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Whether it's a TL-2 or TL-3 attenuator, your first question should always be:

IS IT MASH APPROVED?

With the Austroads Safety Barrier Assessment Panel (ASBAP) 'Transition to MASH' final transition date of 31st December 2020 looming large, there's never been a more important time for equipment purchasers to ask the critical question: **"Is it MASH Approved?"**.

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About the Cover

NSW-based Traffic Logistics operates the largest traffic management fleet of Truck Mounted Attenuators in Australia, comprising some 42 Scorpion® TMA units.

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

Fit for purpose?

Addressing Australia's massive road maintenance challenge

Dear Readers,

While I feel confident that the majority of you, like me, are watching with a balanced blend of excitement, expectation and (maybe just a touch of) scepticism about the myriad of major infrastructure funding promises that are being wheeled out in the federal and state post-pandemic shutdown budgets, I must admit to being a little disappointed – although, perhaps not necessarily surprised – that despite the appalling condition of many of the nation's local roads and smaller rural highways, the focus of the big infrastructure spending promises continues to focus predominantly on new major transport projects.

At this point, I will – as usual - take the opportunity to clearly state that, as with each of my editorials, the commentary in this editorial is no way intended to be construed as a partisan piece. It isn't aimed at any political party or intended to favour any political party. It's only intended purpose is to highlight what I see as a major issue in our road infrastructure planning and spending.

That said, while I am generally the first to argue our urgent need for additional public transport (with adequate parking facilities), new motorways and improved arterial connections - and as such, welcome any announcements of funding for such projects - I believe there are a couple of critical points being overlooked in the frenzy of spending announcements, viz:

- Spending on transport infrastructure does not and cannot stop with initial construction;
- New major road and transport projects, while always welcome (and let's be honest, not a bad sell point for any government) are not the only infrastructure projects we need;
- EVERYTHING requires some form of maintenance eventually; and perhaps most importantly given the expected changes in post-COVID transport habits (e.g. increased personal car use, reduced public transport capacities, etc.)
- There is no point having a selection of major projects that feed out into a road network which is so under-funded and in such a poor state of repair that it is unable to cope with the vehicle loadings (both in terms of numbers and mass) it is expected to cater for.

Now, before anyone decides to fire off a vitriolic email highlighting the many billions of dollars being spent annually by State, Territory and Local Governments across the nation on road and bridge maintenance, I am well aware of the funds being allocated and spent on road and bridge maintenance and repair. I do, however, have these questions in response...

1. Have you seen the condition of much of Australia's rural and regional road network?
2. Have you driven to or from many of the sprawling outer developing suburbs in our major cities?

As I noted previously, any spending on transport infrastructure is, in my humble opinion, worthwhile spending, however, it is clear from the condition of much of the road network, that we are clearly not spending enough.

Our road and bridge network is, quite literally, falling apart under the strain. Indeed, we're even in a situation where most, if not all of our major capitals still have unmade roads forming part of their road network. For added affect, I'll just repeat that... UNMADE ROADS... in 2020!!

And it's not about playing the 'blame game' either.

It serves no purpose to lay the blame for all of the shortcomings of our road and bridge network at the feet of any level of Government... it's an extremely long-term cumulative problem, and attempting to lay blame doesn't fix the problems.

Nor does spending the majority of road infrastructure budgets on feasibility studies!

What is needed is a genuine cooperation between all levels of government; a genuine willingness to get on and fix the issues; and, perhaps most importantly, genuine budgetary commitments that provide sufficient funding for the maintenance and repairs the network so desperately needs.

Anthony T Schmidt
Managing Editor

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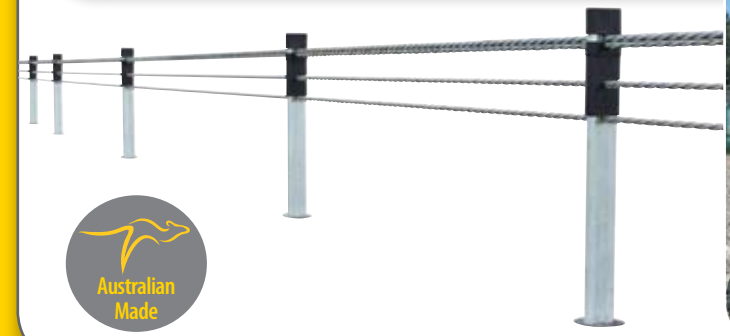

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New online asset management course to kick off in 2021

Enrolment is now open for Australia's only online, industry designed qualification course in asset management.

The *Graduate Certificate in Asset Management* is being offered from Semester 1, 2021, by the *Centre for Pavement Engineering Education (CPEE),* the Australian road industry's not-for-profit provider of accredited training.

The comprehensive course is aimed at both aspiring asset managers and those who already work in the space but want to sharpen and formalise their skills.

"Given its importance, asset management has been relatively under-resourced in terms of education and formal qualification opportunities in Australia," says CPEE CEO Ray Farrelly.

"This new course fills the gap - not just for professionals working in roads, but across a broad range of physical infrastructure assets in local and state government and the private sector.

"It delivers a formal qualification and practical, transferrable skills that are in demand right across Australia and around the world."

The core units of the new online course cover the principles of asset management and the economics of financial management.

Participants can choose two additional elective units from a suite of four, comprising road asset management, sustainable physical infrastructure, project management elements, and the principles, management and risks of contracts.

"The beauty of our online courses is that they offer the flexibility to study when and where it fits around your other commitments," Mr Farrelly says.

The Graduate Certificate in Asset Management has been developed with the support and input of CPEE partners' Austroads and the Australian Asphalt Pavement Association (AAPA), and is accredited by the Federal Government's Tertiary Education Quality and Standards Agency (TEQSA).

For more information on this and other online courses, visit: **www.pavementeducation.edu.au**

Sydney Metro Northwest Stations claim top engineering award

The Sydney Metro Northwest Stations project by Mott MacDonald, SMEC and KBR has been announced as Sydney's top Engineering Excellence Award winner and *Sir William Hudson Award* finalist.

The state-of-the-art metro line, with its fully automated trains and improved safety features, enhances the capacity of people to commute between different areas of the city, interconnects local communities, and provides development opportunities for new employment hubs.

The *Australian Engineering Excellence Awards* (AEEA) recognise Australia's top engineering projects and the engineering teams behind them.

Following a rigorous judging process by an independent panel of experts, projects from each of Engineers Australia's nine divisions are selected to win an AEEA. One winner from each division is also selected as a finalist for the Sir William Hudson Award – the highest honour for a project awarded by Engineers Australia.

Engineers Australia Sydney Division Manager, Greg Ewing, congratulated winners on their teamwork, innovation, and technical excellence.

"These Australian Engineering Excellence Award winners showcase the outstanding achievement in engineering and the invaluable contribution engineering makes to the economy, community and the environment," Mr Ewing said.

"Northwest Sydney Metro has revolutionised the public transport system in Sydney and represents a benchmark for quality of infrastructure. It is a striking addition to Sydney city and is a worthy nominee for the national award."

Australian Engineering Excellence Award winners – Sydney

- Sydney Metro Northwest Stations - Mott MacDonald, SMEC, KBR
- Yandhai Nepean Crossing - Transport for NSW, BG&E and Seymour Whyte Constructions
- Albion Park Rail Bypass - Detailed Design - SMEC Australia, Fulton Hogan
- Wynyard Place - Shell House - Taylor Thomson Whitting (TTW)
- Team UOW – Desert Rose House – University of Wollongong
- Sydney Metro Northwest – Operations, Trains and Systems Contract – Northwest Rapid Transit, CPB Contractors, John Holland Group, MTR Corporation, UGL Limited

Professional Engineer of the Year Award winner – Sydney

- Daniel Lambert - FIEAust CPEng EngExec NER APEC Engineer IntPE(Aus)

Young Professional Engineer of the Year Award winner – Sydney

- Reas Beeston - MIEAust CPEng NER

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Camera monitoring significantly improves safety of HGV driving

A new study from the UK has shown HGV drivers drive much more safely when there are cameras in their cabs monitoring their behaviour.

Computer scientists and driving psychologists from the University of Nottingham analysed data collected before and after the installation of unobtrusive cameras in the cabs of Heavy Good Vehicles (HGV) and found there is a significant reduction of risky driving behaviours with camera monitoring, and that this is even more effective when coupled with coaching. Their findings have been published in Accident Analysis and Prevention Journal.

Driving errors and violations are the leading determinants of road safety and this research highlights the importance of understanding the safety implications of risky driving styles and the extent of the influence of driver-monitoring technologies in improving driving behaviour.

The researchers analysed the largest dataset ever undertaken for this type of research looking at 669 HGVs for the longest period of time ever investigated - June 2017 to August 2019. They analysed three safety critical telematics incidents - harsh braking, harsh cornering, and over speeding incidents. The research was split into cameras with and without the addition of coaching.

The data showed that monitoring and educating drivers with coaching about the risk and consequence of their driving styles has a significantly greater effect in reducing driving errors, with this intervention reducing harsh-braking by 16%, over-speeding by 34% and harsh-cornering by 31%. Without the coaching these percentages dropped to 4%, 28% and -13%.

The research also showed that weather or seasonal changes can influence HGV risky driving behaviours with highest rates of driving incidents observed during spring and summer seasons. This is likely due to the vast majority of families taking their summer holidays at this time, thereby creating busier roads and tailgating.

Jimiama Mosima Mafeni Mase, PhD researcher with the *Horizon Centre for Doctoral Training* at the University of Nottingham who conducted the research under the supervision of Dr Grazziela Figueredo, Dr Peter Chapman and Dr Mercedes Torres Torres, said: "As drivers are made aware of their monitoring especially with the use of cameras, they become conscious and improve their driving behaviours. With the affordability of in-vehicle cameras, the government can enforce policies that enables all HGV companies to install cameras in their vehicles for safety purposes."

"We are aware of the privacy concerns with collecting and storing videos of drivers, however, experts in data privacy can guide decision makers on how to efficiently implement such policies. In addition, decision makers can provide incentives to encourage frequent coaching of HGV drivers using the videos collected during monitoring as educating drivers has shown to significantly improve their driving styles."

"We observed that driving violations such as over speeding are harder to monitor with cameras and may require other factors or methods to detect their causes. Therefore, more multidisciplinary research and collaboration is required between computer scientists, psychologists and human factor specialists to develop more advanced driver assistance systems that can incorporate more information such as external factors and drivers' affective states to accurately detect the cause of incidents or risky driving behaviours."

Grazziela Figueredo, lead supervisor added: "This large-scale study is really significant in showing how important monitoring and coaching is in changing driving behaviour. With further support from policy makers and HGV companies the findings from this research could be an important step in improving the safety of our roads."

Yotta and strategic partner PMS assist City of Parramatta with rapidly-expanding infrastructure plan

Technology company, Yotta has partnered with high-tech civil engineering and road asset management consultancy, Pavement Management Systems (PMS) to win a major tender to deliver their advanced data visualisation and strategic asset management system, PARMMS powered by Horizons™, to the City of Parramatta Council in Western Sydney.

The City of Parramatta Council had used PMS' road asset management system PARMMS for a number of years, with great results, but needed a more agile and flexible system which would allow them to manage their rapidly-expanding road infrastructure requirements being driven by strong population growth in the region.

The Council wanted a system that could provide them with advanced data visualisation functionality and present the results from the PARMMS system seamlessly using a map-based interface; enabling immediate visibility to which locations needed to be prioritised for road treatment and maintenance.

Yotta and PMS partnered to present PARMMS powered by Horizons™ – a strategic asset management system from Yotta encompassing the advanced data visualisation capabilities the council was looking for. Yotta were awarded the tender following the competitive request for proposal process.

The new single-system solution provided the City of Parramatta Council with the

advanced data visualisation functionality needed: presenting the analysis results from PARMMS seamlessly using a map-based interface – creating instant visibility for prioritising road treatment and maintenance actions by location.

Avesh Maharaj, Regional Manager for Australia and New Zealand, Yotta, said "We are delighted the City of Parramatta Council has chosen our strategic asset management and data visualisation platform, to develop and plan their pavement management programs.

"The Council is utilising the predictive modelling capabilities of the platform to develop and explain several possible works programs, based on different road treatment and funding scenarios. The new model and platform are clear and comprehensible to a wider range of stakeholders, without the need for a technical knowledge of the data analysis."

Nikolaos Proufas, Manager Asset Strategy, City of Parramatta Council, has deemed the software as the best value for money, the most technically-competent solution, and the results of its use to date have already greatly exceeded the Council's expectations.

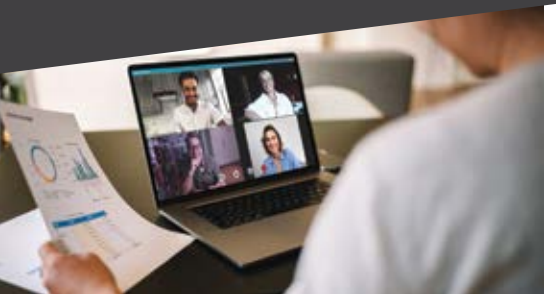
"The biggest benefit we have gained from the software is the ability to quickly and easily generate capital works programs and tweak them based on different funding scenarios.

"We also really value the high-quality visual interface and mapping which enables us to pictorially represent our works program on the software. It also allows us to generate heat maps and hotspots, highlighting where we are planning to spend our money," Mr Proufas added. "We are confident that in the future it will assist us in building collaboration and winning buy in to our programs of work,"

Like many Local Government Authorities across the country, the City of Parramatta Council has felt the significant impacts of the COVID-19 pandemic which has meant greater scrutiny of all public works projects, including road renewals which are deemed critical. By using the information generated by the PARMMS powered by Horizons™ platform, the asset management team are armed with everything they need to better defend their plans against reductions in road maintenance budgets. They also use the software to provide robust evidence-based proof that previous road maintenance projects were necessary for community safety and therefore justified financially.

Further development and use of PARMMS powered by Horizons™ will include the integration of video footage, footpath and stormwater data into the software, and the potential to use the platform for new road management schemes.

For further information, please visit the company's website at: **www.weareyotta.com**



Change in transport demand as more Australians look to work from home post-COVID

Demands on the nation's transport infrastructure are expected to change significantly in coming years as more Australians look to work from home an average of two days per week after the COVID-19 pandemic, according to a survey by the University of Sydney Business School.

The Transport Opinion Survey, conducted by the University of Sydney Business School's internationally respected Institute of Transport and Logistics Studies (ITLS), found across all industries, that while one in five employees worked from home regularly before the pandemic, some 75 percent of workers believe that post-COVID-19, their employers are more likely to support work from home than they did before the pandemic.

During the pandemic, the number of work from home days doubled for managers and almost tripled for employees in sales and clerical/administration work.

"The evidence reinforces the fact that as we move through and beyond the COVID-19 period, we can expect commuting activity to decline by an average of 25 to 30 percent as both employers and employees see value in a work from home plan," said Professor David Hensher, Founding Director of ITLS.

Perhaps not surprisingly, COVID-19 restrictions have seen the biggest change to work arrangements for Victorian workers, with 20 percent of respondents work from home on a regular basis before COVID-19, compared to 45 percent working from home during the pandemic.

New South Wales mirrored a similar rise in the percentage of employees working from home, with 20 percent working remotely before the pandemic compared to 39 percent during. Queensland saw the least change to work from home, with 27 percent of workers saying they worked from home more than usual during the pandemic.

Throughout COVID-19, employees living in metropolitan areas worked from home more than their counterparts in regional areas, according to the survey. But the increase in working from home was least for regional areas of Queensland, with the percentage of remote work rising by just over 16 percent, compared to an increase of nearly 30 percent in regional areas of other states and territories.

RISING PUBLIC CONFIDENCE IN TRANSPORT

Since a major fall in 2015, the latest *Transport Opinion Survey* (TOPS) index of transport confidence suggests public confidence is recovering. The index measures public confidence in transport infrastructure and services provided by local and national authorities. In the short-term, the transport confidence index for local transport is at 110 in the September survey, which is a significant rise from 87 at the same time last year, and higher than 100 in March 2010 when this TOPS began.

The short-term index of transport confidence in one year's time across Australia is back to over 100 for the first time since 2011 while long-term confidence over five years is at 104.

"Transport authorities should take this as a positive sign that their hard work to continue services through the challenges of the pandemic is working," Professor Hensher said.

Leading SA industry executive calls time on key lobbying role

The resignation has been announced of one of South Australia's most influential industry lobbyists, Civil Contractors Federation South Australia (CCF SA) Chief Executive, Mr Phil Sutherland.

He will step down from the pivotal position in January next year, ending a nine year tenure with the organisation, regarded highly for its role under his helmsmanship on pressuring government at all levels to employ infrastructure outcomes as economic drivers.

Mr Sutherland says the decision is timely, allowing him to consider alternative career opportunities and for the CCF (SA) to refresh and refocus at a time civil construction will be a cornerstone behind the pace and success of SA's post-COVID recovery.

Well-known and respected in government, industry and media circles, Mr Sutherland emerged as a fearless champion for civil contractors and the civil construction industry and as a vocal advocate for South Australia. He successfully transformed the Federation from a little-known industry association to significant prominence, placing the lobby group firmly in the spotlight as a key influencer of government, political and community stakeholder interests.

Under Mr Sutherland's leadership, the CCF (SA)'s training operation, *Civil Train*, grew in reputation throughout both SA and the Northern Territory as a high quality not for profit trainer and has more recently extended its operations into Western Australia. He also drove the approval of an *Apprenticeship in Civil Construction*, a long overdue qualification for the sector, establishing a career pathway into the industry for school leavers and others.

The creation of a CCF (SA)-sponsored Group Training Organisation to manage apprentices for the industry, is also a highlight of Mr Sutherland's tenure.

"It has been an honour and privilege to be the face and spokesperson for such an important South Australian industry," Mr Sutherland said.

"The role demands you play with a straight bat with politicians, regardless of their colours. This requires some hard truths to be faced at times by government, as unpalatable as that can be for the government of the day."

"I will leave the position knowing that the Federation has played a major role in seeing historically high government investment in transport and other infrastructure destined for South Australia, and that the State, and in particular, smaller businesses, are benefiting from local industry participation requirements of government," he said.

Mr Paul Davison, President of the CCF (SA) said: "Mr Sutherland's contribution to increasing the advocacy of the CCF (SA) has been second to none over the time he has overseen our Association. We have never before in our history had the visibility we have secured before Government and the media."

"Mr Sutherland has steered the organisation through a vast array of difficult and challenging times and the CCF (SA) is clearly in a better state for his contribution and leadership," Mr Davison said.

CCF SA, CEO, Phil Sutherland

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SCORPION TMAs DELIVER LIFE-SAVING PERFORMANCE IN THE FIELD FOR TRAFFIC LOGISTICS

"We have the largest owned and operated TMA truck fleet in Australia, with five different truck types to cover all customer requirements..."

Established in 2006, Traffic Logistics has grown to become one of Australia's leading specialist traffic management providers, with facilities in Sydney, Newcastle and Wollongong.

Built on the edict of *"finding a better, safer way"*, the company's focus on safety, innovation and efficiency have seen it become the preferred supplier to government agencies, councils and numerous tier-one national and multi-national companies across New South Wales.

Needless to say, Traffic Logistics' focus on safety and innovation extends not only to its people and systems, but also to the equipment it uses out in the field – especially when it comes to key safety equipment such as Truck Mounted Attenuators (TMAs). Traffic Logistics General Manager, Tony Maguire, explained:

"Whether it's for road works, accident response call-outs, road closures, redirections or special events, when it comes to providing traffic management services, safety is absolutely paramount... not only for everyone working on site, but also for our people and, of course, motorists in the vicinity."

"While our traffic management plans always focus on minimising risk, we have to be sure that in the event that something unexpected does happen, we can provide the highest level of protection to all concerned," Tony added. "And that's why Scorpion® is our TMA of choice."

Available exclusively throughout Australia from A1 Roadlines Pty Ltd, Scorpion® TMA's have proven their performance in the field in well over 2,500 documented impacts in the USA alone, as well as in numerous impacts across Australia and elsewhere around the world.

Fully tested, passed and approved to MASH TL-3 standards (impacts up to 100km/h by a vehicle weighing up to 2,270kg) and assessed, approved & recommended for acceptance throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel), Scorpion® II TMA's have been directly credited with saving lives of motorists and site workers alike, while also reducing the severity of injuries suffered by vehicle occupants during an impact.

AUSTRALIA'S LARGEST FLEET OF TMAs

Traffic Logistics operates the largest traffic management fleet of Truck Mounted Attenuators in Australia, comprising some 42 Scorpion® TMA units.

"We pride ourselves on being the leaders in TMA hire in Australia," Tony Maguire said.

"We have the largest owned and operated TMA truck fleet in Australia, with five different truck types to cover all customer requirements, including short chassis, long chassis, emergency response units, cone deployment trucks and training trucks - and they're all Scorpion® TMAs."

"We've been using Scorpion® TMAs for many years, and we believe they provide us with the best performance to meet our needs, both in terms of reliability, protection and whole-of-life cost."

"They are extremely well designed and well made, and most importantly, when it comes to impact protection, they really deliver the goods," he continued.

"As you might expect with so many TMA's deployed across many of the country's busiest roads, we've seen numerous impacts into our Scorpion® TMA's."

"In every instance, including even the most serious crashes, the Scorpion® TMA protected everyone working on site, as well as the TMA truck driver, and everyone in the impacting vehicles," Tony added. "In fact, we've seen a couple of truly horrendous impacts, where the vehicle occupants were still able to walk away with only minor injuries."

PERFORMANCE BY DESIGN

The key to the Scorpion® II TMA's outstanding life-saving performance in the field lies within its unique modular design.

The Scorpion® II TMA consists of strut and cartridge sections that are linked together on a support frame. Each energy absorbing cushion has an aluminium honeycomb core that is enclosed by an aluminium powder-coated box module that provides maximum durability and longevity. This open cartridge design also offers the added benefits of reducing wind resistance and increasing fuel efficiency when traveling to and from job sites at highway speeds.

The Scorpion® II TMA is equipped with LED brake, directional, signal and running lights, as well as all reflective markings (as required under VSG-11) to further enhance advanced warnings to drivers.

When impacted, the Scorpion's modular design crushes in progressive stages, which not only reduces the impact forces on the vehicle's occupants, but also results in lower repair costs and easy parts replacement. The curved side rails are made from corrosion resistant aluminium tubes and offer full width impact protection along the entire length of the Scorpion® II, safely redirecting the impacting vehicle away from the deadly "coffin corners" at the rear of the truck.

QUICK & EASY TO DEPLOY

The Scorpion® II TMA is extremely easy to use and fast to deploy in the field.

Available to suit a wide variety of vehicle types and models, the Scorpion® II TMA's compact design and balanced weight distribution minimises the impact on vehicle handling, while its 'fold-over' design helps to minimise the total vehicle height while in transit to and from the work zone, without having to compromise on performance in the field.

MODULAR DESIGN DELIVERS PERFORMANCE & SAVINGS

As well as playing a significant role in its performance during an impact, the Scorpion® II TMA's 'modular' design also plays a major role in helping to reduce the cost of repairs (particularly after moderate impacts and/or in the event of accidental damage) with only the damaged components requiring replacement.

With most non-modular units, even minor damage caused by a driver inadvertently reversing into an object or colliding with a stationary object while positioning the vehicle, can have extremely costly consequences. In fact, with some units, even minor impacts can result in having to replace the majority of the TMA unit.

Needless to say, with very low speed and minor impacts accounting for around 80% of the total impacts into TMA's, the cost and inconvenience of having to replace an entire unit or the majority of a unit any time minor damage occurs can be considerable.

The Scorpion II TMA units are extremely quick and easy to repair, and with the greater majority of repairs coming in at only a fraction of the cost of a replacement unit, they deliver outstanding 'whole-of-life' value.

"Minor incidents are a 'part of life on the road' in this industry. They happen easily and they happen often. Thankfully, the Scorpion® TMA's modular design means we only have to replace damaged parts, rather than the whole unit," Tony Maguire said.

"This modular design, together with the fact that A1 Roadlines are always extremely quick when it comes to getting replacement parts to us, means that we're able to get the units repaired and back into service with a minimum of downtime," he added.

Importantly, even after most 'medium severity impacts', the Scorpion® II TMA only generally requires replacement of one or two of the 'cartridge' sections and, depending on the angle of impact, a set of aluminium side deflection bars.

A) The damaged components being removed following an impact.

B) With the damaged components removed, the remaining sections are checked prior to the new components being fitted.

C) Fitting the new components. The majority of TMA repairs can generally be completed within a one-day turnaround.

DOES YOUR TMA MEET THE CRITICAL NHVR REAR OVERHANG REQUIREMENTS?

While much of the emphasis on TMA design and performance is, quite rightly, placed on MASH performance capabilities and compliance with the requirements of AS3845.2:2017, it's also important to remember that all TMA trucks must also fully comply with the requirements of both the National Heavy Vehicle Regulator's (NHVR) ***Vehicle Standards Guide (VSG-12)*** and the Commonwealth Government's ***Gazetted Heavy Vehicle National Law - National Heavy Vehicle Standards (Truck-Mounted Attenuator) Exemption Notice 2017 (No.1).***

This is particularly important when it comes to overall vehicle dimensions – especially in terms of permitted rear overhang when the TMA is FULLY-DEPLOYED and operational.

BOTH VSG-12 and the Gazetted Heavy Vehicle National Law state:
When the attenuator is **DEPLOYED** (e.g. LOWERED and/or FULLY EXTENDED so as to provide protection as required for a MASH TL-3 impact) **THE VEHICLE MUST NOT EXCEED THE FOLLOWING DIMENSIONS:**

(a) REAR OVERHANG — 6.50 metres; and
(b) OVERALL LENGTH — 14.0 metres.

For a single rear axle vehicle, this measurement extends from the centre of the rear axle to the outer most point of the LOWERED and/or FULLY EXTENDED TMA.

For a dual/bogie rear axle vehicle, this measurement extends from the centre point between the two rear axles to the outer most point of the LOWERED and/or FULLY EXTENDED TMA.

When fully deployed, the Scorpion® II TMA is only 4.2 m in length, thus giving the Scorpion II the shortest overall length of any MASH Eligible Truck Mounted Attenuator on the market. This shorter length not only reduces incidental impacts and repair costs while still providing the highest level of safety and reliability, it also ensures that all Scorpion® TMA trucks supplied by A1 Roadlines are FULLY-COMPLIANT with the requirements of both VSG-12 and Gazetted Heavy Vehicle National Law.

AVAILABLE FOR A WIDE RANGE OF HOST VEHICLES

While the greater majority of Traffic Logistics' TMA truck fleet utilises Hino short wheelbase cab-chassis, A1 Roadlines are able to supply the Scorpion® II TMA on a wide range of cab-chassis models from leading manufacturers including ISUZU, UD, FUSO and HINO to name a few. Trucks are also available in a range of body and wheelbase configurations to suit any application.

All Traffic Logistics TMA trucks are also fitted with multi-point safety harness drivers seats and Doctor Air Brake® automatic braking system which instantly locks the brakes of the host vehicle upon impact, further protecting the driver of the TMA truck, occupants of the impacting vehicle, and any bystanders or workers near the crash.

"We're extremely happy with A1 Roadlines, both in terms of their trucks and their after-sales service and support," Tony Maguire said. "The A1 TMA trucks are well designed and built well, with attention to detail and using quality components."

"Most importantly, thanks to their attention to detail, we know we can be absolutely confident that our TMA trucks are fully-compliant with all Standards and Statutory Regulations, across all jurisdictions," he concluded.

A BIG TRASH PUMP MAKES SENSE

Many contractors and local government bodies are familiar with dry prime dewatering pumps. One Australian company specialised in the development of wet prime technology believes there is a simpler and better way!

Australian Pump Industries are leaders in the field of self-priming pumps where no additional equipment is required to bring water to the pump's inlet. The company's latest 6" pump development is called the Aussie MQ600TD. The latest version, featuring a Deutz 80hp air cooled diesel engine, will shift 6,000 litres of water per minute. That equates to 360,000 litres per hour.

"The pump's priming system is delightfully simple," said Aussie Pumps Chief Engineer, John Hales. "Instead of compressors or vacuum pumps to prime an end suction style pump, we use a much simpler and virtually maintenance free system," he said.

The big 6" pump has a huge tank designed and cast into the pump's body. Priming the pump is therefore a very simple matter, taking the following steps:

1. Fill the pump's body with water through the priming cap, located adjacent to the delivery port.
2. Place the suction hose in the liquid to be pumped, ensuring there are no suction air leaks at the coupling or in the hose, where it joins to the pump suction port.
3. Start the engine.
4. The water in the pump body is expelled through the delivery port, creating a vacuum which then sucks the liquid up into the pump body and the pumping process starts.

"This big 6" pump not only has huge capacity, it can also draft water through a vertical lift of 7.6m. Its maximum head is 47 m, making it ideal for a wide range of roadworks type application", said Hales.

The pump is designed around the trash pump configuration with a huge non-clog style impeller. The impeller will handle 3" spherical solids. It's built onto a super heavy duty base which can morph itself into a construction style trailer.

The Deutz diesel engine, a big 4 cylinder F4L914, comes with a LOFA 620 controller. It is fitted with low oil pressure, low oil temperature and V-belt failure shutdown. A shock mounted control panel in a water-resistant housing includes an ammeter, tachometer and alternator failure light.

The pump end comes with oil lubricated tungsten titanium carbide seals. A 152-litre diesel fuel tank is incorporated in the base, giving the pump the ability to run an 11 hour shift without refuelling.

This family of pumps have been operated around the country in a wide range of applications. They are in use in quarries, mines and operated by council and roadwork contractors.

"Fast filling tankers on a road project is a key application for this equipment," said Hales.

"Local government bodies also like the pump because of its versatility," he added. "While these pumps are traditionally used for site dewatering on both construction and roadworks projects, in a pinch, they can be put to work as an emergency sewer bypass, or as flood mitigation pumps."

A full information pack is available from Australian Pump Industries.

"We should see a gradual trend from wet dry pumps taking over from dry prime because of their reliability and simplicity," said Hales. "Even a routine service of cleaning out the body in the event of a choke is simple. Debris can be easily removed by opening up the big trash port in the front of the unit," he said.

Further information on the big 6,000 lpm trash pump is available from **www.aussiepumps.com.au** or authorised disturbers around Australia.

Aussie Pumps' Chief Engineer, John Hales inspects a production run of the big Aussie wet prime pumps.

NEW REGISTERED SERVICE PROVIDER FOR THE ROAD INFRASTRUCTURE MANAGEMENT APPLICATION

Transport Certification Australia recently announced SolBox as a registered service provider of Road Infrastructure Management (RIM), an application of the National Telematics Framework.

The RIM application enables the collection of road use data from vehicles fitted with a telematics device, and is used by road agencies to drive productivity and safety reforms, while reducing costs.

SolBox is an Australian company with a background in intelligent process automation solutions with focus on optimisation, real-time turnaround and digital Chain of Responsibility (CoR) safety and service.

Theo Popescu, the Chief Technology Officer at SolBox, said, "We have a track record of improving business mobility and automation using industry leading tools and technologies. SolBox offers bespoke solutions that underpin efficient processes and drive real-time insights for operational support, job management and customer interaction."

"At SolBox, we work hand-in-hand with each customer and project team member to develop the right strategy and solution for their business. RIM is yet another opportunity to meet our customers' needs," said Mr Popescu.

A key element of the RIM application is that transport operators can use their existing telematics devices and service providers.

"We're keen to work with transport operators looking to use RIM to collect and benefit from road data from their vehicles – it's easy to get started, we'll handle the enrolment process for you," said Mr Popescu.

Information on how the RIM application is being used for new productivity and safety initiatives is available under RIM schemes on the TCA website. Fo further information, or if you are Interested in offering RIM as a registered provider, please call TCA on: 03 8601 4600, or visit the TCA website: **www.tca.gov.au/rim**

COUNCIL-SUPPORTED RESEARCH ON RECYCLED ROAD MATERIAL USAGE WILL HELP ENVIRONMENT AND ECONOMY

Local Government NSW (LGNSW) President Linda Scott said that a push towards new jobs in a circular economy is a key driver behind new research on the use of recycled materials in roads and footpaths.

Cr Scott said the LGNSW-funded research undertaken by Sydney University was designed to facilitate the same sort of home-grown approach to recycling and job creation as the Federal Government's new $1.5 billion Modern Manufacturing Strategy, which includes a priority focus on recycling.

"Making and using recycled materials for roads and pavement is exactly the kind of innovative manufacturing the federal strategy is talking about," she said.

"This research has produced a comprehensive guide that will make the process easier for councils, with the added benefits of better environmental outcomes and the creation of sustainable new jobs in the local recycled materials manufacturing sector."

Cr Scott said the University of Sydney research provided a technical overview for council engineers on how to best use recycled plastics, glass, asphalt, concrete and other materials to make safe and durable roads and pavement.

"LGNSW has long advocated for an overhaul of the State's waste and recycling management that recognises the need to transition to a circular economy, where waste is seen as a product, not a problem," she said.

"Practical action such as this guide has never been more necessary, with impending waste export bans resulting in the desperate need to find alternative uses to waste and recycled material.

"The research confirms the lead role councils play in recycling and waste management – not just collecting it but re-using it," she said.

"And it is a critical issue. In 2017-18 alone NSW generated more than 21 million tonnes of waste, which is expected to grow to more than 31 million tonnes over the next 20 years.

"With the option of shipping waste overseas no longer open to Australia, we have to find a viable alternative to deal with it. Reusing it as a resource through research such as this not only fosters innovation, it creates new jobs, new economic streams and, of course, is better for our environment."

LGNSW provided University of Sydney's Waste Transformation Research Hub research team with $50,000 through its Research and Innovation Fund to produce a guide on the technical processes involved in turning recycled material into roads and pavements.

"LGNSW is proud to support this type of innovation as part of its leadership around waste and recycling management," Cr Scott said.

"I congratulate the University of Sydney research team – Associate Professor Ali Abbas, Dr Amirali Ebrahimi Ghadi and

Associate Professor Daniel Dias-da-Costa – for their outstanding work."

Cr Scott said NSW councils were committed to playing a lead role dealing with the rising crisis of waste and recycling.

"Councils are leading the way when it comes to dealing with the one-two punch of increasing waste and shrinking options to deal with it," she said.

"We are starting to see innovative initiatives such as Paving the Way, a collaboration of 15 Sydney metropolitan councils who have joined forces to recycle nearly 100 million glass containers per year into local roads.

"This project represents the biggest local government-led procurement of recycled road-making materials in NSW history.

"We also welcome initiatives such as the $190 million Recycling Modernisation Fund, designed to tackle impending international deadlines for exporting rubbish and recycling.

"We are starting to see innovative initiatives such as Paving the Way, a collaboration of 15 Sydney metropolitan councils who have joined forces to recycle nearly 100 million glass containers per year into local roads. This project represents the biggest local government-led procurement of recycled road-making materials in NSW history."

"LGNSW has taken a lead role for a viable way forward on behalf of councils with initiatives such as the Research and Innovation Fund, which is already yielding results. And we continue to call on the NSW Government to urgently address the dire state of the State's outdated waste and recycling infrastructure and policies through our Save Our Recycling campaign," Cr Scott added.

"This includes a comprehensive plan for the NSW Government to put the $800 million it collects annually through its Waste Levy to good use by supporting councils to strengthen recycling services and build a circular economy in NSW."

Outcomes from the research, including the guide for using recycled materials for roads and pavement, can be found on the Local Government NSW website: **www.lgnsw.org.au**

VERIFIED STEEL CONFORMITY

FROM SOURCE TO SITE

WITH ACRS 2-STAGE CERTIFICATION

From the structural and reinforcing steels used in the construction of dams, treatment & desalination plants, bridges and other infrastructure, through to the reinforcing steel used in tanks, piling cages or precast concrete components, ensuring that the construction steels being used conform with all relevant Australian and New Zealand Standards and Building Codes - irrespective of their country of origin - is of paramount importance.

Notwithstanding the potential issues that can result from using non-conforming construction steels - including structural failure and the serious health and safety ramifications - in these days of widespread litigation and strict 'chain of responsibility' legislation, using materials that don't conform with all of the relevant Standards and Codes can spell disaster for engineers, specifiers, suppliers, builders and contractors in more ways than one.

Importantly, when it comes to conformity of construction steels, it's not only about the steel manufacturer. Philip Sanders, CEO, Australasian Certification Authority for Reinforcing and Structural Steels ("ACRS"), explained:

"When designers and procurement officers specify steel to particular standards, steel suppliers, builders, and building surveyors not only need to actively confirm that the steel they receive and sign-off for is the right steel - they also need to confirm that this conforming steel was cut, bent, and welded so it is still compliant when it is delivered and installed on the project."

"In short, even the best steel in the world can easily be ruined by inappropriate processing or fabrication - and if the steel was the wrong steel in the first place, the best steel processing, or fabrication won't make it right… and that's why ACRS 2-Stage steel certification is so important," he added.

THE BENEFITS OF ACRS 2-STAGE CERTIFICATION

Adapted for Australian and New Zealand conditions from European best practice for high-risk building materials, ACRS' integrated, 2-stage certification system certifies both the steelmaking at the mill and again the last point at which the steel properties can be changed before delivery and installation in the structure.

Known as a "bookended" system, this type of 2-stage certification is far more robust than a single point certification of either just the mill, or just the processor or fabricator (or of one stage being certified by one certifier and the second stage by another).

As ACRS steel certification covers both ends of the supply chain, the ACRS 2-stage system inherently includes full materials traceability - not just for reinforcing and prestressing steels, but also for structural welded sections manufacture, covering CC1 to CC3 to AS/NZS 5131, which are increasingly used in construction.

Philip Sanders commented: "You cannot just accept certification of the steel mill (Stage 1). You need to know what arrives on site. Is all the steel as you expect? If it is, has it then been properly processed or fabricated?"

"Historically, Australia and New Zealand have accepted a more relaxed product verification regime at the processor or fabricator (Stage 2) level than most developed countries, and these less onerous requirements have saved builders significant time and money in checking and testing costs."

"However, in today's dynamic market with global sourcing and supply, we can only maintain our traditional approach by the use of expert and independent certification systems to provide the minimum necessary assurance of both steel manufacture and equally the supply of that steel to site," he added.

"If not, as shown increasingly over the past few years, there will be more poorly performing structures as non-conforming materials are substituted for those the customer, and the public have been led to expect."

"Over the last 20 years, the ACRS 2-Stage certification system has been developed and expanded this to meet the specific needs of Australian and New Zealand construction industries, governments and public," Philip Sanders explained.

CERTIFYING STEEL FROM SOURCE TO SITE

If you only have certificates from the steel mill, it means you only have half the story. The ACRS steel scheme certifies both the steel mill (Stage 1) and steel reinforcement ("rebar") processor, mesh manufacturer, or structural welded section manufacturer (Stage 2) - providing a rigorous mechanism covering the two critical aspects of steel supply, and the traceability of materials between them.

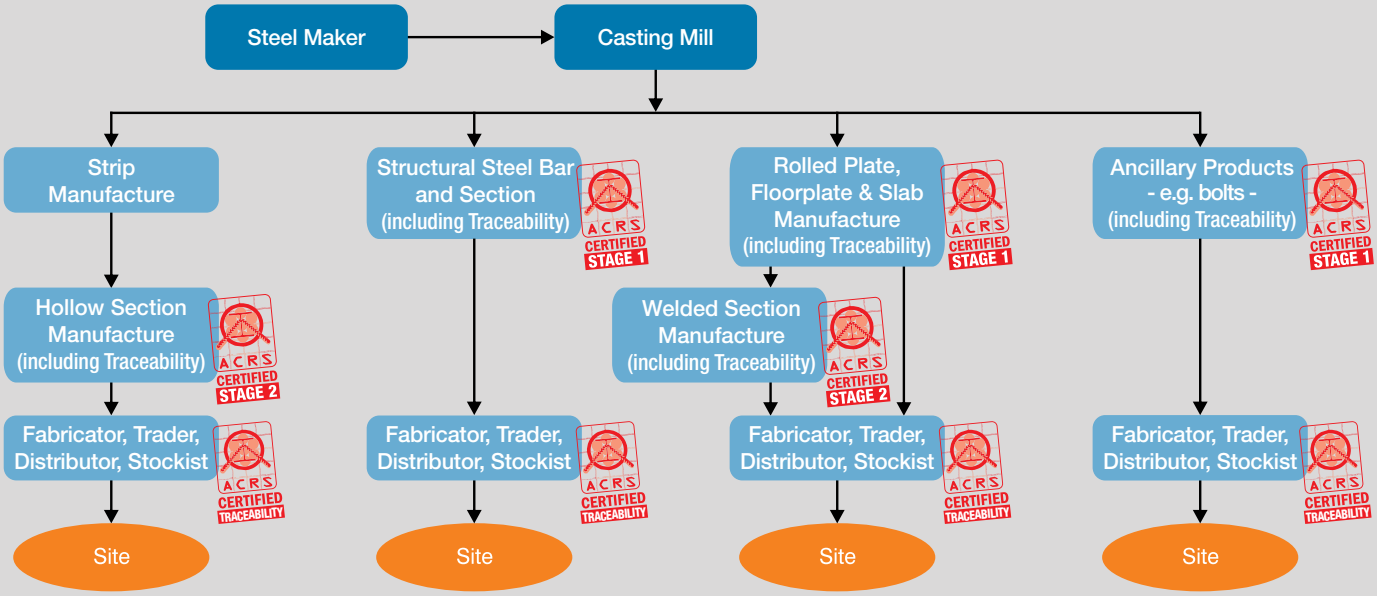
This 2-Stage 'chain of certification' provides a vital link between the steel producer, the reinforcement processor, or welded structural section fabricator, the steel supplier, and the construction site.

ACRS Stage 2 certification of the reinforcement processor, or welded structural section fabricators is the vital link between the steel producer (ACRS Stage 1 certified) and the end-user on the construction site, ensuring that:

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

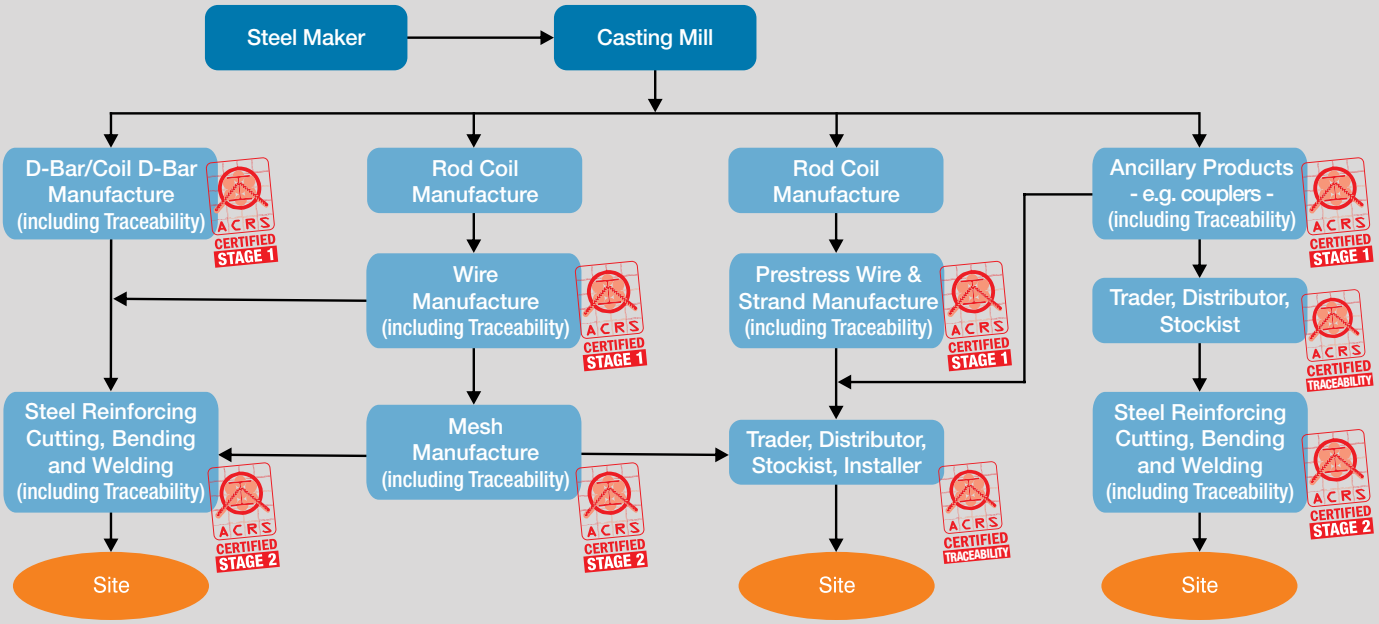
For your steel to be ACRS certified, it must be covered by both ACRS Stage 1 and ACRS Stage 2 certification. Any break in the 'chain of certification' between the steel mill and the processor or fabricator means the steel delivered to site is not ACRS certified.

ACRS Structural Steel Chain of Certification



For structural steels, ACRS certifies BOTH the steel mill that manufactures the steel AND the manufacturer or fabricator of any welded structural steel sections. Verification of the outputs of both these supply streams is essential for any structural steels and steelwork claiming to conform with AS/NZS 5131. ACRS has worked with the ASI to deliver "end-to-end" certification from steel mill to construction site via the ASI's Steelwork Compliance Australia fabricator scheme to provide consumers confidence in structural steelwork from the purchase of verified and traceable ACRS certified structural steels, through the supply chain to ACRS certified welded section fabricators and then through supply, delivery and erection of all finished fabricated steel on the project site.

ACRS Reinforcing Steel Chain of Certification



For reinforcing steels, ACRS certifies BOTH the steel mill that manufactures the steel AND the steel reinforcement processor and mesh supplier. Verification of the outputs of both these supply streams is essential for any steel reinforcing materials claiming to conform with the Standards.

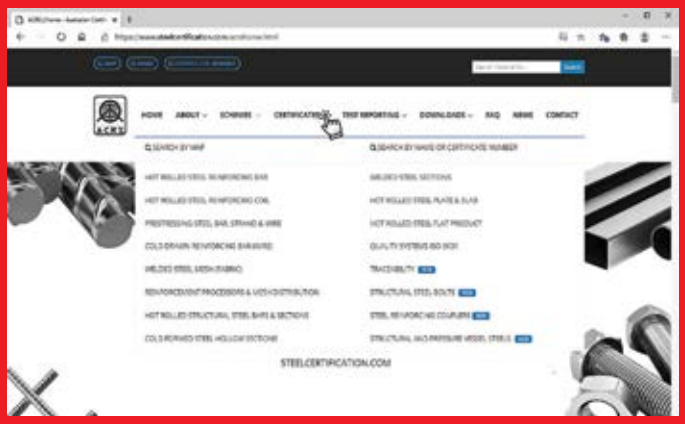
STAY UP-TO-DATE AT **WWW.STEELCERTIFICATION.COM**

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

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

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

Importantly, checking and confirming that ACRS certificates for products/suppliers are current is quick and easy on the ACRS website. Visit: **www.steelcertification.com** for full details of all current certificates.



INDEPENDENT, EXPERT, THIRD-PARTY CERTIFICATION

The only way to be truly sure that the materials being used conform fully with the appropriate Australian and New Zealand Standards and are fit for purpose, is through independent, expert, third party validation and certification.

ACRS provides a fully independent, expert assessment and certification for both Australian and internationally sourced construction steels, including reinforcing steels, structural steels and prestressing steels.

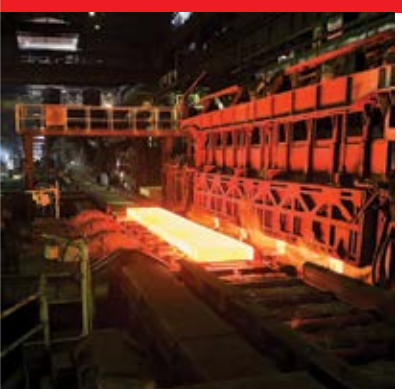
ACRS certification makes checking for compliance with the relevant Australian and New Zealand Standards easy. It demonstrates INDEPENDENTLY and EXPERTLY that the supplier consistently meets the Standards stated on the certificate. By using ACRS certified construction steels, builders and contractors can be confident that they are getting the AS/NZS compliant materials that they ordered, and engineers and building certifiers can be confident that steel meets the requirements of the Building Code and associated Standards.

Beyond checking the supplier's ACRS certificate, product markings and tags, there's no need for you to make any further checks on ACRS certified materials.

- No more checking materials properties against technical specifications;
- No more checking batch numbers against the test certificates.

All ACRS auditors are fully qualified metallurgists with many years of experience working with steels.

In addition to factory production control audits and independent testing, the ACRS scheme provides regular review and analysis of all products manufactured and supplied by the certified supplier. This makes matching material to conformity documentation simple and effective for the customer and for any verifier.



HOW DO I SPECIFY ACRS CERTIFIED STEELS?

The easiest way to manage and minimise the risk of non-conforming construction steels, is to specify ACRS certified steels.

FOR STRUCTURAL STEELS

"Structural steels shall comply with AS 1074, AS 1442, AS 1579, AS/NZS 1163, AS/NZS 1594, AS/NZS 3678, AS/NZS 3679.1, or AS/NZS 3679.2, as appropriate. Structural bolts shall comply with AS/NZS 1252.

Where applicable, materials shall be fabricated in accordance with the "Fabrication" requirements in Section 14 of AS 4100 or Appendix G of AS 5100.6, or AS/NZS 2327, or NZS 3404, and the requirements of AS/NZS 5131.

Acceptable manufacturers of structural steels, structural bolts, and the fabricators of structural welded sections must hold a valid certificate of approval issued by the Australasian Certification Authority for Reinforcing and Structural Steels Ltd (ACRS), or to such other accredited product certification system as shall be demonstrated by the supplier to be directly equivalent in scope and technical rigour to ACRS and approved as such in writing by the specifier.

Evidence of the supplier's compliance with this clause must be obtained when contract bids are received."

FOR STEEL REINFORCING MATERIALS

"Steel reinforcing and steel prestressing materials for concrete shall comply with AS/NZS 4671 or AS/NZS 4672, respectively.

Where applicable, materials shall be cut and bent in accordance with the requirements of the "Material and Structural Requirements for Reinforcing Steel" clauses in AS 3600 or AS 5100.5, or the "Reinforcement" clauses of NZS 3109.

Reinforcing couplers shall comply with RMS specification RMS SF2013/184115 Approval of Mechanical Reinforcing Bar Splices, or NZTA SP/M/022 Bridge Manual (technical approval sections), as specified.

Acceptable manufacturers and processors of steel prestressing and steel reinforcing materials, including both manufacture and application of reinforcing couplers, must hold a valid certificate of approval issued by the Australasian Certification Authority for Reinforcing and Structural Steels Ltd (ACRS), or to such other accredited product certification system as shall be demonstrated by the supplier to be directly equivalent in scope and technical rigour to ACRS and approved as such in writing by the specifier.

Evidence of the supplier's compliance with this clause must be obtained when contract bids are received."

ACRS 2020 CERTIFICATES AMENDED FOR ADDITIONAL CLARITY AND AVOIDANCE OF MISUSE

ACRS 2020 certificates have some important changes to protect builders, engineers and steel purchasers.

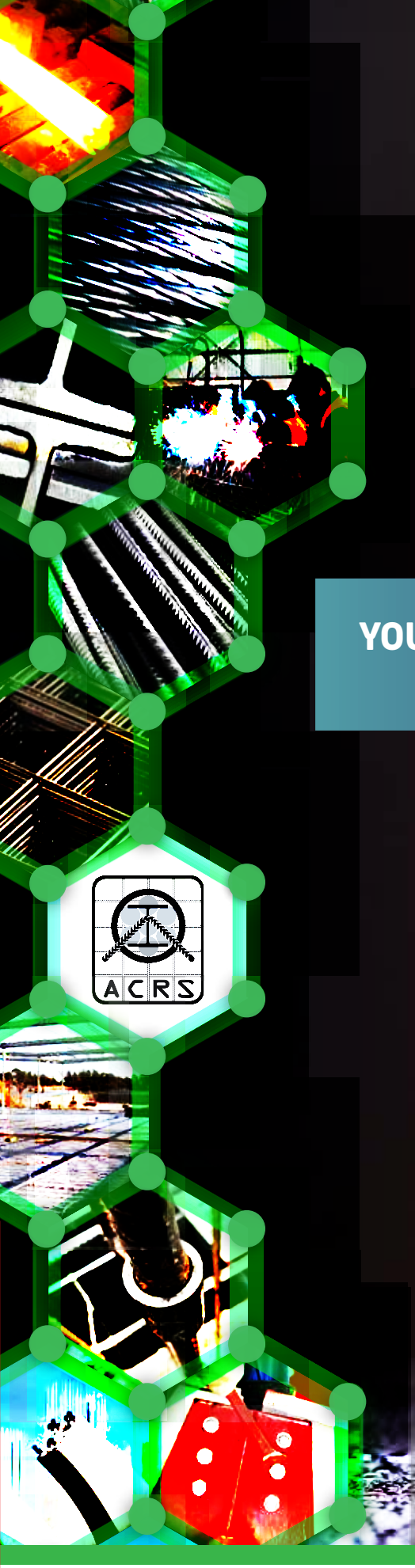
ACRS not only certifies steel at manufacture (Stage 1) and then the rebar processing/welded section fabrication of that steel (Stage 2), but also assesses materials' traceability between the two certificate holders. ACRS Stage 2 certificate holders can only source and use ACRS Stage 1 approved materials, and this is regularly checked by ACRS.

To assist Builders' personnel make their determinations, from 1 January, 2020 the wording on ACRS certificates was amended to state clearly that "ACRS certified" may only be applied to steel that arrives on the project with both ACRS Stage 1 (mill) certificates and ACRS Stage 2 (rebar processor, or structural welded section) certificate.

Ensure your staff are aware of these important changes to ACRS certificates and make sure your specifications call up ACRS certification not only for Stage 1 (mill manufacture) but also Stage 2 suppliers (processing and welded section fabrication) to manage your risk of inadvertently accepting non-ACRS approved materials.

If your staff have any questions, get them to email ACRS for assistance at: info@steelcertification.com

SHANDYING...



YOU WOULDN'T STAND FOR IT WITH YOUR BEER... SO WHY STAND FOR IT WITH YOUR STEEL?

Are you getting what you ordered? (and what you PAID for?)
Does ALL of the steel you're receiving comply with the right Standards?

The problem of mixed supply (or as it's more commonly known, 'shandying') can have serious consequences – even if you're specifying construction steels to meet Australian and New Zealand Standards.

Shandying can occur when conforming supply is ordered, but only a portion of the product supplied is sourced from ACRS Certified suppliers (and the rest is sourced from somewhere else). Using non ACRS Certified steel can leave you with non-compliant construction steel... and the risks that come with that.

By providing effective continuous review of both the manufacturer and the fabricator/processor, ACRS 2-stage steel certification scheme and the new ACRS traceability scheme play a major role in reducing the risk of shandying on your project.

Talk to us TODAY about how ACRS Certification gives you confidence in your steel supply.

ACRS

JAS-ANZ

www.steelcertification.com

Ph: (02) 9965 7216 | E: info@steelcertification.com

ABN: 40 096 692 545

ACRS - Independent, Expert Third Party Certification & Verification of Reinforcing, Prestressing and Structural Steels for Compliance with Australian and New Zealand Standards

CRASHWORTHINESS RULES HAVE CHANGED...

DO YOUR CRASH CUSHIONS COMPLY?

The new rules requiring MASH tested & approved crash cushions came into effect across Australia on January 1st, 2020

In accordance with the Austroads / ASBAP '*Transition to MASH*' process, crash cushions installed on Australian roads are now required to be tested and approved under the AASHTO MASH guidelines, rather than the superseded NCHRP350 guidelines.

Both the **SMART CUSHION SC100** and **SMART CUSHION SC70** have been successfully tested to MASH-2016 Standards, with both models **ASSESSED, APPROVED & RECOMMENDED FOR ACCEPTANCE** throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel).

SMART CUSHION speed dependent crash attenuators have been used in the USA for almost two decades and in Australia for over 5 years – delivering outstanding life-saving performance and significant savings on repair costs in many thousands of impacts.

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.

LB AUSTRALIA

Ph 02 9631 8833

www.lbaustralia.com.au

TRAFFIC MANAGEMENT
ASSOCIATION OF AUSTRALIA

TOUR DE FORCE

The TMAA's significance during the past six months cannot be understated. The industry's tour de force has been achieving the goal of keeping the public, and workers, safe in a vast array of sectors.

Meanwhile, the TMAA internally has continued to communicate with members, associates, stakeholders and government via information technology, and more recently, sold out face-to-face events featuring Ministerial and senior government sector speakers. We can lend our voice now to a wide range of additional industries previously not considered traffic management portfolio.

Our keynotes, Minister David Pisoni (SA), Minister Michael Ferguson (TAS), along with Direcctor General of TMR and Austroads Chair, Neil Scales (QLD) and Chair Infrastructure, John Langoulant (WA), echo the sentiments of Deputy Prime Minister Michael McCormack that the economic recovery will be led by infrastructure works. We have become the eponymous heroes of COVID.

Deputy Prime Minister, Michael McCormack and Assistant Minister for Road Safety, Scott Buchholz, have been vocal in their support for our industry and demand safety be a prime focus.

To that end, their Office of Road Safety catapulted our Your Speed is Our Safety campaign into the national spotlight. The campaign aired again in September and will run again over November as part of National Road Safety Week and the World Day of Remembrance for Road Traffic Victims 2020).

September marked the second set of national airings for the campaign, with the ads aired on television stations across the country. This was further bolstered by a social media reach of over 1,000,000 people on Twitter and Facebook.

Our thanks to ARRB, The Office of Road Safety, A1 Roadlines, SARAH, CCF, RIAA, AAPA, Marc Howard and road authorities and key groups across Australia for sharing YSIOS.

Our voice is being heard, the message is out there; Slow down, because Your Speed is Our Safety.

I urge you to share the safety campaign message via your businesses and social media. I have included links to the three campaign adverts below for you to share so we can all help to reinforce this critical safety message.

YOUR SPEED IS OUR SAFETY – VIDEOS

Part One - https://youtu.be/QLwXOtrMsCg

Part Two - https://youtu.be/0WGSBA4L0W4

Part Three - https://youtu.be/4yzklYJ1p4M

High speeds on roads can cause irrecoverable damage, heartbreak and lifelong anxiety.

Each year National Road Safety Week (NRSW) provides opportunities for all road users to consider their actions and pledge to drive safely. This year NRSW will be held later than usual from November 15. TMAA is a proud supporter of NRSW, and SARAH, who drives this campaign. As a committed member of the NRSW National Communications Committee, I encourage all members and their teams to wear yellow ribbons, display them on vehicles (along with vehicle stickers) and support the many NRSW functions being held across the country, both as part of TMAA events and in the community.

In addition to the Safety Campaign project, the TMAA has undertaken to advise and feedback to Austroads regarding two items that are integral to our ability to lead the recovery – training and pre-qualification. To that end, our national volunteer working group, led by Dr Dan Sullivan, has prepared a detailed submission.

We sit squarely at the head tables on committees across the country, proffering solutions for best practice by business and industry. This year, ARRB, under advisement from TMAA, led the first ever industry data survey. Statistics and research provide immeasurable assistance to government when planning infrastructure and safety on projects. TMAA supports ARRB in the launch of this initial data collection project and have endorsed this as an annual requirement. ARRB has provided a data summary which is available on request.

As the end of a tumultuous 2020 approaches, TMAA will celebrate its members' success stories of safety and excellence with the finalist events for TCOY in December (each Division). Nominations for this excellence award close 31 October, 2020.

Your business is defined by your traffic controllers, reward them with a nomination. Nominations can be made via the website: www.tmaa.asn.au

Throughout 2020, I have sought to preamble industry changes and operations as part of the COVID expansion of traffic management. This will continue as my priority. For more information contact TMAA on 1300 798 772 or visit the website: **www.tmaa.asn.au**

Stay safe.

Louise Van Ristell
TMAA Executive Officer

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MACK LR ELECTRIC TO BEGIN PRODUCTION IN 2021

Volvo Group's American subsidiary Mack Trucks has announced plans to commercialize the Mack® LR Electric, its revolutionary refuse model equipped with a fully electric integrated Mack drivetrain. Orders for the Mack LR Electric will open in Q4 2020, with deliveries beginning in 2021.

"Mack's leadership in the refuse segment goes back more than a century, and we're pleased to build on that heritage today by announcing the commercialization of the LR Electric model," said Martin Weissburg, President, Mack Trucks.

"This clean, quiet and powerful truck demonstrates the very best of Mack innovation and our people, and I couldn't be more proud to announce our plans to build it," Mr Weissburg added.

The production Mack LR Electric model will fulfill the needs of refuse customers, whether commercial or municipal, seeking a true zero-emissions truck that aligns with their own environmental goals and local emissions regulations. With its quiet operation, the LR Electric will meet the needs of customers working in an urban setting who are seeking to cut noise pollution and operate quietly at night.

Introduced as a prototype in 2018, the LR Electric features Mack's fully integrated electric powertrain with twin electric motors and four NMC lithium-ion batteries providing vehicle propulsion, as well as power for all onboard accessories. A unique three-mode regenerative braking system takes into account the truck's increasing load and helps recapture energy from the hundreds of stops refuse trucks make per day.

In a nod to its unique pedigree and fully electric driveline, LR Electric models will feature a copper Bulldog mounted on the front of each truck.

"The LR Electric is paving the way toward widespread acceptance of zero-emissions refuse trucks," Weissburg said.

"As we begin delivering them to customers in the coming year, we remain committed to ensuring these trucks are built to meet the unique needs of the refuse industry."

Like other LR models, the LR Electric may be fitted with equipment bodies from a number of manufacturers, allowing the customer to tailor the truck to their specific application. Customers will be able to choose from the same driver/passenger side driving configurations, seating choices and door options offered on the diesel-powered LR.

In addition, minimal changes to the gauges and select switchgear were made, allowing Mack to carry over the ergonomic driver-designed LR cab.

To maximize customer uptime, the LR Electric will be monitored by Mack GuardDog® Connect, a proactive telematics solution that monitors vehicle performance to help customers avoid unplanned downtime. LR Electric-focused service training and electrical safety curriculum will also be deployed to the Mack dealer network to ensure customers receive the level of support they've come to expect from Mack.

The Mack LR Electric will be manufactured at Mack's Lehigh Valley Operations (LVO) in Macungie, Pennsylvania, where all heavy-duty Mack trucks built for North America are assembled.

AVERAGE COST OF LITHIUM-ION BATTERY CELL SET TO FALL BELOW $100 PER KILOWATT HOUR

The average cost of a lithium-ion (Li-ion) battery cell—used to power electric vehicles and to provide flexibility in the power grid as more renewables, such as solar and wind, are added—will fall below $100 per kilowatt hour (kWh) in the next three years, according to a new analysis by IHS Markit. The average cost of a li-ion cell is expected to decline further through the end of the decade, to as low as $73/kWh in 2030.

The average cost of a lithium-ion (Li-ion) battery has already fallen 82% from 2012-2020. Further reductions are a key factor to increasing the competitiveness and wider adoption of the batteries for electric transportation and in grid storage. By 2023, the cost of a battery will have declined 86% (by $580/kWh) in a decade, according to the IHS Markit analysis.

Sam Wilkinson, associate director, clean energy technology, IHS Markit, commented: "Progress in growing the share of low-carbon generation, such as solar and wind, in the global power mix also brings a particular set of challenges - namely intermittency."

"Improving cost-effectiveness of energy storage, particularly batteries, will be key to providing needed flexibility to balance this supply of electricity with demand," Mr Wilkinson added.

IHS Markit expects that the biggest contributor to falling battery cell costs throughout the coming decade will be reductions in manufacturing costs through larger factory sizes and improving economies of scale. Reductions in material costs by improving efficiencies and adopting lower cost cathode compositions, and improvements in battery energy density are also expected to play a role.

Among the three major Li-ion battery cells—Nickel Manganese Cobalt (NMC), Nickel Cobalt Aluminum (NCA) and Iron Phosphate (LFP)—LFP has already fallen below the $100/kWh threshold in 2020. All three types are expected to be below the $100 mark by 2024. LFP will remain the lowest cost option throughout the next ten years. However, NMC and NCA will continue to command a majority share of the automotive and transport sector on account of their higher energy density.

"Cost is the name of the game," said – Youmin Rong, senior analyst, clean energy technology with IHS Markit. "Technology advances and competition between the different types of lithium-ion batteries is driving prices down. Ultimately, the two major growth markets—transportation and electric grid storage—depend upon lower costs to make batteries more competitive with the internal combustion engine and fossil fuel power generation."

VW ID.3 MARATHON TEST DRIVE TO HIGHLIGHT HPC FAST CHARGING SYSTEM

The High Power Charging Station in Nürtingen – with two charging stations and buffer storage for the distribution grid – will be welcoming a well-renowned visitor. On the one hand, the station is an integral part of a fully electric long-distance test drive involving a number of public bodies, which is being held in order to raise awareness regarding today's mobility revolution. On the other hand, this meeting offers the Ministry of Transport an opportunity to gain some insight into the cutting-edge technology from Baden-Württemberg.

During September, the Mannheim-based specialist agency CHALLENGE4 started a 20,000-kilometre marathon test drive across Germany – from southern Oberstdorf to the German island of Sylt. The drivers Rainer Zietlow and Dominic Brüner will cover the near 20,000 kilometres in a new VW ID.3 Pro S with a 77 kilowatt-hour battery. The network of Fast Charging Stations will play a crucial role in this. The tour plans to cover all VW dealers and charging stations with more than 60 kilowatts of power. One particular highlight is the planned stop at an SOS Children's Village in Bernburg/Saale, which Rainer Zietlow is supporting with his tour.

Another highlight will be the stop in Nürtingen. Here, the test drivers will meet with Baden-Württemberg's Minister of Transport, Winfried Hermann, and charge their ID.3 using the HPC Fast Charging Station at the ADS-TEC company headquarters. The station fits perfectly with the concept of a world record tour, because it is also a world first in its own right, especially when it comes to its performance in relation to its size. Furthermore, the technology offers an alternative to the limited-power distribution grid in all places where fast charging would not actually be possible, due to the fact that the output of the low-voltage distribution grid is naturally limited.

But where does the high energy output come from, if not directly from the grid?

The answer lies in a small white square box, barely more than a metre tall, with a comparable average output equal to 320 single-family dwellings. It contains a sophisticated battery system with a capacity of 140 kilowatt hours, which is able to generate the necessary high-energy output by continuously charging itself slowly at the available low-grid connection and releasing the accumulated energy in a matter of minutes if required.

Two charging stations can be installed at a flexible spatial distance, each of which can then be charged with up to 320 kilowatts – more than any current electric vehicle can accommodate.

By way of comparison: The minister's Audi e-tron can handle a maximum of 150 kilowatts of charging power and the ID.3 can take 125 kilowatts. The Porsche Taycan is currently the only electric vehicle that, at 800 volts, can take almost 320 kilowatts. In future, more vehicles will use 800 V systems and process high charging capacities. The system is, therefore, "future-ready" even today.

The ADS-TEC charging solution enables you to recharge your batteries as quickly as possible anywhere on the normal distribution grid, however with a key difference when compared with all other Fast Charging Stations: It can be installed anywhere on the distribution grid – without the time-consuming development of a medium-voltage connection, without tearing open roads or building large transformer stations and switchgear, for which the corresponding costs must then be accounted for in the form of energy prices.

In addition to the high, one-time and ongoing costs for network expansion, the time saved through lengthy approval processes for medium-voltage systems and the unbeatably small size are decisive arguments for locations such as in city centres or residential areas.

Additional pluses include the fact that charging is quiet - despite the mega-power it produces - and that the system is characterised by a high-quality design. In a few minutes, an e-vehicle is ready to continue driving and makes space for the next vehicle, which can be charged immediately afterwards without burdening the distribution grid. On top of that, and in accordance with existing regulations, the booster can be used to store and make available electricity generated by PV or wind systems.

A selected specialist audience has been invited to the event followed by a press conference in Nürtingen, in order to learn more about the added value on offer from ADS-TEC Managing Director Thomas Speidel, and to see the high-performance technology "Made in Baden-Württemberg" in action.

The marathon test drive can be followed live at **www.id3-deutschlandtour.com.** Students from the Stuttgart Media University (HDM) will deliver text, photos and videos of the route every day.

The marathon test drive is sponsored by: ADS-TEC Energy, Alpitronic, CAR-connect, E.ON Drive, has·to·be gmbh, Infineon Technologies, Intercity Hotel, MOON, Steigenberger Hotels & Resorts, Tank & Rast, We Charge and Volkswagen AG.

ABOUT ADS-TEC

ADS-TEC Energy GmbH is a company of ADS-TEC group, and is part-owned by BOSCH. The medium-sized, family-run business is headquartered in Nuertingen near Stuttgart, with a production site near Dresden.

ADS-TEC Energy GmbH is drawing on its decades of experience with lithium-ion technologies to produce battery storage solutions and fast charging systems, including the corresponding energy management systems. The technology can be used in private homes, public buildings and commercial enterprises, with solutions starting at a storage capacity of 19 kilowatt-hours. The scalable battery storage systems enable industrial and infrastructure solutions as well as self-sufficient energy supply systems with capacities of up to several megawatts. Its new fast charging technology for electric vehicles is truly ground-breaking, and features a unique compact design.

An exceptional high integration depth enables high quality and functionality of the produced battery technology. Apart from the cells, all components are developed and produced in-house.

RICARDO HELPS PREPARE UK'S FIRST HYDROGEN-POWERED TRAIN FOR MAINLINE TESTING

HydroFLEX, a project led by rolling stock owner Porterbrook, in partnership with the Birmingham Centre for Railway Research and Education (BCRRE), has successfully undertaken its first mainline test of the UK's first hydrogen powered train – with support from Ricardo in the key area of safety case development and certification.

Originally unveiled at the RailLive event in June 2019, the HydroFLEX project demonstrates a practical application of hydrogen as the power source for a full-size passenger train. Based on a Class 319 electric multiple unit, the HydroFLEX vehicle – the UK's first hydrogen powered train – is fitted with hydrogen fuel tanks, a fuel cell and battery pack, to provide independent traction power capable of operation with zero carbon emissions.

The HydroFLEX vehicle successfully undertook its first phase of mainline testing achieving a top speed of 50mph, for which Porterbrook sought the assistance of Ricardo in the crucial areas of safety and certification.

In order for mainline testing to be allowed to proceed, the vehicle required approval by an EN17065 accredited certification body and an EN17020 accredited inspection body. Ricardo fulfilled these requirements with rolling stock experts preparing the vehicle Safety Case, whilst colleagues from Ricardo Certification undertook an assessment in accordance with RIS-2700-RST, producing an Attestation Statement along with the Safety Assessment Report as the project's Assessment Body. This means that HydroFLEX is now able to commence with testing on Network Rail's mainline infrastructure.

TOWARDS NET ZERO CARBON

HydroFLEX was originally developed by Porterbrook and BCRRE as a response to the UK government's challenge to remove diesel-only trains from the national network by 2040. The concept may in the future enable the electric multiple unit to operate by drawing energy from an overhead catenary or conductor rail, but transition seamlessly to zero emission self-powered operation beyond the reach of existing electrification. The vehicle could thus serve many routes currently operated using diesel power, while also providing better utilization of existing power infrastructure on routes that traverse both electrified and non-electrified sections.

The fuel cell unit of HydroFLEX is powered by hydrogen stored in high pressure tanks and oxygen is sourced from ambient air. The fuel cell converts the mixture and generates electricity of up to 100kW for traction while generating emissions solely of pure water as a by-product. Two lithium ion battery packs store electrical energy which powers the train's existing traction systems throughout the vehicle's operational duty cycle.

"Ricardo is proud to have supported Porterbrook on this important project to pave the way for mainline testing of HyrdoFLEX, the UK's first hydrogen powered train," commented Stewart Kenworthy, deputy business manager of independent assurance for Ricardo Certification.

"Hydrogen offers significant potential as an energy vector to help decarbonize the railway network, substituting for diesel power systems and eliminating emissions at the point of use. We were pleased to be able to develop a vehicle safety case for the novel hydrogen fuel system, working with Porterbrook and its partners on the HydroFLEX project to address the many unique hazards associated with use of hydrogen as a fuel, in this first mainline traction power application."

HYSTER 4-WHEEL ELECTRIC LIFT TRUCKS DELIVER TOUGH, COST-EFFICIENT PERFORMANCE

New 4-wheel Hyster® electric forklifts engineered for driver control and comfort are being introduced to the Asia-Pacific region for cost-efficient use across multiple warehousing and logistics applications. The UT series of 4-wheel electric forklifts, in capacities from 1 to 3.5 tonnes complements the broader UT series range for customers seeking Hyster toughness, quality and strong service backing to cost-effectively tackle simple everyday materials handling needs. It also brings the performance of electric forklifts to a new market sector seeking optimum cost-efficiency for their needs.

Features of the new machines, which provide an ideal solution to meet users' needs for less frequent usage, include an ergonomically designed operator compartment laid out to enable operators to work comfortably across a range of applications, including food and beverage, frozen produce, manufacturing, distribution and truck and transport centres.

"UT series 4-wheel electric lift trucks are engineered for drivers, with an outstanding range of compliance, performance, comfort and easy service features," says Hyster Area Business Director, Pacific, Mr Mark Chaffey.

"Power options including wet cell batteries with single point watering or

maintenance- free Lithium Ion technology. Smooth, progressive high performance is provided by AC traction and hydraulic motors with electronic control. European designed AC controllers are coupled with AC traction and hydraulic motors to allow for precise controllability. A small steering wheel facilitates fine control, with eight degrees of adjustment and low steering effort for operation in confined spaces. The low steering effort without kick-back facilitates precise positioning," says Mr Chaffey.

The use of high quality and robust components, complemented by outstanding filtration and cooling, helps to provide driver-oriented comfort, reliability and low cost of ownership. These elements, combined with fast availability of cost-effective replacement parts, help to curtail maintenance requirements and costs.

Hyster has a strong and long-established professional dealer and service network extending across Asia-Pacific, strength that is in turn backed by Hyster globally, which has been building relationships and partnering with customers, suppliers, dealers, and employees over many decades.

The new Hyster UT series range embodies the quality features that have been at the heart of the Hyster brand for nearly 90 years, including intelligent design, product testing, quality of manufacturing, quality of suppliers and environmental emphasis.

Rather than offer one-size-fits-all solutions, the UT Series philosophy opens a discussion with customers to ask, "What are your specific needs and how long do you need to use it for on a daily basis?"

"Then our established Asia-Pacific dealer network can bring their extensive expertise to deliver cost-effective, quality solutions for individual customers," Mr Chaffey said.

For further information, please visit: **www.hyster.com**

JEMENA REDUCES CARBON EMISSIONS WITH AUSTRALIAN-FIRST ELECTRIC POWERED CHERRY PICKER TRUCK

Leading energy infrastructure company, Jemena, has unveiled an Australian-first electric powered cherry picker truck as part of its effort to reduce carbon emissions across the Jemena Electricity Network in Melbourne's North-West.

The electric cherry picker, formally known as an Elevated Work Platform truck, will reduce Jemena's carbon output by 30 tonnes per year. This is in addition to other energy efficient initiatives already rolled out within the network including the installation of 500 LED 'smart street lights' that use up to 75 per cent less energy than traditional lighting.

Jemena's Executive General Manager for Electricity Distribution Shaun Reardon said the electric cherry picker truck was made possible thanks to a partnership with Australian automotive technology company SEA Electric.

"SEA Electric are a Melbourne-based manufacturer of electric vehicles and leader in converting commercial vehicles from diesel to electric" said Mr Reardon.

"The cherry picker was converted into an electric vehicle as part of a major reconstruction over a 12-month period."

SEA Electric Sales Director for Australia and New Zealand Joe Di Santo said his team is excited to see the industry-first vehicle join Jemena's Victorian fleet.

"It's been a special and historical project for the management and engineering staff at SEA Electric to partner with Jemena in the development of this Australian-first 100 per cent electric Elevated Work Platform service truck," said Mr Di Santo.

"The SEA Hino FG all-electric vehicle is anticipated to reduce Jemena's carbon output by 30 tonnes per annum."

"Not only is this electric powered cherry picker the first step in greening our fleet, it will also benefit our customers with a quieter operation and zero exhaust emissions," said Mr Reardon. "We will look for new ways to further reduce the carbon emissions across our electricity network in the future."

Originally a Niftylift-built diesel cherry picker, SEA electric converted the truck into a 100 per cent electric vehicle equipped with a 138kWh battery pack that provides around 200km of range. The elevated work platform is powered by the truck's battery which will be charged at the end of each day and takes around six hours.

ABOUT JEMENA

Jemena is an $11.5 billion company that owns and manages some of Australia's most significant gas and electricity assets. These include:

- Jemena's Victorian electricity network which delivers electricity to over 360,000 homes and businesses in north-west Melbourne.
- the Jemena Gas Network servicing 1.4 million customers around NSW
- the Eastern Gas Pipeline which delivers gas from Victoria's Gippsland basin to the ACT, Sydney and regional NSW
- the Darling Downs Pipeline Network in south-east Queensland supplying Darling Downs Power Station and APLNG's export pipeline.
- the Queensland Gas Pipeline which supplies Gladstone and Rockhampton
- the Northern Gas Pipeline from Tennant Creek in Northern Territory to Mount Isa in Queensland.

Jemena also part-owns the EvoEnergy electricity and gas distribution networks in the ACT and United Energy, which supplies electricity to more than 600,000 customers across south-eastern Melbourne and the Mornington Peninsula.

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

ABOUT SEA ELECTRIC

SEA Electric is an Australian company, with global reach, that specialises in the assembly and electrification of 100% electric commercial vehicles around the world. They deal directly with companies (and work alongside automotive OEM's) to supply and license our patented technology.

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

For more information visit: **www.sea-electric.com**

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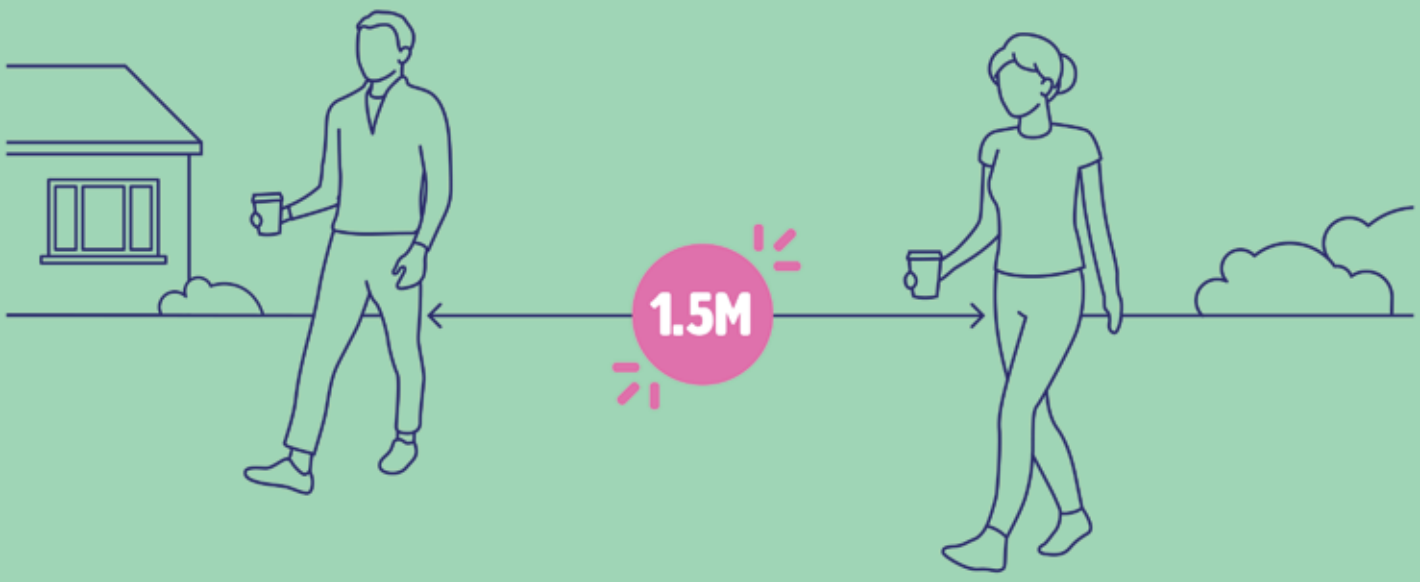

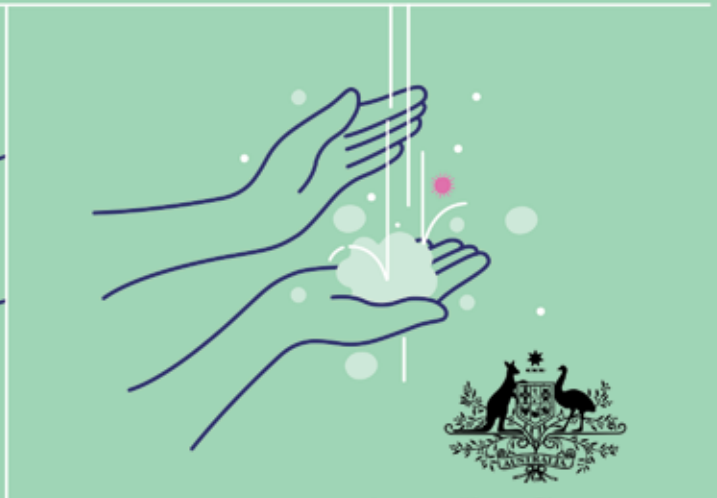

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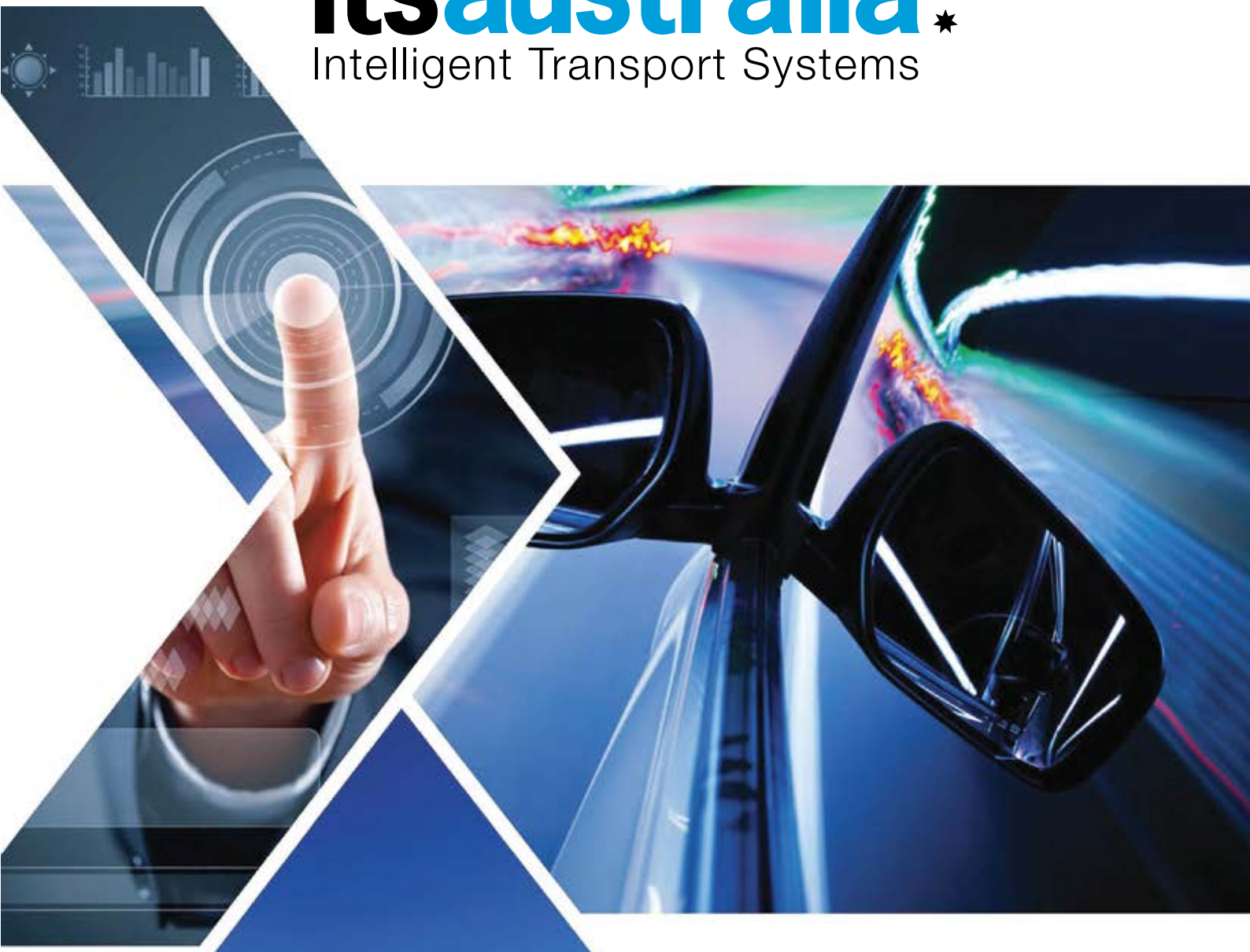

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MOBILITY BUNDLING AND CULTURAL TRIBALISM

DAVID A. HENSHER AND CORINNE MULLEY, INSTITUTE OF TRANSPORT AND LOGISTICS STUDIES (ITLS), THE UNIVERSITY OF SYDNEY BUSINESS SCHOOL

It is becoming popular in the transport sector to promote the packaging of multi-modal services, facilitated by digital platforms that offer the capability to coordinate services offered by many different suppliers. There has been a proliferation of reports and grey material praising the opportunities that bundling (or packaging) can have in achieving broad sustainability goals such as reduced emissions, and in the context of passenger transport through Mobility as a Service (MaaS), the reduction in private car ownership and use. The jury is still out as to whether MaaS will be a game changer or an interesting niche product for a limited population who can gain benefit from a one-stop approach to accessing mobility services.

Bundling or packaging is predicated on the ubiquitous development of digital applications which has allowed new ways of delivering and accessing services, as well as underpinning the development of the MaaS concept. This technology has been growing since the turn of the century with early day applications being smart cards (plastic cards with 'chips') initially used for payment systems in the transport domain. Research into the non-priced or soft benefits in the early days of these smart cards showed that there is value (and a positive willingness to pay) from multiple applications on a single smart card rather than multiple separate cards or multiple smart cards (Edwards and Mulley, 2004). This suggests that contemporary ideas of extending bundles beyond mobility to include a combination of services may well have buy-in from citizens. Telcos are an obvious service to combine with mobility, but utilities are also a good match, sharing the same characteristic of non storeablity with mobility. These also have the advantage of being necessary rather than discretionary purchases.

There is no doubt that some sort of partnering will be helpful for MaaS to develop out of the niche bracket, especially if it is all centred on the single item to carry around as with the smart phone. This is entirely possible, with even bank cards becoming superfluous with the take up of Apple pay. The big question is what sort of service bundles might emerge? Some pundits suggest that the types of service bundles that emerge may be a combination of various services, what we call multi-service in contrast to multi-modal and not restricted to mobility, such as a mobile phone contract, with data, a streaming package and mobility options (e.g., first and last mile (micro-mobility), ride-hail and public transport) together with utility or other household related essential services (e.g., television packages such as Amazon Prime, Netflix). Retail discounts and other rewards have been favoured for inclusion, but these additions are likely to be more marginal, based as they are on discretionary purchases, unless retail reads food and groceries. This could, for those to whom it may appeal, capture all the behaviour of customers from the moment they wake until they sleep, where they go, what they like to look at, and what their willingness to pay is for an extended set of one-stop services and items. It is suggested by some commentators that most of the Telcos are pretty close to full customer capture at the moment (purely due to smart phone capabilities). If this is an active

possibility going forward, then it may be just a matter of time before they transition to partnering with organisations to offer mobility. This could be the much-needed shot in the arm for MaaS as the importance of getting non-mobility service providers involved becomes ever more apparent. Indeed, it is likely to be of more importance to MaaS than to the services with which it partners, as it provides the opportunity to create a business model for MaaS, especially if the aim is commercial, which has more opportunity for cross subsidy than hitherto. To support this idea, consider the business cases in other settings: telcos for example are increasingly offering more bespoke arrangements to keep their customers interested and grow their market share, including 'choose your own plan' and 'bring your plan with you' options. The blurring of the price of a subscription may well be key for these organisations to disguise the real way that the telcos make their money, through on-selling aggregated data and the broader commercial value in their partnering arrangements. Obtaining the customer is essentially marginal. Might this apply to MaaS in the future?

While we have shown, through the Sydney MaaS trial, that offering subscription bundles compared to Pay-as-you-go has appeal to nearly 50% of the market who are interested in MaaS (Hensher, Ho and Reck 2020, Ho et al. 2020), the big question remains as to whether the majority of the population really want such a tailored approach to accessing transportation? Hence the real question is whether 50% of a very small market of trial participants scales up to 50% of the broader population? (1)

The outcome may well depend on the governance arrangements (see Hensher et al. 2020). If we have what is increasingly being called regulated utility MaaS, where there is competition between the aggregators in meeting demand, then there can, in theory at least, be a proliferation of MaaS packages where they are suitably differentiated to meet the needs of different people. This also applies to an extent with the walled garden type arrangement where the aggregators make contracts with selected mobility operators and create offerings to the customer based on these contracts. This is what has happened with the mobile phone/ internet market where people have chosen their provider on the basis of liking the plan they offer. Other governance arrangements where there is only one demand facing aggregator (which arguably is what the Sydney trial mirrored) may not be able to provide enough packages to sufficiently differentiate and appeal to everyone. All of this suggests the need to be more focussed on mapping potential outcomes to potential governance arrangements, and to push in a direction where the MaaS bundles help create the greater sustainability that MaaS could offer, but is very unlikely to be the case if it remains niche.

In working through the arguments to support MaaS, there has always been one issue that has been a significant source of concern to us. It is that, if the packaging of mobility services is not sufficiently flexible, and this may require too many variations to be of value to mobility providers (noting that to date the few MaaS products such as Whim and Ubigo rarely exceed four bundles), then there is likely to be significant built in redundancy from a potential users position that they will not be interested in the uptakes of such offers.

In a recent book by James Mumford called Vexed (2020), he is suggesting that we must be very wary of packaging, and that bundling may have significant concerning issues, since with few variants it constrains choice rather than expands choice. Within the passenger transport context, the one stop shop for all mobility that is claimed to be mobility needs, may in fact contain many non-needs and missing some relevant needs, creating ambiguity, confusion and resulting lack of interest; and hence the best way to minimise ambiguity and redundancy might be to not package services. If this is true, then even if bundling may appeal to a small niche market, it is likely that scalability of MaaS is a dream. If simplicity as a pre-condition to other benefits is what most people want, this might be best provided through a digital platform that is single service focussed, exactly what we have at present for each mode (e.g., Opal for public transport in NSW, Uber, Ola, Didi etc.). Are people complaining about this? Generally, no is the response.

How important is bundling to MaaS? If limited to a few options in a dominant multi-modal only setting, as is current and likely to be the case, MaaS will not grow beyond the niche. The talk of multi-service bundles is still hypothetical. To help understand potential opportunities for MaaS, it will be important to start with a full month of detailed travel activity by all modes of transport for potential users, capturing travel times, service frequency, reliability, costs, crowding, kilometres etc. as well as what non-transport packaging offers have appealed. This would allow the identification of changes that benefit specific individuals and use this to see if some possibly needs-based bundles could emerge. It is important to note that this process is likely to reveal the importance of transport service level improvements and not just financial savings opportunities.

This process will not be straightforward since MaaS offers are unlikely to differ in terms of transport service levels as compared to other ways of accessing transport, and financial incentives associated with mobility services may be the only way to attract interest in a mobility-only based package. This is where the multi-service setting comes into play, and the addition of the non-transport services are what just might sway individuals to subscribe to a bundle that offers very little benefit associated with travel but benefits with being bundled with the other services (Hensher 2020). Multi-service contracts do offer the opportunity to cross subsidise, and the combination of mobility and other services may provide an overall financially beneficial package, not only to subscribers but to suppliers or brokers. However, if this is the case, one wonders how MaaS (with multi-service bundles) brings the societal benefit in terms of helping to meet sustainability goals.(2)

So it would seem the dilemma for MaaS is picking the bundle winners out of a very large stable of combinations of possibilities and developing a business case, commercial or otherwise, that can support the preferred set, where the preferences are those of potential customers in a way that makes all the services more appealing, and desirably passes the test of relevant sustainability key performance indicators which one would hope matter to the commitment of government to MaaS.

Understanding bundling means understanding the behaviour of citizens towards this practice. Underlying much of the thinking about the concerns surrounding bundling is what is sometimes called tribalism, or behaviour and attitudes that stem from strong loyalty to one's own tribe or social group. This needs to be placed in a cultural setting, and so it might best described as cultural tribalism, where national culture is understood as a multi-faceted concept which fits with the different approaches taken by MaaS operators in different countries (Hofstede). Tribalism in this context also has synergies with the segmentation of markets into behaviourally sensitive segments (Anable, 2005) as Figure 1 illustrates with a segmentation or type of tribalism that could be evolving in the MaaS space. This, however, has the real risk of pigeonholing people, with profound implications for MaaS. In the words of Mumford, to let alliances fall where alliances fall. The implication for MaaS is profound.

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(1) One of the crucial experiences many people had with the Sydney MaaS trial was that they saw their monthly mobility "consumption" in dollars per mode the first time. Once consumers get more used to this, acceptance for bundles might increase, especially with marketing as the secure, easy, "not to worry about" option (mobile phone plans) as they offer a ceiling in the case of flat rates.

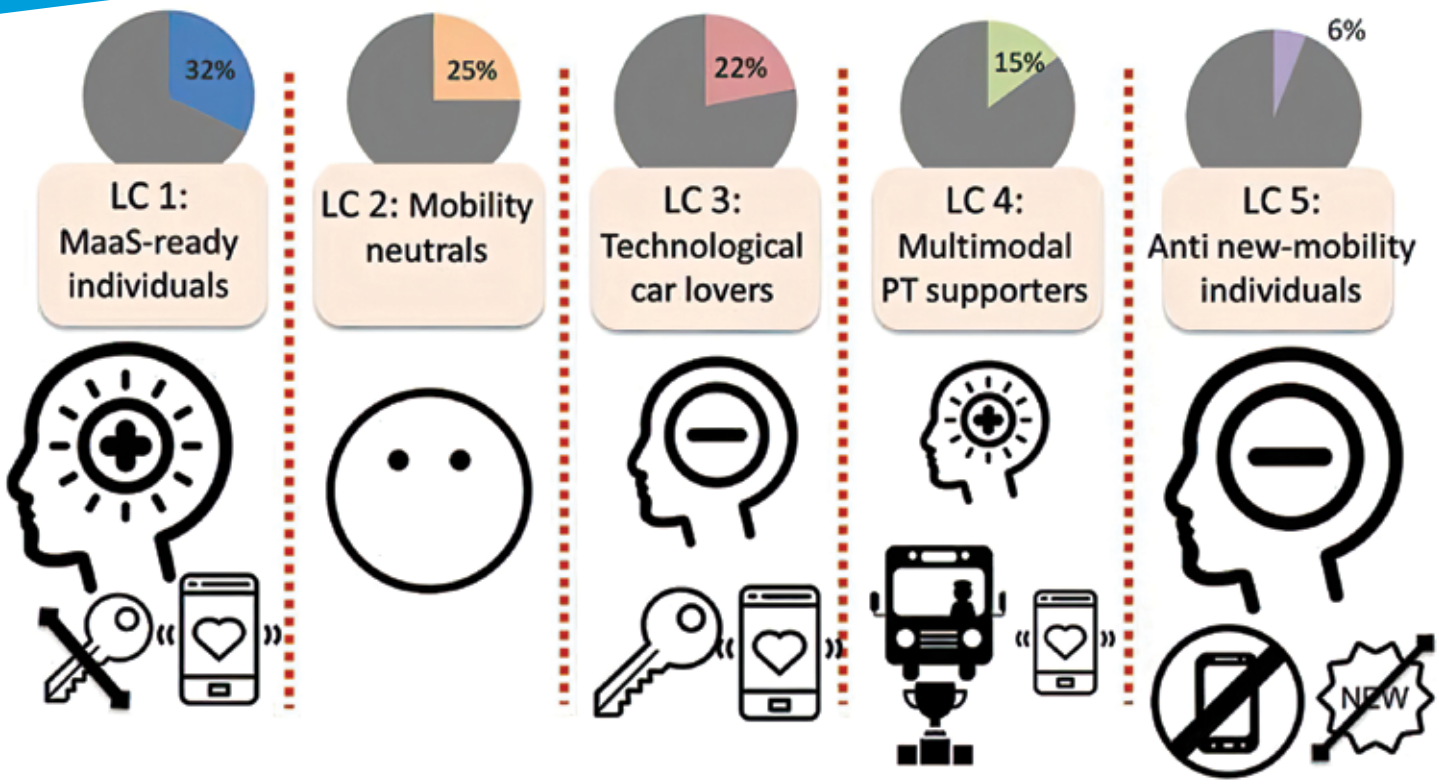

FIGURE 1. Five mobility tribes (Alonso-González et al. 2020)

There is a lot of evidence to suggest that (degrees of) integrated services are good and are what people would like to have, but cultural tribalism is a reminder that there are many built in prejudices that are challenging to break if sustainable outcomes are to be achieved. Perhaps another route might be to accept these cultural differences and use improved relevant information and opportunities to experience alternative ways of doing things, so that what we see in different contexts will be different. This is commonly seen through phrases such as 'I always tend to do what my friends do', 'If it is alright for other elderly people than it will work for me', and 'the world is becoming too complicated and the cost of finding out is not worth the likely benefits' (3)

For some, if not most cultural tribes, change will be slow, very slow, and the extent to which MaaS in particular can benefit by change will be inextricably linked back to how well it can demonstrate that the benefits significantly outweigh the costs (including effort) for many cultural tribes or segments. In the Telco context, customers appear to be happy with bundling as long as the increases are minor and incremental (so they are easy to comprehend and digest), and they can see 'value' in the service being offered. If not, we may, in ten years time or even sooner, talk about a program of historical interest that failed: MaaSively impactful may become MaaSively oversold!

We hope we are wrong because MaaS has the opportunity to add significantly to sustainable outcomes, but time will tell; and with Covid-19 imposing an even more challenging future, that may be a very long time.

ACKNOWLEDGEMENTS

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REFERENCES

- Alonso-González, M., Hoogendoorn-Lanser, S., van Oort, N. and Cats, O. (2020) Drivers and barriers in adopting Mobility as a Service (MaaS) -A latent class cluster analysis of attitudes, Transportation Research Part A, 132:378-401, DOI: 10.1016/j.tra.2019.11.022
- Anable, J. (2005) 'Complacent Car Addicts' or 'Aspiring Environmentalists'? Identifying travel behaviour segments using attitude theory, Transport Policy, 12 (1), 65-78.
- Edwards, S. and Mulley, C. (2004) How can soft benefits increase the viability of multi-application smart card schemes? Paper presented at 11th World Congress on Intelligent Transport Systems, Nagoya, Japan
- Hensher, D.A. (2020) What might Covid-19 mean for mobility as a service (MaaS)? Transport Reviews, 40 (5), 551-556.
- Hensher, D.A., Mulley, C., Ho, C., Nelson, J., Smith, G. and Wong, Y. (2020) Understanding Mobility as a Service (MaaS) - Past, Present and Future. Elsevier, published May 18 204 pp. ISBN 9780128200445. Order here.
- Hensher, D.A., Ho, C. and Reck, D. (2020) Mobility as a Service and private car use: evidence from the Sydney MaaS trial, submitted to Transportation Research Part A, 11 May.
- Ho, C. Hensher, D.A., Reck, D., Lorimer, S and Lu, I. (2020) MaaS bundle design and implementation: Lessons from the Sydney MaaS Trial, submitted to Transportation Research Part A, 10 July.
- Mumford, J. (2020) Vexed - https://books.google.com.au/books?id=0y_KDwAAQBAJ&pg=PT4&source=kp_read_button&redir_#v=onepage&q&f=false

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(2) Outside of the transport sector, there is evidence of a growing area for organisations to have a 'social licence to operate'. This concept is big in the resources sector. As consumers become more environmentally conscious, this type of concept may translate into other sectors with a growing number of companies wanting to be certified as carbon neutral. We might expect that 'culturally' the environmental benefits of MaaS is one of the reasons that the Scandinavian countries embraced the concept of MaaS earlier than other countries. Of course, there is a role for regulators in this space too, in setting the broader societal outcomes that we expect from service operators. (personal communication with Natasha Hinrichsen).

(3) It is noteworthy that less than 4% of household disposable income (HDI) is spent on mobile and fixed-line telephone rent, calls and internet charges (Source. The Household Income and Labour Dynamics in Australia (HILDA) Survey, Release 15.). If we exclude the cost of owning a car (~12% of HDI), then we have a similar percentage outlay on transport as on telecommunications.

AUSTRALIA'S LARGEST CONNECTED VEHICLE **TRIAL A MODEL FOR OTHERS TO FOLLOW**

The *Ipswich Connected Vehicle Pilot* (ICVP) has begun in earnest with up to 500 vehicles in the south east Queensland town of Ipswich (pop. 200,000) being fitted with Cohda's MK5H On-board units allowing them to communicate with each other and with roadside infrastructure. The ICVP is Australia's largest connected intelligent transport vehicle trial by far and the Adelaide-headquartered global leader believes it will pave the way for other large trials across its home nation as well as internationally.

Cohda Wireless CEO Dr Paul Gray said that V2X technology is expected to revolutionise the road transport systems and that city and state transport authorities are at various stages of readiness.

"Large trials such as the ICVP make other road transport authorities sit up and take notice and we certainly encourage decision-makers across Australia and the world to consider their progress so that they don't get left behind."

Other participants in the delivery of the ICVP include the Motor Accident Insurance Commission, Telstra, QUT's Centre for Accident Research and Road Safety – Queensland, iMOVE Australia, Ipswich City Council and the Department of Infrastructure, Transport, Regional Development and Communications.

Dr Gray cited the comprehensive and multifaceted nature of the ICVP trial as model for others to follow.

"Besides the scale of the trial, there is versatility of the technology involved in that it encompasses both Cellular and DSRC V2X technology as well Real Time Kinematic (RTK) vehicle positioning," explained Dr. Gray.

"The trial is also fully compliant from a cyber security perspective with data managed in the cloud in accordance with the relevant safety standards."

ABOUT COHDA WIRELESS

Cohda Wireless is a global leader in the development of Connected Vehicles and Connected Autonomous Vehicle software with proven applications for Smart City, Mining and other environments. Cohda's technology connects vehicles with infrastructure and pedestrians to make our streets, cities and working environments safer, smarter and greener.

Cohda is headquartered in Australia and has offices in Europe, China and the USA.

Cohda Wireless's innovative software solutions enable autonomous vehicles to connect with other vehicles and with Smart City infrastructure. These connections span Vehicle-to-Vehicle, Vehicle-to-Infrastructure, and Vehicle-to-Pedestrian (collectively called V2X), and allow CAVs to 'talk' to each other, Smart Cities, and vulnerable road users in order to avoid accidents, reduce congestion and be more efficient.

Cohda partners with Tier 1 Automotive Suppliers, ITS Equipment Vendors, and Mining Equipment Technology and Services (METS) vendors to provide complete hardware/software solutions to Car Makers, Smart Cities, and Mine Operators, respectively. Cohda's products are used widely in locations including the USA, Europe, Australia, Japan, Africa, Middle East, China, Singapore and Korea.

US TRIAL OF AUSTRALIAN TECHNOLOGY AIMS **TO END FRUSTRATING BATTERY FAILURES FOR FLEET OPERATORS**

Over 50 million vehicle batteries are replaced in North America every year, and unexpected battery failures result in a significant loss of time and money for consumers and fleets. To help address this five-billion-dollar annual market, Intelematics and Voyomotive have partnered to introduce FailSAFE, a new application that predicts battery failure 2-4 weeks in advance. The partnership between Intelematics and Voyomotive provides a turnkey solution that delivers FailSAFE predictive battery analytics for roadside response, vehicle service/repair and fleet applications.

FailSAFE is a predictive services API that ingests real-time vehicle information, provided by the Voyomotive aftermarket controllers and telematics platform, to predict battery failure. The FailSAFE algorithm was developed using machine learning by Intelematics with global data provided from two-million vehicle trips and thousands of battery related service calls.

Unlike other applications that rely on a simple voltage reading, FailSAFE uses a range of advanced battery related parameters captured by the VOYO controller at the time of an engine start. The data from a series of engine starts is sent to the Intelematics cloud where it is analysed to determine battery health. Currently, FailSAFE results are provided by the VOYO app or by SMS message with API options to make results available in third party mobile apps and enterprise systems.

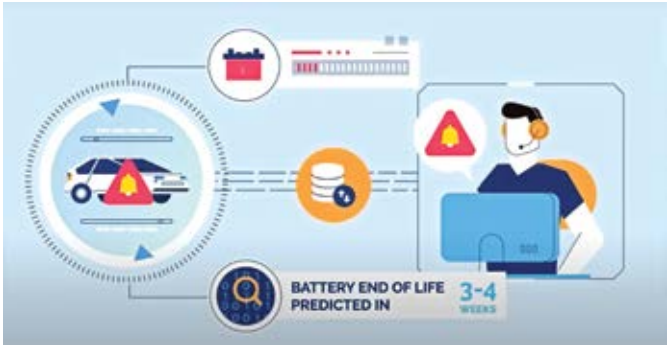
Intelematics' CEO Nick Marks said that FailSAFE is helping businesses prevent battery related failures by alerting drivers to a fault before it becomes a problem.

"Predictive technology has the opportunity to save businesses large amounts of money and improve efficiency by allowing them to plan a replacement installation around their busy schedules and avoid the inconvenience of an unexpected breakdown. It simply allows companies to focus on the needs of their customers, rather than on their own internal operations," Mr Marks said.

Voyomotive CEO, Peter Yorke, said that "Most vehicle data remains out of reach to app developers, fleet operators and even Tier-one component manufacturers. FailSAFE is a showcase example how access to advanced vehicle data provided by Voyomotive enables partners, such as Intelematics, to deliver cost effective solutions that increase safety while decreasing operating costs."

FailSAFE is available to vehicles connected to the VOYO OBDII plug and play controllers.

Parties interested in testing the combined Intelematics - Voyomotive FailSAFE solution can send an email to Contact@voyomotive.com. To enquire about other Intelematics' connected vehicle solutions and APIs, interested parties should email enquiry@intelematics.com



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.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at his disposal to create the finest music...
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BENTLEY BIM SOLUTIONS HELP SPEED THE DESIGN OF THE WORLD'S LONGEST DOUBLE-DECKER BRIDGE

When PT. Wijaya Karya (WIKA), an Indonesia-based company that provides construction, mechanical, and electrical services to the civil construction industry, was contracted to design the *Design and Build Harbour Road 2 Project* in North Jakarta, Indonesia, budgeted at USD $530 million, the project team quickly realised that traditional 2D design methods would not deliver the large and complex 8.95-kilometre toll road development on time and under budget.

"The total volume of the concrete is a quarter of that of the Giza pyramid," said Fery Safaria, engineering manager at WIKA. "The total scale of the project is about four times that of Vatican City." Though large, the project was sorely needed as residents of Ancol and Pluit needed a more efficient way to travel between the cities, with the existing path a frequently congested patchwork of existing toll roads, interchanges, flyovers, railroads, and waterways.

WIKA determined that, due to limited space, heavy traffic, and numerous intersection points, the development needed to include a 3.95-kilometre double-decker bridge along the Ancol River that will become the longest double-decker bridge in the world. However, WIKA needed to overcome the challenge presented by the Indonesian government that mandated the organisation should avoid placing piers in the water that could negatively impact the ecosystem and existing river traffic.

The project team also had to avoid various underground gas pipelines, water pipes, and fibre optic cables, as well as buildings.

Moreover, WIKA faced a strict deadline to complete Harbour Road 2 before the start of the *FIFA 2021 U-20 World Cup,* being held at nearby Jakarta International Stadium. The new highway is expected to ease traffic to and from the facility.

Aside from completing the project prior to the tournament, Harbour Road 2 will improve access to the airport and reclamation islands being developed by the government. Lastly, the new highway will greatly improve economic activity and tourism in the area.

SAVING TIME USING A BIM METHODOLOGY

To design such a complex road system and meet the aggressive schedule, WIKA transitioned from a traditional 2D design method and adopted a 3D BIM methodology. The project team began the conversion with image capture via unmanned aerial vehicles, using generalised predictive control to produce a reality mesh within *ContextCapture.*

The project team was able to photograph and process 166 hectares of land in just 15 days, or roughly six times faster than traditional surveying methods.

Throughout the process, Navigator facilitated communication and collaboration between teams and stakeholders, as well as allowing designers to access running costs and project data from the office, remotely, or in the field. WIKA estimated that using BIM methodologies reduced the time needed for communication and inspection by as much as 30%, compared to previously deployed methods.

OpenRoads helped WIKA review the alignment of the main road, ramps, and approaching structures, while OpenBridge allowed the team to iterate pier positions and heights based on real-world conditions. Careful pier positioning helped the project team avoid placing them in the river wherever possible and lowered the risk of flooding in the surrounding area. WIKA's design iteration within *OpenRoads, OpenBridge,* and *gINT* avoided 1,600 metres of costly waterway foundation work and reduced the design process by 25 days.

MEETING GOVERNMENT STANDARDS WHILE IMPROVING EFFICIENCY

Using *RM Bridge* informed the project team

LEFT: WIKA estimated that using BIM methodologies FOR THE Harbour Road 2 Project in North Jakarta, Indonesia, reduced the time needed for communication and inspection by as much as 30%, compared to previously deployed methods.

where to place tendons, undertake design analysis of the box girder structure, model deformation, and test work method variations on the double-decker bridge. Within *LEAP Bridge,* WIKA analysed the precast girder structure within the concrete to ensure that the project met national bridge loading standards. With *ProStructures,* WIKA designed bar mark reinforcement, created a bill of materials, and issued reports. Since the three applications are interoperable, WIKA increased the efficiency of bridge modelling by 40% and saved up to 10% of the construction budget.

WIKA deployed *PLAXIS* to conduct soil stability and retaining wall analyses to reduce the risk of bridge piers settling along the river banks. Once the project team fully surveyed and modelled the design, it used *LumenRT* to produce a digital representation of the project to help all parties understand the current status. The digital visualisations streamlined communications and improved decision-making.

WIKA's design work included a 4D model of the construction process. The project team simulated the movement of heavy equipment in a tight area using *RM Bridge* to improve efficiency and minimise fuel consumption. *Navigator* and *SYNCHRO* helped project engineers determine work schedules, estimate costs, manage supply chains, and analyse progress to ensure the project is completed on time and within budget.

"With SYNCHRO, we can identify the massive project schedule and help find any potential for construction delay," said Rizky Yusuf Ramadhan, bridge BIM engineer at WIKA.

DELIVERING A ROI THREE YEARS AHEAD OF SCHEDULE

By using a BIM methodology to visualise data, WIKA boosted the accuracy of the model, shortened build time, reduced inspection time, and improved the overall quality of the development. Strong visualisation of the design and construction process improved reviews among stakeholders and accelerated decision-making.

In the end, visualisations and interoperability among the Bentley applications helped WIKA detect 85 potential clashes, which could have caused USD $60 million in cost overruns and up to four months of delays.

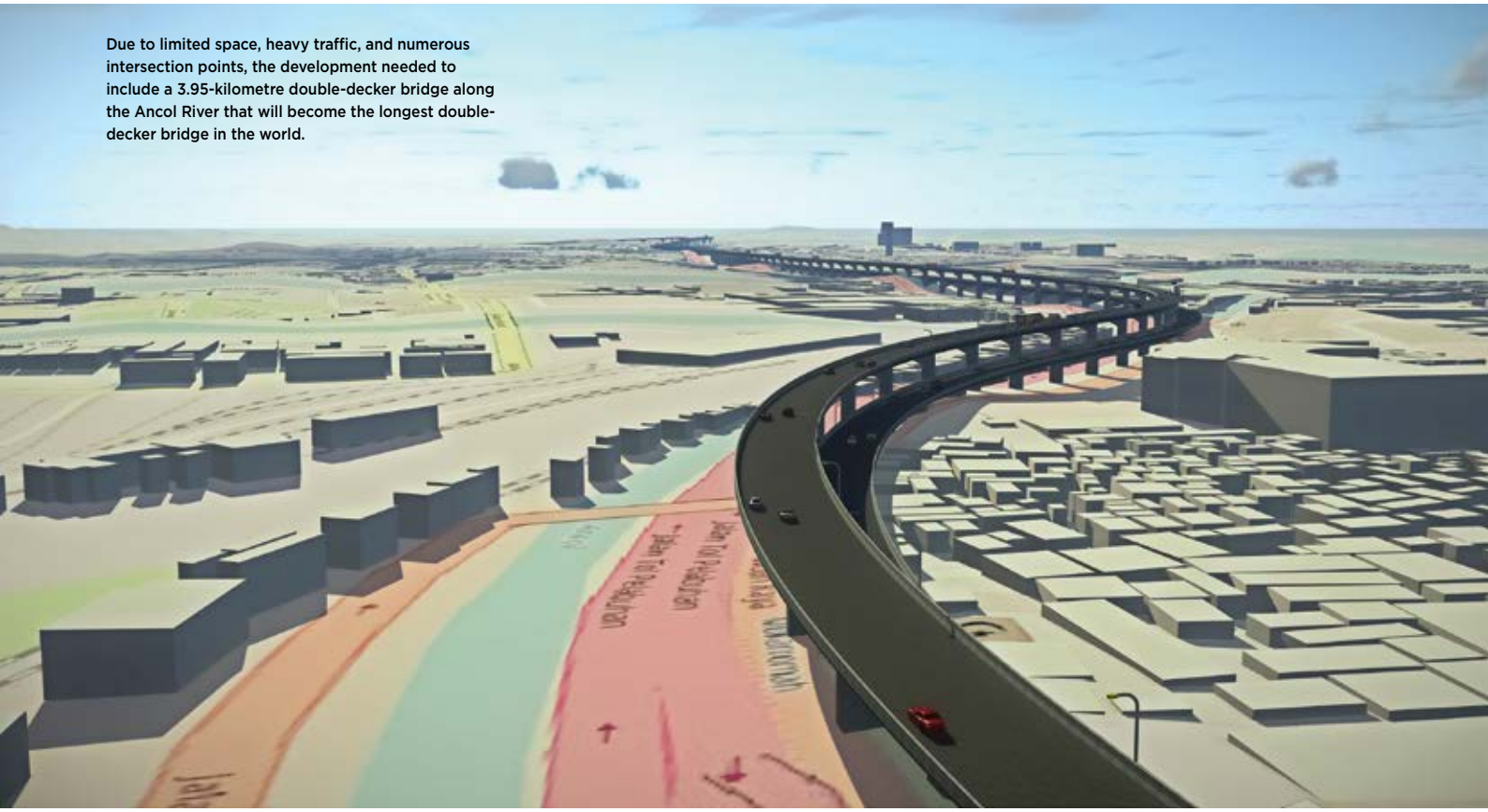
"We used a comprehensive set of Bentley solutions to improve efficiency far more than they would have individually," said Ramadhan.

Additionally, BIM methodology helped WIKA reduce carbon emissions during construction and allowed contributors from numerous locations to collaborate without traveling to the site. Modelling the travel paths of heavy equipment during construction will make movement more efficient and lower fuel consumption, while simulating traffic movement during construction will reduce congestion and, in turn, lessen vehicle emissions.

Though WIKA projected the design of Harbour Road 2 would take seven months using traditional 2D survey and design methods, its decision to switch to a BIM methodology helped the project team complete the design in only four months. When construction is completed, an estimated 63,500 vehicles will cross the new toll road each day, which will speed economic and tourism development in the area and facilitate access to the U-20 World Cup matches.

Combined with the cost savings gained through design efficiencies, the government expects Harbour Road 2 to pay for itself by 2032, or three years earlier than anticipated.

Due to limited space, heavy traffic, and numerous intersection points, the development needed to include a 3.95-kilometre double-decker bridge along the Ancol River that will become the longest double-decker bridge in the world.



LEFT: When complete, the US 181 Harbor Bridge will be America's longest cable-stayed bridge.
Image courtesy Doka ©2020

US 181 HARBOR BRIDGE

BUILDING AMERICA'S LONGEST CABLE-STAYED BRIDGE

Traffic in the USA has increased by 38.4% in the last 25 years, and along with it the importance of measures to create and maintain safe, efficient transport links. The city of Corpus Christi in Texas is rising to this challenge with the new US 181 Harbor Bridge, which will have a considerably higher capacity than the structure it is replacing. Doka's formwork expertise was called in to help build the 164 metre high pylons and over 100 piers.

The Texas Department of Transportation called for improvements to the transport corridor infrastructure in Corpus Christi, where U.S. Highway 181 crosses the harbor. The existing bridge is no longer able to meet requirements and will be demolished on completion of the new bridge.

With six traffic lanes, plus pedestrian and cycle lanes, the new bridge will be much better equipped for future traffic levels. It also has greater clearance for ships than the existing bridge, and this will open up new economic development possibilities for Corpus Christi's harbor.

Once completed, the Harbor Bridge, including connecting roadways, will be 10.36 km long, making it the longest cable-stayed bridge in the USA and the third longest bridge of its kind in the world. It has a whopping span of 506 metres, i.e. the length of about five and a half football fields. Doka was chosen for the formwork engineering due to its delivery reliability and coordinated, integrated solution covering all phases of the infrastructure project.

OVER 100 PIERS OF VARIOUS TYPES

The scope of Doka's part of the project includes two pylons and over 100 piers (with foundations) for the approach roads to the main span. The piers have overall heights of up to 45 m and approximately 4.50 metres pouring height. There are five different types of piers, varying in their external appearance and their execution – solid or hollow cross-sections.

In order to be able to operate the formwork efficiently, the Doka engineers designed a customised steel formwork for each one of the piers. The elements were combined on the outside using the Xclimb 60 automatic climbing formwork and on the inside with the Doka shaft platform. The formwork and platforms were moved as a single unit using the crane.

At the top of each pier is a wide V-shaped pier cap; these were created using the Top 50 large-area formwork, with large profiled timber formwork boxes. The vertical loads were safely dissipated into the concreted section below over a solid steel girder working platform via brackets. The design included a function to lower the platform so that the formwork could subsequently be removed from the concrete.

FORMWORK SYSTEM CAPABLE OF ADAPTING TO DIFFERENT GEOMETRIES

The two pylons are 164 metres tall and are structured in three sections: the lower section

LEFT: The two pylons are 164 metres high, comprising the A-shaped pylon legs and the pylon tower above.
Image courtesy Doka ©2020

consisting of two A-shaped pylon legs; the transition area where the legs meet; and the pylon tower, with its challenging geometry.

The pylon legs are approximately 50 metres high and comprise nine pouring steps, each 5.5 metres high. Twelve SKE100 plus automatic climbing brackets were used on the outside of each pylon leg to lift the entire external formwork to the next concrete section; this meant that no cranes were needed for lifting and thus saved valuable crane capacity. All the working platforms climbed simultaneously, ensuring no edges were left open where there might have been a risk of falling – this guaranteed maximum safety on site. Doka shaft platforms were used inside the hollow construction.

The transition area, where the pylon legs join, was a particular challenge, as there was not enough room for a standard self-climbing solution. Instead, Doka developed a custom working platform which was based for the 13m high transition area. The platform consists of horizontal supporting construction frames which transferred the concrete loads safely in the previous pouring section.

The pylon towers were built using the SKE100 plus's 'little brother', the SKE50 plus automatic climbing formwork. The SKE50 plus has a lifting capacity of 5 tons per climbing unit, half the capacity of the SKE100 plus. It is the standard system for numerous typical building and bridge construction applications where high live loads in combination with large influence widths are not as critical.

Another point requiring careful attention in the formwork design was the shape of the pylon tower, which tapers gradually towards the top. In order to ensure the construction site team had to modify the formwork as little as possible, Doka's formwork engineers designed a custom Top 50 large-area formwork. The groups of holes in the anchor waling were designed to achieve in closed formwork condition the corresponding pouring step geometry.

The new bridge is being constructed using modern bridge-building technology and materials. Once completed it is expected to enjoy a service life of more than 170 years.

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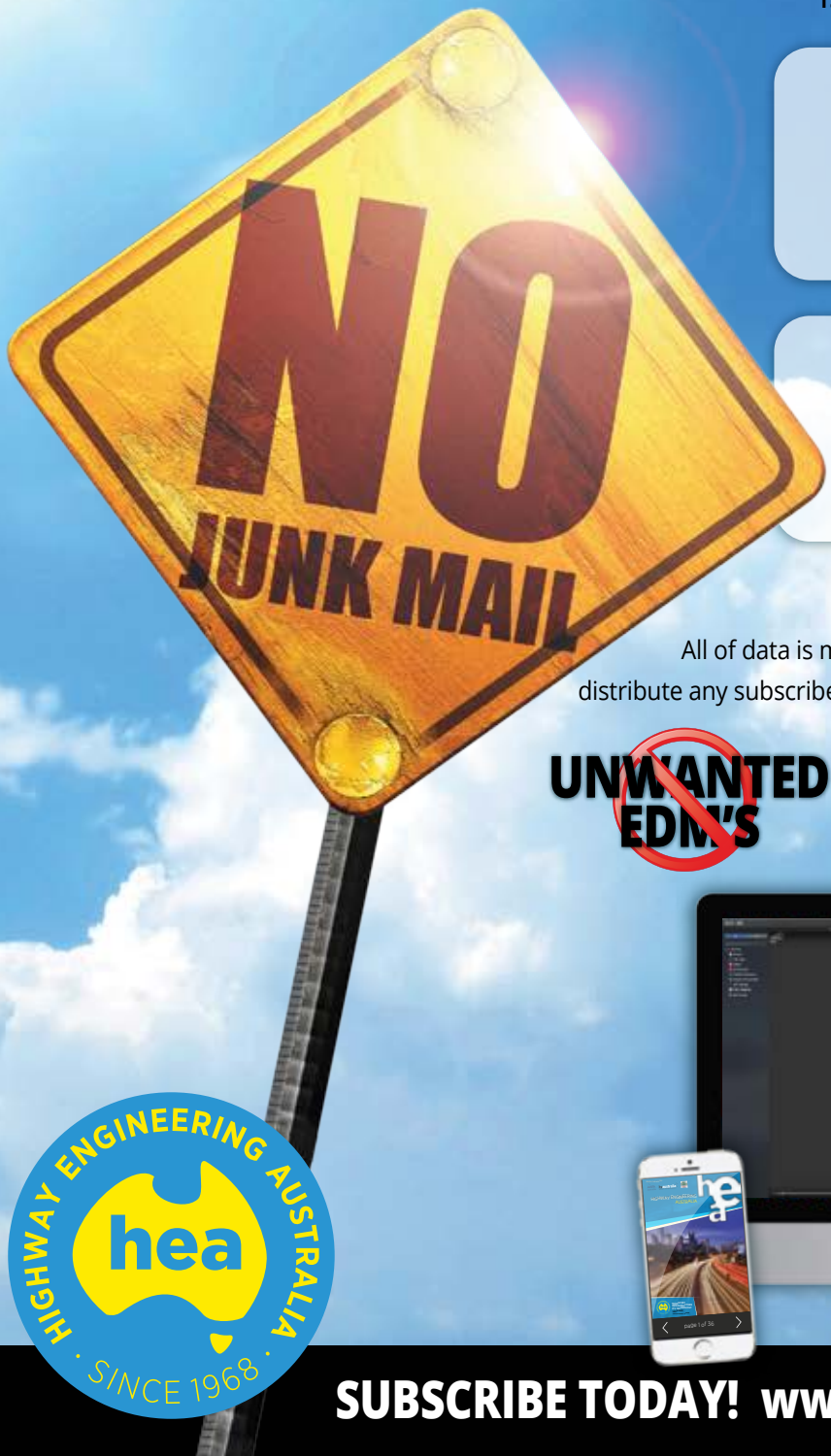

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SURGE OF MEMBERSHIP DESPITE UNUSUAL TIMES

According to National Precast CEO Sarah Bachmann, the organisation's membership has surged in recent times, following a recent influx of new membership applications.

"Who would have thought that in such uncertain times, companies would be reaching out to industry associations to strengthen their market position. It makes sense though, as association membership offers an efficient way to reach an audience of members, via just the one contact point," she comments.

"We are delighted to welcome a number of new members."

Recent new National Precast members include:

- Dulux AcraTex (Industry Partner - textured coatings);
- Ozcast Precast (Provisional Precaster);
- Fine Form Pre-cast (Precaster);
- Reoweld (State Industry Supplier);
- 1Breadcrumb (Professional Associate Organisation); and
- BOSFA (National Industry Supplier).

"We look forward to working with these companies as they become part of the National Precast community. Already we are assisting a couple of them with Standards and manufacturing issues," Bachmann says.

For more information on National Precast's members, visit **www.nationalprecast.com.au**

FIRST INDUSTRY PARTNER MOVES TO RESTORE POSITION UNDER CORE BRAND

As National Precast's very first Industry Partner member, ramsetreid has been a strong supporter of the Association for many years.

According to National Precast's CEO Sarah Bachmann, the company was instrumental in the development of the new membership category, realising the potential of exclusively occupying a nominated product category. It has also been a very active member in a number of other spaces including one of its senior employees representing the Association during the revision of the 2015 version of *AS 3850 Prefabricated concrete elements.*

"Previously, ramsetreid has occupied the 'lifters and connectors' Industry Partner product category, but this year moves to 'manufacturing accessories'. We are delighted to have them continue at this premium level of membership," Bachmann comments.

But some big changes are in store for the ramsetreid company.

Determined to increase their support and ongoing commitment to the precast industry and in particular, National Precast, ramsetreid will return to an integrated model where engineering, marketing, sales are focused under the one common brand, namely, Reid.

According to Business Manager – Reid, David Barnes, the Reid team's commitment is as strong as ever.

More to come soon so watch this space!

IMPROVED SOLUTIONS FOR TEXTURED PRECAST COATINGS

National Precast's newest Industry Partner Dulux AcraTex has developed two new products for the precast industry to deliver long term protection.

According to National Precast CEO Sarah Bachmann, Dulux AcraTex has joined National Precast as Industry Partner, exclusively occupying the 'textured coatings' product category within that membership space.

"With the use of high quality steel moulds, precast concrete manufactured by our Master Precaster and Precaster members is at an all-time high quality of finish. And that has required specific coating development to meet the evolving market needs and to ensure longevity," Bachmann says.

"We are excited to have Dulux AcraTex on board, and have been working with Marketing Manager Briana Keenahan on perfecting the Dulux range of bond-breaker remover and textured coatings to today's smooth precast concrete surfaces.

According to Briana, two new products have been introduced.

AcraTex BondFree Concentrate removes typical barrier-type form release agents to ensure adhesion of coatings, and **AcraTex AcraTilt** has been developed as a medium-build texture coating for precast and tilt up concrete to provide long term durability.

"We look forward to being an integral part of National Precast and working with members to encourage take-up of the products," Keenahan comments.

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