

CASE STUDY: CARGO HOLD HEATING



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REINFORCED PLATE BANKS FOR MARINE TRANSPORT

Transporting various fluids with vastly different properties on a barge presents a unique set of thermal and structural engineering challenges. Omega Thermo Products was tasked with retrofitting a laser-welded plate heat exchanger system for a barge transporting cargo ranging from crude oil to caustic soda. The barge's tanks would often operate at partial capacity, requiring a robust solution to handle fluid dynamics caused by motion and variance in liquid density. The barge's existing pipe coil heating system was failing and the need for an updated heating system to handle the unique circumstances of various densities, hold capacities, dynamic moments of force that could be designed, built, and installed within a robust dry dock turnaround.

APPLICATION CHALLENGES

› Wide Range of Fluid Densities

Fluids such as crude oil, caustic soda, and other industrial liquids differ not only in temperature profiles but also in density and viscosity. These factors directly affect fluid characteristics and the resulting dynamic load on internal structures.

› Low-Volume Sloshing Forces

When holds are only partially filled, fluid motion due to wave action and acceleration can produce significant sloshing forces. This internal motion poses a risk of damaging standard plate banks not designed for such unbalanced loads.

› Corrosive Nature of Cargo

Handling caustic and chemically reactive materials required durable stainless steel materials and designs that minimize the risk of corrosion while maintaining efficient heat transfer.

OMEGA'S SOLUTION: REINFORCED LASER PLATE BANKS

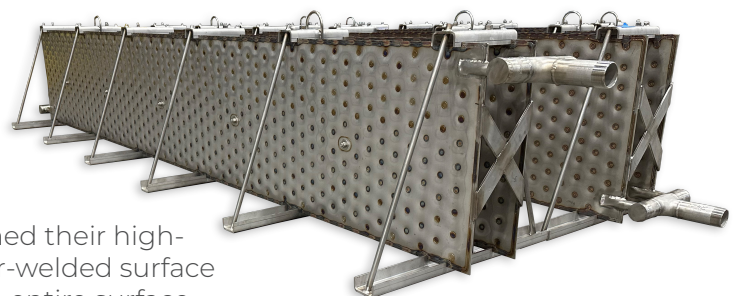
Custom Reinforcement Strategy

Omega Thermo Products engineered a series of reinforced laser-welded plate banks specifically designed to withstand the added mechanical stress of sloshing, especially in low-fill conditions. Reinforcements included:

- › Structural ribbing and bracket systems
- › Plate wall thickness optimization
- › Load-distributing frame designs

Flexible Heat Transfer Surface

Despite structural additions, the plate banks maintained their high-efficiency heat transfer capabilities. The dimpled, laser-welded surface enabled uniform flow and heat distribution across the entire surface—even under variable flow and fill conditions.



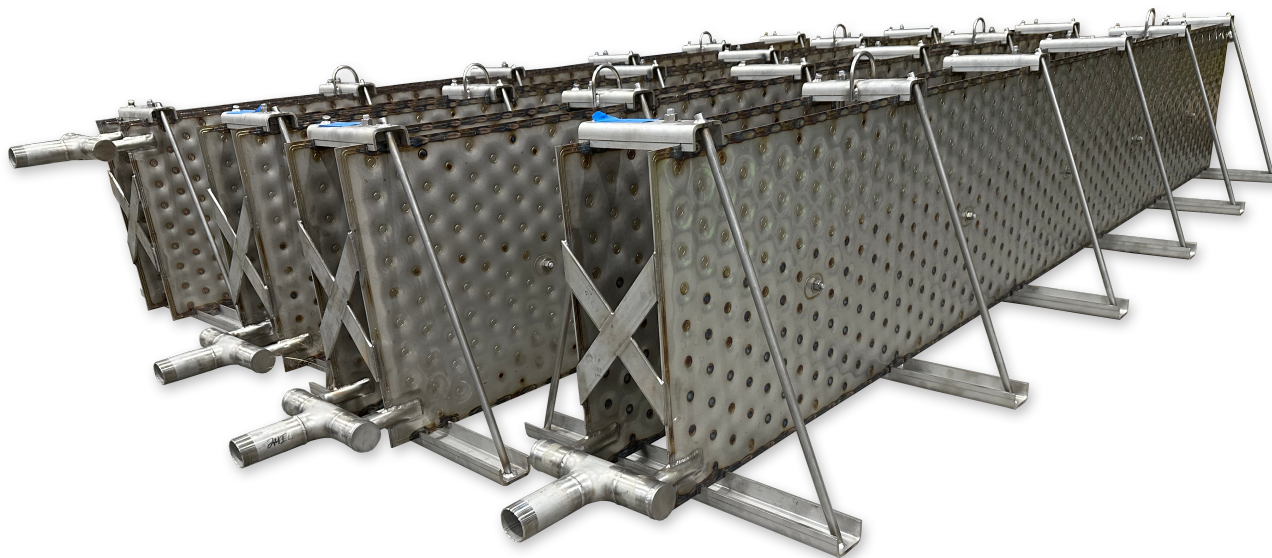
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RESULTS AND BENEFITS

- › **Improved Structural Integrity:** Withstood repeated transport cycles under partial-fill conditions without fatigue or deformation.
- › **Enhanced Safety:** Reduced risk of damage due to wave action and underway conditions along with minimized maintenance needs.
- › **Versatile Cargo Capability:** Enabled transporting a range of liquids with various densities and multiple hold volumes.
- › **Long-Term Durability:** Stainless steel construction and reinforced design prolongs the equipment life even in dynamic environments.

CONCLUSION

Omega Thermo Products continues to lead in marine ready heat exchanger design. By listening to customer-specific transport needs and applying advanced laser welding and structural reinforcement technologies, we deliver high-performance solutions tailored to dynamic, multi-fluid operations.



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