



Stahlbau Nägele GmbH

Skywards with HiCAD –
building Germany's highest viewing tower

For more than 70 years, the Stahlbau Nägele GmbH has relied on a building material that is modern, flexible, quick to assemble and recyclable: steel. The 210-employee company from Eislingen an der Fils installs around 8,000 tons of this formable, environmentally friendly material every year and is on hand, for example, when it comes to new hall construction and extensions, terrace roofing, carports, staircases and railings, carports, stairs and railings. In a narrow time

window of nine months, the highest observation tower in Germany was built with the help of the multi-certified training company and thanks to financial support from the tourism infrastructure program of the state of Baden-Württemberg: the „Himmelsglück“ (German for „Celestial Happiness“) tower in Schleswig-Holstein.

The logo for Stahlbau Nägele, featuring the company name in a stylized font. 'Stahlbau' is in blue with a white outline, and 'Nägele' is in black with a white outline. The logo is set against an orange rectangular background, which is centered within a large white circle.

REFERENCE REPORT



Image: Circumferential rectangular tubes with static function

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Tower with waist and strong steel beams

The tourist attraction, which rests on load-bearing reinforced concrete and has 12 weather-resistant larch wood columns arranged radially on its floor plan, has three visitor platforms at heights of 20, 30, 45 and 55 meters and is also equipped with a fly line and a flying fox facility. Accessibility is provided inside the tower by a panoramic elevator, the size of which even allows the transport of a stretcher with two paramedics. Those who want to get to the top on foot have to climb a total of 300 steps and can hold on to hot-dip galvanized picket railings for a short rest. „Hot-dip galvanized steel was used in large quantities - about 120 tons to be exact,“ explains Matthias Greiner, Technical Director at Stahlbau Nägele GmbH. Hot-dip galvanizing in according to DIN EN ISO 1461 with a minimum coating thickness of 70 µm was applied to all steel parts of the multi-million project, according to the service provider’s construction protocol, including the walkable, close-meshed grating

structures of the steps and platforms. „The nominal mesh size is 30 x 10 mm, with the cross bars being slip-resistant. All stair treads also received a safety edge,“ explains the graduate engineer. The excursion highlight meets the highest safety standards, as other details from the construction protocol also reveal: The bracing of the wooden columns, for example, which runs via a bracing system of circumferential steel tube rings with diagonal tension rod systems. „With 10 tons of tension acting on the diagonal tie rods, it’s even more important that fasteners such as studs, bolts and screws have a durable holding power, or that the structure is designed so that individual columns can be replaced during operation,“ says Matthias Greiner.

Profile installation with HiCAD

„HiCAD makes it very easy to realize both individual and industry-specific designs,“ says the jubilarian, explaining his decision in favour of the CAD system from the

Image: Columns, stabilized by cross-bracings



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“HiCAD makes it very easy to realize both individual and industry-specific designs.”

Matthias Greiner, Technical Director Stahlbau Nägele

Dortmund-based ISD Group, which he has been using since 2006 for a wide-ranging portfolio of services. „The possibility - without major dependencies on each other - to place beams and profiles and thus position all struts freely in space was also very helpful for this project. In addition, errors could be avoided by editing parts in different sections and views and by being able to easily recognize geometric dependencies. Modified constructions could be managed easily by referencing individual beams and profiles or even referencing entire assemblies.“ The combined 2-D/3-D approach of HiCAD played a significant role in the design process: „This made it easy to add structural and architectural details to the 3-D drawing - including annotations and more general details. With the CAD solution's Standard Part Editor, it was possible to configure fastening details individually and thus, for example, to design the beams with a high degree of fitting accuracy. „To change a standard part, all it took was a click of the mouse, and all editing options were directly available, as well as all technological data such as weight, length and surface area,“ says Matthias Greiner.

Save time through clearly structured models

„Automation plays a very important role in the creation of manufacturing documents such as workshop drawings, bills of materials NC data, etc.,“ confirms the engineer. „However, automation could only be used to a limited extent in the planning of the observation tower, as the project was highly individual and did not comply

with any standard. I estimate that 40-50% of the manufacturing documents could be generated automatically, which is a good value given the complexity of this project.“ Unnecessary planning time was definitely saved by the transparent visualization of the complex structure including its sub-platforms: „Through different 3-D perspectives, discrepancies could be identified at an early stage and questions could be clarified with the parties involved,“ says Matthias Greiner.

IFC interface helped realize the project

The data exchange between the project partners took place via the OpenBIM-capable IFC interface and ensured the seamless transfer of information between the architect, the structural engineer and the client throughout the entire planning process. „Thanks to the IFC structure, we were able to comprehensively describe the individual construction elements, such as the columns, including their specific properties - match them according to the specifications from the structural analysis and architecture, integrate them into the design planning, coordinate them in turn with the aforementioned project participants and finally implement them,“ explains Matthias Greiner.

„HiCAD reads the IFC model from the architect's CAD software, for example, uses it as a reference and converts components into HiCAD parts, which can then be processed further. When asked whether projects like the observation tower in Schömberg could have been rea-

Image: Viewing tower



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Matthias Greiner, Technical Director Stahlbau Nägele

lized without a BIM-capable CAD software, the design manager answers with a clear „No.“

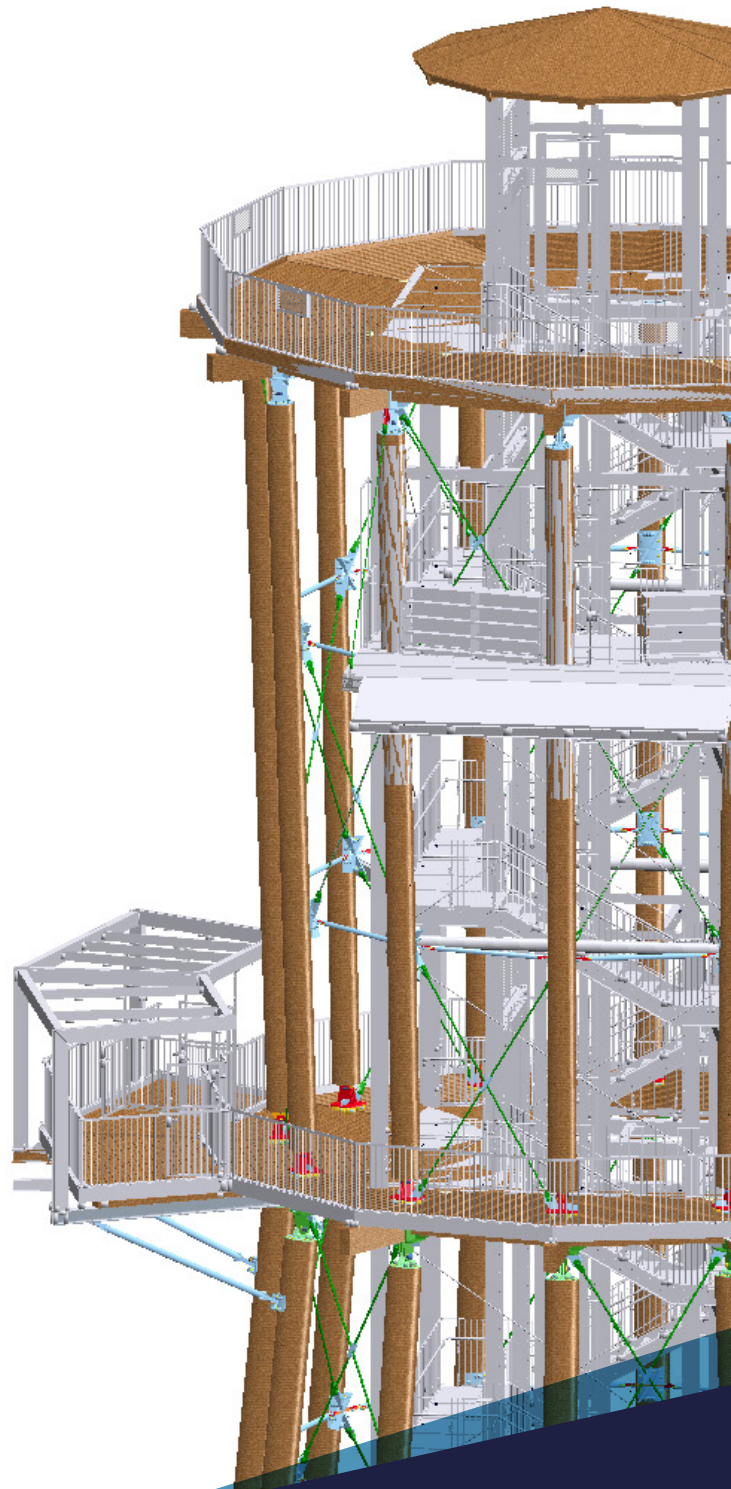
In Kürze:

- › Stahlbau Nägele GmbH
- › Industry: Steel engineering, windows, facades
- › Software: HiCAD, Nemetschek
- › Services: Steel, industrial and turnkey constructions, locksmith and metal works
- › www.stahlbau-naegele.de



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© ISD - HiCAD model of the viewing tower „Himmelsglück“

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