



Case Study

Pitting Detection During Furnace Inspection

Introduction

Intero Integrity has been inspecting furnaces for more than 25 years with high resolution, ultrasonic technologies. Through our continuous effort to expand the information subtracted from the stored A-scan (detailed raw data) we now have proven the capability, utilizing our highly advance software to detect pitting corrosion in furnace tubes.

Intero Integrity was asked to perform cleaning and inspection on multiple furnaces that were previously decoked. The cleaning and inspection of these furnaces were a part of the critical path during the turn around and the client requested data delivery on site to determine the integrity of the furnaces as well as the amount of work needed to get the furnaces back online.

Intero also took all precautions for safety of the people, environment, and assets. In a very short execution period, the job was completed safely and in a timely manner while encountering little to no disturbances.

The Challenge

Furnace tubes in heaters are inspected during turn arounds to determine their condition in order to determine when replacement or repair may need to be scheduled. Degradation in most situations is limited to general corrosion but, in rare cases, pitting-like corrosion can occur. Detection and sizing of general corrosion is a usual capability of furnace inspection tools based on ultrasound technology. However, detection of pitting corrosion requires high resolution, ultrasonic inspection equipment; advanced data analysis capabilities; and highly experienced alert data analysts.

Furnace Characteristics:

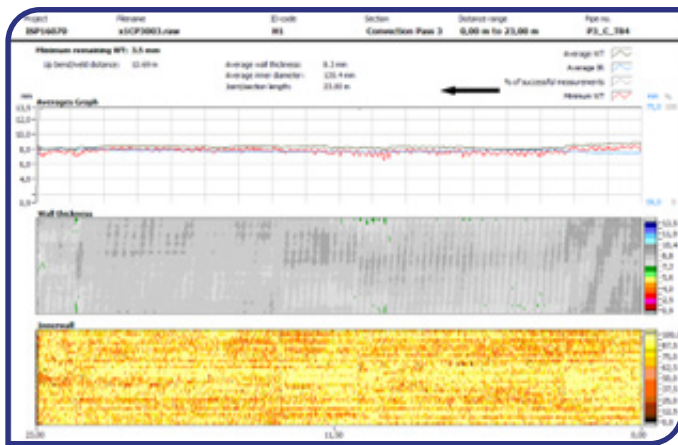
- Diameter: 6", 8", 10", 12"
- Passes: 4
- Length: 650m per pass

Results:

- Cleaning: 45 hrs
- Inspection: 10 hrs
- 3000 L of coke removed
- Anomalies found with a wall loss of 85 %

Solution

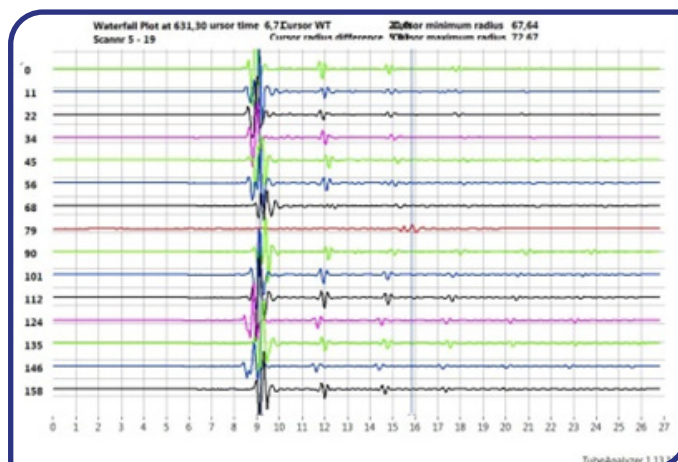
During the inspection of one of the furnaces, the initial data provided during the preliminary results did not show any major concerns (see below image).



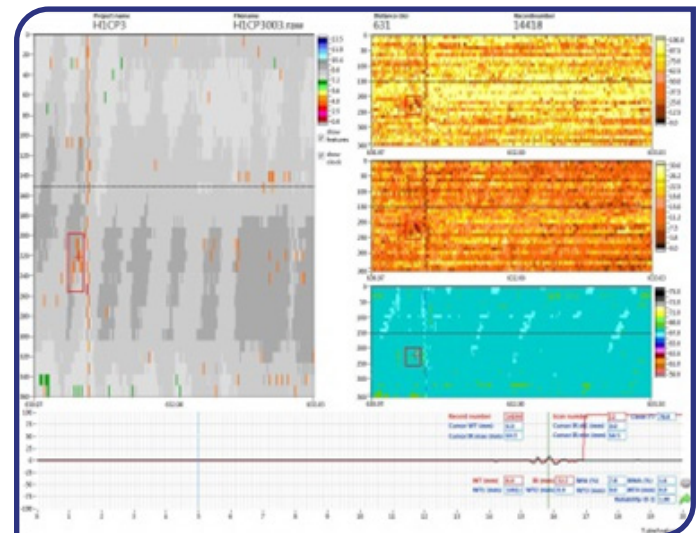
When assessing the data, our highly trained and certified (UT level 2) data analysts found local pitting using our recorded A-scan signal and advanced data analysis algorithms. Pitting corrosion is very unusual for these type of furnaces.



Actual picture of the tube with pitting corrosion.



As the client didn't expect this type of corrosion mechanism inside the furnace, experts were called at the head office for a detailed review. With the colored, detailed data presentations from Intero's data analysis and reporting software (see below) the pitting degradation could be confirmed. The client decided to replace the tubes. After evaluation of replaced tube from the furnace, a 100% correlation with the reported data could be verified.



Advantages

- Turnkey project decoking and inspection
- Advanced data analysis software capabilities
- Storing high quality, A-scan data
- Proof of lowest remaining wall thickness
- Time-efficient: inline furnace inspection during/after decoking, delivering instant results

