



# Failure Root Cause Analysis

## Context is key...

While knowing the failure mechanism is important, it is only by understanding the process conditions that led to failure that steps can be taken to prevent future failures.

## Tetra Engineering

Have delivered field and analytical services to combined-cycle plants and conventional boilers for over 25 years, including performing over 550 HRSG inspections at client sites around the world.

## Contact Us

For more information please call our offices or visit our website.

[www.tetra-eng.com](http://www.tetra-eng.com)



## How and Why Did It Fail?

Components are known to fail in a variety of ways and can have serious implications for the overall system. We call on an interdisciplinary team of accredited experts to identify the type of failure and to establish how and why it happened.



## Testing & Analyses

Physical Testing:

- Visual Examination and Macro Photography
- Metallography
- Fractography
- Chemical Analysis
- Tensile and Fatigue Testing
- Hardness Tests
- Scanning Electron Microscopy
- Energy Dispersive Spectroscopy

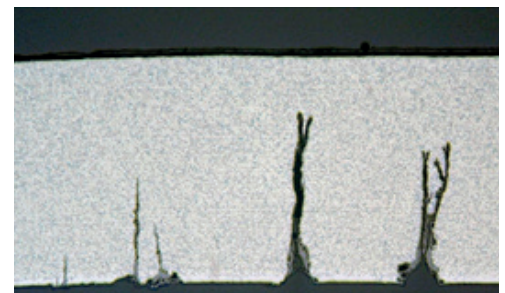
Supporting Analyses:

- Operating data Assessment
- Finite Element Analysis
- Thermal Modelling

## Decisions and Actions on:

Along with identifying the cause, we follow through with clear advice:

- Fitness-for-Service
- Methods of Repair
- Changes to Operations
- Component Redesign
- System Modification



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