



## LR MARINE, DENMARK

### Key Facts

**Company:** LR Marine

**Website:** [www.lrmarine.dk](http://www.lrmarine.dk)

**Industry:** Marine

**Country:** Denmark

**Description:** 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.

**Employees:** 55

### Products Used:

- CADWorx® Plant Professional
- CAESAR II®

### Key Benefits:

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

## LR MARINE REALIZES SIGNIFICANT TIME SAVINGS WITH CAESAR II® AND CADWORX®

### 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 for piping systems, while meeting the tight project schedule.

### OVERCOMING CHALLENGES

The project schedule was very restricted and mandated LR Marine to 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 afterwards.

CADWorx® Plant Professional and CAESAR II® 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 CAESAR II 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.





Figure 1: The main goal of the project was the delivery of a double-wall piping system for an LNG ship.

## 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.

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 CAESAR II, 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.

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The stress analysis had to be executed in accordance with International Maritime Organization (IMO) standards. Amongst many others, CAESAR II uses ASME standards; LR Marine calculated the limitations separately according to IMO and then adjusted the values in CAESAR II 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 CAESAR II. After the analysis, parts of the system showed that the piping was overstressed. With the accurate information provided by CAESAR II, 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 CADWorx Plant Professional. In CADWorx, 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 CAESAR II and CADWorx Plant Professional 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 onsite. The installation of the system went well and the complete system has been installed and is currently in service.



Figure 2: The cut out plan helped the fabricator to avoid any manual work and ensured that the piping would be fabricated exactly according to the original design.

## 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, commented: “CAESAR II 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.”

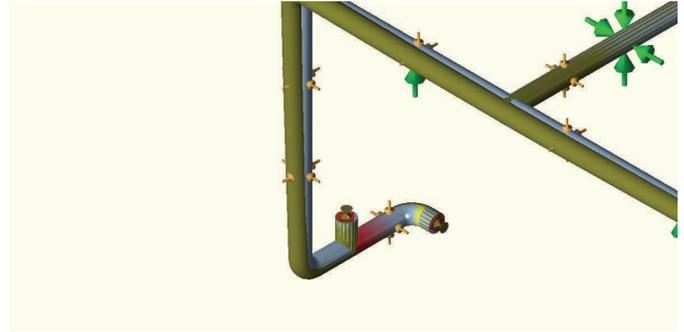


Figure 3: LR Marine will continue to work on similar projects for the LNG and maritime industries in the future.



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## ABOUT HEXAGON PPM

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