



Case study

Multi-process welding robot cuts weld time by up to 90 percent

SMW Group, Rockhampton QLD

Servicing, Maintenance and Welding (SMW) Group provides field servicing, maintenance and emergency repair and rebuild services to customers in Central Queensland. The team also provides complete plant and equipment management, supported by a range of mine site compliance activities.

In response to SMW's desire to make its large welding workshop more efficient, BOC and its integrator partner Robot Technologies-Systems Australia Pty Ltd (RTA) supplied and installed a unique robot welding system for adaptive maintenance welding of heavy mining buckets and dump truck bodies.

Jack Trenaman, SMW Group Managing Director, said: "Our welding robot has dramatically increased our production capabilities, improved safety and quality, and reduced costs. BOC and RTA have helped set us apart from our competitors – no one else is doing this type of work with robots in Australia."

The challenge

A downturn in profitability across the mining sector caused by decreasing iron ore and coal prices has placed increasing pressure on suppliers like SMW Group to reduce costs for mining and haulage equipment maintenance, repair and remanufacturing.

This was a challenge for SMW, as the maintenance and repair of buckets and truck trays required significant welding hours due to large quantities of weld metal and pre-heat temperatures of over 200°C. Safety measures to prevent operator injury, fatigue and heat stress also contributed substantial time and cost. With all this, it was not uncommon for a single dragline bucket repair to take upwards of 2,000 man hours of welding.

Automation of repair welding had not been considered a feasible solution due to the size and geometry of the equipment, as well as the damage, distortion and uneven wear of components.

"It wasn't until we met with BOC and RTA that we were able to find a solution that could meet the demanding welding procedures required for this type of work."

The solution

To kick off one of the most complex automation projects they had worked on to date, RTA and BOC conducted in-depth feasibility trials followed by an extensive research and development process – crucial to the ability to deliver a unique customised robotic system that suited SMW's welding procedures.

Utilising advanced laser seam tracking, adaptive welding software, a new generation welding system and a modular robot configuration, BOC and RTA built and installed the robot welding package and provided training for all SMW operators.

The portable robot cell is the most versatile multi-process welding robot in the world – comprised of a Kawasaki RA 15X robot equipped with a Servo Robot PowerCam laser camera and an EWM Phoenix 552 welding package, supplied exclusively by BOC. SMW's robot is supplied Argoshield from a BOC CRYOSPEED Mix Onsite system.

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Built on a modular base, the robot can be positioned on, beside or beneath the component being welded, and utilises real-time laser seam tracking to enable multi-pass welding and to cope with complex weld joint geometry. The welding solution and integrated software enable live monitoring and real-time analysis of welding procedures and data storage.

To minimise programming time, RTA developed world-leading technology to convert encoded data from a DXF file into data that allows the robot to scan and weld any type of weld geometry. The SMW operator only needs to 'teach' the robot where the piece was located in space; the robot then uses the laser camera to scan the part and build weld paths based on data in the DXF file.

The benefits

Since installing the welding robot, SMW has reduced its welding time by 70 to 90 percent. It has also reduced overall production costs, improved safety, quality and reporting, and broadened its range of work scope capabilities.

"We noticed the benefits straight away – our team can now complete a specific welding task in just 30 hours, made up of 20 hours of robot welding and 10 hours of man labour. That same task previously took 120 hours of man-only weld time.



"The real standout for our customers has been the consistently top quality of the weld – and greater quality assurance documentation. We can now access live detailed reports on temperature, gas flow, voltage and amps at any point in the welding process – all by logging in from a mobile device."

The robot has also eliminated the risks of fatigue, heat stress and working height restrictions, minimising risk of human injury and the need for ergonomic access planning. Commercially, it has boosted overall productivity, while reducing labour and associated personal protective equipment (PPE) costs.

"Everyone at SMW has witnessed the robot's potential and we're fully invested in setting it up for continuous success."

About BOC: BOC is a member of The Linde Group which supplies compressed and bulk gases, chemicals and equipment around the globe. The company develops safe, sustainable and innovative solutions for customers in many specialty sectors, heavy industry and medical environments. For more than a century the company's gases and expertise have contributed to advances in industry and everyday life, including steelmaking, refining, chemical processing, environmental protection, wastewater treatment, welding and cutting, food processing and distribution, glass production, electronics and health care. For further information, see www.boc-limited.com.au.

About Robot Technologies-Systems Australia Pty Ltd (RTA): Established in 1986, Robot Technologies-Systems Australia Pty Ltd (RTA) is Australia's foremost integrator of turnkey robotic automation systems, with proven experience in industrial robotics and manufacturing, process and factory automation. RTA has a diverse range of automation applications including materials handling, picking, sorting, packing, polishing, sealing, loading and unloading, fluid application, spray painting, all types of welding, palletising and depalletising, cutting, and vision systems... just to name a few. RTA specialises in Kawasaki Robots, Servo-Robot Vision Systems and Staubli Robotics, and we also offer support, service, repairs and maintenance for ABB, Kuka, Fanuc and Panasonic Robots. For further information, please contact RTA on telephone +61 (3) 9330 3511 or e-mail info@robots.com.au

About Servicing, Maintenance and Welding (SMW): Servicing, Maintenance and Welding (SMW) Group has been a proud Central Queensland provider of field servicing, maintenance, and emergency repair and rebuild services for over 10 years. The company provides complete plant and equipment management for projects large and small. SMW's management team has more than 60 years of combined industry experience and is recognised for efficient and quality service in assisting clients with servicing, maintenance and welding projects. The company supports this service by delivering a range of mine site compliance activities and providing experienced on-site and project based staff. SMW makes industry move.

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BOC Limited

ABN 95 000 029 729

Australia

131 262
contact@boc.com
www.boc.com.au

New Zealand

0800 111 333
customer-service@boc.com
www.boc.co.nz

Papua New Guinea

675 472 2377
sales.lae@boc.com.png
www.boc-png.com