

HOMC APPLICATION NOTE-3

Corrosion Assessment at Simple Resting Supports



Corrosion at Simple Resting Supports

Uninsulated or bare piping resting directly on structural steel or over soil with a round bar have resulted in repeated corrosion problems posing high risks for pipe leaks. The geometry of bare piping resting on structural steel or on the ground with a corroding round bar provides a crevice that allows water to be trapped.

Since the paint system is designed to withstand atmospheric exposure and not immersion service, it softens over a period of time under the influence of trapped moisture. Eventually the pipe protective coating fails due to pipe movement on structural steel surface exposing the bare steel surface to water (which is often with high chlorides in a saline environment such as encountered in the middle east region or on offshore platforms) and starts to corrode. The crevice holds moisture and consequently results in accelerated corrosion rate. It is worthwhile noting that even if the pipe and support are made from same material such as carbon steel, the metallurgical difference can provide a small potential difference to drive the formation of a corrosion cell. Crevice corrosion thus leads to a potentially hazardous situation for the piping system.



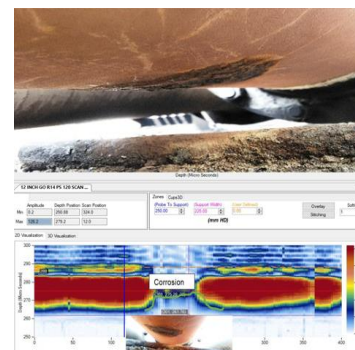
Challenges to Simple Resting Support Inspection

The main challenge to such inspection is the ability to size the corrosion reliably as many systems detect the same. Sizing is related to pipe size, accessibility, shape and nature of corrosion. The ability to size deep pitting on general / gradual corrosion. Corrosion at elbows and pipes that are closely spaced pose challenged to inspection. Visual inspection is not useful if corrosion does not extend beyond the point of resting.



HOMC Guided Waves as Reliable Solution

The Higher Order Mode Cluster (HOMC) Ultrasonic Guided waves can be deployed axially in through transmission mode (AHOMC-TT) for pipes with access to the region of interest such as elevated pipes, elbows etc. Pipes with no access to the bottom or closely spaced pipes can be inspected from the top with probes at 2 and 10 'o' clock positions Circumferential HOMC in TT Mode (CHOMC). Not only the depth of wall loss but the profile of corrosion is also determined with extreme high sensitivity to the deepest wall loss. The sizing accuracy is in the range of 20-80% Wall loss. It can be deployed from 2inches and above pipe sizes



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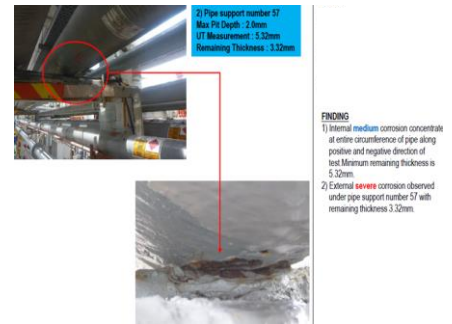
Corrosion Assessment at Simple Resting Supports



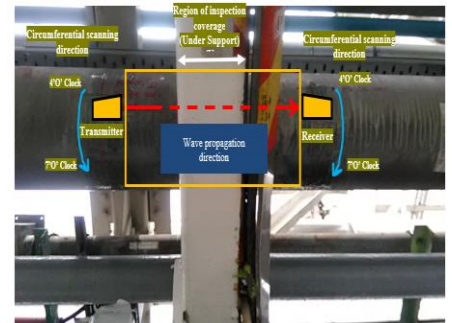
HOMC INSPECTION of 12inch Hydrocarbon Line

A 12inch Pipe in service had been inspected earlier by Visual inspection and pit depth and UT adjacent to the support in the accessible region was obtained. Wall loss identified though severe (3.32mm remaining) did not reflect the potential deepest corrosion due to access issues. The wall loss thus had to be estimated reliably for suitable engineering assessment for pipeline fitness for service.

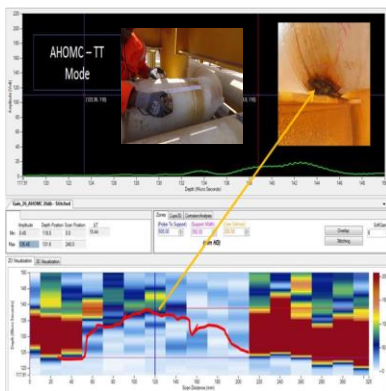
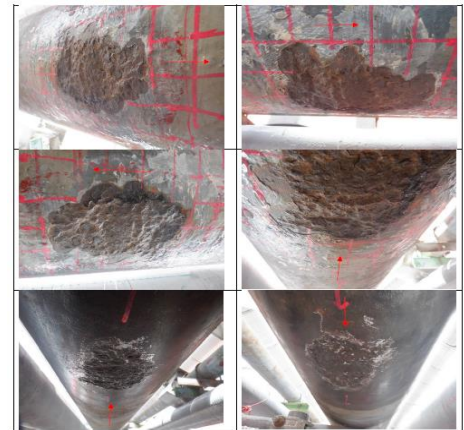
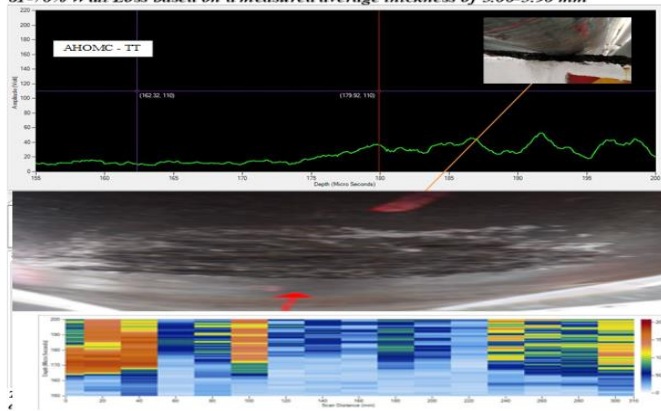
Axial HOMC (AHOMC) in the through transmission TT Mode was conducted and the severity of wall loss was estimated to be much more severe than originally estimated previously. Wall loss of up to 61-70% of a reduced average thickness of around 5.0mm (general corrosion in the pipe) was determined. Remaining thickness of around. Predicted remaining wall thickness by HOMC was 1.5-1.95mm. The severity determined on lifting the pipe matched the same with a few localized deeper spots within 10%.



FINDING
 1) Internal medium corrosion concentrate at entire circumference of pipe along positive and negative direction of least Minimum remaining thickness is 5.32mm
 2) External severe corrosion observed under pipe support number 57 with remaining thickness 3.32mm.



61-70% Wall Loss based on a measured average thickness of 5.00-5.90 mm



Note: The deepest corrosion profile between the two probes seen across the pipe circumference is as highlighted in red.

HOMC Inspection of 12inch Pipe with Corrosion at Elbow on a resting support

A 12 inch pipe with corrosion at the support near the elbow of the pipe was inspected with Axial HOMC (AHOMC) in the TT Mode 51-60% Wall Loss based on a measured average thickness of 9.30-9.50 mm was estimated along with the cross-sectional extent across the circumference as well. The client could take decisive action for mitigation of the corrosion based on HOMC results

HOMC

**RELIABLE- PRECISE -ACCURATE
 FOR CORROSION ASSESSMENT AT SIMPLE SUPPORTS**