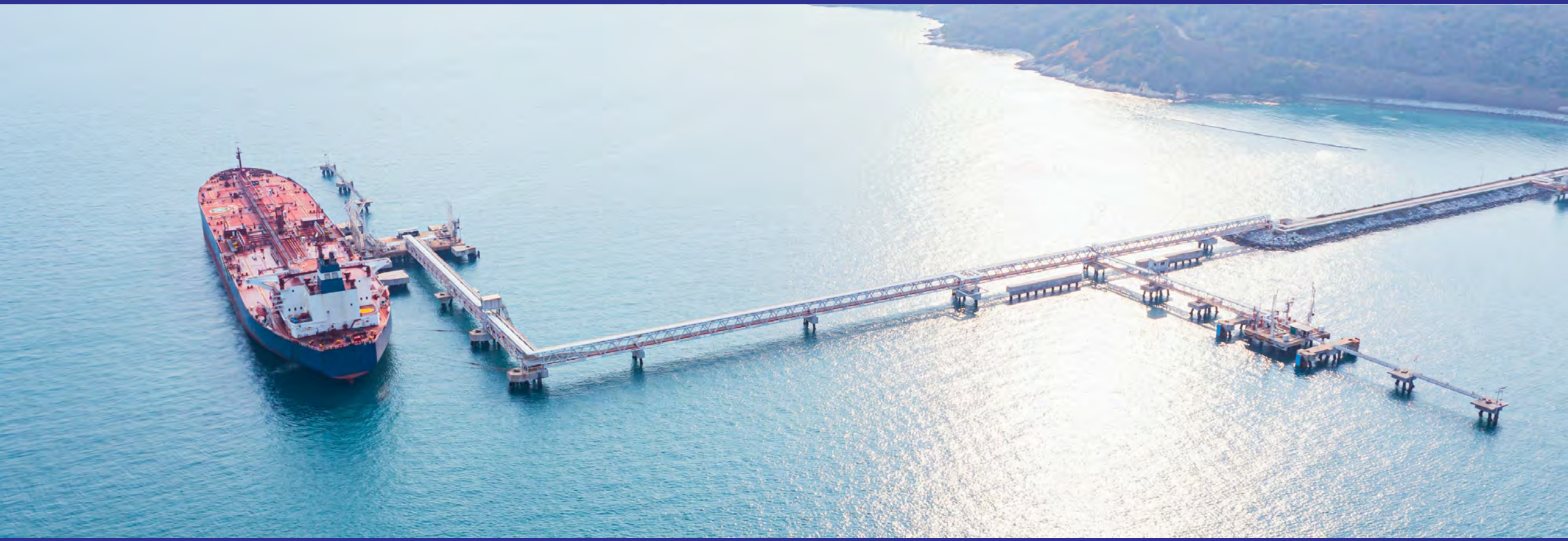


EARLY DETECTION OF CORROSION IN JETTY LINES



PROACTIVE INTEGRITY MANAGEMENT THROUGH REMOTE MONITORING

2025

BACKGROUND

INTEGRITY MANAGEMENT OF JETTY LINES



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- ◆ Jetty facilities enable seaborne refineries to import crude & feedstocks and export finished products and intermediates. These pipelines can be several kilometres long.
- ◆ Exposure to harsh marine conditions, including sea spray, increases the risk of external corrosion, alongside internal corrosion from transported materials.
- ◆ Access for regular inspections is limited, difficult, and costly. Unplanned maintenance disrupts refinery operations, with significant operational and financial implications. Loss of containment poses environmental and reputational risks.
- ◆ **Proactive integrity management is essential** for the safe and efficient transfer of fuel, chemicals, and other materials between ships and shore.

GUIDED WAVE MONITORING

JETTY LINE MONITORING WITH gPIMS®

In 2022, a client installed gPIMS® sensors on multiple pipelines beneath and alongside a jetty structure to support integrity management. This case study focuses on one of these pipelines.

16"

Crude Oil
Line

12.7 mm

WT
(Wall Thickness)

3.17 mm

Corrosion
Allowance

Ex

Installation
Area



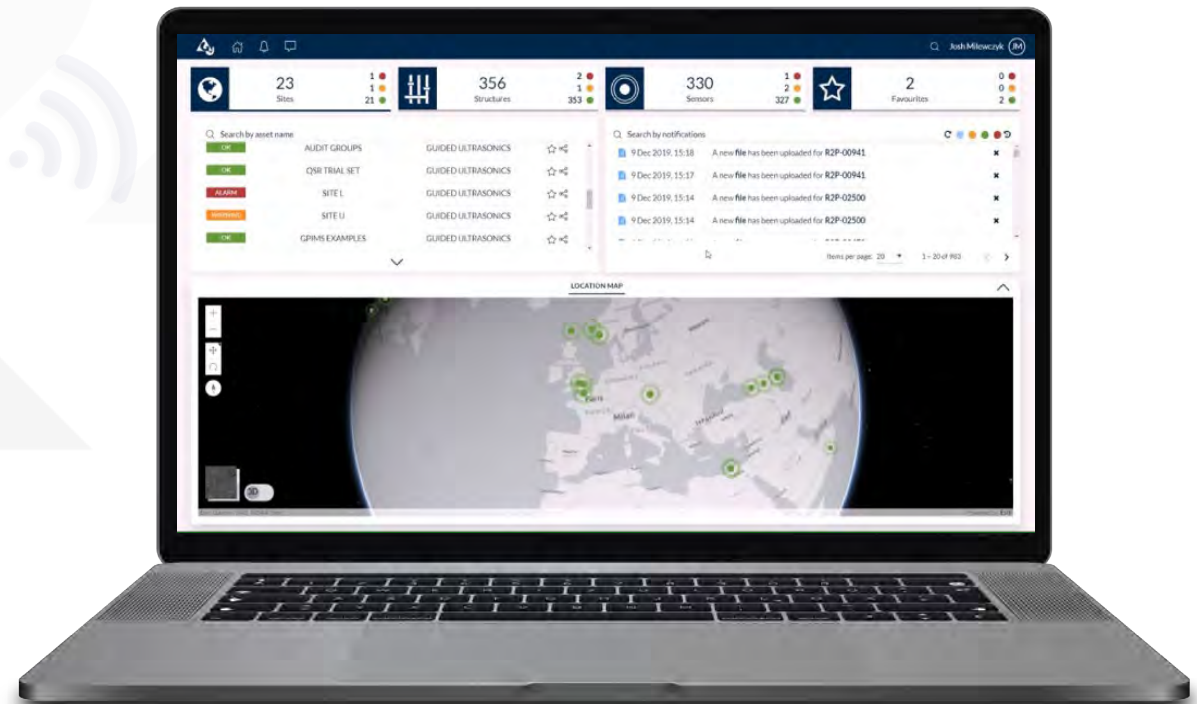
GUIDED WAVE MONITORING

SENSOR TO INFORMATION

The system delivers frequent data via a Wi-Fi connection provided by a Field Control Unit (FCU) directly to the desk of the client's corrosion engineers. The information from the sensors is accessed via the browser-based **GUL Monitoring Studio**.



PIMS® FCU



GUL MONITORING STUDIO

WALL THICKNESS MONITORING

Wall thickness measurements underneath the sensor remained stable throughout the monitoring period, showing there was no threat from generalized internal corrosion.

SENSOR SEGMENTS



☐ SELECT ONE SEGMENT

DESELECT ALL

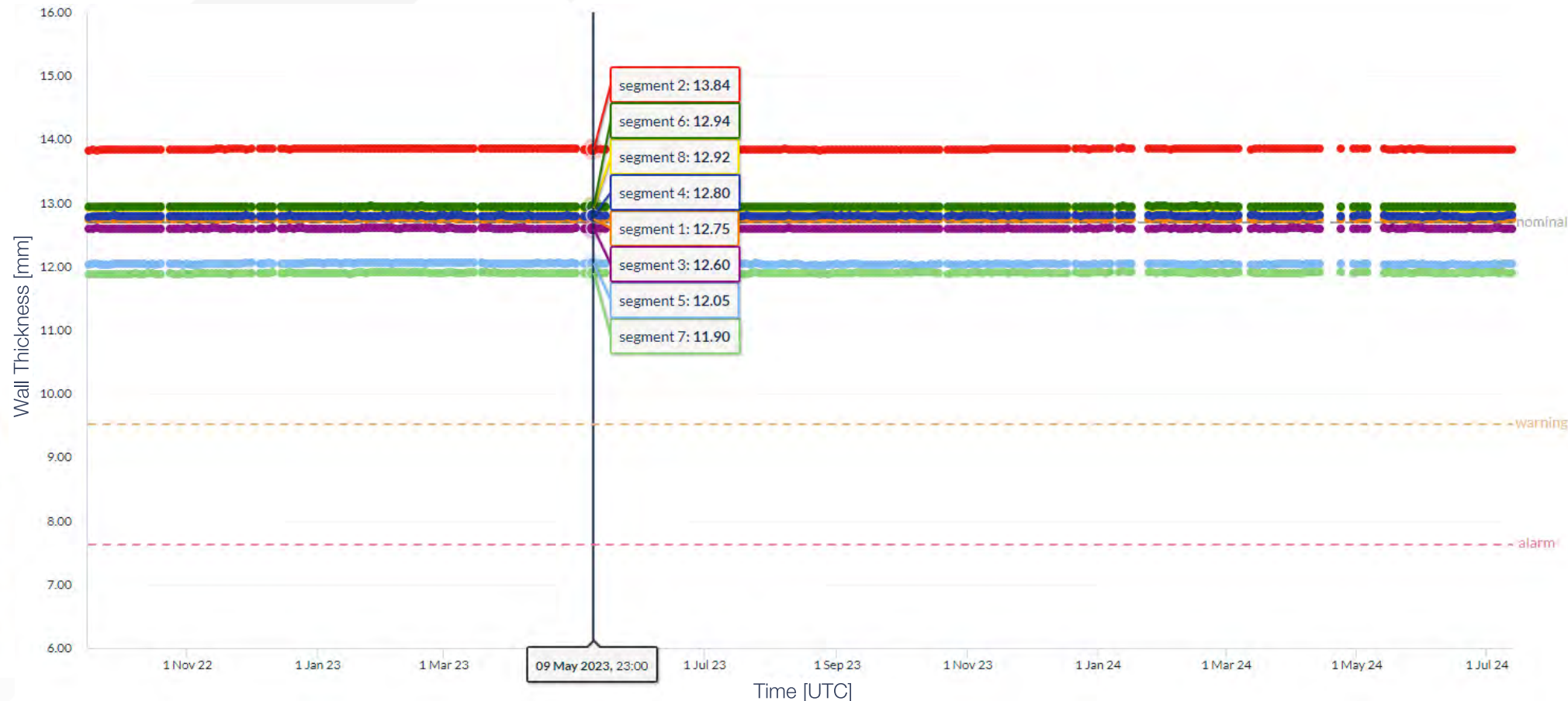
SELECT ALL

Minimum segment: 7

Minimum: 11.87 mm

Mean: 12.73 mm

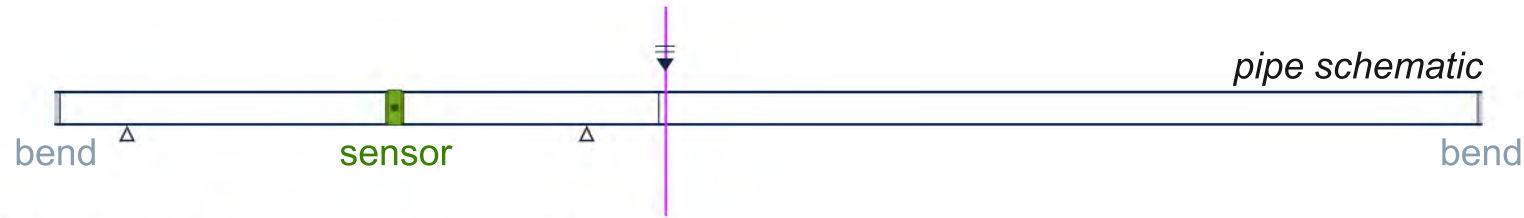
Max: 13.87 mm



GUL MONITORING STUDIO

AREA MONITORING

Approximately 1.5 years after installation, an alarm was raised in **GUL Monitoring Studio** as increasing cross-section changes near a weld exceeded the **warning** level and reached the **alarm** threshold.

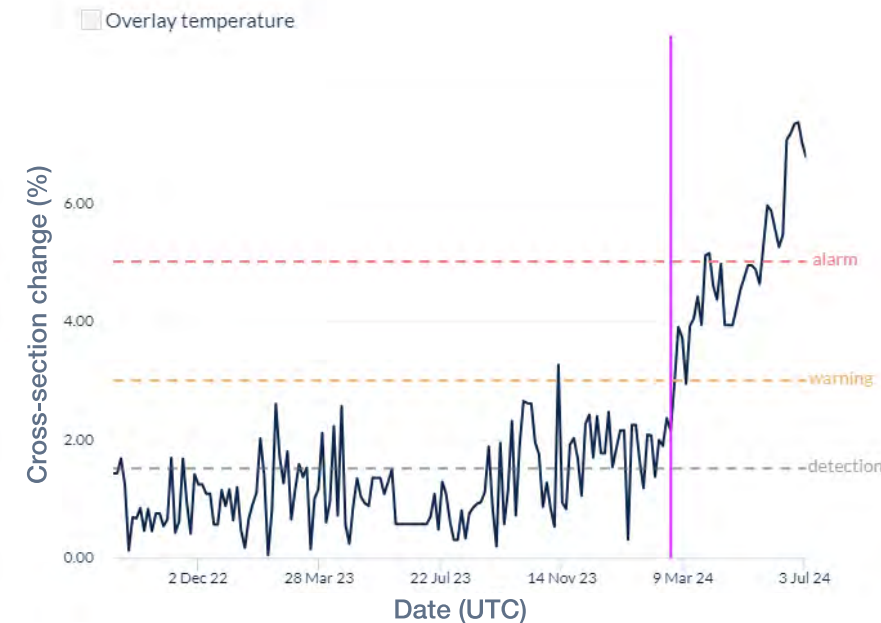
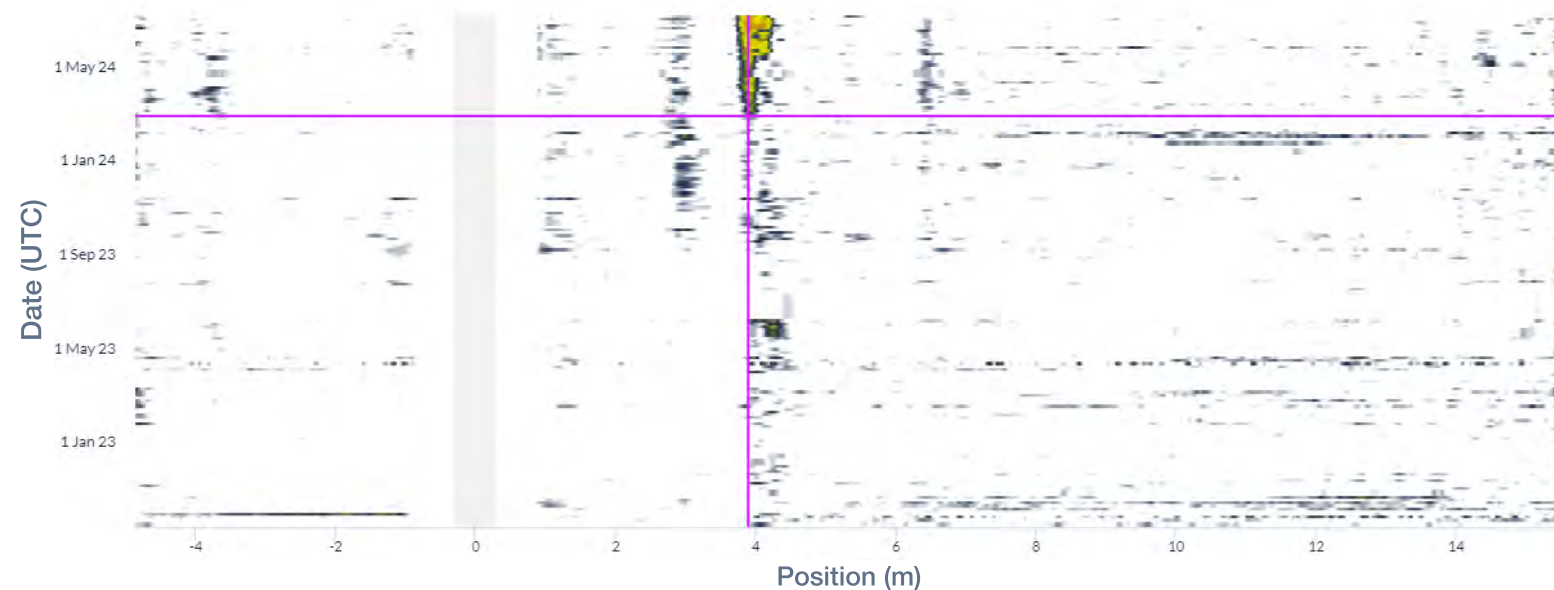


EXPORT CHARTS ▾

● Residual ○ A-Scan Position: 3.88m Date: 26 Feb 2024, 18:11

Zoom 1w 1m 1y All Reset zoom

From: 13 Sep 2022 To: 05 Jul 2024

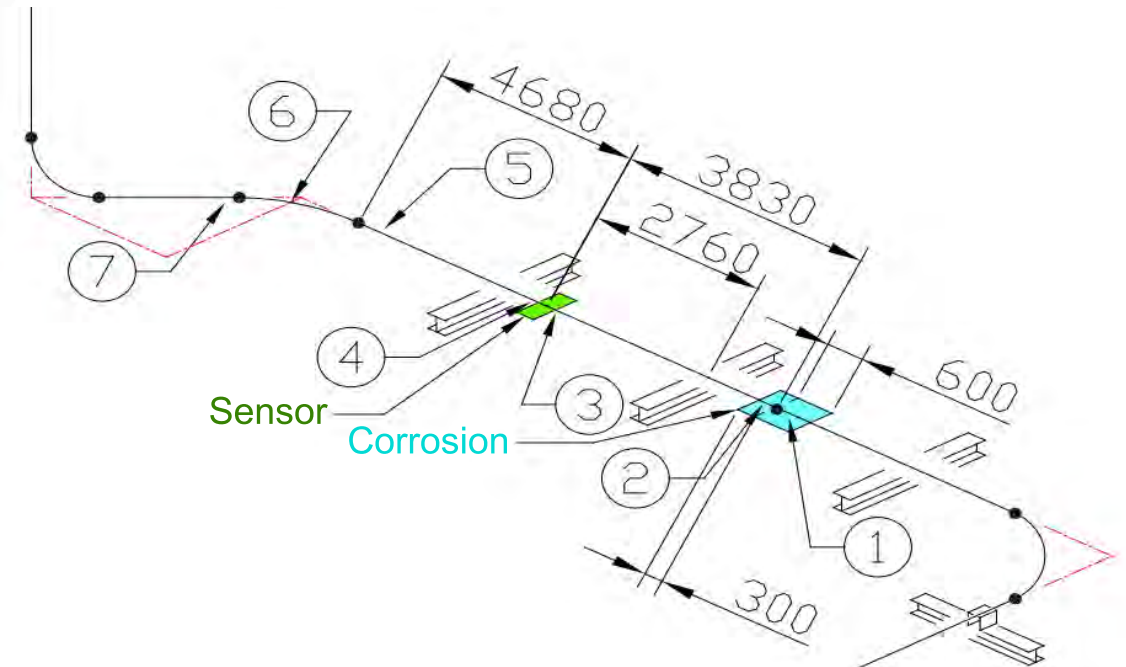


ON-SITE VERIFICATION

FOLLOW-UP INSPECTION

Visual follow-up inspection revealed corrosion scale in the area of the weld. The scale was removed and the area around the weld inspected:

- ♦ Visual testing: ~ 1–3 mm wall loss in the affected area
- ♦ Ultrasonic testing in area ①: minimum WT **10.8 mm**; in area ②: minimum WT 11.2 mm



OUTCOME

BENEFITS OF AREA MONITORING

~ 250,000 cm²
Area Monitored
by Single Sensor

♦ Early Detection

gPIMS[®] monitoring identified active corrosion before corrosion allowance limits were reached, enabling timely follow-up inspection and targeted maintenance.

♦ Wider Coverage

Located beneath the jetty and above water, the pipe is difficult to inspect visually. Even when accessible for inspection, corrosion beneath coatings can be missed.

Corrosion can develop anywhere along a pipeline. However, local monitoring methods, such as coupons and UT point monitoring, cannot detect damage outside their measurement locations.

In contrast, gPIMS[®] provides frequent pipe condition data without requiring physical access for each measurement, while detecting cross-sectional changes from either internal or external corrosion over an extensive area.

In this case, a single sensor monitored a pipe area of approximately 250,000 cm².

♦ Targeted Maintenance

Follow-up inspection recommended cleaning the affected area and reapplying a coating suitable for marine environments.

Early detection helped prevent more extensive, costly, & unplanned maintenance that could have restricted jetty capacity and resulted in lost refinery profits.

♦ Reduced Risks

gPIMS[®] detected corrosion that could otherwise have gone unnoticed, enabling timely follow-up and helping to reduce the associated operational risks.

Without area monitoring, this corrosion could eventually have resulted in loss of containment, with potentially serious consequences including environmental pollution, regulatory non-compliance, reputational damage, and loss of stakeholder confidence.



Technology you can trust.

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