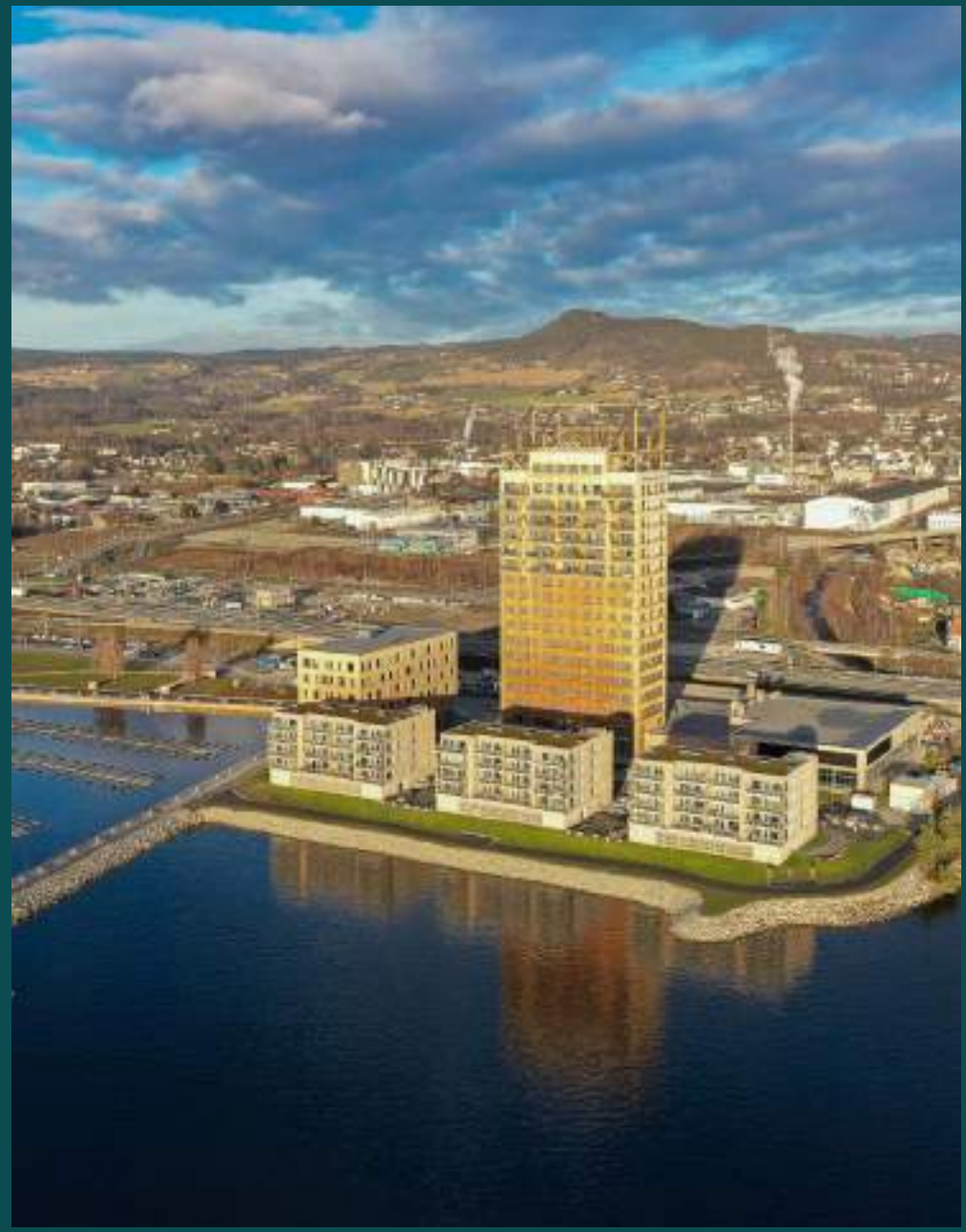
Moelven

Rune Abrahamsen
CEO
Moelven Limtre AS

Mjøstårnet
The world's tallest all-timber building

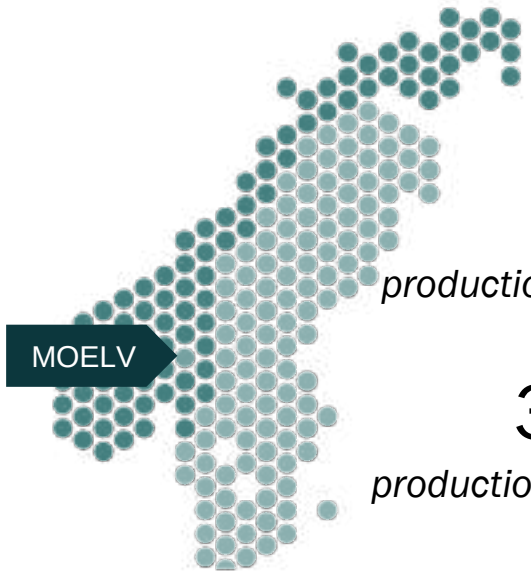
Sep 10, 2024



new york design awards
GOLD

1

Moelven is one of the biggest Scandinavian wood processing companies



2

production countries

34

production companies

40

production sites

3256

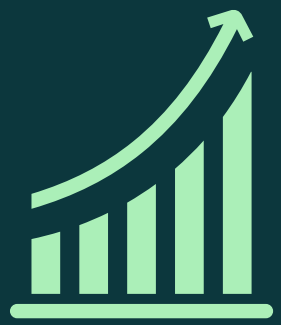
employees (approx)

458

women

2798

men



12936.0

MNOK operating revenues

(2023)

381.0

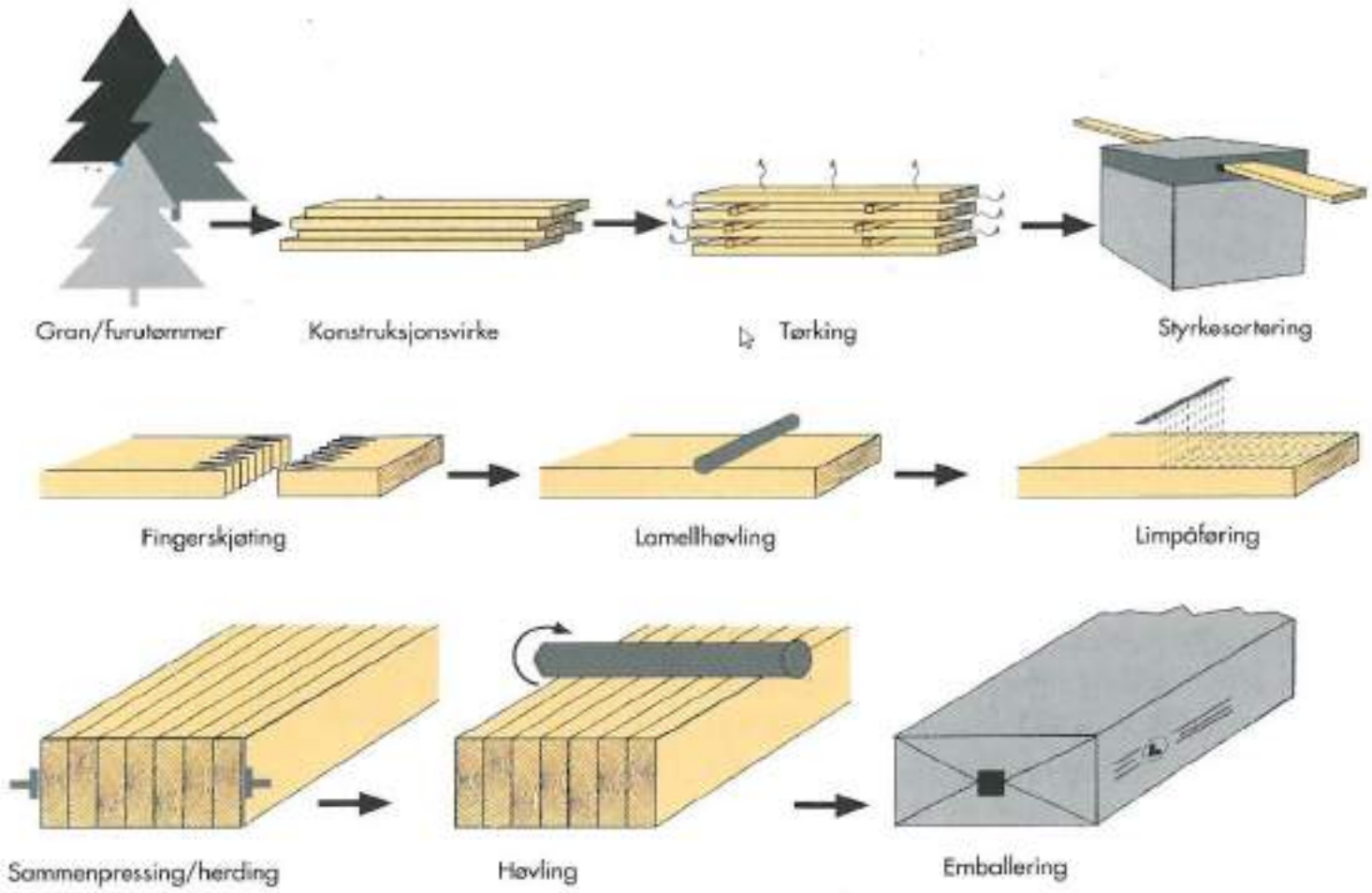
MNOK operating result

(2023)

Moelven Limtre (Limtre = Glulam)

- Established in 1959. 125 employees
- Production of about 22 000 m^3 per year in Norway and 30 000 m^3 per year in Sweden. *No CLT production!*
- One factory in Norway. One in Sweden (Töreboda)
- Head office and main production in Moelv

Crash course in glulam production



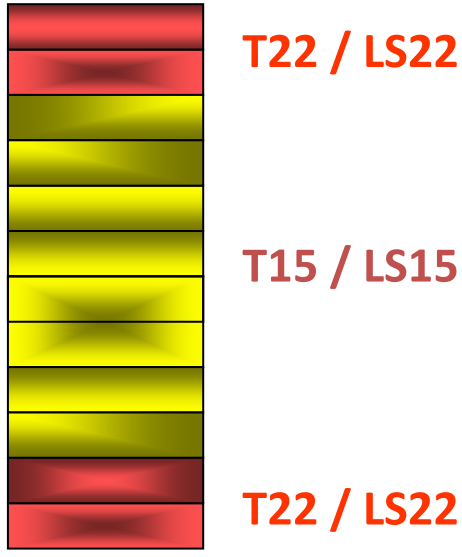
Glulam build-up

- **Standard quality:**

  Combined section
  GL 30C - NS-EN 14080

- **The planks we use come from sawmills in southeast Norway**

- **PEFC and FSC certified product**



EPD: 97 kg CO_2/m^3

Standard glulam

Spruce (blue wrapping) and impregnated pine (green wrapping)

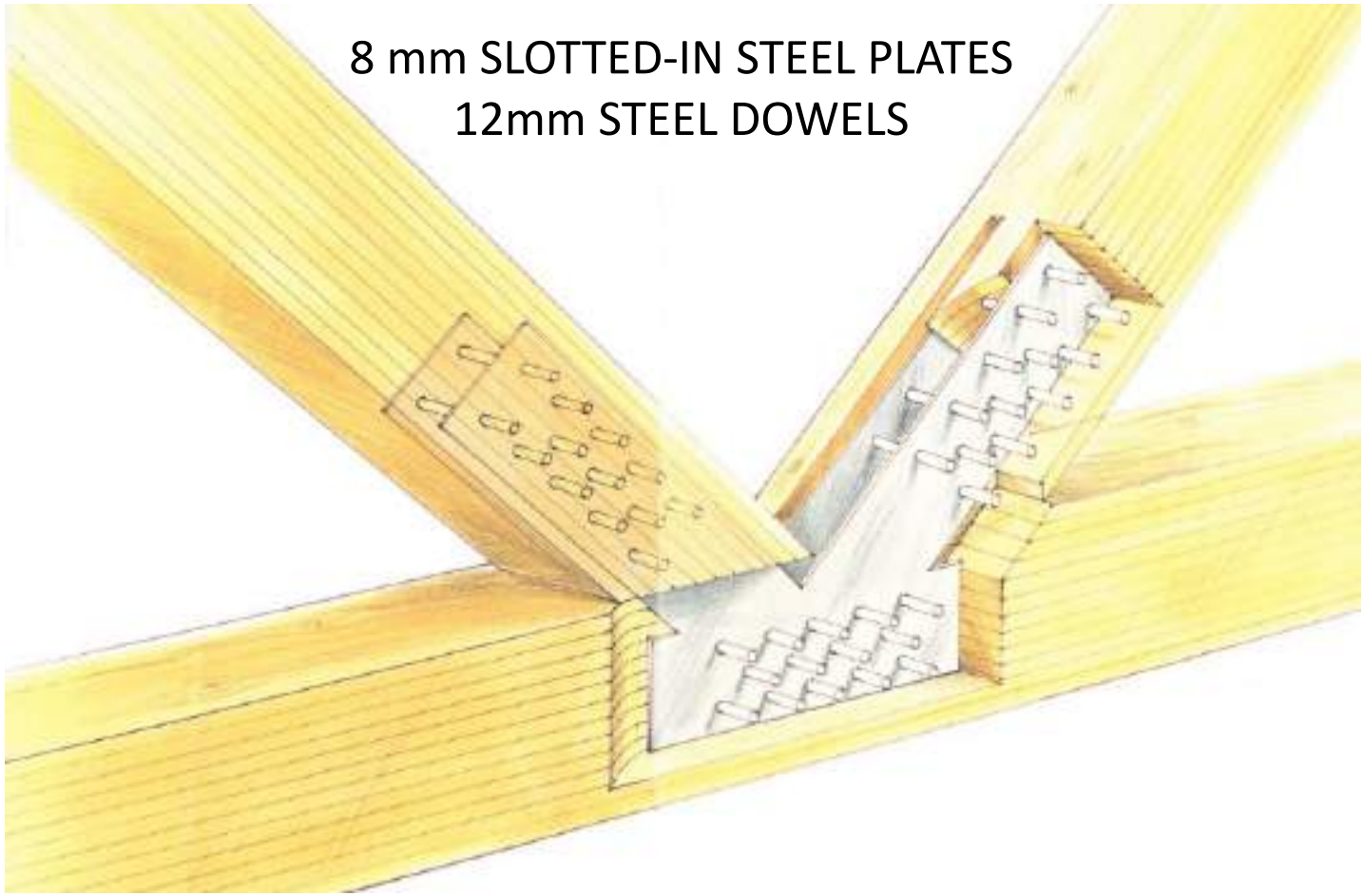
Moelven Limtre projects
Winter Olympics 1994 - Lillehammer

Span 96,4m

Span 70,8m

Span 85,8m

The heritage from Winter Olympics 1994



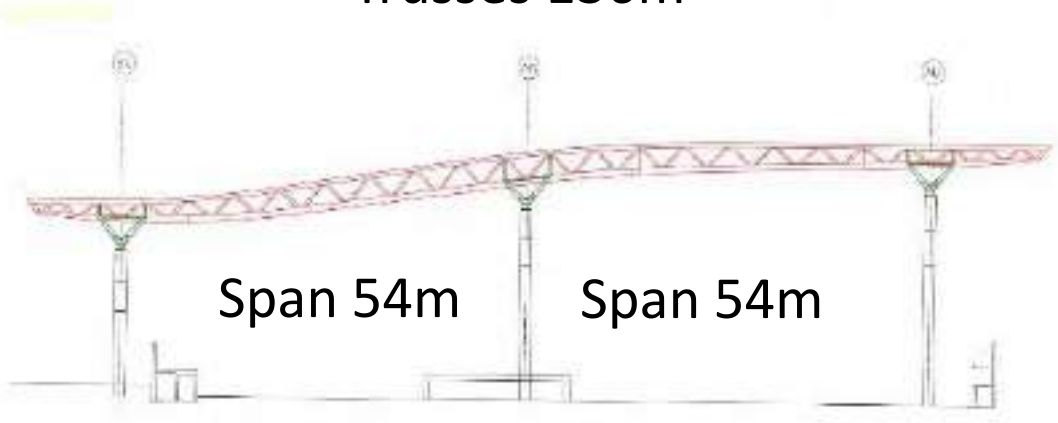
Strongest joint designed by Moelven is a splice with 11 steel plates and 42 dowels. Capacity 700 tons = 7000 kN

The connection was tested in Borås, Sweden, in 1990 with very good results. Capacity is high and predictable

Good fire resistance. The steel is inside the wood.

Moelven Limtre projects
OSL Airport 1996

Trusses 136m



Moelven Limtre projects
More than 200 timber bridges 1996-2024

Moelven Limtre projects
Multi-storey buildings

2019 - MJØSTÅRNET
18 STOREY

2015 - TREET IN BERGEN 51m
14 STOREY

2005 – TRONDHEIM
5 STOREY

Mjøstårnet – The world's tallest all-timber building

Height: **85,35 m!**

Opened **2019**

new york design awards
GOLD

20 18 NORWEGIAN TECH AWARD

Council on Tall Buildings and Urban Habitat

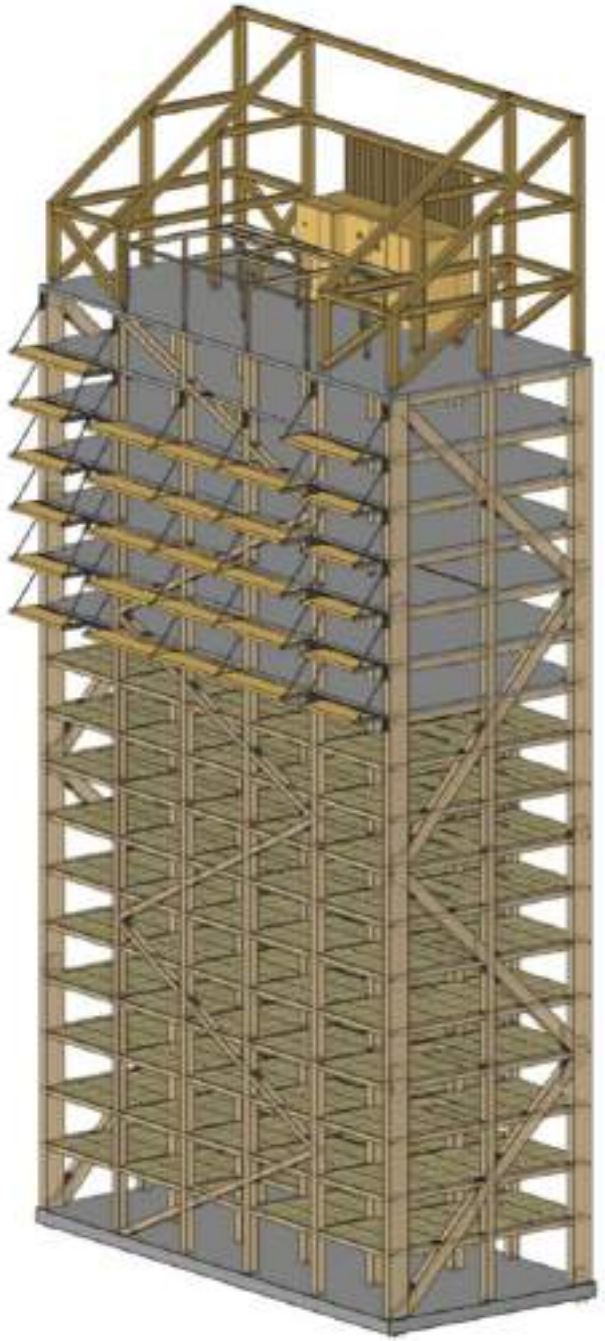
Mjøstårnet, Brumunddal
2021 Award of Excellence Winner
Structural Engineering Award

Mjøstårnet – The Tower by the Lake of Mjøsa - 2019

Moelven

The Builder - Arthur Buchardt
Investor and Developer

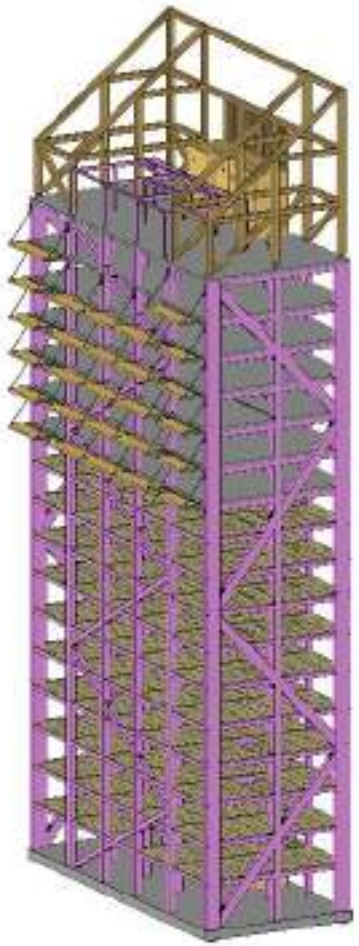
Moelven



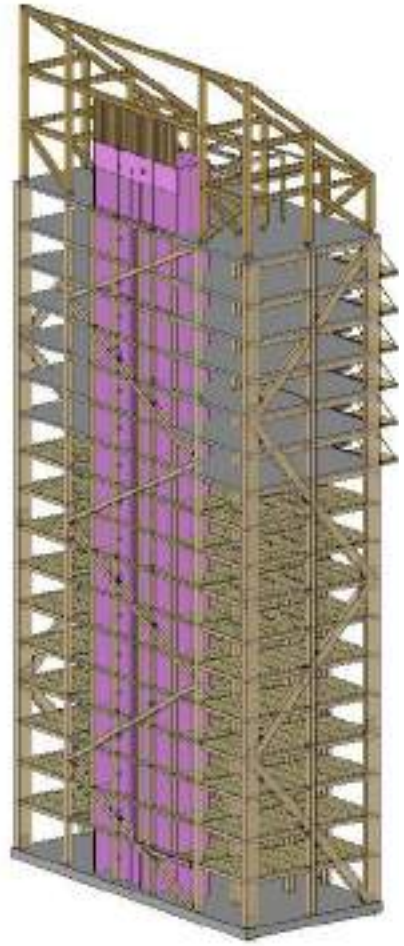
The structure at a glance

- High strength glulam columns, beams and diagonals
- CLT shafts for elevators and stairs
- Wooden decks in the first ten floors. MoelvenTrä8 floor elements
- Concrete slabs in the upper floors for apartments. This improves the dynamic behavior – hor. accelerations
- Wooden prefabricated façade elements make up the building’s envelope

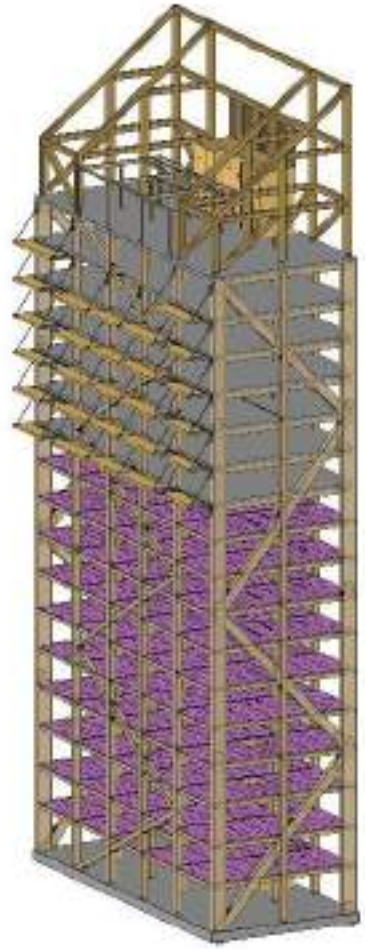
Moelven Limtre AS - Produced – Delivered - Installed



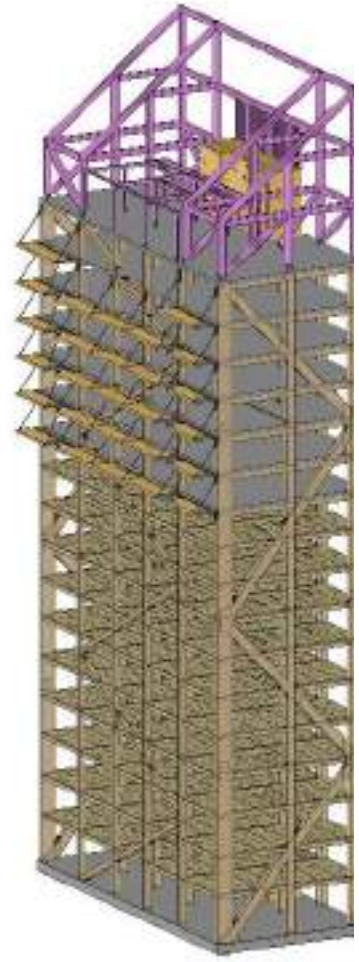
Primary Structure in
Glulam



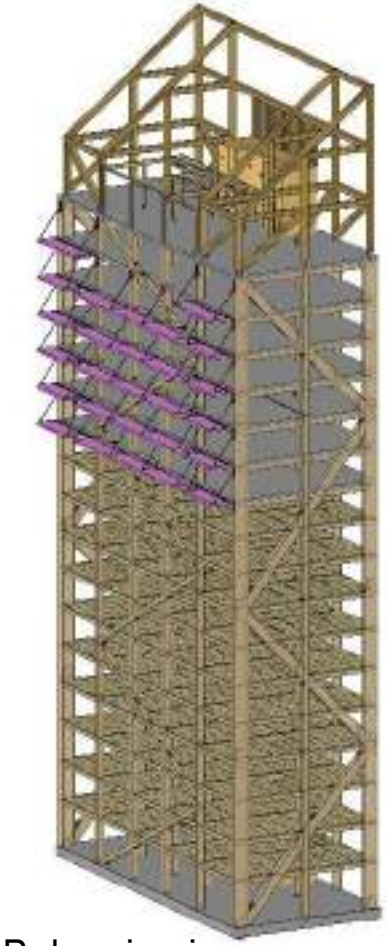
Shafts in
Cross Laminated Timber



Floor elements in
Timber structure



Pergola in
Glulam



Balconies in
Cross Laminated Timber

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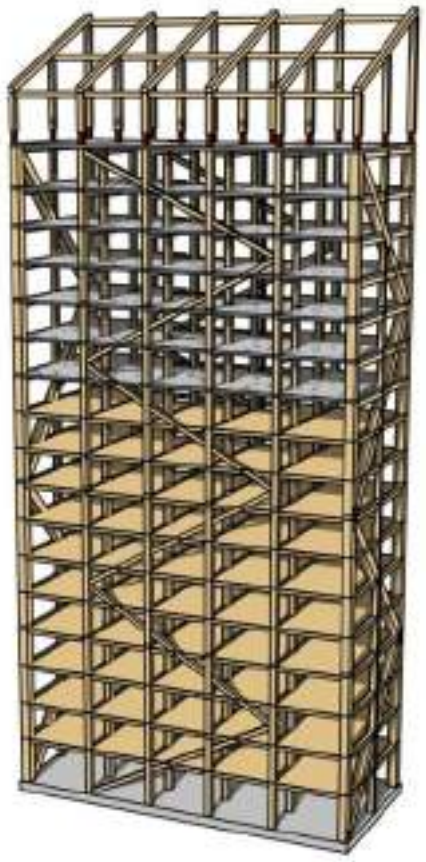
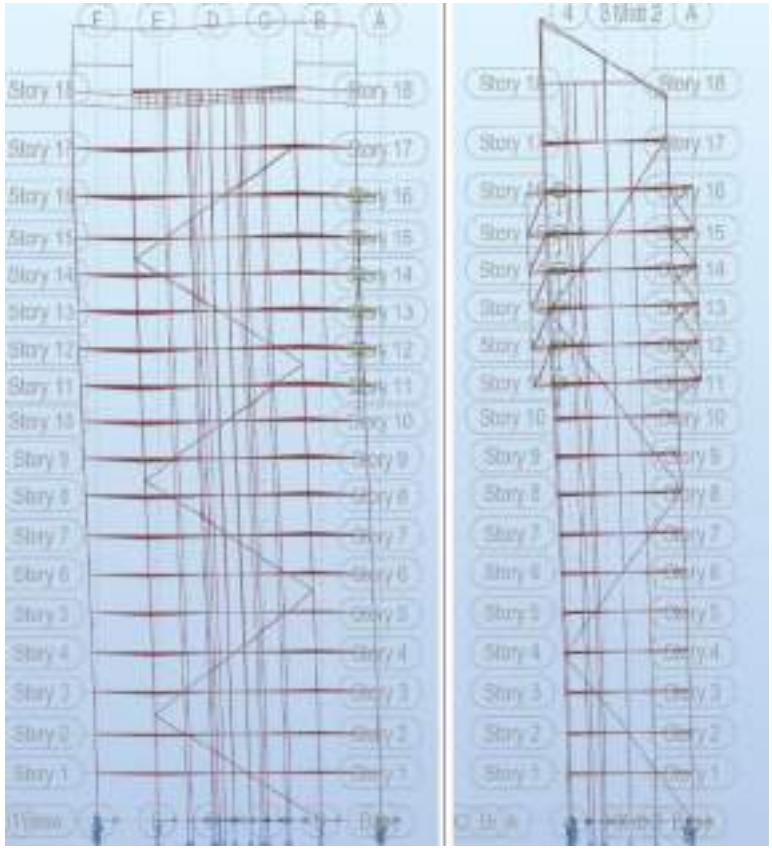
Engineering Company – SWECO
Design of Timber structures and Foundations



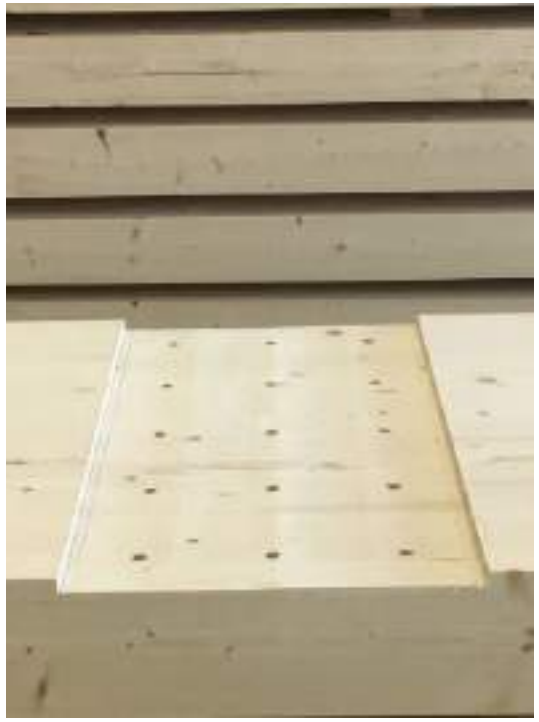
Structural design



Dynamic behavior

Fire analysis

Production of components

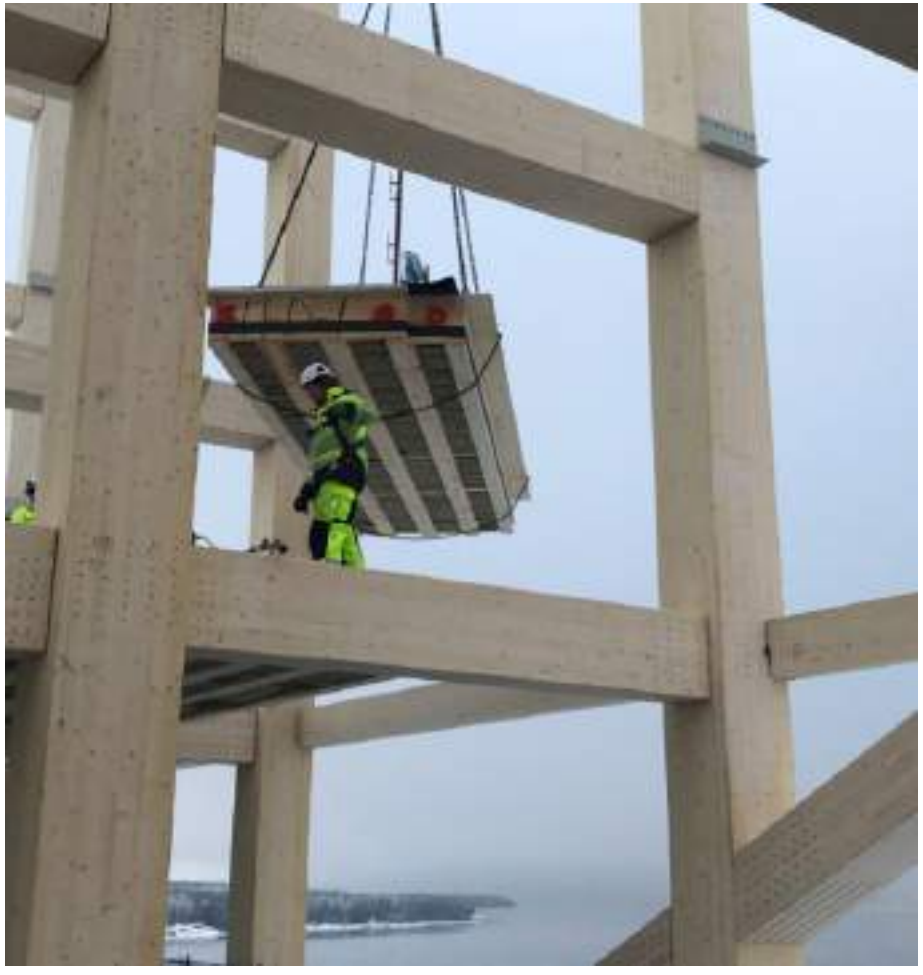


All parts are processed with slots and predrilled holes using CNC machines. Millimeter precision

Block gluing of large cross sections

Preinstallation of steel plates

Trä8 building system
Based on optimized material use and prefabrication



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Assembly like an Ikea furniture

Weather protection.
Open construction before façade installation

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Fire concept of the building

- Wooden structures maintain their load-bearing capacity throughout a burnout fire
- Glulam will cool down and stop burning when the fire energy in a fire cell is out.
- Fire resistance for primary structure 120 minutes (R120)
- The whole building is sprinkled internally
- The wooden cladding in the façade is pressure treated with a fire-retardant liquid
- Fire stop at every floor in the façade
- Two staircases. One is for emergencies only. With gypsum cladding. Fire elevator
- Wood is visible throughout the building. The surfaces are fire painted in emergency routes and common areas

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Fire protection of connections

2.5mm Intumescent strips expand 20 times at 150 degrees Celsius

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Assembly time – 15 months

July 2017
Positioning anchor plates

4th September 2017
First frame

1 year

4th September 2018
Last beam

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Assembly steps

Sept 17

+15,5m

Step 1
Floors 1-5

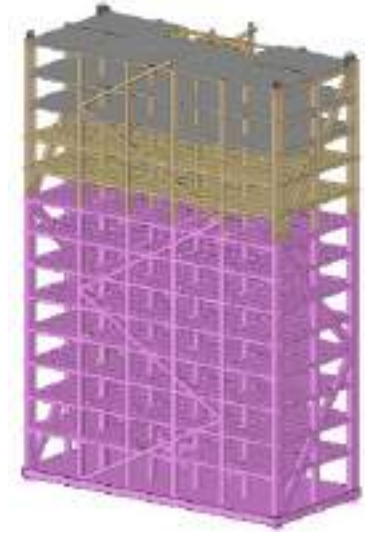
Nov 17

+33,2m

Step 2
Floors 5-9

Jan 18

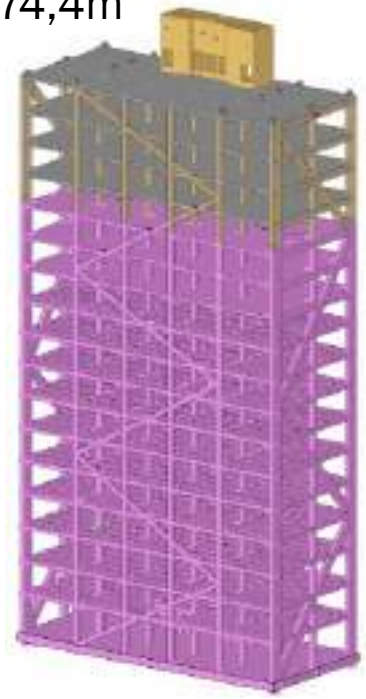
+55,2m



Step 3
Floors 9-14

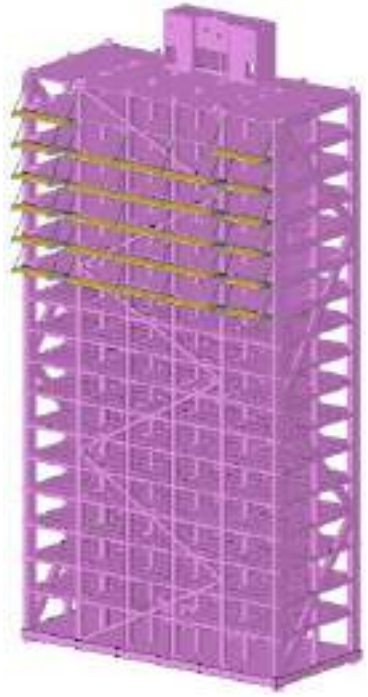
March 18

+74,4m



Step 4
Floors 14-18

July 18



Step 5
Balconies

Sept 18

+85,4m

Step 6
Pergola

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The last beam is lifted in

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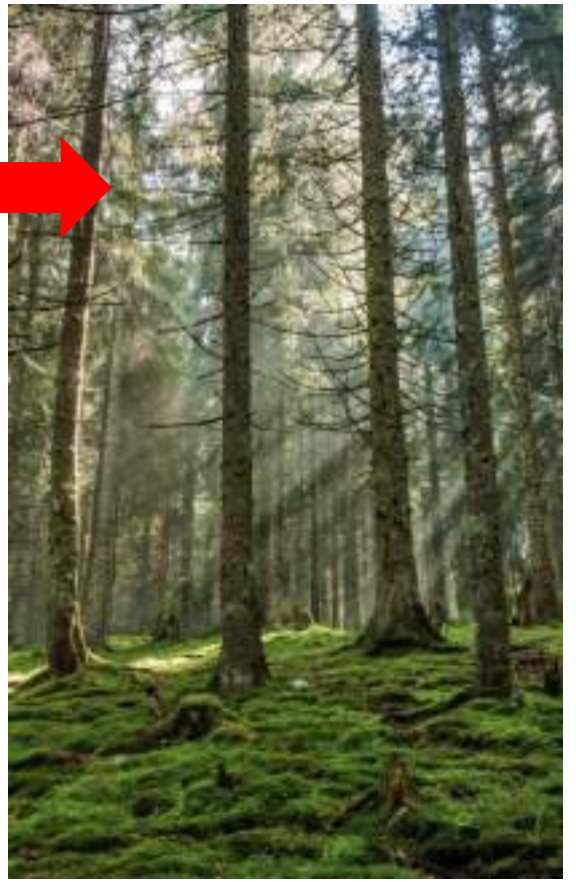
How many trees have been cut down?

3.000 m3 timber structure

8000 m3 logs

16.000 spruce trees



4000 m3 sawn timber

200 years

80 years

Experiences and thoughts on tall timber

- Glulam is well suited for high rise timber buildings. The large cross sections can handle the fire requirements
- Assembly is quick – everything is prefabricated
  Contractor estimated 3 months saving compared to concrete building
- Using wood considerably lowers the CO_2 footprint
- Excess use of materials should be avoided, also when it comes to wood
- People seem to like working and living in a wooden environment
- Norway's largest insurance company occupies two floors in Mjøstårnet
- Using only the materials you need and combining wood, steel and concrete will result in "climate smart buildings".
  These are the buildings that our grandchildren want to live in!

We don’t think Mjøstårnet will be the record holder for too long. But we, and especially the climate, are fine with that ☺

Rune Abrahamsen, Moelven Limtre

Tallest Mass Timber Buildings

The following is a complete list of mass timber buildings worldwide, eight stories and higher. These buildings are completed or under construction, as of February 2022.

Rank	Name	City	Height (m)	Height (ft)	Floor Count	Structural Type	Function	Status as of Feb. 2022	Year of Completion
1	Ascent	Milwaukee, United States	86.6	284	25	Timber-Concrete Hybrid	Residential	Architecturally Topped Out	2022
2	Mjøstårnet	Brumunddal, Norway	85.4	280	18	All-Timber	Mixed-Use	Completed	2019
3	HoHo	Vienna, Austria	84	276	24	Timber-Concrete Hybrid	Mixed-Use	Completed	2020
4	HAUT	Amsterdam, Netherlands	73	240	22	Timber-Concrete Hybrid	Residential	Under Construction	2022
5	Sara Kulturhus	Skellefteå, Sweden	72.8	239	19	Timber-Steel Hybrid	Mixed-Use	Completed	2021
6	De Karel Doorman	Rotterdam, Netherlands	70.5	231	22	Timber-Concrete-Steel Hybrid	Mixed-Use	Completed	2012
7	55 Southbank	Melbourne, Australia	69.7	229	19	Timber-Concrete-Steel Hybrid	Mixed-Use	Completed	2020
= 8	Roots Tower	Hamburg, Germany	65*	213	19	Timber-Concrete Hybrid	Residential	Completed	2024
= 8	Wellington	Melbourne, Australia	65*	65	15	Timber-Concrete Hybrid	Office	Under Construction	2023
= 10	Abro	Risch-Rotkreuz, Switzerland	60	197	15	Timber-Concrete Hybrid	Mixed-Use	Completed	2019
= 10	Kromet	Göteborg, Sweden	60*	197	15	Timber-Concrete Hybrid	Mixed-Use	Under Construction	2022
12	Brock Commons Tallwood House	Vancouver, Canada	57.9	190	18	Timber-Concrete Hybrid	Residential	Completed	2017

Next contender

A project named Rocket & Tigerli

will be built in the Swiss city of Winterthur.

100 m tall.

A residential building to be completed in 2027

Thank you for your attention

Moelven