

Japan's Tonen Corp. Solves Refinery Corrosion Problems with APC's ChemLine®

ChemLINE®
CASE STUDY



1 - Tonen Corp.'s major refinery in Wakayama, Japan, encountered severe corrosion problems due to the manufacturing nature of the plant and the surrounding seas and its corrosive salt air. In this application at the refinery, APC's ChemLine® coating with excellent bonding capability, was applied directly to pipelines over hard rust. 2 - ChemLine® is sprayed on areas of piping throughout the Tonen refinery. 3 - Stacks at Tonen are coated with a pigmented ChemLine® coating to blend in with the surrounding environment.

Situated in the seaport town of Wakayama, Japan, is one of Tonen Corp.'s major gasoline producing refineries. A leading problem for Tonen has been that the corrosive nature of the plant, combined with the abusive sea salt air, has required a new painting of the refinery's pipes every 18 months.



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Closeup of coating on stack.

To further compound the situation, strict environmental laws prohibit any lead-based paints from being discharged into the air or dropped into the water. All removed lead paint has to be collected, placed in plastic bags, deposited and sealed in steel drums, and properly buried.

The entire effort of removing lead-based paints and then recoating the pipes running between the refinery and ship-loading docks located by the Japanese Sea has been a costly and time-consuming undertaking on a regular basis for Tonen.

Tonen Corp. developed guidelines to find a protective coating that would deliver a number of key benefits at its refinery:

- Be surface tolerant (even in wet conditions) with the capability to encapsulate the lead-based paint already used
- Bond to hard rust
- Require a minimal amount of surface preparation
- Last a minimum of 12 years before another application (resisting air containing corrosive chemicals such as sulfides, SO₂, SO₃ and chlorides, and also salt water and ultraviolet light)
- Have a very low VOC
- Be able to cure in a range of 5°C to 60°C

During an 18-month period, Tonen field-tested 74 different performance coatings in various applications throughout the refinery.

After this period, Tonen's test results showed that only the APC's ChemLine® coating delivered all the performance specifications and showed no deterioration. Based on these parameters, Tonen decided to coat several miles of pipes and steel structures with ChemLine®.



Pipe running throughout Tonen facility is coated with ChemLine®.

To conform to environmental guidelines and close monitoring from local government officials, Tonen carefully prepared the pipe and steel structures for the new coating application. First, all structures with well-bonded paint were high pressure washed with water containing a biodegradable detergent to remove dirt, grease and grime. Next, to avoid any sandblasting, any areas with loose rust were removed by mechanical brush with vacuum collection. Finally, all deteriorated paint was removed from the structures by mechanical means and vacuum collected.

The Application

Once all surfaces were ready, the ChemLine® coating was applied in two separate 3-4 mil coats (75 to 100 microns). This guaranteed complete encapsulation of the lead based paint. The coating was even applied over hard rust without surface preparation.

Tonen also utilized another feature of the ChemLine® coating – its ability to be pigmented in various colors. At the Tonen refinery, earth colors were used to blend in with the surrounding natural environment. For example, pipes located by the beach were coated with a sand color. Stacks were coated white at the base and progressively tinted with blue as the stack rises. At the top of the stack the color became darker blue to blend in with the sky.

The first section at Tonen was coated in about six months with the second segment coated the following year.

The ChemLine® coating performed well and has held up under various tests. Even after a number of months where the new coating was bonded to hard rust, Tonen personnel have checked the coating by hammering on the rust-coated areas, and no coatings have broken loose.