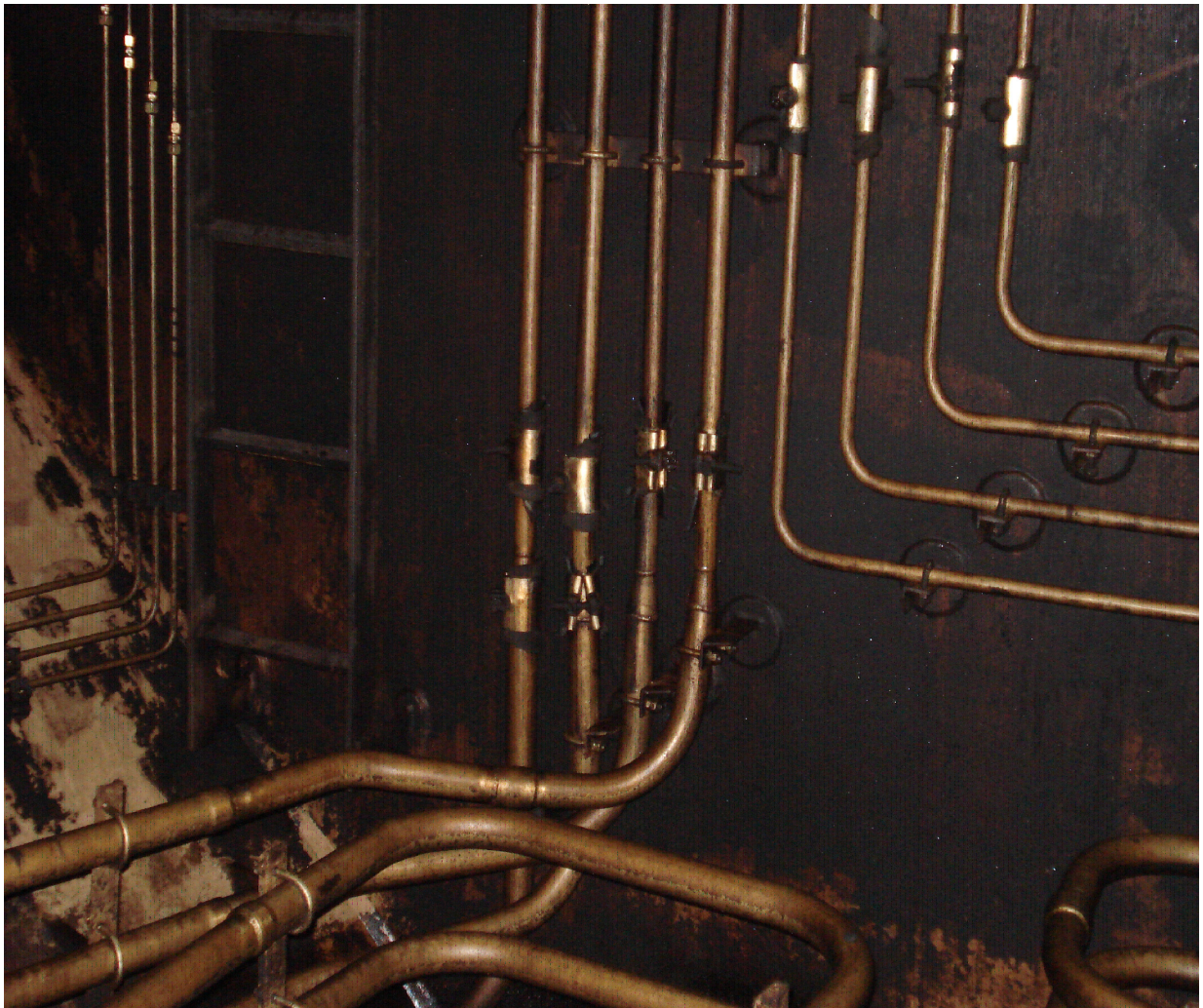


Heating Coils - Tank

Application:	Repair of Heating Coils
Place:	Lisnave, Portugal
Date:	October 2006
Job and report done by:	Assens Shipyard Ltd, Denmark
Wencon products used:	Hi-Temp, Reinforcement Tape, Cleaner, appl. tools

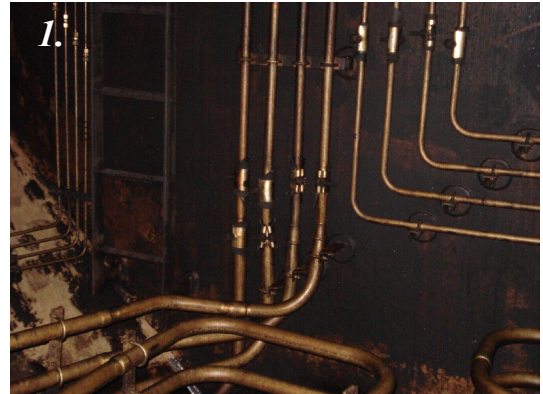


Introduction:

A total of 379 holes in heating coils, had to be repaired using Wencon Hi Temp Coating and Wencon Reinforcement Tape. 80% of the holes found in welding seams by the sleeves. All holes marked by the crew, to ensure that all holes are being repaired.

Repairing:

- Return pipes dismantled after emptying for water (before ventilation)
- Oil removed from the surface using engine cleaner.
- Surface grinded rough using sand paper grit 60.
- Surface cleaned with 90% alcohol.
- Applied 1 layer of Wencon Hi Temp, using a brush with half the bristles cut.
- Wrapped Wencon Reinforcement Tape around, in the wet Hi Temp – 50% overlap.
- Applied 2nd layer of Wencon Hi Temp.
- Applied until 3 layers of Reinforcement, Tape and 4 layers of Wencon HiTemp.



SB/BB tanks are pressure tested, and repairs approved by the crew. All repairs were tight – not leaking.

Minimum 80% of all repairs were done on pipes on vertical bulkheads.

Number of repairs done where:

Tanks:BB 1	20 rep.	SB 1	18 rep.
BB 2	25 -	SB 2	18 -
BB 3	17 -	SB 3	32 -
BB 4	19 -	SB 4	44 -
BB 5	28 -	SB 5	13 -
BB6	57 -	SB 6	23 -
BB slop	15 -	SB slop	47 -

Total repairs – 379



Choose the relevant surface preparation, according to the nature of the job. Seek advice from a Wencon Technician if needed.

Specification for surface preparation for Dry Applications

Defined as applications, where the Wencon product will be applied to a surface at a temperature minimum 3 degrees above dew point. Use the Wencon Products: Wencon Cream, Wencon Rapid, Wencon Coating, Wencon Ceramic Cream, Wencon Ceramic Coating, Wencon Hi-Temp, all requiring a dry surface.

1. Blast the machine part to SA 2 ½ using sharp-edged blasting media, to a roughness of min. 75 microns.
2. Leave the part for sweating out salts in a warm place for at least 12 hours or heat it up to 30 - 40 °C (86-104 °F) using gas torches.
3. Blast again to SA 2 ½ immediately prior to the application.
4. For parts containing lots of water and salt, it may be necessary to repeat 2. and 3. until the surface remains light grey for at least 2 hours after blasting.
5. Always use Wencon Cleaner prior to application.

Specification for surface preparation for Wet/Damp Applications

Defined as applications, where the Wencon product will be applied to a surface at a temperature less than 3 degrees above dew point. Use the products Wencon UW Putty, Wencon UW Cream and Wencon UW Coating for applications on wet or damp surfaces.

1. Water jet the entire surface with water and sand to a standard equal to SA 2½, as described above.

Specification for surface preparation for Emergency/Temporary Applications

Perago Treatment

Perago is a rubber disk with hard steel spikes mounted on the periphery. Perago can be mounted in a normal drilling machine, and gives a surface close to a blasted surface - clean and rough with sharp edges. Perago dishes can be ordered at Wencon and at all Wencon Distributors.

Grinding

Wheel grinding is often an acceptable surface preparation for emergency applications, where shot blasting is not possible. When grinding use a coarse stone or flap. Use the Wencon Cleaner before and after grinding. Grinding with sandpaper or emery cloth is only advisable when, for example, carrying out shaft-repair on a lathe. Often the grinding will not hit the dents.

Needle Gunning

Needle gunning is a method that has almost been forgotten in recent years. Or should we say is mostly used for very rough cleaning or removal of rust. It is possible to do a very nice job using a needle gun, but it takes time and should be closely supervised. It is essential that the marks from the sharp needles cover the whole surface so that none of the original surface remains. It is recommendable to steam clean the surface before needle gunning.

Wire Brushing

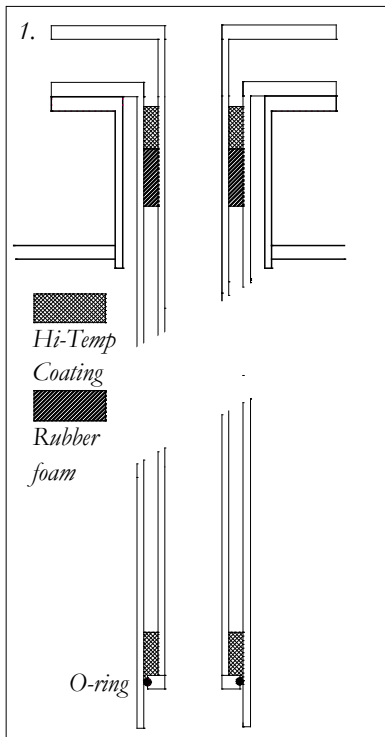
Wire brushing can be a good way of removing scales, rust and old paint. However, you will need to grind the surfaces after the wirebrushing to make the surface as rough as possible.

Pipe repair - heating coils, thermal oil pipes

Heating Coils often corrode in the upper tank area, approximately ½ -1 meter (20-40 inch) beneath the tank top.

This area is normally very difficult to reach, and demands the use of scaffolding from inside the tank.

Below you find an alternative method of repairing this kind of damage from the deck-side. The repair method is simple, you cast an insert pipe into the original pipe by injecting Wencon Hi Temp, which also helps to delay the Bi – Metallic corrosion.



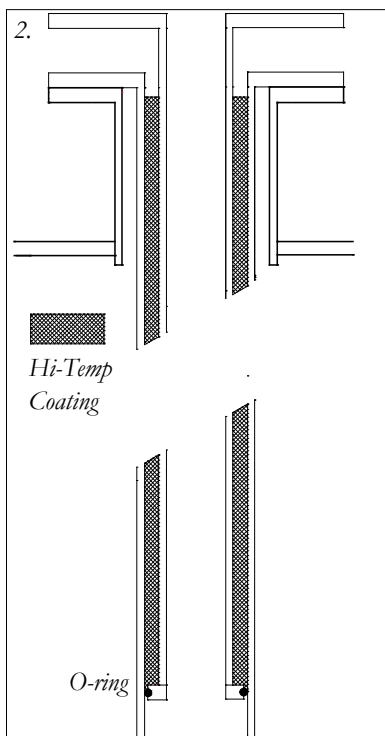
The insert pipe off course will reduce the flow in the heating medium, so it has to be considered how much this will effect the heating capacity.

An insert pipe is prepared, 2-3 cm (0,8-1,2 inch) smaller in outer diameter than the inner diameter of the original pipe, and in a length about 20 cm (8 inch) beneath the damaged area. In the bottom of the insert pipe there has to be a groove for an O-ring, to seal for the later injected Wencon Hi Temp Coating. You can make the insert pipe with a flange in the top or without. You only have to be sure that the insert pipe will not fall down in the original pipe during the curing process.

If you find large holes in the original pipes, you have to use method 1, if no leaks we suggest you use method 2.

Method 1

1. Slide in the insert pipe. If you choose a flange in the top on the insert pipe, leave approximately 10-15 cm (4-6 inch) free for injecting.
2. Mix Wencon Hi-Temp Coating and fill it in a standard cartridge for a “sealant-gun”.
3. By means of a thin-walled steel- or plastic pipe mounted on the gun, a layer of 5 cm Coating is injected in the bottom area between the two pipes.
4. Remove the filling-pipe, and push in a layer of approximately 5 cm (2 inch) of rubber-foam to form a seal between the two pipes, and force it down 5-10 cm (2-4 inch) under the flange surface.
5. Fill the remaining gap between the two pipes with Wencon Hi-Temp. If the insert pipe has a flange, use Wencon Hi Temp coating as a sealing compound between the old and the new flange.
6. Let the coating cure for 8-10 hours.
(The rubber-foam is used, to prevent coating leaking into the tank-area through holes in the damaged surface)



Method 2

1. Slide in the insert pipe into the original pipe.
2. Mix Wencon Hi-Temp Coating and fill it in a standard cartridge for a “sealant-gun”.
3. By means of a thin-walled steel- or plastic pipe mounted on the gun, fill up the gap between the two pipes.
4. Let the coating cure for 8-10 hours.

In principle it is possible to use this form of repair-procedure, even for full tanks, as there will be no contact between the repair material and the cargo. There is also no explosion-hazard, as no heat or sparks are made during repair.