CASE STUDY

LR Marine realizes significant time savings with Octave Aspect Pipe Stress and Forte 3DWorx

Key facts:

Company: LR Marine

Website: www.lrmarine.dk

Industry: Oil & Gas

Country: Denmark

Employees: 55

Octave products used: Forte 3DWorx *(CADWorx Plant Professional),* Aspect Pipe Stress *(CAESAR II)*

Key benefits:

- Ability to analyze a double wall piping only once, enabling 50% time savings
- Accurate and quick pipe analysis
- Improved efficiency due to integration between the analysis and design software

Identifying goals

LR Marine A/S is a total supplier of cost-efficient, effective and sustainable solutions for marine and industrial applications. LR Marine's core business and primary activities are within the fields of pre-insulated pipe systems, machinery units/ skids and cryogenic cargo tank insulation.

The company was contracted to supply a double-wall LNG pipe system, including 3D drawings, for an international LNG company. Due to the engineering teams being located in different continents, LR Marine needed a solution that would enable the piping departments to collaborate remotely.

The main goal of the project was the delivery of a double-wall piping system in accordance with both local and global class regulations, while meeting the tight project schedule.

Overcoming challenges

The project schedule was very restricted and mandated LR Marine look for a solution that would enable improving efficiency and shortening the time needed for the design and analysis of the system. Because LR Marine didn't execute the routing of the new system, the first step of the project

was to receive the three-dimensional routing information of the piping from the shipyard. Waiting for this meant a delay in the project

from the very beginning, requiring efficient project execution afterward.

Forte 3DWorx and Aspect Pipe Stress were chosen for the task due to LR Marine's familiarity with the products, their ease of use and the expected productivity gain.

In addition, the light IT footprint of Aspect Pipe Stress software enabled LR Marine engineers to access the system via a VPN connection. This way the engineers in Australia could work on the project remotely while the Danish office could keep track of the issues and project steps.

Realizing results

The routing information included single-line isometrics of the piping system. Separate lines were created for the outer (service) and inner (conduit) pipes to create a double-wall system for the piping. The next step was to combine the lines.

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Previously, when working with other software solutions, this would mean that the two lines would first need to be analyzed separately and then the results combined manually. With the help of Aspect Pipe Stress, LR Marine was able to join the two files into one and run only one analysis on both of the files simultaneously. In addition, the ability to execute clash analysis of the two lines at once provided LR Marine with tremendous time savings.

The stress analysis had to be executed in accordance with International Maritime Organization (IMO) standards. Amongst many others, Aspect Pipe Stress uses ASME standards; LR Marine calculated the limitations separately according to IMO and then adjusted the values in Aspect Pipe Stress to ensure that the maximum stresses and yields were in accordance with both standards.

Once this information was available, the subsequent step was to run the analysis of the piping system with Aspect Pipe Stress. After the analysis, parts of the system showed that the piping was overstressed. With the accurate information provided by Aspect Pipe Stress, LR Marine was able to quickly start the engineering phase to manipulate the routing to ensure that the stress levels were below an acceptable level.

The next step was to export the data, including piping and pipe support information, to Forte 3DWorx. In Forte 3DWorx, the piping system was divided into spools. After this, all the spools had their separate drawings, which were used to automatically generate a cut out plan for the fabricator. This helped the fabricator to avoid any manual work and ensured that the piping would be fabricated exactly according to the original design.

After this, the customer evaluated the drawings to ensure that the piping would fit

into the vessel. The seamless integration between Aspect Pipe Stress and Forte 3DWorx ensured that the spools were generated accurately, and no problems arose during the installation.

Next, the double wall piping was released to the fabrication yard. After all the spools were ready, the final step was to lay out the complete piping system and connect the spools. After this, the piping system was filled with water to test and ensure that no leaks existed. The final check was performed at the fabrication yard in the presence of a class surveyor.

Finally, the piping system was shipped to a client in Turkey where LR Marine had a supervisor on site. The installation of the system went well and the complete system has been installed and is currently in service.

Moving forward

This project was the first project where LR Marine was contracted for only fabrication work. After successful completion, the company has been working on many similar projects for the maritime and LNG industries globally. Soren Kjaer, sales manager at LR Marine, said: "Aspect Pipe Stress enabled us to run the analysis of the two pipes at the same time, providing us with tremendous time savings. Using other software, we would have needed twice the time to execute the same analysis."

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.