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- **Peer reviewed paper:** Research and application of new dust control technologies
- **Engineering services feature**
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- **Australian Bulk Handling Awards, 6th November, Doltone House, Darling Harbour Wharf, Sydney**

MERIDIAN ENGINEERS PTY LTD

Precision Weighing on the move. Anywhere. Everytime. See pg 32

TOP: Brookfield Rail 8A high speed weighbridge at Gutha, WA. L& R: GrainCorp Geelong Dual Gauge 2BXD train weighbridge, first weighpoint.

Dual gauge train weighbridge a first for Meridian

Meridian Engineers has continued to develop its grain industry presence this year. The industrial weighing engineer, which first worked with GrainCorp in 2013, delivered two more projects for the commodities company, in addition to projects for Aurizon and FMG, in the past twelve months.

GrainCorp's Geelong Port train unloading facility was the site of a rather complex project: the Meridian solution had to address a dual gauge track consisting of standard gauge and broad gauge, meaning there were three rails on the track.

Net weight reports are required along the Geelong system, so weighing points are located before and after the unloading shed (thus giving a gross and tare weight, respectively). The weighbridge accepts trains from a single direction and includes a static RFID station at the gross weighing point, for identifying wagons.

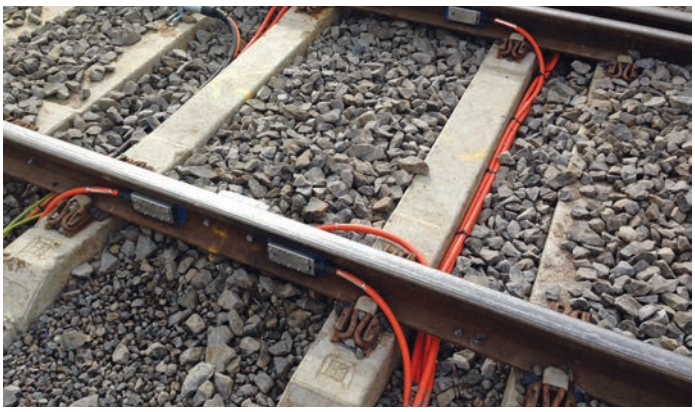
Both weighing points employ a Meridian Trackweigh 2BXD system, which means each wheel is weighed twice and the average result is used. This gives the system a better likelihood of achieving class 0.5 train weighing and class 1 wagon weighing results, an improvement over the standard Trackweigh 1BXD system, Meridian says.

Trains are expected to traverse the weighbridge at speeds below 10km/h to obtain accurate weights, however the system is able to handle upwards of 50km/h, without missing data, according to the engineer.

As the Geelong system has both standard and broad gauge rail, 50% more rail mounted hardware was required to capture all trains than in a single gauge rail system. Additional hardware and software was allocated to automatically handle the third rail. A report is produced automatically at the end of each train, regardless of which rail gauge it is travelling on. A NextG access point facilitates the distribution of reports and allows remote access to monitor the weighbridges.

Operators inside the unloading control room are provided with a SCADA interface allowing them to observe in real time train activity over the weighbridge. The weighbridges are configured in automatic mode, and require no operator input.

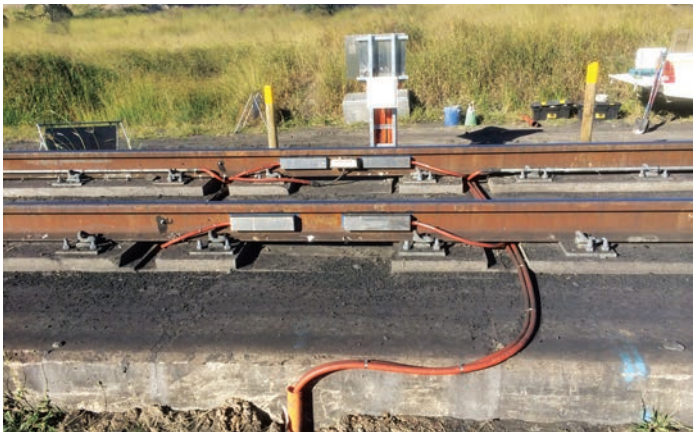
Elsewhere in the last 12 months, Meridian sold rail operator Aurizon its latest Rail-Master 6 software (RM6) package. The engineer also installed new weighbridges at Anglo American's



GrainCorp Geelong Dual Gauge 2BXD train weighbridge second weighpoint.

FMG Solomon Mine Train Tare 1BXD weighbridge and RFID Tag readers.

GrainCorp Geelong Dual Gauge 2BXD train weighbridge first and second weighpoints with trackside junction box.



Aurizon Boundary Hill 1BXD weighbridge with harsh environment load cells.

German Creek and Callide coal mines. The latter weighbridge was upgraded to include the latest harsh environment load cells.

The Boundary Hill installation had a very tight track closure window of 48hrs in which to install the rail mounted hardware, while working around other contractor groups in the same area, according to a Meridian spokesperson.

"The project was completed on time with no delay to any rail movements," says Dr Anthony Pruiti, managing director of Meridian Engineers. "This system was later certified producing some of the best accuracy results to date, achieving (+/- 0.1%) for total train weight and (+/- 0.5%) on individual wagon weights."

Also, three new RM6 weighbridges have been supplied to Aurizon to service Gregory, Hail Creek and Moranbah North. All of these were Trackweigh 1BXD systems, according to Meridian.

Weighbridge R&D saves money

Meridian says it has refined the design of its 1BXD train weighbridge and is now able to offer potential clients a 1BXDS split system.

The equipment is designed to have no loss in accuracy for train speeds under 10km/h, but has the major advantage of not requiring sleeper relocation.

"This system is designed to be installed where rail support points are at 600mm centres. Our standard system generally requires the rail support points be shifted to 900mm centres."

By not requiring rail support spacing adjustment, installation cost and time is significantly reduced, the engineer says.

"We estimate it is $20,000 cheaper to install and a half day of installation time saved. It also has the advantage of not disturbing previously well tamped track."

Improvements to mass control

Two major improvements have been implemented to Meridian's Train Loading Mass Control System software (TLMCS) in the last year, the company says.

The first was improving the software execution speed: latencies in the system have been minimised so that information flowing into the master controller is processed more quickly, Meridian says.

"This makes the system more responsive to changing loading conditions and thus allows loading to be more accurate."

The second was the introduction of closed loop feedback from the gross weighbridge to the batching control. Results from weighing full wagons are fed back to the master controller which automatically makes adjustment to the loading parameters such as gate open position and chute allowance, a change aimed at improving accuracy.

Meridian says both of these features have been implemented at FMG's Solomon and Christmas Creek train loading stations.

The train loading systems at FMG continue to perform very well, according to the engineer, loading thousands of wagons a month at very high average wagon loads whilst at the same time maintaining wagon overload occurrences to almost zero.

Loading rate per train averages are now in excess of 13,000 tonnes per hour and it is all done under Meridian's mass control system.

Targeting future improvements in train loading

"Meridian is continually researching ways to improve the loading performance and accuracy of its TLMC System," says Dr Pruiti.

"There is a major drive presently, across the rail industry in Australia, to improve the loading distribution of wagons, to reduce the impact of unnecessary wear on rolling stock and other safety aspects.

"Although currently our system works quite well with evenly balancing loads, we are working with existing and new customers to implement systems which we believe will greatly improve current expectations."

Contact: Dr Anthony Pruiti, Meridian Engineers,
email: apruiti@meridianengineers.com.au

WHY MERIDIAN ENGINEERS?

Meridian Engineers has been providing train weighing and train loading improvement solutions since the late 1990s. Meridian designs, manufactures, sells and supports all of its products. The company has senior mechanical, structural and electronic engineers on staff. This skill set has enabled the company to be successful in the design, supply, installation and commissioning of pattern approved in-motion weighbridges.

Proven Quality

Meridian believes it is important to use NMI pattern approved systems for all in-motion train weighing applications. An NMI pattern approved system is a strong endorsement from a Government body that the product meets stringent international requirements for accuracy, stability, electrical immunity and reliability. All of Meridian's train weighing products sold since 2004 in the Australian market have been NMI pattern approved. There are now over 100 installations, most of which have been installed in very demanding mining environments. Pattern approved weighbridges are of course mandatory for trade applications, but even if an application does not require trade, a customer will gain a lot of confidence in the quality of a product by specifying NMI pattern approval as a requirement.

R&D Investment

Meridian's success in train weighing is not by accident; the company has and continues to invest considerable resources into Research and Development of its products. It is difficult to achieve NMI Pattern approval for in-motion train weighing and even more difficult to hold onto it. Meridian has held NMI approval for over 10 years and for the largest range of train weighing applications (i.e. weighing speeds from 0-100km/hr and wagon weighing from 15 to 170t).

Reliable & Robust Technology

Few companies have succeeded to either gain or sustain NMI pattern approval. Meridian is one of the few. At first look, the design of Meridian weighbridges is incredibly simple. There are only a few parts, all of which are solid state. The product bolts onto existing rail greatly simplifying installation. Whilst not ideal, they have been designed to operate permanently under water in the harshest conditions imaginable for weighbridges.

The key benefits of Meridian's in-motion weighbridges include:

- NMI Pattern Approved design
- Very reliable and proven many times over throughout Australia
- Very few parts and all solid state
- Patent protected bolt on load cell design (the only NMI pattern approved bolt on design currently on the market)
- -40 to 80°C operating environment
- IP68 loadcell design
- 24VDC low power design
- Solar power options for remote installations
- Minimal infrastructure requirements
- Upgradable product to Meridian's award winning TLI system
- No sleeper spacing adjustments required for low speed systems
- Minimal maintenance
- Remote configuration/calibration
- Minimal spare parts (only 6 items required for critical spares)
- Sophisticated software
- Fully automated
- Bi-directional weighing
- Net weighing options