CASE STUDY

Petrofac Saudi Arabia benefits from Octave engineering and design collaboration

Key facts:

Company: Petrofac

Website: www.petrofac.com

Industry: Petrochemical

Country: Middle East

Octave products used: Aspect Pipe Stress *(CAESAR II)*

With 18,000 employees, Petrofac is a leading service provider to the global oil and gas production and processing industry. The company designs, builds and operates oil and gas facilities and also develops and co-invests in upstream and infrastructure projects. Petrofac maintains operating centers in Aberdeen, Sharjah, Abu Dhabi, Woking, Chennai, Mumbai and Kuala Lumpur and an additional 24 offices and 14 training centers worldwide.

Saudi Aramco and Sumitono Chemical awarded Petrofac the $500 million Rabigh II refining and petrochemical project to develop U02 and U03 packages in its new aromatics complex and expand the facility to process 30 million standard cubic feet per day of ethane and three million tons per year of naphtha. These products provide feedstock for various high value-added petrochemical products. With 248 systems requiring stress analysis, Petrofac chose Aspect Pipe Stress for the project deliverables, which included stress isometrics using the Isogen® tool; graphical plots; expansion joint datasheets; reports on input, stress summary, displacement summary, restraint summary, equipment nozzle compliance, civil and structural loadings data; calculations for API 650 appendix P.2, flange leakage, wear pad requirements and trunnion loading.

Collaboration among Octave Products to save more than 20% in work-hours

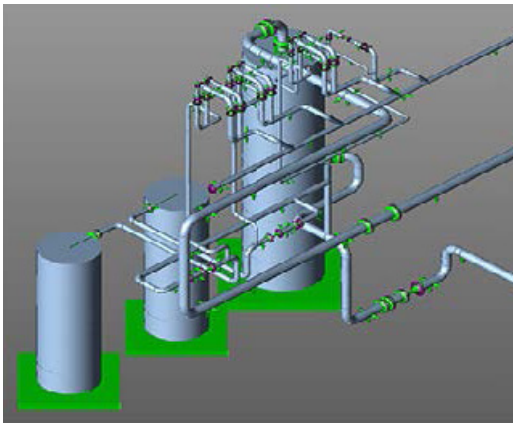
For such a large-scale project involving numerous vendors and companies working together, errors and overdesign are common due to the different interfacing contractors using or developing different solutions. On this project, Petrofac had 198 interface points with other contractors. Even with this complexity, the flow and sharing of engineering information among the contractors was smooth and efficient because many of them use Octave's Forte and Aspect solutions that provide easy interface between design and engineering, including Aspect Pipe Stress.

Resolving geotechnical complications

Geotechnical investigations revealed clay at several site locations, and the settlement analysis indicated large long-term settlement values. Considering these values in the compliance checks resulted in nozzle connection overloads. This meant that Petrofac had to achieve equipment nozzle compliance on piping without special aids, such as spring supports or lateral expansion joints, and without soil improvements. "Aspect Pipe Stress's tools for dynamic analysis, API-650 nozzle flexibilities and center of gravity calculations addressed these challenges," said Shaikh Farrukh, lead piping stress engineer, "and its easy-to-use graphical interface provided the accurate analyses that allowed us to eliminate the risks associated with these complications."

Expediting schedules, saving more time and money

Using the built-in codes and post-processing tools in Aspect Pipe Stress, such as WRC107/297, NEMA SM23, API 610, API 617 and API 661, Petrofac was able to quickly validate equipment nozzle loads for more than 500 nozzle connections. It achieved this without the aid of Teflon pads and low friction sliding plates, specifications that are not recommended in the prevailing sand storm and desert-like conditions at the site. These tools helped save additional work-hours and money and helped expedite the schedule.



About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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