



GUROBI
OPTIMIZATION

Streamlining the Scaffolding Modeling Process

Kvaerner creates better scaffolding models, faster, while boosting operational efficiency and reducing costs.

KVÆRNER

Kvaerner was acquired by Aker Solutions. Aker Solutions delivers integrated solutions, products and services to the global energy industry. They enable low-carbon oil and gas production and develop renewable solutions to meet future energy needs. By combining innovative digital solutions and predictable project execution Aker Solutions accelerates the transition to sustainable energy production.

Industry: Construction

Location: Europe

Use Cases: Production

Website: akersolutions.com

Results

- Create better scaffolding models, faster
- Boost in operational efficiency
- Reduces construction times and project costs for their customers

Engineering, procurement, and construction (EPC) companies – who plan and execute complex, large-scale infrastructure projects – operate in a highly competitive and challenging business landscape. In order to deliver projects of the highest quality – on time and within budget – for customers and to win new contracts, EPC companies must be able to maximize their operational efficiency.

Kvaerner – a leading global provider of EPC services for the oil and gas and renewable energy industries, which specializes in delivering advanced offshore platforms, onshore plants, floating production units (FPSOs), and renewable energy solutions – is constantly looking for opportunities to improve the efficiency of its project planning and execution process.

One technical function that was identified as an area for possible improvement is scaffolding modeling. The process of designing and building a scaffolding model – which is carried out by specialized engineers – is a critical part of Kvaerner's entire project planning and execution framework.

As a typical project requires several hundred tons of scaffolding, having a scaffolding model before construction can significantly reduce construction times and costs. The actual process of creating a scaffolding model, however, can be a complicated and time-consuming endeavor.

Around two years ago, Kvaerner looked at its scaffolding modeling process and saw that there was room for improvement. Kvaerner's digitalization program was enlisted to implement an automated, 3D scaffolding modeling tool to boost the efficiency of the process and the quality of the scaffolding models.

This automated, 3D scaffolding modeling tool gives scaffolding engineers a detailed drawing showing exactly how the finished scaffolding will look and enables them to precisely calculate:

- The design of the scaffolding
- The weight of the scaffolding
- The exact list of parts needed
- The amount of time to build it
- The amount of time it will take to demolish it after the project is done



But Kvaerner's Technology & Digitalization team did not merely want to be able to create just any 3D scaffolding model – they wanted to be able to rapidly and automatically generate an optimal one. To achieve this, they decided to use mathematical optimization.

The Solution: Automated, Optimal Scaffolding Design

A key component of Kvaerner's automated, 3D scaffolding modeling tool is a mathematical optimization application, which is powered by the Gurobi Optimizer. This mathematical optimization application – which is embedded in Kvaerner's automated, 3D scaffolding modeling tool – gives the company's scaffolding engineers the capability to automatically generate optimal scaffolding models that improve access and minimize construction times and costs. A key component of Kvaerner's automated, 3D scaffolding modeling tool is a mathematical optimization application, which is powered by the Gurobi Optimizer. This application enables Kvaerner's scaffolding engineers to easily and effectively design optimal scaffolding models, which are then used to guide the construction of the actual scaffolding for the offshore platform, onshore process plant, or other structure.

With mathematical optimization, Kvaerner's scaffolding engineers can:

- Use all relevant data on the design, weight, time requirements, and parts requirements of the scaffolding that will be built.
- Specify the volume, type, and location of scaffolding required at each phase of the given project, the locations where workers will need access, and the location of the obstructions where the scaffolding cannot be built.
- Rapidly generate optimal scaffolding models that take into account access points and obstructions.
- Dynamically revise and redesign the scaffolding models as business

conditions and requirements change.

This mathematical optimization application – which is embedded in Kvaerner's automated, 3D scaffolding modeling tool – gives the company's scaffolding engineers the capability to automatically generate optimal scaffolding models that improve access and minimize construction times and costs.



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