



CASE STUDY /

FEM Analysis from Bois HD Reinforces Atelier Normand's Wooden Structures

“Bois HD customizes the Ansys platform so their advanced structural, acoustic and fluid simulation tools can be used daily by craftsmen in the French wood-working and construction industries. With these tools, our SME partners are confidently designing more complex structures in half the time it took with more traditional approaches.”

Sebastian Fuentes
R&D Engineer / Bois HD

The Atelier Normand is a French SME manufacturing complex wooden structures of various types including advanced platforms. Nowadays, SMEs are facing the challenge to quickly design and manufacture structures including more functionalities (storage, evacuation route, phone booth, etc.) while still complying to safety regulations such as Eurocode 0, 1 and 5.

/ Company Description

Bois HD is an engineering service company attached to the ESB Group in Nantes (France). Its main activity consists to provide technical support to French wood companies. Bois HD propose services based on experimental and numerical methods to help its clients in their R&D approach.

Atelier Normand is a French company specialized in the design and manufacture of high-end structure. Since 1960, the company has evolved adopting new technologies while preserving the tradition of the trades of the wood. Today, the Atelier Normand products are recognized in hotels, restaurants and commercial building as well as in the naval industry.

/ Technology Used

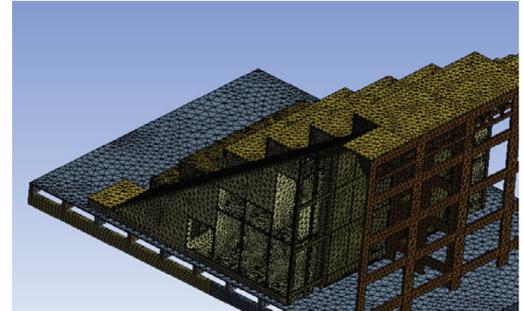
- Ansys Mechanical

/ Business Challenges

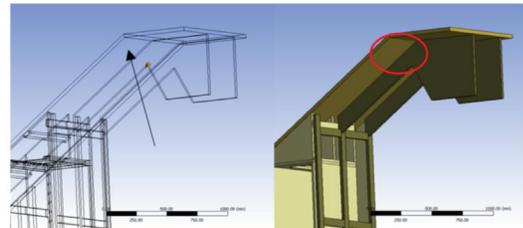
Engineering simulation allows Bois HD, an Engineering Services company, to investigate the different designs provided by the Atelier Normand, identify possible weaknesses (excessive local stress in the structure) and eventually validate their compliance to requested safety codes. The adoption of an engineering simulation approach also enables them to quickly address possible safety questions related to the addition of components such as a guardrail.

/ Engineering Solution

- The structure is made of various wooden components including solid wood or chipboard panel. Metal components are used to assemble the platform. The behavior of each component within the entire structure is predicted by the adoption of relevant material properties models.
- The platform itself is relatively complex as it involves numerous assemblies imported from CAD software. Reducing them to shell or beam elements constitutes an additional task that may oversimplify the model.
- Accurate stress assessment across the entire structure identifies the weakest region(s) that might be reinforced to comply with or even exceed the norms.



3D mesh directly generated from existing CAD.



Identification of weak zones.

/ Benefits

- The FEM model quantifies the safety margin between stress experienced during services and extreme conditions and regulatory norms; this gives confidence the structure will resist any reasonable exploitation conditions.
- Simulation results also provided immediate answers to regulatory authorities questioning the structure. The answer was provided at least two times faster and cheaper than through classical methods.
- The FEM analysis based on 3D solids elements is compatible with the BIM (Building Information Modeling) process.
- Design safety and quality is more easily communicated to end users and decision makers through simulation results, conveying more confidence that the structure will reliably perform as expected.
- The collaboration between Bois HD and the Atelier Normand effectively provides knowledge and expertise in a new technology (engineering simulation) not yet adopted by Atelier Normand.

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