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APRIL 2022
Volume 53 Number 3



Published by:

Editorial and Publishing
Consultants Pty Ltd

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Publication No. 100001888

ISSN 0046-7391



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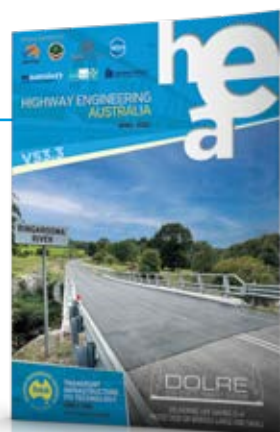
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About the Cover

The Ringarooma Bridge on the Tasman Highway near Moorina in Tasmania's north-east recently secured its place in Australian road and bridge safety history as the first bridge in Australia to feature the innovative new DOLRE Low Stress Parapet System. Ideal for bridge refurbishment projects, DOLRE barriers provide life-saving MASH TL4 protection on bridges large and small.

► Turn to **Page 10** for the full story.

Taking the politics out of transport infrastructure investment

Dear Readers,

While I feel reasonably certain that some of you have read the title of this editorial with a wry smile and thoughts along the lines of *'sure, that would be nice, but it won't ever happen'*, I'll beg your indulgence and push on regardless. After all, even though *'removing the politics'* from a matter of such national importance may seem somewhat idealistic, or nothing more than an impossible utopian dream, the purpose of this editorial is to highlight what I see as a major issue, and perhaps encourage discussion as to how we can overcome that issue... the consequences of which are affecting us all.

Those consequences - choking congestion, rising transport costs, massive environmental impacts and, in our major capitals, travel and commute times that are now among some of the worst on the planet - are not only threatening to bring our major capitals and regional centres to a standstill, they can also severely impact our future growth and prosperity.

Interestingly, while the previous paragraph seems to hold the sentiments of the election cycle statements of most, if not all, political parties, it would also seem that that is where the agreement ends.

And therein lies the problem...

Despite the fact that there seems to be almost universal agreement that our current infrastructure - both in terms of roads, freight and public transport - is, quite literally (and figuratively, if you wish) choking under the

current demands being placed on it, we appear to be unable to achieve any sort of reasonable political consensus as to how we can move forward with a workable, long-term transport infrastructure plan.

These issues are once again being highlighted in the lead-up to the federal election, with parties and candidates pitted against each other in terms of which projects should be given the green light, which projects are needed more and, perhaps not surprisingly, accusations of favourable treatment for particular areas or regions depending on their current political status.

What's more, the arguments aren't just about which projects should get the go-ahead, they're also about which transport modes we should invest in.

Do we invest in roads? Do we invest in public transport? And if we invest in public transport, should it be rail, bus, light rail? What about bike paths? What about pedestrians? What about autonomous vehicles?

You get the picture...

Unfortunately, the ONLY result of the never-ending political bickering, is that the infrastructure that our nation so desperately needs gets endlessly delayed, and our transport problems continue to get worse.

Regardless of your political persuasion (or lack thereof), I would suggest that if you are to look at the current transport infrastructure crisis, the answer to all of the questions listed above should be a resounding YES... WE NEED ALL OF THIS!

We live in a rapidly growing nation, with rapidly expanding capitals and major regional centres, and an increasingly mobile population. Our national freight task continues (and will continue) to grow at a significant rate each year, and our population growth is exceeding our historical expectations.

Furthermore, none of these issues are going away any time soon.

With that in mind, I believe that it falls to us all - regardless of political affiliations and/or ideological motivations - to work together, honestly and in good faith, to make the investment that we need across the full scope of transport modes, to develop and deliver the infrastructure that our nation so desperately needs.

And I'm not talking about an endless array of feasibility studies.

I'm referring to actual investment, in actual infrastructure capable of delivering actual results.

After all, it doesn't matter what your political affiliations are when you're sitting in a traffic jam or there is no public transport for you to catch.



Anthony T Schmidt
Managing Editor

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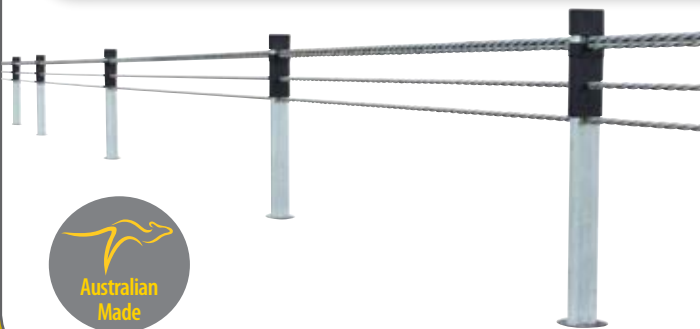
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New Study reveals growing transport disadvantage for many communities

Many Australians – particularly those with specific/complex needs and the aged – still struggle to get where they need to go, and a new multi-state study highlights the opportunities to get transport access right for our communities. Can technology help?

Access to transport is a basic human need that fundamentally impacts everyone's wellbeing. Community Transport (CT) is a critical element of our wider transport network that ensures suitable transport options exist for everybody, especially those with specific or more complex needs.

A new study reveals how emerging technologies can improve community transport by increasing access for clients, allowing better allocation of resources by providers, and increasing client choice with improved customer experience.

The study offers a foundational understanding of community transport operations across Australia, their critical role, and the challenges they and their customers face. It has clarified hesitations around technology, highlighting the advantages and the importance of reciprocal partnerships for technology adoption.

The study was led by ITS Australia, the peak body in Australia for advanced transport technology, with the University of Technology Sydney's Institute for Public Policy and Governance leading the research effort. It includes input from departments of transport TfNSW, DOT VIC, DOT WA and TMR, and is supported by iMOVE Cooperative Research Centre, the national centre for transport and mobility R&D.

The findings provide the clearest picture yet of the Australian community transport landscape and where there are opportunities to deliver services that meet everyone's needs at both a system and service level.

This new research highlights how needs

are still not being met in many places. It explores the options for improving the situation by having the right discussions and action, including integration and innovation in the community transport sector.

Investment in community transport reduces transport disadvantage, defined as 'the inability to travel when and where one needs to without difficulty'.

This seemingly simple objective is becoming increasingly difficult to achieve, especially for older people, those with a disability and people in rural and regional areas. Our ageing population (estimated to double by 2057) is just one reason why the number of people at risk of transport disadvantage will grow significantly over time.

Lee-Ann Breger, Programs Director, iMOVE, commented: "The ability to get around is key to any individual's wellbeing as it enables them to access health services, to work and participate in leisure activities."

"In Australia, we have an increasingly ageing population, where 5% of the population has a severe disability of some kind, many of whom need support to get from A to B. We need to make sure that our CT networks deliver this," Ms Breger said.

The wider transport sector is currently undergoing a sustained period of change arising from technology, digitalisation, automation and access to data. New capability is creating ways of planning and delivering services that have the potential to meet everyone's needs, including our most vulnerable and disadvantaged communities. There needs to be consensus and action to ensure that we minimise transport disadvantage and maximise opportunities for our communities.

Speaking about the research, Susan Harris, Chief Executive Officer, ITS Australia said the work offers excellent insights into how technology can support community transport and make a meaningful difference in people's lives.

"As we advance this pathway, technology providers must be sensitive to the nuances of community transport, and partnerships are vital to getting this right. ITS Australia will continue working in this space to realise some of the benefits through a collaborative approach," Ms Harris said.

These sentiments were echoed by Peter Lee, Senior Manager, Institute for Public Policy and Governance, University of Technology Sydney, who added:

"In taking a strategic look at community transport and its context, our research really shines a light on a poorly understood area of transport to evidence the complexities experienced by service providers and their customers. In drawing attention to existing and emerging challenges and opportunities for community transport, we hope the research can act as a catalyst for action in policy, engagement, innovation and partnerships."

Key points from the research:

- Community Transport is more about the 'Community' than just transport – it provides the glue connecting users to vital services and social networks
- Community Transport users are a growing and complex stakeholder group with challenging needs and expectations – by 2057 it's projected that Australians over 65 will make up 22% of the population.
- In 2020, the Commissioner for Senior Victorians published a report which found that 92% of seniors rated personal mobility as critical to health, social well-being and independence
- This is a complex and challenging ecosystem and technology has the potential to improve CT by increasing access for clients, better allocation of resources by providers, and increased client choice with improved customer experience.
- CT providers see many opportunities to work with transport technology providers, to partner on solutions that work for their customers and to utilise technology platforms that have the potential to scale to a wider user base.
- Opportunities exist for reciprocal partnering (with the risks shared by technology platform/provider and CT operators) to build adaptive fit-for-purpose products that work for CT clients and operators.

CT's complex funding structures play a significant role in how services are delivered.

The full report can be downloaded from: <https://imoveaustralia.com/project/project-outcomes/community-transport-of-the-future>



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Intertraffic Amsterdam triumphant return after four-year absence

Intertraffic Amsterdam, the world's leading trade event for infrastructure, traffic management, smart mobility, safety and parking finally brought the industry back together again in Amsterdam. The 50th anniversary edition more than made up for lost time and both exhibitors and visitors looked back on a very inspiring and productive week. Intertraffic Amsterdam is organised by RAI Amsterdam and took place from 29 March to 1 April 2022.

Four-year absence due to the Corona pandemic

There have been other traffic technology events staged over the last months, of course, but Intertraffic was genuinely the first one that felt "normal" again. Joyce de Winter, Director Intertraffic at RAI, is over the moon with how the event turned out. "We are very proud to have an in person show again. There was a great vibe everywhere on the show floor. Everyone was thrilled to see each other and meet up and do business face to face. The complete lifting of Covid restrictions by the Dutch government that came into force on 23 March certainly helped, with mask-wearing on the show floor now a matter of personal choice."

"One thing missing was Chinese exhibitors and groups of Chinese delegates but travel restrictions meant that was not possible. Attendance levels were encouraging, our halls were permanently busy and the constant hum of people reassuringly familiar. In terms of atmosphere it was undoubtedly the happiest of any trade show that I can remember," Joyce de Winter added.



121 countries represented

The 2022 edition of Intertraffic Amsterdam exceeded expectations, taken into account that Covid restrictions are still in place for certain countries and business travel definitely has not yet gone back to pre-pandemic levels. Close to 800 companies from 49 countries exhibited, with the majority of Chinese participants taking part online via Intertraffic Connect.

Over the four event days an attendee grand total of 23,526 from 121 countries worldwide engaged with 4,400 exhibiting industry specialists. The international attendance was 74% with an overall 20% originating from outside Europe (EU). 82% of attendees are involved in the decision making process, with no less than 62% as final/joint decision maker. Visitors appreciated Intertraffic with an excellent mark



of 8.4 and over 90% plan to visit again in 2024. Exhibitors satisfaction goes to show in 70% of floor space already being reserved for Intertraffic Amsterdam 2024.

Exhibitors glad to be back

The exhibitor feedback illustrated the industry's delight of being back face to face. "I hadn't realised how much I'd missed being around people," said one emotional exhibitor. "Zoom and Teams have been a godsend but this feels like a return to life in 3D."

It goes without saying that everyone was pleased to be back. "I got a pat on the back from someone on day one," said Aimsun CEO Alexandre Torday. "Just to say thank you for a good collaboration - but it was worth 100 emails."

This positive reaction to the return of busy exhibit halls was reflected all around the RAI's halls and theatres.

"Being here and interacting with people is something that we really needed to do," said Italian-based OpenMove CEO Lorenzo Modena. "We sell B2B Mobility as a Service solutions to large companies and in order to do that we need to build relationships and it's just not possible to do that with someone that you have never physically met in person. We've been looking forward to this show for two years and it's really important for us to be here in person."

Many happy returns & Intertraffic Award winners

The 50th brand anniversary of Intertraffic gave the event an extra festive touch. The official opening was attended by ministries and dignitaries from the Netherlands, Israel, Curacao and Mexico, to name but a few.

During the ceremony the winners of the Intertraffic Awards were revealed. The TraffiPole of Jenoptik (Germany) took home the Green Globe Award. Its innovative design which enables ITS hardware to function in hot climates without the need for air-conditioning impressed the judges as a simple, easy-to-deploy concept, with instant benefits in reducing energy consumption, and thus CO2 emissions.

Acusensus Heads Up by Acusensus (Australia) came out as winner of the Intertraffic Inspiration Award. Acusensus was the first to introduce an automatic detection system that addresses the growing safety problem of mobile phone use at the wheel.

The easy-to-use interface for parking facility owners and customers alike earned Toogethr Parking by Toogethr (Netherlands) the User Experience Award. The jury was particularly impressed by dynamic, demand-responsive interface that can also help to enable multi-modal



travel and ridesharing. The solution helps organisations and parking operators make more efficient use of existing capacity.

A special mention was given to SCReWS (Save Crash Reinforcing Weak Soil) by Aisico (Italy). More information on the award winners is available online at the Intertraffic website:

<https://www.intertraffic.com/>



Summit programme and ITSUP

The Intertraffic summit with 120 sessions on the latest industry developments was highly appreciated because of its strong and varied programme with interesting authorities and speakers.

The Intertraffic Summit Programme was powered by Be-Mobile. The startup event ITSUP gave 30 new kids on the block from 13 countries the opportunity to present their smart mobility solutions at a prominent location on the floor. All were invited to work out a number of challenges prepared by sponsors Swarco and Connex. Swarco announced the winner of the ITSUP contest, the lucky one being MicroTraffic Road Safety Video Analytics winning an acceleration journey at Swarco.

Intertraffic global portfolio

Intertraffic events are staged around the world. Intertraffic Amsterdam is the flagship event with a global focus. Regional events are held in Turkey, Mexico and China. Next up is Intertraffic Mexico, running from 8 to 10 November 2022 in Centro Citibanamex in Mexico City. Intertraffic Istanbul and Intertraffic in Shanghai will take place in 2023. The next edition of Intertraffic Amsterdam is scheduled for 16 to 19 April 2024.



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ARTC appoints Regionerate Rail consortium for \$5 Billion Queensland section of Inland Rail

The Australian Rail Track Corporation (ARTC) has appointed *Regionerate Rail* – a consortium comprising Plenary Group, Clough, GS Engineering and Construction, Webuild and Service Stream – as preferred bidder for the development of the Gowrie to Kagaru section of Inland Rail, a significant milestone for the part of the project running through the State of Queensland in Australia. The contract is worth more than \$5 billion for the design and construct elements, of which approximately \$1.98 billion is attributable to *Webuild*.

The section between Gowrie and Kagaru will be approximately 128 kilometres of new and upgraded rail track through the most geographically challenging section of the 1,700-kilometre rail line between Brisbane in Queensland and Melbourne in Victoria. It will include a 6.2-kilometre tunnel through the Great Dividing Range, the largest diameter freight tunnel in the southern hemisphere. Being delivered as a public-private partnership (PPP), the contract will also include a 25-year maintenance phase after the completion of the section between Gowrie to Kagaru.

"For us, Australia is one of the most strategic markets in the world, given the opportunities that it offers in sustainable mobility and renewable energy," said Webuild Chief Executive Officer, Pietro Salini.

"We are proud of Webuild's involvement in Inland Rail, especially on the most technically complex section of the project. Our reputation continues to strengthen, built day in, day out by our people in a country that is one of the most demanding markets in terms of quality and expertise required."

"As a Group, we have been in Australia since the 1970s. We have gradually expanded our activities in a number of states, from

Western Australia to New South Wales, from Victoria to Queensland," Mr Salini added. "This latest project, after the North East Link in Melbourne, is the results of years of investment made in a country where we aim to consolidate our presence for the long term – as Australians in support of clients who face the challenges of delivering sustainable infrastructure of quality to their communities."

In Perth, the Group is completing the Forrestfield-Airport Link, a rail service connecting the eastern suburbs with the city centre. In Sydney, it built the Skytrain bridge and viaduct for Sydney Metro Northwest.

In the Snowy Mountains, Webuild is developing Snowy 2.0, the biggest hydropower project in the country.

The contract on the Inland Rail project is also the second PPP to be signed by Webuild in Australia. In Melbourne, the Group and its consortium partners signed a contract for the North East Link PPP Primary Package, the largest for an infrastructure project in Australia.

As a global leader in the transport sector, Webuild has built more than 13,600 kilometres of metro and rail lines, more than 80,200 kilometres of roads, 946 kilometres of bridges and viaducts, and more than 2,300 kilometres of tunnels and underground works. Its latest projects include a number of high-speed/high-capacity railways to improve Italy's connections with Austria, France and the rest of Europe. The Terzo Valico dei Giovi-Genoa Hub will strengthen links between the ports of Genoa and the rest of Europe. In the United States, the Group has obtained a final agreement to build the country's first true high-speed railway between Dallas and Houston.



Construction supply chain welcomes new report on government infrastructure procurement

The Australian Industry Group (Ai Group) has welcomed the release of a Federal Parliamentary report into procurement practices for government-funded infrastructure.

"This timely report will ensure that critical enhancements to government procurement will be addressed as Australia moves to greater self-sufficiency in the delivery of infrastructure projects," Innes Willox, Chief Executive of the national employer association Ai Group said.

"The Ai Group Construction Supply Chain Council have long been advocating for fundamental change to the way governments manage the procurement of infrastructure projects and the Standing Committee on Infrastructure, Transport and Cities report is a practical assessment of the key impediments to the advancement of an effective construction and infrastructure sector and, importantly, the sector's supply chain."

"Nation building infrastructure projects cannot be developed and delivered in the absence of a healthy supply chain and, as identified in the Standing Committee's report, there are many aspects of infrastructure projects that could and should be improved if projects are to be completed on time and within budget," Mr Willox said.

"The importance of the industry's supply chain and the risk to its longevity was identified by Ai Group when it formed its Construction Supply Chain Council prior to the COVID-19 pandemic. In fact, the Council has already commenced the development of a roadmap for change titled Construction Supply Chain 2030 that will now reference the findings and recommendations of the Standing Committee and deliver a set of proposals designed to future proof the industry's supply chain businesses and improve the sector's lagging productivity."

For further information about Ai Group and the work of its Construction Supply Chain Council, please contact Lindsay Le Compte, General Manager (Construction and Infrastructure) on: (02) 9466 5522 or by email at: lindsay.lecompte@aigroup.com.au

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A technical diagram of the DOLRE Low Stress Parapet System. It shows a cross-section of a bridge parapet with a series of vertical posts connected by a chain of circles, illustrating the low-stress design. The diagram is flanked by two stylized bridge structures.

DOLRE

LOW STRESS PARAPET SYSTEM

A photograph of a bridge with the DOLRE Low Stress Parapet System installed. The bridge has a dark asphalt road surface and a metal guardrail. The background shows a lush green landscape with trees and a blue sky.

SETTING A NEW BENCHMARK IN BRIDGE SAFETY UPGRADES



To the untrained eye, the Ringarooma Bridge on the Tasman Highway near Moorina in Tasmania's north-east may appear to be no different from literally thousands of relatively 'non-descript' road and highway bridges located across Australia. Closer inspection reveals that it is far from 'ordinary'. Indeed, this rather unsuspecting looking bridge has recently secured its place in Australian road and bridge safety history as the first bridge in Australia to feature the innovative new DOLRE Low Stress Parapet System.

Installed in March by Tasmanian civil infrastructure specialists BridgePro Engineering Pty Ltd as part of a comprehensive bridge strengthening and refurbishment project, the new 'DOLRE Regular' parapets are not only an aesthetically pleasing barrier solution that complies with Australian Standards and has been ASBAP approved, they also provide life-saving MASH TL4 rated protection for road users, while at the same time delivering unmatched protection from damage to the bridge deck and structure during an impact.

Speaking about the Ringarooma Bridge installation, Paul Hansen, Managing Director with DOLRE's exclusive ANZ distributor LB Australia Pty Ltd, commented: "We're extremely proud to see the first Australian DOLRE barrier installation on the Ringarooma Bridge in Tasmania."

"We've been involved with the DOLRE system for a number of years, through the development, testing and approvals process, and while we've seen numerous installations of the DOLRE barriers completed across Europe in recent years, it's always a major milestone to see the first product installed on an Australian bridge," Paul said.

"We believe that this installation not only represents a major watershed moment in bridge barrier safety but also in the way in which bridge remediation projects and bridge safety upgrades are approached in Australia," he added.



PROJECT BACKGROUND

While many of the early European and Chinese settlers were attracted to areas around Derby, Pioneer and Moorina in north-east Tasmania as part of the 'Tin Mining Rush' of the mid-1870s, the highly fertile ground and heavily-treed landscape also saw the rapid development of a major forestry and timber milling industry across the region. Even though the region's tin mining operations have long since subsided, timber and forestry still play a significant role in north-east Tasmania's economy, together with agriculture and a burgeoning tourism sector. Indeed, Derby and the surrounding areas are now widely regarded as one of Australia's premier mountain biking, adventure tourism and eco-tourism destinations, attracting thousands of visitors each year.

Not surprisingly, this strong growth in tourism (and the resultant increase in vehicular traffic), combined

with the heavy vehicle traffic associated with the region's timber, forestry and agricultural sectors, is placing a significant strain on the region's ageing bridge infrastructure.

This is particularly true for the bridges along the Tasman (A3) Highway, which provides critical road access across north-east Tasmania for locals and tourists alike.

With that in mind, remediation works have been carried out on a number of key bridges across the region to increase load-carrying capacity and safety.

Remediation works on the Ringarooma River bridge near Moorina - including bridge strengthening works, application of a new wearing course, and in an Australian first, installation of the DOLRE Regular (TL4) Low Stress Parapet System - were carried out by Tasmanian civil infrastructure specialists BridgePro Engineering Pty Ltd.



AUSTRALIA'S FIRST DOLRE INSTALLATION

Located on the Tasman (A3) Highway some 11 km east of Derby, the Ringarooma River bridge near Moorina is one of three bridges over the river between Launceston and St Helens on Tasmania's north-east coast. Despite its remote location, the bridge carries an annual average of 335 vehicles per day, including a significant percentage of heavy vehicles such as logging trucks and freight carriers.

Measuring some 35 metres in length, the 2-lane bridge previously featured an old-style concrete post and rail barrier with direct connections to the bridge kerbs along the outer edges of the deck.

Phase One of the remediation project incorporated the bridge strengthening works, which included carbon fibre strengthening of the beams using a combination of fabric, laminates and rods, and stainless steel strengthening of the bridge beam diaphragms. With the bridge strengthening works completed, the existing concrete post and beam barriers along the bridge were removed, and minor concrete repairs were completed along the bridge kerbs in readiness for the DOLRE installation.

Importantly, thanks to DOLRE's ground-breaking design – which restricts the energy from a vehicular impact to a fraction of the capacity of the bridge deck, resulting in a low load in the bridge deck – the new barrier could be installed along the bridge kerbs without the need for and additional reinforcement or strengthening works. The Ringarooma River bridge project included the installation of some 35 metres of 'DOLRE Regular' (TL4) barrier along each side of the bridge, together with the installation of off-structure barriers on both sides of the bridge.

The off-structure barriers include DOLRE's purpose-designed TL4 rated transitions, which connect the DOLRE barrier to a section of TL4 Thrie-Beam barrier. These TL4 Thrie-Beam barriers subsequently transition to TL3 W-beams with TL3 end terminals.



Taken during construction, this image shows the new DOLRE barrier on the left, and the old concrete post and rail barrier on the right-hand side of the bridge deck prior to its removal and replacement.



Remediation works on the Ringarooma River bridge near Moorina in north-east Tasmania included bridge strengthening works, application of a new wearing course, and installation of Australia's first DOLRE Regular (TL4) Low Stress Parapet System.

Together with the obvious benefit of improved safety for road users and reduced risk of damage to the bridge deck during an impact, another major benefit of the DOLRE design is the speed and ease with which it can be installed. This was highlighted during the Ringarooma River bridge installation, which was completed in a little over a week, including removing the original concrete barriers and old 'W-Beam' barriers and the installation of the new DOLRE barriers, transitions and new off-structure barriers.

Speaking about the DOLRE installation, John Nel, Project Manager with BridgePro Engineering, said they were very pleased with the installation process and the finished barriers.

"For the most part, the DOLRE barrier system was relatively easy to install, simply by following the instruction manuals provided by the supplier," he said.

"As with anything new, it initially took time for everyone to get acquainted with the design and components, but once the crew had gained some experience in the assembly process, the barrier installation proceeded more efficiently, and everything went smoothly," John Nel added.

Installation of the DOLRE barriers, transitions and off-structure barriers was followed by the application of a new asphalt wearing course (PSV value 54) across the bridge deck. The completed bridge was opened fully to traffic in late March.

COST-EFFECTIVE SOLUTION FOR BRIDGE SAFETY UPGRADES

While the combination of increased traffic flows, increased vehicle loadings, and the rapidly-changing vehicle mix undoubtedly

present some significant challenges for Australia's aging bridge assets, bridge remediation is not only about load-carrying capacity. Other critical considerations include safety for road users and compliance with the current Australian Bridge Standards and safety guidelines.

In short, even though many road bridges - particularly those in rural, remote and urban interface areas - are now carrying vehicle numbers well in excess of their original intended design and, as a consequence, are often in urgent need of refurbishment and/or strengthening works to enable them to cater for these increased loads, not all are at the end of their useful design life. Indeed, for many bridges across Australia, it's not so much a question of upgrading capacity but rather one of upgrading safety. DOLRE provides the ideal solution for both situations.

TL4 TRANSITIONS



Another unique feature of the DOLRE Regular performance traffic barrier is the ability to transition to MASH TL4 Thrie-Beam. The DOLRE barrier, DOLRE transitions and the Thrie-Beams create a continuum of MASH TL4 protection for road users onto and across the bridge structure. Thus, there is an engineered continuity of MASH TL4 protection on either side of the DOLRE Regular traffic barrier.

Even though the Ringarooma Bridge DOLRE installation was carried out at the same time as the bridge strengthening and remediation works, another significant benefit of the DOLRE design is that, unlike some traditional safety barrier designs, it is not always necessary to complete strengthening works along the bridge deck simply to meet the needs of the new barrier.

Paul Hansen explained: “The DOLRE Low Stress Parapet System offers councils, road authorities and other bridge asset owners an extremely cost-effective and efficient method of upgrading bridge safety barriers to meet the requirements of the current Australian bridge Standards, without necessarily needing to perform strengthening or remedial works on the bridge deck.”

“Put simply, DOLRE provides the ideal safety upgrade for bridges that still have residual life in the Bridge Deck but need

upgrading to meet the current Australian Bridge Standards.”

The key to this unique capability lies within DOLRE’s patented ‘low stress’ design which absorbs and redirects the greater majority of the energy generated during a vehicular impact along the length of the barrier – including the transitions and adjacent off-structure barriers - rather than transmitting it directly to the bridge deck. In fact, with the DOLRE barrier, the stresses transferred to the bridge deck during an impact are less than one-third of the stresses created by a conventional barrier.

Developed by Belgian bridge engineer David De Saedeleer, a director of Belgian manufacturer DESAMI, working in conjunction with world-renowned FEA (Finite Element Analysis) specialists GDTech Engineering, the DOLRE Low Stress Parapet System has been crash tested to European

Standard EN1317-2 H2 and simulated to USA Standard MASH TL4. DOLRE complies with Australian Standards AS/NZS3845-2015 and AS5100-2017 and has been approved by ASBAP for use throughout Australia.

Ideal for bridge refurbishment projects, the DOLRE Low Stress Parapet System offers a cost-effective and easy to install method of upgrading existing bridges to meet current Standards without the need for expensive deck strengthening or deck replacement works. DOLRE also provides the added advantage of being easy to dismantle and remove in times of flood, thereby helping to significantly reduce the risk of damage to valuable bridge assets.

For further information, please contact DOLRE’s exclusive ANZ distributor, LB Australia Pty Ltd, on 1300 522 878, visit the website: www.dolre.com.au or **SCAN THE QR CODE BELOW.**



ABOUT LB AUSTRALIA

Part of the HFH Group, LB Australia Pty Ltd has been at the forefront of road safety for over 30 years.

Over the past three decades, we have built a proud history of providing innovative, high performance, life-saving road safety products and solutions for clients across Australia, New Zealand and beyond.

From the largest road infrastructure projects to small regional construction and upgrade projects, our team of specialist engineers and technicians work with our clients to deliver bespoke solutions that focus on saving lives and reducing the severity and cost of road trauma.

ABOUT BRIDGEPRO ENGINEERING

Founded in 2010, BridgePro Engineering Pty Ltd has been operating in the civil infrastructure industry in Tasmania as both a head contractor and a sub-contractor.

BridgePro provides the Local Tasmanian market with a highly competent, high-quality infrastructure provider delivering solutions from pre-construction through to completion. We focus on projects involving foundations, bridges, wharves, jetties and other areas where our engineering skills, highly trained workforce and specialist equipment can be brought together to provide excellent outcomes for our clients.

Since its inception, BridgePro has grown to be one of the largest Tasmanian contracting businesses, employing over 100 Tasmanians, including many trainees and apprentices.

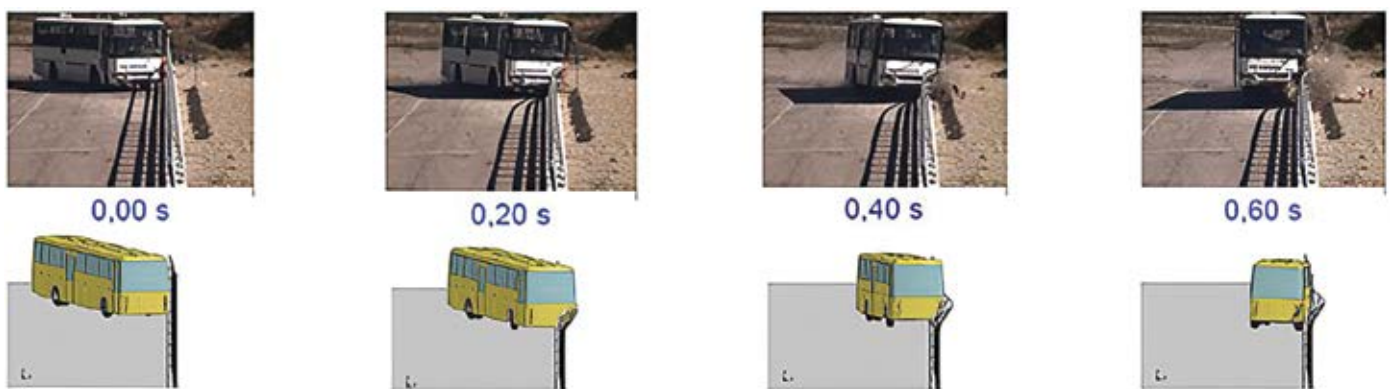


FEATURES AND BENEFITS

DOLRE Regular Barrier

KEY SAFETY BENEFITS:

- ▶ Meets the requirements of AS5100-2017 for a 'regular' traffic barrier
- ▶ Crash tested in Europe in accordance with European Standard EN1317-2010 for an H2 class barrier (equivalent to MASH TL4)
- ▶ Finite Element modelling, verification and validation of the simulations to both European and US MASH Standards by GDTech (Belgium)
- ▶ Approved by Austroads Safety Barrier Assessment Panel (ASBAP) in 2020 for use in Australia as a MASH TL4 traffic barrier



KEY STRUCTURAL BENEFITS:

- ▶ Thanks to DOLRE's unique post and 'fuse' design, the maximum outward transverse force is limited to only 43 kN/post (22 kN/metre)
- ▶ DOLRE's maximum outward transverse force is only 14% of the allowable ultimate load under AS5100-2017
 - **NOTE:** Regular bridge traffic barriers designed prior to 2017 and using the AS5100-2004 Standard used an ultimate transverse outward load of 250 kN. The AS5100-2017 Standard increased the required resistance in the deck by 20% (to 300 kN) for the modern traffic barrier.
- ▶ The DOLRE traffic barrier and the DOLRE transition to Thrie-Beam are tested to both US and European Standards to MASH TL4 or equivalent
- ▶ The DOLRE transition simulation testing has been assessed and approved by ASBAP
- ▶ The DOLRE barrier, DOLRE transitions and the Thrie-Beams create a continuum of MASH TL4 protection for road users onto and across the bridge structure
- ▶ DOLRE can deliver substantial savings in both time and cost for the majority of bridge refurbishment projects, by eliminating the need for carbon fibre or other reinforcing of the deck specifically for the safety barriers
 - **NOTE:** All installations are subject to inspection and certification by a qualified bridge engineer

AS5100 - 2017 Barrier Performance Level	MASH Test Level	DOLRE System	AS5100 - 2017 Ultimate Transverse Outward Load	DOLRE Maximum Transverse Load per Post	DOLRE Load as % of Ultimate Load	DOLRE Transverse Load per metre
Regular	TL4	DOLRE MASH TL4	300kN	43kN	14%	22 kN/m
Medium	TL5	DOLRE MASH TL5	600kN	83kN	14%	55 kN/m

find out more at www.dolre.com.au

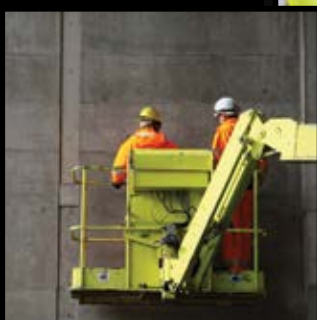
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**TOWARDS ZERO
ASSET FAILURES**



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INNOVATION
TOWARDS ZERO

NETCORP AUSTRALIA – NEW REGISTERED SERVICE PROVIDER FOR RIM

Transport Certification Australia has welcomed Netcorp Australia as a new registered provider for the Road Infrastructure Management (RIM) application.

As the National Telematics Framework (NTF) continues to evolve with the needs of stakeholders, TCA is delighted to see new providers entering the NTF for the first time. Netcorp is an Australian-owned company that provides IT and telematics solutions.

Anthony La Malfa, Managing Director at Netcorp said, “At Netcorp GPS, our goal is to provide a seamless and efficient heavy vehicle safety and compliance solution. Through RIM we can now offer our existing and future heavy vehicle operators a user-friendly solution which helps them leverage all of the benefits available through existing schemes on these digital applications.”

“Now that we have attained our RIM registered provider status, we understand the value in adding these TCA-approved programmes to the rest of range of products and services and will be continuing to further engage with TCA’s team in line with our client’s needs for a quality approved solution,” he added.

The RIM application of the NTF enables reliable and standardised collection of road use data from vehicles using a telematics device. Road agencies use RIM in a range of road access schemes, permits and national notices across jurisdictions to drive productivity and safety outcomes, while reducing costs.

These include:

- Oversize Overmass (OSOM) Vehicle Movement Scheme

- Safety, Productivity and Environment Construction Transport Scheme (SPECTS)
- Farm Gate Access Scheme
- Port Botany Container Movement Efficiency Scheme
- RIM Performance-Based Standards (RIM) monitoring schemes.

Information about Netcorp is available at:

www.netcorp.com.au

For further information on the Road Infrastructure Management (RIM) scheme, including details on new productivity and safety initiatives, please visit:

www.tca.gov.au/rim

NEW SMART OBM SYSTEM FROM RIGHT WEIGH

During March, Transport Certification Australia announced that Right Weigh has obtained type-approval of a Smart OBM system at Category B. Smart OBM systems use digital technology to collect and transmit mass data from vehicles in a reliable and standardised way.

Right Weigh has achieved type-approval for Smart OBM by collaborating with V-DAQ – a certified provider that offers the Telematics Monitoring Application (TMA) and Road Infrastructure Management (RIM) through the National Telematics Framework.

Supplier	OBM system model	Category	MSU* model
Right Weigh	Right Weigh Exterior Digital Scales	OBM system (Category B)	201-EBT-01B 201-EBT-02B 201-EBT-04B

* MSU means Mass Sensor Unit, which is the individual mass sensor fitted to each axle group.

Together, Right Weigh and V-DAQ deliver specific aspects of the functional and technical requirements to obtain Smart OBM type-approval from TCA.

Details of the Right Weigh Smart OBM system type-approved by TCA are listed in the table above.

Andy Mount, President and CEO at Right Weigh, said, “Our mission is to provide reliable and affordable load scale systems that support productivity, profitability and safety for the Australian transport industry.”

“Right Weigh’s 201 series Smart OBM approved gauge offers the most convenient, affordable system available to fleets in Australia,” Mr Mount added.

Paul Fenech, Director at V-DAQ, said, “This type-approval demonstrates a combined effort between V-DAQ and Right Weigh to deliver what is possible with new and

emerging technologies. The V-DAQ Right Weigh Smart OBM solution enables operators of all sizes to meet their Smart OBM requirements simply and affordably.”

This combined effort is another demonstration of the flexibility of the National Telematics Framework, and how unique technology and business innovations can be brought to market to deliver intended outcomes.

Type-approval involves the assessment of OBM system ‘types’ against the performance-based requirements contained in the OBM System Functional and Technical Specification.

Find out about the three categories of type-approved OBM Systems (Categories A, B and C) which meet the needs of different stakeholders at www.tca.gov.au/obm

You can also download a fact sheet highlighting the differences between categories of OBM systems from:

www.tca.gov.au/obm-factsheet



TCA TYPE-APPROVES NEW SMART OBM FROM KNORR-BREMSE

Transport Certification Australia recently announced the type-approval of a Smart On-board Mass (OBM) system from Knorr-Bremse Australia Pty Ltd. Based in Munich, Germany, and already with a long footprint in Australia, the Knorr-Bremse Group can boast the addition of a Smart OBM system to its world-leading manufacture of braking systems.

The new Smart OBM at Category B adds to Knorr-Bremse's OBM system (Category A) that TCA type-approved in July 2021.

Smart OBM systems use digital technology to collect and transmit mass data from vehicles in a reliable and standardised way.

Road managers are using Smart OBM to introduce new access arrangements that are unlocking major productivity improvements by expanding available road networks.

Gareth Lawless, Sales Business Manager of Knorr-Bremse Australia, said, "We are excited to have completed what is a significant milestone in accomplishing the TCA Category B type-approval. Our focus is now firmly on preparing for the Australian market release of iMass during the course of this year."

Details of the Knorr-Bremse OBM system type-approved by TCA are listed below:

Supplier	OBM system model	Category	MSU* model
Knorr-Bremse Pty Australia	iMass	OBM system (Category B)	ELC ECU: V3 TEBS G2.2 Premium: V3

* MSU means Mass Sensor Unit, which is the individual mass sensor fitted to each axle group.

Type-approval involves the assessment of OBM system 'types' against the performance-based requirements contained in the OBM System Functional and Technical Specification.

Find out about the three categories of type-approved OBM Systems (Categories A, B and C) which meet the needs of different stakeholders at: www.tca.gov.au/obm

You can also download a fact sheet highlighting the differences between categories of OBM systems at: www.tca.gov.au/obm-factsheet

Are you interested in offering type-approved OBM systems through the National Telematics Framework? Talk to us at: (03) 8601 4600 or visit: www.tca.gov.au/type-approved-obm



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Did you know you can access the latest issue of *Highway Engineering Australia* via Informit?

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Confidence in Steel Supply

From Source to Site



There is no question! We live in challenging times, with the COVID-19 lockdowns and movement restrictions giving rise to global logistics issues and subsequent challenges throughout the supply chain. At the same time, governments around the world are investing in infrastructure at unprecedented levels, with a subsequent rise in demand for materials. These rises in demand and challenges to the source of most building materials, including steels, are having a significant impact on product availability, quality and costs.

MULTIPLE SOURCES

In today's highly globalised markets, where materials are being sourced from multiple locations around the world (all of which are

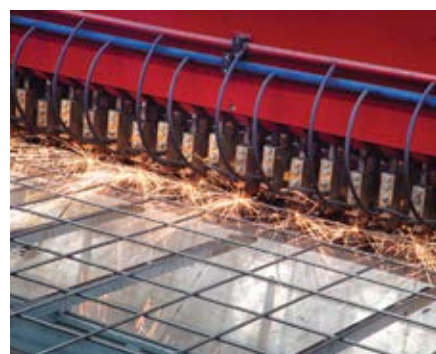
being manufactured to an assortment of international standards) it is more important than ever before to ensure that steel coming into both New Zealand and Australia meets the required standards for quality and for sustainability.

From discussions in the industry, and judging by the outcomes of recent litigation, there is no question that in the current market, there are numerous suppliers who are either deliberately or unintentionally supplying materials that do not meet the specified standards. Alarming, there are also some material purchasers that appear to be oblivious to the issue, or worse still, are choosing to ignore these risks in the interests of meeting time frames or to minimize costs.

So, how can we achieve an appropriate

level of confidence in the materials being supplied? Is buying local enough? Is there any more assurance buying with larger suppliers? Do buyers need to inspect materials to ensure compliance? Do buyers even have the required expertise on site to carry out the inspections? Or the resources or the time? And what are the risks of non-compliance?

Focusing on steel and particularly on reinforcing and structural steel products, local production is reportedly already running at capacity, with some domestic manufacturers having to supplement locally produced steel with imports to meet demand. So, buying local may provide confidence, but with mixed batches frequently being delivered, they may not necessarily be compliant.



Looking at the experience required to inspect materials, this is a challenging area as different standards require different parameters, and invariably the test certificates accompanying batches of steel are only for a single sample. These are generally provided by the manufacturer, not necessarily in English, and increasingly, cannot be shown to apply to all the steel in any one batch. So, can they really be relied upon to demonstrate compliance, or is there another way to demonstrate conformity?

In the current environment the Australasian Certification Authority for Reinforcing and Structural Steels ("ACRS"), is seeing increased enquiries from both sides of the Tasman around supply availability, and possibilities of importation of product into both New Zealand and Australia. ACRS has also received numerous requests for certification for steel manufacturers who are being used by buyers/traders for the first time, as ACRS is seen as a proven system to ensure the quality of the imported product.

Over the twenty years that ACRS has been

certifying steel destined for both countries, it should be stressed that the product being put forward for compliance has not always met the necessary standards, with some suppliers having been denied certification. Buying product that meets specified standards, regardless of what the accompanying documentation might state, cannot be taken for granted and ACRS would urge all end-users/purchasers to remain vigilant when using producers who do not hold ACRS certificates.

Andrew Wheeler, CEO, ACRS, also stated that "on a positive note, in respect to manufacturing, there have recently been a number of new mills that have gone through the ACRS audit process and obtained manufacturing certificates, consequently increasing the supply diversity of products into the building industry which is particularly important at this time."

"Similarly, we are seeing an increase in firms taking up the traceability scheme to ensure products being imported maintain full traceability," he added.

PROCESSING OF MILL MATERIAL

While it is encouraging that there is an increase in ACRS Manufacturing Certificates, it is important to note that both New Zealand and Australian standards require that dimensional and mechanical properties need to be verified by the processors of reinforcement after the processing stage, or by the manufacture of sections. The processing of the bar, which includes straightening off coil and bending bars into scheduled shapes, can have a significant impact on both the material's properties and its geometry, and it is mandated in the Standard that these be checked.

ACRS has seen numerous examples of poorly processed materials, with flattening of ribs, cracking of bars at bends, and significant reductions of ductility due to the steel being overworked. In each case, the resulting products were non-compliant. Hence, purchasers need to ensure they are checking the dimensional data, monitoring the long-term quality data supplied by the processor and verifying the appropriate test certificates.





Alternatively, the purchaser can source product from an ACRS certified processor. ACRS' audit processes ensure that all testing to the correct Standard has been carried out as part of the processing, and that that process has been independently verified. It should be stated explicitly that the processing of an ACRS certified product by a non ACRS certified processor means that compliance is no longer assured, and traceability of product may no longer exist. In short, the product can no longer be called ACRS Certified.

In the current procurement and supply environment it is increasingly recognised that the whole supply chain has a responsibility for ensuring compliance. Consequently, understanding any third party certification and what it covers is critical to ensure what is being specified complies.

ACRS CERTIFICATION

The ACRS steel scheme certifies both the steel mill (the producer of the raw product) and the downstream processing (steel reinforcement processor, mesh manufacturer, or structural welded section manufacturer) -

providing a rigorous mechanism covering the two critical aspects of steel supply, and the traceability of materials between them.

This 2-Stage 'chain of certification' provides a vital link between the steel producer, the downstream material processing, the steel supplier, and the construction site. Thus, providing assurance to the end-user on the construction site that:

- All steel is from an approved source and satisfies the requirements of the relevant product Standard(s).
- Steel is correctly handled and processed so materials performance is not compromised during subsequent rebar processing or steelwork fabrication.
- The necessary procedures and documentation are in place to ensure full product traceability from steel mill through materials scheduling and fabrication to delivery to site.

Known as a "bookended" system, this type of 2-stage certification is far more robust than a single point certification of either just the mill, or just the processor or fabricator. While historically in New Zealand and Australia

there were minimal compliance issues with products, in today's dynamic market - with global sourcing and supply, growth in local processors and an increase in offshore fabrication - providing assurance in the end product is becoming increasingly difficult.

As ACRS steel certification covers both ends of the supply chain, the ACRS system inherently includes full materials traceability - not just for reinforcing and prestressing steels, but also for structural welded sections manufacture, covering CC1 to CC3 to AS/NZS 5131, which are increasingly used in construction. The specification of ACRS steel for fabrication using the processes outlined in with AS/NZS 5131 also provides the certifiers with confidence that complying materials with full traceability have been used in fabricated structures.

In short, for your steel to be ACRS certified, it must be covered by both the ACRS certificate from the Mill/Manufacturer and the ACRS certificate from the processors.

Any break in the 'chain of certification' between the steel mill and the processor or fabricator means the steel delivered to site is not ACRS certified.

COMPLIANCE ENSURED EASILY

ACRS regular and rigorous audits by independent experts provides confidence in the suppliers and their ability to supply compliant products. By specifying and ensuring ACRS steel is delivered to site, you are receiving a product that has demonstrated ongoing compliance to the relevant standards, thus giving certifiers and end users confidence in the materials.

All certified suppliers and processors and their range of products may be easily found at www.steelcertification.com

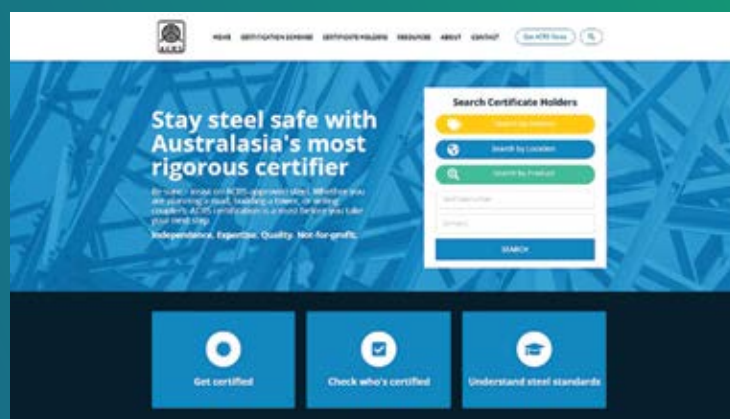
Stay up-to-date at www.steelcertification.com

Just because your supplier was previously ACRS Certified, don't take it for granted that they still are. Their ACRS Certification status may have changed due to factors including:

- Changes in ownership
- Changes in manufacturing locations
- Additional products
- Discontinued Products

That's why ACRS' comprehensive program of annual audits and rigorous 3-monthly data analysis is so important. It ensures that standards and quality are maintained, so you can have confidence in your construction steel supplies.

Importantly, checking and confirming that ACRS certificates for products/suppliers are current is quick and easy on the ACRS website.



Visit: www.steelcertification.com for full details of all current certificates.

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At A1 Roadlines we understand that our customers have a range of preferences when it comes to fleet vehicles. That's why we fit and service the Scorpion II TMA across a full range of suitable host vehicles from world-leading manufacturers including **ISUZU**, **UD**, **FUSO** and **HINO** to name a few.

So, when it comes to selecting a fully MASH tested, passed and eligible TMA that has also been **ASSESSED, APPROVED & RECOMMENDED FOR ACCEPTANCE** throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel), the only name you need to remember is **Scorpion II® TMA** from **A1 Roadlines**. When it comes to the brand of host vehicle... that's up to you!



THE EQUIPMENT YOU NEED – THE SERVICE YOU EXPECT

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INFINITY TESTING

'Infinity Testing' is without a doubt the harshest method of testing the performance of a Truck Mounted Attenuator (TMA) during an impact.

NO RELIANCE ON ROLL-AHEAD DURING AN IMPACT

Rather than relying on some of the impact energy being absorbed by the forward movement of host vehicle on which the TMA is fitted, with 'Infinity Testing' the host vehicle is anchored to the ground to prevent any forward movement during an impact.

'WORST CASE' SCENARIO TESTING

Compared to standard testing with an unrestrained host vehicle, Infinity Testing is a much tougher testing regimen. It is considered 'worst-case scenario' testing which makes it much more difficult to meet the pass criteria for IS values, as all of the Ridedown Acceleration must be provided by the TMA absorbing the energy from the impact.

TMA ABSORBS & DISSIPATES 100% OF THE IMPACT ENERGY

Testing the TMA on a host vehicle which is anchored in place, tests – and for both the Scorpion II® TL-3 and Scorpion® II METRO® TL-2 TMAs – confirms the capacity of the TMA to absorb/dissipate 100% of the impact energy – without the benefit of the host vehicle roll-ahead.

NO UPPER LIMIT FOR HOST VEHICLES

From a practical standpoint, the fact that both the Scorpion II® TL-3 and Scorpion® II METRO® TL-2 TMAs were successfully tested to MASH Standards using the 'Infinity Testing' method, means both units are MASH certified with no upper weight limit for the host vehicle.



THE ULTIMATE TEST OF ATTENUATOR PERFORMANCE

HOW IT'S DONE

With 'Infinity Testing' the host vehicle is anchored in place during the impacts to assess the TMA's capacity to absorb/dissipate 100% of the impact energy without the benefit of roll-ahead.



WHAT ABOUT ROLL-AHEAD DISTANCES?

Importantly, to emulate 'real world' operating conditions, both the Scorpion II® TL-3 and Scorpion II® METRO® TL-2 TMA have also been successfully tested and MASH certified using standard 'non-anchored' host vehicles, with both units posting impressively low roll-ahead distances.

Scorpion® II TL-3 TMA

Crash Test: MASH Test 2-53
Impact Angle: 10.3 Degrees
Roll-Ahead Distance: 5.1m

Impacting Vehicle Weight: 2266kg
Impact Speed: 103.8km/h

Scorpion® II METRO® TL-2 TMA

Crash Test: MASH Test 2-53
Impact Angle: 9.9 Degrees
Roll-Ahead Distance: 12.4m

Impacting Vehicle Weight: 2295kg
Impact Speed: 81.6km/h



THE EQUIPMENT YOU NEED – THE SERVICE YOU EXPECT

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Adding 50 Years of Service Life to Victoria's Lerderderg Bridge

Located between Melbourne and Ballarat, the Lerderderg Bridge is a key piece of Victorian infrastructure, consisting of two bridges, totalling four lanes of traffic. As part of the Major Highway Upgrade Project by the Department of Transport (VicRoads), a range of Master Builders Solutions products were specified to increase the load-carrying capacity and extend the design life of the bridge by more than 50 years.

VicRoads utilised four MasterBrace products during the rehabilitation works:

MasterBrace Laminate

Long 100mm wide strips of carbon laminate, were bonded to the I-beams to increase the general load-bearing capacity in flexure.

Visit: <https://www.master-builders-solutions.com/en-au/products/masterbrace/masterbrace-laminate> for product details.



MasterBrace Fibre

50cm wide carbon fibre sheet was used to wrap the underside of the bridge to increase the shear strength.

Visit: <https://www.master-builders-solutions.com/en-au/products/masterbrace/masterbrace-fibre> for product details.



MasterBrace MBar

Pultruded carbon fibre rods, embedded into the bridge deck, provide increased tensile strength over the piers.

Visit: <https://www.master-builders-solutions.com/en-au/products/masterbrace/masterbrace-mbar> for product details.



MasterBrace 1444

A two-pack, thixotropic epoxy structural adhesive was used to bond the products mentioned above to the concrete surfaces of the bridge.

Visit: <https://www.master-builders-solutions.com/en-au/products/masterbrace/masterbrace-1444> for product details.



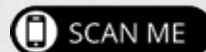
As each bridge consists of two lanes, traffic was able to continue flowing in both directions while repairs were made to either bridge.

Scan the QR code for more information on the full MasterBrace range, or to watch the Project Reference Video.





Construction solutions for a sustainable world



At Master Builders Solutions, our commitment to world's best practice sustainable operations isn't just empty words or clever marketing – it is a genuine commitment to minimising the environmental impact of all aspects of our business, including manufacturing, services, products and day-to-day operations.

It's also a genuine commitment to working in tandem with our customers, business partners and other stakeholders to understand their sustainability needs and ESD goals - helping them to achieve those goals, as we work towards our goal of achieving **Carbon Neutrality by 2030**.

Scan the QR Code for more information.



GRAFFITI REMOVAL: THE HEATWAVE SOLUTION

Graffiti vandalism is a major issue for Local Governments, road authorities, public transport operators and other infrastructure asset owners alike, with vandals regularly targeting everything from buildings and fences, to bridges, sound walls, bus shelters, rail stations and even pavements.

Together with the obvious issues associated with the visual pollution and damage caused by the graffiti itself, there is the added challenge of minimising the impact of the graffiti removal activities on the surrounding environment.

With that in mind, Australian Pump Industries has come up with a solution that presents a flexible and chemical-free way of removing graffiti safely and efficiently.

Known as the *Aussie Heatwave*, the machine is a Honda petrol drive 4,000 psi high-pressure water blaster with a steam facility. That function enables it to literally peel graffiti off walls using 130°C steam. Best of all, you can carry out graffiti removal without the need for carcinogenic cleaning chemicals or caustics.

The machine is compact in design with loads of features to keep both the unit and operator safe. Built into a stainless steel frame, it comes with four steel wheels with rubber tyres. This means it can be used as a mobile wash unit in difficult to access locations, or alternatively, it can be hard mounted on the back of a pickup truck or

utility vehicle becoming a mobile steam cleaning plant. Add a 300 or 400-litre water tank (optional) to feed the system and it's a self-contained mobile high-pressure steamer.

The secret of the Aussie Heatwave is its ability to run a diesel-fired burner off the 12-volt ignition system of the Honda 13hp petrol engine. The heating system enables the operator to go from using cold water to hot at the click of a button. The operational temperature of these machines infinitely varies from ambient to 130°C with the turn of a dial.

"Using the machine at maximum temperature does burn more diesel fuel than operating the machine at 90°C," said Aussie Pumps' Chief Engineer, John Hales.

John suggests that operating at 90°C you get a good result in terms of both cleaning and fuel efficiency.

SPACE EFFICIENT & RELIABLE

The heavy-duty triplex pump is fitted with solid ceramic pistons and top quality seals for a long trouble-free life. Operation is simple. The water coming from the feeder tank or direct mains supply goes through the high-pressure pump at pressure and from there it travels to the boiler. The heating system includes a 'Spiralast' coil, with a lifetime warranty, that heats the water to the temperature set on the thermostat. The boiler includes a small diesel fuel pump to complete the system.

Not surprisingly, the *Heatwave* is already proving to be a popular choice with Local Government bodies across Australia - with a number of councils incorporating both the standalone and ute-mounted machines into their equipment fleets. The key to the Heatwave's success lies within its versatility and performance in the field. Together with buildings and other structures, the Heatwave is also ideal for a myriad of other council jobs, including cleaning amenities, sanitising park tables and benches, even melting the grease off public BBQs.

"They're not just great for removing graffiti, they also fulfil a useful role cleaning public spaces like car parks or piazzas where spilled food or even oil stains can be removed without the use of caustic cleaning fluids," said Hales.

OPTIONAL ACCESSORIES FOR MAXIMUM VERSATILITY

Australian Pump has found that adding their range of Aussie high-pressure accessories can make the machine even more useful.

For example, stainless steel high-pressure reels, that can accommodate longer length hoses, can either be fitted to the machine or, if it's part of a mobile cleaning system, bolted to the deck of the vehicle. The standard reel will take up to 50 metres of hose, while optional larger reels can take up to 75 metres. That enables the operator to clean a wide area without moving the machine.

The reels are fitted with *Aussie BluePro* hose, rated to 5,800 psi, with a temperature rating of 155°C maximum.



"Using a hose reel to mount long length hoses doesn't only extend the life of the hose but is also regarded as being safer," John Hales said. "Having hoses tangled around the job site can be a real OH & S danger."

If extra reach is required, Aussie's *Extenda Wand* will provide cleaning capability up to 5.5 metres in height. Using the telescopic wand enables operators to clean difficult to reach areas such as the underside of bridge decks, the upper areas of large sound walls

or similar jobs without the need for a ladder.

The company points out that the *Extenda Wand* is rated to 90° and is, not suitable for use with steam.

Other handy accessories include a *Turbo Lance* for the gun. All Aussie machines come with a standard heavy-duty 5,000 psi rated gun and lance but can also be supplied with a complete *Turbo Gun Kit* that has the effect of multiplying the effectiveness of the pin jet to over 6,000 psi EWP. EWP is an industry-standard for measuring the impact of the combination of pressure and flow whilst the machine is operating with cold water only. The turbo is a rotating turbine, mounted in the end of the lance, that multiplies the impact of the jet going through as it spins under pressure.

BLOCKED DRAIN SOLUTION

Other available options include a drain cleaning kit that enables warm water (up to 80°C) to be used under pressure to clear blocked drains and even sewer lines.

The drain cleaning kit, *Aussie Viper Mini Reel*, comes with 60 metres of high pressure

3/16th sewer cleaning hose and a toolbox of high-pressure cleaning nozzles capable of clearing a wide range of chokes. It also includes a safety plate to keep the operator out of harm's way.

Best of all for users, the *Aussie Heatwave* is a Class A machine and therefore doesn't require operator official certification.


Aussie's Safe Operator training program is available free of charge to users, including Councils, cleaning contractors, graffiti specialists and virtually anybody who professionally uses a pressure cleaner of any brand. It's available online free of charge!

"We don't care what brand of machine is in use. We want operators to be safe and we've done our best to produce a practical online guide to make it easy," John Hales added.

Larger machines are also available in the product package, with both diesel drive and *Clean and Capture* options.

Further information on the Aussie Heatwave and the full range of Aussie high-pressure cleaning equipment and pumps is available from Australian Pump Industries, W: www.aussiepumps.com.au T: 02 8865 3500.

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SEA Electric's Glen Walker joins EVC board

SEA Electric's Glen Walker has been voted onto the Board of Directors of Australia's Electric Vehicle Council (EVC), the country's peak body for the e-Mobility sector. As Vice President of Asia Pacific, Mr Walker leads SEA Electric's operational activities in the region, including new products, design for manufacture, assembly systems innovation and various product distribution channels.

Under his watch, SEA Electric has launched as the country's newest truck OEM, with the company's Melbourne factory producing a full suite of commercial zero-emissions solutions, which are available from a nationwide dealer network. The trucks are propelled by the proprietary SEA Electric's SEA-Drive® power-system, which is available in various performance and range packages to suit applications from 4.5-tonne car licence vehicles to 22.5 tonne three-axle trucks.

For SEA Electric, having a voice at the top level of the EV movement is a positive for the entire commercial vehicle segment, as it shifts into an electric future.

"Over the past six years, the EVC has become the pre-eminent industry association representing the modern zero-emission mobility sector in Australia," said Mr Walker.



"Through this time of transition, it has provided invaluable policy support across all levels of Government.

"I look forward to adding the unique perspective of zero-emission commercial vehicles to this conversation, supporting the EVC mission to accelerate Australia's transition to sustainable vehicles."

Mr Walker brings to the EVC years of experience as an executive in the automotive and transport fields. Following an 18-year career at Kenworth Australia that included roles as Chief Engineer of Kenworth Trucks and Group Operations and National Sales for Kenworth Australia, he spent three years on executive assignment with PACCAR in Seattle.

He also has extensive recent experience working for major transport companies.

The EVC represents all businesses producing, powering, and supporting EVs in Australia, aiming to make the market more affordable and competitive through a robust regulatory framework and increased consumer awareness.

Undertaking a range of activities, the EVC leads advocacy and research efforts, industry coordination, and harnesses innovation that builds confidence in EV systems.

For further information on SEA Electric, visit: https://sea-electric.com/en_au.

For further information on the EVC, visit: <https://electricvehiclecouncil.com.au>

ABOUT SEA ELECTRIC

SEA Electric is an Australian company with a global reach specialising in the assembly and 100% electrification of commercial vehicles worldwide. Dealing directly with vehicle users and working alongside automotive OEM's, SEA Electric supplies and licences patented technology.

SEA Electric was founded in 2013. After four years of product development and testing, SEA Electric launched its commercial operations in early 2017, triggered by the reduction in battery kWh pricing, allowing for commercial feasibility in offering electric drivetrains to the global market.

Third-party lab confirms high specific energy and high power of Zenlabs' new large format electric aviation battery cells

Zenlabs Energy, an advanced lithium-ion battery company, recently announced that Energy Assurance, an independent third-party test laboratory, has validated the high specific energy and high power of Zenlabs' new large-format pouch cells for the electric aviation market.

Energy Assurance tested Zenlabs' 32 ampere hour (Ah) capacity pouch cells and confirmed a high specific energy of ~327.5 watt hours per kilogram (Wh/kg) and a high-power rating of greater than 3,000 watts per kilogram (W/kg) using 12C rate (~394 A), 30 sec pulses at 30° Celsius.

Although cycle life testing at Energy Assurance is ongoing, Zenlabs' internal test data has demonstrated greater than 700 cycles for this cell configuration when measured at 1C (one hour) charge/discharge rates.

Previously, Idaho National Laboratory (INL) validated over 1,000 dynamic stress test (DST) cycles and rapid charging in Zenlabs' 315 Wh/Kg electric vehicle cells, which were

developed in a program with the United States Advanced Battery Consortium (USABC).

"The high specific energy, high power and rapid charging capabilities of Zenlabs' battery cells make them uniquely suited for the electric aviation market, which requires each of these capabilities to extend flight times, power take-offs and landings, and enable different flight use cases," says Zenlabs founder & CEO, Dr Sujeet Kumar.



"Accordingly, we believe that our proprietary pre-lithiated silicon anode and high-performance battery cells will be a real game changer for the electric aviation market," Dr Kumar added.

Energy Assurance is an independent battery laboratory with certifications from ANAB, Underwriters Laboratories, IECEE, SGS and TÜV SÜD America.

The Energy Assurance test report on Zenlabs' 32 Ah lithium-ion pouch cells is available on our website: www.zenlabsinc.com/news

ABOUT ZENLABS ENERGY INC.

Zenlabs Energy, which is headquartered in Fremont, California, is a leading developer of high-energy, high-power, fast-charging lithium-ion cells for electric aviation and electric vehicle applications.

To learn more about our technology and obtain the Energy Assurance or INL test reports, please visit: www.zenlabsinc.com



Trucks' New River Valley plant in Virginia, the exclusive producer of all Volvo trucks in North America.

Targeting 50% electric sales by 2030

Globally, Volvo Trucks has set the ambitious target that by 2030 50% of all trucks it sells will be electric.

"We are determined to lead the electric transformation of the transport industry. Volumes are still low, but we see rapidly growing interest in Europe, North America and also other parts of the world. In 2021 we took orders, including letters of intent to buy, for more than 1,100 trucks in over 20 countries. It's clearly becoming a key competitive advantage to be able to offer electric, zero-emission transports," says Roger Alm, President Volvo Trucks.

Volvo Trucks was the market leader in heavy electric trucks in 2021 in Europe with a market share of 42% and also has a leading position in North America. With a total of six electric truck models in production as of this year, Volvo Trucks has the most complete electric lineup in the global truck industry, covering everything from city distribution and refuse handling, to construction transports and regional haulage.

Record order from Maersk for Volvo electric trucks

Volvo Trucks in North America has won an order for 110 Volvo VNR Electric trucks from the global logistics company Maersk. The deal adds to a previous order of 16 vehicles of the same model and marks the single largest commercial order to date for Volvo's electric trucks.

The order was placed by Performance Team, part of the Maersk Group, and adds up to mean a total of 126 such electric trucks will be in service for Performance Team. The first electric trucks will be in operation in the second quarter of 2022, all 126 trucks are scheduled for deployment by the first quarter of 2023.

"Volvo Trucks is excited to continue collaborating with Maersk on its fleet

sustainability goals and to play a key role in the organization's continued scaled investments in electromobility solutions," says Peter Voorhoeve, president of Volvo Trucks North America.

The Class 8 electric trucks will be used in California for a variety of transport assignments, serving port drayage and warehouse distribution routes.

The Volvo VNR Electric has an operating range of up to 440 km and energy storage of up to 565kWh. The truck can be 80% charged in 90 minutes with the six-battery package and 60 minutes with the four-battery version. The Volvo VNR Electric is produced in Volvo

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Hyundai Motor Group leadership in electromobility recognized with multiple World Car Awards

Hyundai Motor Group has won a series of highly sought-after accolades at the prestigious *World Car Awards* (WCA), with the Hyundai IONIQ 5 securing the *World Car of the Year*, *World Electric Vehicle of the Year*, and *World Car Design of the Year*. The award wins and finalist nominations across multiple WCA categories highlight the Group's vision and leadership in the delivery of battery electric vehicles (BEVs) with cutting-edge design and technology.

An independent international jury comprising of 102 highly experienced, well-respected automotive journalists from 33 countries around the world reviewed the latest models to launch over the past year. The BEVs of Hyundai Motor, Kia, and Genesis were nominated as top three finalists in at least one of the six categories, with the Hyundai IONIQ 5 and Kia EV6 both named as finalists in the *World Car of the Year* and *World Car Design of the Year*. The Genesis GV60 was among the three finalists for the *World Luxury Car of the Year*.

Euisun Chung, Executive Chair at Hyundai Motor Group, commented: "It's a great honour for us to win these highly influential World Car Awards, including the *World Car of the Year* title. I would like to thank all of our team members across the Group for their continued hard work and dedication, without which we would have not achieved such outstanding results."

"Our three brands, Hyundai, Kia and Genesis, have all introduced game-changing electric vehicles this past year. While each has its own clear identity, they all reflect an important Group-wide ethos: to deliver products with class-leading design, innovation, quality and performance. Our vision is to create a new world of mobility, where people can come together safely and sustainably. These vehicles – and these award wins – are evidence of this vision becoming reality; part of our diverse range of new electromobility solutions designed to benefit humanity."

The Hyundai IONIQ 5, Kia EV6 and Genesis GV60 are all based on HMG's innovative Electric-Global Modular Platform (E-GMP), combining the latest EV powertrain and charging technologies with highly spacious interiors. With extensive driving ranges and 800V ultra-fast charging capabilities for a 10 to 80 percent charge in just 18 minutes, all three models have been designed to be enjoyed without compromise.



The highly acclaimed Hyundai IONIQ 5 won big at the prestigious 2022 World Car Awards, with the all-electric crossover named overall *World Car of the Year*, *World Electric Vehicle of the Year* and *World Car Design of the Year*.

Hyundai Motor Group has recently been awarded with a series of globally renowned accolades for its BEVs. The Hyundai IONIQ 5 was crowned *Car of the Year* in both the UK and Germany, while the Kia EV6 took the *European Car of the Year* title and won the *Crossover of the Year* in the *Top Gear Awards*. The premium-class Genesis GV60 was also awarded a prestigious 2022 Red Dot Award.

Extensive electrification strategy

Hyundai Motor Group has devised a comprehensive and far-reaching electrification strategy across its three automotive brands, with the Group targeting to achieve annual EV sales of 3.07 million units by 2030, a 12 percent of the global market share.

As part of this plan, Hyundai Motor will introduce 11 BEVs by 2030, including three sedans, six SUVs, one light commercial vehicle and one new model-type. This year, Hyundai will launch the IONIQ 6, followed by the IONIQ 7 in 2024.

Kia will grow its EV line-up to include 14 BEVs by 2027, including a new range of small and medium-sized EVs from 2025. Kia plans to sell four million vehicles a year globally by 2030, 1.2 million of which will be BEVs. These include the all-new Niro EV, two EV pickup trucks (a dedicated electric pickup truck and a strategic model for emerging markets), an entry-level BEV, and a production version of the Concept EV9 SUV.

Following on from the successful launch of the GV60, HMG's luxury Genesis brand plans to introduce six additional BEVs by 2030, including two passenger cars and four SUVs, one of which is the electrified GV70 due to launch later this year. All new models from Genesis will be electrified by 2025.

Hyundai Motor Group plans to introduce a new dedicated BEV platform, Integrated Modular Architecture (IMA). The IMA will be utilized for passenger vehicles as well as purpose-built vehicles, helping to streamline production processes and reduce cost. The Group will achieve software transformation by expanding the business areas of mobility, connectivity and other services based on data, and enhancing software competitiveness. To do so, the Group will establish specialized centres of excellence for software development in Korea and abroad.

ABOUT HYUNDAI MOTOR GROUP

Hyundai Motor Group is a global enterprise that has created a value chain based on mobility, steel, and construction, as well as logistics, finance, IT and service. With about 250,000 employees worldwide, the Group's mobility brands include Hyundai, Kia, and Genesis. Armed with creative thinking, cooperative communication and the will to take on any challenge, we strive to create a better future for all.

For more information about Hyundai Motor Group, please visit: www.hyundaimotorgroup.com.

READY TO CHARGE: electricity network operators get smart about electric vehicle charging

Even before recent petrol price increases, many Australians were thinking seriously about making the shift to an EV – this means electricity networks are also thinking seriously about what they need to do get ready for increased demand on the grid, with a \$3.4 million ‘smart charger’ trial kicking off during April.

As part of the 12-month trial ‘smart chargers’ have been installed at the homes of more than 160 EV owners in Victoria, Tasmania and the ACT. These smart chargers not only charge EVs up to three times faster than the chargers that usually come with the vehicle, but also allow electricity network operators to dynamically adjust when the vehicle charges.

This means participants’ EVs can be plugged in when it’s convenient, but charged at times when the electricity grid has more capacity, whether that’s after midnight, or during the day when excess solar energy is being fed back into the grid – ideally leading to lower electricity bills for all consumers.

Information about EV charging habits so far shows most owners plug in their vehicles to charge at around 6pm, already a time of high demand on the electricity grid.

Through the trial, participants will have more visibility of their EV charging data, as well as being able to charge their cars faster, and electricity network operators will gain a better understanding of how to work with EV owners to manage the increasing demand on the grid.

“It’s clear that energy network businesses need to be ready for an influx of EVs. Through this trial, we’re looking at how we can best work with customers to coordinate charging their vehicles at times when there’s more capacity in the grid,” Jemena Networks Executive General Manager Shaun Reardon said.

“With more Australians buying electric vehicles, we’re keen to create a sustainable solution with communities that supports that choice, without needing to build extra energy infrastructure, which in turn could increase electricity costs for customers,” he added.

‘Solar soak’ events on forecast sunny days will be a key feature of the trial. During these events, participants will be notified ahead of time to have their cars plugged in during a day when there is an abundance of solar energy being exported into the grid, to better understand the impact of EV charging in absorbing surplus electricity and helping manage grid voltage.

According to figures from the Electric Vehicle Council, EV sales are rapidly increasing, jumping from 6,900 sold in 2020 to 20,665 in 2021. Australian Government projections indicate EVs will be up to 30 per cent of all new cars sold by 2030, which would mean about 1.7 million electric cars on our roads – all of which will need charging and place demands on the grid.

The EV Grid trial is being led by Jemena, which delivers electricity to homes and businesses across north and western Melbourne. Jemena has partnered with Victorian electricity distribution network businesses AusNet Services and United Energy, TasNetworks in Tasmania and EVOEnergy in the ACT.

Leading EV charging infrastructure business JET Charge is the trial’s technology partner, responsible for providing and installing the smart chargers across all locations.

“The EV Grid trial demonstrates one of the key paradigms of our time: the convergence of transport and energy,” JET Charge Founder & CEO Tim Washington said. “By harnessing the power of smart charging, we will work with our project partners to ensure that EVs offer a tangible benefit to the efficient operation of our electricity grid.”

These comments were echoed by TasNetworks Future Networks Team Leader Adeel Rana, who added: “The EV grid trial will give TasNetworks a valuable, real world

understanding of our customer’s needs which will ensure we can continue powering a bright future for Tasmania.”

The trial has been co-funded by the Australian Renewable Energy Agency (ARENA) under the Advancing Renewables Program.

Speaking about the trial, ARENA CEO Darren Miller said:

“As we see the uptake of electric vehicles increase, it’s vital that we better understand the impacts of EV charging from a network perspective and manage the optimum time for consumers to charge their vehicles.

“We’re excited to be seeing Jemena’s project officially begin, and with over 160 customers participating across the ACT, Victoria and Tasmania, we’re looking to gain valuable insights into how network managed EV charging can be positive for both the network providers and the vehicle owner,” Mr Miller added.

Trial outcomes will be shared with electricity retailers, electric vehicle manufacturers, governments and other energy industry stakeholders. In total, 123 Victorian, 22 Tasmanian and 22 ACT households have had smart chargers installed to participate in the trial.

For more information, please visit:

www.evgrid.com.au or www.arena.gov.au/projects/jemena-dynamic-electric-vehicle-charging-trial/



As part of the 12-month trial, ‘smart chargers’ have been installed at the homes of more than 160 EV owners in Victoria, Tasmania and the ACT.

Rugged, Safe and Fast

New low-profile torque wrench offers twice the lifespan

A new lightweight, low-profile Enerpac HMT 13000 interchangeable torque wrench is being introduced to the Asia-Pacific and Australasia offering faster operation, fewer moving parts and with rugged alloys that give it 2.5 times the typical lifespan of comparable tools.

The HMT 13000 – which is an extension to the previously introduced HMT product line – is designed especially for low-profile applications only and suits hex sizes from 2 7/16" to 4 5/8" AF (62mm to 115mm AF).

The HMT 13000 delivers output torques from 1,829 to 18,289 Nm (1,349 to 13,489 Ft. Lbs) in applications including those requiring powerful tool access to confined spaces in tasks in mining and aggregates, oil and gas, infrastructure and construction, manufacturing, maritime and power generation and distribution.

"The HMT 13000 shares the same advantages of low cost of ownership as the broader range, and is also cost-effective and reliable because the cassettes have up to 25% fewer internal components than other designs, reducing the risk of failure and cost of repair," says Enerpac Asia-Pacific Marketing Manager, Tony Cooper.

"The HMT 13000 distinguishes itself through its speed, durability, and efficiency. It is designed to be interchangeable with different tools in the market," he said.

"When it comes to speed, it offers a best-in-class output-to-weight ratio and is up to 25% faster than traditional designs."

"As for durability, superior alloys make this tool lightweight and gives it a 2.5x longer life expectancy than comparable tools," Tony Cooper added.

"When it comes to operator efficiency, the modular parts allow for interchangeability, but at the same time guarantee a higher productivity. Its 30-degree angle of rotation saves time and money and is 25% more efficient."

Other features that improve operator efficiency are a 360-degree swivel hose attachment, lightweight design that results in less fatigue, and a standard ergonomic safety handle.

The HMT series is complemented by Enerpac's broader range of non-impact professional bolting technologies – including market-leading S and W torque wrenches – and by one of the world's most comprehensive ranges of pump technologies.

These include system-matched electric, air and petrol-powered types as well as the XC Series cordless torque wrench pumps, which are ideal for remote locations, sites that do not have access to power or where having electric cords could cause trip hazards, such as in maintenance workshops.



Enerpac's low-profile HMT1300 series torque wrench.

For more information about the full range of Enerpac tools and equipment, please visit: www.enerpac.com.au

ABOUT ENERPAC

Enerpac is a global market leader in high pressure hydraulic tools, controlled force products, portable machining, and solutions for the precise positioning of heavy loads.

As a leading innovator with a 110-year legacy, Enerpac has helped move and maintain some of the largest structures on earth. When safety and precision matters, elite professionals in industries such as aerospace, infrastructure, manufacturing, mining, oil & gas and power generation rely on Enerpac for quality tools, services and solutions. For more information, visit: www.enerpac.com.

ABOUT ENERPAC TOOL GROUP

Enerpac Tool Group is a premier industrial tools and services company serving a broad and diverse set of customers with operations in more than 25 countries. The company was founded in 1910 and is headquartered in Menomonee Falls, Wisconsin U.S. For more information, visit: www.enerpactoolgroup.com

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ONLINE LEARNING AND WEBINARS ON PRECAST NOW AVAILABLE

As the peak body of the Australian precast concrete industry, National Precast is invested in ensuring a safer, more standardised and sustainable construction industry and in improving the competency of all industry stakeholders.

Architects, engineers, builders, precast manufacturers and students alike will benefit from a new range of webinars and online learning modules that are now available at <https://nationalprecastonline.com.au>

These add to a growing list of publications that are available in both hard copy and digital format.

AS 3850 PREFABRICATED CONCRETE ELEMENTS WEBINAR

A must for every precast stakeholder

Every stakeholder in precast construction should understand the requirements and responsibilities

under AS 3850. The Standard has been revised to include civil construction as well as buildings, and this webinar covers the most important aspects of the standard. It is presented by three longstanding members of the BD-066 committee which is responsible for the standard's development and review – Simon Hughes from Precast Concepts, Rod Mackay Sim from Hillside Engineering and Steve Roach from the ACTU/CFMMEU.

INTRODUCTION TO PRECAST

Perfect for precast first-timers.

The *Introduction to Precast* online learning module provides industry professionals and students examples of how precast concrete differs from insitu concrete, the variety of applications and explains why precast is the most efficient construction method available. The module outlines the sequential precast

concrete timeline of manufacturing, transport and installation and finishing.

UNDERSTANDING GROUTED PRECAST JOINTS

Technical course for builders, engineers and erectors

As a technical course, *Understanding Grouted Precast Joints* details applications and approaches to grouting precast concrete elements.

Based on National Precast's highly regarded 2020 publication *Understanding Grouted Precast Joints – A guide for engineers and building contractors*, this module covers a range of typical grouting practices and outcomes. It covers design and specification, joint types, precast elements, common grouting practices, design and construction responsibilities and aesthetics.



2022 Excellence in Precast Concrete Awards

To celebrate 30 years of National Precast, we are excited to announce the inaugural Excellence in Precast Concrete Awards.

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www.nationalprecast.com.au/awards

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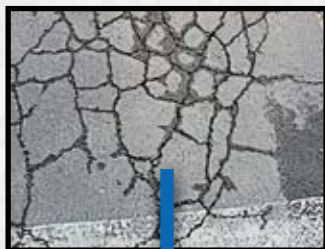
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- No expensive tools or machinery required
- Consistent quality – Reduced rework
- Waterproof seal with the flexibility of bitumen rubber
- Prefabricated format for ease of use and 24/7 availability
- Easy to handle 750mm x 1000mm sheet size
- Cut to size or shape on-site as required
- Sheets can be easily butted together for large areas
- Available with various aggregate sizes to match existing surface conditions
- Also adheres to a range of other surfaces including steel, timber and concrete
- Open to traffic immediately after installation
- Storage shelf-life of 10+ years





ROAD MAINTENANCE

The BRP Road Patch can be cut to size. Pieces can be butted together, ensuring zero wastage.



Early Intervention

Early intervention with a proven seal will result in safer roads and cost savings.



Long-life Repairs

By sealing off the defects using a waterproof seal, the BRP Road Patch delivers a high quality, long-lasting repair. Sealing 100mm beyond any visible defects eliminates perimeter cracking and hidden stress cracks, thereby reducing the possibility of rework.



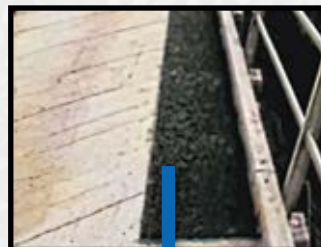
BRIDGE MAINTENANCE

The BRP Road Patch is ideal for small bridge maintenance jobs, and can be used on range of surfaces.



Bridge Joints

The BRP Road Patch provides a cost-effective solution for constructing and waterproofing bridge joints.



Deck Sealing

The resilience of the bitumen rubber provides a durable binder for flexible structures, including timber decks, vehicle and pedestrian bridges.



Minimal Disruption

Installation is quick and easy. The BRP Road Patch offers a cost-effective solution for deck sealing with minimal disruption to traffic.

SIMPLE INSTALLATION PROCEDURE REQUIRING MINIMAL LABOUR AND TOOLS



1

Sweep all loose particles from area. Demarcate 100mm beyond any visible defects.



2

Evenly apply emulsion to the demarcated area and to the back of the of the BRP Road Patch.



3

Wait for the emulsion to break (e.g. turn from brown to black). Place the BRP Road Patch onto the emulsion treat area.



4

Apply a small quantity of emulsion to the edges and along any joints. Blind edges and joints with crusher dust or sand.



5

Driver over the BRP Road Patch with construction vehicle on-site (several passes recommended). Open to traffic immediately.

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AUTOLIV LAUNCHES MULTI-YEAR COMMITMENT TO SUPPORT THE UN ROAD SAFETY FUND

Autoliv, Inc., the worldwide leader in automotive safety systems, is supporting the *United Nations Road Safety Fund* (UNRSF) to strengthen insights into road safety challenges, contribute to safer mobility and help deliver Autoliv's goal of saving 100,000 lives a year.

By exchanging valuable insights, knowledge, and data, Autoliv and UNRSF will actively support the *Global Plan for the Second Decade of Action 2021-2030*, which seeks to prevent at least 50% of road traffic deaths and injuries by 2030.

Road traffic crashes claim 1.35 million lives every year and are the leading cause of death among children and young adults. More than 90 per cent of road traffic fatalities take place in developing countries. Autoliv's support of UNRSF is an important step to further democratize road safety and increase awareness and availability of life-saving products where it is most needed.

Shaping the future of mobility in a safer and more sustainable way

Autoliv's vision of Saving More Lives directly supports UN Sustainable Development Goal (SDG) number three, which aspires to ensure good health and well-being for all, with one of its targets focused on halving global deaths and injuries from road traffic crashes.

"Cross-sector collaboration is key if the world is to advance its positions on the Sustainable Development Goals. Supporting the UNRSF is a way for Autoliv to share our expertise while gaining additional insights into the main road safety challenges facing the world today," says Mikael Bratt, CEO and President, Autoliv.

"Through our core business of life-saving products, we have an important role to play. Saving More Lives is an integral part of our sustainability agenda, and our aim is to save 100,000 lives a year," Mr Bratt said..

Cross-sector collaborations required to reach global sustainability goals

"As a member of the multi-stakeholder UNRSF Platforms of Engagement, Autoliv directly supports UNRSF thinking on high-impact road safety projects," Nneka Henry, Head of the UNRSF Secretariat said.

"With its financial contribution, Autoliv is also directly supporting UNRSF project operations in low- and middle-income countries. It is this type of multi-pronged engagement from the private sector which will leapfrog the global community towards achieving the SDGs on safe, sustainable and inclusive mobility for all."

Autoliv's commitment to support the UNRSF will directly result in road safety interventions in low- and middle-income countries ranging from better vehicle standards and road infrastructure design to effective systems to improve road user behaviour and emergency post-crash response.

AUSTRALIAN ROAD SAFETY TECHNOLOGY WINS PRESTIGIOUS GLOBAL PRIZE

One of Australia's world-leading traffic technology providers has taken out top honours for its life-saving 'Heads-Up' program, currently being deployed across the world.

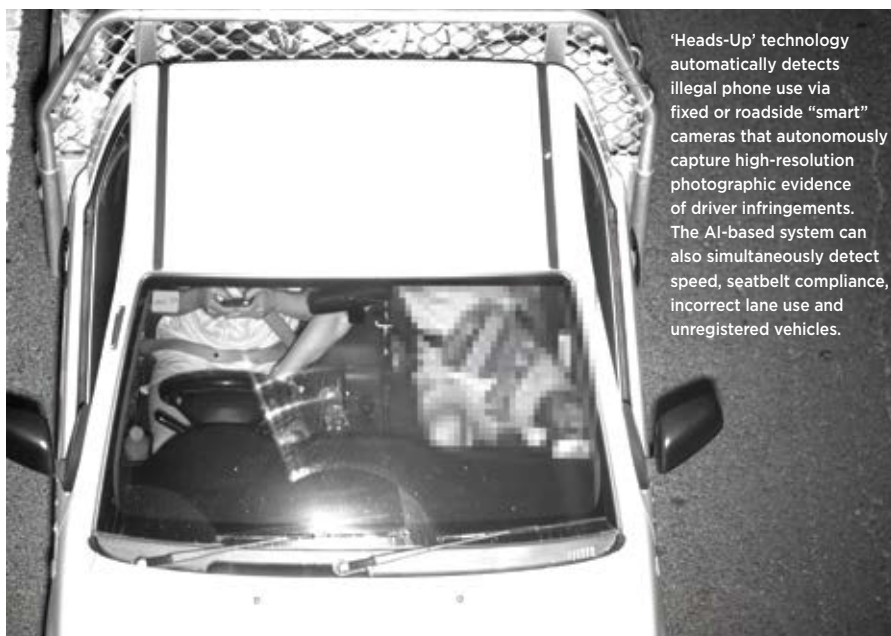
Acusensus was announced the winner of the Inspiration Award at Intertraffic in The Netherlands, the preeminent global mobility trade event profiling the latest advances in technological and hardware solutions.

Acusensus launched its world-first 'Heads-Up' safety solution in 2018 to drive behavioural change on road networks, enabling authorities to more easily prosecute drivers for illegal mobile phone use.

'Heads-Up' technology automatically detects illegal phone use via fixed or roadside "smart" cameras that autonomously capture high-resolution photographic evidence of driver infringements. The AI-based system can also simultaneously detect speed, seatbelt compliance, incorrect lane use and unregistered vehicles.

The Intertraffic jury said Acusensus's successful world-first NSW Heads Up program had been demonstrated to have saved lives since its launch in December 2019, following on from a successful 2018 pilot study.

Commending the 'Heads-Up' technology, the judges stated: "Reducing the death toll in traffic is, or at least should be, one of the industry's main priorities. Driving behavioural change on driver (mobile) devices is one of the key issues of our times. This innovation is a solution that marks a new era in enforcement. It's a clever set up, making it applicable to regions throughout the world and is agile to future needs."



'Heads-Up' technology automatically detects illegal phone use via fixed or roadside "smart" cameras that autonomously capture high-resolution photographic evidence of driver infringements. The AI-based system can also simultaneously detect speed, seatbelt compliance, incorrect lane use and unregistered vehicles.

NSW 'Heads-Up' data shows a 22 per cent drop in fatalities since the program began, equivalent to saving 93 lives based on past road trends. Infringements have also fallen, from 1 in 82 drivers during the program's initial rollout in 2019 to approximately 1 in 478 to the end of October 2021.

Acusensus founder and managing director Alex Jannink said he was honoured his company had been recognised by the world's foremost thought leaders in the traffic infrastructure space.

"It's particularly fitting to win the Inspiration Award given I was inspired to start Acusensus after a friend was killed by a distracted driver. I'm proud at how far we have come and how many lives we have saved, but there is still much more that can be done on a global scale," Jannink said.

"Distracted driving is a universal challenge. One quarter of crashes involve a distracted driver and 9 per cent of all road fatalities can be attributed to drivers distracted by a mobile phone. Our 'Heads-Up' program has proven we can dramatically reduce those numbers, preventing hundreds of thousands of deaths and road injuries worldwide."

Acusensus is already working with traffic authorities in the UK, US, Spain, The Netherlands, Belgium, South Africa and India. As well as NSW, the camera technology is being used in Western Australia and Queensland, which in addition to catching distracted drivers, is using the cameras to detect and enforce the world's first seatbelt compliance campaign.

"I'm really proud that Australian technology is leading the world in this space. Acusensus's mission is to improve safety outcomes by using technology to drive behavioural change. I believe our camera programs have the capacity to transform road safety behaviours in much the same way that seatbelts changed road user behaviour and quickly became accepted practice," Jannink said.

ABOUT ACUSENSUS

Acusensus was founded in 2018 with a mission to improve road safety around the world by providing intelligent solutions to drive behavioural change on the roads, reduce the instances of dangerous and unlawful driving, and the deaths and serious injuries that result from it.

Acusensus's 'Heads-Up' solution provides anywhere-anytime digital evidence that can be used in conjunction with law enforcement to drive behavioural change and address issues, including distracted driving, seat belt use, speeding, and vehicles of interest.

For more information on Acusensus solutions, please email: info@acusensus.com or visit: www.acusensus.com



WORLD FIRST ASIC WITH INTEGRATED ISP AND OCCULA® NPU OPTIMIZED FOR DRIVER AND OCCUPANT MONITORING SYSTEMS

OMNIVISION, a leading global developer of semiconductor solutions, including advanced digital imaging, analog and touch & display technology, together with Seeing Machines, the advanced computer vision technology company that designs AI-powered operator monitoring systems to improve transport safety, recently announced the automotive industry's first dedicated driver monitoring system (DMS) and occupant monitoring system (OMS) application-specific integrated circuit (ASIC) that combines an image signal processor (ISP) and is powered by Seeing Machines' Occula® Neural Processing Unit (NPU).

OMNIVISION announced the world's first dedicated DMS ASIC with an integrated AI NPU, ISP and DDR3 memory in January 2021 (OAX8000). The new OAX4600 integrates the Occula® NPU. It will feature a higher level of processing and performance, comply with ASIL B advanced safety standards, and is based on a much deeper level of partnership with ecosystem vendors. It will include an optimal HW RGB-IR ISP, cybersecurity and deliver the most power efficient solution.

"OMNIVISION has been working with Seeing Machines for more than five years now and was the first to execute a silicon license for the Occula® NPU in 2021. Today, we are unveiling our unique ASIC implementation, the OAX4600, featuring an integrated ISP and NPU, capable of higher resolution processing of up to 5 megapixels (MP)," said Andy Hanvey, director of automotive marketing, OMNIVISION.

"With the need for automotive-grade RGB-IR processing solutions, OMNIVISION brings its knowledge and leadership in ISP processing together with its highly optimized OAX4600 implementation that minimizes DDR bandwidth requirements. We will be releasing the combined solution which is ideal for space-constrained automotive integrations, such as in rear view mirror, in the second half of this year

to deliver improved efficiency and the lowest power to automotive OEMs."

"The rear-view mirror is the critical integration point for automotive OEMs to add occupant monitoring that adheres to the Euro NCAP roadmap for distracted, drowsy and, in the future, impaired driving detection," says Colin Barnden, principal analyst at Semicast Research.

"However, the mirror is both space and power constrained, demanding a highly-optimized imaging signal chain to meet the conflicting needs of high-performance vision processing with very low power consumption. Together the OX05B1S sensor and OAX4600 processor represent the interior sensing equivalent of an ace high royal flush, combining 5MP resolution with best-in-class image processing and low power consumption. It isn't obvious how this solution could be bettered on a performance-per-watt basis and looks positioned to be extremely successful in the automotive OEM nominations for occupant monitoring to be decided throughout this year and next."

"We are excited to be working with OMNIVISION to bring this optimized DMS/OMS solution to the market. With the introduction of the OAX4600 device, OMNIVISION now occupies a unique position in the silicon space as the only company that can offer a physical pipeline from pixel to the processing," added Nick DiFiore, SVP and GM of automotive at Seeing Machines.

"Pairing Seeing Machines' Occula NPU, and expert knowledge of the associated algorithms and optical space, with OMNIVISION's market leading imaging solutions, the OAX4600 brings the first truly optimized DMS/OMS standalone SoC processing solution."

Availability of the combined ASIC IP solution is expected in later 2022.

For more information, please visit: www.ovt.com/contact-sales

INTELLIGENT COMPACTION: THE BIG PIECE OF FUTURE ROAD CONSTRUCTION

by Sam Afkar, Pavement & Asset Principal Engineer, ARRB

Intelligent Compaction is a solution to the rapidly growing need in the road construction industry for more efficient, reliable and quicker ways of testing and collecting compaction data during earthworks and pavement construction.

Adequate compaction is critical to ensure the long-term performance of pavement layers and earthworks. Currently, the in-situ density of these layers is primarily assessed using either cores/samples extracted from the compacted layer or a nuclear density gauge. Pavement cores and sand replacement samples used for density testing are intrusive and time-consuming methods that provide limited coverage, whereas nuclear density gauge testing has associated health and safety risks.

Intelligent Compaction (IC) refers to the compaction of road materials, such as soils, aggregates, or asphalt, using modern vibratory rollers equipped with an integrated measurement system, an onboard computer reporting system, Global Positioning System (GPS) based mapping, and optional feedback control (<https://www.intelligentconstruction.com>). IC rollers facilitate real-time compaction monitoring and timely adjustments to the compaction process by integrating measurement, documentation, and control systems. These rollers also maintain a continuous record of the number of roller passes and material stiffness measurements that are conveniently displayed on colour coded maps of the project site. Over the last decade, this technology has gained popularity around the world and has been shown to improve construction quality and productivity.

NACOE project P105 Implementation of Intelligent Compaction (IC) in Queensland has been investigating the hardware and software requirements to implement IC into Queensland, as well as transferring international knowledge and experience to the local industry. A new pilot specification for the use of IC in road pavement construction was also developed. In addition, the project is also identifying and quantifying the costs and direct and indirect benefits of this innovative technology, as well

as developing technical specifications and training materials to facilitate future rollouts.

The NACOE project has also recently trialled the use of IC technology on different pavement layers and materials, including embankment fill, subgrade soils, cement modified granular, unbound granular and asphalt. These trials showed that IC can provide important and immediate roller operating parameters to the operator (in the form of a visual map) to ensure that pavement layers and earthworks are compacted uniformly and in accordance with appropriate standards. The data can also be uploaded and stored online for archiving and remote-monitoring purposes.

It was found that IC technology can readily identify soft areas in a pavement or embankment and can also be used to improve the uniformity of the compacted layers.

The study showed that the Compaction Meter Value (CMV) has varying degrees of correlation against the in-situ stiffness (measured by a light weight deflectometer) and conventional density results (measured by a nuclear density gauge). It was also noted that the CMV is sensitive to in-situ moisture conditions during construction. The team delivered an online webinar to disseminate the results and findings from the demonstration trial. AfPA (AAPA at the time) also delivered a virtual masterclass, providing additional training on the use of the latest IC data management software, Veta (version 6.0 at the time) and the project has funded Veta package to support the latest GDA2020 system which became the main cadastral grid to be used across different jurisdictions in Australia.

Currently, the focus is to trial the use of IC technology on asphalt layers. After gaining some experience on few small projects, a twelve-shift rehabilitation work as a full-scale project was selected to be treated and delivered as an intelligent construction project for the purpose of having first-hand experience of all the challenges, assessment of the advantages, requirements and costs.





Pre-mapping was also identified as one of the major benefits of using IC technology for asphalt projects. The trial gave the opportunity to understand what the requirements are, how the road authorities can monitor, oversee, quality control and accept an asphalt project and what it needs to be in terms of specifications, technical standards and contracts. It was also a great chance to develop a checklist for IC projects.

After applying IC on different pavement materials, to help implement the technology and demonstrate the benefits of it, the concept of using IC, results of analysis, details of experience and lesson learned are planned to be shared in future webinars and published reports. Additionally, a training session on more details of IC concept, data analysis and the use of Veta package is organised to be held in May.



IC technology is a game-changer that significantly increases the level of details on the pavement layer while it is compacted. It provides reliable information on compaction and on-the-fly unlimited feedback which helps to:

- Have consistency and uniformity
- Avoid under-compaction (leading to less respective defects and longer-lasting pavement layers)
- Avoid over-compaction (for asphalt)
- Prevent extra (excessive) work after completion
- Make savings on less penalties, and
- Overcome the issue with a limited number of tests (and increase the reliability of the information).

To find out more about how ARRB can help you using Intelligent Compaction technology, contact Sam Afkar, Pavement & Asset Principal Engineer, ARRB, T: 03 9881 1555 E: sam.afkar@arrb.com.au

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LEFT: ARRB's Intelligent Pavement Assessment Vehicle (iPAVe) provides pavement strength testing in a single pass along a road – providing an accurate, cost-effective way of measuring the quality of a road surface and its sub-surface.

VICTORIAN ROADS MINISTER VISITS ARRB HEADQUARTERS, LABS AND iPAVE

Victoria's Roads and Roads Safety Minister Ben Carroll got to know his Department's newest addition when he visited ARRB headquarters in Port Melbourne. Victoria's Department of Transport is now using ARRB's *Intelligent Pavement Assessment Vehicle* – or iPAVe – to measure and help manage its road network.

Minister Carroll visited ARRB's Port Melbourne headquarters with a team from the Department of Transport, including Head of Transport Services Nick Foa, and the local Upper House member of Parliament and Victorian Government Legislative Council

Whip, Nina Taylor MP.

ARRB Chief Executive Officer Michael Caltabiano took the group on a tour of our facility, including a deep dive into our transport research laboratories and a look inside the inner workings of the iPAVe.

The iPAVe has the latest in data collection technology to help determine which roads most urgently need upgrades and repairs, saving time and money. It collects data in a single pass at normal traffic speed - making the process of monitoring, measuring and managing road networks better for all concerned.

Importantly, it also allows to see exactly the condition of what's under the road surface, allowing proper maintenance decisions to be made and prioritised.

"To think you can have a vehicle travelling literally at 80km/h, making the assessment of the road surface, and more than that though, what's under the surface - looking at the structural impact of the road, is fantastic technology for Victoria," Minister Carroll said.

The Department of Transport will use ARRB's iPAVe across the roads it controls in Victoria.

"The iPAVe vehicle is capable of doing the entire Victorian (road) network within one year," Mr Foa said. "That means better information, received far more quickly."

The iPAVe is the flagship of a large fleet of ARRB survey vehicles, which allow roads in all jurisdictions, at all levels, to be measured and managed.

"We can do the right treatment in the right place at the right time, preserving taxpayers' dollars, and keeping our roads safe and efficient," Mr Caltabiano said.

ARRB is also working with the Victorian Government on a variety of sustainability-based projects as part of the State's Recycled First commitment.

Find out more about the iPAVe at: <https://www.arb.com.au/ipave>

ARRB INVESTIGATING THE USE OF RECYCLED PLASTIC PIPES IN DRAINAGE SYSTEMS

Using more of the millions of tonnes of unwanted plastic Australians consume every year in recyclable products is something we all want to see happen.

Road infrastructure products have been identified as potential keys to boosting the use of recycled plastic. ARRB is already involved in several research projects in the waste plastic space.

ARRB has been engaged by Major Road Projects Victoria and Department of Transport to explore the use of recycled plastics in drainage pipes under the road pavement.

Currently, concrete pipes have only ever been used for the drainage and wastewater network under the road pavement in Victoria. The project, which is well underway, will involve the review of existing standards and practice both interstate and nationally, consultation with relevant stakeholders,

development of performance requirements, and material testing requirements.

Potential for the inclusion of recycled plastics into other drainage-related structural elements and components in the future will also be explored.



ARRB has also been involved in the development of the soon to be published Department of Transport recycled plastic noise wall. In addition, ARRB works in conjunction with the National Asset Centre of Excellence (NACOE) and the Western Australian Road Research and Innovation Program (WARRIP) on projects involving recycled plastics.

"ARRB is proud to be supporting the use of recycled plastics in transport infrastructure. Development of specifications to incorporate recycled materials is a big step in towards recycled products being business as usual", Melissa Lyons, Senior Technology Leader of Sustainability and Material Performance said.

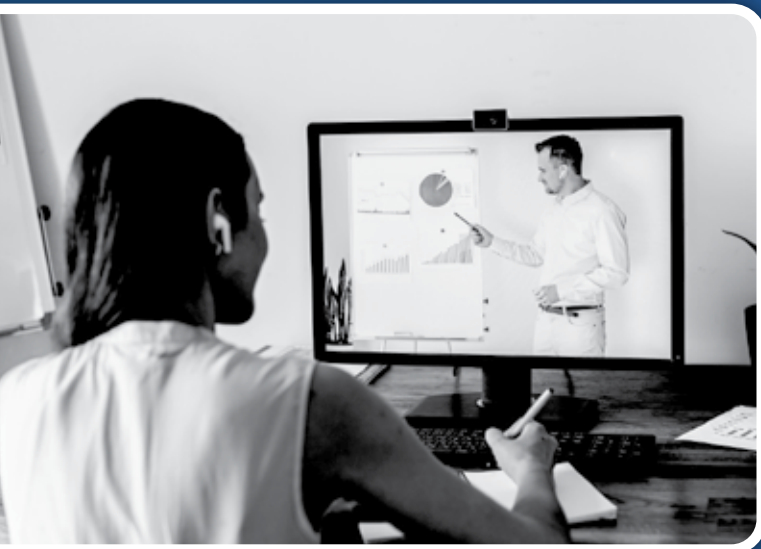
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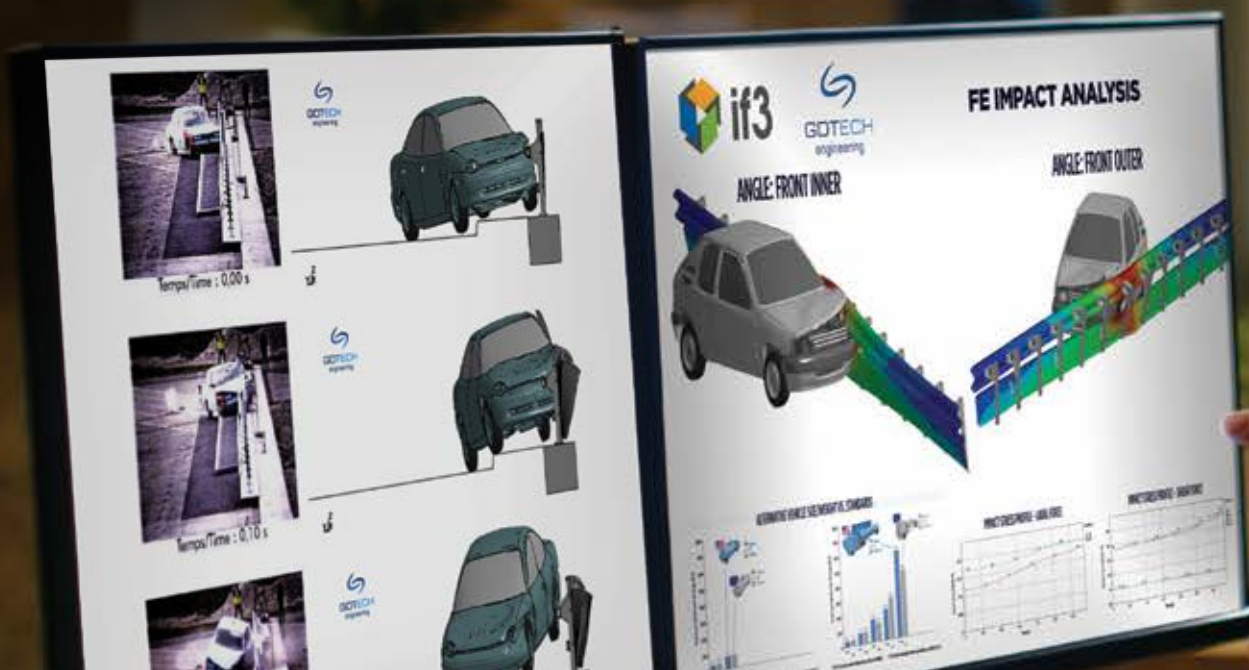
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Gamuda Australia and Laing O'Rourke Consortium Awarded Major Sydney Metro Tunnelling Package

A consortium between Gamuda Australia and Laing O'Rourke has been appointed by the NSW Government to deliver the AUD\$2.16 billion Western Tunnelling Package (WTP) on the Sydney Metro West project. Sydney Metro West will support a growing city and deliver world-class metro services to more communities. This new underground railway will connect Greater Parramatta and the Sydney CBD.

Project scope includes:

- Twin 9km tunnels from Sydney Olympic Park to Westmead;
- A Tunnel Boring Machine launch site at Rosehill, tunnelling first toward Sydney Olympic Park and relaunched from Rosehill toward Westmead;
- Excavation for a services facility and crossover structure at Rosehill to allow provision for fresh air ventilation and emergency egress;
- Tunnel portal and dive excavation at Clyde Services and Maintenance Facility;
- Earthworks, retaining structures, drainage and utilities corridor for the Clyde Maintenance Facility;
- Excavation and civil works for Parramatta and Westmead Stations; and

- A segment manufacturing facility at Eastern Creek constructing over 60,000 segments.

Dato' Yun-Ling Lin, Group Managing Director Gamuda Berhad said: "We thank the NSW Government for placing their trust in us to deliver this critical portion of Sydney Metro West. We are excited to share our international experience in building high-frequency rail sustainably, and are focussed on generating benefit for communities in Western Sydney."

Cathal O'Rourke, Managing Director, Laing O'Rourke said: "We are proud to once again partner with the NSW Government to deliver a vital piece of infrastructure for Sydney Metro. Gamuda Australia and Laing O'Rourke share an innovation mindset and a commitment to people which will be at the heart of this successful consortium."

Simon Hussey, WTP Project Director said: "There is a huge opportunity for us to leave a positive legacy through this project by engaging suppliers in Western Sydney, creating local jobs and building strong partnerships with local stakeholders and communities."

"This includes establishing a Tunnel Infrastructure Academy, to attract and train a more diverse and inclusive tunnelling

workforce," Mr Hussey added.

Gamuda brings decades of international experience in metro rail construction and engineering innovation which will be harnessed during delivery of WTP.

Laing O'Rourke has a long track record in successfully delivering large projects throughout Australia. It is this power of experience which the business will bring to the Western Tunnelling Package.

Sydney Metro West will double rail capacity between Greater Parramatta and the Sydney CBD, transforming Sydney for generations to come. This once in a century infrastructure investment will reduce commuting times to around 20 minutes between the two centres, link new communities to rail services, and support employment growth and housing supply.

Sydney Metro West will create more than 10,000 direct new jobs and 70,000 indirect jobs, with many of these jobs generated by this major contract.

Appropriate disclosures of the contract award have been made to Bursa Malaysia in Kuala Lumpur.

Tunnelling works on the WTP are scheduled to start late 2023, with completion of the contract expected by the end of 2025.



More time and planning for tunnel projects is the key to functional cities

by Matt McLean, Operations Manager, Mainmark Civil and Mining

As traffic density continues to increase with population, keeping society from grinding to a halt often rests on our tunnel infrastructure.

Tunnels help to alleviate congestion, promote smoother traffic flow, and minimise disruption in built-up areas. They are a highly valued element when developing urban environments, which is why a number of tunnels have been included in the national infrastructure boom, such as the new Sydney Harbour tunnel in New South Wales and the North East Link project in Victoria.

These important infrastructure projects are particularly valuable for major cities in growing metropolitan areas. New South Wales, for example, saw 5,892,206 motor vehicles registered in 2020 according to the latest motor vehicle census, with many of those vehicles expected to travel through Greater Sydney.

Tunnels are complex structures that require funding in areas which can sometimes be overlooked, yet the investment is essential to ensure the safety, quality and longevity of these heavily utilised transport corridors.

“It is vital that tunnel construction includes a combination of careful pre-construction planning, ground and risk analysis, and the specification of appropriate remediation solutions.”

The relationship between tunnel infrastructure and ground conditions

When surrounding ground conditions have not been fully considered during construction, tunnels can become more susceptible to degradation. For example, unconsolidated soil can result in a soft and often precarious envelope for tunnels that is prone to shifting.

This can be problematic in areas such as Sydney, where ground conditions are rife with water tables, palaeochannels and weak and unconsolidated sandstone. If these geological occurrences are not identified

and planned for in advance, they can affect a tunnel's structural integrity by causing ground movement and cracking, or significant water ingress that can slowly degrade the structure.

Unfortunately, costly and irreversible damage may not appear for some time as significant deterioration can take a decade or more. In some cases, issues may even be completely overlooked due to competing priorities such as meeting the community's expectation to complete a tunnel quickly to alleviate serious traffic congestion. Yet the serious implications of water ingress in tunnel infrastructure cannot be ignored and having a plan and budget in place for proactive mitigation, like waterproofing and ground reinforcement to minimise the likelihood of costly structural issues post-construction, is essential.

Remediating problems before they occur

With increasing pressure on roads in our expanding urban centres, the need for tunnel infrastructure across Australia will



“Tunnels are complex structures that require funding in areas which can sometimes be overlooked, yet the investment is essential to ensure the safety, quality and longevity of these heavily utilised transport corridors.”

be ongoing. It is therefore vital that tunnel construction includes a combination of careful pre-construction planning, ground and risk analysis, and the specification of appropriate remediation solutions. Detailed planning, site surveying and a thorough geotechnical analysis of the surrounding ground conditions should take place well before construction begins. This should then be followed with tailored solutions like specialised resins, gels and coatings that are engineered for civil infrastructure use, introduced before and during the tunnel construction phase.

Based on the experience of Mainmark's technicians with remediating and strengthening tunnels, understanding what solutions and application techniques to use for different tunnel systems and ground conditions is vital to mitigating potential issues. By utilising the right solutions, we can ensure the quality and longevity of Australia's existing and future tunnel infrastructure for decades to come.

Matt McLean is the operations manager for the civil and mining division at Mainmark. He is a concrete remediation, specialised coatings, resins and waterstop injection specialist with a long history of working with ground stabilisation and grouting technologies.

ABOUT MAINMARK

Mainmark provides a range of specialist ground engineering and asset preservation solutions for residential, commercial, industrial, civil infrastructure and mining sectors.

Committed to excellence, Mainmark's state-of-the-art solutions are backed by more than 25 years of engineering expertise. Mainmark has 15 sites across Australia, New Zealand, Japan and the UK.

Mainmark products and services include solutions for ground stabilisation, void filling, stopping water ingress, raising and levelling on-ground and in-ground structures, fixing anchors into rock faces and embankments, and other related ground engineering processes.

For more information, please visit: <https://mainmark.com>

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