Failure Analysis & Root Cause Analysis

Develop Practical Risk Mitigation Strategies After a Failure or Loss of Containment

Every plant is focused on achieving safe and reliable operations; however, equipment failures and loss of containment issues do occur. You need answers and you need them quickly. You need a team who can provide immediate answers, outline practical recommendations, and offer corrective solutions.

Our Materials & Corrosion team has decades of plant experience and access to state-of-the-art laboratory equipment to help you understand the cause of the failure and identify proper remediation strategies. We conduct a complete failure analysis to help ensure a rigorous assessment provides correct, actionable conclusions and recommendations.

What is a Failure Analysis and Root Cause Analysis?

The full value of your failure analysis comes from Equity Engineering's unique combination of engineering expertise and damage mechanisms knowledge. Applying the practical recommendations and information outlined in an Equity Engineering failure analysis or root cause failure analysis will support continuous improvement at your plant.

FAILURE ANALYSIS

A failure analysis or metallurgical analysis helps you understand what happened or what could happen in the future. During a failure analysis, our team will identify the damage mechanisms responsible for the failure of a piece of equipment, loss of containment, or the material degradation of near miss.

➔ OUTCOME

Our team conducts Level 1 and Level 2 (API RP 585) failure analyses that include lab investigation, tests, and microscopy to understand the damage mechanisms.

We identify the material properties, damage progression rate, and proper remediation strategies, all important factors for fitness-for-service (FFS) assessments and incident investigations.

ROOT CAUSE FAILURE ANALYSIS (RCFA)

An RCFA is a process to identify the most basic cause of a particular failure and use that information to develop practical corrective or mitigation strategies. Using an experienced materials and corrosion engineer to conduct the RCFA is critical to ensuring a quick and accurate conclusion.

➔ OUTCOME

An RCFA is a rigorous, formal Level 3 (API RP 585) incident investigation. The results are typically related to organizational culture, management, and procedures.

The goal is to identify the physical and immediate causes (metallurgical), root cause (procedural), and contributing causes (what made failure worse).

Case Study

Loss of Containment Failure Analysis Leads to Robust Engineering Practices

Industry:
Midstream Oil & Gas

Type of Asset:
Brazed Aluminum Heat Exchanger (BAHX)

Location:
USA

Issue:
The failure of a complex BAHX resulted in a loss of containment and significant downtime at the terminal. The client was unclear what caused the failure and what the risk levels were for potential failures in similar equipment.

Solution:
We provided immediate onsite support to help the company's internal investigation into the failure. While onsite, we collected samples for a metallurgical analysis and performed an expedited failure analysis. The analyses confirmed the suspected cause of failure – thermal fatigue along with other damage mechanisms observed but not immediately responsible for the failure. As a result, we identified fabrication practices, operating modes, and past repairs which also played a significant role in the failure.

Result:
Equity Engineering developed an engineering practice for the client to mitigate similar failures. Based on the robust engineering practices, the client realized increased reliability in the operation of the BAHX equipment and increased confidence in similar equipment at other facilities.

Benefits

- **Make informed run, repair, or replace decisions**
- **Improve damage mechanisms growth, propagation rate, and damage progression rate predictions**

"POSITIVE EXPERIENCE, ACCOUNTABLE, PROMPT, AND INSPIRES CONFIDENCE IN THEIR FIELD OF EXPERIENCE. **THANK YOU FOR THE QUALITY SERVICE YOU PROVIDE.**"

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EMERGENCY SUPPORT +1.216.658.5444
VISIT E2G.COM
CONTACT OUR TEAM SALES@E2G.COM

TECHNOLOGY FORWARD
P: +1.216.283.9519

EQUITY ENGINEERING