Scanning and Data Collection Boost Weld QA

MICHAEL BELL
North American Director
Pemamek LLC

WITH NEW AND ADVANCED computer-controlled laser scanning capabilities used in automated robotic welding systems, there is a viable solution to collect accurate, usable data on every welded joint—before, during (in real time), and after the weld material is applied.

Good data in a searchable database format that's immediately accessible is helping welding and quality assurance (QA) technicians do their jobs better, and likely bringing them some peace of mind, too. Imagine not confidently knowing that the welds on a nuclear cooling tower, a windmill, or a naval ship hull are at risk for failure. This sort of thinking doesn't exactly encourage a good night's sleep.

Graphic of the Weld Groove Geometry

In this new laser scanning scenario, the operator of the automatic welding system essentially sees a graphical representation of the weld groove geometry on a display screen at any given point in the seam. It can be conveyed in several different ways, such as a groove fill graph. It presents and saves every piece of data, including speeds, fill volumes, temperatures, amperages, and more.

When companies transition from manual to automated welding, they are typically pleased to see the consistency of speeds, feeds, temperatures, and volumes, and that all the set parameters are being met at exactly the correct time and place in the process. This is the major advantage of automatic versus manual welding. In the cases where our customers are subcontractors to top tier suppliers or to OEMs, they have a newfound ability to provide this data to their customers' quality assurance departments. Depending on the critical nature of the part, reliable, accurate, and timely data delivery may be a requirement to win the contract.

Using new laser scanning and automated welding systems, the welding data is valid for every point along the joint, not just the section to be tested. The operator or QA technician can review the entire data log file and can see every fill, from the first time the arc is set, to every stop to remove the flux, to every restart to continue the weld. In the event of a rare occurrence of a weld failure, that data can be scoured for information to help avoid a more catastrophic event.

Key Benefits of Laser Scanning

The optimal case is catching problems before they happen. This is one of the greatest benefits of laser scanning. The technology "reads" the groove before the weld and after the weld from two separate angles, acquiring the geometry, speed, and fill data as the robot welder travels along the seam, creating the traceability function that welders have been wanting for many years. Alarms are set to sound or message when the weld goes out of tolerance of whatever parameter ranges are established in advance. The welding operator can go back and resolve the issue and let the customer know that a repair was made at an exact spot and time, and supply the weld application parameters as well. This sort of information exchange and level of service is tremendously valuable, both for part integrity and for solidifying customer relationships.

Another benefit of this new technology is having remote access to the welding data out in a wind farm, at the power plant or wherever the installation stands or floats. For example, the data can be stored securely in the cloud. The owner of the wind tower or ship hull in question is provided with a QR code associated with the weld that can be scanned by a QR code reader on a smartphone, allowing the specific data to be reviewed.

Customer demands for valid data streams will only increase in the future, given the robust trend toward data-driven manufacturing across all functions in a supply chain, including welding.