



Report following lining of Fire suppression pipes on M/Y Dynasty

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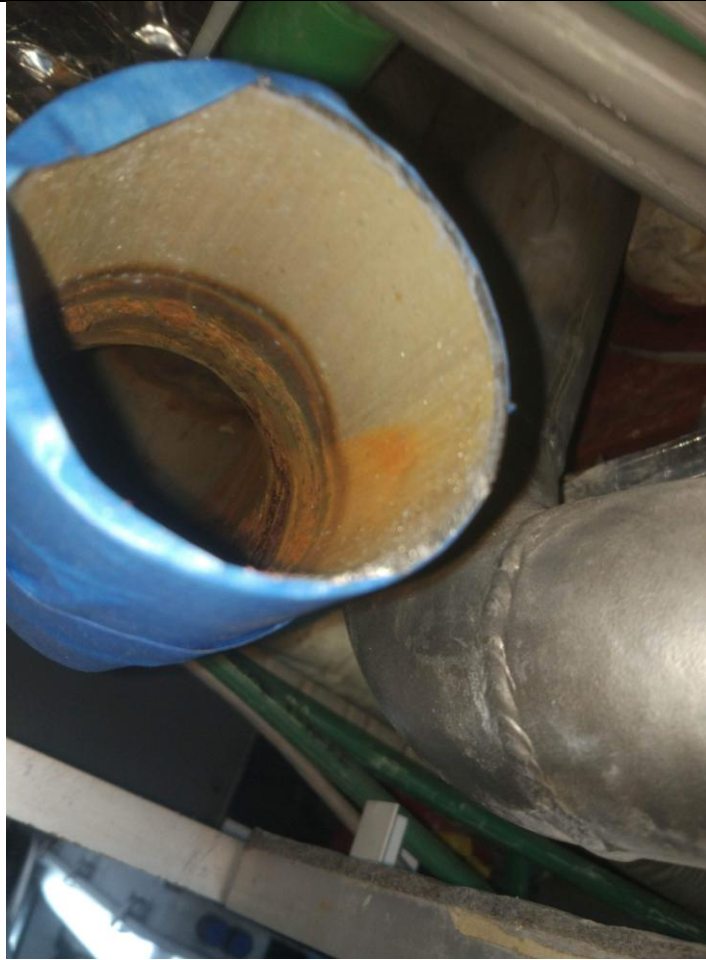
Background

Two 2" fire suppression pipes located in the ceiling area of the Engine room were suspected to be leaking resulting in pressure loss on the system. .

The pipes pass through the bulkhead under the floor above which made repair and replacement difficult and disruptive.



Pipe access was good in the ceiling of the engine room



50mm Pipe Showing internal corrosion in the welds



Potential point of leakage at butt joint

Lining

R2 Pipetech technicians were able to solve this problem for the customer without causing any damage to the vessel . Firstly the team inspected the condition of the corroded pipes and assessed the nature of the problem. Broscope camera inspection revealed corrosion on the welded joints and possible leaking points on the butted joints

The team cleaned and restored the pipes state using abrasive tools which removed the corrosion and scale and created a surface profile for the lining to adhere. A second inspection was conducted to ensure the pipe was prepared, clear, and ready for the liner to be installed.



Mechanically cleaning the Pipe

Following the Cleaning procedure, the pipes were then heated ensure no moisture remained in the area and ensure the humidity levels are within the parameters to accept the coating. The Coating material was conditioned and dispensed ready for mixing.



Temperatures and dew point all within acceptable limits

R2 Pipetech's lining Epoxy was used to line the prepared areas. The liquid Epoxy was applied the system to evenly coat the interior of the pipes, forming a smooth barrier between the pipe and water. Extra time as spent working the coating into the welded joints as this was the area suspected of leaking.

This barrier coating was then cured before final inspection confirmed that the system was restored to the highest standard of quality.

. The process was applied to each pipe in adherence with an Inspection Test Plan monitoring the key stages; Drying, Cleaning, Lining, Curing and Final inspection. The table below summarises the key details with the application also setting out the minimum requirement where applicable.

- 1) Existing condition
- 2) Post initial manual cleaning
- 3) Post curing epoxy lining

Pipe	Date of Lining	Drying	Cleaning			Lining	Curing		Final Inspection
		Duration (mins)	Mechanical abrasive Cleaning	No. of Coats	Profile achieved	Exit pipe temp (°C)	32°C (mins)	Ambient (hours)	Satisfactory
P1	1/2/20	Overnight	ST3	1	Yes	24.9	15	19	Yes
P2	2/2/20	3hrs	ST3	2	Yes	23.5	15	19	Yes
Minimums		3.hrs				23.5	15	19	

Each batch of epoxy resin mixed was done in strict adherence to the following mixing process:

- Dispense the calculated quantity of epoxy through set to a temperature of and a ratio of 4:1 by volume
- Thoroughly mix for 5 minutes using a slow speed mixer until material temp reaches at least 32°C
- Allow the mixed material to stand for a 10 minute “induction period” to permit out gassing
- All mixing to be completed in a dry moisture free environment

Pipe	Date of mix	Batch Numbers		Quantity (g)	Mix		Epoxy mix temp (°C)
		Part A	Part B		Start time	Finish time	
P1	1/2/20	501csrg	501csgrh	500g	15.30	16.10	23
P2*	1/2/20	501csrg	501csgrh	500g	15.30	16.10	23
P1	2/2/20	501csrg	501csgrh	500g	09.30	10.10	22
P2*	2/2/20	501csrg	501csgrh	500g	09.30	10.10	22
P1	2/2/20	501csrg	501csgrh	500g	13.40	14.10	24
P2*	2/2/20	501csrg	501csgrh	500g	13.40	14.10	24

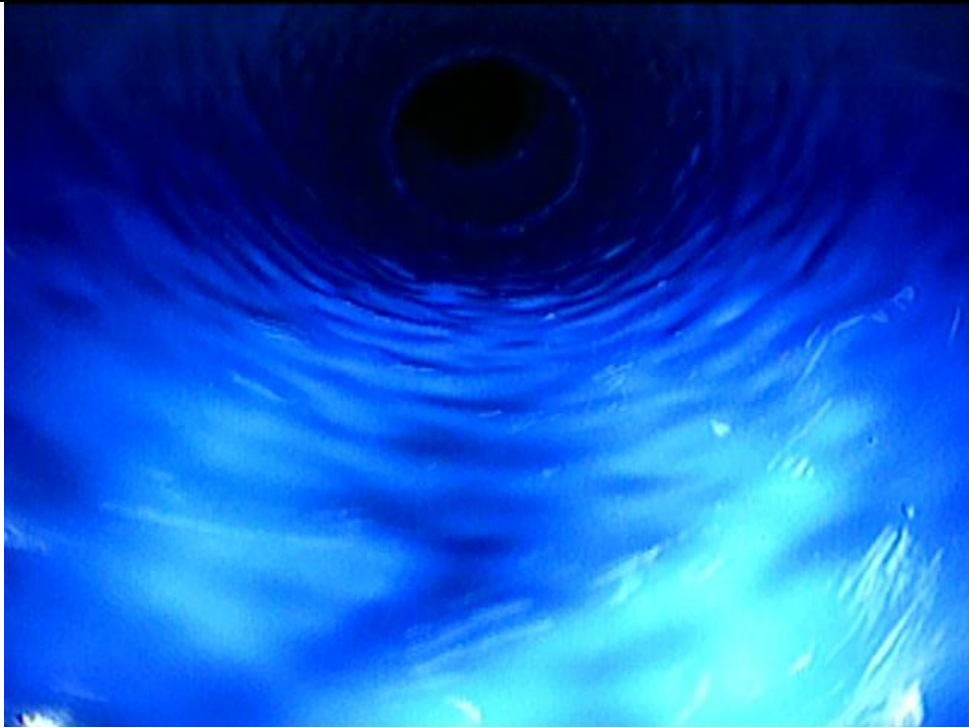
*One mix for both pipes due to close proximity.

Conclusion

Each of the pipes were inspected using the borescope after allowing the epoxy to cure overnight. Each inspection found the condition of the epoxy resin lining satisfactory. The welded joints were fully overcoated in the areas suspected of pitting. Three coats were applied to each pipe to ensure full coverage in the areas suspected of leaking.



Welded joint showing good monolithic coverage



Post Lining Boroscope picture

Attachments

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