



Visit to the De Poli Shipyard in Venice, Italy

Before the Duplex World 2000 Conference in Venice in October of 2000, the delegates had the opportunity to visit Cantiere Navale De Poli, the De Poli shipyard. De Poli was founded in 1880 and is situated on the Island of Pellestrina near Venice.

De Poli fabricates marine chemical tankers, the ships which transport a wide variety of liquid cargo across the oceans from port to port. Typical cargoes include chemical, petrochemical and food products. Examples are phosphoric acid, sulphuric acid, petroleum products, vegetable oils and molasses.

At the port, the product is pumped directly into one of the several tanks on the ship. Tanks are typically 10 meters (33 feet) wide, 12 meters (39 feet) long, and 11.5 meters (38 feet) high and carry about 1380 m³ (365,000 gallons) of liquid. However, a marine chemical tanker usually has tanks of various capacities to accommodate different cargo sizes.

Because of the wide range of possible cargo, the tanks have to be as corrosion resistant as possible, while still affordable. With tanks of increasing corrosion resistance, the potential range of cargo and, therefore, the customer base increase for the owner of the ship.

At our visit to De Poli, a 140-meter (462 feet) long, 16,000 dead-weight-tons heavy chemical cargo tanker was under construction. It is the seventh fabricated by De Poli with all duplex tanks and will take about 16 months to complete. All of the 17 tanks on the ship are made from 2205 duplex stainless steel. This molybdenum-containing stainless steel is the standard stainless steel for marine chemical tank applications, replacing the lower alloyed austenitic stainless steels 316LN and 317L.

The duplex stainless steel 2205 is about twice as strong as the above-mentioned austenitics and, therefore, allows a lighter wall construction. This saves fuel or allows for higher cargo weight – always an important consideration in freight transportation. This stainless steel is also much more corrosion resistant than its predecessors. Because of this, a wider variety of chemicals can be transported over a wider temperature range. Some of the chemicals are transported at temperatures up to 80°C (176°F).

The interior tank walls, called the bulkheads, are usually corrugated (Figure 1). The corrugated construction provides structural strength for the whole ship. At the same time, the vertical corrugation in these tanks also facilitates the cleaning of the tanks after each cargo. In older designs it was necessary to use internal stiffeners to give the tanks stability and strength. These tanks were, of course, much more difficult to clean.

Wherever possible, De Poli uses automatic submerged arc welding in the horizontal position for the corrugated panel fabrication (Figure 2). For position welding on-board, flux cored wire and covered electrodes are used. After the tank fabrication the interior of the tanks is pickled and passivated.

Over the last several years, marine chemical tankers were the single largest consumer of duplex stainless steel. Approximately, 900 tons of molybdenum was consumed in 1998 by this application.

Observing the construction of a marine chemical tanker is awe inspiring; it is exciting to see how molybdenum-containing stainless steels contribute to the safe and economical transportation of chemicals in such a massive scale.

Figure 1: The cargo vessel as it is being built. The corrugated interior of a duplex stainless steel tank is open to the view.

Figure 2: Prefabricated, corrugated duplex stainless steel panels are ready to be installed on the ship to form liquid cargo tanks.