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Published by:
Editorial and Publishing Consultants Pty Ltd
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www.epcgroup.com

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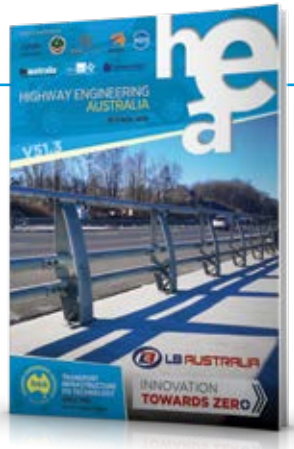
Registered by Australia Post
Publication No. 100001888
ISSN 0046-7391



About the Cover

LB Australia Pty Ltd has been leading the way in the provision of world-leading road safety equipment and technologies for over 35 years. Not surprisingly, the company's focus on providing engineered safety solutions to reduce road trauma is reflected in its motto 'INNOVATION TOWARDS ZERO'.

▶ Turn to **Page 8** for the full story.

When it comes to beating congestion... It's all about alternatives

Dear Readers,

I noticed with great interest that the subject of congestion charging is once again being touted as a solution to traffic congestion throughout the Melbourne CBD. This is perhaps not surprising, given the success of the congestion charge scheme in London.

Now, before I continue, I feel there are a couple of salient points that I need to make:

a) I am extremely familiar with both London and London's congestion charge and, perhaps most importantly, the massive improvement in London's traffic that has been experienced since its introduction. I believe it delivers significant benefits to London – so, no arguments from me on that front!
b) I agree 100% that traffic congestion is a serious environmental and economic challenge which MUST be addressed – and quickly.
c) It's no exaggeration to say that Melbourne's traffic (particularly in the CBD and inner-suburbs) must surely rank as some of the worst in Australia.

That said, I feel I can now state that **at this point in time** I am totally and unequivocally OPPOSED to the introduction of a congestion charge or peak toll or whatever name it's given for Melbourne. And please note, that I have highlighted the words *'at this point in time'*.

While my previous comments may have left some of you wondering why I am so vehemently opposed to congestion charging for Melbourne at this time - especially given my recognition of the fantastic result that it has had in London – the answer is simple... ALTERNATIVES.

By that I am of course referring to available transport alternatives.

Put simply, if you want to get people out of their cars, you need to provide them with a viable alternative method of getting around. And that applies whether it's a specific section of the road network (e.g. the CBD or inner-city suburbs) or the wider road network in general.

Case in point – London vs. Melbourne: In much of London, you are rarely more than a couple of minutes' walk from a regular, reliable and affordable public transport service – either bus or train. What's more, these services have been designed and are delivered in a fashion which provides regular connections across the greater London area.

In short, London has a public transport network that in many instances obviates the need to use a private vehicle – especially for daily commuting into the CBD.

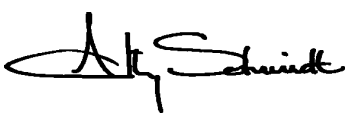
On the other hand, whilst Melbourne has a relatively well organized and, for the most part, convenient tram network running throughout the southern half of the CBD, even a simple trip across or from the northern end of the CBD (or most neighbouring inner-city suburbs) can be a time-consuming and, more often than not, logistically challenging task.

Then there is the matter of connections – or complete lack thereof – with the majority of the greater Melbourne metropolitan area. In addition to the staggering percentage of Melbournians who live more than 1km from the nearest public transport offering, problems with lack of services, service disruptions and a lack of connections between services, renders public transport a completely unusable option for a large proportion of the City's population.

Add to that, the of lack of parking spaces for people who would like to use public transport, but have to use a private vehicle to get to the nearest station, stop or interchange, and it becomes clear that in it's current form, Melbourne's public transport network is simply 'not up to the task'. And while there are many plans for improvements – and several major projects currently underway – the gap between where it is now and where it needs to be to provide a viable alternative to private vehicle use for the majority of Melbournians is massive.

Congestion charging is a highly effective method of delivering a significant reduction in vehicular traffic in specific areas at specific times. However, it should not be a consideration until such time that viable public transport alternatives are available to the majority of the populous.

It should also not be used as a method of funding the required public transport alternatives. When in comes to congestion charging, the 'horse must definitely be put in front of the cart', with services delivered first and charges levied afterwards... lest the public end up viewing the whole process as *'yet another form of revenue raising with no genuine intent or result'.*



Anthony T Schmidt
Managing Editor

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MASH COMPLIANT

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The QuadGuard® M10 is a redirective, non-gating crash cushion that consists of an engineered steel nose and crushable, energy absorbing cartridges surrounded by a framework of steel Quad-Beam™ panels. The system is tested to the Manual for Assessing Safety Hardware (MASH) Test Level 3. It can be used to shield fixed objects of 610 mm wide.

The QuadGuard® M10 system utilises two types of cartridges in a configuration designed and tested to address vehicles as defined by MASH for both lighter cars and heavier, high centre-of-gravity vehicles.

Advantages

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Lendlease recognised for school engagement programs

Lendlease was recognised with the Queensland Major Contractors Association (QMCA) Ian Harrington Award for collaboration, after successfully developing and running several school engagement programs in partnership with the Australian Business and Community Network (ABCN) in Queensland.

More than 110 students from lower socioeconomic backgrounds have benefited from these programs, involving nearly 60 volunteers from Lendlease's regional Head Office and three major infrastructure projects in Brisbane; Gateway Upgrade North, Kingsford Smith Drive upgrade and Pacific Motorway Upgrade.

Speaking about the Award, Glen McIlroy, Lendlease Executive General Manager – Northern Region, commented:

"Lendlease is extremely proud to offer development opportunities to encourage more young Queenslanders to pursue careers in the civil construction industry."

"These programs aim to help raise awareness of STEM-related careers in the civil construction industry and assist students to develop crucial interview skills to help them pursue these careers when the time comes."

"We're hoping these programs will increase the diversity of students considering careers in civil construction, with many of the students from multicultural backgrounds and around 50 per cent of the cohort female," Mr McIlroy added.

Lendlease is the only property and infrastructure group in Queensland to partner with ABCN to equip students with essential skills, mentoring and career opportunities, with seven programs now run at major projects across Queensland.

"When ABCN was formed 14 years ago, most of its member companies were in the finance sector," Heather Smith, ABCN Queensland Manager said.

"This collaboration with Lendlease is important because it allows students from high-needs schools to be exposed to a wider diversity of career choices, including in the civil infrastructure industry," Ms Smith concluded.

L-R: Katrina Kaurila (Lendlease), Bec Farrell (Lendlease), Alison Blacker from ABCN, and Michael Steele (Lendlease)

Builders Back Treasurers' Focus on Fast Tracking Infrastructure Construction

"The focus by the nation's treasurers on concrete action to fast track infrastructure construction and boost productivity will be welcomed by the nation's builders," Denita Wawn, CEO, Master Builders Australia said.

"It's good to see the Federal Government focussed on working with the states to advance the rollout of smaller projects that can be rolled out more quickly, particularly in jurisdictions outside Sydney and Melbourne where there are not capacity constraints," she said.

"It will provide opportunities for smaller construction contractors from across the country and boost local businesses, economies and communities," Denita Wawn said.

"This is exactly what Master Builders Australia has been calling for since the re-election of the Morrison Government," she said.

"Focus on fast tracking infrastructure projects outside Melbourne and Sydney will also help fill emerging gaps in the pipeline of civil and engineering construction work, which if not filled may challenge the industry's ability to maintain capacity," Denita Wawn said.

"The long term outlook is positive but we need to think tactically about how we might bring certain public projects forward to fill these gaps," she said.

"Master Builders has put forward a list of infrastructure priority projects which could be fast tracked in each state and territory in our submission to Infrastructure Australia's priority list," Denita Wawn said.

"We also strongly back the Treasurer's agreement for the states to work with the Federal Government to overcome capacity constraints to infrastructure construction in Sydney and Melbourne and are happy to assist," Denita Wawn said.

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Radar-based intersection collision avoidance system takes out top road safety award

A Queensland-based crash avoidance system has taken out one of Australasia's premier road safety awards, the 3M-ACRS Diamond Road Safety Award.

The 3M-ACRS Diamond Road Safety Award recognises exemplary innovation and effectiveness in saving lives and injuries on roads.

The winning project, titled *'Hold the Red: Radar-based intersection collision avoidance system'*, was led by Peter Kolesnik, Director of Road Safety Programs at the Queensland Department of Transport and Main Roads (TMR). Team members on the project were Allan Hales, Manu Hingorani, Connor Broe, Denis Floyd, and Matt Baylis.

The 3M-ACRS Diamond Road Safety Award was presented at the recent ARSC2019 Conference Gala Dinner and Awards ceremony by Mr Llew O'Brien, Federal Member for Wide Bay, QLD, along with Mr Martin Small, President of the Australasian College of Road Safety (ACRS), and Mr Andrew King, Group Business Manager for 3M Transportation Safety Division and 3M Commercial Solutions Division, Australia and New Zealand. The award ceremony was attended by over 500 of Australasia's foremost road safety professionals and advocates.

Mr O'Brien congratulated all of this year's award winners for their contribution to improving road safety throughout Australia. "Thank you to everybody who has organised events and campaigns to focus the nation's attention on this important issue", he said.

"Every life lost on our roads is a tragedy, especially for the victim's family and friends, but it also has a ripple effect on local communities" Mr O'Brien said. "Road safety should be a priority for all of us and we can all do our part to help make Australia's roads safer."

ACRS President, Mr Martin Small, said "The Australasian College of Road Safety is delighted to continue our association with 3M in this highly sought after award. Congratulations to this year's winner, Peter Kolesnik and his team at Queensland Transport and Main Roads, for their well-researched application of a proven system to protect the life and health of people in our road traffic system."

3M representative Mr Andrew King said "3M is proud to again support this award, now in its 9th year and congratulates Peter and his team at TMR Queensland for the win. Through collaboration, innovation and team work this program shows what can be achieved through new technology in road infrastructure to assist in reducing road trauma on our roads. A well deserved 3M-ACRS Diamond Road safety award winner that could be replicated globally in our target toward zero."

Hold the Red (HTR) is an intelligent crash avoidance system that is installed into the Traffic Controller Cabinet at signalised intersections using a virtual loop card. The system uses radar to track each vehicle approaching an intersection up to 150m from the stop bar. This range provides the advantage of using radar over other alternatives such as existing induction loops as the radar system can dynamically track the speed of vehicles and predict when a vehicle approaching an intersection will not be able to stop in time. When such a vehicle is detected, HTR instructs the signal controls to extend the all-red phase by an extra two seconds. Law-abiding drivers in cross traffic lanes do not enter the intersection, reducing the chances they will enter into a potentially hazardous situation.

The Department of Transport and Main Roads (TMR), in conjunction with the Queensland Police Service (QPS), are trialling HTR at four intersections in South East Queensland. Installation at these sites was carried out between August and October 2018.

Queensland University of Technology Centre for Accident Research and Road Safety - Queensland (CARRS-Q) is conducting an independent evaluation of the functionality and road safety benefits of HTR. As at 27 May 2019, HTR had been activated approximately 14 times per day since installation across all four sites, with 3514 total activations. HTR has improved the safety of vehicles and pedestrians at each intersection where it is installed by reducing the risks of a collision due to red light running. There have been no recorded fatalities due to red light running at these intersections since installation.

Finalists for the 3M-ACRS Diamond Road Safety Award came from many areas including local and state government groups, police, not-for-profit organisations, industry associations and private companies.

Judges of the award evaluated all the entries in terms of problem solving, innovation in technology and thinking, and the benefits in reducing trauma. Cost-effectiveness and transferability to other areas were other key criteria.

Engineering solutions for safer roads

More than 1.25 million lives are lost on roads around the world each year – a statistic a University of Queensland-led research team is aiming to tackle using engineering technology.

UQ civil engineer and researcher Professor Simon Washington said the Engineering and Technology project relied on video technology, deep learning, artificial intelligence and advanced econometrics to improve road safety.

"Using advanced video analytics technologies, we're able to measure and detect interactions among road users that are reliable predictors of future crashes," Professor Simon Washington said.

"This data can then help determine how roads can be improved, in order to prevent crashes.

"We estimate this technology has the potential to eliminate approximately 540 crashes in South East Queensland each year — equating to about $40 million in reduced crash-related costs."

Professor Washington worked with Professor Tarek Sayed from The University of British Columbia and Associate Professor M.D. Haque from the Queensland University of Technology, bringing together more than 70 years of research experience.

The team developed a complex set of algorithms that can relate information about interactions among vehicles, pedestrians and cyclists, to crash risks.

These algorithms allow researchers to predict where and when crash risks are greatest.

"We've already implemented this technology in 20 cities in eight countries around the world, resulting in improvements to a number of intersections," Professor Washington said

"We've also partnered with the Department of Transport and Main Roads to roll out a pilot of the technology locally."

Professor Washington said the project was part of a significant partnership between UQ and the state government in supporting innovation.

"This pilot project with Transport and Main Roads will help us to build on the knowledge gained from implementation of the technology in other cities," he said.

Transport and Main Roads' Director (Safer Roads) Simon Harrison said previously blackspots were mainly identified through reported crashes, but now there is a greater focus on proactive methods.

"This research into video analytics has the potential to improve the way we identify safety issues before a crash trend develops," Mr Harrison said.

"As we work towards Vision Zero — zero road deaths and serious injuries — this intervention could take us one step closer to implementing engineering solutions before anybody gets seriously hurt."

INNOVATION TOWARDS ZERO

While few would argue that the ultimate goal of achieving ZERO FATALITIES and ZERO SERIOUS / PERMANENT INJURIES on our roads should be the only target to aim for, achieving that goal will undoubtedly require significant effort and investment on behalf of all stakeholders – especially given the current state of the nation's road toll. It's also clear that achieving that goal will require much more than increased levels of enforcement activities and/or improved driver education.

Together with driver behaviour and enforcement, it has long been recognised - both in Australia and internationally - that factors including vehicle safety, traffic management and the quality and design of road network infrastructure are all critical factors in reducing the road toll. Indeed, the European Commission's 'Vision Zero' policy framework highlights the importance of implementing a "Safe System" with core elements including safe road use, safe vehicles and safe infrastructure.

Needless to say, the term 'safe infrastructure' also extends to the design and performance capabilities of roadside furniture and safety infrastructure including barriers, fences, crash cushions and other safety equipment.

In keeping with this Safe System approach to road network infrastructure, LB Australia Pty Ltd has been leading the way in the provision of world-leading road safety equipment and technologies for over 35 years. From its earliest work in wire rope safety barriers (LB Australia supplied the first tension wire rope barrier system into Australia in 1991), LB Australia has been responsible for the introduction of a wide range world-renowned road safety technologies, including:

- BASYC motorcycle crash barrier;
- BARRIACEL motorcycle crash attenuating device;
- JEROL frangible posts and columns;
- SMART CUSHION speed dependent crash attenuator; and most recently
- DOLRE low stress parapet system.

What's more, as the exclusive Australian partner of internationally renowned Finite Element (FE) modelling specialists GD Tech Engineering, LB Australia - through its sister company if3 - continues to test and develop specialist road safety solutions specifically for the Australian road network.

"We've always recognised the critical role that 'passive safety' plays in reducing road trauma," LB Australia Managing Director, Paul Hansen, commented.

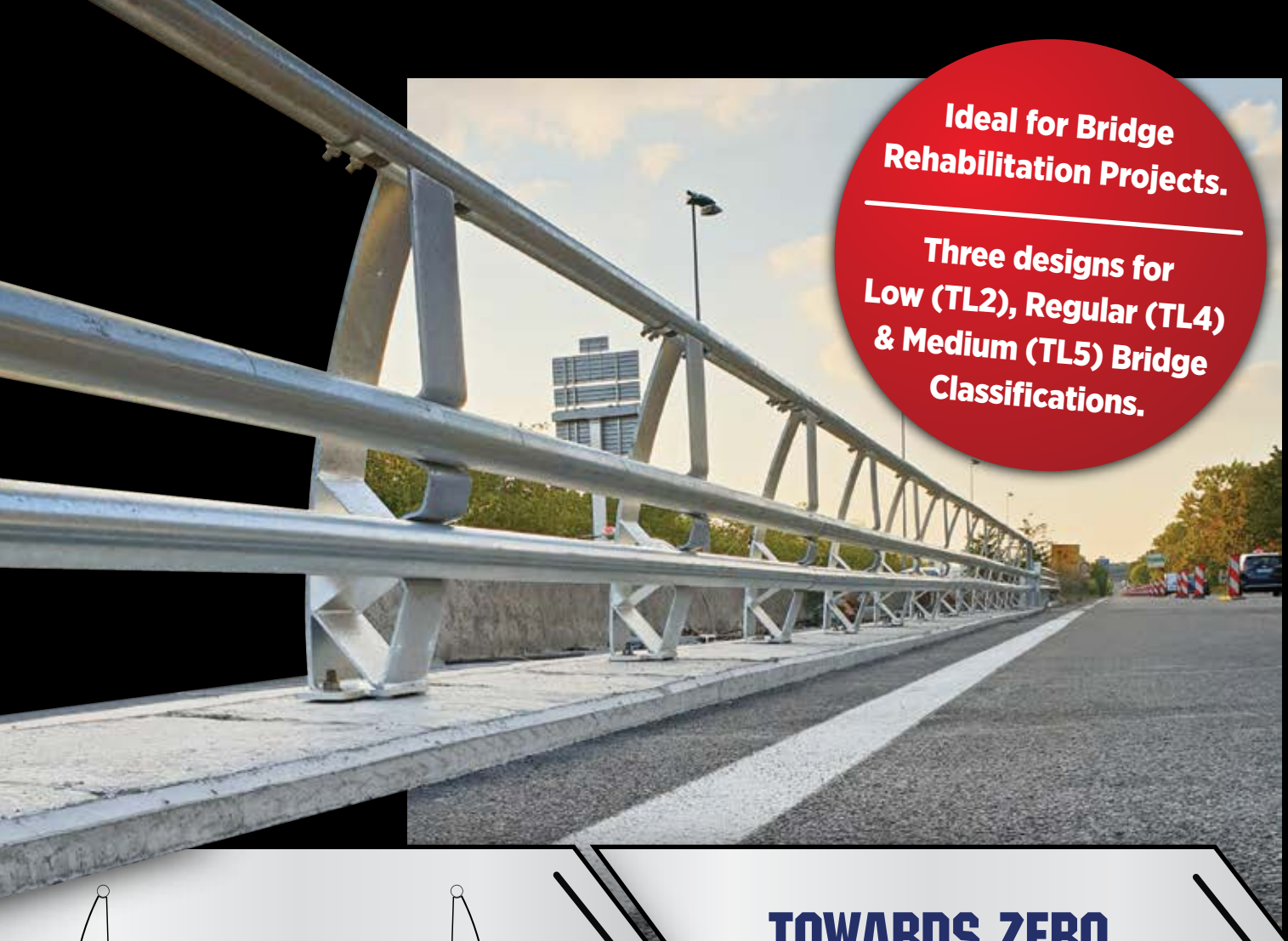
"It's clear from the European example, that when combined with driver education, enforcement and improvements to the road network, passive safety devices such as frangible posts and poles, safety barriers, crash cushions and high performance parapet systems can, and do, play a major role in reducing road trauma," he said.

Not surprisingly, the company's focus on providing engineered safety solutions to reduce road trauma is reflected in its motto 'INNOVATION TOWARDS ZERO'.

"While it is not always possible to eliminate all of the issues involved with driver behaviour, we believe that everything and anything that can be done to help mitigate the risk of fatality or serious injury in the event that a driver does make an error, must be done," Paul Hansen said.

"And while Zero Fatalities and Zero Serious Injuries may seem to be an almost impossible task, we too believe that it must remain the ultimate genuine goal – and we'll continue to work with our partners around the globe to develop and supply products to help achieve that goal."

"After all, one fatality on our road network, is one fatality too many," Paul Hansen concluded.



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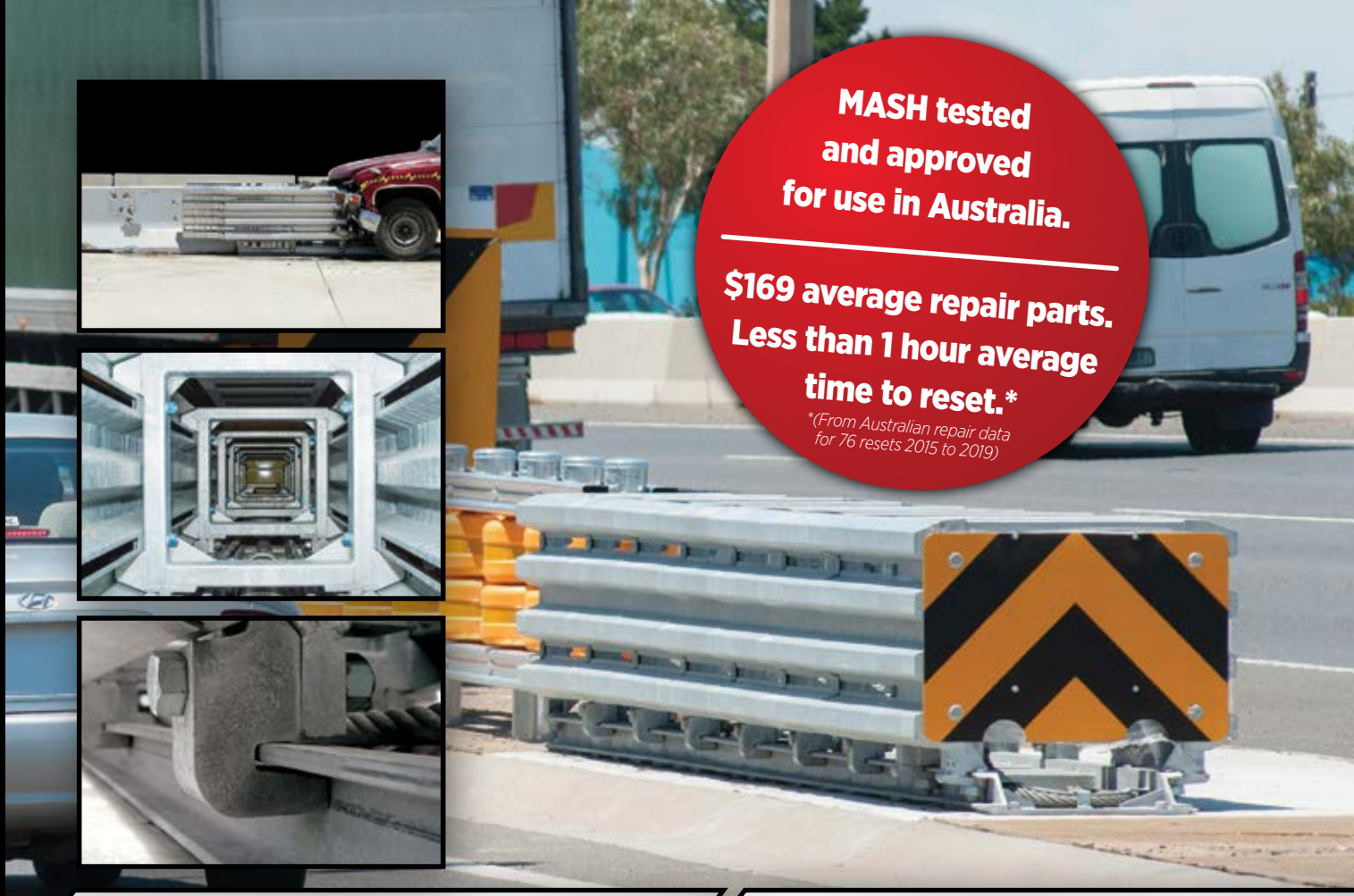
- Easy to install
- Quick and easy to dismantle in times of flood
- Cost-effective bridge rehabilitation solution



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*(From Australian repair data for 76 resets 2015 to 2019)

TOWARDS ZERO REPAIR COSTS

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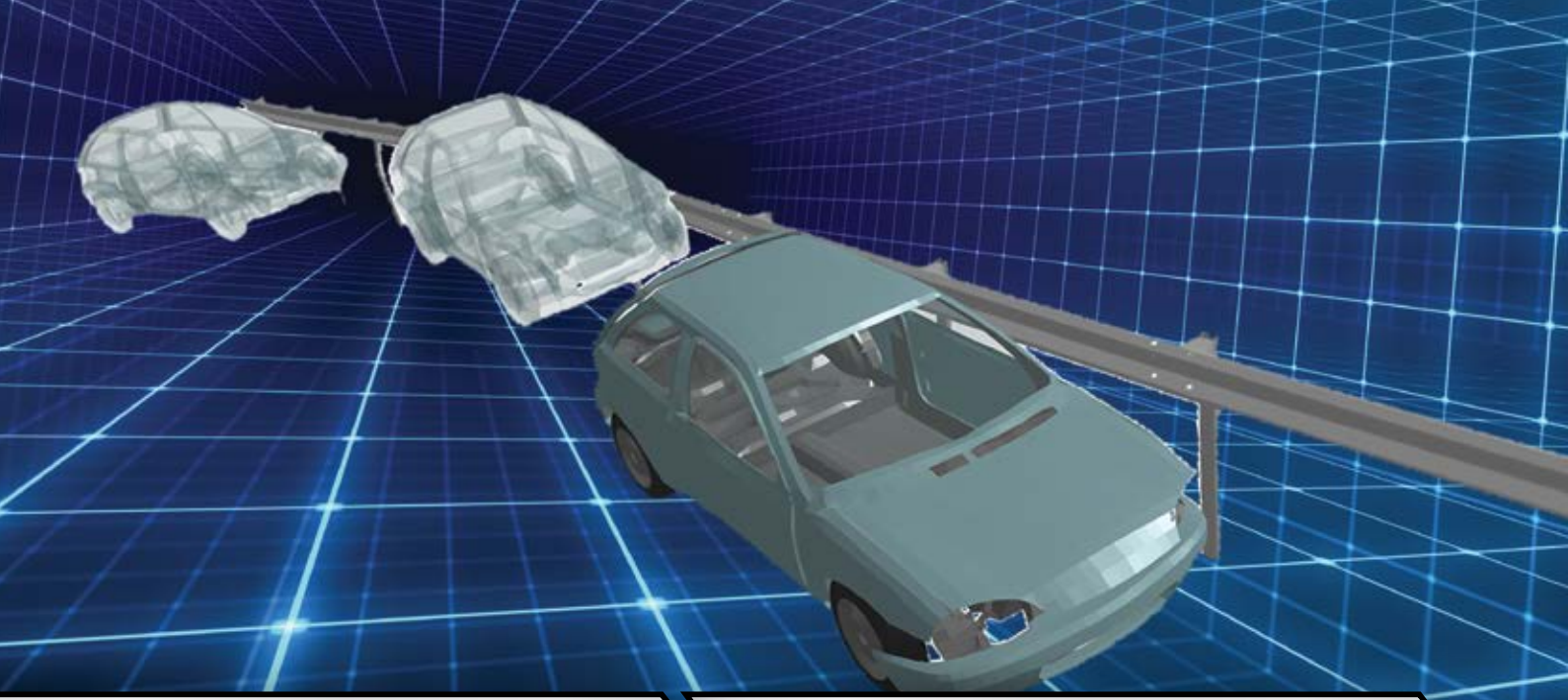
- Lowest whole-of-life cost
- Low ride-down acceleration protects drivers
- Suitable for temporary or permanent installations
- Minimal replacement parts
- MASH TL3 tested & certified
- Rapid repair & reset

INNOVATION

TOWARDS ZERO



if3 GDTECH engineering

TOWARDS ZERO PRODUCT FAILURE

When it comes to designing safer roads, having a high level of confidence in the processes being used to assess the predicted performance of a specific safety barrier or other piece of roadside furniture in a specific location is critical. The accuracy of the input data, the quality of the calculations and the knowledge and expertise of the team conducting the FE Modelling are all of paramount importance when it comes to getting an accurate result.

Recognised as a global leader in the field, GDTech has been providing FE modelling services to the aero-space industry since 1998 and highway safety barrier industry since 2002. The company now employs over 200 engineers and IT specialists – including a team of 10 full-time Simulations Engineers - and operates more than 80 LS Dyna licenses, providing it with outstanding computational capabilities (clusters > 1000Gb RAM). The GDTech crash and dynamic team (dealing with roadside barriers) has gained an enviable reputation for excellence in the fields of performance prediction, numerical validation of a crash tests and numerical certification, as well as in their increasingly popular field of traffic accident investigation.

- Finite Element (FE) modelling with LS Dyna and other specialised software
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Making a total of 10 new Dynapac rollers this year alone, Perth-based equipment specialists Mayday Services Australia recently took delivery of three new Dynapac CA4600D rollers for their hire fleet.

ROBUST, RELIABLE AND READY TO ROLL

When it comes to hire equipment, reliability is paramount – especially with large construction equipment! Non-functioning or poorly performing equipment can not only result in project delays and expensive downtime, it can also spell disaster for a contractor's reputation. Put simply, if you're hiring equipment for a project, you need to be certain that when it arrives at the job site, it's going to be fully functional and ready to go, and that it will perform as expected.

With that in mind, when it came to purchasing three new vibratory rollers for their equipment hire fleet, the team at Perth-based equipment specialists Mayday Services Australia had no hesitation in choosing the Dynapac CA4600D. Managing Director Bryce Abbott explained:

"When we send equipment out into the field, we need to be sure that it's going to perform as expected, without any problems. After all, with hire equipment, it's only booked when it's needed - and our customers expect it to arrive at the job site ready to work."

"What's more, our customers also need to be sure that the machines will keep working for the duration of the project - regardless of whether that's a few days, a few months, or longer," he said.

"We have more than 30 Dynapac rollers in our fleet, and we've always found them to be robust and reliable, and easily able to stand up to the additional challenges of being part of a hire fleet such as widely varying work conditions and lots of different operators."

"Needless to say, when it came to selecting the three new rollers, it was an easy decision to make – especially given the performance of our existing Dynapac rollers," Bryce added.

The largest of Dynapac's medium-heavy vibratory rollers, the CA4600 delivers the ideal combination of manoeuvrability and compaction performance. Engineered for maximum versatility and reliability in the field, the CA4600D has been specifically designed for long working days in tough applications, making it an ideal choice for all manner of jobs - from major infrastructure projects, through to remote road and construction projects, and everything in between.

Weighing in at 13,700kg, and delivering a static linear load of 41kg/cm across its 2130mm drum width, the Dynapac CA4600D is able to efficiently compact all types of base courses and reinforcement courses to considerable depth. Importantly, the unit's 35mm thick drum shell ensures excellent resistance to wear - even in compaction operations on rockfill.

Powered by the Deutz TCD2012L06 (IIIA/3) water cooled turbo Diesel engine - producing an impressive 128 kW (174 hp) @ 2200rpm - the Dynapac CA4600D delivers the ideal combination or power and reliability - even under the most demanding operating conditions. What's more, thanks to Dynapac's innovative ECO Mode, the CA4600D consumes 15–20% less diesel than the previous range without ECO Mode – without sacrificing performance. This reduction in fuel consumption, combined with other features such as reduced operating noise levels, make the new Dynapac CA4600D one of the 'greenest' rollers on the market today.

Above: (L-R) Mayday Services Australia Managing Director, Bryce Abbott and Mark Williams, Major Account Manager WA at CEA, with the new Dynapac CA4600D rollers.

Importantly, these innovative operating features have not come at the expense of operator comfort or ease-of-use. Indeed, the ergonomic cab layout, operator comfort, excellent visibility and use-of-use are also proving to be popular with operators.

"While the key measure of performance is always going to be compaction, operability and operator comfort are also both critical factors. After all, the operators are in the machines for numerous hours each day, and if the cab is uncomfortable, or it has poor visibility or the machine is difficult to use or manoeuvre, it can have a major impact on productivity," Bryce Abbott said.

"We've purchased a total of 10 new Dynapac rollers this year, and they've all proven to be extremely popular with customers and their operators," he said.

"They do a great job out in the field, and the operators like using them – so from an equipment perspective, they tick all of the boxes," he concluded.

NEW TRAINING FACILITY EXTENDS AUSTRALASIAN LEADERSHIP IN SAFETY AND ENVIRONMENTAL BEST PRACTICE

Hydraulic hose, fittings and service specialist Hydraulink is setting up a new *'Hydraulink Academy'* training school aimed at equipping its hose centre staff, hydraulic field technicians and customers with top training, skills and standards of safety and environmental practice.

The Hydraulink Academy offers a range of hydraulics-focused training programmes, including a number of nationally recognised units. The training – which can be tailored to suit particular requirements – is run by qualified trainers either on-site at a customer facility, or at a dedicated Hydraulink Academy venue in Australia or New Zealand.

The initiative – which applies to customers and staff of Hydraulink's 400 service points in Australia and New Zealand, as well as customers, distributors, OEMs and end-users – extends the company's priority on investment in its staff to ensure they have an opportunity to grow with the business, while also delivering innovative solutions and consistent standards of safety and service excellence to the advantage of customers.

"The new Hydraulink Academy training courses are a great way to ensure our staff and our customers are up to date with best practices in safety and environmental and practice processes," said Mr Jim Thompson, Group HR Manager, Hydraulink Australia and New Zealand.

"Hydraulic technicians are often working with high pressures – in many cases 5,000 PSI or more – so keeping up to date with the latest safety practices is essential not only for their own safety, but for those who will end up using the machine being worked on," Mr Thompson said.

Nationally Recognised Skills

The Hydraulink Academy training courses involve a combination of technical, safety, environmental, communication and service skills, which have all been developed in consultation with external third party safety consultants to ensure Hydraulink staff, franchisees, distributors, OEMs and end-users are appropriately trained and competent to work in such a highly specialised field.

The Hydraulink Academy is a learning resource and skills development centre for customers, hose centres and field technicians.

"The courses involve nationally recognised units of competency, which can be used by the graduate towards a later higher qualification such as a Cert II, III, IV or Diploma within the Manufacturing and Engineering Training Package," explains Mr Julian Tullier, Group Technical Trainer – Hydraulink Australia and New Zealand.

Core outcomes for graduates of the Hydraulink Academy include the ability to safely and competently identify, select, assemble, install and remove high pressure hydraulic fluid conductor components and assemblies.

Additionally, attendees are instructed on the safe shutdown of equipment, identification of hazardous energy sources and how to conduct thorough pre-work risk assessments to identify hazards to individuals and the

environment and implement appropriate controls for the identified hazards.

"The potential adverse outcomes of a fluid conductor product prematurely failing in service are very serious, and can include serious injuries, permanent disability or death, loss of productivity for the equipment the fluid conductor is fitted to, additional downtime and repair costs to repair the equipment," said Mr Tullier.

"Hydraulink's training staff have more than 90 years' combined industry experience, and we have invested in capital equipment for course attendees to practice on, within a controlled environment. An online training portal is provided for easy and intuitive access to relevant information," he said.

Hydraulink is planning to run courses approximately every four weeks in Australia and New Zealand, and can readily add additional courses as demand rises.

For more information, contact Daniella Laurenzi, Group Marketing Manager, Australia and New Zealand, Hydraulink, T: +61 2 8785 4600 or E: Daniella.L@hydraulink.com.au

MASH INTRODUCTION BRINGS THE NEXT GENERATION OF TERMINALS TO OUR HIGHWAYS

Since its introduction in 1999, the Australian/New Zealand Standard AS/NZS 3845 has utilised NCHRP Report 350 guidelines as the basis for testing protocols to assess safety barrier related hardware and devices. In the recent revision of this Standard, Part 1:2015 and Part 2:2017 recognised the introduction of the Manual for Assessing Safety Hardware (MASH) guidelines, and nominates MASH as the basis for crash testing.

The MASH testing program contains revised criteria for impact performance evaluation of virtually all highway safety features. Updates include increases in the size of several test vehicles to better match the size and shape of the current vehicle fleet, changes to the number and impact conditions of the test matrices, and more objective, quantitative evaluation criteria.

Specifically for end-terminal and crash cushion testing, the MASH testing program introduced a wider range of impact angles when compared to the old testing program, NCHRP-350. These include testing at 5˚ and 25˚ impact angles. The increase to 25˚ for the redirective capacity test represents a 73% increase in impact energy for Test Level 3.

The need for increased scrutiny of terminal testing was reinforced after research published in 2016 by a joint AASHTO-FHWA Task Force on Guardrail Terminal Crash Analysis identified several performance limitations for all types of extruding w-beam guardrail terminals reviewed in their study. Common extruder type terminals in the Australian market include the MSKT, FLEAT and ET-Plus end-terminals.

Left: For MASH testing, the small car weight was increased from 820kg to 1100kg.

Below: The weight of large vehicle (pickup truck) used in TL3 containment testing was increased from 2000kg up to 2270kg.

"The need for increased scrutiny of terminal testing was reinforced after research published in 2016 by a joint AASHTO-FHWA Task Force on Guardrail Terminal Crash Analysis identified several performance limitations for all types of extruding w-beam guardrail terminals reviewed in their study."

The performance limitations included side impacts, head-on/shallow-angle corner impacts, and head-on/shallow-angle high-energy impacts.

Taking end-terminal technology into the 21st century, the new ET-SS terminal has been developed with these shallow angle impact limitations in mind via the tension based anchoring of the rail. Many older extruder type terminals extrude the W-Beam rail out the side of the head upon impact, while this extrusion mechanism has good energy absorbing characteristics, a key drawback is that these terminals lose their anchor cable from most end on impacts. The ET-SS system uses a proprietary head with front anchored technology to anchor the W-Beam from the loads exerted on the rail during an end-on

MASH TL-3 capacity end-on test with guardrail remaining anchored after impact

or side vehicle impacts on the terminal. From end-on impacts within the MASH criteria, the W-Beam guardrail is flattened as it is guided through the head to the front anchor, this absorbs impact energy from the errant vehicle bringing it to a controlled and gradual stop. This front anchor also minimises the deflection of the downstream guardrail system to help contain and redirect an errant vehicle. With the W-Beam remaining anchored and in line with the run of barrier, the risks to vulnerable road users, such as pedestrians who may be behind the unit, are minimised.

The system is MASH TL3 and TL2 compliant as a re-directive, gating end terminal. The Point of Need is post 3 and the unit can be flared at a maximum rate of 1:25.

To offer further protection for vulnerable road users and for increased hazard awareness, a protective cover and post caps are also available. These safety additions are particularly suitable for locations with a high volume of motorcycle traffic. Made from a UV stabilised, proprietary polymer blend, the cover can help mitigate some of the snag points and also improve visibility of the upcoming roadside safety barrier.

For further information on the next generation of highway safety products, or how your state is making the transition to MASH, please contact your local Ingal Civil representative on 1300 446 425.

MASH EXPLAINED

What is MASH Testing?
What are the differences between MASH and NCHRP350?

With the AASHTO Manual for Assessing Safety Hardware (MASH) testing and assessment guidelines being referred to as the preferred testing method in the Australian Standard AS/NZS 3845.2:2017 – replacing the previous NCHRP350 testing guidelines - Austroads has implemented a *'Transition to MASH'* program. The program, which is being conducted by ASBAP (Austroads Safety Barrier Assessment Panel), assesses the suitability of road safety devices including steel and concrete barriers, end terminals, wire rope safety barriers and crash cushions, transitions, temporary barriers and products such as TMA's for use on Australian roads according to their performance under AASHTO's MASH guidelines.

The following extracts, which are republished here courtesy of AASHTO (American Association of State Highway and Transportation Officials), provide a brief overview of MASH guidelines, including details of how they differ from the previous NCHRP350 testing guidelines. Additional information, including copies of the full MASH guidelines, can be obtained direct from the U.S. Department of Transportation Federal Highway Administration website: **www.safety.fhwa.dot.gov/roadway_dept**

WHAT IS MASH?

The AASHTO Manual for Assessing Safety Hardware (MASH) presents uniform guidelines for crash testing permanent and temporary highway safety features and recommends evaluation criteria to assess test results. This manual is recommended for highway design engineers, bridge engineers, safety engineers, maintenance engineers, researchers, hardware developers, and others concerned with safety features used in the highway environment.

MASH is an update to and supersedes NCHRP Report 350, *Recommended Procedures for the Safety Performance Evaluation of Highway Features,* for the purposes of evaluating new safety hardware devices. MASH does not supersede any guidelines for the design of roadside safety hardware, which are contained within the AASHTO Roadside Design Guide.

An implementation plan for MASH that was adopted jointly by AASHTO and FHWA states that all highway safety hardware accepted prior to the adoption of MASH – using criteria contained in NCHRP Report 350 – may remain in place and may continue to be manufactured and installed. In addition, highway safety hardware accepted using NCHRP Report 350 criteria is not required to be retested using MASH criteria. However, new highway safety hardware not previously evaluated must utilize MASH for testing and evaluation.

MASH was developed through *National Cooperative Highway Research Program* (NCHRP) Project 22-14(02), *"Improvement of Procedures for the Safety Performance Evaluation of Roadside Features,"* and contains revised criteria for impact performance evaluation of virtually all highway safety features, based primarily on changes in the vehicle fleet.

HOW DOES IT DIFFER FROM NCHRP350

Some of the major differences between MASH and NCHRP Report 350 assessment include:

Changes in Test Matrices

- The small car impact angle is increased from 20 to 25 degrees to match the impact angle used with light truck testing
- The impact speed for the single-unit truck test is increased from 80 km/h to 90 km/h to better distinguish the TL-4 test from TL-3
- The impact angle for length-of-need testing of terminals and crash cushions is increased from 20 to 25 degrees to match that for longitudinal barriers
- The impact angle for oblique end impacts for gating terminals and crash cushions is reduced from 15 to 5 degrees
- A head-on test with the mid-size car is added for staged impact attenuation systems
- The barrier mounting height is recommended to be set at the maximum for small car tests and at the minimum for pickup truck tests
- The critical impact point for the small car terminal test is defined as the point where the terminal behaviour changes from redirection to gating
- Two previously optional TMA tests are now mandatory
- Variable message signs and arrow board trailers are added to the TMA crash test matrix
- A pickup truck test is added to tests of support structures and work zone traffic control devices

- Longitudinal channelizers are added as a category and a test matrix is recommended
- Event data recorded and airbag deployment data to be collected on test vehicles

Changes in Test Vehicles

- The size and weight of test vehicles is increased to reflect the increase in vehicle fleet size:
  - the 820C test vehicle is replaced by the 1100C
  - the 2000P test vehicle is replaced by the 2270P
  - the single unit truck mass is increased from 8000 kg to 10,000 kg
  - the light truck test vehicle must have a minimum centre of gravity height of 28 inches
- The option for using passenger car test vehicles older than 6 years is removed
- Truck box attachments on test vehicles are required to meet published guidelines
- External vehicle crush must be documented using National Automotive Sampling System (NASS) procedures
- A new crushable nose needs to be developed for use on surrogate test vehicles
- TMA designers are required to select maximum and minimum support truck weight ratings

Changes in Evaluation Criteria

- Windshield damage evaluation uses quantitative, instead of qualitative, criteria
- Windshield damage criteria is applied to permanent support structures in addition to work zone traffic control devices
- The occupant compartment damage evaluation uses quantitative, instead of qualitative, criteria
- All evaluation criteria will be pass/fail, eliminating the “marginal pass”
- All longitudinal barrier tests are required to meet flail space criteria
- Maximum roll and pitch angles are set at 75 degrees
- The subjective criteria for evaluating exit conditions are eliminated; reporting the exit box evaluation criterion is required
- Documentation on vehicle rebound in crash cushion tests is required

Changes in Test Documentation

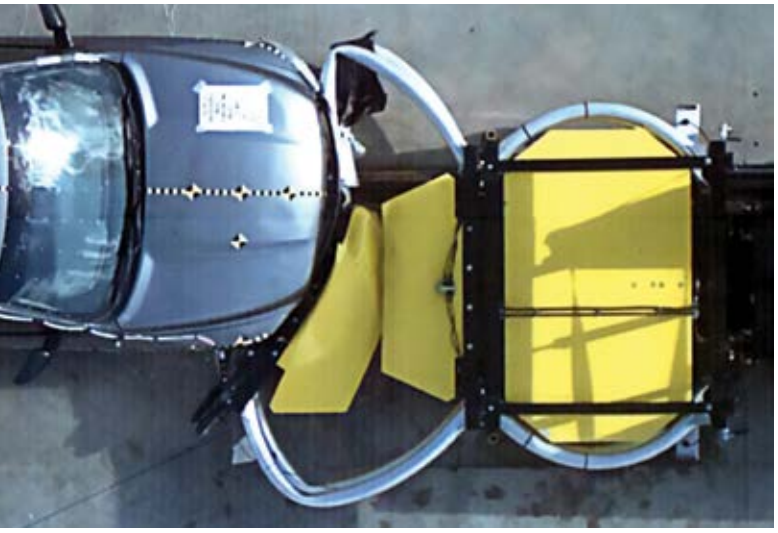
- CAD drawings of the test device and test installation are required
- Additional documentation of the test and evaluation results is required

Changes in Performance Evaluation

- Language emphasizing the importance of in-service evaluation is added

Factsheet extracts courtesy of AASHTO (American Association of State Highway and Transportation Officials)

For further information and downloads, please visit: **www.safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/aashto_guidancecfm.cfm**



IT'S TIME

Australia is moving to MASH tested Crash Cushions on December 31st 2019
and the time to prepare, is NOW!

According to the Austroads / ASBAP *'Transition to MASH'* process, tenders called for new crash cushions installed on Australian roads after December 31st 2019, will require them to be tested and approved under the AASHTO MASH guidelines, rather than the superseded NCHRP350 guidelines.

With this date rapidly approaching, **NOW IS THE TIME** to start preparing for this critical transition.

SMART CUSHION has been **ASSESSED, APPROVED & RECOMMENDED FOR ACCEPTANCE** throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel).

SMART CUSHION has been used in the USA for almost two decades and in Australia for over 5 years.

SMART CUSHION is the ONLY crash cushion to have passed both the NCHRP350 and MASH-2016 crash test standards.

SMART CUSHION

Speed Dependent Crash Attenuators

SMART CUSHION

Speed Dependent Crash Attenuators

MASH TESTED & APPROVED ✓

SAVE TIME...

For most impacts up to 100km/h (by vehicles up to 2,270kg) the SMART CUSHION can usually be repaired and reinstated into service in under 60 minutes.

SAVE MONEY...

In 90% of all impacts in Australia, the only spare structural parts needed for repairs are 2 shear pins (COST <$5). After 59 impacts in Australia, the average cost for each reset was $169.

SAVE LIVES...

After more than 20 years of successful service internationally and over 5 years successful service in Australia, SMART CUSHION has been directly credited with saving numerous lives and significantly reducing the severity of injuries in literally thousands of impacts.

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THE TRUTH ABOUT TMAs

Dispelling some of the myths and rumours surrounding TMAs and Australia's Transition to MASH

It's fair to say that since the Austroads Safety Barrier Assessment Panel (ASBAP) announced its *Transition to MASH* program some 18 months ago, the traffic management and road construction and maintenance industries have been literally bombarded with information relating to the capabilities, performance and eligibility of different Truck Mounted Attenuators (TMAs) after the final transition date on 31st December 2020.

The *Transition to MASH* represents a significant change in how safety barrier devices such as TMAs will be assessed for suitability for use on the Australian road network. As such, it's also clear that as part of that process TMA owners and operators need to be fully informed of the new Standards, regulations and operational requirements.

While there has been no shortage of TMA-related information 'doing the rounds' over the past 18+ months, it's also clear that not all of it is accurate... In fact, far from it!

Indeed, it's fair to say that some of the information being distributed – especially in relation to the Scorpion II TMA - could at best be described as highly inaccurate, and at worst, be described as malicious, alarmist and highly misleading.

With that in mind, HEA magazine recently sat down with Janine Bartholomew, Manager of A1 Roadlines – the exclusive Australian distributor of the Scorpion II TMA – to address some of the claims and dispel some of the myths and rumours surrounding the Transition to MASH and the Scorpion II TMA.

HEA: Hi Janine, thanks for joining us today. The Transition to MASH program is an extremely busy time for everyone in the industry, what have been some of the biggest challenges so far?

JB: Together with the work involved in the approval process, for us, one of the biggest challenges has been trying to dispel some of the myths, rumours and allegations being spread throughout the road maintenance and traffic management industries about the Scorpion TMAs.

HEA: What kind of myths and rumours are we talking about specifically?

JB: One of the first myths doing the rounds was that once we got to the December 31, 2020 deadline, everybody's older TMAs would be taken off the road and no longer be able to be used because they had been tested and approved to NCHRP-350 rather than MASH. This is simply not true. The MASH testing requirements only apply to new equipment.

During '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.

The Scorpion II was also successfully tested to MASH 2016 while attached to an unblocked host vehicle weighing 6803kg with the parking brake engaged and the transmission in 2nd gear. The TMA has a recorded roll-ahead distance of 16.8 ft (5.1 m) when impacted by a 2012 Dodge RAM 1500 4-door pickup truck weighing 2266kg at an impact angle of 10.3° and an impact speed of 103.08 km/h.

HEA: I'm assuming that myth caused a lot of stress for existing equipment owners?

JB: It certainly did. We were inundated with calls from equipment owners who were panicking because they'd been told that their TMA trucks were all going to be taken off the road and they wouldn't be able to use them again! That would be an absolute disaster for any equipment owner.

HEA: So, to be clear, the new 'Transition to MASH' requirements don't render your existing equipment obsolete after the cut-off date?

JB: Absolutely not. To suggest otherwise is simply not true. Existing equipment, including the older Scorpion TMAs approved for use on the road network prior to December 31, 2020 will still be able to be used after that date. What's more, there is no cut-off date for existing equipment.

HEA: There have also been some claims that the Scorpion II is 'not really' or somehow 'not fully' MASH tested and approved... how do you respond to those allegations?

JB: Both the Scorpion II Truck Mounted Attenuator and the Scorpion II Trailer Mounted Attenuator are fully tested, passed and eligible – or in common terms, fully tested and certified - to MASH 2016 testing and assessment standards.

In fact, the Scorpion II TMA was actually the first TMA to be fully certified under MASH 2016. The official eligibility letters (CC-132 and CC-138) are available on the U.S. Department of Transportation website for all to see. All of the documentation, including full details of the MASH tests, is also available on our website (**www.a1roadlines.com.au**).

We're also happy to provide copies of the testing approvals via email to anyone who wants to check them.

HEA: What about the allegations that the Scorpion TMA is 'not fully' MASH tested because it was tested with an impact speed of 100 km/h rather than 110 km/h?

JB: That just is another one of the ridiculous claims doing the rounds at the moment. And I call it ridiculous because it makes no sense whatsoever.

Each of the MASH tests have extremely strict criteria and must be carried out accordingly. Vehicle weights, impact angles and impact speeds are all specified, and must all be strictly adhered to - they're not optional. The tests need to be carried out as specified, under strictly controlled conditions to ensure the product being tested meets all of the performance requirements before it can be certified.

The impact speed requirement for the MASH Level TL-3 tests 3-50, 3-51, 3-52 and 3-53 is 100 km/h at specified impact angles, and the Scorpion II was successfully tested and certified to those requirements.

HEA: A lot is being made of roll-ahead distances during an impact, and this has led to a number of serious allegations in relation to the Scorpion II's performance and capabilities during an impact. Indeed, together with the claim that no roll-ahead distances have been measured for the Scorpion II during testing, it has also been inferred that the Scorpion II somehow avoided being tested for roll-ahead distances because it was attached to a host-vehicle that was 'anchored' to the test bed to prevent it from moving forward during the impacts.

JB: Again, this is yet another highly misleading claim being made about the Scorpion II, in what I can only assume is an attempt to seriously undermine the product's reputation.

To suggest that the Scorpion II was somehow not subjected to the full rigour of MASH testing because some of the tests were conducted as 'infinity' weight tests is another ridiculous claim. If fact, 'Infinity Testing' is the harshest method of testing the performance of a TMA during an impact.

HEA: So, what exactly is 'Infinity Testing'?

JB: In short, during an impact into a TMA out in the field, some of the impact energy is absorbed by the TMA, and some is absorbed

by the forward movement of the host vehicle – the roll-ahead. Just how far the host vehicle rolls forward during an impact relies on a wide range of factors, including the weight of the host vehicle, the brakes, the tyres, the condition of the pavement, the weather, etc.

HEA: That makes sense. So why would you test the unit with the host vehicle anchored in place?

JB: Testing a TMA with a host vehicle that can roll forward during the impact makes it much easier to obtain preferred Impact Severity (IS) values, thanks to the benefit of the host vehicle's forward movement.

On the other hand, testing the TMA on a host vehicle which is anchored in place 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. It's a much tougher testing regimen and is considered a worst-case scenario test condition from the perspective of testing the TMA's capacity to absorb/dissipate 100% of the impact energy without the benefit of roll-ahead.

HEA: What are the practical benefits of 'Infinity Testing' for TMA owners?

JB: As well as knowing that the TMA alone is capable of absorbing the energy of the impact without having to rely on the host-vehicle rolling forward, it also means that the Scorpion II TMA is the only TMA to be MASH certified with no upper weight limit for the host vehicle. Unless a TMA has been tested under blocked/anchored host vehicle conditions, there is no method for evaluating the TMAs capacity in the event the TMA is attached to a support vehicle beyond the tested documented weights used during MASH evaluation.

HEA: So how are roll-ahead distances calculated for the 'Infinity Tests'?

JB: While MASH states that support truck roll-ahead distances should be documented, it also recognises that this is not possible during 'Infinity' tests. With that in mind, MASH 2016 Appendix Section A2.2.3 also states: *"It is noted that roll-ahead distances can be accurately estimated from the "conservation of momentum" principle of mechanics based upon an estimate of the frictional resistance of the support truck to forward movement* [70]*."*

70. Humphries, J and T.D. Sullivan. Guidelines for the Use of Truck-Mounted Attenuators in Work Zones. In Transportation Research Record 1304. Transportation Research Board National Council, Washington, DC, 1991

HEA: Is this information provided to your customers?

JB: Every Scorpion TMA comes with clear instructions as to safe operating distances and buffer zones to protect workers in a wide range of workzone conditions.

HEA: Were all the MASH tests carried out as 'Infinity Tests'?

JB: No. Tests 3-50, 3-51 and 3-52 which according to MASH 2016 (Sections 2.2.3.1 and 2.2.3.2) should be conducted with the heaviest allowable support truck or a rigidly blocked support truck for no upper support-truck weight limit (Infinite Weight), were conducted as 'Infinity Tests'.

Test 3-53, which according to MASH 2016 should be conducted with the lightest allowable support truck, had the Scorpion II TMA attached to an unblocked host vehicle weighing 6803kg, with the parking brake engaged and the transmission in 2nd gear. The TMA was then impacted by a 2012 Dodge RAM 1500 4-door pickup truck weighing 2266kg at an impact angle of 10.3° and an impact speed of 103.08 km/h

HEA: Were roll-ahead distances recorded for test 3-53?

JB: Absolutely... recording the roll-ahead distance is a requirement of the MASH 2016 testing. The recorded roll-ahead for the support vehicle was 16.8 ft (5.1 m).

HEA: Well, that seems to have addressed most of the rumours and myths doing the rounds at the moment. Is there anything else you'd like to add?

JB: I think the clearest lesson from the past 18-months is that you can't believe everything you read or everything you're told.

There is a lot of misinformation doing the rounds, but importantly, accurate information is readily available from a range of independent sources.

For us, we're only interested in looking after our clients and selling our products on their merits. With that in mind, we felt that it was important to set the record straight on some critical issues and address some of the myths and allegations that have been doing the rounds, so TMA owners and operators can make informed decisions based on accurate and factual information.

CALL FOR PAPERS

The RIAA's biennial conference planning is well underway and it is promising to be an exciting, informative conference - exhibition – workshop.

The "ROAD TO SUCCESS" theme will provide you the opportunity to present papers to get everyone talking about your association and your industry. As part of this preparation we would like to invite you to share your knowledge and expertise and submit your paper for review.

Sessions may include:

Technical Papers or Case Studies: The latest technology from around the world

The Value of Linemarking: For customers, Pavement marking has a price but how do we communicate the value?

Road Safety: The vital role our industry plays

Harmonization: Is it that hard to achieve

Customer Service: Dealing with difficult clients and suppliers.

The future of Linemarking: Where can we expect to be in 5, 10 or 20 years

Your Workplace: And you thought it was tough out on the road!!!! We now have to be social workers, therapists, councilors, experts on substance abuse. I just want to paint lines

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Papers need to be submitted prior to
Friday March 27th, 2020
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GET THE FACTS!

on TRUCK MOUNTED ATTENUATORS (TMA's)

BEWARE OF 'FAKE NEWS'

With the move from NCHRP350 testing to MASH (Manual for Assessing Safety Hardware) as the preferred testing for Truck Mounted Attenuators (TMA's) in Australia currently progressing there has been confusion amongst some equipment owners as to what equipment is compliant and, perhaps more importantly, what the status of their equipment will be after Australia moves to MASH as the testing standard.

This situation has no doubt been inflamed by the inaccurate information and spurious claims that have surfaced over the past 12 months – including claims that some units will no longer be permitted to be used after December 31, 2020.

With that in mind, the following fact sheet has been developed to provide key FACTS as to the current status of the 'Transition to MASH Guidelines'.

FACT!

The move by the Austroads Safety Barrier Assessment Panel (ASBAP) towards MASH testing and certification is a complex process that will take some time to implement. The Panel is transitioning the current suite of accepted road safety barrier systems and devices within the Australasian market to MASH guidelines over an extended timeframe, with Part 2 Products (which includes TMA's) to be completed by 31 December 2020.

FACT!

This **DOES NOT** by any definition mean that non-MASH tested equipment is suddenly obsolete or can no longer be used. It also **DOES NOT** render TMA's that have been previously approved as tested under NCHRP350 guidelines obsolete or unusable **– to suggest otherwise is simply NOT TRUE.**

FACT!

While there is a formal agreement on the transition to MASH testing from NCHRP350 testing, there is **NO CUT-OFF DATE** for using equipment that has been certified under the NCHRP350 testing while it is operational **– to suggest otherwise is simply NOT TRUE.**

FACT!

Even if a TMA is recommended for acceptance at an Austroads level by ASBAP, it must still be approved for use in individual jurisdictions by the relevant State Authority.
The State Authorities are responsible for approving the use of TMA's in their individual jurisdiction.

FACT!

The transition to MASH guidelines is a lengthy and ongoing process and lists of 'Austroads Approved Products' are currently a Work in Progress. If a product does not currently appear on a jurisdiction's list, or is not currently recommended for acceptance at an Austroads level by ASBAP, it **DOES NOT** mean that it has not been successfully tested and certified to MASH guidelines, or that it is not acceptable for use in that jurisdiction. It may simply have not yet been assessed by ASBAP.

FACT!

The Scorpion® II Truck Mounted Attenuator was **the first TMA to be fully certified as Tested, Passed and Eligible to MASH 16** by the U.S. Department of Transportation Federal Highway Administration.
The U.S. Department of Transportation Federal Highway Administration *Safety Eligibility Letter CC-132* for the Scorpion® II TMA can be viewed online at:
https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/barriers/pdf/cc132.cfm

FACT!

The Scorpion® II Trailer Attenuator is also fully certified as Tested, Passed and Eligible to MASH 16 by the U.S. Department of Transportation Federal Highway Administration.
The U.S. Department of Transportation Federal Highway Administration *Safety Eligibility Letter CC-138* for the Scorpion® II Trailer Attenuator can be viewed online at:
https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/barriers/pdf/cc138.cfm

CHECK THE FACTS

Scorpion II® TMA

Truck Mounted Attenuator

TrafFix Devices Inc. Engineered Products for Safer Highways

MASH™ Manual for Assessing Safety Hardware

TESTED, PASSED AND ELIGIBLE

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ULTRA-THIN LIFTING BAGS SAFELY HOIST HEAVY LOADS IN SOFT, EMERGENCY AND REMOTE CONDITIONS

Pronal ultra-thin CLT lifting cushions combine the advantages of high durability and power with gentle, precisely controlled lifting that can spread the load over broader surfaces of the object being lifted, rather than focusing the power on point loads.

Lifting bags so powerful and durable they have been used to hoist crashed locomotives are being offered by Air Springs Supply Pty Ltd for heavy vehicle recovery, on-site repair and emergency rescue operations on soft ground or irregular surfaces.

Pronal ultra-thin CLT inflatable cushions – which are easily transported to remote areas by helicopters, light aircraft and 4wd service vehicles – can individually handle lifting loads of 65 tons on surfaces including soft ground, confined trenches, crash recovery areas and uneven earthworks that can create hazards for conventional lifting technologies such as cranes and hydraulic or pneumatic cylinders.

Multiple Pronal cushions, each as thin as 20mm uninflated, with lifting heights from 85-500mm, can be stacked one on top of another for heavier lifts. The cushions, which comply with standard NF EN 13731 *'Lifting bag systems for fire and rescue service use - safety and performance requirements'* for safety in operation, can also be used to immobilize blocks of stone and to release trapped people.

Seamless inflatable CLT lifting cushions are actuated by compressed air cylinders or standard portable compressors at 8 Bar, to rapidly but delicately raise loads ranging from heavy vehicles, pipelines and plant through to beams, bridge components, building components, machinery and resource development structures. The cushion remains leak-tight after disconnection, thanks to its self-sealing coupling.

CLT cushions are highly suitable for use at crash and rescue sites, urgent vehicle extraction and repair sites, mining and energy exploration sites, construction sites, remote infrastructure developments and recovery and maintenance of 4wd and heavy vehicles used by local authorities and service utility services including electrical distribution and water and waste water plants and pipelines.

Pronal lifting and separation cushions range from ultra-thin bags (just 20mm thick deflated) to powerful spreading cushions that can exert hundreds of tonnes of force to part plant and machinery components for servicing. Complementary low-pressure CPB Maxi-Lift cushions can be used on land and under water, offering greater strokes of up to 700mm (or 1400mm where a pair are employed).

"Their durability in aggressive and remote conditions, where reliability is paramount, is assured by construction with threaded layers coated with chemical resistant elastomer, hot vulcanised under pressure in one operation," says James Maslin, National Sales and Marketing Manager for Air Springs Supply, which is national distributor for Pronal products.

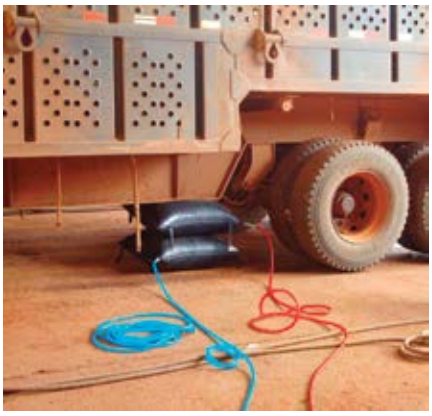
"Often there is insufficient room overhead to employ suitable cranes, even if they can be brought overland to a remote site. Sometimes also there is insufficient stability underfoot to employ lifters that produce high point loads both on the ground and on the object being lifted," he says.

They can be used in confined spaces underneath inaccessible loads which, in addition to vehicle lifts, range from engines and plant, through to foundations of bridges, buildings, machinery, pipeline structures and resource development rigs requiring lifting for inspection and repair.

Features include:

- Lifting height from 85-500mm (CLT), with longer strokes provided by combinations of cushions
- In addition to standard sizes, specific sizes and shapes can be made to order to suit particular applications
- Ease of use, with inflation either by compressor or simple air cylinders
- Inflation pressures up to 8 Bar, regardless of stroke (CLT models – CPB pressures vary from under one bar, depending on model)
- Non-slip surface providing maximum friction when stacking two cushions
- Control systems tailored to particular uses
- Can be used for straight lifting, pressing, clamping, tilting or guiding

Pronal equipment such as the PAC series of lifting cushions can be supplied with trailers, lifting bases and control systems developed to the demanding standards of Pronal's world-wide customer base, including military and civil aviation applications.



Pronal CLT lifting bags are ideal for vehicle recovery, repair and emergencies

ABOUT PRONAL

Pronal is one of the world's most experienced and respected producers of flexible products used to lift, push, press, seal and store. Founded in 1961 and headquartered near Lille in the north of France, Pronal builds standard and customised flexible products from fabrics coated with elastomer and/or plastomer. In addition to extensive industrial expertise, Pronal also works in the defence, aerospace, civil emergency and maritime/harbour sectors.

Pronal's Australian distributor, Air Springs Supply, is Australia's leading supplier of air springs and associated pneumatic technology for the industrial and transport sectors.

For more information visit: **www.airsprings.com.au**

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AMMANN

Below: Cold milling machines like Wirtgen's W 210i, with their ability to selectively mill the surface, binder, and base layers help to ensure that the RAP can be recycled cost-effectively at the asphalt mixing plant.

PERFECTING THE ASPHALT RECYCLING PROCESS CHAIN

In order to turn aggregates and bitumen into asphalt for road construction, a thermal mixing process is needed – this is what an asphalt mixing plant is used for. When it comes to the production of this "black gold," an increasing number of companies around the world are discovering that reclaimed asphalt pavement, or RAP for short, is a valuable resource. In addition, industrialized nations are rehabilitating far more miles of road than they are building new ones.

This also means that millions of tons of asphalt are being removed – a job primarily performed by cold milling machines. They are the first link in the process chain, which continues with crushing and screening plants as well as asphalt mixing plants in the next step and ends with the reclaimed asphalt being repaved by pavers as part of the new mix. Machines designed to work together, innovative processes, and state-of-the-art technologies all have a major impact on the efficiency of this process chain. Smooth processes make it possible to increase the cost-effectiveness and sustainability of asphalt recycling.

The Challenge: Increasing the Feed Volume of RAP

In many countries, virtually every truck that transports asphalt mix on a site has at least some recycled asphalt on it. In Germany alone, for example, a quarter of the total asphalt produced in 2018 (41 million tons) contained RAP (10.5 million tons). With a total of around 12 million tons of asphalt pavement removed last year, this represented a recycling rate of 87%.

Recycling old asphalt is an economic imperative in order to conserve natural resources. As a result, the industry is constantly looking for solutions to optimise the processes within the asphalt mixing plant. One of the main approaches is to increase the volume of reclaimed asphalt pavement used in all of the different recipes produced using "hot and cold" processing technologies. Using the maximum amount of old asphalt not only protects the environment, it also positively affects asphalt mix prices.

In the traditional parallel flow recycling method, the temperature is limited to 130°C due to the exhaust gas emissions, but the exhaust gas temperatures are physically higher, which leads to increased energy consumption and the need for additional dedusting. In order to achieve a mix temperature of 160°C, white mineral must be overheated in this case.

The Solution: The Counterflow Method – Recycling Rate of 90+%

Unlike conventional parallel recycling drums, in a recycling drum with hot gas generator the recycled material is heated indirectly using the counterflow method, meaning that the material in the drum flows towards the heat source. This makes it possible to achieve higher material temperatures while simultaneously reducing the exhaust gas temperature. The outflow temperature of 160°C corresponds to the temperature of subsequent processing, while the exhaust gas temperature lies above the dew point at approx. 100°C.

The entire process is only possible by using a hot gas generator, because direct firing would burn the recycled material and make it unusable. The burner, hot gas generator, recycling drum, extraction hood, and the recirculation and exhaust air system are all designed to work in perfect harmony.

One positive effect is that the white mineral no longer has to be overheated, which results in a significant reduction in energy consumption.

Recycling using the counterflow method massively reduces emissions (as required by Germany's Technical Instructions on Air Quality Control regulation) and – depending on the quality of the recycled material – achieves recycling rates of 90+%. This makes an investment in the equally green and efficient technology particularly attractive.

Screening plants like the MOBISCREEN MS 953 EVO screen the milled material to achieve an optimum PSD curve, making it possible to increase the amount of RAP added to the asphalt mix.

Asphalt mixing plants like the stationary BA RPP 4000 produce up to 320 tons of asphalt per hour. When recycled using the counterflow method with a hot gas generator and a recycling rate of 90+%, the new mix can consist of around 300 tons of RAP, depending on the recipe.

This technology becomes even greener when the upstream process steps – processing the particle-size distribution curve (PSD curve) and milling the asphalt – are implemented using state-of-the-art processes and technologies.

Screening Plants: Ideal Particle-Size Distribution Curve Increases Amount of RAP Added

The maximum theoretical amount of RAP that can be added to the mix depends largely on its PSD – or, to put it another way, on the quantity, size, and composition of its constituents. As a result, one goal must be to align the PSD curve of the crushed RAP as closely as possible to the desired PSD curve of the final asphalt product.

This is where mobile screening plants come into play. They ensure that the mixing plants are able to directly process up to 80% of the reclaimed asphalt (milled material). This significantly reduces process costs compared to post-processing all of the milled material.

In the case of complete post-processing, i.e. also of the remaining oversize grain, impact crushers equipped with a secondary screening unit would also be used.

Intelligent Milling for Cost-Effective and Sustainable Recycling

First, however, the RAP must be recovered by removing individual layers of the road structure. By removing the asphalt in layers using cold milling machines, the milled material can be fed into the material cycle for reuse separately for each type of mix, depending on its structural suitability and its qualitative properties.

The selective recovery of the surface course, binder course, and base course alone offers significant environmental and financial advantages.

If intelligent milling technology is also taken into account, it increases the cost-effective reuse of the milled material in the asphalt mixing plant even further. This is largely due to the cold milling machines' load-dependent water sprinkling system. In this context, the water used to cool the picks varies depending on the engine load and milling speed. Water consumption can be significantly reduced by automatically activating the water system when the milling drum is in use or by switching it off when the milling operation stops. This can cut water consumption by up to 20%.

As a result, the service life of the picks is extended, the cold milling machine's water tanks have to be filled less frequently, and downtimes are shorter. This not only pleases the milling machine operator, but also the master mixer in charge of the asphalt mixing plant. They benefit from the low water consumption because it means the milled material has a 3-4% lower residual moisture content per ton of asphalt. Without the use of state-of-the-art milling technologies, the residual moisture level would be higher.

The formula applicable to the drying process required to produce the new asphalt in the asphalt mixing plant is simple: *Material that is 1% drier saves 1 litre of heating oil per ton of finished asphalt during subsequent processing into recycled mix – as well reduced CO_2 emissions due to the process requiring less energy.*

PRECISION PAVING FOR SINGAPORE'S GRAND PRIX

For the second year running, Singapore contractor United E&P was tasked with preparing the racetrack for the country's Formula 1 race in September. Unlike many cities that utilise existing race circuits, Singapore transforms some of the city streets into race car-worthy surfaces in a matter of days, shutting down roads for the shortest periods possible to minimise impact to residents, visitors and traffic.

To meet the tight deadlines and deliver a track that will pass muster with the racing car elite, United E&P partnered with Topcon Positioning Systems' largest distributor in the Oceania region, Position Partners. Using a full suite of design software, mapping and profiling technology, survey instruments and paving machine control systems, United E&P began by scanning and modelling the planned track surfaces before optimising a design and paving the tarmac.

"Having worked closely with United E&P at Singapore's Changi airport expansion project in recent years, we have developed a trusted business partnership to utilise technology to its full potential on these cornerstone projects for the country," said Mathew Connelly, Position Partners Manger for South East Asia.

"We assisted United E&P with paving the Formula 1 circuit last year and coming back to complete the track for a second year running demonstrates United's ability to deliver a high-quality finish on time and within budget," he added.

The proof is in the drivers' performance – last year's track saw Lewis Hamilton complete an All Time Lap Record in a qualifying round, while Kevin Magnussen achieved the Official Lap Record during the race, taking just under eight seconds off the previous record held by Daniel Ricciardo since 2015.

The racetrack has a specification governed by global motor sport safety association FIA (Federation Internationale de l'Automobile).

"The tolerances on this job are very tight," said Graham Castle, Construction Manager at United E&P.

"We have a riding index we have to meet, a +/- 3mm tolerance on our levels, and also 3mm tolerance under a four metre straight edge for the paved surface."

The biggest challenge the team faces on site is traffic, Mr Castle explains. "90% of the work needs to be done at night and involves road or lane closures," he said. "Normally we don't get road closure until 1am and the road must be open at 5am, so completing the work in four hours is extremely stressful."

United E&P use Topcon's resurfacing solution to map the existing surface of the circuit. Laser scanning technology is used to model the track, enabling an optimised design to be loaded onto the machines.

MAGNET software is used to create a CAD model for the racetrack, which is then loaded onto paving machines using machine control technology and survey rovers to accurately build to design.

"Using Topcon's RD-M3 software we can variable depth milling for our machines so we're milling to the design," Mr Castle said. "Previously on jobs like these you'd take 50 millimetres out and put 50 millimetres back in, wasting material and not optimising the surface."

United E&P also utilised a range of Topcon paving machine control solutions to steer the paver to deliver the smoothest results, while also automatically correcting the machine for optimal compaction.

Topcon offers a unique machine control system for fine tolerance work including grading and paving applications. Millimetre GPS uses a combination of a high-performance laser transmitter and GNSS positioning technology to create a large working zone that delivers up to 300% greater accuracy than a standard GPS solution alone.

However, in a city with many high-rise buildings, getting a clear view of the sky for GPS technology is not always possible. In these areas, the team switched to total station technology to give positioning information to the machines to maintain a consistent level of accuracy across the project. Survey rovers are used throughout the paving process to check as-built information.

"Topcon has the ability to utilise GPS, lasers and total stations and switch between them easily, which makes a huge difference when it comes to projects like these that need precision, at speed," Mr Connelly said. "We're really used every bit of technology we had at our disposal for this job to give a great result in a limited amount of time," he added.

Mathew Connelly and Ricky Hales from Position Partners with Graham Castle from United E&P

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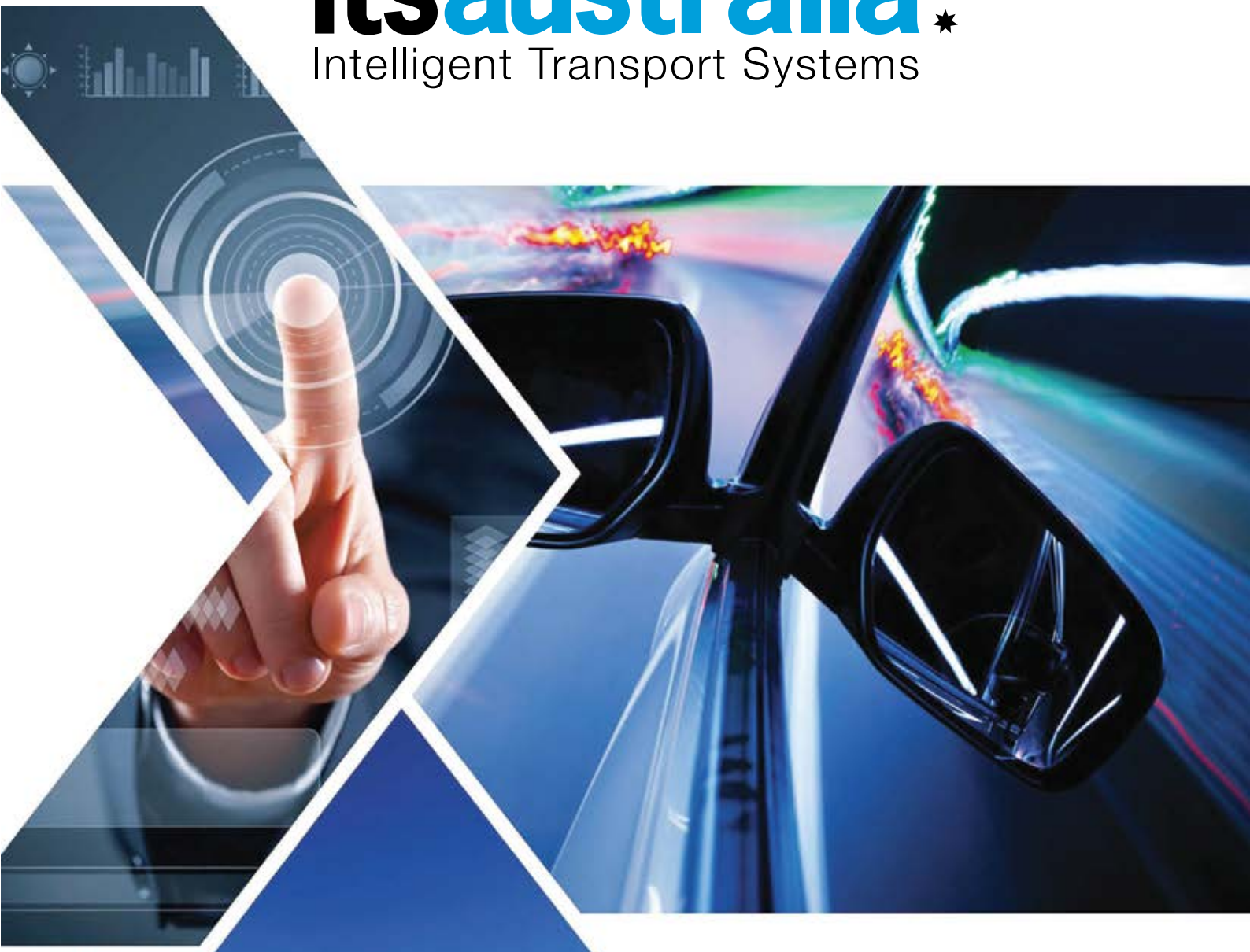

ITS SPECIAL FEATURE

Intelligent Transport Systems
News and Feature Articles

BRIAN NEGUS FIRST AUSTRALIAN INDUCTEE TO ITS WORLD CONGRESS HALL OF FAME

Brian Negus, ITS Australia Ambassador and Chairman of CICA Group, became the first Australian inducted to the Intelligent Transport Systems (ITS) World Congress Hall of Fame at the recent 26th ITS World Congress in Singapore.

At the opening ceremony of each annual ITS World Congress three individuals are honoured with the Hall of Fame award, one each from the Asia Pacific, American and European regions. Negus was inducted to the Hall of Fame alongside Jim Barbaresso of the United States and Svend Tøfting of Denmark.

The annual award recognises industry professionals who personify the highest standards of leadership and help to drive the ITS industry forward.

"I am deeply honoured to be recognised by my international ITS colleagues."

"However, I see this as much more than a personal award. I firmly believe that this award recognises the leading role that Australia has played for many years in advancing the adoption of smart technologies to improve transport," Mr Negus said.

"Vehicle technology is now at the forefront of the mobility, safety and environmental improvements that we in the industry have long been seeking".

Hajime Amano, Secretary-General of ITS Asia Pacific said; "With a career spanning more than 50 years, Brian Negus is one of Australia's most respected and influential transport and mobility leaders."

A director of ITS Australia since 2007 and president for six years, Brian Negus is highly regarded for his long-standing strong contributions to transport, his commitment to intelligent transport initiatives, and his role in advocating for, and delivering ITS solutions in the transport sector.

Mr Negus represents ITS Australia on the ITS World Congress Board, chaired the organising committee for the 2016 ITS World Congress held in Melbourne, and is chair of the ITS Australia Policy Committee. Negus's career spans both the government and private sectors including General Manager Public Policy with the Royal Automobile Club Victoria (RACV); Deputy Director of Public Transport in Victoria; Regional Director of VicRoads; and General Manager of Port Planning at the Melbourne Port Corporation.

For his distinguished career Brian Negus was awarded the *Max Lay Lifetime Achievement Award* in 2018 and named Ambassador and honorary life member.

ABOUT CICA GROUP

Cica Group was formed in 2012, combining an experienced group of client-focused strategists, advisors, technologists and commercial contract managers. Each has a proven record in guiding enterprises through analysis, planning, management, realisation and the ongoing support of complex technology projects.

Cica Group's strength is its fusion of accomplished practitioners and their combined experience and expertise. Together they have unparalleled industry knowledge across Intelligent Transport Systems (ITS), Defence, Infrastructure, Transport, Mining, Utilities and Government sectors throughout Australia and overseas. Each practitioner has the ability to draw upon each other's expertise to deliver sound and well-considered advice, leading clients to project success.

For more information visit: **www.cicagroup.com.au**

AUSTRALIA-FIRST ROAD SAFETY TECHNOLOGY TRIAL GETS GREEN LIGHT

The Victorian State Government is making Victorian roads safer with a trial of Australia-first technology at one of Melbourne's high-crash intersections.

Victorian Minister for Roads, Roads Safety and the TAC Jaala Pulford recently announced new connected and automated vehicle technology will be fitted at the intersection of Williamstown Road and Somerville Road in Yarraville in Melbourne's inner-west.

"A third of road fatalities in Victoria happen at intersections – this trial will give us important insights on how to boost safety at intersections and keep more Victorians safe," Minister Pulford said.

"Victoria has always led the way in connected and automated vehicle technology, this is another way we're making our infrastructure and policies support the uptake of this life-saving technology."

One third of deaths and 44 per cent of serious injuries on Victoria's roads occur at intersections. This trial will provide insights that can help boost safety at busy, complex intersections. Specialist light detection and ranging (LIDAR) sensors will monitor the intersection and analyse all crashes and near misses.

The cutting-edge technology will also provide real-time warnings of potential hazards to vehicles fitted with connected technology.

"This technology will play a key role in keeping Victorians safe on our roads – that's why we're investing in it and beginning the roll-out on our roads," Victorian Minister for Public Transport, Melissa Horne added.

This is the first time LIDAR technology has been used in this way in Australia and will allow Road Safety Victoria to closely analyse crashes and near misses, and how they may have been caused, to make roads safer. The trial is being undertaken by Omni-Aware – a consortium of specialist technology companies including Intelligent Transport Services, Transoptim Consulting and IBIS Computer.

The project is funded through the Victorian Government's $9 million *Connected and Automated Vehicle Trial Grants Program.*

TORONTO CITY COUNCIL APPROVES FIRST COMPREHENSIVE AUTOMATED VEHICLES PLAN

Toronto City Council has approved the *Automated Vehicles (AV) Tactical Plan and Readiness 2022* report. This is the first comprehensive plan of its kind for a North American city.

The plan aims to make Toronto "AV Ready" by 2022 and includes five key actions for City staff.

One of the key actions is an Automated Shuttle Trial already scheduled to connect the West Rouge neighbourhood in Scarborough with the nearby Rouge Hill GO Transit station by September 2020.

While driverless cars (highly/fully automated vehicles) may still be a few years away, they have the potential to reshape Toronto's transportation system. Partially automated vehicles are already in Toronto. These are mainly passenger vehicles with cruise control, automated braking, lane control, etc. The Tactical Plan addresses both types of automation and recognizes that some actions are required now while other planning can stretch all the way to 2050.

Speaking about the AV Tactical Plan, Toronto Mayor John Tory, said: "By taking proactive steps today to prepare for fully automated technology, Toronto is preparing for the future."

"I'm confident that the comprehensive plan adopted today – the first of its kind by a North American city – will ensure we are ready to embrace the benefits of this emerging technology while preparing to confront the challenges that such an innovation will bring," the Mayor added.

The plan balances the long-term opportunities automated vehicles offer, such as improvements in how freight, goods and people are moved throughout the city, and how services are delivered, while anticipating and mitigating the possible risks. It sets the foundation for a future transportation system that improves mobility, social equity and health; considers environmental and economic sustainability; reinforces protection of privacy as well as a more integrated transportation network; aims to use automated vehicles to increase efficiency; and supports progress toward achieving safer roads through Vision Zero.

Toronto City Council's AV Tactical Plan - the first comprehensive plan of its kind for a North American city - aims to make Toronto "AV Ready" by 2022.

One of the automated shuttles currently being trialled in Toronto.
Image courtesy: BlogTO

The Mayor's comments were echoed by the Chair of the City's Infrastructure and Environment Committee, Councillor James Pasternak, who spoke about the way that highly autonomous vehicles are not only expected to rapidly change the way in which people and freight are moved, but also the way in which many City services would be delivered in the future.

"There is tremendous potential for this technology in helping us to achieve our broader city goals as they relate to efficiency and resiliency in our transportation network, and how they contribute to social equity, and environmental and economic sustainability," Councillor Pasternak said.

The AV Tactical Plan was developed by more than 30 City of Toronto divisions and agencies and by consulting more than 350 community groups and companies that are currently involved in developing AVs. The City also partnered with a number of leading-edge organizations including academic institutions in Canada and the U.S., as well as other national and international organizations and experts to prepare the plan. Early on, a panel of international experts from across four continents and various sectors related to automated vehicles reviewed and contributed to components of the plan.

- A video about the Automated Vehicle Tactical Plan is available at: **https://youtu.be/Lqvo_UJ0Wxs**
- Details about the Automated Shuttle Trial are available at: **https://www.toronto.ca/services-payments/streets-parking-transportation/automated-vehicles/automated-vehicles-pilot-projects/automated-shuttle-trial**
- Additional information about Automated Vehicle planning at the City of Toronto is available at: **http://www.toronto.ca/automated-vehicles**

Toronto is Canada's largest city, the fourth largest in North America, and home to a diverse population of more than 2.9 million people. It is a global centre for business, finance, arts and culture and is consistently ranked one of the world's most liveable cities.
For more information, please visit: **www.toronto.ca**

INTELLIGENT TRANSPORT PIONEER BRIAN SMITH AWARDED MAX LAY LIFETIME ACHIEVEMENT AWARD

Intelematics veteran Brian Smith has been recognised for his integral role in the advancement of Australian navigation technology by receiving the highest accolade by Intelligent Transport Systems (ITS) Australia, the *Max Lay Lifetime Achievement Award.* The globally recognised award celebrates the achievements of leaders in the transport industry and ITS.

Brian has had a distinguished career – in 1995 he played a leading role in developing the first digital navigation map in Australia, then in 2000 Brian led the development of technology that combined mapping data with telephone directory data. This made it possible for commuters to search for specific locations like the nearest café or petrol station which is still a popular function today.

Intelematics' Chief Executive Officer, Rod Chapman, says Brian's contributions throughout his 14 years at Intelematics have been industry-leading.

"Brian played a key role in the launch of what is now known as Intelematics' SUNA Traffic Channel, which at the time was the first product of its kind and to this day is market-leading."

"Today, thanks in large part to Brian, Intelematics uses the SUNA Traffic Channel to provide traffic congestion and incident information to more than 4 million Australian and 2.5 million New Zealand drivers, plus an even greater number who access the information via a web browser or smartphone application," Mr Chapman said.

Intelematics provides its customers, which include vehicle manufacturers, road authorities and fleets, with services including vehicle tracking and management, 24/7 emergency response assistance and traffic data as a service.

"It has been a privilege to work in a relatively young and fast developing ITS industry. This combined with having the good fortune to work for innovative and supportive organisations that have allowed risky product development the time to mature and deliver on potential has played a large part in the success of the products and teams I worked with," Brian Smith said.

ITS Australia President, Dean Zabrieszach, says that Brian's contributions to the industry have been impressive.

"Over the past 30 years, Brian has dedicated his professional career to advancing Australian ITS technologies. In doing so, Brian has become a leading voice in the industry."

"Brian is perhaps most highly regarded for his work delivering the nation's first RDS-TMC digital traffic service in 2007.

"Today, Brian continues to advocate for safer, better transport for Australia. He is a very deserving recipient of the Max Lay Lifetime Achievement Award," Mr Zabrieszach added.

Brian will be formally honoured at the ITS Australia Awards Presentation Night Dinner in Adelaide on Thursday 21 November.

ABOUT INTELEMATICS

Intelematics delivers the intelligence behind connected services to keep people moving. Since its establishment in 1999, Intelematics has continually been at the forefront of the telematics industry with a presence in Australia, North America and Europe. Intelematics' expertise is delivered via a suite of scalable, multi-tenanted solutions. This includes connected transportation services such as real time insights and predictive services, connected motoring applications on vehicle dashboards and specialist safety and security services. Intelematics Australia is a wholly owned subsidiary of RACV.

2019 Max Lay Lifetime Award Recipient, Brian Smith

2019 ITS AUSTRALIA NATIONAL AWARDS NOMINATIONS ANNOUNCED

Intelligent Transport Systems (ITS) Australia recently announced the nominees for the ITS Australia National Awards 2019.

The awards are given in five categories: Government Award, Industry Award, Research Award, Young Professional Award, and Automated Vehicle Award, sponsored by the Australia & New Zealand Driverless Vehicle Initiative (ADVI).

Now in their 10th year, the annual ITS Australia National Awards recognise both individual and team accomplishments from the year, celebrating innovation and excellence in the industry.

Hosted by ITS Australia, the awards will be presented in Adelaide on Thursday 21 November 2019 at the Adelaide Oval.

Nominees for the ITS Australia National Awards are determined by a ten-person judging panel made up of intelligent transport systems professionals, representing industry, government, and academia. Gino Dompietro, Awards Committee chair, said: "Each year Australia's ITS industry impresses us with the increasing breadth, quality, and volume of work that is submitted for an award. That continues to be true in 2019."

"After much deliberation, we are delighted to announce this year's nominees for the ITS Australia National Awards," Mr Dompietro said.

This year's Awards feature an expanded number of nominees compared to previous years, reflecting the growing number of submissions received. For the first time this year there are seven nominees for the Young Professional Award.

Susan Harris, ITS Australia Chief Executive Officer, said, "Each year, we in the industry continue to be impressed by the incredible diversity of talent that is emerging in our industry. This year's nominees for the Young Professional Award represent the very best of that talent."

"ITS Australia is proud to support their burgeoning careers in transport technology," Ms Harris added.

The 2019 Awards nominees include:

AUTOMATED VEHICLE AWARD

- **AURRIGO**
  Autonomous Mobility as a Service to Enhance Life in Retirement Villages and Aged Care
- **BUSWAYS**
  BusBot – An On-Demand, Shared Automated Vehicle Pilot for Regional Public Transport
- **QUEENSLAND DEPARTMENT OF TRANSPORT AND MAIN ROADS**
  Cooperative and Highly Automated Driving (CHAD) Pilot's Connected and Automated Vehicle (ZOE2)
- **SAGE AUTOMATION**
  SAGE Autonomous Vehicle Ecosystem

GOVERNMENT AWARD

- **DEPARTMENT OF TRANSPORT VICTORIA**
  Cross Boundary Incident Management through Multi-Party Managed Motorway Control System Centre-To-Centre (C2C) Interface
- **DEPARTMENT OF TRANSPORT VICTORIA**
  Melbourne Freeway to Freeway Ramp Signal System
- **QUEENSLAND POLICE SERVICE**
  Reducing Congestion Duration from Serious Incidents
- **QUEENSLAND DEPARTMENT OF TRANSPORT AND MAIN ROADS**
  Hold the Red: Innovative Intersection Crash Avoidance System
- **TORRENS ROAD TO RIVER TORRENS PROJECT ALLIANCE**
  Thermal Video Incident Detection System

INDUSTRY AWARD

- **BUSWAYS**
  Cooee Busways On-Demand Public Transport
- **DM ROADS**
  ITS Asset Management Software
- **ROYAL AUTOMOBILE CLUB OF VICTORIA**
  Arevo Smartphone App
- **SPOT PARKING**
  Parramatta Parking Finder - Mobility for Parramatta
- **UBER AUSTRALIA**
  Uber's Mobility as a Service (MaaS) Innovation in Partnership with Transport for NSW

RESEARCH AWARD

- **ARUP**
  MaaS Governance Research - Arup University
- **MONASH UNIVERSITY**
  VRAV: Augmented On-Road Driving Simulator for Autonomous Vehicles Using Virtual Reality
- **SWINBURNE UNIVERSITY OF TECHNOLOGY, SMART CITIES RESEARCH INSTITUTE**
  Automatic Passenger Counting Technologies for Bus Replacement Services

YOUNG PROFESSIONAL AWARD

Candidates for the 2019 Young Professional Award for demonstrating passion and dedication to the ITS industry as a young professional are:

- **ANTHONY LEDUCQ**
  Senior Solutions Architect
  CUBIC TRANSPORTATION SYSTEMS
- **DANIEL GUNEK**
  Network Intelligence and Asset Reliability Engineer
  DM ROADS
- **MITCHELL PRICE**
  Regional Director of Government Strategy & Policy – Asia Pacific
  LIME
- **PATRICK BUSBY**
  ITS Engineer
  TRANSURBAN
- **SEPEHR GHASEMI DEHKORDI**
  Research Associate – Centre for Accident Research and Road Safety – Queensland (CARRS-Q)
  QUEENSLAND UNIVERSITY OF TECHNOLOGY
- **TEGAN ROSS**
  Undergraduate Engineer
  AURECON
- **YALE ZHUXIAO WONG**
  Doctoral Candidate and Research Analyst – Institute of Transport and Logistics Studies
  UNIVERSITY OF SYDNEY BUSINESS SCHOOL

ABOUT ITS AUSTRALIA

Intelligent Transport Systems (ITS) Australia is the peak body for advanced transport technology in Australia. Formed in 1992, it has partnered with government, industry, and academia to shape future transport for more than 25 years. Australia is a global leader in intelligent transport, and ITS Australia works on behalf of more than 125 member organisations to promote the development and deployment of technologies that enable all Australians to move more safely, efficiently, and sustainably through the nation's transport networks.

So too, the Engineer can use the vast capacity of Finite Element analysis to validate, optimize and adapt data to create the finest design solutions.


Just as the Conductor uses all the instruments
at his disposal to create the finest music...
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ULTRA FAST HIGHWAY CHARGING NETWORK FOR ELECTRIC VEHICLES

On behalf of the Australian Government, the Australian Renewable Energy Agency (ARENA) recently announced $15 million in funding to Evie Networks to roll out the largest ultra-fast battery electric vehicle (EV) charging network along Australia's highways. The funding will support the first phase of the $50.2 million intercity highway charging network with 350 kW ultra-fast chargers located along the 'National Land Transport Network' and beyond.

A total of 42 charging sites, all powered by renewable energy, will be installed at roadside service centres connecting Adelaide, Melbourne, Canberra, Sydney and Brisbane, plus destination charging in Far North Queensland, Tasmania and Perth. Construction commenced at the end of August on the first site north of Brisbane, and it is expected that the first 23 sites will be fully operational within the first year.

Each of the 42 sites be able to charge two cars concurrently and will enable the typical EV available in Australia to charge 100 kilometres within 15 minutes using Tritium chargers.

All sites will be open access with charging plugs suitable for all EV models available, including Tesla with an adaptor. Spacing of sites is designed to align with Australian geography, population areas, highways and to be well within range of even the most affordable EV models.

ARENA CEO Darren Miller said Evie Networks' charging network would further contribute to the infrastructure required to support the uptake of EVs in Australia.

"Evie's fast charging stations across the country will help to increase the supply and adoption of electric vehicles by building the charging infrastructure in key areas along major roads. Reducing range anxiety will encourage EV uptake by giving motorists confidence they can get where they want to go - even on long road trips," he said.

Last year, ARENA also committed $6 million for to Chargefox's ultra-fast charging network which will include 21 charging sites from Adelaide to Brisbane, around Perth and in Tasmania.

"Both networks will provide complimentary coverage along major highways connecting capital cities, and both will be powered solely with renewable energy," Mr Miller said.

Last year ARENA and CEFC published a report which predicted the uptake of EVs would increase significantly in the next decade. The report said EVs would reach price parity with petrol cars by the early to mid 2020s when looking at the upfront cost, and sooner than this on a total cost of ownership basis. A lack of fast charging infrastructure was identified as a barrier to the uptake of EVs.

"EVs could play a huge role in the future, allowing renewables to power our cars. This could reduce fossil fuel consumption from transport and reduce the cost of car ownership," he said.

Evie Networks' CEO Chris Mills said: "We have estimated that Australia needs around 350 sites to cover all the highways that make up Australia's National Land Transportation Network. While many consumers will charge at home, they will also need plenty of fast chargers in towns, suburbs and cities."

"There are currently around 6,500 petrol stations. This is just the beginning of the infrastructure build out," Chris Mills added.

FIRST ACE ELECTRIC VANS ASSEMBLED IN SOUTH AUSTRALIA

by Peter Roberts / @AuManufacturing

The first ACE-EV electric cargo van to be assembled in Adelaide, South Australia was revealed recently at the Tonsley Innovation District, the former Mitsubishi Motors main assembly building, in Adelaide.

Greg McGarvie, managing director of Australian Clean Energy Electric Vehicle Group (ACE-EV), was beaming as the carbon fibre composite van impressed with not only its silence, but its solidity, its quality and its promise for the future.

"It has taken us a million dollars to get where we are today," McGarvie said.

"My ambition is to work at it until at least 50 per cent of the car comes from South Australia."

"That will be a higher local content than Holden ever had," he added.

For the moment the solid carbon fibre composite chassis is brought in from China in flatpacks and assembled by Aldom Body Builders at their facility in Wingfield north of Adelaide. Interiors, electric drive train and a variety of bodies are then added, with local content for the first vehicles limited to labour and road wheels.

The ACE-EV cargo bay has a capacity of 500 kilograms, giving the vehicle a range of 200 kilometres.

Body builder Mark Aldom said the chassis came in 17 parts and the bodywork a further 78.

"You and I could put it together in abut 18 hours," Aldom said. "The design is very clever."

One hundred vehicles are available initially, with local government representatives at the launch expressing keen interest in the Adelaide product.

McGarvie is now in discussions with investors to raise $5 million, a first tranche of capital needed to take production to a planned 15,000 a year by 2025.

First published in @AuManufacturing

AUSTRALIA'S FIRST ELECTRIC MOTORBIKE LAUNCHED IN ADELAIDE

by Joshua Fanning

The Fonzarelli NKD electric motorbike and its charging stations will be manufactured in Adelaide, South Australia.

Michelle Nazzari and Simon Modra met at a wedding several years ago in Sydney and spent the evening engrossed in conversation about motorbikes. The pair of entrepreneurs stayed in touch as each went their separate ways, Simon back to Adelaide and various startups in the sustainability sector, and Michelle into her own electric vehicle company called Fonzarelli.

"I had been working in automotive manufacturing with electric and hybrid buses," said Nazzari.

"That's where it all started, but I looked at the powertrain and it's very simple and thought, 'yeah, I might give this a go,' and so set up the company and started tinkering."

Nazzari launched her first electric scooter in 2012-13 under the brand Fonzarelli and has grown the business from there.

Always with the push to increase mileage and with a dedication to motorcycles still in her heart, Nazzari reconnected with Modra to tackle the issue of charging stations for her NKD electric motorbike.

Launched recently at Modra's Motorcycle Society café in the Adelaide CBD, the electric dual-sport mini motorcycle has a range of up to 120kms and can produce 6000 RPM and a top speed of 100 km/h.

Modra, who is also an architect and Future Submarine design researcher at the University of South Australia, jumped at the chance to collaborate with Nazzari on the NKD project and convinced her to manufacture the charging stations and bike in South Australia.

"It's a legitimate form of transport – there are many motorcyclists out there who don't have a car and we're lucky battery power has become so reliable now and Peter [Coombs – Chapter president of Design Institute of Australia] did give the hat-tip to Tesla," Modra said.

"Now we've got this incredible range with the vehicle and we're getting further and further out."

The Fonzarelli technology can be retrofitted to older motorcycles – potentially expanding the customer base for this product throughout high-use motorcycle populations in the countries across the Southern Hemisphere.

"The idea at the moment is to solidify ourselves here in Australia, but we've got strong interest from around the world," said Nazzari.

Modra said the motorcycle has got a bit of iRobot or Gattaca about it.

"I think the NKD is very futuristic looking and in Gattaca they actually retro-fit electric motors into their cars and that's what I get excited about with the Fonzarelli – is that all that embodied energy in all the steel that's on our roads now can actually stay there with a new powertrain. It is the future."

The Fonzarelli NKD bike is made to order. Base model pricing starts from $9,990AUD and early adopters will be able to have their bikes ready for the Australian summer.

THE FUTURE OF E-MOBILITY TO BE SUPERCHARGED AT UQ

Advancing the performance, economics and uptake of electric vehicle (EV) technology globally will be the focus of The University of Queensland's first dedicated e-mobility researcher Dr Jake Whitehead. The new research position – the *Tritium e-Mobility Visiting Fellow* – aims to make a significant contribution to the sustainability of the transport sector which is one of the main generators of air pollution and greenhouse gas emissions around the world.

Dr Whitehead said he was honoured to take on this exciting role for the next two years, and relished the opportunity to continue building on UQ's existing transport and energy research.

"EV technology, and e-mobility more broadly, present enormous opportunities for Australia," Dr Whitehead said.

"From an economic perspective, we have a unique opportunity to build on our existing mining expertise, and transition our resources sector towards the growing global demand for the minerals required to produce batteries and EVs."

A $1.5 million donation to UQ through The Trevor and Judith St Baker Family Foundation will fund the new position.

Dr Whitehead will work alongside leading researchers at the UQ Dow Centre for Sustainable Engineering Innovation as part of the *'Rapid Switch Project'*.

The Rapid Switch Project is an international research initiative originating at the UQ Dow Centre, which seeks to identify the most viable and rapid pathways in the global transition to a low carbon economy.

"EV technology will reduce both carbon and particulate emissions, helping not only the environment but also improving air quality and reducing the impact of fossil fuel vehicle emissions on our health," Dr Whitehead said.

"Transport costs can also be reduced by at least 70 per cent through the use of EVs, meaning we can travel from A to B cheaper and also transport goods at a lower cost."

"Finally, EVs can support the uptake of renewable energy and lead to a more stable electricity grid by acting as 'batteries-on-wheels'," he added.

The new Tritium e-Mobility Visiting Fellow was named after the internationally recognised e-mobility company Tritium, which grew out of a solar car racing team at UQ in 1999.

For more information about future Tritium Fellows, please contact the UQ Dow Centre, E: dowcentre@uq.edu.au

UQ's first dedicated e-mobility researcher, Dr Jake Whitehead

FREE-FLOW PARKING FOR CAR-SHARING

Across Australia, there is increasingly intense competition for kerbside space and parking. Roadside infrastructure management is a complex challenge in most jurisdictions so working to better understand and improve current parking arrangements will tackle a range of high priority issues for local and state governments, businesses, and our growing urban and regional centres.

The current, round trip, car-share services in Australia are proven to reduce the use of motor vehicles, and can also increase the use of public transport and active transport (including cycling and walking).

These transport modes enable a reduction in pressure on network capacity resulting from population growth and cars owned by residents. This, in turn, reduces the number of cars competing for parking and driving space. Impressively this can all be achieved at a minimal cost to government, including councils and other agencies charged with managing transport networks and parking.

Free-floating car sharing services (FFCS) have been introduced in a range of jurisdictions internationally as an additional option to round trip car-sharing. FFCS removes the need for the shared vehicle to have a specific parking spot, most commonly allocated by a Local Government Authority (LGA), negotiated with the car-share provider. FFCS allows users to pick up and return cars anywhere within specified areas of a city.

While a seemingly simple proposal, whereby a customer can collect a vehicle through their member app and pay-per-kilometre to a destination of their choice, and park it where another member of the car-share program can share it, this can be a surprisingly complicated process to enable, and can cause public backlash, as seen with the implementation of free-floating bike share.

This project will work with key stakeholders in academia, government, industry, and the community to better understand the current parking challenges and work towards a solution that enables the wider availability and usability of car-share services.

Project participants include: ITS Australia, RMIT University, IAG, Cubic Transportation Systems and the Royal Automobile Association of SA Inc (RAA).

Project Background

One of the most visible but less considered impacts of the more than 19.2 million registered motor vehicles in Australia is parking. The number of cars is soon to outnumber the population. As cars are stationary on average 95% of the time, parking is only going to become more of an issue in our suburbs, towns, and cities.

It is reasonable to assume that a reduction in private vehicle ownership will help mitigate the impacts of parking and reduce the need for car-park spaces, and in the long-term, potentially change the way we look at roadside infrastructure with the opportunity for completely rethinking the way we manage land-use planning and development.

This project, in close collaboration with government and industry, will investigate if free-flow parking for car-sharing programs can increase car-share uptake, helping reduce congestion and lead to better flows of traffic in and around regions, similar to the proven effect of round-trip carshare.

This project proposes to investigate FFCS services as they currently exist internationally and assess the potential benefits they can bring.

FFCS have been introduced in a range of jurisdictions internationally as an additional option compared to round trip car sharing, which removes the need for the shared vehicle to have a specific parking spot most commonly allocated by a Local Government Authority, negotiated with the car-share provider. FFCS allows users to pick up and return cars anywhere within a specified area of a city.

FFCS can provide a high degree of utilisation of vehicles and less usage of infrastructure in the form of parking lots and thus has the potential to increase the efficiency of the transport sector. However, there can also be a concern that FFCS competes with other efficient modes of transport such as biking, taxi/uber and public transport or could perhaps increase the number of vehicles movements on the network due to the increased convenience.[1]

The greatest advantages of the 'one-way' service is that it provides it users with sought-after flexibility as people can drive wherever they need to go and then terminate the rental of the vehicle by simply returning it within the same delimited area, using one of the authorised spaces.

The greatest disadvantage is the potential negative impact on the wider community as FFCS can lead to bunching and disruption to local parking areas and resident backlash, as seen in free float bike share.

Currently the Australian car share service market supports over 150,000 users accessing over 30,000 vehicles. This takes place primarily in Melbourne and Sydney, where 90% of the members and vehicles are based. Thanks to the investment of the round-trip car share service providers and the support of councils, there is now a market in which car services can compete with low-use car ownership.

1. Habibi, S., Sprei, F., Englund, C., Pettersson, S., Voronov, A., Wedlin, J., Engdahl, H., 2017. Comparison of free-floating car sharing services in cities, in: MOBILITY – ECEEE 2017 Summer Study – Consumption, Efficiency & Limits, p. 8 page 771

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SECOND PROVIDER NOW CERTIFIED FOR HILL DESCENT MONITORING APPLICATION

Transport Certification Australia is pleased to announce Transport Compliance Services (TCS) as a second certified service provider of Hill Descent Monitoring (HDM) – a new application of the National Telematics Framework. TCS is a subsidiary of MTData, one of Australia's leading telematics providers.

The HDM application manages the risks associated with heavy vehicles travelling down long or steep hill descents. It monitors heavy vehicle speed on descent on a nominated route and indicates if a driver has performed safety checks before the descent.

Main Roads Western Australia is the first jurisdiction to make use of the HDM application, and results of their initial trial of HDM will inform future network access decisions.

HDM may be applied by road managers or regulators as a condition of road network use for specific kinds of vehicles at high risk locations – they will advise transport operators if HDM is a condition of access.

The application can also be used by transport operators who want to better manage the safe use of their vehicles, and obtain access benefits, for example when transporting primary produce from regional areas across hilly slopes such as Roelands Hill on the Coalfields Highway in WA.

As with all other applications of the National Telematics Framework, HDM references common building blocks including the Telematics Data Exchange and associated Business Rules.

Dennis Turner, the Head of Operations at MTData/TCS, said, "We are delighted to become certified by TCA to offer the new HDM application."

"We strive to provide excellent service and a seamless integration of telematics for operators. HDM is part of our commitment to safety and productivity. We look forward to working with Qube Logistics, and other operators who are seeking to use HDM for trials in Western Australia."

In addition to HDM, TCS supports numerous applications available through the National Telematics Framework, including:

- Intelligent Access Program (IAP)
- Interim On-Board Mass (OBM) Solution
- Intelligent Speed Management (ISM)
- Intelligent Speed Compliance (ISC)
- Certified Telematics Service (CTS)
- Traveller Information Exchange (TIX).

For more information about TCS, please visit the TCS website: **www.tcs.net.au** or call 1300 683 282 and select option 6.

Find out about HDM, including how it works, benefits and scheme information, at: **www.tca.gov.au/ntf/applications#hdm**

For more information on the National Telematics Framework, contact TCA by phone on (03) 8601 4600 or by email: tca@tca.gov.au, or visit the website: **www.tca.gov.au**

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NEW GUIDE COVERS USE OF PRECAST ON CIVIL SITES

Civil sites aren't exempt from WHS laws and a new Guide published by Australia's peak safety authority Safe Work Australia will assist duty holders to understand their responsibilities when using precast concrete elements on civil sites.

The national industry body for precast concrete National Precast Concrete Association, has welcomed the document's release.

According to National Precast's CEO Sarah Bachmann, precast is commonly used on civil construction sites and the authority's new *Guide to managing risk in construction: Prefabricated Concrete* is a positive development for the industry.

"To date there hasn't been any readily available information pertaining to safe use of precast on civil construction sites," Ms Bachmann comments.

"The only material that has been available was the *National Code of Practice for precast, tilt-up and concrete elements in building construction,* which was published by the authority's predecessor the Australian Safety and Compensation Council in 2008."

"That document though, only pertained to the construction of buildings," she adds.

"The document is one step closer to helping everyone in civil construction understand their responsibilities in so far as safety is concerned," Ms Bachmann says.

It has been released just as AS 3850:2015 Prefabricated concrete elements Part 3 is being finalised by Standards Australia's BD 066 committee, which will also apply to civil construction sites.

Builders and engineers who work with precast concrete are the main target of the new Safe Work Guide, and Ms Bachmann recommends they familiarise themselves with the document and understand their responsibilities.

Safe Work Australia's website indicates the Guide provides national guidance material for duty holders in the construction industry and applies to both building and civil projects. It provides information on managing risks and work health and safety (WHS) duties associated with working with prefabricated concrete. All prefabricated concrete elements are covered by the Guide – both factory-manufactured precast and site-cast tilt-up – with the exception of small products like concrete blocks, pavers, fence posts and the like.

The Guide gives guidance on planning, design and documentation, as well as the safe handling, transport, storage and erection of elements. There is also a series of Appendices which provide practical templates for use. These assist with assigning roles and managing qualifications of stakeholders. A manufacture certificate of compliance and a useful pre-erection checklist are there as well.

The Guide is available for free download from the National Precast website: **www.nationalprecast.com.au**

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