Application of protective and insulative coating on MDEA gas absorber vessel 1151-B on platform K12-BP, GDF Suez

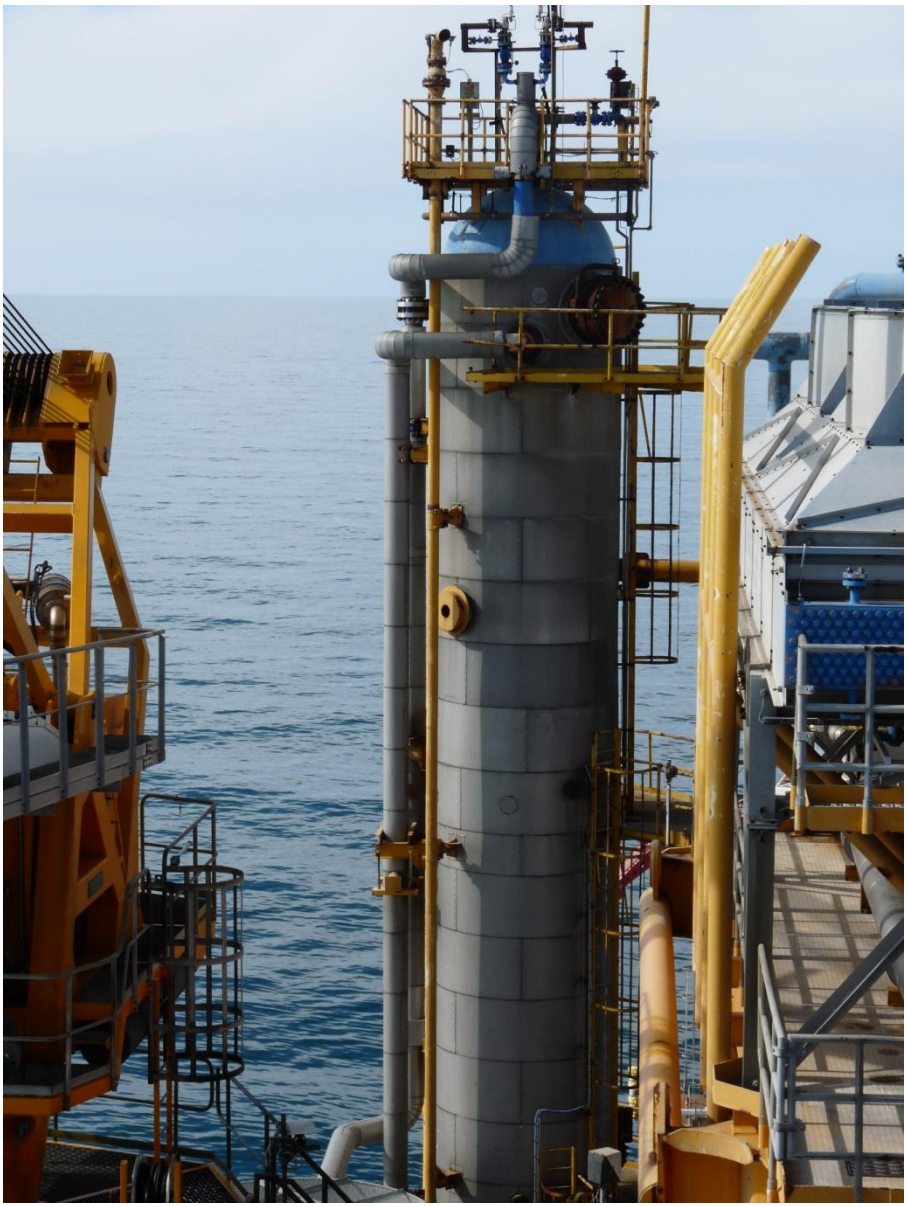
1151-B MDEA gas absorber (upper right tower)

Used coatings:

- Rust Grip as protective layer, rust inhibitor and primer (150-200 mu)
- Hot Surface Coating (HSC) as an insulative layer (10 mm)
- EnduRoof as a protective top coat for the HSC (1.2 – 1,5 mm)
- Enduro Top-E for (UV) protection and colored in desired RAL colors 7035 and 5024

Vessel was heavily corroded due to a very common problem in traditional insulation materials and systems, named corrosion under insulation (CUI). Besides this, traditional insulation materials tend to absorb moisture and lose their insulation value gradually. The HSC system that will be applied directly on to the surface will make sure this problem will not occur anymore in the future.

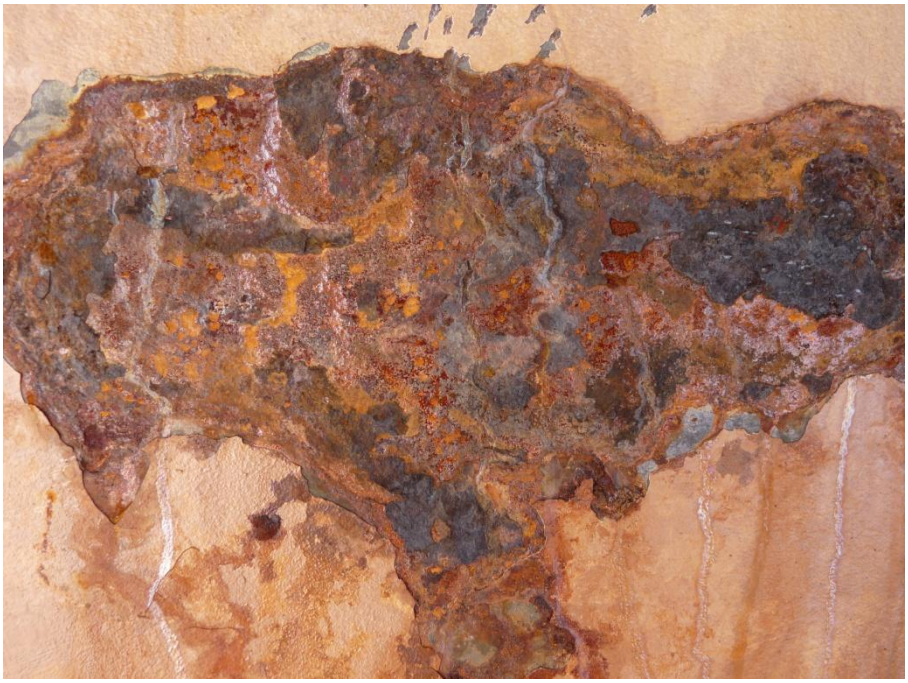
Vessel before removing Rockwool insulation material:



1151-A (not the treated one, but similar to 1151-B)

Vessel after removing the insulation material:

Corrosion under insulation (CUI)



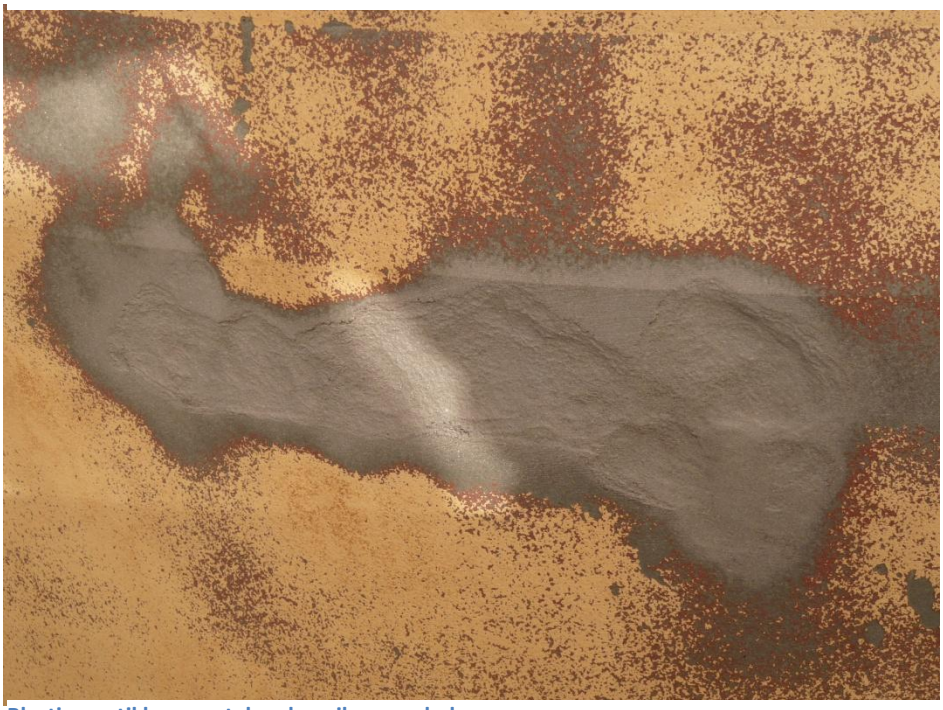
Close up

Preperation

Vessel covered with scaffolding and tent

The vessel has been completely covered from top to bottom with scaffolding and a tent. After removing the old insulation material the complete vessel is power washed with water to remove all dirt, lose particles and remove any existing chlorides.
After a shut down for welding, the system is put online again and the complete vessel is being blasted to SA1 on the lightly affected area's with still good adhesion of the old coating system en up to SA 3 on the heavily corroded areas.

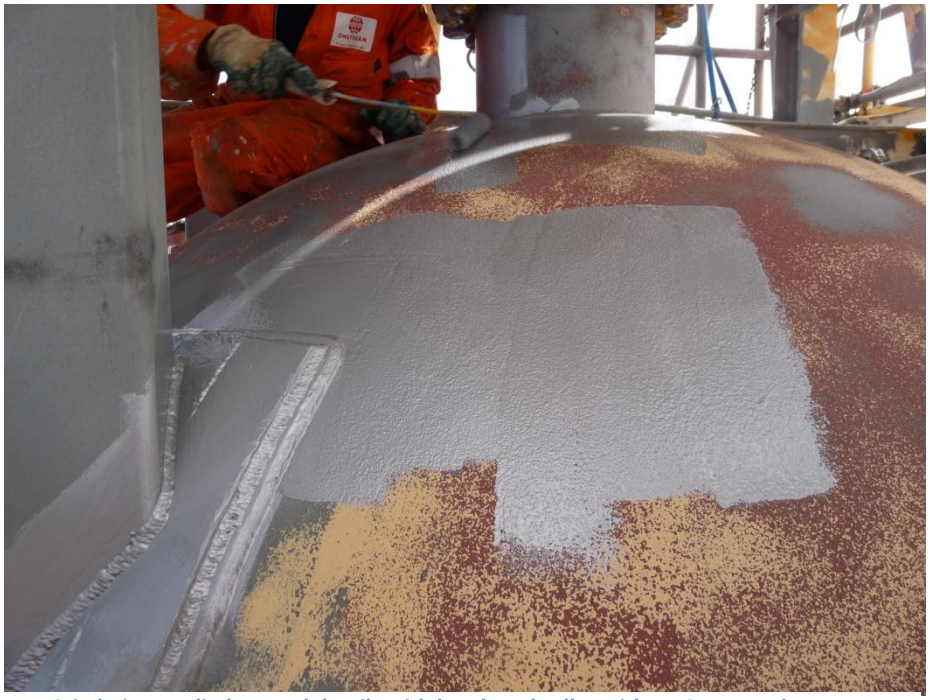
Sweep blasted surface before application



Blasting until bare metal on heavily corroded areas

Rust Grip

RustGrip® is a metallic-based, moisture-cured polyurethane encapsulating coating that will coat over most surfaces to seal them up against further corrosion, weathering, and physical wear. Rust Grip is a three-coats-in-one system that acts as a primer, intermediate, and topcoat in one. Rust Grip is applied in 2 coats with a total DFT of around 150-200 micron DFT. This is a bit more than the specifications, possible because of the higher temperature of the surface. Usage per square meter is about 0,25 – 0,35 liter (depending on surface and details).

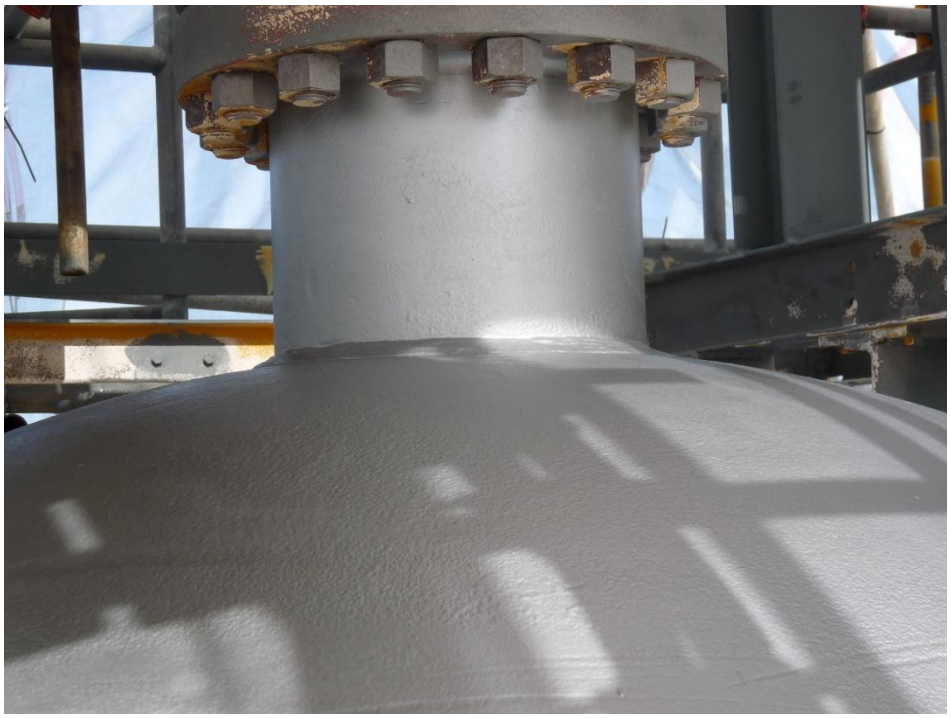


Rust Grip being applied around details with brush and roller with 5-10 cm overlap

Rust Grip applied on heavily affected areas

Application of Rust Grip by roller and brush

First layer (left) and second layer (right)



Top completed

Second section from top completed

Application of HSC insulative coating

Hot Surface Coating is a ceramic pigmented insulative coating, designed to block heat transfer from hot surfaces up to 175 degrees Celsius. In this case 10 mm of HSC will be applied on the surface to reduce the surface temperature with 35% and save on energy for heating the MDEA gas absorber.

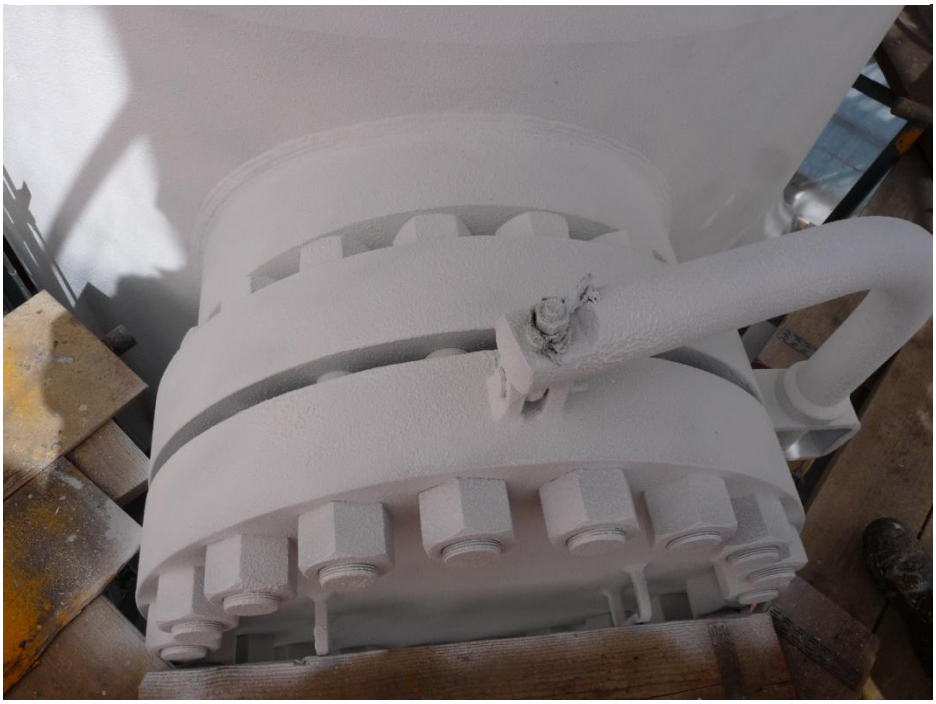
The product is being applied with a 57 liter Graco pressure vessel with a RTX Texture spray gun. The Hot Surface Coating is build up in roughly 4 layers: first layer with a 3 mm nozzle between 1,5-2 mm, additional layers with a 4 mm nozzle around 3 mm until 10 mm is reached

First layer of HSC at 1,5 mm

First layer HSC top complete

Hot Surface Coating will be applied directly over manholes, trunnions and valves, which ensures a seamless insulation layer around the vessel which prevents insulation ‘leaks’ and (salt) water contamination of the treated surface.

HSC applied on manhole



HSC applied on manhole

After the 10 mm thickness of the HSC layer is reached, the surface can be smoothened for esthetical reasons. For this a trowel can be used.

Surface partly troweled (left)

Top level after trowelling

Enduroof

When the surface is more or less smooth and completely dry, the protective top layer Enduroof can be applied. This will ensure a durable, protective and watertight layer to prevent moisture penetrating the insulative layer and the treated surface of the vessel. Enduroof is an elastic polyurethane roof coating with a 25 year water barrier certification.

First layer of Enduroof

Top completed with Enduroof

The complete system will be top coated with the elastic protective polyurethane top coating TOP-E which ensures a smooth finish, UV- and weathering protection of the system. This coating can be tinted in any desirable RAL color. In this case GDF has chosen to leave it transparent.

System completed with transparent coating TOP-E

The advantage of this system compared to other more traditional insulation systems is that the system will keep its insulative value, doesn't degenerate and doesn't allow water to reach the treated surface anymore, which will help preventing any corrosion under insulation.

Conclusion

The vessel is now insulated and protected against further corrosion for many years. The surface temperature of the vessel is decreased from around 70-80 degrees Celsius to a more acceptable level of around 40-45 degrees Celsius. Temperatures have been reduced around 40%, which is in line with the expected temperature reduction stated in the COT report where a 36% reduction of temperature has been measured with a temperature of 70 degrees Celsius.

The total application time was 4 weeks (10th of august until 9th of September 2012) including 8 days of stopping time caused by failure of a compressor, welding activities around the vessel and problems with a spray gun.

Several temperature readings of the vessel (on untreated surface and on completed system):

Temperature reduction of 45%

Temperature reduced by 40%

Contacts

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