

Pickling and Passivating of New built Huge Fleet of Chemical Tankers in Szczecin Nowa Ship Yard from 2002 till 2007

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Ancora Co. signed contracts with Szczecin Shipyard (Fig.1) on cleaning, pickling and passivation of 8 huge chemical ships 40 000 dwt each with fully stainless steel tanks with pipeline systems, starting work from the second part of 2002 (Fig. 2).

filling with inert gas. The surface for passivation was extremely large so that required huge quantities of chemicals. These were delivered in road cisterns straight from producers (Fig.4) but also in IBC containers (Fig.5).



Fig. 1. Huge chemical vessel built in Szczecin shipyard



Fig. 3. Slope tanks located over the board



Fig. 2. The latest tanker from the series at Szczecin Nowa Ship Yard



Fig. 4. Chemicals for passivation delivered in cisterns



Fig. 5. Chemicals for passivation delivered on the tanker board

The owner of the tankers was Odfjell SE - Odfjell Seachem AS from Norway. These ships with tanks and systems made of duplex stainless steel represent the highest level of flexibility yet to be built.. Each of the ships has 40 cargo tanks, 6 slope tanks (Fig.3) and adequate pipeline systems for filling and emptying cargo tanks, for ventilation and

The chemicals were diluted, mixed or neutralized in a container built by the Ancora Co. with the primary purpose to carry port chemicals (Fig.6).



Fig. 6. Chemicals prepared at the landing pier

There were 20 men from Ancora Co. working on two shifts. The work area was closed to the people not involved to the work.

A specific procedure for cleaning, pickling and passivation of each system was presented to the shipyard and the owner representatives and was accepted by the supervisors of each side. The proposed system for the tanks was to spray the chemicals, water and finally demineralized water using automatic tank washing system. The system allowed governing all the technological steps from the control room (Fig. 7) including loading, unloading, pumping, opening or closing valves etc.



Fig. 7. Room for automatic control of transported and sprayed chemical

Electronic control made possible to read volume of chemicals, to guide their transport by operating valves, to put into operation (rotation and up and down

movement) of scan jet spraying nozzles, precisely controlling time of each operation.

Each of the chemicals were pumped from one tank to another consecutively using ship pumps after making out flexible temporary connections of the cargo systems with the cleaning systems at the manifold (Fig.8).



Fig. 8. Flexible temporary connections started from manifold

After making temporary connections the systems were checked for tightness using water under pressure. There was around 50 m³ of each chemical liquid circulating from the loading systems to the cleaning systems and flushing the tank walls. After the circulation in one tank was over the medium was pumped to the next tank, and a new circulation between cargo system and the washing system started without a delay. Simultaneously a cleaning operations, pickling and passivation were carried out in the maximum number of tank systems. Demineralized water was produced by each of the ship to cover the demands for final cleanings.

If some small tank surfaces were not properly passivated due to limited chemicals and water access from the automatic washing jet it was necessary to carry out the work locally with application of gels. In single cases when defects were found at the height the specially trained workers performed all the steps of pickling/passivation from a chair or a platform hanged on lines introduced through the openings at the tank ceilings.

The pipeline systems were cleaned, pickled and passivated by circulation method or pipeline filling.

During one of the operations thanks to the pickling work wrong valve material was discovered after steel was dissolved and a leakage was found. This luckily happened at the shipyard, not at the voyage on the sea.

After drying the tanks with compressed air delivered through the large plastic pipelines the electrochemical potentials were measured and reports on completing the work were issued. Then a full, very stringent inspection by the shipyard and the owner inspectors was carried out to confirm a proper quality of the work.

Before final washing with water and demineralized water the concentration of the acids was laboratory checked. Concentrated fresh acid was added when it was required. Waste waters were pumped to the chemical containers staying at the quay for neutralization with caustic soda/lime slurry, and after laboratory control were pumped to the sewage pond.

At the beginning of the operations white sediment was found at tank walls after water washing. It was stated that fresh water from ship yard well contained too much of calcium carbonates, whereas chlorides content was below 100 ppm. The calcium salts were removed with a solution containing phosphoric acid. High quantities of water were needed and the local well was the only one source. The problem of solids in water was solved by engaging specialists from the Gdansk University of Technology who working day and night found a solution that based on addition of calcium complexing agents to water.

After the guarantee time passed Mr. Dan Odfjell chairman of the fleet owner company wrote a reference letter stating that the cleaning, pickling, passivation process was done by Ancora Co. with a high professional experience within the shortest possible time.

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