

The Specialist – “sharing through experience”

Machines Vessels Piping Materials Fired Equipment Civil Structural Inspection Electrical Instrument Control Process Safety Projects

Pipework Integrity

“Are you focussing on the right areas, are you in control?”

The sheer scale and complexity of pipework on a process plant makes managing its integrity far from straightforward. Especially as many pipework systems are exceeding their original life expectancy.

Risk based approaches to pipework integrity management require a thorough knowledge of piping: by knowing its design basis and failure modes we can target inspection and remediation efforts effectively.

Many standards and guidelines are available, including:

API 570 Piping Inspection Code

API 571 Damage Mechanisms affecting Fixed Equipment in the Refining Industry

EEMUA Publication 206 Risk Based Inspection Guide

However, further work is required to turn the advice of these standards into a practical integrity management strategy.

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Corroded pipe leads to refinery explosion

“Refinery unit shuts down.....Permanently

Background

- A leak of ethylene at a US refinery earlier this year was attributed to corrosion at a pipe support.
- The resulting explosion shook homes for miles around.
- No one was hurt.
- Closure of the unit resulted in '40' lay-offs as the cost of rebuilding the unit was not economically justifiable.



A typical pipe support detail showing “hidden” corrosion

Investigation

- Moisture was trapped between the pipe and a metal sleeve on which it rested, leading to corrosion.
- The pipe was inspected every five years.
- The piping inspection programme had not adequately included inspection at pipe support locations.

Key Elements

1. Some design features, e.g. pipe supports, can encourage external corrosion.
2. Typical piping inspection schemes focus on average or “representative” wall thickness measurement.
3. There is a need to deal with local features which can cause accelerated corrosion.
4. But, how do we determine corrosion rates and retirement dates for these cases?
5. The piping integrity management programme needs to balance remediation as well as inspection, so that risks are adequately managed.

“If you change the way you look at things, the things you look at change”, Wayne Dyer