



Shipyards
Tamaulipas, Mexico

Overview: Non-insulated compartments within the hulls of petroleum container vessels are constructed from carbon steel. In order to apply anti-corrosion coating, the inner walls must first be cleaned. The environment must be cool, for worker comfort, dry and dust-free for coatings to adhere to surfaces. In order to achieve this aim, our highly progressive, ahead-of-their-time engineers conceived of a radical new way (at the time) to cool the environment by piping up cold water from the ocean, running it through a cooling system to a desiccant dryer that dried and cooled the inside of the compartment, allowing workers to sandblast the hull and apply anti-corrosion coating.

Challenge: A full range of engineering and feasibility studies were conducted to analyze the efficacy, affordability, and capability of the design. This included technical and economic assessments, offshore surveys, environmental analysis, review of permit needs, and innovative water pipeline designs.

Case: The choice of materials for seawater pumping systems depends upon many factors, including material reliability requirements, manufacturing characteristics, availability and cost. Maintenance reliability, life expectancy and performance compared to traditional systems also influences the materials choice design.

Problem: Pemex had not accounted for the large amount of electricity required to cool the air inside petroleum container vessels. With high corrosion rates in humid environments, this translates into increased energy usage and costs, difficulty associated with conducting crucial maintenance, and inefficiency complications due to long lead times associated with producing customized mobile air cooling and dehumidifying equipment.

Solution: From the conceptual through final engineering to construction, we provided the needed solution that enabled the efficient and economic ongoing maintenance of Pemex's petroleum storage vessels.

Mitigation Strategy: The parameters of this project required 45% RH at 22°C.

Our highly flexible cold water air conditioning system was comprised of high efficiency filters with 95% efficiency, a customized sea water pump, specialized cooling coils for ocean water / high saline water handling, a desiccant dehumidification wheel, and a high-pressure fan system, at a time when the economics and technical feasibility of utilizing seawater air conditioning as a means to provide cooling was still under evaluation by the US Department of Energy.

Methods for inhibiting corrosion in storage compartments, especially cargo and container compartments aboard ships where serious corrosion difficulties are encountered require critical environmental design and engineering expertise. The corrosion of inner surfaces contaminate substances therein, especially liquids, degrading oil cargo. Intervention utilizing communicating pipelines in cold water air conditioning systems resolved these issues for this application.

