

ENSURING STRUCTURAL INTEGRITY OF PIPELINES

Can you afford poor quality?



High cost of poor quality control

Australia's manufacturing industry was at its strongest in the 1960s, accounting for 25% of the country's gross domestic product¹. Australia manufactures a wide range of products - from food, textile, and wood, to metal products. Steel manufacturing has remained one of the main industries in Australian manufacturing, with an industry percentage of 19% since 2001.

One of the main uses of steel is for pipeline construction. Australia has a comprehensive pipeline network, which transports different forms of gas and other liquids such as oil, slurry and water. Pipelines are critical infrastructure for Australia and for the energy industry. Australia's first pipeline was built in the 1800s for transportation of water. There are more than 33,000km of gas transmission and distribution pipelines². Transmission pipelines transport natural gas from processing or storage facilities over long distances to domestic markets. These pipelines typically have wide diameters and operate under high pressure to optimise shipping capacity. Distribution pipelines deliver gas to industrial customers, cities and towns³.

Due to the high operating pressures and toxicity of transport material, it is of utmost importance that a high level of structural integrity is maintained. Over the years, pipeline failures ranged from leaks resulting in billions of dollars lost to catastrophic disasters causing injuries and deaths. In 2015, a leak from a pipeline in Canada spilled 100,000 liters of oil and gas into a lake. A recent incident in Taiwan saw a string of explosions from leaked propylene killing 30 people⁴.

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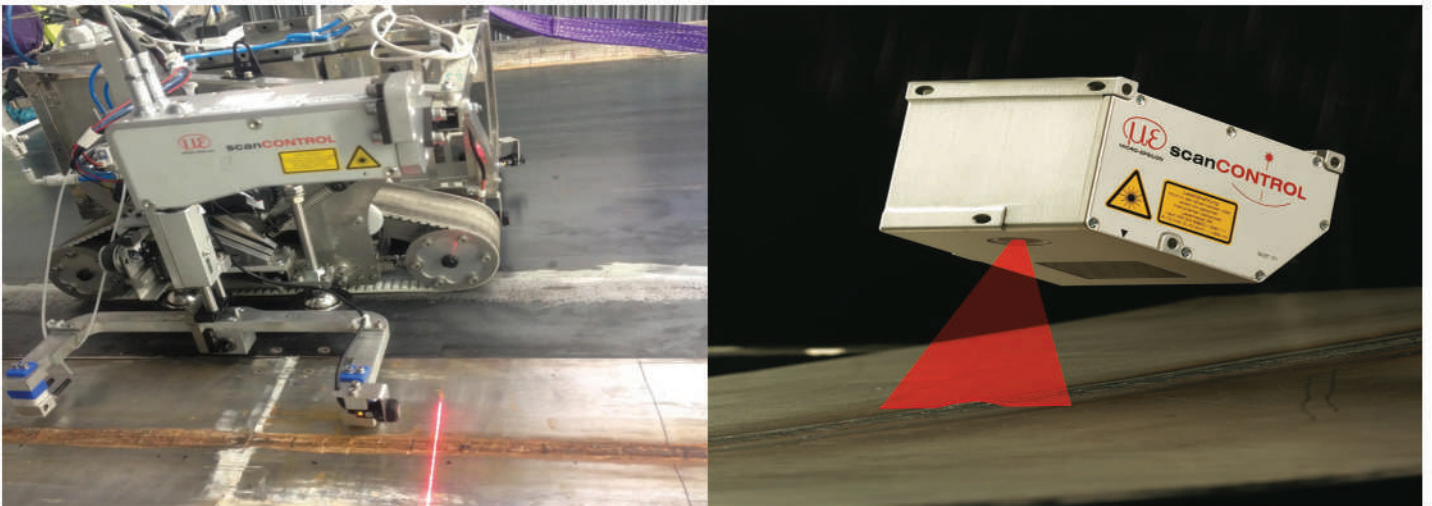


How does a steel manufacturer minimise the risk of pipeline failure? Most pipeline failures are the result of defective weld seams during the manufacturing process. To ensure defects are detected early, quality control must be an integral part of the manufacturing process. There is no better cost to eliminate than the cost of poor quality. Scrap and waste material, including lost labour hours add no value to the operation. Most importantly, millions of dollars are lost in contract deals if defective steel products are supplied. In many instances today, manufacturing process sensors are the limiting capability that defines the best possible product performance and reliability⁵.

Advances in weld quality assurance

Weld seams in pipelines and other steel products can be checked for issues with a 3D laser scanner, able to detect cracks as small as a few microns. Non contact laser measurement records profiles and outputs them to a computer for evaluation. Recently, a laser scanner was installed on a crawling robot that deploys remote volumetric surface and visual inspection to verify the integrity of welds on the hull plates of ships during manufacture and in the servicing of shipping vessels. Weld quality is a major issue in the marine industry, with dozens of ships sinking each year, causing pollution and loss of life⁶. Pairing a robot with a high precision sensor makes for an inspection process that is more reliable, faster, cost effective, and safer.

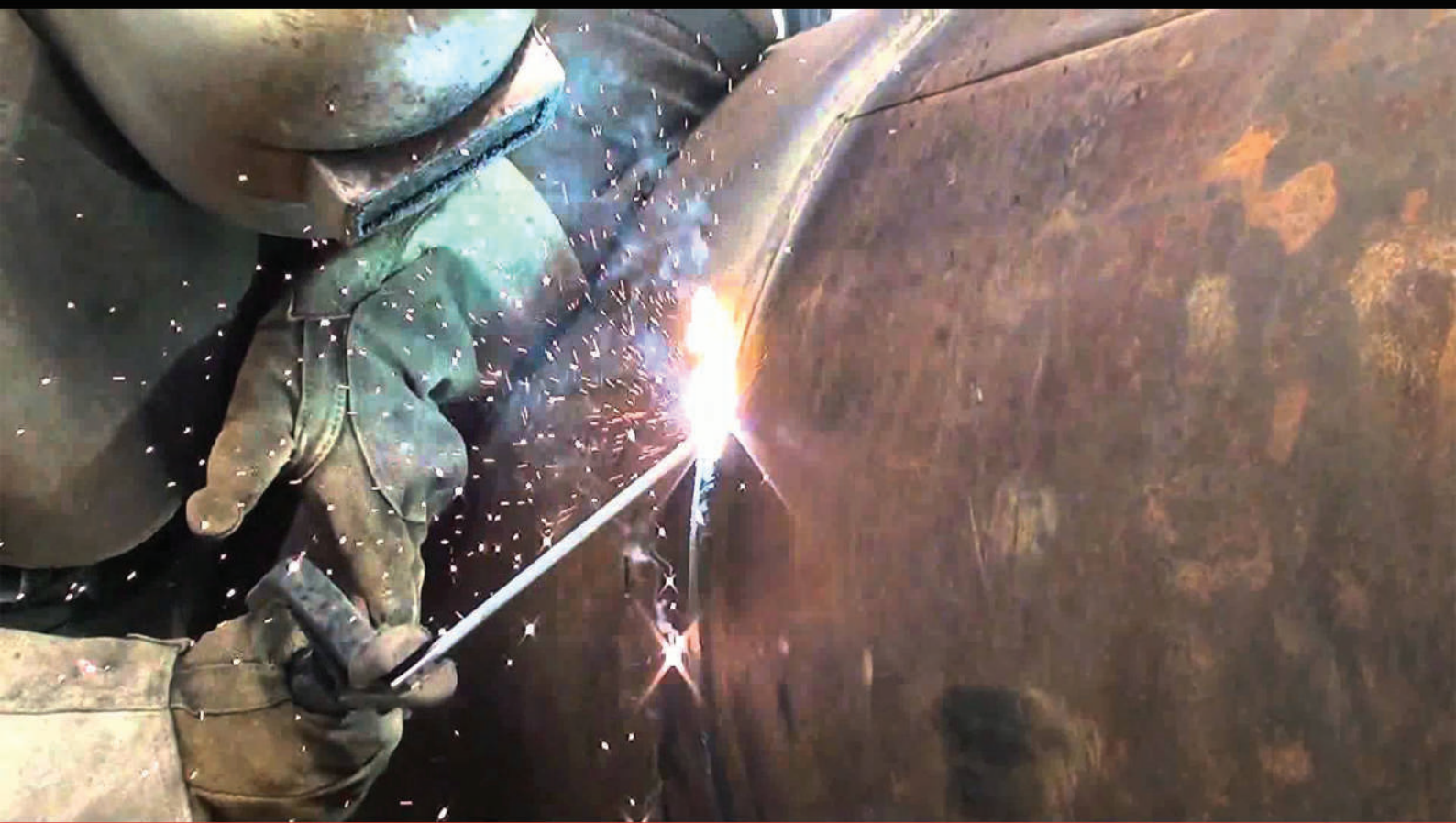
Innovation in laser scanning technology has seen the design of blue laser profile sensors. Unlike a red laser, the blue laser operates at a shorter wavelength of 405nm, making it ideal for shiny, highly polished surfaces, as well as transparent materials such as plastics, glass, optical components, and films. It is unaffected by the emitted infrared radiation from hot or glowing targets, due to the implementation of a simple optical filter which ensures stable signals⁷.



Manufacturers are spoilt for choice with the wide range of sensors and measuring equipment we have today. However, the best quality assurance processes can only be implemented when the right sensors are paired with expert advice. When it comes to sourcing measurement instrumentation, savvy process engineers and project managers favour those reliable and collaborative providers that are able to offer complete solutions for their applications. Bestech is one such renowned provider with its team of dedicated application engineers, specializing in high quality, certified sensors and instrumentation with support expertise for the manufacturing industry.

Bestech offers a wide range of displacement sensors such as lasers, 3D scanners, draw wires, LVDTs, potentiometers, capacitive, and eddy current sensors. When the stakes are high, as they are in the manufacturing industry, a provider of innovative, custom-adapted solutions to the technical challenges of the industry can make huge savings in fiscal and human capital.

To find out more about what's available to ensure the best quality assurance practices, contact Bestech at 03 9540 5100 or visit www.bestech.com.au



[1] "Manufacturing In Australia". Wikipedia. N.p., 2016. Web. 6 Sept. 2016.

[2] "Facts And Figures - Australian Pipelines And Gas Association". Australian Pipelines and Gas Association. N.p., 2016. Web. 8 Sept. 2016.

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