

## PRESS RELEASE

Gossau, March 2022

# Complex Free Form construction for the Tekniska Museet in Stockholm

**The new timber structure for the National Museum of Science and Technology in Stockholm is already listed as one of the ten most important buildings in Sweden. It was designed by the Swedish architectural firm Elding Oscarson in collaboration with structural engineer Florian Kosche. Based on these designs, Blumer Lehmann worked with its planning partners to develop the unique Free Form construction in spruce LVL (laminated veneer lumber).**

The architectural competition stipulated the use of cross-laminated timber (CLT) and LVL as the main construction materials for this innovative construction project. These materials are delivered by project partner Stora Enso, one of the largest forestry companies in the world and manufacturer of CLT and LVL products. The challenge of implementing this project was therefore to find a team of timber construction specialists with the necessary timber construction expertise and experience to plan and build the winning project. Blumer Lehmann was commissioned to create the timber construction with the support of, the engineers at SJB Kempter Fitze with Hermann Blumer and the parametric planners from Design-to-Production.

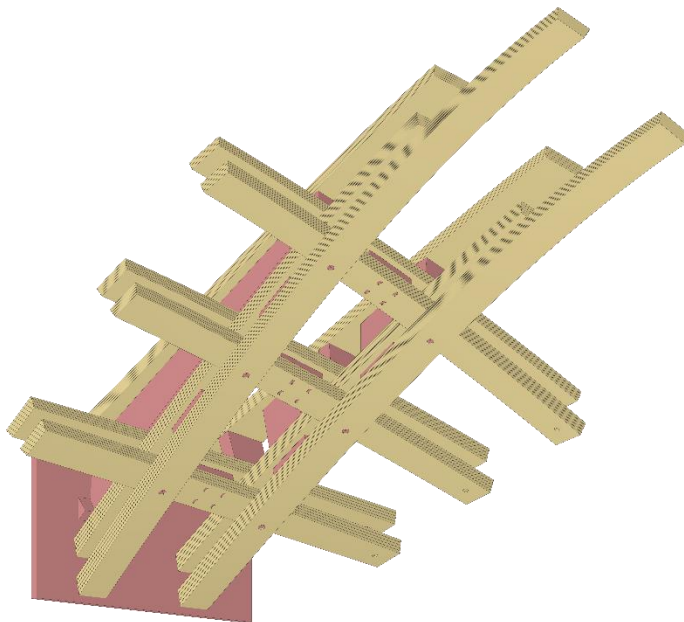


### **Main roof in Free Form construction**

The main roof of the central building consists of a Free Form construction that spans a footprint of 26 m x 48 m without columns. This building houses the Dome and another museum exhibition area. It is quite possible that the building and its origin story will themselves be an exhibit here.

### **20 km of LVL panel strips for the roof support structure**

A grid with crosswise beams forms the roof support structure; three layers of beams in the transverse direction and two layers of beams in the longitudinal direction of the building. This creates a total of five layers of beams, which in turn are formed from five lamellas of LVL panels. The beams are joined by specially developed shear and positioning dowels, which are also milled from LVL material. A total of around 20 km of LVL panel strips will be installed in the grid of the roof support structure. On three sides of the building, a projecting roof supplements the roof support structure and brings the curvature of the roof surface level with the eaves line.



### **Unusual bending and milling**

In order to fulfil the architect's aesthetic vision with the requirement for static loads using LVL, the timber construction engineers opted for a production method that is unusual for complex Free Form geometries. Unlike constructions made of glulam timber, which are bent and milled beforehand and delivered to the construction site as complete components, for construction of the main roof only the lowest panel strip layer is laminated beforehand in the curvature required and delivered as a finished component. All four other layers are bent and installed on site during assembly.

All connections are designed with dowels and peg connections. This requires maximum precision in planning and producing the components. This is because once bent, the holes for the connections – milled into the flat panel strips – must fit exactly.

### **24 columns support the roof construction**

The differently vaulted roof construction is supported by 24 solid columns around the edge that are made from block-laminated LVL in the dimensions of 60 cm x 80 cm. The columns are connected rigidly to the approximately 1.20 m high concrete bases. To limit the horizontal deformation of the roof support structure, tensioning rods are integrated into the wooden columns, to which a considerable pretensioning force is applied after assembly. A solid edge beam is arranged on the column heads to enclose the Free Form construction all the way round.



### **A dome inside the building**

The actual dome is located inside the building. The hemisphere is made from 100% CLT (cross-laminated timber) on site at the Stora Enso plant in Sweden. Detail planning of the timber construction takes place in Switzerland. The 21.5 m-diameter domed structure will house a 3D cinema with a spherical screen for screenings as part of the Wisdome project, visitor stands with seating and technical rooms.

Timber construction work will begin on site in June. The construction site is covered with a tent during the entire assembly period, so that the dome and the subsequent main roof are protected from the weather.

Further information:

<https://www.storaenso.com/sv-se/newsroom/press-releases/2019/7/elding-oscarson-ritar-stockholms-smartaste-hus-i-tra-vid-tekniska-museet>

<https://wisdomeproject.se/>

#### **Facts and figures**

Installed amount of CLT: 450 m<sup>3</sup>

Installed amount of LVL (spruce laminated veneer lumber) from Stora Enso: 750 m<sup>3</sup> or 20 km of panel strips, approx. 2,500 individual lamellas, 500 LVL beams (still subject to slight change)

Roof surface without columns 26 m x 48 m 3,600 shear dowels

**Client:** Tekniska Museet, Stockholm

**Architecture:** Elding Oscarson Architects

**Structural engineer:** Florian Kosche

**Project type:** Art and culture, museum construction

**Planning and execution Free Form timber construction:** Blumer Lehmann

**Structural engineering timber construction:** SJB Kempter Fitze and Hermann Blumer

**Parametric design:** Design-to-Production

**Services:** Timber construction planning and execution

**Construction:** 2022

Start of planning: 1 May 2021

Production in Switzerland: June 2022,

Start of construction: June 2022

Handover, 1 January 2023

**Address:** Stockholm, Sweden

## **Blumer Lehmann**

### **Timber construction, modular construction, general contractor, Free Forms**

As a leading Swiss timber construction company, Blumer Lehmann offers comprehensive sector expertise encompassing consultancy, design, production, assembly and project management as either a general or full-service contractor. In collaboration with internationally renowned architects such as Foster + Partners, Shigeru Ban Architects and Herzog & de Meuron, Blumer Lehmann completes pioneering timber structures all over the world.

Another specialism is modular and temporary structures. Standardised modular room concepts are used to construct schools, office blocks, residential complexes and other buildings.

In January 2021, Blumer Lehmann launched its German branch in Großenlütter near Fulda covering sales, project development and modular construction finishing.

Blumer-Lehmann SARL in Luxembourg has been active in sales and project development for its domestic market since 2019.