

Knovel®
OIL AND GAS

Solution story: Designing an oil rig transmission to avoid delays and hefty fines

Knovel helps an engineering team gain regulatory approval for a new gear design



Summary

An oil and gas company needed a new transmission for a shallow-water rig. The new transmission had to pass a regulatory audit, and failure meant expensive delays and heavy fines. Knovel enabled the engineering team to deliver a design that passed the audit ahead of schedule, keeping the project on track and under budget.



“Knovel enables my team to quickly surface the calculations we need and to understand how those calculations fit into the overall application process. It’s like working with an expert guide throughout every stage of the audit.”

—Jordi Trauco, Mechanical Engineer

Challenge

A multinational oil and gas company with both upstream and downstream operations needed a custom transmission designed for one of its rigs. The company operates a diverse range of oil rigs in a wide variety of challenging environments. In this case, they needed an 18,000 foot-lb transmission for a 3000 HP engine for a jack-up rig operating in shallow water in the European market.

The company tasked its Rig Mechanical Engineering group, headed by engineer Jordi Trauco*, to design the gear system, which needed to successfully pass the ABS audit for off-shore oil rigs and receive its Classification Certificate, including the Class notation CDS (Certified Drilling System). The gear’s bolted design also needed to comply with the European ISO standard, which required adhering to a specific design guideline known as VDI 2230.

However, the engineering group lacked access to software capable of calculating design parameters that would meet the current standard. Before beginning production on the new transmission, Trauco’s team needed a way to calculate those parameters and verify the output of those calculations. Failure to pass the final audit would prevent the delivery of a \$2 million project and would incur substantial fines for the delay.



* Names have been changed to protect rights to innovation

“With Knovel, we’re able to access not only the mathematical models we need but also back up those calculations with trustworthy references and verify them through industry-standard tests.”

—Jordi Trauco, Mechanical Engineer

Solution

To obtain the calculations it needed, the team turned to Knovel, which provided an array of detailed information about the ISO standard application. These resources included samples of application diagrams used in similar applications, along with standard calculations and examples for verifying the performance of oil rig transmissions.

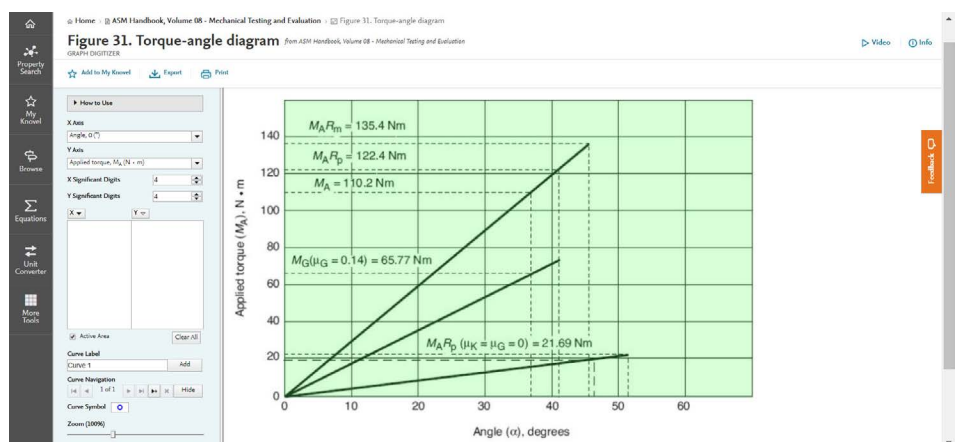
One key element of the ISO application was a finite element method (FEM) analysis, which uses differential equations to assess airflow around obstructions. Trauco used Knovel to obtain detailed FEM examples and calculations, enabling his team to create the FEM analysis required by the regulatory agency.

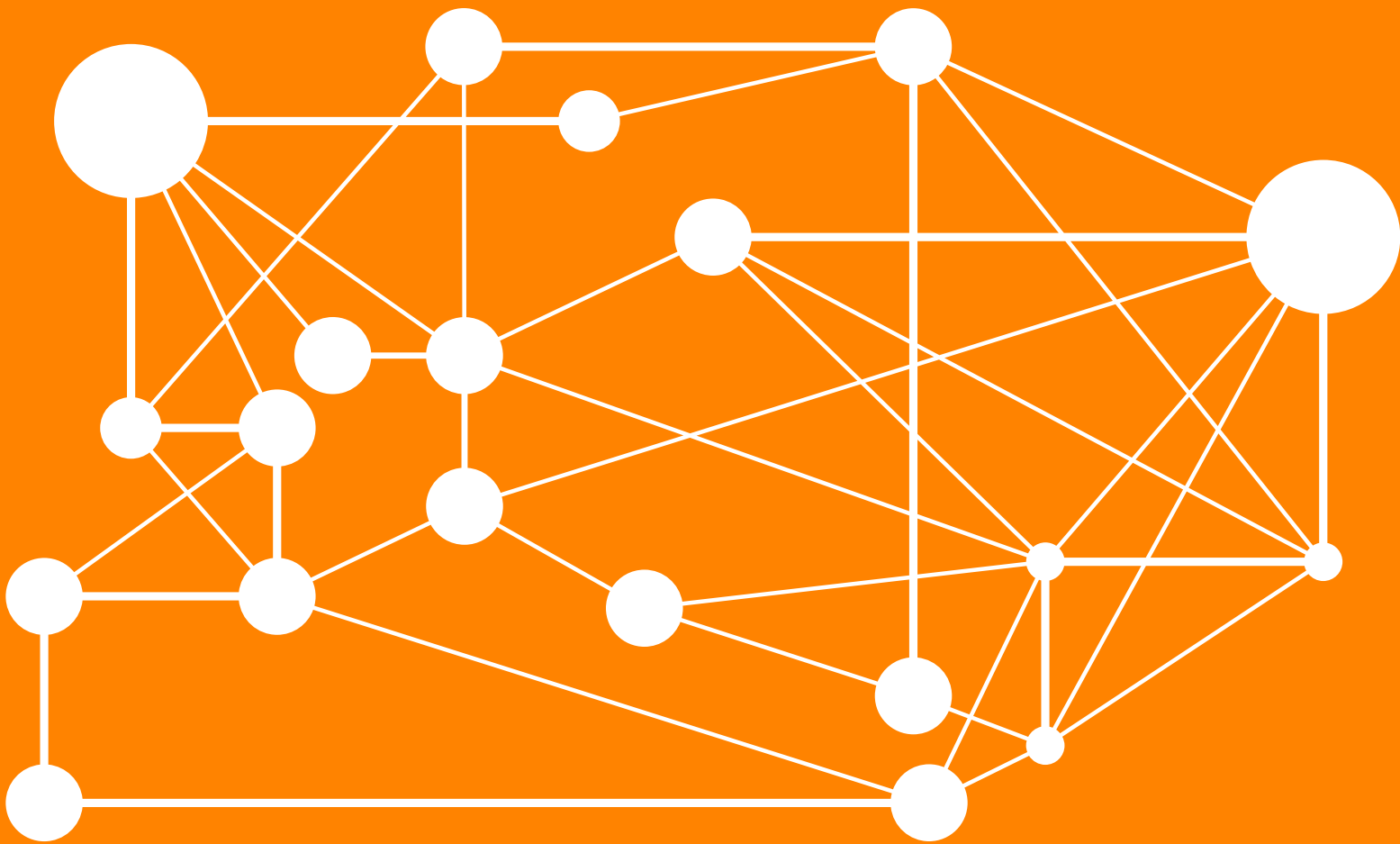
“With Knovel, we’re able to access not only the mathematical models we need but also back up those calculations with trustworthy references and verify them through industry-standard tests,” he said. “That added backup gives us much-needed peace of mind as we work through an application and offer evidence during a regulatory audit.”

Impact

With the help of Knovel’s up-to-date information and calculations, the engineering group was able to quickly verify their computational model calculation and submit their audit application in advance of the deadline. The combined risks of project delays and failure fines meant that millions of dollars were riding on the success of this audit. By delivering the necessary calculations and verified references, Knovel enabled the engineering group to complete their application on time and under budget.

The application passed the ABS audit on schedule, earning the oil rig the legally required CDS certification and helping the company remain competitive and ahead of the market.





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