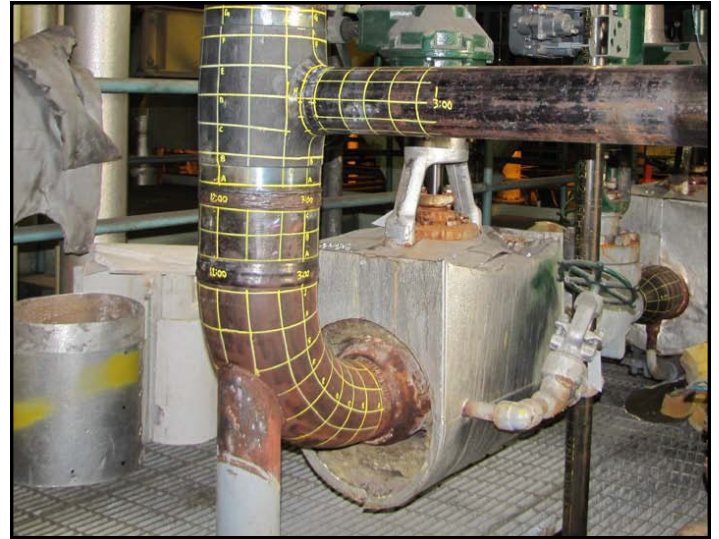


SMART NON-DESTRUCTIVE TESTING



When your plant is down, time is money - lots of money! If you had the right damage or repair assessment plan on-site within the scheduled outage time window, that foresight would save your company money.

The benefits of on-site evaluation of nondestructive testing results are:

- Rapid damage assessment
- Direct conferencing and decision making
- NDT quality oversight as a third party QA/QC
- Repair and welding quality oversight
- Focused NDT with less redundant or unnecessary testing

With a knowledgeable metallurgical engineer on-site during the outage, any questionable conditions that the NDT team uncovers can

be reviewed immediately with direct examination of the damage. A face-to-face conference with the plant personnel will lead to more informed and efficient decision making. Upper management can be brought in and critical damaged addressed correctly the first time.

The engineer provides oversight to verify proper quality assurance and testing methodology, as well as supervision of component and test location selection. This expertise leads to confidence in the NDT results and the decisions that are based on them.

Once the damage has been assessed and a plan of action chosen, the engineer will provide quality assurance for the repairs. He or she will review the proposed repair and welding procedures, the welding quality, and



the final NDT acceptance tests. Our engineers know the NDT methods and their expected flaw and defect results and can identify the probable damage mechanisms on-site.

Along with on-site outage NDT and repair support, M&M Engineering also offers on-site metallurgical testing:

- Replication
- Field microscopic analysis
- Hardness testing
- Alloy identification (PMI)

Please call any of our engineering staff to discuss your next outage support needs.

Case Study

In the case demonstrated by the HRSG duct burner photograph

above, an M&M engineer was on-site with an NDT crew when the plant opened the HRSG to find a huge section of internal wall casing blasted away by leaking fuel gas. Our engineer was able to do the visual NDT himself, find 3 of the 4 duct burner fuel lines cracked, fractured, or with a very poor quality weld. The plant personnel were able to talk with the engineer about “why” this had happened (thermal cycling on poorly designed fillet welds with poor quality). The engineer was then able to observe the welders, advise them about weld quality, and assist in getting good welds back in place quickly. The plant engineer was comfortable starting back up with the problem fixed and no extra outage time was needed.



For additional information contact:

Ron Lansing, P.E.
(503) 706-8124
Ron_Lansing@mmengineering.com

Jon McFarlen
(512) 407-3773
Jon_McFarlen@mmengineering.com