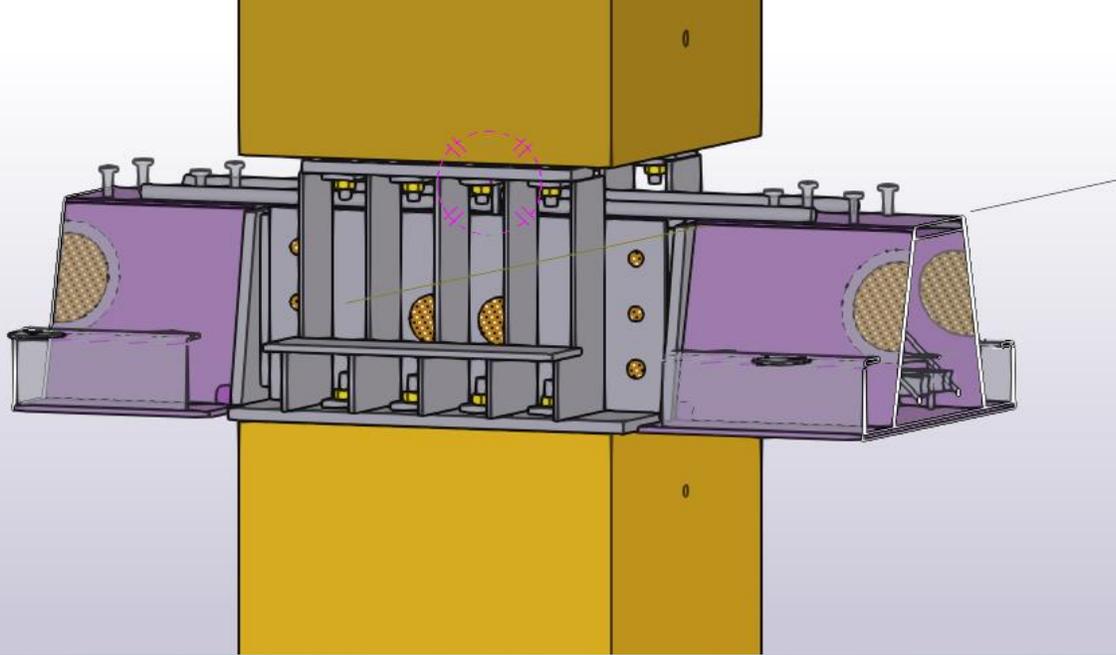
- Single Span Wood Columns
- Simple Span Concrete-filled Steel Beams
- Simple Span Wood Slabs with Reinforced Concrete Topping
- Global Stability with Reinforced Concrete Cores, and in one location Steel Bracing Frame
- Central Large Span open space enabled with Concrete Filled Steel Columns and 4no. 14m span 4m tall 11t Megatrusses and numerous extra 14m span WQ-top-chord steel floor trusses





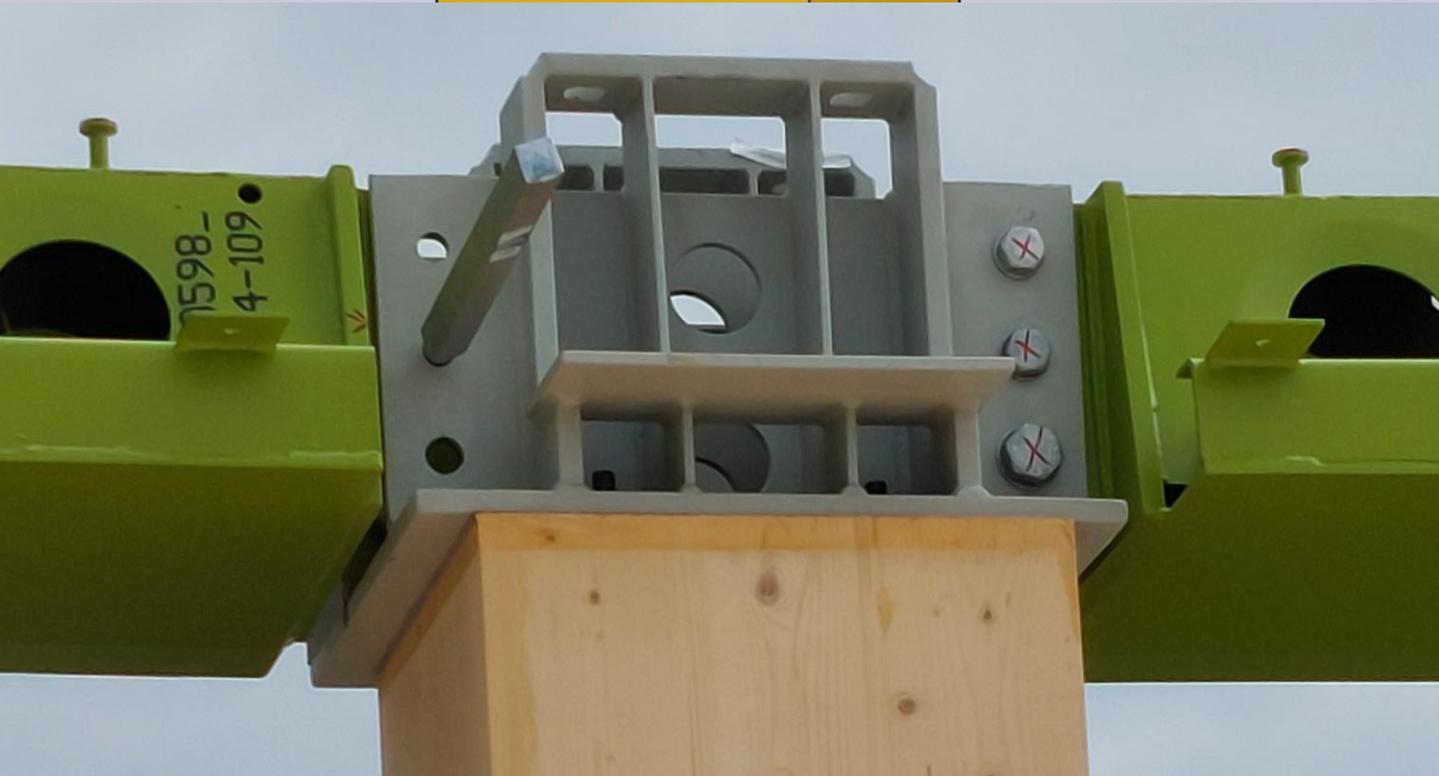
# Sub-contractors for load-bearing frame

- Stiffening: Site cast concrete cores (Sierak)
- Site case basement (Sierak)
- Glulam wood columns (Versowood)
- Composite beams and other steel structures (Peikko Deltabeam)
  - >3700m deltabeams
  - ~250t structural steel
  - Significant proportion of recycled steel
- CLT-concrete –composite floors (Arcwood)
- Wood roof elements (VVR Wood)
- External wall cladding (HAKA PKS)
  
- >4000m<sup>3</sup> wood



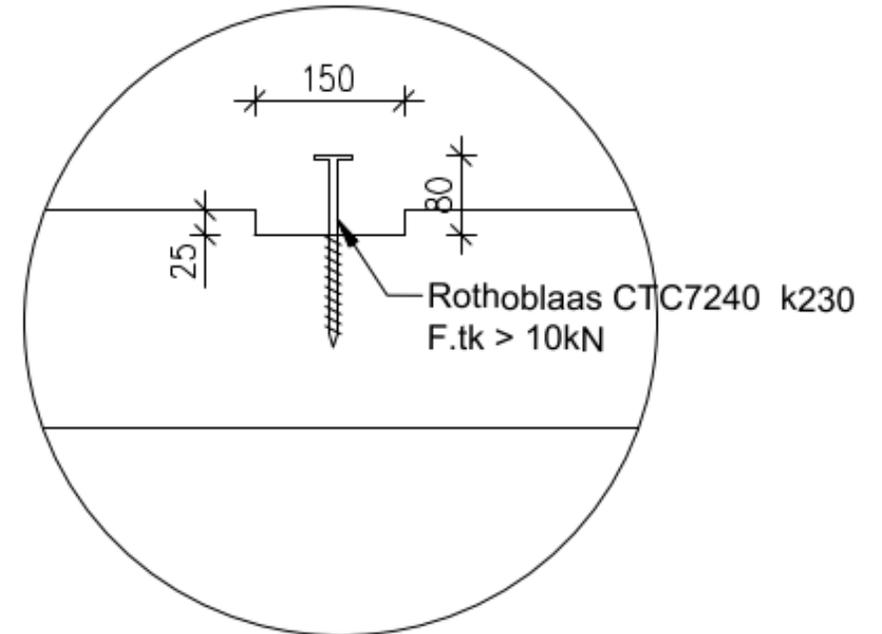
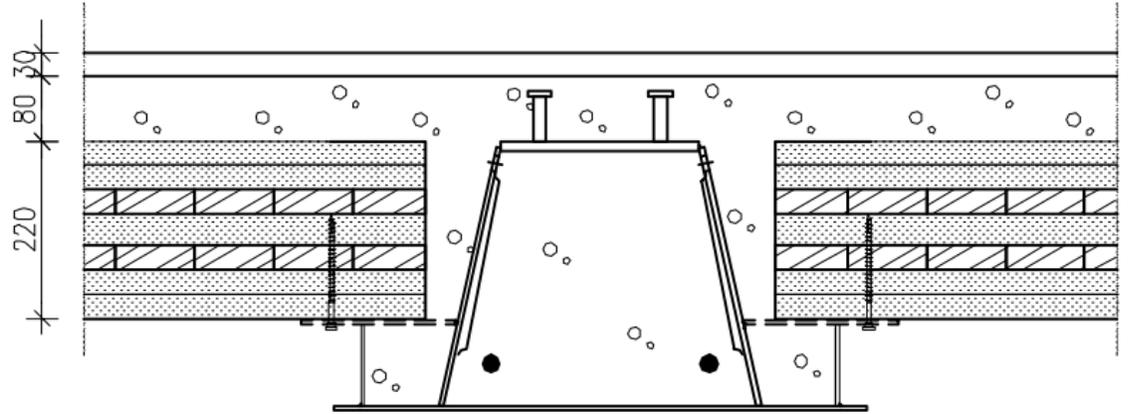
# Wood columns

- Glulam wood columns 500x500, 600x600 and 650x650
- Connection part ("Steel hat") pre-installed at column factory
- Glued rod fire resistance and strength resistance
- No significant challenges encountered during load-bearing frame erection

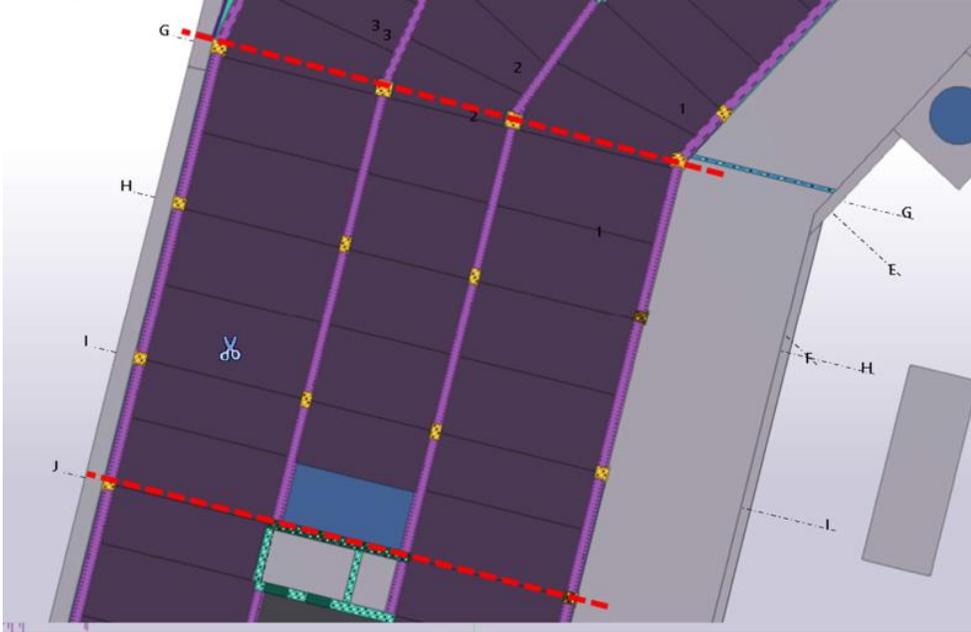


# Floors

- CLT-slabs (180..240 mm) with structural reinforced concrete topping slab (80..100mm) composite structure
- Design static and dynamic response calculations performed to draft Eurocode SC5.T2 ja T3
- Dynamic response also measured and verified following construction

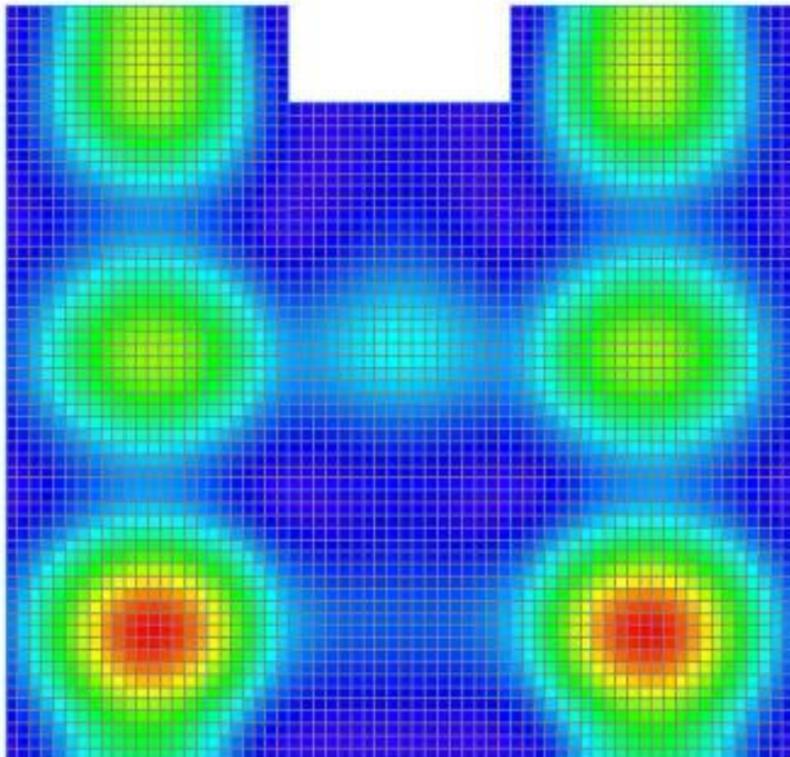
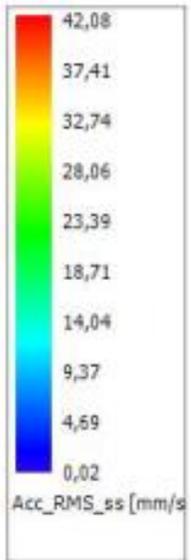






# Floors - Dynamics

- $n > 7.5\text{Hz}$
- R-value  $< 10$
- Average measured natural frequency 68 % higher than calculated
- Low frequency slabs  $\rightarrow$  High frequency slabs  $\rightarrow$  Calculations are conservative
- The slab structural system was significantly better than in the calculations due to an increase in natural frequency.
- Damping ratio - average 0,080





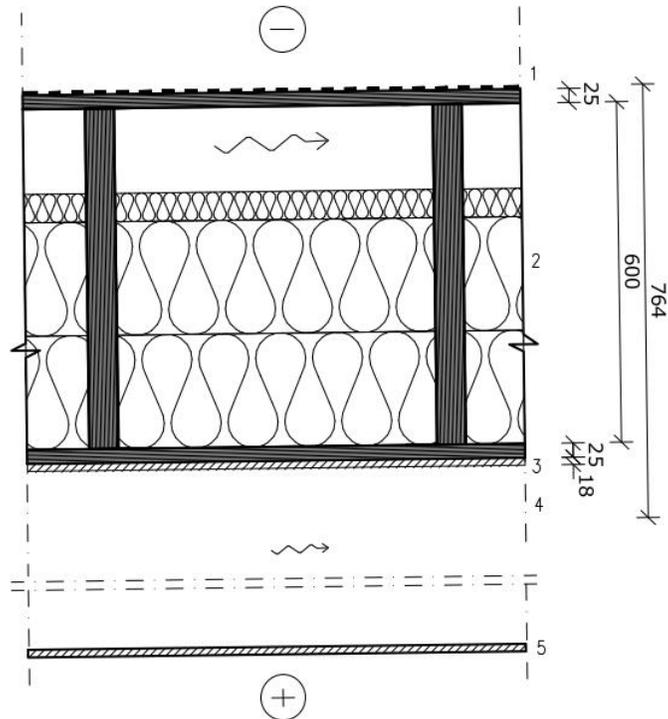
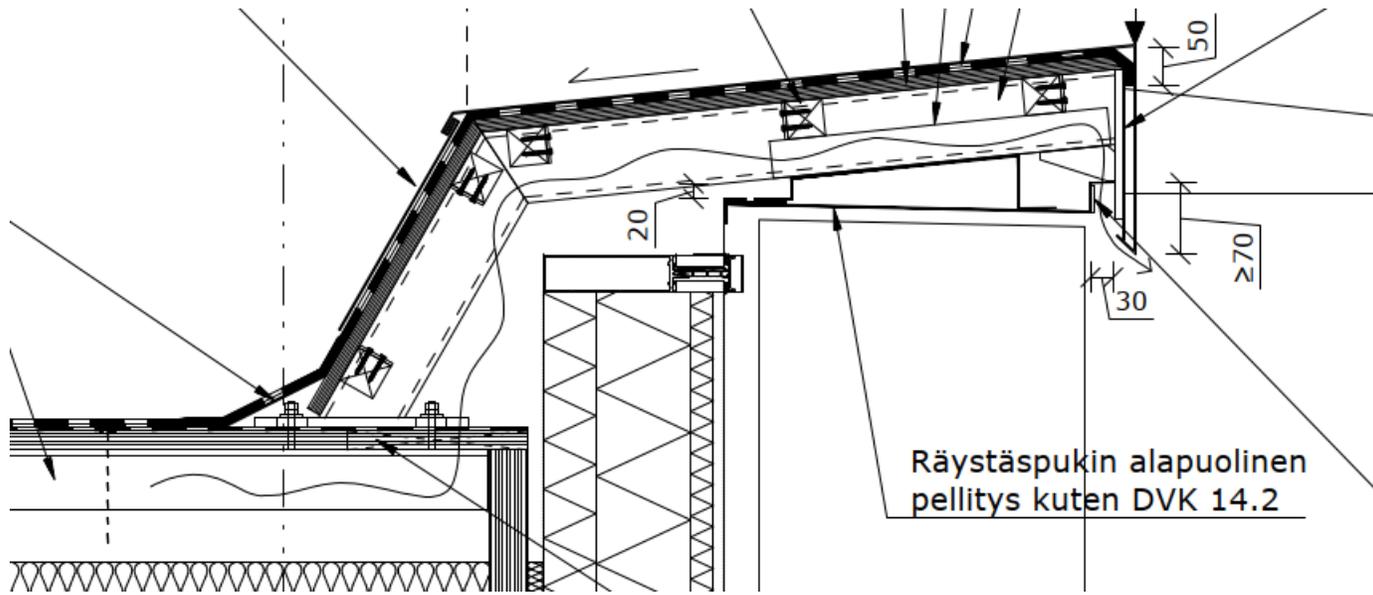
# Floors – benefits and challenges

## PROS

- Speed of erection
- Flexibility
- Approvals
- Hung services
- Design following models

## CONS

- Handling of moisture
- Fire properties



# Wood roof elements

- Elements 650 mm thick (25+600+25), longest element about 22 m
- Careful design to ensure internal space airing
- Fire breaks – no ETA – local approval required
- Project specific special solutions (inclined elements, maintenance rail support)
- Despite challenging geometry, erection progressed well





# External wall cladding system

- Haka PKS product design approach
- Purson P76E element system
- Hung from each floor level edge beam
- Project specific element testing within the laboratory

Onwards and upwards with Buildings for a Sustainable Future

Thank you!

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