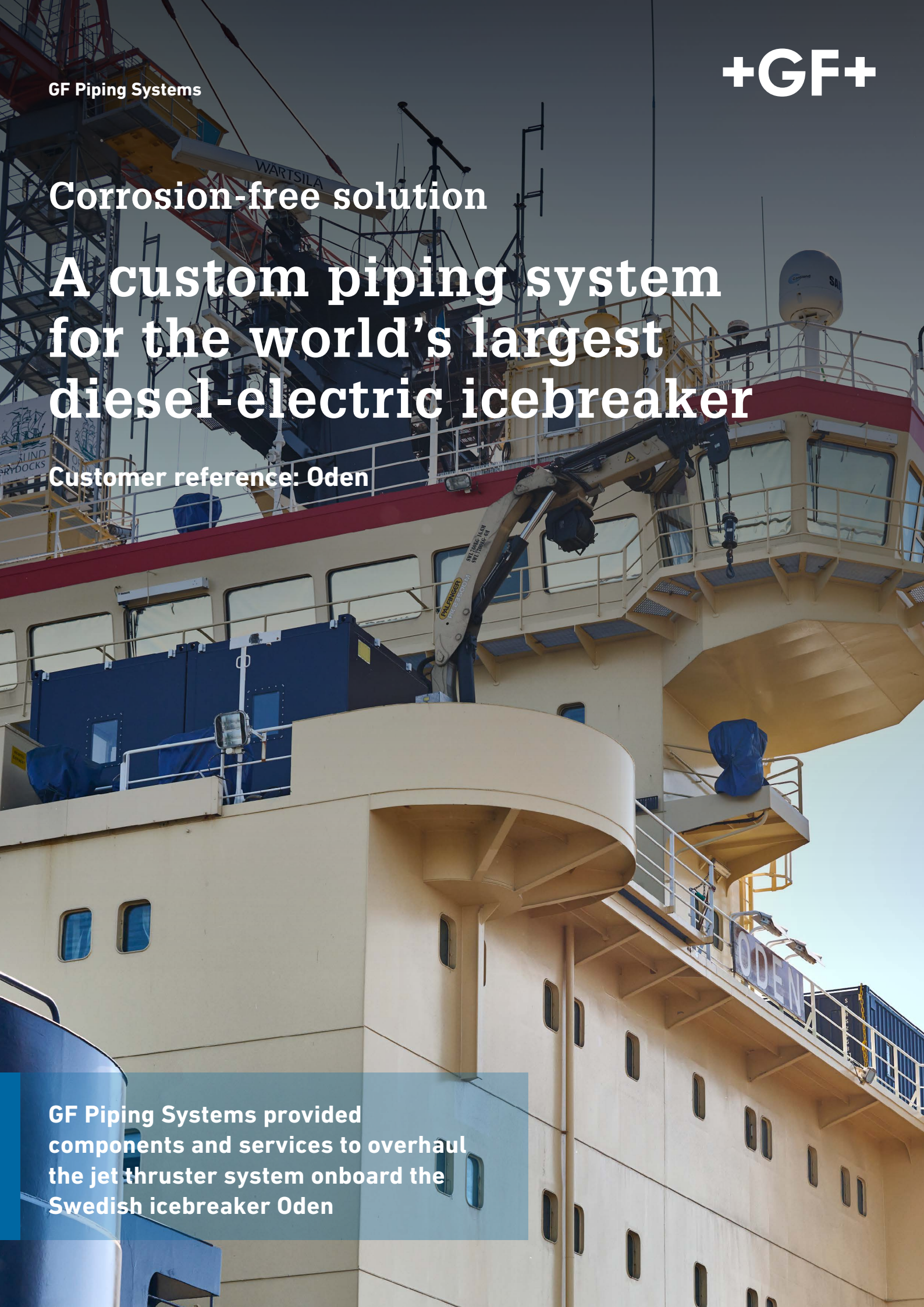
GF Piping Systems

Corrosion-free solution

A custom piping system for the world's largest diesel-electric icebreaker

Customer reference: Oden



GF Piping Systems provided components and services to overhaul the jet thruster system onboard the Swedish icebreaker Oden

Extensive engineering services enable a cost-efficient retrofit with 200 meters of thermoplastic piping

The Oden, launched in 1989 and currently owned by the Swedish Maritime Administration, is the world's largest diesel-electric icebreaker. As one of the most powerful non-nuclear vessels of its type, the Oden is still active throughout the Baltic Sea during winter. For the rest of the year, it is a research platform for Swedish polar expeditions in the Arctic. To ensure that the vessel continues to operate at the highest level, the Swedish Maritime Administration decided to replace the steel pipes of the ship's jet thrusters with a complete thermoplastic solution by GF Piping Systems.

Project background

To meet the high operational demands, the Oden was designed to be highly maneuverable thanks to features like a square bow, a specific hull shape, and oversized rudders. In addition, the ship uses jet thrusters to spray high-pressure water onto the ice to reduce friction at the bow, which increases the ship's energy efficiency. Initially, the jet thrusters relied on a steel piping system to handle the high flow rates and pressures for this process. However, due to issues with corrosion, it became necessary to replace the system once and for all.

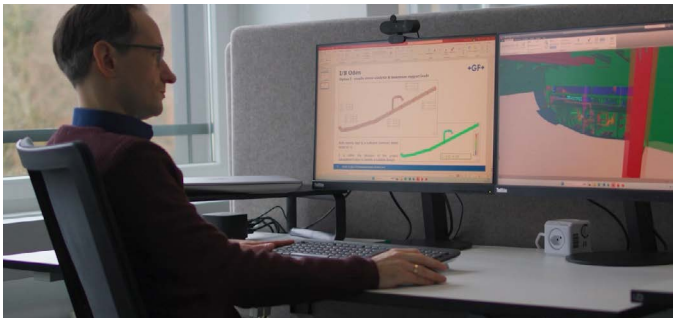
Selected technical solution

In total, GF Piping Systems supplied 200 meters of DN1000 piping made of HDPE as well as 100 ELGEF Plus electrofusion fittings and couplers made of PE100. Due to the very tight spaces on board, using standard components was impossible, so GF Piping Systems provided engineering support to create a custom solution. In addition to the dimensioning of the pipes, this also required services such as a feasibility study, pipe stress analyses, hydraulic calculations, and analyses of flow characteristics and energy consumption.

Achieved improvement

Despite the tight spaces onboard the Oden and the system's complexity, the retrofit was completed by 14 installers in 2,000 hours, making it much more cost-efficient compared to metal. The thermoplastic pipes are corrosion-free and, therefore, have a much longer service life compared to metal, while smooth inner surfaces allow the same flow volume as metal pipes in larger dimensions. At the same time, GF Piping Systems' engineering services have enabled a safe and reliable operation. The crew of the Oden can therefore focus on what matters: Clearing shipping routes and advancing Arctic research.

Completed in 2,000 hours by 14 skilled installers, the Oden retrofit overcame tight spaces and system complexity, offering a cost-efficient alternative to metal.



GF Piping Systems provided custom solutions, including feasibility studies, stress analyses, hydraulic calculations, and energy optimization.

Customer benefits

- **Corrosion-free:** Thermoplastic piping systems are a long-lasting and reliable alternative for applications involving seawater
- **Customization:** GF Piping Systems' engineers offer support in designing and customizing the optimal flow solutions onboard ships
- **Reliable Partner:** Thanks to a global footprint, GF Piping Systems is capable of providing full project support wherever it is needed

Where next?

Find out more

Visit our webpage to get in touch with your local specialist:
www.gfps.com/our-locations

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