SUCCESS STORY

Monitoring Critical Refinery Pipes & Structures

Using state-of-the-art ultrasonic scanner assemblies to conduct inspection of oil refinery pipes, vessels and storage tanks to prevent leaks or structural breach and protect the safety of workers and the public

The Challenge

Oil refineries and petrochemical plants process crude oil or other raw materials/liquids into various usable forms through a variety of complex industrial processes. These plants typically have large vessels and tanks that are connected by vast networks of piping that carry streams of material in liquid, gaseous or slurry state. Maintaining these networks of vessels and pipes requires rigorous in-service inspection at regular intervals to ensure safety, reduce the risk of leaks or structural breach and avoid unplanned outages. In some plants, aging assets present a potential threat, requiring thorough and precise monitoring with inspection results that are readily available and reliable.

The Customer provides specialized on-site inspection services for companies in the refining, petrochemical, oil & gas and power industries. Plants want inspections to be thorough and accurate; additionally, plant operators want to minimize facility downtime. The Customer was seeking to differentiate their services by offering high-quality ultrasonic testing with rapid set-up and efficient inspection, and the ability to perform testing in more

Petrochemical plant at night

Industry: Energy / Petrochemical / Oil & Gas

Technology: Ultrasound

Products & Services: Portable automated scanner units for ultrasonic inspection of pipes and tanks

Customer Profile: A U.S. provider of in-service structural and safety inspection services to the refinery, petrochemical, oil & gas and power industries

Business Challenge: Technicians travel from site to site conducting inspection at refineries and petrochemical plans; they need easily transportable ultrasonic systems with rapid set up that can provide accurate inspection even in confined spaces

Solution: Compact scanner units featuring ultrasonic imaging technology and mechanical assemblies that can be attached to pipes and refinery equipment to perform rapid, automated testing in small spaces

Benefits:

- Scanner units are easy for technicians to transport and set up at each inspection site, maximizing efficiency, minimizing downtime and allowing the majority of time to be spent on inspection activities
- Both ferrous and non-ferrous piping can be inspected to a high degree of sensitivity
- Automated operation and data collection allows technicians to conduct real-time analysis, delivering relevant, actionable information to refinery maintenance crews right away, minimizing downtime
- Compact scanner units can operate in confined spaces, allowing refineries to more accurately determine appropriate replacement schedules of previously hard-to-reach equipment, thus avoiding unnecessary costs

challenging, hard-to-access areas. Ultrasonic testing offers a high-degree of sensitivity to both internal and external flaws in the piping, and it can also operate well on non-ferrous material, such as that used in many refinery systems.

In some refineries and chemical plants, vessels and process piping is not thoroughly inspected because inspection points such as pipe-support areas are inaccessible. To avoid the risk of failure in these critical points, plants institute automatic equipment replacement at designated intervals (e.g., every 12 years). Without being able to inspect pipes to determine their condition, it is safer to simply replace them. By offering new inspection capabilities, the Customer could save refineries money by allowing them to keep structurally sound equipment in service longer.

The Solution

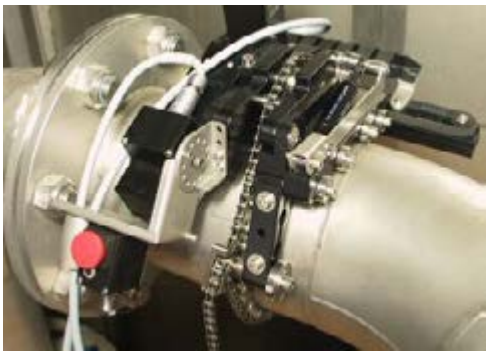
Adaptive Energy helped the Customer identify and deploy a unique ultrasonic scanner unit, working in partnership with FORCE Technology, a Danish research institute specializing in non-destructive testing innovation. The scanner unit selected was the Automatic Pipe Scanner 6 (APS-6), a robust and stable scanner that operates with high speed large strokes and several probes. The APS-6 is a chain-guided wheel XY scanner that can be used to perform inspection of pipes down to OD 100 mm and operate in confined spaces. It was designed with low-profile dimensions and geometric flexibility, primarily for inspection of non-ferromagnetic pipes.

The APS-6 scanner units that Adaptive Energy helped the customer deploy have proven to be easy for technicians to transport and set up at each inspection site, maximizing manpower efficiency.

The APS-6 is quickly and easily assembled from modular scanner components mounted on a scanner X-body with chain transmission. It has a standard Y-module and spring loaded probe holders, and the position of the chain guide wheels can be adjusted to fit the pipe diameter. The scanner has a free wheel X-direction encoder.

The scanner uses a guide chain and a transmission chain to ensure stable movement and attachment of the scanner to the pipe. The guide chain orients the scanner in the X-direction. The transmission chain is assembled by a device called a “chain lock” and afterwards tightened by activation of the scanner’s tension system. To avoid sliding of the transmission chain on the guide chain, two slide stops can be mounted on the guide chain.

To serve the petrochemical and oil & gas industries, FORCE Technology also offers the P-Scan AUS-3 Mini, a magnetic wheel ultrasonic scanner unit for inspection of ferrous pipes and pipe welds, and the APS-3 family of scanners, designed for use on Austenitic and carbon steel piping. The APS-3 scanners provide fast set up by a single operator and easy mounting with automated operation especially suited to challenging inspection tasks such as



The APS-6 confined-space ultrasonic pipe inspection scanner unit

by-pass systems (high radiation level), small pipes in penetrations (access problems), pressurizer safety/relief nozzles (restrictions) and off-shore corrosion mapping.

Results

The APS-6 scanner units that Adaptive Energy helped the customer deploy have proven to be easy for technicians to transport and set up at each inspection site, maximizing manpower efficiency. The scanner units are compact and can operate in confined spaces, allowing refineries to inspect pipeline areas that otherwise would be difficult to access such as the pipe support areas.

With more complete inspection data, refineries can make an informed assessment of safety and risk. They can accurately determine appropriate equipment replacement schedules, avoiding unnecessary costs, instead of having to simply replace components on a pre-emptive schedule because it is too difficult to determine their structural status.

In addition, the APS-6 scanner units are integrated with automated data collection and analysis software, which allows inspection technicians to assess pipe status in real time. By delivering relevant, actionable information to the refinery maintenance crews, they can begin addressing any potential structural integrity issues right away, minimizing system downtime.

About Adaptive Energy

Adaptive Energy creates customized, non-destructive material evaluation solutions to address mission-critical, time-sensitive testing needs. By combining the latest digital radiography, computed tomography, and ultrasonic imaging technologies with innovative mechanical and robotic assemblies, Adaptive Energy's integrated systems offer rapid deployment, are easy to learn and maintain, and perform reliably under pressure.

Working collaboratively with organizations in the aerospace, automotive, energy, petro-chemical, defense, infrastructure, and materials industries, our experts develop optimized solutions for flaw and crack detection, composite delamination, weld inspection, hardness testing, custom radiation enclosures and overhead gantry systems, and more.

Adaptive Energy is also the exclusive distributor in the U.S. and Canada of FORCE Technology's P-Scan ultrasonic scanners, including the P-Scan Stack with Phased Array, a next generation automated inspection system.

adaptive energy

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