INSPECTION + MONITORING = PROCESS OPTIMIZATION

Inspection plays a critical role in identifying corrosion before it leads to failure, downtime, or safety risk. As infrastructure ages, inspection strategies must deliver not only adequate coverage, but reliable data that supports sound operational decisions. Traditional inspection methods can leave gaps in coverage and limit the ability to accurately track corrosion rates over time. This case study describes how a Gulf Coast petrochemical plant reassessed its inspection program after multiple tank failures and implemented a comprehensive robotic inspection and monitoring approach to increase corrosion visibility and asset reliability.

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THE CHALLENGE

The facility relied on annual manual UT inspections focused on selected areas of an aging tank. Despite this approach, corrosion remained undetected, resulting in three failures over a five-year period, including one outside the inspected zones.

2

THE SOLUTION

The asset integrity team transitioned to 100% robotic UT inspections to achieve full coverage of the tank. Fixed sensors were installed at critical locations to measure daily corrosion rates and gain a better understanding of the impact of operations.

3

THE BENEFITS

Inspection time and cost were significantly reduced, while inspection quality and data reliability improved. Since implementation, no failures have been reported, and the team is actively using the data to manage corrosion and extend asset life.

The Challenge

A petrochemical plant in the Gulf Coast, USA, previously employed a manual inspection program on a 12’ x 80’ tank more than 15 years old. These manual UT thickness inspections utilized a grid strategy in what they deemed “critical” locations across the asset, measured one time per year.

Over the last 5 years, the asset experienced three leaks/failures. Two of the failures occurred in the gridded/inspection areas, and one occurred in an area that was not annually inspected. This prompted the asset integrity team to move to a full (100%) robotic thickness inspection of the entire tank.

As a part of the FMEA (Failure Modes & Effects Analysis), the Asset Integrity Team found two issues:

1. Manual inspection was not sufficient in coverage of the asset’s critical (or non-critical) locations
2. Manual inspection was not sufficient in providing a viable corrosion rate to discern operability of the asset (due to accuracy & sample size/lack of meaningful data)

The Solution

The Asset Integrity Team elected to move from an annual manual inspection strategy to a tri-annual fully automated/robotic, 100% health/UT thickness scan of the tank. In conjunction with this new inspection, the Asset Integrity Team would identify 'critical locations' based on a red/yellow/green heat map (thinnest locations red, thickest locations green) and place fixed sensors in those locations monitoring once per day to produce a corrosion rate to 0.001" accuracy.

Based on the corrosion rates from these sensors, the Asset Integrity Team then overlays thickness data with operational data to discern when, where, and how corrosion activity compares to process operations. The primary objective is to enhance process optimization via corrosion remediation or asset life extension. Secondarily, to predict maximum useful asset life and plan maintenance/replacement schedules accordingly.

The Benefits

The manual inspection strategy yielded three failures (each of which cost the facility >$1MM/failure in downtime & repairs), and is outlined below:

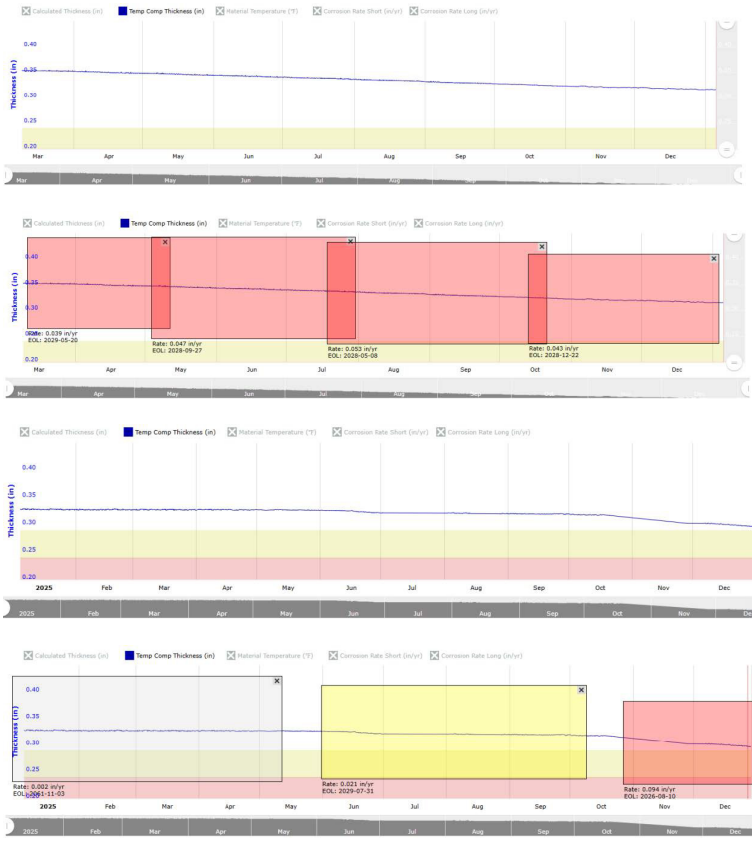
Manual Inspection:

- Time: 5 days w/ 2-person crew (80 man-hours)
- Annual Cost: ~$32,000
  - Scaffold/ladders/preparation: ~$25,000
  - Labor: ~$7,500

*3 incidents costing >$3MM

Automated Robotic Inspection + Sensors:

- Time: 2 day w/ 2-person crew (16 man-hours)
- Annual Cost: ~$17,000 ($50,000 / 3 years … tri-annual inspection/monitoring)
  - Robotic Inspection: ~$25,000
  - Sensors: ~$25,000 (Sensors are reusable/redeployable, so only a one-time cost)
- 0 incidents reported
- Asset owner is actively working with operations to remediate corrosion/extend the life of the asset (see data on the right)



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