Octobotics Tech

UT System for Weld Joints & Weld overlay

A multinational conglomerate company utilized the Octobotics' Tech Automatic and Recordable UT system for weld joints & Weld overlay in pressure vessels.

Inspected Asset: Thick shell upto 8m diameter for use in manufacturing of coke drums, reactors etc.

Industry: Heavy Engineering/hydrocarbon

Challenges :

- Remotely located parts at height was challenging to access.
- Speed of inspection was usually very slow and cumbersome.
- Higher manpower cost and time for inspection.
- No robotic solution was available for autonomous weld overlay scanning.

Solutions :

Weld Sensei - Autonomous Crawler for Weld Scan using TOFD/PAUT.

Weld Navix - Autonomous Crawler for Weld Overlay Scanning

Results

- Two axis encoded scanning has been done with no-man intervention.
- Auto scanner provided with complete wireless environment. And inbuilt storage for the couplant (Water/Cellulose paste)
- Variable scanning speed as per asset condition and also crawler worked in semi-autonomous mode.

80%
decrease in total scanning time

>70%
Cost saving

90%
decrease in inspection labor and resources

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Challenges

A multinational company operational in heavy engineering/hydrocarbon industry manufacturing the pressure vessels like coke drums and reactors, ensuring their strength through weld inspections used to be a huge headache. The sheer number of welds, combined with the need to inspect massive weld overlays on their surfaces, made traditional manual methods slow and clunky. Reaching those awkward corners and high-up areas felt like climbing Mount Everest without a map. Adding to the challenge, their special non-magnetic weld overlays rendered their usual magnetic inspection robots useless. Manual scanning slows down production and increases labor costs. Also, Manual methods leading to the inconsistent identification and assessment of defects, For instance if any defected area is not marked during the inspection then it will be very challenging to locate that spot and make repairs. This subjectivity can result in variations in the acceptance or rejection of welds, impacting quality control measures.

After internal study they realized the need for autonomous robotic solution and conducted trials on several robotic solution available in market

Solutions

Achieving consistent and precise measurements manually can be difficult. Hence, To overcome such issues, MNC utilized the Octobotics' Tech Automatic and Recordable UT system for scanning of weld joints and weld overlays of the structures i.e., "WELD NAVIX "– An Autonomous Crawler for Weld Overlay Scanning and "WELD SENSEI" - Autonomous Crawler for Weld Scan using TOFD/PAUT technology. Both crawlers follow weld section autonomously using AI-ML algorithm while tracking the weld with the help of mounted high resolution camera and with their 2-section navigating capability on complex surfaces they can be used on bigger diameter dish-end overlay scanning. They were reached at the tough locations where no man can reach without any means of accessibility and do the dual axis encoded scanning with 50% overlap by marking the defected area with inbuilt color spray so that at the time of repair

Solutions (Continued....)

, it is easy to identify the spots and perform necessary repairs. They packed with the various safety features including anti-fall mechanism, low couplant alarm, low battery voltage alarm etc. to provide a hassle free operation.

These crawlers did their job in complete wireless environment performing A-scans along with B-scan as well as C-scan with inbuilt storages for the Couplant (Water/Cellulose paste) that is being used during the scanning, eliminating the need for more no. of equipment required in manual scanning, Also offer the convenience of remote witnessing to clients, allowing them to observe inspections in real-time, increasing transparency and convenience. Weld Navix and Weld Sensei operates at variable speed according the condition of the assets and provide more appropriate results while working in the semi-autonomous mode.

Results

Traditional weld checks were a pain in the neck,and difficult to reach all the nooks and crannies. Guess what? This MNC threw those worries out the window! They brought in these awesome robot crawlers, "WELD NAVIX" and "WELD SENSEI," that are basically AI ninjas for welds. These crawlers zip around tight spaces, scan every inch with super-accurate scanning, and even store their own couplant (water and paste). No more tangled hoses, and welds checked perfectly 10x faster, saving a bundle of cash in the process. Also Two axis encoded scanning has been done with fully automatic mode with no-man intervention. It's like a whole new game for weld quality in the industry – talk about game changers!

This MNC has raised the bar, welding a new standard for weld assurance. So next time you hear robotic whirring on a weld joint, remember the names "WELD NAVIX" and "WELD SENSEI" – the heroes who brought efficiency, accuracy, and a touch of robotic cool to the world of heavy engineering.