



TRANSPORT INFRASTRUCTURE ITS TECHNOLOGY SINCE 1968

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## A FRAMEWORK FOR THE FUTURE OF TRANSPORT

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

Scorpion II" METRO

Scorpion II TMA Truck Mounted Attenuato

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MASH V

TESTED, PASSED

AND ELIGIBLE

TESTED, PASSED

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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So, whether it's TL-2 or TL-3, when it comes to selecting a fully MASH tested, passed and eligible TMA that has also been **ASSESSED**, **APPROVED & RECOMMENDED FOR ACCEPTANCE** throughout Australia by ASBAP, the only name you need to remember is Scorpion® from A1 Roadlines.

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#### **About the Cover**

Transport Certification Australia (TCA) continues to evolve the National Telematics Framework by responding to the evolving needs of road agencies, local governments and regulators – and critically, the transport industry – by applying innovative approaches to digital technology and data.

Turn to Page 12 for the full story.

# Time to crack down on unroadworthy vehicles

#### Dear Readers,

When considering road safety and how to improve it, first thoughts usually turn to the 'big four' - speed, alcohol, drugs and fatigue.

Unfortunately, most people don't immediately think about the horrendous impact that unroadworthy vehicles can have on road safety. Bombs, bush-bashers, heaps, junkyard candidates (any many other names which I won't use in this forum) - whatever the name, the problem is the same - there are many unroadworthy and dangerous vehicles driving on our roads, and they pose a significant hazard to all. Perhaps not surprisingly, many of them are only 'discovered' following their involvement in serious, often fatal, road accidents.

Although it is difficult to even begin to calculate the number or percentage of unroadworthy vehicles using the roads, it's clear that the problem is extensive to say the least. What's more, with the ridiculous increase in the cost of second-hand cars and issues with new car supply that have resulted from the COVID-19 pandemic, I believe the problem is becoming increasingly widespread and continues to worsen.

While I feel certain that most of you would not consider the safety of yourselves, your loved ones, or for that matter, the safety of all other road users an 'optional' or luxury item, it is a sad fact that there are many who do.

Whether it is because they choose to

ignore the severity of the problem with their vehicles, or that they simply don't understand or consider the disastrous consequences that can result in the event of a vehicular malfunction, is essentially a moot point.

Regardless of the reasons, for some people, ensuring that a vehicle is well maintained and roadworthy represents nothing but an inconvenient waste of time and money. In fact, based on some of the examples that I have seen in my travels, it appears that there are some who believe that if a vehicle is capable of movement in the general intended direction (forward movement optional) and has a better than 5% chance of actually arriving at the intended destination without losing too many important pieces, it is considered 'good enough'.

While I clearly understand the fiscal pressures facing many Australian families and sympathise with the difficulties caused by COVID lockdowns and restrictions, I believe that there can be no justification for placing anyone at risk with a sub-standard, unroadworthy vehicle.

With that in mind, I believe that if we are serious about removing unroadworthy and dangerous vehicles from our roads, we have little choice other than to introduce mandatory annual vehicle inspections nationally.

While vehicle inspections are currently part of the registration process for certain categories of vehicles in NSW, ACT and NT, the majority of states still have no such arrangements for private passenger vehicles. Making the inspection part of the re-registration process provides an ideal opportunity for all vehicles to be checked thoroughly, and non-compliance to be addressed immediately.

Although it may seem unjust to some to attempt to overcome a problem which in many instances is 'cost related' by imposing yet another charge or cost for vehicle owners, I believe the removing unroadworthy vehicles from the road network represents an excellent investment in road safety and will result in a significant reduction in risk to both the owners and occupants of the offending vehicles, as well as to all other road users. And while the establishment and operation of a vehicle checking scheme will carry a cost for governments, I also believe that any investment in saving lives and reducing road trauma must surely be considered 'good value'.

Anthony T Schmidt Managing Editor



# MashFlex<sup>®</sup> TL3 Wire Rope Safety Barrier

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## IPWEA launches Asset Management Education Pathway to combat skills shortage in infrastructure boom

IPWEA's Asset Management Pathway is the first-of its-kind in Australasia and offers the opportunity to become globally certified.

In light of the Federal Government's \$17B infrastructure funding announced in May budget, the Institute of Public Works Engineering Australasia (IPWEA) has devised an educational pathway to help deal with the critical shortage of professional skills available to manage infrastructure projects.

In 2021 Local Government NSW, found that 80% of NSW councils were experiencing shortages across key professions including asset management, engineering and planning. To help relieve the skill shortage pressure, IPWEA is now offering an Asset Management Pathway, the first-of-its-kind in Australasia which also provides participants the opportunity to become internationally recognised by the renowned World Partners in Asset Management (WPiAM) Global Certification Scheme.

David Jenkins, CEO, IPWEA is passionate about providing further education opportunities to asset managers and raising awareness of the profession as a viable career path to ensure the long-term success of infrastructure projects all over Australia and New Zealand.

"When developing these courses, we thoroughly examined industry needs to ensure the pathway added value to those currently working as an asset manager and those considering building their skills in this profession.

"It's critical for the viability and safety of our community assets such as roads, bridges, parks sewage works and other key infrastructure projects, that qualified people are managing these projects throughout their lifespan.

"The rhetoric around infrastructure needs to change – it is people, skills and education which are at the core of infrastructure stimulus package being successful, for now and over the long term.

"The demand for professional asset management skills will be vital for the increasing responsibility of infrastructure projects and financial investments from the public purse," said Jenkins.

The pathway has three levels starting from a foundational understanding through to strategic thinking. With complete autonomy over which level to begin with and no prerequisites, this course is perfect for industry veterans or those starting out.

The three levels of the IPWEA Asset Management Pathway of learning include:

- Foundations: aims to develop understanding of the key concepts and theories of asset management and fleet management.
- Build: focuses on applying knowledge and developing a deeper capability in asset management.
- Recognition: consolidates learning and enhances skills with strategic thinking and decision making, leading to an internationally recognised designation.

IPWEA Asset Management Pathway participants can leverage their educational achievements combined with five years demonstrated experience, to make an application for the Certified Practitioner in Asset Management (CPAM) designation via the new WPiAM Global Certification Scheme.

Registration is open now for all levels of the Asset Management Pathway. For course dates and to register visit: https://www. ipwea.org/education/ipwea-am-pathway





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## NSW moves into global realm with smart electric vehicle reforms

The NSW Government's package of intelligent and balanced reforms have made New South Wales the only state in Australia to sit amongst the advanced global pack on electric vehicle policy, according to the Electric Vehicle Council of Australia.

"World leaders from California to the United Kingdom have policies to turbocharge the transition to electric vehicles and capture the abundant economic, health, and environmental benefits. Now New South Wales has stepped up to stand amongst them," said Electric Vehicle Council chief executive Behyad Jafari.

"This package, frankly, represents how grown-ups do reform – consultative, balanced, and longsighted," Mr Jafari added. "Many Australian governments have announced EV 'plans,' sometimes even 'plans to have a plan', but New South Wales is the first state to step up and deliver real action."

"This reform package will ensure New South Wales cleans its streets of exhaust and noise, lowers health costs, reduces carbon emissions, and breaks its dependence on foreign oil. Simultaneously it ensures tax revenue will flow fairly from road users as the transition unfolds."

"Jurisdictions around the world that have taken this path have seen billions in investment flow toward them. New South Wales residents will now see more places to charge their cars and innovative EV-oriented businesses flourish."

"Vitally, they will see the world's leading manufacturers offering their most affordable EV models to the state. Currently there is a strong incentive to reserve these less expensive models for overseas markets. That changes with this announcement. New South Wales residents with tight budgets will finally be able to escape the weekly punishment of the petrol pump," he said.

For further information, please visit: **www.electricvehiclecouncil.com.au** 



# Mandatory registration of some engineers is now in effect in NSW and VIC.

## What does this mean for you?

If you're a practising professional engineer in NSW, VIC or QLD, you may need to be assessed against competency standards to be registered.

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## **Revised Assessment Framework a step towards sustainable infrastructure**

The latest edition of Infrastructure Australia's Assessment Framework, released during July, will better integrate sustainability into nationshaping infrastructure proposals. But the Infrastructure Sustainability Council of Australia also looks ahead to future editions.

Infrastructure Australia's revised Assessment Framework guides the development of high-quality infrastructure proposals by providing nationally consistent assessment criteria.

The launch of the Framework follows the release of Infrastructure Australia's new Sustainability Principles in April. It also follows the 2019 Infrastructure Audit, which found Australian governments often fail to incorporate sustainability or resilience into their infrastructure projects, but by doing so could become world leaders.

Infrastructure Australia makes investment recommendations to the Australian Government after evaluating business cases for projects worth more than \$250 million.

"What and how infrastructure projects are delivered have implications for Australia's workforce, communities, the environment and our economy – so looking at infrastructure through a holistic lens will lead to better short-term investment decisions which deliver long-term dividends," says ISCA's Chief Executive Officer, Ainsley Simpson.

"With a clear mandate to consider value beyond the traditional benefit-cost ratio, Infrastructure Australia's revised Assessment Framework will help to reset entrenched practices which incentivise lowest cost and short-term outcomes at the expense of longterm value. "This step will certainly be welcomed by our members. Our most progressive government members are driving sustainability outcomes using the IS Rating Scheme, with \$206 billion of investment registered since 2012."

More than 70 per cent of applicable projects on Infrastructure Australia's 2021 High Priority and Priority List are expected, or are already, undertaking IS Ratings.

Historically, 65 per cent of those from Infrastructure Australia's lists have delivered environmental, social, economic and governance outcomes through the IS Scheme.

The new edition of the Assessment Framework provides extra guidance on a range of broad sustainability issues across the quadruple bottom line of economic, environmental, social and governance.

"The Framework recognises that infrastructure proposals should consider societal impact, that transparent and meaningful engagement with First Nations people communities is important, and that sustainability, resilience and quality of life are interconnected. This recognition will change the way we think about infrastructure," Ms Simpson notes.

"We believe the Assessment Framework will enhance governance practices, provide economic certainty and uplift for local contractors and suppliers, and build capacity and skills across the sector."

The Framework acknowledges that rating tools like the IS Rating system and Green Star can be "useful" but does not require a specific sustainability assessment using these tools. However, Infrastructure Australia does acknowledge that this may become a requirement in future updates. "Infrastructure Australia acknowledges it is taking a 'pragmatic' approach to sustainability rating tools in this edition of the Framework. Pragmatism will level up those early in the journey to good practice. Deep determination will help us achieve best practice across the board and meet the aspiration of world leadership that Infrastructure Australia outlined in its 2019 Audit.

"Australia is standing on the edge of a new era of sustainable infrastructure. The enhanced Assessment Framework is a defining step to drive the collaborative leadership required for Australia to consistently deliver infrastructure with true quadruple bottom line sustainability benefits," Ms Simpson concludes.

#### **ABOUT ISCA**

The Infrastructure Sustainability Council of Australia (ISCA) is Australia and New Zealand's authority on sustainable infrastructure projects and assets. ISCA's purpose is to ensure all infrastructure delivers cultural, social, environmental and economic benefits. The council works with more than 20 federal, state and local government departments in Australia and New Zealand.

The Infrastructure Sustainability (IS) rating scheme is mandated by delivery agencies and asset operators across Australia and New Zealand with approximately over \$200b government-funded large infrastructure projects undertaking the rating.

ISCA represents more than 200 individual companies, departments and associations with a combined annual turnover of more than \$50 billion. ISCA's membership reflects the diversity of the infrastructure sector including all levels of government, major infrastructure contractors and alliances, professional services firms, product manufacturers, utilities, suppliers, not-for-profits and associations and universities.

For more information, contact ISCA on info@isca org.au or visit: www.isca.org.au



## TMR puts Queensland on track to greener roads

In a first for Queensland, the Department of Transport and Main Roads (TMR) has granted Alex Fraser's Archerfield and Nudgee Recycling Facilities with a Quarry Registration Certificate; supporting increased use of recycled construction materials in major roads and infrastructure.

The TMR initiative is set to markedly improve the sustainability of Queensland's road and rail projects. It gives major contractors the ability to choose a certified supplier of recycled roadbase and aggregate, that delivers on sustainability and quality in compliance with TMR specifications.

Alex Fraser Recycling GM Sean McCormick said the Queensland Government's move to increase the use of recycled material in road projects is accelerating the circular economy.

"The best way to improve resource recovery is to develop strong markets – a critical part of that is having certified suppliers, and clear specifications for the use of recycled products."

In July 2020, TMR discontinued the MRTS35 technical standard, specific to recycled unbound materials. TMR then updated the MRTS05 technical standard, specifying recycled materials alongside virgin quarried materials; making it easier for Queensland civil contractors to make sustainable choices.

McCormick says the Quarry Registration Certificate is strictly controlled to ensure consistent quality. "To maintain certification, our products are tested regularly to ensure they are consistent and conform to the same standards as virgin material. This gives our customers peace of mind, knowing that they'll never have to compromise on quality to achieve sustainability."

"We have been manufacturing high-spec, recycled construction materials for use in major infrastructure for decades; many of our customers consider our green roads products to be equal to, if not better performing than their quarried counterparts," McCormick said.

"There's been a lot of talk around increasing the use of recycled products – TMR has taken real action by awarding this Quarry Registration Certificate to Alex Fraser. It's an exciting time to be in recycling and construction in Queensland."

"Alex Fraser's Quarry Registration Status means the industry now has a go-to certified supplier for sustainable materials across a wide range of applications."

"This TMR certification assures the construction industry that our recycled products are manufactured and tested in a way comparable to quarry products. It's a clear sign to local governments that certified suppliers of recycled materials can supply their works too," McCormick added.

Alex Fraser's Recycling Facilities in Archerfield and Nudgee have the annual capacity to divert more than one million tonnes of South East Queensland's construction and demolition waste, recycling it for reuse in sustainable infrastructure projects, that can reduce carbon emissions by up to 65 per cent.

For more information, please visit: www.alexfraser.com.au

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## Queensland transport business sees \$24,000 annual saving from solar power panel install

Despite Australia's high uptake of solar, data from Solahart's Solar Index Report has revealed that as a nation, we are using less than five per cent of the potential capacity of residential and commercial rooftop solar.

However, Local Queensland transport solutions company, All Purpose Transport (APT), is one commercial business bucking this trend. The family-owned business is paving the way to a more sustainable future with the recent installation of a 250 panel, 100kW solar PV system at their head office in Brisbane.

The system was installed by Solahart in March 2021, is capable of generating 128,000 kWh per year, and has already saved the warehouse 9,509.76 kg of  $CO_2$  - the equivalent of planting on average 25 trees per week! The addition of solar PV has also reduced the use of electricity sourced from the grid by an average of 38 per cent, saving the business around \$24,000 on their annual energy bills.

General Manager of APT, Paul Kahlert, said that the installation of the large-scale solar PV system is part of an ongoing sustainability plan to reduce  $CO_2$  emissions of APT's operations and that the team are amazed by the instant outcome.

"Solar power is one of three initiatives that make up our Sustainability Roadmap, and it has already exceeded our expectations in terms of carbon emissions saved and the reduction of our energy bills. It provided us with a full turnkey solution and some really cool software to show the system's activity," said Paul.

Other initiatives include the installation of LED lighting in the APT warehouses, which was completed in July 2020, plus converting electricity from the grid to 25 per cent green power sources.

Based in Berrinba, APT was established in 1975, with clients including IKEA, Fantastic Furniture, BP, and Dairy Farmers. APT has a fleet of over 260 vehicles and is a Queensland specialised transport solutions company, offering all types of transport services, from standard courier work, semi-trailer deliveries, refrigerated services, through to home and office relocation.

The future-focused business also has an electric truck which, thanks to the solar PV, is now fuelled by the sun. APT also has an Electric Vehicle Program in action, with the company aiming to have 35 EV's undertaking zero-emission on fleet by 2025.

Commercial Sales Manager of Solahart Sunshine Coast/ Caboolture, Stephanie Holland, said that they were proud to be able to support APT's sustainability initiative.

"APT has been Solahart's freight carrier in the region for over 15 years, and we're proud to help them reduce the impact of their operations, while saving them money on their energy bills which can be funnelled into other areas of the business," said Stephanie.

# Cycling community remembers 570 cyclists killed in the 16 years since Amy Gillett's death

Sunday 18 July, marked 16 years since Australian professional cyclist, Amy Gillett, was killed while on a training ride with the Australian Women's Cycling team. Cyclists across Australia joined the Amy Gillett Foundation (AGF) in remembering Amy, and all people who have been killed or seriously injured while riding bikes in Australia.

Tragically, 570 people have been killed while cycling in Australia since Amy was killed in 2005.

Amy's family shared a special message with the community on the eve of the anniversary of their daughter's death:

'Loss will be a part of everyone's life, but it is the sudden, traumatic loss (most cyclist crashes occur this way) that has to be dealt with daily whilst trying to rebuild a life without your loved one.'

"Separated bike lanes are the way to go, and we need to keep advocating for our three tiers of government for funding to keep cyclists safe in this way. In the meantime, let's all ride with great awareness and good attitude as we share the road and help every cyclist get home safely," said Mary Safe, Amy Gillett's mum.

Since Amy's tragic death, her legacy has been honoured by the work of the AGF, Australia's leading cycling safety charity, championing an evidence-based approach to road safety. The AGF supports research, creates education programs and advocates for safe cycling.

"We remember Amy today, and every day. Our thoughts and condolences are with all families across Australia who have lost someone they loved to a crash on our roads," said Dan Kneipp, CEO of the AGF.

"In 2021, it simply isn't good enough that people continue to die while riding bikes. There is no silver bullet, but we know investment in infrastructure, lower speeds and education will save lives."

are preventable. It's time for us to stand up

and demand safety as well as mobility," Dan Kneipp added.

#### ABOUT AMY GILLETT FOUNDATION

Every day over 20 cyclists are hospitalised with serious injuries, including brain injuries and fractures. A cyclist is killed every 10 days on Australian roads. This isn't good enough.

The Amy Gillett Foundation's mission is for safe cycling in Australia. Our vision is for zero deaths and a reduction in the serious injury of people riding bikes. Each year, nearly 40 people die while riding a bike on Australian roads. One in five people injured on Australian roads is a person riding a bike. The Amy Gillett Foundation (AGF) was born out of the tragic death of Amy Gillett, killed while on a training ride with the Australian Women's Cycling Team in 2005. As Australia's leading cycling safety charity, we champion an evidence-based approach to safe cycling. We support research, create education programs and advocate for safe cycling. We work with all levels of government, road authorities, corporate, motoring, cycling and community road safety organisations and the public to create a safe cyclist environment in Australia. Find out more: www.amygillett.org.au

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# INNOVATION TOWARDS ZER\$



# A FRAMEWORK FOR THE FUTURE OF TRANSPORT

Transport Certification Australia (TCA) continues to evolve the National Telematics Framework by responding to the evolving needs of road agencies, local governments and regulators – and critically, the transport industry – by applying innovative approaches to digital technology and data. The interactions between authorities, providers and operators remains central to the success of the Framework.



The Framework provides an operational ecosystem to manage relationships and interactions between:

- Authorities: Creators of applications and schemes through the Framework, and users of data, reports and analysis using data generated from applications of the Framework.
- Providers: Providers of digital technologies and services recognised through the Framework.
- Operators: Users of applications (and associated schemes) offered by providers through the Framework.
- **TCA:** The national administrator responsible for functions and services within the Framework, including:
- o Coordination of the interaction of parties within the Framework
- o Development of performance-based requirements for application service providers and suppliers
- Oversight of assurance mechanisms for application service providers and suppliers (which offer services recognised through the Framework)
- Management of the collection, storage and use of data, based on standardised consent arrangements entered into by users of applications and schemes
- o Management of the Telematics Analytics Platform (TAP) and associated services.



#### **Different tools for different jobs**

New applications of the Framework are now being widely used by authorities and transport operators to drive new productivity and safety outcomes.

Road Infrastructure Management (RIM) and the Telematics Monitoring Application (TMA) offer new approaches to the use of digital technology and data, complementing the Intelligent Access Program (IAP). Both applications respond to the growing use of digital technology and data for a diverse range of purposes and, with it, gaining stronger insights into how heavy vehicles are using road networks through data-driven reporting and analyses. The IAP is based on the premise of exception-based reporting, which remains a central pillar of the IAP as a regulatory telematics application used for compliance management purposes. Exception-based reporting provides an effective way to ensure only essential information is shared with authorities, consistent with 'privacy-by-design' principles.

With the move to digitalised networks, road agencies have sought different ways of gaining access to road use data, without compromising privacy-by-design principles essential to generating a 'trust equation' for transport operators to share data with government agencies. RIM and TMA respond to these needs.

#### **Road Infrastructure Management (RIM)**

RIM is a low-cost application that provides a new way of collecting road use data.

For RIM, TCA performs a critical role in collecting, securely storing, aggregating and de-identifying data received from service providers who offer RIM to transport operators. The figure below provides an overview of how RIM data is collected and reported. There are two key defining features of RIM:

- · All data collected by service providers is transferred to TCA
- TCA aggregates and de-identifies all data before being represented in reports and visualisations to authorities (for RIM, authorities are primarily road infrastructure managers).

Privacy-by-design principles are preserved through the aggregation and anonymisation of data collected through RIM.



#### How RIM data is collected and reported

TCA makes reports and visualisations to road infrastructure managers through the Telematics Analytics Platform (TAP). An example of the kind of reports generated through RIM is presented over the page, which shows the average speed of vehicles travelling on key freight corridors in New South Wales.







Zoom and salect LGA



Examples of reports made available through RIM, including 'Average Speed by Road Segment' and 'Journey Counts by Road Segment'. The data can be reported for specific road types and vehicle types across a specified region

## **Telematics Monitoring Application (TMA)**

TMA provides a new way of using telematics for compliance management purposes.

For TMA, TCA performs a critical role in controlling access to identifiable vehicle movement data received from service providers by authorised personnel for compliance management purposes. There are three key defining features of TMA:

- All data collected by service providers is transferred to TCA
- TCA controls access to authorised personnel within authorities to access visualisations and reports (for TMA, authorities are primarily regulators).
- TCA oversees and audits access to the use of data.

Privacy-by-design principles are preserved by TCA controlling access to, and auditing the use of, TMA data by authorised persons within authorities.



How data is collected and reported through TMA

An example of the kind of reports generated through TMA is presented in the figure below. This shows the movements of an individual B-Double combination operating at HML on a single day (noting that the transport operator and vehicle registration number details have been redacted for this story).



Example of reports available through TMA

#### **Telematics Analytics Platform (TAP)**

A range of users are gaining improved insights into vehicle movements on the road network through TAP, which provides a single point of access to data, reports and visualisations using data received through the Framework. No other digital platform is structured with a focus on delivering public-purpose transport outcomes through data.

TAP is now being rolled-out to local governments in New South Wales and Tasmania, providing local road managers with unparalleled insights into vehicle movements on local road networks. Working in conjunction with Transport for NSW and the Department of State Growth in Tasmania, these reports and analysis can help inform road safety and transport efficiency, improved asset management and sustainability for heavy vehicles.



TAP is transforming data collected through RIM, TMA and IAP into powerful analytics through TAP.

Critically, TAP is providing data-driven insights into how roads are being used. This is helping road managers to make better informed decisions about heavy vehicle access.



TCA has launched analytics specifically tailored for road managers, to support the use of de-identified and aggregated vehicle movement data, for example showing average speed, and journey 'heat maps', for jurisdictions and local governments.

Smart OBM systems

Smart OBM systems are now available to support new productivity and safety reforms.

OBM systems are often referred to as on-board weigh scales or electronic weighing systems, and are widely used across the road transport sector for commercial, contractual and regulatory purposes.

The distinguishing feature of Smart OBM systems is the ability to generate digital axle mass data which can be combined with other digital systems and services through the National Telematics Framework.

Smart OBM systems are approved by 'type' against the performance-based requirements contained in the OBM System Functional and Technical Specification. The specification contains minimum requirements for accuracy, reliability and integrity, providing assurance to stakeholders.

Since the beginning of 2020 TCA has type-approved Smart OBM Systems from four major suppliers (presented in alphabetical order):

- **Airtec Corporation**
- E-Max
- LoadMass Australia
- Tramanco.



After type-approving Tramanco with the first Smart OBM in February 2020, other typeapprovals have followed during 2020 and 2021. The availability of different Smart OBM systems offers competition and choice to transport operators of all kinds.

Smart OBM systems are being used by road agencies to introduce new productivity and safety initiatives, which are helping unlock access to a wider range of road networks. An example is the improvements being made to High Productivity Freight Vehicles (HPFVs) in Victoria.

In Victoria, a HPFV is a heavy vehicle combination that exceeds 26 metres and/or has a Gross Combination Mass (GCM) of more than 68.5 tonnes.

HPFVs operating in Victoria are able to carry increased payload and access new parts of the Victorian HPFV network.

The use of Smart OBM, when used with TMA and the IAP, will deliver easier first-andlast-kilometre approval and reduce the need for permits. Importantly, Smart OBM provides greater insights into the level of utilisation of road networks, and the loads being carried on them by heavy vehicles.





### Farm Gate

Farm Gate Access enables safe and legal heavy vehicle access on first and last-mile journeys - by connecting Restricted Access Vehicle (RAV) networks to the 'farm gate'.

Developed in partnership between industry and Transport for NSW, Farm Gate enables the use of more productive vehicles to safely transport grain and livestock from the farm gate to market, meaning fewer trips for the freight task.

Farm Gate allows RAVs to travel legally on local roads, in return for being monitored through the RIM application.

By having access to TAP, local road managers can quantify the number of vehicles transporting grain or livestock on local roads. This knowledge can be used as an evidence base to better manage infrastructure risks (and inform maintenance and investment decisions) and community concerns.

🕑 EV Charging

## WA accelerates towards longest EV fast charging network

Western Australia will soon be home to the longest electric highway in Australia, with the WA State Government recently announcing the 45 locations that will make up the electric vehicle fast charging network. The infrastructure network includes up to 90 fast charging stations and back-up chargers at 45 different locations connecting Perth and regional Western Australia - stretching north to Kununurra, south to Esperance and east to Kalgoorlie. Electric vehicle owners will easily be able to travel the State along these routes, with the average distance between charging stations around 160 kilometres.

Most electric cars can run for at least 400 kilometres in one charge, and it is expected the technology will continue to improve over the next few years. One of the most popular WA models can run for 550km in one charge.

Western Australian Environment and Climate Action Minister, Amber-Jade Sanderson, commented:

"Western Australia is a vast State and our huge fast-charging network will give electric vehicle owners confidence they can travel far and wide by eliminating any concerns around range anxiety."

"This infrastructure is a key to boosting electric vehicle uptake in the State and helps continue the transition to net zero carbon emissions by 2050," Minister Sanderson said.

The network will allow electric vehicles to be charged in as little as 15 minutes and locations have been chosen to encourage tourists to spend this time exploring a local regional town.

"The charging time will provide EV owners the perfect opportunity to stop in at a local business for lunch or a coffee in a welcome boost for our regional towns," she added.

A tender for the charging stations' design is expected to go out to market by the end of 2021, with the network expected to be fully operational by early 2024.

The locations of the stations have been determined by energy providers Synergy and Horizon Power in consultation with the Department of Water and Environmental Regulation.

This announcement is part of the WA Government's \$21 million *Electric Vehicle Fund* and the *State Electric Vehicle Strategy* for Western Australia.

"The McGowan Government is preparing for the future, with 20 per cent of new car sales in Australia expected to be electric by 2030," WA Energy Minister Bill Johnston said.

"This is an exciting and important task for Synergy, Horizon Power and Western Power, with the 45 locations spanning more than 3,000 kilometres across the State."

"An electric vehicle charged using the State's main electricity grid will generate 30 per cent less greenhouse gas emissions than a conventional petrol vehicle," he said.

The McGowan Government also recently launched the *Electric Vehicle Action Plan,* which provides a set of actions to prepare WA for a rapid uptake of electric vehicles and a new brochure for fleet managers.

"I'm also pleased to launch the *Electric Vehicle Action Plan*, which will prepare our electricity system for the rapid uptake in electric vehicles and ensure it stays safe, secure and reliable," Minister Bill Johnston added.



"These actions will make the electricity system more resilient and will support the continued uptake of rooftop solar."

To view the Electric Vehicle Action Plan, please visit: https://www.wa.gov.au/government/ publications/electric-vehicle-action-planpreparing-was-electricity-system-evs

To view the fleet manager guide, please visit: https://www.wa.gov.au/service/environment/ environment-information-services/electricvehicle-strategy



## Iconic Kombi goes green thanks to an ambitious University conversion project

The aim was to take a classic 1970s VW Kombi and bring it into the 21st century by converting it to a totally electrically-powered vehicle (EV). From concept to reality took 18 months but now the Kombi is fully roadworthy and capable of cost-effective, pollution-free, long-distance travel.

Decked out with eye-catching Southern Cross colours and a brightly coloured retro interior, the Kombi is a unique symbol of what ingenious engineering can achieve. It has a 88kW AC SRIPM electric motor coupled to a 4-speed gear box and draws power from 10 5.3kWh batteries sourced from a written-off electric vehicle. Add in power steering and the technology allows this EV conversion to outperform a conventional combustion-powered Kombi on all levels.

Andy Naughton, of electric classic car conversion business EV Machina, is a Southern Cross Environmental Science graduate who was commissioned to undertake the conversion, using his own customised solution.

"The batteries are split into two encased packs, one between the front seats and the other in the rear engine bay, with both being charged simultaneously. An elaborate battery management system controls the delivery and distribution of power," said Mr Naughton, who also won a 2018 Clean Energy Hackathon run through the University's Enterprise Lab.

"This particular combination of the range, the power, the idiosyncrasies of a Kombi – all add up to make it one-of-a kind electric vehicle conversion. And we had to learn along the way – there was no workshop manual for this one.

"The car has incredible torque and its acceleration is not what Kombi drivers would expect, that's for sure.





"VW purists might miss that Kombi engine sound but with the whole world moving away from combustion engines this offers a great compromise of keeping old vehicles on the road with new technology," Mr Naughton said.

Chair of Engineering and Information Technology at Southern Cross, Dr Ricardo Vasquez Padilla, said the Kombi was a wonderful opportunity to have students involved at the cutting-edge of technology and engineering systems.

"One of our students helped with the CAD (computer-aided design) of components and then saw them through to manufacture. It was a great hands-on experience," he said.

The 18-month project, jointly funded by Investment NSW's Boosting Business Innovation Program, delivers on four fronts:

- A retro-fitted electric vehicle with a driving range that suits regional Australia.
- A tangible and mobile learning resource about renewable energy available for schools nationally.
- 3. The project was led by a Southern Cross graduate and included hands-on electrical and mechanical engineering experience for current students.
- The new electric Kombi complements another existing Southern Cross renewable energy project – the solar-powered Sunflower that delivers remote power.

Southern Cross Vice Chancellor Professor Tyrone Carlin said the electric Kombi is now part of a narrative about a University determined to find solutions to today's challenges.

"One of our goals was to create a Kombi that had a range that was practical for regional Australia, and at 200km or even more per charge, we believe we have achieved that," Professor Carlin said.

While contemporary electric vehicles, such as Tesla, are emerging with long-range capacity, most converted vehicles – especially those with the aerodynamics of a Kombi – have been limited to the 80km-160km range.

"The romance and nostalgia attached to Kombis generally, but particularly in the Northern Rivers, only adds to the story of this vehicle," the Vice Chancellor said. The vehicle's EV conversion features:

- Motor: 88kW AC SRIPM electric motor with custom-built aluminium transmission adapter plate attached to original transmission
- Batteries and Charging: 53kWh watercooled lithium battery pack (10 x 5.3kWh batteries); 6.6kW onboard AC charging system for faster charging on the road
- Braking: Electric pump-boosted disc brakes with additional motor braking (off-throttle pedal and on-brake pedal) for regenerative braking increasing efficiency
- Power steering: Speed-variable custom electric power steering system allows for better manoeuvrability
- Gears: 4-speed gearbox
- Dashboard connectivity: Web-connected display with android operating system and OBD connection to motor and battery information; Adjustable regenerative braking modes with a dashboard toggle switch plus a drive-neutral-reverse switch; Reverse camera
- Cruising speed: 110km/h highway cruising speed
- Optimum highway range: 200+ kilometres
- Optimum urban traffic range: 250+ kilometres

Visit www.scu.edu.au/kombi to learn more.



## JAC Electric truck delivers 'fantastic' performance for All Purpose Transport

The new JAC N55 EV electric light duty truck has hit Australian roads following its unveiling at the recent Brisbane Truck Show and is already doing service as a delivery vehicle for major furniture retailer Fantastic Furniture in Brisbane.

The new JAC N55 EV has been working in trials with All Purpose Transport, the transport provider for Fantastic Furniture, and a number of other leading retail operations around the country.

During the trials the new JAC N55 EV has proved a winner for All Purpose and Fantastic Furniture, returning strong flexibility, range, driveability and performance. All Purpose Transport's divisional manager - new furniture, Mitch Devine, said the truck has already impressed with its good throttle response, quiet operation and power to allow smooth transition in traffic flow.

"The E55 is nice to drive and handles well and the cabin is comfortable and spacious, while the dash is nice and clear," Mitch Devine said.

"We have put the truck through a number of days operation including local test drives for key stakeholders and staff, actual delivery operations and promotional activities on main highways and in suburban streets," he said.

"Our longest day of testing so far saw the JAC perform extremely well, covering 139km of actual delivery operation, with about one third of that on highway and two thirds on suburban streets using about 73 per cent of its battery capacity," he added.

"It has also proved quick and easy to charge, and on several days we covered around 50km using about 25 per cent of its battery capacity, which we were able to charge back to full capacity around 55 minutes," Mitch said.

"The vehicle handled the deliveries well and had plenty left in the tank for more deliveries as required and our aim for the remainder of the trials is to push the vehicle out in regards to both distance and battery utilisation," he said. "The other factor for us to consider is the fact that during the trials the truck had to travel around 25 kilometres in on highway running to get to the loading point, and if the vehicle was charged at the point of loading, we could save additional battery percentage," he added.

All Purpose Transport's general manager Paul Kalhart welcomed the JAC N55 as a new competitive alternative in the EV market as the company pursues its zero emission goals.

"All Purpose Transport commenced our EV journey in 2019 with a goal of 35 zero emission vehicles by 2025," said Paul Kalhart.

"JAC's new offering of EV to the Australian market has opened an alternative competitive solution to fleets replacing their diesel motors with a carbon neutral option. We thank BLK Auto for giving us the opportunity to undertake a month-long real life test drive of their JAC equipment," he added.

Jason Pecotic, managing director of BLK Auto, the Australian and New Zealand distributor for JAC trucks, said the trials with All Purpose Transport have proved very promising and encouraging and the truck will move on to other major fleets in Sydney and Melbourne over the next few weeks.

"The initial trials have proved our claims about range driveability as well as performance, and we are pleased that All Purpose has been very happy with the truck," said Jason.

"It is clear that this is a very competitive product that delivers strong range and zero emissions at a price which is extremely competitive and is already arousing lots of interest in the market from other operators who are seeking a cost competitive zero emission transport solution," he said.

The JAC N55 EV is available as a car licence compliant 4.5 tonne spec or as a light rigid spec 5.5 tonne and on current pricing it undercuts equivalent opponents by as much as 40 per cent.

For more information, please visit:



## IKEA takes delivery of 30 electric vans from QUANTRON

International furniture powerhouse IKEA has set itself the goal of becoming climatepositive by 2030. To support this mission, IKEA turned to e-mobility specialist Quantron AG to supply 30 environmentally friendly e-vehicles for the IKEA logistics centre near Vienna.

This changeover will enable around 117,000 deliveries to be made emission-free in the first year alone, reducing CO<sub>2</sub> emissions by more than 300 tons. This corresponds to more than 1.5 million route kilometres and over 65 percent of all deliveries in the Vienna area.

QUANTRON's first all-electric Q-Light was already used for extensive testing at the logistics centre in June 2020. With a range of at least 170 km, a drive power of 100 kW and a maximum charging power of 70 kW, the e-transporters are ideally equipped for routes between IKEA locations and customers' delivery addresses.

Initially, the vehicles will be used for deliveries to all 23 of Vienna's municipal districts and within a 30 km radius of the logistics centre. The electricity for the vehicles is generated by photovoltaic systems and thus comes from 100 percent renewable energy sources.

Andreas Haller, founder and CEO of Quantron AG commented: "We are pleased to be able to support IKEA with our knowledge and expertise in this important step towards emission-free delivery. With its switch to electric mobility, IKEA is sending an important signal internationally for a greener future."



Pictured above: Andreas Haller, founder and CEO of Quantron AG (left), hands over a symbolic key for the delivered vehicles to Claes Lindgren, Country Customer Fulfillment Manager IKEA Austria (right).

"QUANTRON is helping companies like IKEA with our many years of e-mobility experience and our international network to make the switch to emission-free freight transport," Mr Haller added.

Claes Lindgren, Country Customer Fulfillment Manager at IKEA Austria, said: "Climate protection cannot be postponed, which is why IKEA is working consistently to save emissions and become climate-positive. Quantron AG is a competent partner with high-quality products that we can trust 100%."

"Today marks the start of the deployment of our new environmentally friendly QUANTRON vehicles in Vienna," Mr Lindgren added. "At the end of this month, a car-free IKEA furniture store will also open at Vienna's Westbahnhof station, which will deliver the purchased goods to our customers' homes directly and in an environmentally friendly manner."

"In the future, we will roll out our innovative delivery concept throughout Austria. By 2025, we plan to completely switch to zeroemission vehicles," he concluded.

#### **ABOUT QUANTRON AG**

Quantron AG is a system provider of clean battery and hydrogen-powered e-mobility for commercial vehicles such as trucks, buses and vans. In addition to new electric vehicles, the wide range of services offered by the innovation forge includes the electrification of used and existing vehicles, the creation of individual overall concepts including the appropriate charging infrastructure as well as rental, financing and leasing offers and driver training. Quantron AG also sells batteries and integrated customised electrification concepts to manufacturers of commercial vehicles, machinery and intralogistics vehicles.

The German company from Augsburg in Bavaria in passenger, transport and freight traffic. It has a network of 700 service partners and the comprehensive knowledge of gualified experts in the fields of power electronics and battery technology, through its cooperation with CATL, the world's largest battery producer.

Quantron AG, as a high-tech spin-off of the renowned Haller GmbH, combines 138 years of commercial vehicle experience with state-of-the-art e-mobility know-how.

For more information visit: www.quantron.net

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## Leading fleet management software provider integrates vision technology to ensure safer roads

Seeing Machines, the advanced computer vision technology company that designs Al-powered operator monitoring systems to improve transport safety, recently announced that EROAD will integrate Seeing Machines' *Guardian* technology into its fleet management software to help combat driver fatigue and make roads safer.

EROAD is a leading transportation technology company that offers fleet management software and products designed to improve driver safety, manage vehicle fleets and reduce costs associated with driving.

Seeing Machines' world-leading *Guardian* technology utilises face and eye tracking algorithms to detect fatigue and distraction, allowing proactive intervention before a risky driving incident occurs. According to Seeing Machines' research, in-cab alerts reduce fatigue by upwards of 60 percent, and 24/7 monitoring centre analysis and intervention decreases the occurrence of fatigue by an additional 30 percent to achieve a reduction in fatigue related driving events of more than 90 percent.

Paul McGlone, CEO of Seeing Machines said: "We are very happy to be partnering with EROAD. Our *Guardian* technology has seen expanding global penetration into long haul and heavy transport fleets and will be a huge benefit to EROAD users not only in New Zealand, but Australia and America as well."

"The Seeing Machines purpose is to get everyone home safety so we are closely aligned with EROAD as both companies take pride in helping make roads safer, knowing this integration will help achieve that," he said.

The integration of this technology will provide operators with a single tool for managing video telematics where previously there were two separate managing systems, making it easier for fleet managers to prioritise actionable insights from data as well as developing a greater understanding of the risks associated with their fleet and coach drivers.

Steven Newman, CEO of EROAD said: "Our mission at EROAD is to help every community enjoy safer, more productive roads. We're all about improving fleet safety through better driver behaviour and the integration of Seeing Machines' *Guardian* technology will help us achieve that."

"Seeing Machines' *Guardian* safety technology is set to become a vital element in the MyEROAD portal to ensure safer and more sustainable outcomes for fleet operators and drivers."

Seeing Machines' *Guardian* technology is being used in over 26 countries to protect drivers and their assets, and with 80 percent of all Heavy Transport ERUC in NZ being purchased through EROAD, they have witnessed the growing adoption of *Guardian* by this industry and were quick to get on board.

"With strategic growth and partnerships like this EROAD continues to contribute to safer roads through the delivery of products and services to transport operators and drivers throughout Australia and New Zealand," Steven Newman added.

#### **ABOUT SEEING MACHINES**

Seeing Machines Limited is an industry leader in vision-based monitoring technology that enable machines to see, understand and assist people. Seeing Machines' technology portfolio of Al algorithms, embedded processing and optics, power products that need to deliver reliable real-time understanding of vehicle operators. The technology spans the critical measurement of where a driver is looking, through to classification of their cognitive state as it applies to accident risk.

Reliable "driver state" measurement is the end-goal of Driver Monitoring Systems (DMS) technology. Seeing Machines develops DMS technology to drive safety for Automotive, Commercial Fleet, Off Road and Aviation.

Founded in 2000 and headquartered in Australia, the Company has offices in Australia, USA, Europe and Asia, and supplies technology solutions and services to industry leaders in each market vertical. For further information, please visit: www.seeingmachines.com

#### ABOUT EROAD

EROAD Limited's purpose is safer and more sustainable roads. EROAD develops and markets technology solutions to manage vehicle fleets, support regulatory compliance, improve driver safety and reduce the costs associated with operating a fleet of vehicles and inventory of assets. EROAD has a proven SaaS business model and is

experiencing continuing growth in installed units and revenue.

EROAD has operations in New Zealand, North America and Australia with customers ranging in size from small fleets through to large enterprise customers.

For more information visit: www.eroadglobal.com



## New technology making Victoria's roads safer

The Australian and Victorian governments are trialling innovative new technologies to help reduce death and injury on regional roads in Victoria.

In a first for regional Victoria, LED tactile pavings will be installed at pedestrian crossings in Bendigo and Trafalgar, with trials of glow-in-the-dark line marking and signage, and high reflectivity paint also being rolled out at locations across the state.

Deputy Prime Minister and Minister for Infrastructure, Transport and Regional Development Barnaby Joyce said one life lost on Australian roads is one too many.

"That's why the Australian Government has committed \$3 billion for the nationwide Road Safety Program," the Deputy Prime Minister said.

"Our Government is committed to keeping our communities safe, while securing our economic recovery.

"The funding supports the fast roll-out of life-saving safety works on rural and regional roads, and is another example of the Australian Government working to reduce the number of Australians missing around the dinner table due to tragedies on our roads."

Victorian Minister for Roads and Road Safety Ben Carroll said driving down road trauma and ensuring more Victorians make it home safely every day was at the core of the Victorian Government's Road Safety Strategy 2021–2030.

"Whether it's mandating seatbelts or legislating random breath tests, Victoria has always been at the forefront of road safety with a track record in leading the introduction of lifesaving road safety initiatives," Minister Carroll said.

"We're investing in better and safer infrastructure which includes looking at new and innovative ways to create a safer road environment for motorists and for overrepresented groups including pedestrians." Assistant Minister for Road Safety and Freight Transport Scott Buchholz said road safety was a key priority for the Australian Government and this investment in road upgrades would provide a boost to the economy while ensuring Victorians can get home sooner and safer.

"Making our roads safer is a critical component of our work to reduce deaths and serious injuries on our roads and move towards achieving vision zero – that is zero deaths or serious injuries on our roads by 2050," Mr Buchholz said.

"We are also investing significantly in other life-saving road safety initiatives including the Black Spot Program, Targeted Road Safety Works initiative and Road Safety Innovation Fund.

"This additional funding complements that work, resulting in an even greater roll out of improved infrastructure and roads right across the nation."

The in-ground LED tactile paving being installed in August at pedestrian intersections in Bendigo and Trafalgar, changes colour to match the red/green phases of the pedestrian signals. This provides a clearer signal for pedestrians, including those looking down at the road or on their phone, when it's safe to cross the road.

Glow-in-the-dark (photo-luminescent) line markings or signage is being trialled on roads in the east, south west and north of the state, and on a shared user path in Bendigo, from September. It looks and functions like ordinary line marking in daylight but emits stored light enhancing its visibility to road users when dark.

High reflectivity paint, which stays brighter for longer and is more durable, is being trialled on roads in Gippsland and the south west of the state to test its long-term effectiveness.

## WA Government crackdown on impaired drivers

From July 1, for the first time, Western Australian drivers caught with both alcohol and drugs in their system are being charged with the new offence of driving with a blood alcohol content of or above a particular level with a prescribed illicit drug in oral fluid or blood. Western Australia is only the third State to introduce a specific 'poly' offence for driving while affected by a combination of alcohol and drugs.

A driver who records a blood alcohol reading in excess of 0.05 and tests positive to drugs will have their licence disqualified for a minimum of three months and face a maximum fine of \$1,900 for a first offence. Repeat offenders could face a mandatory licence disqualification for life and fine of up to \$11,250 for driving under the influence of alcohol and drugs.

Penalties for existing, stand-alone drink and drug driving offences have also increased by a minimum of 1.5 times the previous penalty. The penalty for refusing to comply with a direction from police to provide a breath or saliva sample for testing has more than doubled.

Western Australian Police and Road Safety Minister Paul Papalia said that impaired driving is a major contributor to road trauma in Western Australia.

"We are determined to take dangerous drivers off our roads and make our roads safer for all road users," he said.

"We have invested significantly in increased enforcement and now we are introducing these tougher penalties," the Minister added.

The increase in penalties reflects the seriousness of driving while affected by drugs or alcohol. Last year there were 42 road fatalities where alcohol was suspected to be a factor.

The Road Safety Commission has developed a road safety campaign to educate the community on the new impaired driving offences and penalties. The ads are running State-wide on TV, radio, and digital platforms.



Aussic Pumps

## EARTHMOVING ... KEEPING IT CLEAN

ussic humps

One Australian pump and pressure cleaner manufacturer that understands the earthmoving business better than any other is Aussie Pumps. With some of the key executives having had a lifetime of being associated with big equipment, they understand the pressures, the opportunities and most of all, the challenges facing earthmoving contractors and their operators on a daily basis.

One of those challenges is maintenance, and the fact that efficient maintenance depends on the overall condition and cleanliness of machine.

The company, widely regarded as Australia's leading manufacturer of engine drive high pressure water blasters up to 500 bar, has built machines tough for this industry.

#### A CLEAN MACHINE MAKES SERVICE EASY

Nobody wants to have to battle through built-up oil and dust caked over an engine or transmission before they can start to do any disassembly or repair. What's worse, often you can't even see where the issue is, whether it's a leaking o-ring or major seal that is the problem. Australian Pump has developed a ure cleaners just for

great range of pressure cleaners just for these types of applications. The heavy duty steam cleaners and hot wash machines are capable of blasting off greasy, dusty surfaces, making it easy to identify the source of the problem.

The company recently introduced a new 4,000 psi steam cleaner that is designed specifically for tough jobs in earthmoving.

"We know that earthmovers need to have reliable machines in their wash bays," said Aussie Pumps Chief Engineer, John Hales.

"The reason we developed the *Aussie Admiral 4,000* was to not only provide 130°C steam capability, but also the impact of 4,000 psi to blast off caked on dirt fast!"

The new 4,000 psi machine is built like a tank and designed for Australian conditions. Mounted on a steel chassis with stainless steel cover, the machine boasts four rubber tyred wheels for stability and manoeuvrability.

The heavy duty coil comes with a two year warranty and a top quality slow speed triplex pump with brass head and ceramic pistons is standard equipment. The motor, four pole IP56 1450 rpm is designed for reliable long life performance.

Other major features include an 18 litre diesel fuel tank that provides long running time, especially when the operator runs it at 90° – 100°C.

"We've seen operators who want to run these machines at 130 degrees continuously! Apart from using a lot of fuel, that has a tendency to cook internal components like switches, creating potential premature failures," Hales said.

The machines all feature a steel bumper for extra protection and a flexible coupling between the motor and the pump for a smoother, cooler drive.

#### PROTECTION PREVENTS FAILURE AND REDUCES COSTS

The Aussie Admiral 4,000 is also geared to protect the machine and the operator. Each machine is fitted with a low water cut out warning light, a low fuel sensor and warning light. The unit also features Timed Total Stop, an automatic shutdown device which switches the machine off a few minutes after the operator closes the gun. A Safety Thermostatic to protect the pump is also included as well as Micro-Leak Detection with warning light.

"Aussie Pumps knows that for operators working in what can be a wet environment, it's easy not to see a leak, even a small one, under those conditions," said Hales. "The Micro-Leak Detection warning light tells you something is wrong and to stop the machine and fix the leak before continuing."

#### HIGH PERFORMANCE MOBILE STEAM SOLUTION

Need mobile steam? Try Aussie's *Heatwave*. This Honda petrol engine powered machine delivers 4,000 psi at 130°C steam and comes at a bargain price in stainless steel frame for only \$10,820.

Best of all for operators, the machines are Class A, and therefore do not require operator certification. Earthmovers and truck operators who want to move dirt fast, where time is everything and every second counts, will appreciate Aussie's complete range

Further information is available in the Aussie Pumps *Blaster Blitz 6*, which is available for download from **www.aussiepumps.com.au** (see the Hot Water section for a world of heavy duty cleaning gear designed just for Aussie contractors and operators).

# THE CHOCE BANGE OF MODELS

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

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# **INFINITY TESTING**

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

NO RELIANCE ON ROLL-AHEAD DURING AN IMPACT

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

### 'WORST CASE' SCENARIO TESTING

Compared to standard testing with an unrestrained host vehicle, Infinity Testing is a much tougher testing regimen. It is considered 'worst-case scenario' testing which makes it much more difficult to meet the pass criteria for IS values, as all of the Ridedown Acceleration must be provided by the TMA absorbing the energy from the impact. TMA ABSORBS & DISSIPATES 100% OF THE IMPACT ENERGY Testing the TMA on a host vehicle which is anchored

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

## **NO UPPER LIMIT FOR HOST VEHICLES**

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







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## THE ULTIMATE TEST OF ATTENUATOR PERFORMANCE

## **HOW IT'S DONE**

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



## WHAT ABOUT ROLL-AHEAD DISTANCES?

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

### Scorpion<sup>®</sup> II TL-3 TMA

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

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

### Scorpion<sup>®</sup> II METRO<sup>®</sup> TL-2 TMA

Crash Test: MASH Test 2-53 Impact Angle: 9.9 Degrees Roll-Ahead Distance: 12.4m Impacting Vehicle Weight: 2295kg Impact Speed: 81.6km/h



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## MEETINGS A SUCCESS DESPITE COVID

In the past, National Precast members' meetings consisted of a formal lunch, dinner and conference. Then COVID-19 hit, forcing a rethink of how the precast industry's peak body brings together its members.

According to National Precast's CEO Sarah Bachmann, restrictions on travel and a hesitancy to unnecessarily travel interstate prompted a rethink about how best to continue what is one of the most valued services for our members.

Over the last year, the organisation has worked on improving the value and variety of membership events with local and increasingly casual, open gatherings that allow members to visit factories, develop new relationships, network with peers and discuss industry issues. It has also allowed members to bring along more staff, removing the cost impediment of interstate travel.

"The revised event format has seen precast manufacturers take the lead of the conversation, ensuring the topics discussed are relevant and exciting," comments Bachmann.

Throughout the first half of 2021, National Precast has hosted four member events - in Perth, Newcastle, Melbourne and Adelaide respectively. Each of these events have recorded the record numbers of attendees, despite the complications of COVID-19. Despite being intended as local events, several members have taken the opportunity to travel where able.







Perth - the first event of the year held in March - had a focused discourse around some potential items for discussion with Main Roads WA. Since then, the authority has been consulted and a meeting process initiated. At the same time, the event provided a friendly space in which both members and prospective members were able to mingle. It also provided Bachmann and the organisation's Communications Coordinator Kate Moore, with an opportunity to update members on other matters and to visit the factory of one of the Association's newest Master Precaster members, BGC Precast.

Later that month, a similar event was hosted in Newcastle consisting of once again a member lunch, and as well, a tour of local Master Precaster member Waeger Constructions factory. Matt Press, Director of the NSW Office of the Building Commissioner attended the event and brought members up to speed with the impact the Office was having on non-compliant construction in the state.

The Melbourne event was hosted in early May. This time, the member lunch was preceded with an exclusive guided tour of Master Precaster Hollow Core Concrete's Laverton factory.





Adelaide, the home of National Precast's office, was host to the latest member event. Due to COVID-19 restrictions remaining a harsh reality, the planned tour of the S.A. Precast factory was unfortunately cancelled. The scheduled member lunch proceeded however, which - like the previous events - gave members an opportunity to discuss the latest industry news and network with peers.

Hosting local member events in various locations around the country allows the Associations' member base a variety of events to choose to attend. As some members have representatives in multiple states, this allows all members an opportunity to attend their preferred event location.

National Precast's members have responded well to the shift from formal national events to casual local meetings throughout the last year, with increased event attendances from prior years. Local events will continue, with national events being reduced in number as COVID-19 is better under control and travel restrictions eased.

The next event has been scheduled for the end of August to be hosted in Launceston, Tasmania, where National Precast is excited to showcase Hudson Civil's precast factory with a member-only tour. The tour will be followed by lunch.

## The Road to Relevant Research

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 $\sqrt{\Box}$ 







widened up the ability of Master Precasters to deliver architectural solutions to the market.

"Traditionally, architectural precast was considered to be only available from a few, regarded as precast that had integral oxide colouring or an applied finish such as polishing," Bachmann comments.

"Architectural precast has become a whole lot more accessible and varied, with almost any quality precaster able to achieve this extended range of architectural finishes. Using a formliner or custom mould for texture, combined with an infinite stain colour palette that is now available to specifiers, really offers so much more. Colours can be solid or translucent colours and metallics are an option too."

Adelaide's Entertainment Centre as well as Sydney's Sky Train and Top Ryde Shopping Centre all boast Nawkaw Australia stains. The stains can be used for colour correction as well, and deliver a 25 year warranty against fading.

ecotio2® has a more recent presence in the Australian market with coatings that keep structures looking new while they purify the air. They are also ISO accredited for anti-viral and anti-bacterial protection.

"With so many amazing precast structures in this country, no-maintenance solutions are essential to keep them looking new. Plus, we need to look after the environment too and protect against COVID-19. These coatings are a game changer," adds Bachmann.

"It makes perfect sense that the two brands have combined under the ECOTONE™ label, a truly Australian solution to simplify a brilliant value-add to the already superior precast product manufactured by our Master Precasters."



## ECOTONE: // COLOURING YOUR WORLD

#### A NEW TAKE ON COLOURED PRECAST HAS HIT THE MARKET.

Combining two already available product lines - Nawkaw Australia stains and ecotio2® environmental self-cleaning coatings -ECOTONE™ will deliver a truly local solution to colours and coatings in Australia. The company claims its point of difference as bringing to life a structure's internal and external surfaces.

Both brands have a solid history in Australia, with Nawkaw Australia stains being widely specified across architectural and civil projects.

National Precast's CEO Sarah Bachmann

affirms the Nawkaw Australia product as having





**Australian Government** 

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Lateral restraint blocks made of custom-fabricated high density polyethylene PE 100 blocks can safeguard suburban and highway concrete bridges against earthquakes and radical structural movement.



## **COST-EFFICIENT POLYMER SHOCK BLOCKS OFFER 100 YEARS OF CONCRETE BRIDGE PROTECTION AGAINST EARTHQUAKES**

Lateral restraint blocks made of an engineering plastic that typically retains most of its strength over 100 years are being produced by Hercules Engineering to safeguard suburban and highway concrete bridges in Australia and New Zealand against earthquakes and radical structural movement.

The custom-fabricated high density polyethylene PE 100 blocks are used as sacrificial elements so concrete components will remain preserved instead of grinding on one-another, says bridge bearing producer Mr David Booty, Manager of Hercules Engineering (a division of Cut To Size Plastics).

Apart from minimising sliding wear, HDPE blocks can also minimise the impact of shock by deforming and absorbing the kinetic energy that could otherwise fracture or destroy single span beam bridges spanning creeks, hollows and smaller obstacles, potentially causing accidents, human casualties, disrupting vital communications and costing time and money to restore, Mr Booty said.

According to Australia's Seismology Research Centre, an earthquake exceeding magnitude 7 occurs somewhere in Australia every 100 years or so, while nations on the Pacific "Ring of Fire" earthquake zone (including New Zealand, SE Asia, Japan and the American West Coast) experience them far more regularly, sometimes several a year. Even relatively smaller earthquakes – such as the magnitude 5.6 Newcastle earthquake – can cause extensive damage to bridges and infrastructure. The 6.3 magnitude Christchurch earthquake was one of New Zealand's worstever disasters, because it also struck close to a populated area.

"Bridge builders – including public works and private enterprise – are very aware of their Duty of Care to safeguard their structures' safety, so we had approaches to see what we could recommend as the best long-term, simple and cost-efficient solution. It turned out the PE100 blocks were not only the best polymer available for the job, but also one of the least expensive," said Mr Booty, whose company produces a range of bridge bearings that are in strong demand as bridges cope with the expanded loads they have to carry on public and private roads, including those serving resource, construction and civil engineering sites. The easily handled and installed PE100 virgin grade HDPE blocks – the latest order for which was 200x200x40mm blocks for a Sydney suburban bridge – are made from the same long-life material from which HDPE water pipes are made.

This well researched long-life material has been tested by the International Technical Committees responsible for ISO and EN standards. HDPE can be welded, does not absorb moisture, does not crack when water is frozen solid inside and can tolerate deformations without cracking. PE 100 can retain 60 per cent of its mechanical strength at average ambient temperatures of 20oC for up to 100 years and potentially more, depending on the application.

Even higher performance composite materials are available from Hercules Engineering, which also produces Stainless Steel–PTFE–Elastomer Bearings to enable concrete and steel structures to flexibly, quickly, and cost-efficiently cope with internal movement and stresses caused by changing loads, vibration, thermal expansion, and other common additional factors. David Booty (right) with Laurie Green, the Managing Director of Cut To Size Plastics, of which Hercules Engineering is a division. The company has installed some of Australia's most efficient and versatile engineering plastics technology to produce precision plastics components.



One solution developed by Hercules Engineering comprises the range of nomaintenance, cost-efficient Herculon Type D Bearings (HLD/SG, HLD/FF & HLD/FX), which are widely proven on applications complementing the PE100 blocks, ranging from steel and concrete beam engineering is essential, including piping, bridge blocks and tanks for water and processing fluids.

structures through to materials handling and processing facilities. Herculon HLD bearings are part of a comprehensive range of Hercules composite sliding joints and structural bearings incorporating high performance combinations of engineered composite materials and stainless steel facing surfaces.

#### **ABOUT HERCULES ENGINEERING**

Hercules Engineering has provided costefficient sliding joints and bearings to help protect and extend the longevity of landmark buildings and major industrial structures in Australasia, the Asia-Pacific and Africa.

Australia's Hercules Engineering - the producer of Hercules<sup>™</sup> composite sliding joints and Herculon<sup>™</sup> structural bearings has provided long-lasting product for use in structures as diverse as the Sydney Opera House, the Hang Seng bank in Hong Kong, Australia's New Parliament House in Canberra and the world's largest copper mine, Kansanshi, in Zambia.

The company provides sliding joint solutions for optimum cost-efficiency and durability for buildings ranging from hospitals and shopping centres, carparks, transport terminals, office towers and warehouses through to factories, storage tanks, silos, boilers, bridges, industrial and resources plants.

Hercules Engineering can provide technical advice for technologies required for different types of structures located across areas of widely differing climatic and geographic diversity, ranging from the arid Australian Outback to Africa, Melbourne to Brunei, tropical and maritime.

For further information, please contact Mr David Booty, Manager, Hercules Engineering (a division of Cut To Size Plastics) T: 61 (0)2 9681 0400, E: davidb@cuttosize.com.au





Transition Test #3 for 2270kg Ute



Transition Test #1 for 900kg Sedan The DOLRE bridge traffic barrier development demonstrates how the incorporation of FEA into the design process can optimise a solution that is vastly different from the solutions that traditional Engineering methodologies would produce.

A problem was identified and through the iterative use of FEM combined with Eurocodes for structural analysis a solution was found and optimised that was vastly different to the direction that traditional engineering was leading.

Once the bridge barrier design was optimised, the same process was used to assess **transition designs** to various European roadside barriers in accordance with EN1317 and TR16303-2011 requirements.

Australian authorities required product assessment to Australian bridge standards. Future finite element modelling in accordance with MASH standards and NCHRP179 validation requirements satisfied ASBAP's analysis for both traffic barrier and transition designs.

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## Improving the Behaviours of Expansive Soils Using Recycled Tyres

A. Taheri and M. Saadat - The University of Adelaide, South Australia; A. Soltani - Federation University, Victoria; and N. Dastoor - City of Charles Stuart, South Australia.

Finding solutions for the use of 'end of life' tyres presents significant challenges Australia-wide, with a range of organisations looking closely into how we can increase the use of locally derived tyre products in public works, including in road construction.

A field trial was recently conducted by the City of Charles Sturt in South Australia, the University of Adelaide, and the Downer Group. The trial investigated the benefits of using a soil and ground rubber mix as road sub-grade, to reduce swelling and the resulting cracking and failure on reactive clay soils.

Trial results showed that ground rubber inclusions were able to control the soil's swelling potential, and that the higher the ground rubber content, the higher the reduction in swelling. Coarse crumbed rubber consistently outperformed medium or fine crumbed rubber, but strength reduced beyond 5% ground rubber content. This indicates optimal benefits from the use of 5% coarse ground rubber in a soil mix for this purpose.

The trial concluded that soil/ground rubber blend can be used as a reliable subgrade material in road construction projects.

The following is an excerpt from the study which reports the results of an experimental investigation into the use of ground rubber (GR) products, at varying contents and sizes/gradations, as a sustainable solution towards improving the inferior geotechnical attributes of a subgrade clay deposit located in Adelaide, South Australia.

#### INTRODUCTION

In arid and semi-arid climates, the design and construction of infrastructure are often adversely affected by the presence of expansive/reactive soil deposits. A notable fraction of expansive soils consists of active clay minerals, such as montmorillonite, which are highly susceptible to seasonal fluctuations, and undergo significant expansion or contraction upon the addition or removal of water (Soltani et al. 2019a).

The consequent cyclic increase and decrease in soil volume results in foundation distortion and wall cracking, and in the case of road infrastructure, undulating and cracking of pavements and embankment slumping. These issues are costly to maintain and repair, and also compromise road safety (Jones and Jefferson 2012). Accordingly, these adversities demand engineering solutions to mitigate the associated socioeconomic impacts on human life.

The geotechnical engineer can either complete the design within the limitations imposed by the expansive soil or preferably alleviate the soil's adverse behaviours employing soil stabilisation techniques. The term "stabilisation" refers to any physical, chemical, biological or combined practice of altering the soil fabric to meet the intended design criteria (Winterkorn and Pamukcu 1991; Soltani et al. 2017).

Conventional stabilisation practices often suffer from sustainability issues, attributed to high manufacturing and/or transportation costs, as well as environmental concerns due to greenhouse gas emissions. A sustainable soil stabilisation scheme can be characterised as one that maintains a perfect balance between infrastructure performance and the social, economic and ecological processes required to maintain human equity, diversity, and the functionality of natural systems.

The transition to sustainable stabilisation warrants incorporating solid waste materials as an "additive" or "reinforcement" to expansive soils, while opting for nonconventional, environmentally-friendly chemical binders for further enhancements.

Discarded tyres are among the most significant and problematic sources of solid waste, owing to extensive production and their durability over time; for instance, annually, around 0.5 million tons of scrap tyres are stockpiled in Australia, annually (Li et al. 2018). Quite clearly, discarded tyre rubber materials are not desired at landfills, owing to their low mass to-volume ratio, resilience, and the fact that they are rarely "flat-packed".

These adverse characteristics, from a landfill perspective, also make them one of the most reusable waste materials for soil stabilisation practices. This is because, the rubber is resilient, lightweight, and possesses a rough surface texture. The latter, its rough surface texture, may potentially promote adhesion and/or induce frictional resistance at the soil rubber interface, and thus alter the soil fabric into a unitary mass of enhanced strength resistance.

The use of recycled tyre rubbers in geotechnical engineering dates back to the early 1990s, where theoretical concepts

governing the mechanical performance of soil-rubber blends were put into perspective.

Much like fibre-reinforced soils, the rubber particles randomly distributed in the soil matrix and when optimised in content and geometry (i.e., size/gradation and shape), enhance the inferior engineering characteristics of the host soil. The literature from this era, however, was mainly geared towards coarse-grained soils. As such, the rubber's capacity of improving the adverse behaviours of finegrained soils, and expansive clays, in particular, remained rather vague.

Ever since, several studies have documented the effects of rubber reinforcement, with and without cementitious binders, on the physical and mechanical behaviours of expansive clays. The clay–rubber amending mechanisms can be attributed to the rubber content, with higher contents often producing a more pronounced reduction in the swelling capacity. Moreover, the rubber's geometrical features may also play an important role, and thus demands further investigation.

This study reports the results of a comprehensive experimental investigation, as well as a subsequent field trial, into the use of ground rubber (GR) products, at varying contents and sizes/gradations, as a sustainable solution towards amending the inferior geotechnical attributes of a subgrade clay deposit from a local road located in Adelaide, South Australia.

#### **TESTING PROGRAM**

The experimental program was carried out in two phases:

- a) The first phase involved investigating the soil's physical and mechanical properties by means of conventional laboratory tests
  namely, Atterberg limits (i.e., liquid and plastic limits, and plasticity index), grainsize distribution (i.e., sieve and hydrometer analyses), standard Proctor compaction, and sediment volume (to measure the free swell ratio) tests. The results obtained from this phase were analysed to classify the soil in terms of its plasticity, mineralogy and degree of expansivity.
- b) The second phase involved investigating the effects of GR inclusion, in terms of both content and size, on the soil's compactability, shear strength and volume change behaviours. A total of seven soil-GR mix designs, consisting of one control (i.e., natural soil) and six GR-blended cases (at two GR contents and three GR sizes/gradations), were examined. This phase consisted of standard Proctor compaction, unconfined compressive strength (UCS) and oedometer swell tests. The results obtained from these three tests were then carefully analysed, and cross-checked with each other, to arrive at the optimum GR content and size.

#### **EXPERIMENTAL RESULTS**

Effect of GR on Soil Compactability Figures 1a and 1b illustrate the variations of optimum moisture content and maximum dry unit weight, obtained in accordance with the standard Proctor compaction test (ASTM D698–12), against GR content for the natural soil and various GR-blended samples, respectively. For any given GR size/gradation, the greater the GR content, the lower the optimum moisture content and the maximum dry unit weight, both following a monotonically decreasing trend with respect to GR content. Similarly, for any given GR content, an increase in GR size led to a further, yet slightly less pronounced, decrease in the soil's compaction characteristics.

## EFFECT OF GR ON MECHANICAL PROPERTIES

#### Effect of GR on Soil Compactability

Figure 2a (shown on the following page) illustrates the variations of UCS, obtained as per ASTM D2166–16, against GR content for the natural soil and various GR-blended samples. For any given GR size, the greater the GR content, the higher the developed UCS up to 5% GR, beyond which the GR material was found to adversely influence strength development in the matrix while still maintaining a notable advantage over the natural soil. The only exception was 10% GR A (the fine rubber), which exhibited a lower UCS value compared with that of the natural soil.

In terms of GR size, the addition of GR C, the coarse rubber, was found to consistently outperform the medium and fine rubber variants. The samples blended with 5% and 10% GR C resulted in UCS values of 248.5 kPa and 193.7 kPa, respectively. In other words,



Figure 1. Variations of (a) optimum moisture content  $w_{opt}$ , and (b) maximum dry unit weight  $\gamma_{dmax}$  against GR content for the tested samples.

the soil's strength is improved, respectively, by almost 100% and 50% when mixed with 5% and 10% GR C.

Figure 2b illustrates the variations of axial strain at failure Eu, a measure of the material's ductility, against GR content for the natural soil and various GR-blended samples. For any given GR size, the greater the GR content, the higher the axial strain at failure and hence the more ductile the sample's response to unconfined compression, attributed to GR's higher deformability compared with that of the soil grains. Similarly, the larger the GR size, the more ductile the sample's response to unconfined compression.

The elastic Young's modulus, denoted as Es, is a measure of the material's stiffness in the elastic compression domain (lyengar et al. 2013). In general, the variations of Es, as shown in Figure 2c, exhibited a trend similar to that observed for the axial strain at failure; however, in an adverse manner. The greater the GR content and/or GR size, the lower the developed stiffness, attributed to GR's inherent lower stiffness compared with that of the soil grains.

#### Effect of GR on Swelling Potential

Figure 2d illustrates the variations of swelling potential SP, obtained as per ASTM D4546–14 under a nominal overburden stress of 7 kPa, against GR content for the natural soil and various GR-blended samples. For any given GR size, the greater the GR content, the lower the swelling potential, following a monotonically decreasing trend. Similarly, for any given GR content, an increase in GR size led to a further, but marginal, decrease in the swelling potential. In addition to the two amending mechanisms "interfacial frictional resistance" and "mechanical interlocking", the swelling potential is also a function of the soil's expansive clay content, with lower contents exhibiting a lower tendency for swelling.

Consequently, an increase in GR content substitutes a larger portion of the expansive clay content with non-plastic, hydrophobic GR particles, thereby leading to a further decrease in the swelling potential.

The swelling potential can be employed to specify the soil's degree of expansivity. The natural soil can be classified as "highly expansive" based on the classification framework suggested by Seed et al. (1962). The use of 10% GR A, B and C led to an improved "moderately expansive" classification.

#### **FIELD TRAILS**

The optimum soil–GR mix design was applied to stabilise a subgrade clay deposit from a local road located in Adelaide, South Australia. The total length of the project area was 210 m, and it was divided into



Figure 2. Variations of (a) UCS  $q_{u}$ , (b) Axial strain at failure  $\varepsilon_{u}$ , (c) Elastic Young's modulus  $E_s$ , and (d) Swelling potential  $S_P$  against GR content for the tested samples.



three different zones, each having a length of approximately 70 m. The GR stabilisation technique was implemented in two zones using a GR content of 5% (i.e., Zones A and C). The third zone, Zone B, in the middle of the road, was repaired by changing the asphalt layer. Zone B served as a control area for short- and long-term comparisons.

The main objective of this field practice was to assess the feasibility of the GR stabilisation solution in terms of field implementation - that is, to understand the possible issues that may be encountered when mixing GR with the soil subgrade. It was observed that by implementing common paving practices, the GR particles can be mixed with the soil in a uniform manner - that is, potential mixing issues such as segregation and its adverse effects on compaction were not observed.

Dynamic cone penetration (DCP) and field density tests were also performed on the base material. The results of field investigations demonstrated that the soil– GR could be used as a reliable subgrade material for road construction projects.

#### CONCLUSIONS

 As a result of GR inclusion, both the maximum dry unit weight and the optimum moisture content exhibited a monotonically-decreasing trend with





Field application of GR: (a) Spreading GR on the existing soil; (b) Mixing GR and the existing soil; (c) Adding lime to the soil–GR mixture; (d) Multi-wheel roller operating after completing the mixing process; (e) Vibrating drum roller operating at a high frequency and a low amplitude; (f) Smoothdrum roller operating at a high wheel pressure; (g) Spreading the PM2 material on the soil–GR–lime layer using a grader machine; (h) Compacting the base with a vibrating drum roller; (i) The road view after compaction of the base; and (j) Laying the asphalt layer on the road.

increasing the GR content. Similarly, for any given GR content, an increase in GR size led to a further decrease in the soil's compaction characteristics.

2. For any given GR size, the greater the GR content, the higher the developed UCS up to 5% GR, beyond which the dominant GRto-GR interaction (i.e., rubber-clustering) adversely influenced the blended samples' UCS while still maintaining a notable advantage over the natural soil. The sample stiffness, however, manifested a monotonically-decreasing trend with GR content. Similarly, for any given GR content, an increase in GR size promoted a notable increase in the UCS and a decrease in stiffness.



- 3. As a result of GR inclusion, the swelling potential exhibited a monotonically decreasing trend with increasing the GR content. Similarly, for any given GR content, an increase in GR size led to a further, yet less pronounced, a decrease in the soil's swelling capacity.
- 4. The GR material, at its optimum 5% content, was used to stabilise a subgrade clay deposit from a local road located in Adelaide, South Australia. It was concluded that by following standard paving practices, the GR particles can be mixed with the soil in a uniform manner, and potential mixing issues such as segregation and its adverse effects on compaction were not observed. This field

application demonstrated that the soil-GR blend can be used as a reliable subgrade material in road construction projects.

#### ACKNOWLEDGMENTS

The authors would like to acknowledge Green Industries SA for funding this project. The authors also wish to thank Paul Morgan from Pavement Asset Services Pty Ltd and Downer Group for their assistance in collecting soil samples, providing rubber samples and also for supporting the field work, as well the South Australian EPA and the SA Department for Infrastructure and Transport for their technical input and assistance with the project. Finally, the aid of PhD students Victor Zhao and Masoud Manafi in undertaking the experimental work is acknowledged.



## BRP ROAD PATCH Prefabricated Bitumen Rubber Bound Seals





ROAD MAINTENANCE

#### SEALING UTILITY REPAIRS





**BRIDGE MAINTENANCE** 

TRAFFIC CALMING

## **FEATURES & BENEFITS:**

- Simple application with standard emulsion
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## **ROAD MAINTENANCE**

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



#### **Early Intervention**

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





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



### **BRIDGE MAINTENANCE**

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







### **Bridge Joints**

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

### **Deck Sealing**

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

### **Minimal Disruption**

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

## SIMPLE INSTALLATION PROCEDURE REQUIRING MINIMAL LABOUR AND TOOLS



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



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



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



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



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## NEW DATE ANNOUNCEMENT FOR THE 2021 AUSTRALIAN PAVEMENT RECYCLING AND STABILISATION CONFERENCE

AustStab is very pleased to announce the revised dates for its *Australian Pavement Recycling and Stabilisation Conference* and associated activities. This follows its earlier decision to postpone these events due to the evolving and ever-changing COVID-19 situation across Australia and in particular the Sydney region. Although disappointing, it was a necessary decision for the safety and wellbeing of all involved as well as the uncertainty around timing of lockdowns and border closures/restrictions.

#### The new dates are:

#### Tuesday, 19th October 2021

 Golf (details to be confirmed) and Informal dinner - Novotel Brighton Beach -Sponsored by Wirtgen

#### Wednesday, 20th October 2021 at the Novotel Brighton Beach, Sydney

- Australian Pavement Recycling and Stabilisation Conference (commencing at 8:30am AEDT)
- AustStab Gala Dinner and Awards Night Sponsored by Caterpillar (commencing at 7:00pm AEDT)

The **2021 AustStab Annual General Meeting** will be conducted online on Wednesday, 18th August 2021 at 10:30am AEST – for more information and to register, please visit: https:// www.auststab.com.au/conference-and-agm/

AustStab is actively monitoring changing COVID-19 requirements. The Australian Pavement Recycling and Stabilisation Conference will be held in compliance with all COVID-19 requirements that are in place at the time it occurs.

AustStab acknowledges and thanks all those who took the time and effort to submit presentation proposals and Awards nominations. AustStab will be in contact to advise all presenters, Awards finalists and registered delegates of the changed arrangements. The theme of this one-day technical conference is Pavement Recycling for Sustainable Roads and will cover research outcomes, stabilisation for Local Government, construction excellence and sustainability.

The 26th Anniversary of AustStab gives us the opportunity to recognise the unique nature of AustStab as an organisation and to focus at our conference on the important attributes of sustainability and resilience that are able to be delivered by pavement recycling and stabilisation processes.

This will be a conference not to be missed by anyone involved in pavement design and construction that has an interest in pavement recycling and stabilisation.

Following is an outline of the program and an interim list of presenters – these may be subject to change. The one-day conference will feature four speaking sessions and around 20 presentations, including:

- Implementation of foamed bitumen in Queensland – a 25 year journey, by Jothi (Rama) Ramanujam, Queensland Department of Transport and Main Roads
- A practical approach to rehabilitate thin existing pavements using base-grade stabilisation, by Scott Young, Stabilised Pavements of Australia
- Characterisation of fatigue performance of in-situ foamed bitumen stabilised pavements under ALF full-scale pavement testing, by Dr Didier Bodin, ARRB Group
- Sustainability assessment for innovative pavement materials, designs and processes, by Brook Hall and Louise Dutton, ARRB Group
- Design of foamed bitumen stabilised pavements for local government engineers, by George Vorobieff, Head to Head International
- Emulsion treated road base Bracalba

*Quarry case study,* by Iulian Man, Sami Bitumen Technologies

- Development of design procedures for lightly bound cemented materials, by Dr James Grenfell, ARRB Group
- Effects of 'hot storage and duration' on Class 170 binder properties and foamed bitumen stabilisation performance, by Damian Volker, Queensland Department of Transport and Main Roads
- Foamed bitumen stabilisation and the Airport Pavement Research Program, by Dr Greg White, The University of the Sunshine Coast
- Canberra Airport Taxiway Bravo extension, by Tim Jackson, Downer
- Industry partnerships in national recognised stabilisation operator training, by Marcia Kelly, THE Mining & IS Australia
- Case study: Northbourne Avenue, Canberra, by Alvaro Amorim, Transport Canberra City Services
- Circular Economy: Construction of an (almost) completely recycled road in Central Coast Council NSW, by Stuart Baverstock, Central Coast Council NSW (to be confirmed)
- Rehabilitation of 300 projects in the Campbelltown NSW LGA by pavement recycling and stabilisation to optimize service levels, by Mahbub Hossain, Campbelltown City Council
- Long-term performance of bound in-situ stabilised pavements in Richmond Valley Council NSW, by Steve Button, Richmond Valley Council (to be confirmed)
- Managing respirable crystalline silica risks for stabilisation works, by Rohan Davies, Queensland Department of Transport and Main Roads

For more information and to register, please visit: https://www.auststab.com.au/ conference-and-agm/







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## ITS SPECIAL FEATURE

Intelligent Transport Systems News and Feature Articles

## ITS AUSTRALIA'S MOBILITY 2021 HYBRID CONFERENCE OPEN TO DIGITAL ATTENDEES

ITS Australia will host *Mobility 2021* from 1-2 September 2021 at the Melbourne Convention and Exhibition Centre. *Mobility 2021* is Australia's leading event for the discussion of new mobilities, demand-responsive transport, and Mobility as a Service (MaaS). The event will be held with the support of Premier Partner, The Victorian Department of Transport. *Mobility 2021* is also sponsored by Cubic Transportation Systems, Kapsch TrafficCom Australia, NTT Data, Transurban and Intelematics.

Over the past 18 months, we have all witnessed tectonic changes in the needs of transport users across the globe. *Mobility* 2021 will specifically examine the effect of the pandemic upon the new mobility and transport technology spaces. The *Mobility 2021* program is designed by a committee of transport technology leaders representing government, academia and industry. The committee works collectively over several months to develop a substantive program addressing real-world challenges and opportunities. Like all of ITS Australia's events, *Mobility 2021* is designed by industry, for industry.

*Mobility 2021* will be held as a hybrid event, with all presentations and sessions live-streamed across a hybrid platform, allowing delegates from across Australia and worldwide to participate digitally. This platform is supplied by Delegate Connect, a leading global end-to-end software provider delivering hybrid and virtual events.

"ITS Australia's Mobility conference has continued to grow each year. During the most challenging part of the pandemic, 2020's virtual event served as an important forum for our industry to come together and exchange knowledge, experience, and lessons learned," said Susan Harris, CEO of ITS Australia.

"ITS Australia remains committed to enabling the full participation of delegates, regardless of whether they can physically attend the event. To that end, we are excited to deliver a robust and engaging hybrid event in September."

Held over two days and featuring two concurrent program streams, *Mobility 2021* will include presentations by more than 50 speakers. Andy Taylor, Senior Strategy Director for Cubic Transportation Systems, will review how MaaS and Mobility on Demand are being viewed, piloted, and implemented worldwide from a global perspective.

"Cities are facing dramatic changes in mobility with a resurgence in road congestion and public transport utilisation below that of previous years," said Mr Taylor.

"This changing paradigm gives us a chance to make mobility options for the future better for everyone. How do we reduce congestion, how do we provide better mobility options?"

Ishra Baksh, Executive Director (Mobility as a Service) for the Queensland Department

of Transport and Main Roads, will speak about the mid-2021 trial of a real-world Mobility as a Service (MaaS) solution launched at the University of Queensland for staff and students. Through iOS and Android smartphone applications, participants could plan multi-modal journeys, set up monthly transport bundles, access incentives and benefit from integrated private and public transport modes.

Subramani Samprathi, Enterprise Architect for NTT DATA Payment Services, will speak about the organisation's NFC Mobile Application Solution that will allow cardholders to use their mobile phone to top up their physical transit card.

Dale Andrea, Chief Information Officer Transport Services for the Victorian Department of Transport and Chris Bennetts, Head of Technology and Innovation for Transport NSW, will speak on behalf of the road agencies of Australia's two most populous states.



#### **ABOUT ITS AUSTRALIA**

Intelligent Transport Systems (ITS) Australia is the peak body for advanced transport technology in Australia. Formed in 1992, we have partnered with government, industry, and academia to shape future transport for more than 25 years.

Australia is a global leader in intelligent transport, and ITS Australia works on behalf of more than 130 member organisations to promote the development and deployment of technologies that enable all Australians to move more safely, efficiently, and sustainably through the nation's transport networks.

ITS Australia is an independent not-for-profit incorporated membership organisation. Affiliated with peak ITS organisations around the world, ITS Australia is a major contributor to the development of the industry across all public and private transportation modes: air, sea, road, and rail.

Our key activities include convening national and international conferences, facilitating dialogue between transport modes and across government jurisdictions, promoting

research and development, and supporting the export of Australian technologies. ITS Australia advocates the application of communication, data processing, and electronic technologies for in-vehicle, vehicle-to-vehicle, vehicle-to-infrastructure, and mode-to-mode systems to increase transportation safety and sustainability, reduce congestion, and improve the performance and competitiveness of Australia's networks. To find out more, please visit: **www.its-australia.com.au** 





## SKEDGO LAUNCHES PARTNERSHIP **TO ACCELERATE MAAS IN JAPAN**

Global Mobility-as-a-Service (MaaS) tech enabler SkedGo has partnered with Al Base Technology to accelerate seamless mobility development across Japan.

The new collaboratively built platform 'Fukurou GO' will predominantly target municipalities, prefectures, and transit agencies in Japan. SkedGo delivers the MaaS front end and tailored routing technology. Al Base's behavioural analytics capabilities, based on machine learning and artificial intelligence, provides deep data analysis to the platform hosts.

Korhan Saglam, Co-Founder & Chief Executive Officer at AI Base Technology G.K., says: "Fukurou GO is a new, ground-breaking mobility service platform for Japan, which integrates all available mobility models. Through innovative use of AI & human centric technologies and predictions, it helps ensure mobility for everyone in Japan.

"We are facing major changes in how people travel in Japan, due to megatrends such as urbanisation, population growth and decarbonisation. With Fukurou GO, we not only offer a public service, but also provide data services to analyse mobility trends. In partnering with SkedGo, we will combine our AI and data analytics technology with the best routing capabilities currently on the market."

John Nuutinen, CEO of SkedGo, says: "This is an exciting opportunity for us to enter the Japanese market together with an experienced and forward-thinking local partner. We hope to create a symbiotic relationship which delivers a superior user experience and value proposition to our prospective Japanese customers.

"MaaS has the potential to transform how we consume travel and given Japan's exceptionally well built public transport system, we think a leading-edge MaaS platform will do extremely well in the country."

#### **ABOUT SKEDGO**

SkedGo provides award-winning mobility-as-aservice technology – for start-ups, corporations and governments. Our senior developer team creates highly tailored and localised products leveraging our unique API, SDKs and white label solutions.

The result: organisations can rapidly create their own multi/mixed modal MaaS offering, including parking, book & pay features, events and itineraries as well as complete corporate mobility solutions.

For further information visit: www.skedgo.com

## SICE EXTENDS ITS COMMITMENT TO TRANSFORMING SYDNEY'S ROAD NETWORK

SICE recently announced a new contract awarded by CBP Ghella UGL (CGU) Joint Venture for the M6 Stage 1 tunnel and motorway to deliver the Operations Management and Control System (OMCS). This project extends SICE's long-term commitment to transforming Sydney's road network in partnership with the NSW Government, as the M6 Stage 1 connects underground into the WestConnex M8, also controlled by SICE's OMCS.

SICE is appointed to deliver its unique federated OMCS architecture that will allow for low risk, safe, staged construction of one of the longest underground networks in the world. This M6 Stage 1 tunnel and roadway will connect a federation of control systems in a seamless, fully integrated control room. This greater interoperability will allow faster and safer travel for Sydney motorists. SICE's scope for this project also includes software, control room hardware and master programmable logic controllers.

'By participating in this project, SICE's team feel proud to be part of the transformational road agenda in Sydney. SICE senior management is sincerely grateful to the NSW Government and CGU Joint Venture for trusting SICE with another step in Sydney's transport transformation journey.

SICE's team offers a low-risk solution by providing continuity of engineering skills improved from stage to stage from previously completed WestConnex projects, higher quality solutions, and innovative technology for the CGU Joint Venture and the NSW Government.'

The M6 Stage 1 proposes a multi-lane road link that aims to provide better connectivity to Sydney's south by shortening up to 15 minutes of motorist commutes in a safer, shorter, and reliable way.

This first stage will consist of an approximately four-kilometre twin tunnel that connects the WestConnex M8 at Arncliffe to President Avenue at Kogarah. The \$2.52 billion contract is expected to start construction in 2022 and be opened to motorists by the end of 2025. SICE is a systems integration technology company with extensive and comprehensive experience in over 60 locations worldwide. No two roads are the same, each with unique geometries and operating challenges. SICE's flagship product, SIDERA, is a highly configurable commercialoff-the-shelf technology to suit customers' unique roadways and requirements. SIDERA is a world-leading, fully integrated OMCS that allows road operators and maintainers to seamlessly manage the entire operation, surveillance, traffic management, and life safety equipment.

In Australia and New Zealand, SICE has successfully delivered its SIDERA OMCS in five projects – the M5 West in Sydney, the St Helena Tunnel between Tintenbar to Ewingsdale on the Pacific Highway, the WestConnex M4 East in Sydney, the WestConnex M8 in Sydney, and the Waterview Tunnel in Auckland New Zealand. SICE has a further three projects under construction – the WestConnex M4-M5 Link in Sydney, the WestConnex Rozelle Interchange in Sydney, and the West Gate Tunnel Project in Melbourne.

#### **ABOUT SICE**

SICE is a systems integrator company focused on providing value-added services by integrating different technologies and systems, own and third-party, aimed at offering the best-customized solution to meet the needs of its clients.

Its major contribution is in the field of technology expertise and professional experience gained from over almost 100 years' experience and the knowledge of more than 2,500 employees and 3.800 clients worldwide. SICE can deal with all phases of a project, from design and conception, installation and commissioning, to maintenance and operation.

SICE laid grounds in Melbourne in 2005, since then, it has continued to achieve growth and market shar within the ITS and Tolling industries in Australia and New Zealand.

For further information, please visit https://www.sice.com/en



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## Five Top Tips for Submitting an EOI or Tender

#### By Ian Hudson, Executive Director, Industry Capability Network NSW

Being busy isn't always being productive. If a you or your business development team are busily preparing expressions of interest (EOI) or submitting tenders without really considering the worthiness of it, you could all be wasting your time.

Here are some tips for people who want to make sure that their time is well spent with a reasonable chance of success, rather than having a shotgun approach of trying to hit anything. Of course, the first step is to understand your own business, but once you know this then you're in a much better position to make the right choices and present the business in the right light.

#### 1. Know the buyer

The number one tip is to know the buyer even before the EOI is called for, if that's possible. The more you know about the buyer, the better the chance that you'll be able to highlight the aspects of your business that the buyer is going to be interested in. So, try to meet the buyer, get on the mailing list, review the company's annual reports and get into the management's heads to fully understand where the company is now and where it's trying to go.

If the buyer is really of long-term interest to your company, then maybe you should consider also modifying your business to better match the requirements of the buyer or similar buyers. This could involve employing additional aboriginal companies or employees, if that is part of their direction. You might also consider ISO 9001 or other certifications to support your refined approach.

When you actually start writing your EOI (or responding to questions if it takes that form), you'll find that the request makes more sense if you know the buyer. This means when you respond you can take the context of the question and use that in framing your response so it appeals to the buyer's needs.

## **2.** Ask if the opportunity is a good one for your company

I remember clearly the moment when I realised that before charging down the road of responding to a tender or an EOI that I should stop and consider if the opportunity is really relevant for my company. You need to know if it's a good fit, because chances are that if it's not, then there are plenty of other companies that can provide the same solution, but would have a much stronger case to present. If there are hundreds of companies that can do it better than you, you are probably considering the wrong opportunities.

You need to get your business into a limited field so that you have a one in five

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or one and 10 chance of being considered. This might also just take geography into account. In some cases where you are located in relation to the requirement can be an important factor. So, if geography is relevant, will this favour your business over others or will it actually disadvantage you?

Also, in considering whether an opportunity right for your company, you need to consider the track record that you can present as part of your EOI or tender response. If you don't have a track record in an area where other people will, you will be at a severe disadvantage.

With an EOI where price is not even being considered yet, you can't even use low price to offset your lack of experience in the required area. Because price it is not relevant in an EOI, your capability and your professionalism are the key elements that need to shine.

## 3. Answer questions clearly and tailor your response

The third tip is getting the words right. The last thing a procurement person wants to do when they have a pile of EOIs or tenders to go through is to have to wade through words upon words to try and find your answer to a question. Keep your answers within the space or word count provided. And, of course, never ask the procurement person to look at external sources - they are not going to visit your website to find the additional information to support your response.

Sometimes you might have a capability that is not specifically requested, but it could strengthen your response. It's a good idea to include this in your EOI or tender, but you need to build a bridge from that capability to the buyer's needs and spell out how this is relevant and will benefit them. If you don't make this connection, all you have done is added more words.

Yes, there might be a lot of questions in an expression of interest, but each one has been prepared by the buyer for a reason. Savour each question, answer it fully, answer simply and let it stand alone as a description of your company's response to that question. It is true that sometimes a buyer will add questions or a prequalification form just to test your mettle. However, if you are not willing to cooperate at the EOI stage, how good a supplier partner will you be? No matter how difficult it is, if the work is right for you, you must answer and be totally cooperative with the buyer's requirements.

You should always tell the truth in your tenders or EOIs. While you always want to present your business in the best possible light, if you oversell to the point of contorting the truth, you're wasting the buyer's time. (And wasting your time.)

If you are submitting an EOI through a portal, such as the ICN Gateway, keep in mind that your capability profile will form part of your response. So, it's important to revise your profile each time you are submitting an EOI so that you understand how your capability profile will be seen from the buyer's perspective. You should make sure that your capability profile is up-to-date and reflects your business in the best possible light in the eyes of the buyer.

#### 4. Ask for feedback

The fourth tip you've probably heard before. However, many people don't do it. You should always seek feedback from the buyer, even though sometimes the buyer is unable to give it. If you do manage to receive feedback: listen carefully, don't be defensive and consider modifying your future responses to reflect the feedback. If you find the buyer is giving you responses that are vague and full of platitudes, try to probe deeper and give the buyer an opportunity to revisit your EOI without losing face.

You won't believe it, but sometimes they might try to give you an answer without having fully considered your submission.

#### 5. Keep on submitting

My final tip is don't submit just one EOI and then give up. This is a long-term game. Each time you prepare an EOI or a tender, you better understand your company, know how to present it in the best light and to how to write more succinctly. Most of all, you will find that you have certain answers to questions ready to go in future EOIs. You'll also get better at providing responses and delegating requirements to your team early, so that you don't leave things to the last minute.

Overall, if you know your business strategy, your markets and where you sit relative to the rest of your competitors, you can choose the right opportunities and shape your business to best suit those specific opportunities and create targeted responses for your most desirable customers.

#### About the Author

Ian Hudson is the Executive Director of Industry Capability Network NSW (ICN NSW). ICN NSW bring suppliers and project owners together by giving exclusive access to ICN Gateway, our powerful online database, and our extensive network of Industry Consultants. Our consultants actively work with project owners and suppliers behind the scenes to build the right procurement partnerships.



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There's much to marvel about the highways of Australia – not for the endless hours it takes to trek the expanses like the Hume, but the 1000's of long-haul trucks that travel daily from State to State on them.

It's the combination of highways, arterial roads and trucks underpinning Australia's economy and what is being carted aboard the 18-wheelers. And whatever the extent of the lauding, and the role trucks play in helping Australia's economy thrive, it's the infrastructure development and construction of highways that play an equally if not more critical part in Australia's economy.

The once dirt tracks and animal trails are now the conduits linking the tyranny of distance as the arteries to Australia's economic prosperity.

Building and strengthening the Australian economy also requires developing and maintaining more modern highways – roads that can cope with capacity which are efficient and open new routes to trade. Its helping to build a better path for Australia to an even brighter future, which fosters greater economic growth.

David Erczmann, General Manager, LinkSafe

Australia's highway construction sector prior to COVID once housed armies of engineers and contractors, but all that has changed how sites operate. COVID has manifested a different working environment.

Adapting to changing circumstances has meant civil engineering firms responsible for the construction and maintenance of Australia's roads and highways, have had to be nimble toward the management of contractors and project managers.

In the past, road construction firms have seen companies' sub-contract out work consistently, and not provide the necessary site and compliance tickets and information to company owners. It's been a dangerous practice that has the potential to leave company owners exposed to all forms of litigation and fines, with the potential of criminal prosecution hanging over them like the Sword of Damocles.

As for civil construction companies, their ability to weather storms of potential prosecution is far greater with the outcomes more devastating - making compliance even more critical.

Highway construction companies can vary on site staff numbers, and contractors quickly – making site inductions, and recording of compliance harder to manage and administer, especially if personnel changes are consistently frequent. Prequalifying may centre around a company's key competencies, ensuring they understand the high-risk work requirements, that they have the right insurances in place, demonstrate an element of competency, and the principles associated with the need for the right governance.

Its essential contractors are pre-qualified, if commercial construction companies are to ensure they capture contractor data, ask the right questions on safety matters, and have a system that captures ABN validity, interrogates the ASIC database for ABN currency, and monitors expiry dates for key insurances.

A company's responsibility being a PCBU is detailed, and can be found by clicking onto the link <u>https://www.safeworkaustralia.</u> gov.au/law-and-regulation/duties-underwhs-laws/duties-pcbu

Based on best practice principles, companies should have the ability to log in to their own portal and understand which of their staff are inducted prior to them being allocated work on construction sites - this means that time wasting is minimised.

It's important to understand which contracting entities are pre-qualified, which of their staff are inducted and which of their staff have the appropriate licences/ credentials to perform work. Having a system that can monitor expiry dates, send out email reminders as items approach expiry, and a system that can check validity on-site will save time, money, effort and mitigate legal liability.

Site project managers can scan people entering, confirming the company they work for is compliant, their inductions are within date, credentials and licences up to date and a fully searchable site register that can identify who has signed in, when they signed out along with a system that can be used to broadcast SMS messages.

There are many civil construction companies ill-equipped to have full-time on-site staff, however, that doesn't preclude them from using a system that can provide compliance data and statistics, imperative to having the right people, accounted for, on site.

Knowing when contractors are on site, how compliant they are, whether they are ticketed or not, means technology plays an even more critical role managing contractors. Systems with API technology are imperative. They allow flexibility for solutions to speak to one another, for example, API's bring data into finance; work order management solutions and work order dispatches can be dependent of a compliance status of a company.

Changing the parameters of how civil engineering companies adapt and operate means 'building a better path for Australia' to an even brighter future, and will foster greater economic growth for where prosperity will continue.



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