HTHA Demystified

HIGH TEMPERATURE HYDROGEN ATTACK (HTHA)

WHAT IS HTHA?

High Temperature Hydrogen Attack (HTHA) is a condition that can occur in process equipment exposed to hydrogen at elevated temperatures and pressures over time. Hydrogen reacts with carbides in steel and can manifest into internal decarburization and fissuring including molecular hydrogen and methane accumulating at grain boundaries. Subsequent high localized stresses can lead to formation of fissures or cracking in steel, resulting in degradation of mechanical properties. HTHA poses a substantial threat of catastrophic failure if left undetected. The main factors influencing HTHA are hydrogen partial pressure, temperature, the duration of the exposure, and stress.

Carbon and low alloy steels are the most susceptible to HTHA but any process piping and vessels with the above combination are at risk.

ACUREN HAS MORE QUALIFIED HTHA INSPECTION TECHNICIANS IN CANADA AND THE USA THAN ANY OTHER NDE PROVIDER

ACUREN'S HTHA ARSENAL

ADVANCED SCREENING TECHNOLOGY

Throughout the industry, conventional methodologies have not proven effective at detecting early stage HTHA. Acuren has recognized this limitation, and has adopted a suite of advanced NDE screening methodologies that employ the latest in advanced ultrasonic equipment and techniques to accurately diagnose symptoms of HTHA:

64 ELEMENT PAUT

High Resolution Phased Array

- Sound is generated across the active elements when a voltage is applied, with increased firing power/elements, a greater resolution is achieved
- Greater resolution means the ability to see smaller indications that may not be detected using conventional ultrasonic methods and the ability to discriminate between single or clusters of smaller indications

TOFD

Time Of Flight Diffraction

- Diffraction-based method that measures the reflection of the indication body and diffraction of the sound wave at the indication tips making it a highly sensitive sizing technique
- A reliable screening tool for the early stages of HTHA
- Wide coverage area and useful for weld and parent material examinations
- Small data files
- Equipment is readily available and cost effective
- Needs to be performed in conjunction with other NDE methods to verify exact position and indication type

TULA

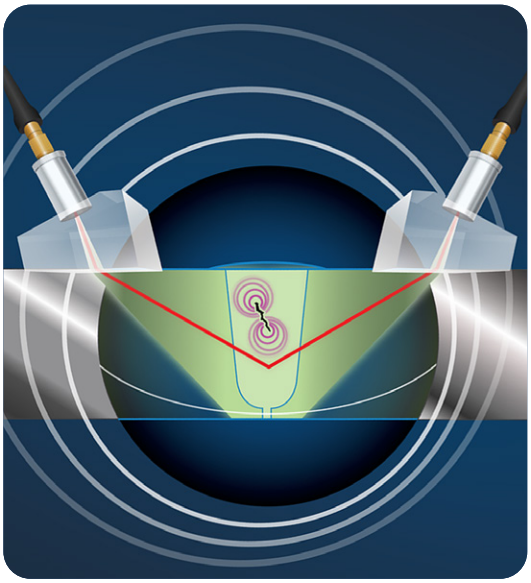
TOFD Ultra Low Angle

- Simple but highly sensitive means of detecting HTHA
- Scan speeds exceed Phased Array and TFM
- Probes with different specific focal depths
- Can be used in-lieu of TOFD where there is only room for one probe
- Operator training is essential

TFM

Total Focus Method

- Similar to PAUT, except one element fires and all elements listen for reflections
- Detects defects in many different orientations
- Good sensitivity to even small defects
- Very large data files
- Slower method than TOFD and TULA



IN-HOUSE ENGINEERS

Our in-house engineers can utilize the findings of the advanced NDE technologies in conjunction with Fit For Service (FFS) API 579 engineering evaluations to determine the best course of action for your assets. If early stage HTHA is suspected, the FFS can quickly resolve if the asset can continue to run, or determine correct inspection methods and intervals for mitigation of risk.

HTHA SPECIALISTS

The evaluation of HTHA damage is highly specialized and requires advanced HTHA training which may include 3rd party training or performance demonstration qualification examination recognized by owner/users. Acuren has more qualified HTHA inspection technicians in Canada and the US than any other NDE provider, a number of whom also hold rope access qualifications. We have the resources (personnel & equipment) to support customers across North America.

Because HTHA inspections aren't regulated, Acuren's combination of engineers, specialists and rope access experts can help take the guesswork out of your approach, assist you with designing a program that fits your specific equipment, and minimize your risk profile

WHY ACUREN?

- More bench strength than our competitors – equipment and personnel
- In-house engineering support
- In-house certified technicians, rope access capabilities
- We already perform work on many sites – familiarity of owner's facilities
- Experience – industry leading experts with 40 years of experience

Most companies have piping or vessels that are in hydrogen service at elevated temperatures and pressures with high probability of HTHA damage occurring. We have performed HTHA inspections on hundreds of sites across all industrial segments.

Contact us today to help you assess your risk, and design an approach to address your specific areas of concern.

ACUREN

CONTACT OUR HTHA EXPERTS TODAY

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BEYOND INSPECTION