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APR/MAY 2022

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**CONSTRUCTION
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CIVIL ENGINEERING**

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**ACRS SUSTAINABLE
STEEL & PRODUCT
CERTIFICATION**

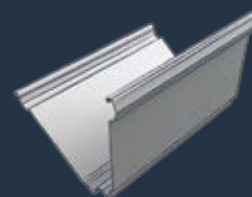




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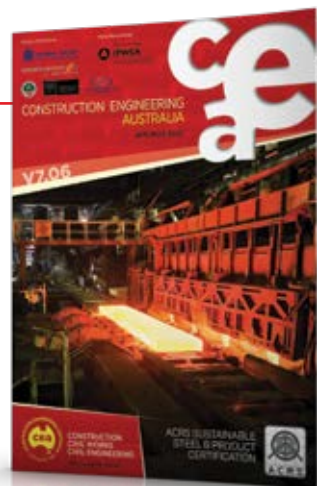
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About the Cover

ACRS has partnered with leading international construction steel certification authority CARES to introduce its market-leading Sustainable Construction Steels (SCS) Certification Scheme to the Australasian market. The SCS Scheme ensures that construction steel meets the highest global environmental, social and ethical standards, using independent certification of ESG criteria and performance indicators.

► Turn to Page 10 for the full story.

FINDING OPPORTUNITY FROM ADVERSITY

(PART 3)

Dear Readers,

For those of you who are long-time readers of Construction Engineering Australia (CEA) magazine – particularly those with good memories – you may find something familiar in the name of this editorial... hence the 'Part 3' addendum.

As our nation recovers from more than two years of severe COVID restrictions, it's clear that some cities and regions are recovering far better (and far quicker) than others from the impacts of the COVID-19 pandemic. While some cities are now thriving, others remain a *'shadow of their former glorious existence'*, with an extremely high percentage of commercial vacancies and, in many instances, shockingly low levels of passing foot traffic for the businesses that remain.

While there may be an understandable level of reluctance on the part of some to return to office-based employment in the CBD, or to fully re-engage with city life as they did in pre-COVID times, for cities like Melbourne, there is a fear that it may take many years for the city to fully recover. Indeed, over the past month alone I have had numerous discussions with friends and colleagues from around the country who have visited Melbourne for the first time since the restrictions lifted and their reactions to Melbourne's current condition – and, more specifically, the lack of people and/or activity in the CBD and other key areas – generally ranges from shocked to horrified.

It seems that following the COVID-19 mandate of *'those who can work from home, MUST work from home'* a significant percentage of the population has now

decided that they don't really have to attend a centralised workplace every day to keep working. And it's not just about a 'fear of COVID' – it's also a matter of convenience, and that all-important and often difficult to achieve work-life balance.

In short, there is a significant percentage of people who despite the removal of restrictions and limitations, appear to have no desire or intention whatsoever of ever returning to a life of daily (often lengthy) commuting to a centralised workplace.

Now, before I continue, I do recognise that for many people, having to work from home is both onerous and challenging on many levels, and as such, I do not wish to suggest that eliminating office space altogether is desirable, or for that matter, even an option. However, I do believe now is the ideal time to have a serious rethink about planning, zoning and building use. Not only in terms of greenfield developments in outer suburbs and rural and regional centres, but also in terms of how we utilise our existing inner-city buildings and infrastructure.

Although it is clear that we cannot simply abandon our current CBD planning strategies, it is also clear that applying the current building use and planning model may result in it taking many years for many of our CBD's to return to anything even resembling their former glory... if ever.

While I have previously discussed concepts such as 'The 15-minute City' (where cities are designed so a large percentage of residents can live within 15 minutes of their workplace, essential shopping and recreation facilities) – which are more focussed on greenfields developments in outer-suburban, regional

and rural settings – I believe that we also need to rethink planning and building use guidelines for our major inner-city CBD's.

Please don't misunderstand. I'm not suggesting a 'free-for-all' policy for inner-city building use. I am, however, suggesting that rather than having strict prescriptive controls for commercial office space vs. residential space vs. light-tech, etc, that it might be time consider a new type of 'mixed-use' zoning that allows the establishment of residential and business facilities within what is currently considered 'commercial office space'. Much in the same way as we've seen a significant growth in home-office / home-small business enterprise 'mixed-use' housing across the suburbs and regions.

Being able to live and work in the same building – even if that building is in the CBD of a major capital – can deliver a raft of benefits... both in terms of quality of life, and sustainability.

Reduced commuting, (which reduces pollution, carbon emissions and stress), less reliance on individual vehicle ownership, improved work-life balance, expanded economic opportunities, and the revitalisation of our CBD's... the list goes on.

While it's clear that there are many more things to be considered when it comes to rethinking urban planning and zoning than a simple one-page editorial will allow, I believe that now is the ideal time to have the discussion.



Anthony T Schmidt
Managing Editor



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FROM BRICKS TO CLICKS: LADY TRADIES TO BENEFIT FROM FIRST OF ITS KIND DIGITAL SKILLS PROGRAM

Business management platform MYOB has partnered with Master Builders Australia to provide a seven-week online Business Resilience program as part of its Women Building Australia program, a joint initiative with the Australian Government. The content aims to boost the business success and resilience of women in the building industry, by bridging the digital skills divide facing women in construction. Women Building Australia is designed to attract more women to the building industry and provide services that support them to achieve their career potential, including as small business owners and operators.

"Women who have completed their construction apprenticeship or certificate, and gone on to set up their own business, might come out of their training highly proficient in practical skills but still require the knowledge to run a business. Equally, women who are managing the family construction business may not have had the time or opportunity to gain the knowledge required to run a successful SME in the industry," said Denita Wawn, CEO of Master Builders Australia.

"With no universally available digital business course currently on offer, this program is a first of its kind, industry-led learning approach providing hands-on business skills to set them up for success from the beginning."

The program is made up of seven weekly webinars of 45-60 minutes each, focussing on practical elements such as managing cashflow, opportunities to generate revenue, understanding compliance such as tax requirements, as well as managing relationships with clients and suppliers.

"The modules available in the Business Resilience Program cover vital business management basics, while introducing the benefits of digitisation that many small businesses may miss out on," said Helen Lea, Chief Employee Experience Officer at MYOB.

"In addition to saving time and improving accuracy, businesses with advanced levels of digitisation are 50% more likely to grow revenue[1] and eight times more likely to create jobs[2]. Helping small businesses in construction to get online not only benefits the individuals but the economy overall."

MYOB modelling shows one in five

small businesses – around 80,000 in the construction industry – have no or low digital engagement, and that bringing those SMEs with low or no levels of digitisation online could grow the industry's contribution to overall GDP 1.9%.[3]

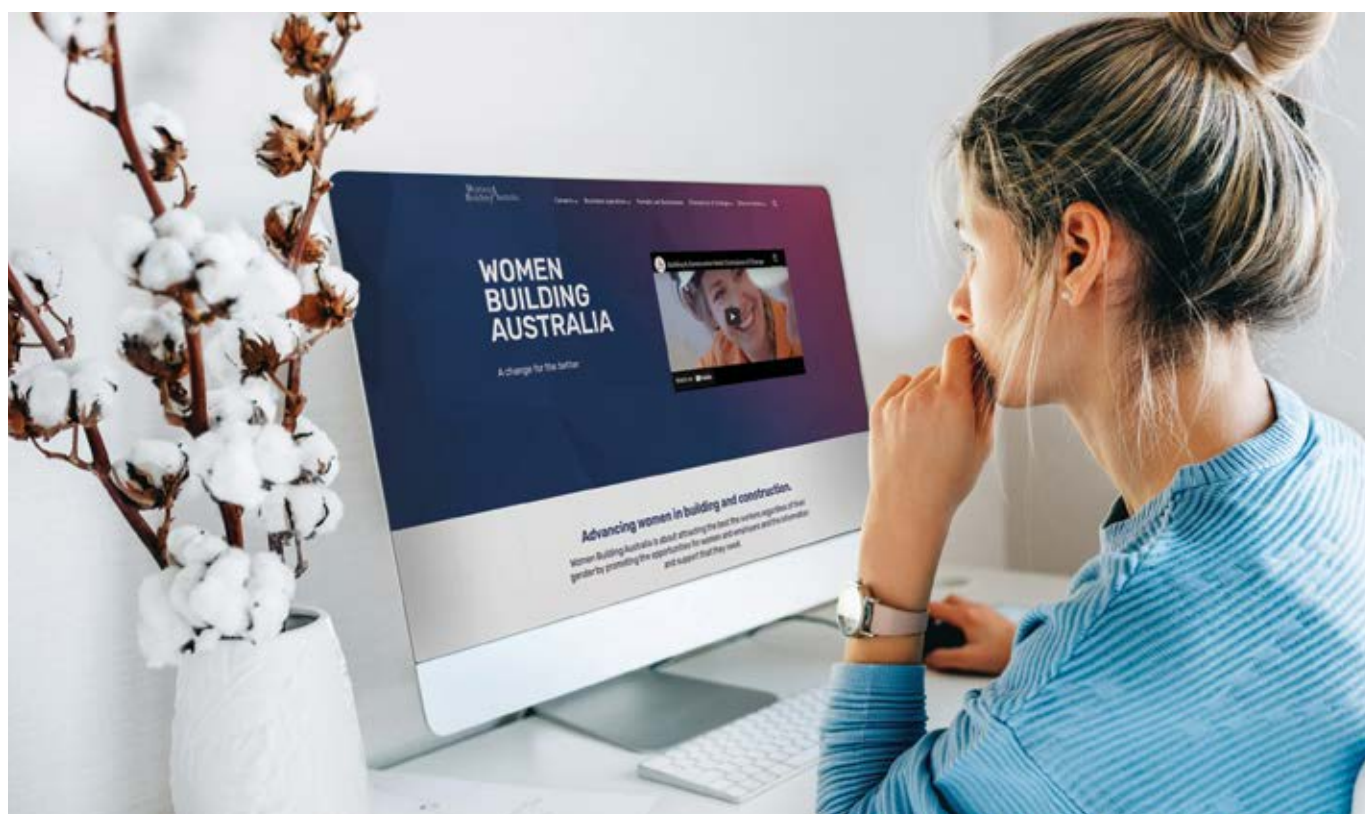
"To help more Australians benefit from digital skills, and more Australian businesses reap the productivity rewards of a digitally-skilled workforce, we see an opportunity for the Government to support the industry-led creation of targeted skills programs like this one," Ms Lea said.

The Business Resilience program is available free of charge for women working in construction, as well as women running a family construction business. Content will be available the week commencing 17 May and is open now for pre-registrations via MYOB Academy.

[1] *Connected Small Business 2017, Deloitte Access Economics*

[2] *Connected Small Business 2016, Deloitte Access Economics*

[3] *Closing the digital gap: an incentive for SMEs, May 2021*

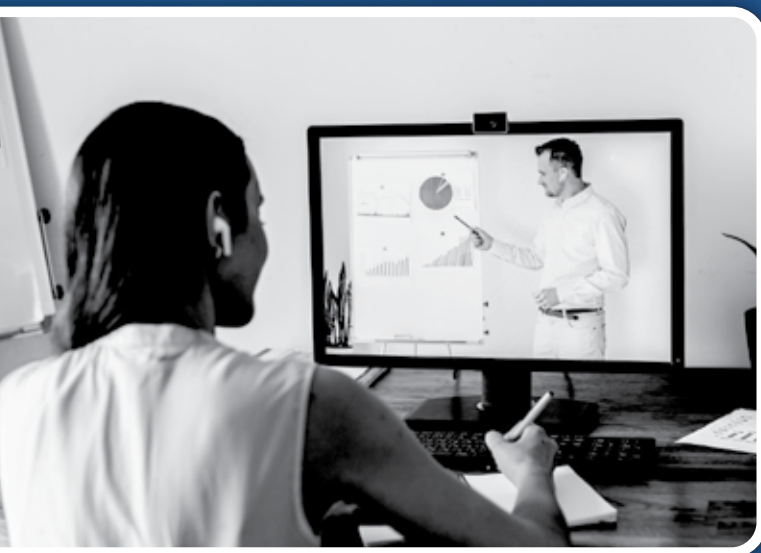




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ACOR WELCOMES NSW EPA DECISION ON C&D RECYCLING RULES

The Australian Council of Recycling (ACOR) has welcomed the decision by the NSW Environmental Protection Agency (EPA) to retain the existing rules relating to construction and demolition resource recovery. The NSW EPA has confirmed they will not move ahead with proposed changes to the *'Recovered Fines (skip bin fines) Orders and Exemptions'*, which threatened to disrupt the C&D recycling sector.

The existing recovered fines orders and exemptions will remain in place and the

EPA will instead focus on waste industry education, monitoring and compliance to improve environmental outcomes.

"The proposed approach would have been difficult to implement, prohibitively costly and unnecessarily divert recoverable materials to landfill," said ACOR CEO Suzanne Toumbourou.

"The NSW EPA decision reflects the concerns of the recycling sector, small businesses and the construction industry over the last six months, and highlights the

importance of a constructive relationship between industry and regulators."

"The NSW EPA decision to retain the existing rules and instead focus on education and compliance is the appropriate approach to support progress towards the NSW resource recovery targets," Ms Toumbourou added.

"Looking forward, we are very keen to work with the NSW Government on the review of the Resource Recovery Framework, which has great potential to catalyse significant circular economy outcomes through the resource recovery, remanufacturing and recycling value chain."

ABOUT ACOR

The Australian Council of Recycling (ACOR) is the preeminent industry forum for resource recovery, recycling and remanufacturing, leading the transition to a circular economy in Australia.

ACOR represents businesses that are part of a successful \$15 billion industry that employs over 50,000 Australians, generates exceptional environmental benefits for our society, and is committed to supporting proactive product stewardship initiatives, to inform better recycling and circular economy outcomes.

For further information, visit: www.acor.org.au

INNOVATIVE PLATFORM REVOLUTIONISES THE PAYMENT PROCESS FOR DEVELOPERS, BUILDERS, SUBCONTRACTORS & SUPPLIERS

As Australia's building industry faces the fallout behind a recent trend of high-profile insolvencies, a revolutionary buildtech payments platform known as IPEX has been launched to help protect the cashflow of construction projects. IPEX ensures construction project funds are held securely, distributed correctly and used for their intended purpose from a dedicated account for each project.

IPEX Executive Director, Mathew Carey says industry payment times, are now at record highs, with CreditorWatch reporting in December 2021 that around 12 per cent of building companies more than 60 days behind on debts.

"The current risk profile for construction payments is high. IPEX provides access to instant payment capabilities across Australia's New Payments Platform – and is a vital tool in helping manage that risk," says Mr Carey.

"Our platform stores data securely and has transparent and verifiable records,

helpful for when projects don't go to plan."

"With IPEX, subcontractors and suppliers receive funds into their accounts instantly, with a notification automatically sent to them. We know it's working as developers and builders have already trusted over \$400 million to be paid through IPEX to subcontractors and suppliers."



IPEX works with builders to onboard the project's subcontractors and suppliers, specifically linking them to that site. The builder can only pay the subcontractors and suppliers who have been onboarded. There is no opportunity to indiscriminately use funds for third parties not part of the official project team.

"The IPEX objective is to become the industry standard for payments in construction and help to protect Australia's construction future. We want to develop a new benchmark level of trust around the country in the sector and make it a foundational element of all construction projects," Mr Carey said.

"We're saying to subcontractors and suppliers - ask for IPEX on your next project to ensure their funds are delivered safely. And we are saying to builders IPEX is a great way to deliver trust upstream to clients and financial institutions and downstream to subcontractors and suppliers," he added.



ENTERPRIZE PARK DELIVERS ADDITIONAL GREEN SPACE FOR MELBOURNE

Melbourne's new look Enterprize Park is open to the public following major works to make the north bank of the Yarra River – Birrarung more accessible and enjoyable. Melbourne Lord Mayor Sally Capp said locals and visitors can now enjoy an extra 1,000 square meters of lush, green lawn – almost the size of one Olympic swimming pool – with quality views and better access along the river.

“Seating along the river’s edge, more space, better pathways and wider stairways will make this a space where family and friends can be active or come to unwind,” the Lord Mayor said.

“We’re proud to say this project supported up to 50 local jobs during construction – keeping many people in work throughout this challenging period.”

The upgrade of Enterprize Park marks the first milestone of Greenline, which will deliver an uninterrupted journey from the MCG to Docklands – attracting visitors and investment. The improvements also enhance the area as a significant piece of Aboriginal history and identity.

“Enterprize Park was once a gathering place for Aboriginal people and its connection with our First Nations people is profound,” the Lord Mayor said.

“The park now offers our diverse community with an honest and respectful representation of what this space once was.”

Growing indigenous vegetation and improving this sense of belonging will ensure the area can act as a meeting place for Aboriginal cultural tours into the future.

Environment Portfolio Lead, Councillor Rohan Leppert, said the improvements

are huge step towards repositioning the Yarra River – Birrarung as a centerpiece of Melbourne’s culture and livability.

“Our vision of a greener, more sustainable Melbourne is becoming a reality. Enterprize Park is just one of many projects which will reinvigorate the north bank of the river,” Cr Leppert said.

Immigration Museum General Manager Rohini Kappadath said the upgrades breathe new life into one of Melbourne’s most important, yet relatively unknown, historical precincts, of which the Immigration Museum is proudly a part.

“The area now showcases a re-emerging of the traditional environment and a tribute to First Peoples,” Ms Kappadath said.

In line with the City of Melbourne’s Yarra River – Birrarung Strategy, Enterprize Park is one of many projects being delivered by Council in 2022.

For more information visit:
<https://participate.melbourne.vic.gov.au/city-river-strategy>

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Biju Balakrishnan
FIEAust CPEng NER

FICEM AND ACI EXPAND PARTNERSHIP WITH JOINT EFFORT ON CARBON NEUTRALITY IN CONCRETE

The Federacion Interamericana Del Cemento (FICEM) and the American Concrete Institute (ACI) recently completed an addendum to their International Partner Agreement which calls for a joint effort to achieve carbon neutrality in the concrete/cement sector.

The efforts of FICEM and ACI will be propelled through NEU: An ACI Center of Excellence for Carbon Neutral Concrete (NEU), whose mission is to provide access to technologies and the knowledge needed to effectively and safely produce and place carbon neutral concrete in the built environment. The expanded agreement will encourage cooperation in areas of joint events, industry partnerships, research, technology acceleration, technical committees, and other related activities.

"FICEM is very pleased to reinforce and expand our partnership with the American Concrete Institute through this updated International Partner Agreement," said Maria Jose Garcia, Executive Director, FICEM.



"This agreement reaffirms FICEM's role in promoting the sustainable development of cement-based construction systems and highlights both organizations' commitment to achieving a carbon neutral industry."

In 2019, FICEM and ACI completed an International Partner Agreement to exchange the technical expertise of each organization through publications, meetings, conferences, internet links,

committee membership, certification activities, and other activities. An international agreement between concrete-related organizations that are committed to cooperation, coordination, and collaboration is a critical step in the effort to develop a worldwide unified concrete community of equal partners.

"The Institute is eager to expand this partnership with FICEM and we look forward to members of both organizations carrying on technical exchange and collaboration through committee activities, development of education products, and more," said Charles K. Nmai, President, ACI.

"This agreement aligns with ACI's strategic goal to provide resources for concrete professionals globally and to effectively meet the demands of a changing world."

To learn more about FICEM and ACI, visit: www.ficem.org and www.concrete.org respectively.

PLUMBER HELD TO ACCOUNT FOR BREAKING THE RULES

The Victorian Building Authority (VBA) has penalised a plumber over \$9000 for breaches of the Building Act 1993, including for failure to have pipework inspected, increasing the risk of flooding and property damage.

Ben Juchno (accreditation number 48991) faced a VBA Plumbing Inquiry and was penalised \$9,554.50 for covering installed pipe work on a below ground sanitary drain at a Kew property, prior to the pipework being offered for inspection by the VBA.

Incorrectly installed drains pose a real risk to properties, with the potential for water not flowing correctly and flooding a home, causing extensive damage and costing thousands of dollars in repairs.

The Inquiry found that Mr Juchno also lodged a compliance certificate with incorrect information, leaving the homeowners exposed.

The VBA's Executive Director of Regulatory Operations David Brockman said it is important that drainage is looked at during the building process, because failure to do so could result in leaks and sewage

flowing into homes, creeks and waterways.

"Leaking sewage is a significant danger and poses a serious risk to people's health and can cause illnesses like gastroenteritis.

"Not only does it pose serious health risks, but if there is a leak, the drain will need to be dug back up, resulting in added stress and substantial cost," he said.

"Most plumbers do the right thing, but individuals such as Mr Juchno who break the rules erode the public's trust."

Mr Juchno was also suspended for a year, which has been deferred on the condition that he does not breach any provision of the Act for the next 12 months.

He can apply to the Victorian Civil and Administrative Tribunal (VCAT) for a review of the decision.

The VBA conducts below-ground sanitary drainage inspections of plumbing work to ensure the work complies with the relevant standards, regulations and local laws.

A compliance certificate is a form of evidence that proves specific plumbing work has been carried out or certified by a licensed practitioner and certifies that the work has been carried out properly.

Victorians can visit vba.vic.gov.au/check to make sure their builder or plumber is registered or licensed.





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ACRS SUSTAINABLE STEEL & PRODUCT CERTIFICATION

HELPING ENSURE YOUR CONSTRUCTION STEELS
MEET YOUR SUSTAINABILITY REQUIREMENTS

Recent years have seen a significant increase in demand for sustainable products and practices. But the 'journey to a more sustainable world' is not without its challenges – especially when it comes to selecting the most sustainable product options. This is particularly true for products such as construction steels, where there is an array of globally-produced and supplied product options to choose from.



“The SCS Scheme ensures that construction steel entering Australia and New Zealand from anywhere in the world meets the highest global environmental, social and ethical standards, using independent certification of ESG criteria and performance indicators.”

CHOOSING SUSTAINABLE STEEL

First, there is the challenge of establishing which product is actually ‘the most sustainable’ choice. This task is often made more challenging thanks to the variety of methods used to measure ‘sustainability’, and the fact that many products are either self-assessed or assessed against ISO 14001:2016 Environmental Management rather than product certification.

Then there is the matter of traceability: once you order the most sustainable product, can you be sure that the construction steels you ordered are what you received?

Not surprisingly, these ‘sustainability challenges’ have resulted in a significant increase in demand for a premium, independent verification scheme in the area of steel sustainability. A verification scheme that provides surety there is no producer bias, misrepresentation or dilution of the expected certification process.

With that in mind, ACRS has partnered with leading international construction steel certification authority, CARES, to introduce its market-leading Sustainable Constructional Steels (SCS) Certification Scheme to the Australasian market. The SCS Scheme ensures that construction steel entering Australia and New Zealand from anywhere in the world meets the

highest global environmental, social and ethical standards, using independent certification of ESG criteria and performance indicators.

SUSTAINABLE CERTIFICATION OPTIONS

Independent Third-Party Product Certification systems continue to develop around the world to meet the needs of international and local consumers, specifiers, designers and governments. Independent third-party certification schemes such as ACRS Steel Certification provide a rigorous and trusted mechanism for certificate holders to demonstrate that the products they supply consistently meet evolving requirements.

This evolution has been driven in part by demand for sustainable steel and responsible sourcing. Need for certification of such materials has increased inline with both growing public expectations and an increased focus by governments and industry on sustainability. Indeed, with ‘as built’ sustainability ratings now playing such a critical role in the success and ‘saleability’ of most construction projects, sustainability certification is now being demanded in tandem with product certification for most construction products.

However, most available sustainability certification schemes are based wholly, or largely, on ISO 14001:2016 Environmental Management rather than product certification. Unfortunately, ISO 14001 certification focuses primarily on documented systems rather than on making a regular detailed assessment of actual activity and product output – much in the same way as ISO 9001 focuses on Quality Management Systems rather than product output.

As a result, when used on their own, ISO 14001-based schemes are increasingly considered not to provide adequate verification of supplier claims of sustainable supply to consumers, due to the fact that this generic ‘quality’ approach does not verify actual output or provide an adequate mechanism for product traceability. This can open the material supply chain to the possibility of unsubstantiated or incomplete claims of environmental attainment.

Put simply, demonstrating the conformity of any product, including steel, is not simply a matter of reviewing documented management systems. It’s the same for proving a product’s sustainability credentials. What’s more, basing claims of ‘sustainability’ purely on a management system rather than on regular assessments of actual product output disadvantages both specifiers and



consumers as well as better-performing suppliers by providing lesser performing suppliers with an unfair cost advantage and market access.

CONFIDENCE IN SUSTAINABLE STEELS

Australian and international steel producers are working hard to reduce their emissions. Currently, around 7% of global CO₂ emissions are generated by the industry, but this is expected to drop significantly in coming years thanks to new materials, manufacturing and processing methods. The SCS Scheme will play a major role in helping steel producers and processors measure, monitor, and improve the sustainability performance of their products, further strengthening industry efforts to combat greenhouse gas emissions.

The ACRS SCS Scheme also delivers a range of significant advantages for consumers, industry and governments across Australia and New Zealand. The Scheme helps building designers, specifiers and customers make informed decisions about the materials they are buying. It enables them to confidently source high-quality constructional steels produced under high standards of environmental, social and ethical management within an internationally-recognised scheme looking at the actual product, rather than a scheme that focuses on documented processes – thereby combatting any ESG confusion throughout the steel supply chain.

What's more, the SCS Scheme will provide the public with confidence that the steel installed in their homes, high-rise commercial and residential buildings, and infrastructure projects, meets the highest global standards in terms of both quality and sustainability.

MORE THAN EMISSIONS

Importantly, the SCS Scheme is about much more than simply measuring the CO₂ emissions associated with a piece of steel. It is a true assessment of product sustainability across all key sustainability benchmarks.

The Scheme's supplier mapping evaluation and management systems requirements provide insights into labour conditions and human rights risks in sourcing and production. The

Scheme aligns with the UN Sustainable Development Goals – 'The Global Goals' – and measures and monitors a comprehensive range of criteria through the global supply chain, including ethical business practices; modern slavery, human rights and labour conditions; environmental impacts (including circular economy and climate change); fair supplier treatment; and the socioeconomic impacts of the steel value chain.

Raw material and transport data, combined with independently-verified production and lifecycle emissions data, support the development of the products' carbon footprint and Environmental Product Declarations (EPDs) – prerequisites of the scheme. This enables accurate data, for example, the Global Warming Potential per tonne of product, to be easily accessed by designers and specifiers. On-product bar markings and digital product labelling allow 100% traceability on all verified products from manufacture to site.

The SCS Scheme assesses producers annually against benchmark sustainability performance, providing independent expert verification of the environmental and social performance of their product and its production processes.

Utilising a Rosette Rating System, credits are awarded to recognise and incentivise levels of performance exceeding mandatory levels. As well as providing producers with an accurate assessment of their current performance, it enables organisations to better understand and plan a 'transition pathway' from current performance levels to an aspirational 'sustainable' steel production, which is represented by a '4 Rosette Rating'. This '4 Rosette Rating' requires zero-emission steel production, responsible sourcing, a good safety record, and sustainably produced and processed constructional steel with a digital record.

For steel specifiers and procurement teams, the SCS Scheme's easy-to-access producer performance data and information allows them to assess and demonstrate the expected certification requirements of leading construction firms and governments more easily and accurately.



ONE STOP FOR COMPLIANCE, TRACEABILITY, AND SUSTAINABILITY

With the introduction of SCS certification, product conformity, traceability, and sustainability certification will all now be available through ACRS. Firms seeking both independent premium product and sustainability certification can now do so through one certification body – ACRS.

The SCS Scheme provides independent verification to steel sustainability requirements by an expert body in steel and product certification on a continuing basis to the recognised levels expected by ACRS. The independence and rigour

that ACRS is renowned for in Australia and New Zealand will help achieve the desired quality, environmental and socially responsible outcomes across the construction industry.

The SCS Scheme already certifies 29 producers and suppliers from 11 countries, with several suppliers to the local market already expressing interest. Products certified under the SCS Scheme are approved inputs for a range of international building and infrastructure rating systems, and are compatible with the recently-released Responsible Steel Standard. ACRS is also currently seeking recognition from the Green Building Council of Australia.

The UK's Building Research Establishment Environmental Assessment Method (BREEAM) recognises the Scheme as a 'responsible sourcing certification scheme'; with the US LEED building rating system and the Hong Kong CIC scheme also recognising its Environmental Product Declarations (EPD).

**For further information
please email ACRS at:
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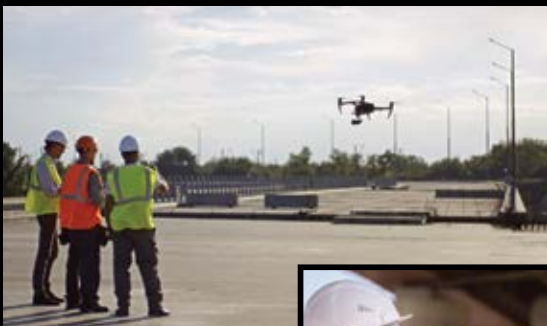
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TIME TO GET ASSESSED AND REGISTERED

PREPARING FOR MANDATORY REGISTRATION FOR CIVIL AND STRUCTURAL ENGINEERS IN VICTORIA

From October 1 2022, civil and structural professional engineers practising in Victoria will need to be registered. This also includes engineers living in other states and territories but working on projects based in Victoria.

With Engineers Australia (EA) recommending commencing the process up to five months beforehand, the time to start is now... with the first step of applying for a competency assessment by 30 June 2022 at the latest.

To support civil and structural engineers get a better understanding of who needs to be registered and what they need to do, Engineers Australia is running a number of free information sessions specifically on Victorian registration during May and June. These sessions are being run in addition to their existing program of registration info sessions.

The sessions will provide valuable information about registration requirements and competency assessments. Attendees will also be able to ask EA's team of experts any questions about the assessment and registration process.

Speaking about the importance of mandatory registration of engineers in Victoria, Jane MacMaster FIEAust CPEng, Chief Engineer with Engineers Australia said the compulsory registration of professional engineers will enable significant enhancement of public safety and consumer confidence.

"Registration helps to ensure that only those with suitable qualifications, enough relevant experience, and a proven commitment to ongoing training and professional development can provide engineering services," MacMaster said.

THE REGISTRATION PROCESS

Registration of engineers in Victoria is carried out by the Business Licensing Authority (BLA), however first an applicant must be assessed by an approved entity, of which Engineers Australia is one.

The assessment process has two components:

- an 'Entry to Practice' assessment to determine the adequacy or otherwise of the applicant's qualifications; and
- an 'independent practice' assessment to determine the acceptability or otherwise of the applicant's experience and competency.

Engineers Australia recommends that engineers start the registration process at least five months prior to the date by which they are required to be registered to ensure that they can continue to provide professional engineering services in Victoria. This allows six to eight weeks to gain an assessment from Engineers Australia, and three months for the Business Licensing Authority (BLA) to process the application (as recommended by BLA).

WHY IS REGISTRATION SO IMPORTANT?

Registration raises the bar on public safety, lifts consumer confidence, and increases the integrity of the engineering industry. It helps to ensure that only those with suitable qualifications, enough relevant experience, and a proven commitment to ongoing training and professional development can provide engineering services.

Engineers Australia had been advocating for the statutory registration of engineers for the past two decades. Indeed, Engineers Australia was instrumental in the introduction of mandatory registration for professional engineers in New South Wales and Victoria almost a year ago.

Victoria's scheme underscores growing momentum for mandatory registration of professional engineers around Australia.

In Queensland, registration has been necessary for all engineers for the past ninety years. New South Wales introduced a scheme for mandatory registration of some engineers last year, legislation in Western Australia is before the Minister for consideration, and the ACT is looking to implement registration following a commitment made in the 2020 election.

The benefits of getting assessed by Engineers Australia Alesha Printz FIEAust CPEng EngExec NER, General Manager, Victorian Division, Engineers Australia highlighted the benefits of getting assessed by Engineers Australia.

"EA is the only one stop shop, able to provide outcome reports for all five Areas of Engineering, and statements of eligibility for building industry endorsement in all five Areas of Engineering," Printz said. "EA is also able to undertake assessments for engineers who do not hold a Washington Accord degree and is the only Australian assessment entity who can do so."

"EA is the only one stop shop, able to provide outcome reports for all five Areas of Engineering, and statements of eligibility for building industry endorsement in all five Areas of Engineering."

Importantly, you do not have to be a member of Engineers Australia to be assessed. "If you are a Chartered member of Engineers Australia, or have membership with Engineers Australia and are registered on the National Engineering Register you are eligible for registration without further assessment of qualifications, experience and competency. These members can download a Victorian Registration Outcome report from MyPortal - accessed via the Engineers Australia website." Alesha Printz said. "That is, of course, unless you need to be registered in an area of engineering for which you are not Chartered or registered on the NER."

WHAT ARE THE IMPLICATIONS OF NOT BEING REGISTERED?

From October 1, 2022, there will be serious implications for anyone attempting to provide professional engineering services in Victoria without registration. If you are not registered, you will either need to work under the direct supervision of a registered engineer or only work in accordance with a prescriptive standard to not commit an offence under the legislation.

It is an offence under sections 67 and 68 of the *Professional Engineers Registration Act 2019* to provide professional engineering services without registration or to hold out to be registered or endorsed without registration; with those breaching the rules risking fines of up to \$90,870 per offence.

For further information on getting assessed for Victorian registration, visit: <https://engaus.org/GetAssessed>

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UNDERSTANDING GLASS AND ALUMINIUM CURTAIN WALL DESIGN AND CONSTRUCTION

by Paul Uno, Director, ETIA

When we look at high rise buildings and apartment towers in Australia today, we take for granted that the façade will primarily be glazing supported by aluminium sections (called curtain wall). However, this system of façade construction has only been in the Australian marketplace since the late 1950's. Prior to this period, buildings were not excessively high (usually less than 12 storeys) and thus heavy brick masonry was a very common façade in low to mid rise construction.

Initially it was a slow start but by the 1980's it took off in a big way when an American company called Cupples bought into a company called HHRRobertson. I was fortunate enough to have worked for HHR at the time when the transformation took place. I was appointed the structural curtain wall engineer as well as the NATA signatory for the façade test rig on site.

The HHR curtain wall test rig was the largest in the Southern Hemisphere at the time (being 11m high x 9 m wide x 2m deep) and was able to perform wind pressure tests on test facades to pressures of 10 kPa, water penetration tests as well as air permeability and deflection tests. The highest profile project I worked on at the time in 1984 (with another engineer) was the State Bank in Martin Plaza. The site is now where the Channel 7 studio is located. Having visited this site recently, I was impressed

to see how modern and classy the building still looks after nearly 40 years. One distinctive aspect of that project (as well as most projects during those years) was the fact that all the glass, aluminium and granite stone panelling was manufactured or came from Australia, nothing was imported in those days. We designed the aluminium sections to AS1664 and the glazing panels to AS1288, both of which still exist today albeit in Limit State format. In fact, AS1288 was revised just recently in 2021 to reflect new research done in this area. The Aluminium Standard AS1664 was and still is heavily based on American 'Aluminum' Standards.

The wind pressures we used for this building in Martin Plaza were derived by Dr Bill Melbourne, who is based in Melbourne. He was able to provide us with wind pressures more applicable to this site and building profile (which produced wind pressures less than those conservative values that would have been obtained using the Wind Standard at the time ie AS1170.2-1983). As most engineers involved in Wind design realise, the greatest wind pressures are found on the corners of buildings (local effects producing suctions often 2 to 3 times higher than pressures elsewhere on the façade). The design wind pressures for this building were in the order of 2.2 kPa and were proof tested accordingly in the 11m high test rig at Chipping Norton.

Another building I worked on was the ABC studios in Ultimo. The glazing for this project relied heavily on reducing the sound transmission from external sources. The specification called for STC (Sound Transmission Class) values in some areas in the order of 37. Considering that 100 mm concrete panel achieves an STL (Sound Transmission Loss) of around 44, it can be seen that achieving a loss of 37 dB for glass would have required a relatively thick panel. As it turned out, some of the options considered for this job was a composite single panel system comprising 6 LAM / 6 Mono / 6 LAM, where the polyvinylbutral interlayer (PVB) in both laminate panels was 1.14 mm in thickness, which would have achieved an STC around 39. One alternative was a double-glazed system comprising 5 mm mono / 50 mm air gap / 10 mm mono (total thickness of 65 mm and total mass of 32 kg/m²) which would have achieved an STC of 41. I am not a liberty to disclose the actual systems chosen but as you can see, it requires some fairly thick (and heavy) glass panels to provide enough mass to minimize sound transmission across the glazing section. Today the acoustic ratings are in terms of R_{tw} + C_{tr}. The other significant glazing project I was involved with was sizing the glass and RHS steel sections for the skylights on Parliament House back in 1985. The primary aspect of this job was structural design to resist dead loads, live loads and wind actions.

The other important aspect of any curtain wall design (besides structural and acoustic requirements) is thermal efficiency ie keeping the heat out (or in), depending upon the geographical location and the Building Codes/Standards that apply. When I received the curtainwall specification for the Sydney Airport Centre in the 1980's, it nominated a transmission coefficient (or U value) of 6.4 W/m²/K and a visible light reflectance less than 20%. These days the technical requirements for glazing are much more detailed and more stringent than 30 years ago. Solar Heat Gain Coefficient is a more commonly quoted values that is required to be satisfied by a glazing system.

Engineers who do not have expertise in these aspects of curtain wall design can attend a two (2) day *Glass and Aluminium Curtain Wall Design and Construction* course that we conduct at the Engineering Training Institute Australia (ETIA). The next course is being held via live stream on 1-2 June 2022. The courses link is available at: <https://www.etia.net.au/events/course-list>

This blog is the latest in a series produced for *Construction Engineering Australia* by globally respected engineering educator and reinforced concrete specialist, PAUL UNO BE MBdgSc MIE(Aust) CPEng NER RPEQ APEC Engineer IntPE(Aus), Director, ETIA (Engineering Training Institute Australia).





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The Benefits of Steel Cladding in Long-Span Building Applications

The roof is one of the most critical components of the building. It protects the building from weather elements and contributes to meeting the functional requirements of the build – thermal efficiency, acoustics, structural integrity and more. The choice of roof design and materials also greatly impacts the speed and economy of construction.

The span of the roof is a major design consideration that has flow-on effect across any building project. Long-span roofing systems (generally defined as exceeding 12 metres in span) were developed to satisfy the functional requirements of specific types of buildings.

Long-span roofing creates unobstructed, column-free interior environments. This capability is ideal for spaces where visibility is a high priority, where flexibility is required to support a range of activities, and for structures built to house large objects.

Long-span building applications – whether roofs, walls or otherwise – present a unique design and construction challenge. Steel cladding is the ideal option due to its ability to achieve great spans in a cost-effective manner while providing a range of significant benefits.

DESIGN FLEXIBILITY

Long-span steel cladding can accommodate a wide variety of roof designs, whether applied to conventional buildings or unique architectural statements. This includes classic roof designs, irregular geometry or long-span arches that are entirely self-supporting.

Steel cladding also lends itself to integrated roof and ceiling systems. It can be used as a feature material for both the interior and exterior and

provides a consistent finish. Perforated sheeting can be specified to provide acoustic attenuation.

INTERIOR VOLUME

Given its ability to support long-spans while providing excellent weather protection, steel cladding can be relied upon to create flexible, column-free internal spaces that are sheltered from the elements.

STRENGTH AND STABILITY

Steel's unique combination of performance properties makes it an ideal option for long-span building applications. High tensile steel has the requisite strength and stability to support long spans. When specifying long-span steel cladding, it is important consider the yield strength, grade and temper of the material and ensure it is appropriate for the proposed application.

FIRE RESISTANCE

Steel is a non-combustible material that does not burn, provide an ignition source or add fuel that contributes to the spread of fire. The material's inherent fire-resistance is important to meeting the stringent requirements in the National Construction Code for standard fire-resisting construction as well as protecting buildings in bushfire prone areas.

CONSTRUCTION BENEFITS

As they are cost-efficient and require less time to construct, long-span steel cladding is ideal for structures that require lengthy roofing systems. Much of these time and cost savings come from eliminating the complexity of the building's secondary structure. Long-span steel roofing

allows massive spans without the need for purlins or girts. This can reduce the number of structural steel and secondary steel members. Building complexity is further reduced with the ability to achieve very low roof pitches.

Fielders offer onsite manufacturing, for products such as ARAMAX® structural cladding, using a mobile roll-former, which can help projects realise even greater savings. A mobile roll-former provides the unique ability to roll sheeting onsite, eliminating any complications arising from product transport and delivery. Project efficiency can be improved as onsite roll-forming can accommodate last-minute changes without needing to wait for new product to be manufactured offsite and delivered. Fewer seams in the final product also contribute to a more weather-tight roof and better project outcomes.

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Delivering a distinct, signature aesthetic to your next project, Fielders ARAMAX® is the visual and functional choice for engineers, architects and builders alike.

The ARAMAX® structural cladding system is unlike any other, with a product that is bigger, bolder and deeper than conventional steel cladding profiles. The ARAMAX® roof sheeting allows for huge roofing spans of up to 20 metres with no purlins or girts. This enables the designer to eliminate the cost and complexity of the building's secondary structure.

The ARAMAX® cladding serves as a visually stunning and structural component of the structure, reducing cost without compromising performance. ARAMAX® is manufactured in a standard 800mm cover width but 700mm to 900mm cover width may be available subject to request. The profile can accommodate individual project requirements by tapering the sheeting along its length to produce spectacular curves and designs.

Specialist engineering assistance is available for design of ARAMAX® structures. Minimum order quantities may apply for ARAMAX® however, the Fielders team will be pleased to speak with you regarding your specific project requirements.

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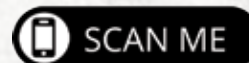
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Avoid air voids in walls/columns

Whether you're building walls with core filled blockwork, traditional formwork or permanent formwork, air voids are a general industry concern.

Historically, improper or no vibrator use and inadequate concrete slump have been common causes for air voids in walls.

But how do you remove the risks and issues associated with the use of vibrators and installed concrete's appropriateness? The current convention is to scan walls for air voids using specialty equipment, an expensive endeavour. And you haven't even reached the costly rectification stage yet.

Dincel firmly believes that it's far better to avoid air voids than to find them and then rectify them. That is why, as an engineering-led company, and in partnership with Boral, we have worked hard to develop, test and fine-tune the use of Self-Compacting Concrete (SCC) with our patented walling system.

SCC is concrete that is able to flow and consolidate under its own weight without the need for vibration.

Except under specific controlled conditions the addition of water on construction sites is not permitted.

An SCC mix is distinctively different from the concrete typically used for floor slabs, so the possibility of the wrong concrete mix being placed into walls is obvious and as such avoidable – which leads to;

✓ Issue Solved.

To reinforce our endorsement in another **Australian first** we are offering a **Void Free Warranty** when you partner up Dincel walling with Boral's 'Dincel SCC Mix', and install it to Dincel's specifications, on your next build.

Initially, this **Void Free Warranty** offer is being rolled out to the Greater Sydney Metro, Canberra and Queanbeyan areas.

For more information on Dincel's SCC testing, visit: <https://youtu.be/9-V9D91G29s> or scan the QR Code below.



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Whether it's a TL-2 or TL-3 attenuator, your first question should always be: **IS IT MASH APPROVED?**



With the ASBAP (Austroads Safety Barrier Assessment Panel) guidelines now requiring all new TMAs sold for use in Australia to be tested and approved to MASH Standards, one of the most critical questions for equipment purchasers to ask is: **“Is it MASH Approved?”**.

When it comes to **Scorpion® TMAs**, the answer is a resounding **YES** – for BOTH TL-2 and TL-3 attenuator.

In fact, the Scorpion II® Metro MASH TL-2 TMA is not only **THE FIRST TL-2 TMA** to be fully tested and approved to the latest MASH Standards, it is currently **THE ONLY TL-2** Truck Mounted Attenuator to be successfully **TESTED, PASSED & ELIGIBLE** to the current MASH Standards.

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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INFINITY TESTING

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

NO RELIANCE ON ROLL-AHEAD DURING AN IMPACT

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

'WORST CASE' SCENARIO TESTING

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

TMA ABSORBS & DISSIPATES 100% OF THE IMPACT ENERGY

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

NO UPPER LIMIT FOR HOST VEHICLES

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



THE ULTIMATE TEST OF ATTENUATOR PERFORMANCE

HOW IT'S DONE

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



WHAT ABOUT ROLL-AHEAD DISTANCES?

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

Scorpion® II TL-3 TMA

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

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

Scorpion® II METRO® TL-2 TMA

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

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



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Graffiti removal: the heatwave solution

Graffiti vandalism is a major issue for Local Governments and building owners alike, with vandals regularly targeting everything from buildings, public facilities, shops and factories, to through to fences, bridges, bus shelters and even pavements.

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

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

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

The machine is compact in design with loads of features to keep both the unit and operator safe. Built into a stainless steel frame, it comes with four steel wheels with rubber tyres. This means it can be used as a mobile wash unit in difficult to access locations, or alternatively, it can be hard-mounted on the back of a pickup truck or utility vehicle becoming a mobile steam cleaning plant. Add a 300 or 400-litre water tank (optional) to feed the system and it's a self-contained mobile high-pressure steamer.

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

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

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

SPACE EFFICIENT & RELIABLE

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

Not surprisingly, the Heatwave is already proving to be a popular choice with Local Government bodies across Australia - with a number of councils incorporating both

the standalone and ute-mounted machines into their equipment fleets. The key to the Heatwave's success lies within its versatility and performance in the field. Together with buildings and other structures, the Heatwave is also ideal for a myriad of other council jobs, including cleaning amenities, sanitising park tables and benches, even melting the grease off public BBQs.

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

OPTIONAL ACCESSORIES FOR MAXIMUM VERSATILITY

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

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

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



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

If extra reach is required, Aussie’s *Extenda Wand* will provide cleaning capability up to 5.5 metres in height. Using the telescopic wand enables operators to clean difficult to reach areas such as the underside of bridge decks, the upper areas of large sound walls or similar jobs without the need for a ladder.

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

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

BLOCKED DRAIN SOLUTION

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

The drain cleaning kit, *Aussie Viper Mini Reel*, comes with 60 metres of high pressure 3/16th sewer cleaning hose and a toolbox

of high-pressure cleaning nozzles capable of clearing a wide range of chokes. It also includes a safety plate to keep the operator out of harm’s way.

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

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

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

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

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

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Fit For Purpose

The unique environmental conditions and varying tasks performed in different occupations necessitate a variety of boot designs to match each worker's occupational safety and functional requirements. Within the Construction industry, the challenge brands face is that work-related footwear must be designed for three purposes with equal focus—occupational safety, functionality and comfort. While the average person may walk 10,000 steps a day, a worker on their feet can cover in excess of 30,000. As such, comfort features such as cushioning, weight and fit should all be considered important factors when choosing the right work boot. Research has shown that

variations in work boot design have a huge impact on fundamental tasks such as walking, with instances of lower limb injuries and workplace fatigue widespread in occupations that require safety footwear.

“Boot design can alter the way the foot moves while walking, affecting the way the ground reaction forces are distributed throughout the lower limbs. For those who work in construction, it is crucial that their boots meet the demands placed on their lower limbs while walking and when performing other working tasks,” says Adrian Blandford, Blundstone's Global Work and Safety Range Manager. “Otherwise, the risk of these workers

experiencing a lower limb injury is increased—whether it is an acute injury, such as a sprain or strain due to slipping or tripping, or a chronic injury, such as Plantar Fasciitis due to prolonged periods wearing incorrectly fitted boots,” he continues.

Whilst safety footwear is defined as a boot design that incorporates protective features to safeguard the wearer from injuries that arise through accidents, the statistics also prove that many foot injuries are related to incorrect footwear. The National Safety Council also discovered that as many as 120,000 work-related foot injuries occur each year, and according to the Bureau of Labour Statistics, three-quarters of those injuries occurred because workers were wearing the incorrect footwear. Thus, many of these problems can be prevented with the right work boot.

Safety footwear sold in Australia must comply to Standard AS 2210.3:2019. But not all safety boots are the same.

For workers in the Construction industry, focus on the following features when selecting your safety footwear.

- **Fit for Purpose** | The Construction industry delivers some of the harshest working environments. It's important that your boots can withstand these conditions—from safety to design and comfort. When there is a risk that a person may come in contact with a live electrical circuit, electrical shock hazard footwear will provide the best possible protection against electrical shock hazard.



- **Safety Toe Caps** | Given the potential risks within the Construction industry, it's important to select a boot with a safety toe cap to prevent injuries from rolling compression and drop impact.
- **Quality Uppers** | Choose uppers that are breathable and protective. Given the potentially muddy environments of construction sites, it's recommended that your boots have a water-resistant upper. Select styles in Blundstone's safety range are specifically treated to create a water-repelling membrane. This provides added protection from the elements.
- **Sole Design and Material** | Ensure the tread pattern will provide adequate stability on the uneven surfaces within your industry. Durability is also key.
- **Footwear Design** | Comfort features, closure systems, linings make all the difference. Make sure the boots fit and feel right for you and there is no excessive movement of the foot.

Once you've selected the right boots for you, taking care of them will keep them in good



stead. Treat with a waterproof spray regularly, remove caked dirt and debris with a soft brush and apply a small amount of polish as needed. When your boots are wet it's important to dry them at room temperature. Never dry your boots with artificial heat or in front of an open fire as this will cause the leather to harden and crack.

With over 150 years' experience, iconic footwear brand, Blundstone, is a world leader in tough, no-nonsense footwear that is reliable and fit for purpose. Investing heavily in research to access the best and latest technologies available, Blundstone's safety styles are built to protect, with features that provide optimum protection against impact and penetration, plus resistance to cuts, chemicals, heat, electrical

hazards, rolling forces, and other foreign stimuli. On top of this, their boots are renowned for providing unmatched comfort.

Workplace environments and risk factors vary enormously, and OH&S risk assessments should be consulted before choosing footwear protection.

For further information, please visit:
<https://www.blundstone.com.au/work-boots>

- 1 *Safety and health Magazine: Work Boots and Fatigue article*
- 2 *University of Wollongong: Work boot design affects the way workers walk: A systematic review of the literature*
- 3 *EHS Today: Foot Protection article – These boots are made for walking*

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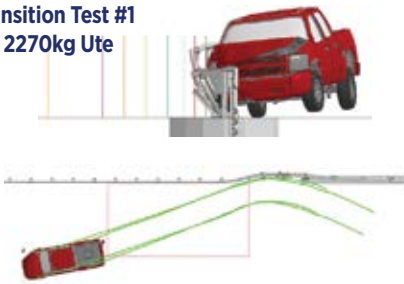
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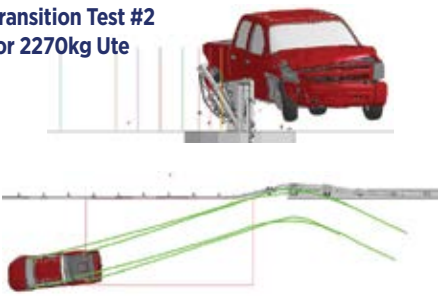
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Transition Test #1
for 2270kg Ute



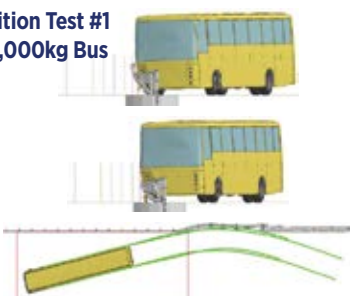
Transition Test #2
for 2270kg Ute



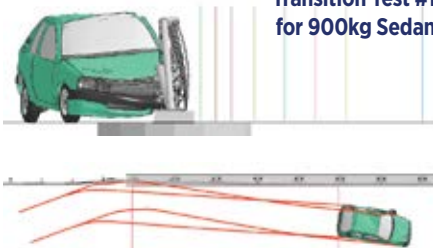
Transition Test #3
for 2270kg Ute



Transition Test #1
for 13,000kg Bus



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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CONSTRUCTING TECHNOLOGY FOR A HUMAN-DRIVEN INDUSTRY

By Will Twomey, Director of Solution Consulting, APAC, Procore Technologies

The construction industry is constantly adapting to innovation and global developments. Today, state-of-the-art projects are coming to life through methods that were unheard of years ago, including 3D printing, drone technology, artificial intelligence, machine learning and robotics.

However, construction is frequently described as the industry that drags on Australia's productivity and is in urgent need of reform. Large project teams of contractors with different skill sets and responsibilities appear chaotic, unpredictable and inefficient to those outside the sector.

With such a significant investment in technology, why are we still perceived to be drifting behind? And how do we shift the industry's reputation away from decentralised work and volatile stakeholder dynamics, towards one that's on the cusp of a truly innovative working environment?

CONNECTING THE DOTS BETWEEN PEOPLE AND TECHNOLOGY

Before the tsunami of technology, the construction industry was built on handshake deals and strong relationships to keep business going – an approach that has remained a trusted system for many. A Procore survey conducted by ACA Research in 2021 investigated the state of data-driven quality and compliance in the industry. It revealed that at least one in five leading Australian construction companies continue to rely on paper-based records for key business processes, such as health and safety, quality assurance and compliance.

There's no doubt the industry will always be dependent on human interaction, but technology must be incorporated to create balance, rather than feared as a competitor. It's important for the industry to showcase the importance of digital connection and collaboration among stakeholders on high-risk projects. This will help take pressure off certain practices and streamline the flow of critical information.



Will Twomey, Director of Solution Consulting, APAC, Procore Technologies

Technology solutions have been introduced to the industry, but very few focus on the core challenge of connecting all stakeholders from the start. Many construction companies have separate digital tools for different tasks; for example, one tool for scheduling, another for project management and yet another for financials.

The construction industry must use the power of technology in collaboration with human connection – and to do this effectively, a single source of truth and adequate tools must be available for all team members to view and connect. Disparate technologies that inhibit communication and access to information also lead to expensive rework, and this is unfortunately evident in NSW – with two in every five strata buildings in the state having 'serious' defects, according to the [Strata Community Association of NSW](#), and requiring an average repair cost of \$332,000. In addition to this costly consequence, the power of data is overlooked.

THE CAPABILITY OF DATA IN CONSTRUCTION

Construction companies generate massive amounts of data every day, but with so many different stakeholders involved, it's often the case that no single company has easy access to, or control over, all the available data for any given project.

Different parties have different record systems, which are often proprietary. This leads to a huge amount of data being stuck in siloed solutions, making it impossible for the wider team to connect and collaborate.

The construction industry reportedly generates over \$360 billion in revenue in Australia and has a projected annual growth rate of 2.4% in the next five years, with the potential for continuous insights and innovation to be driven by technology. This is where the true value lies.

The Procore platform is designed to provide a single source of truth for the construction industry. Procore provides teams with workable data and valuable insights from a connected platform, bridging the gap between design and construction, and helping the industry make sense of its siloed, unused data. Procore helps construction companies track productivity, reduce risk, provide accountability, and monitor safety, generating value for the business and the wider industry.

In 2020 alone, Procore customers uploaded or created over 90 million documents, 121 million photos, and 92 million inspection items. On average, our customers are adding over 224 terabytes of data to the Procore platform every month. Every single one of these uploads is data that can be leveraged to transform construction into a connected, data-driven industry.

2021 was arguably the most challenging year for construction in the sector's history, both in Australia and globally, and no doubt pushed many organisations to breaking point. Government and industry are faced with the critical task of rebuilding the economy and are under pressure to improve Australia's productivity performance. With this in mind, new regulations are likely to follow to ensure businesses take full advantage of new innovations and technology.

With digital growth and development already evident across the industry, now is the time to streamline processes and adopt systems that allow for seamless connections between teams. This will create the foundation for the delivery of quality projects built on trust.

For further information, visit: <https://www.procore.com/en-au>



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The new Combi-MR4 with Dynamic 360°™ Steering

Since Combilift launched its first C4000 model in 1998, multidirectional capability has been one of the major hallmarks of the company's wide range of handling solutions. Twenty-Four years and thousands of R&D hours later, its latest product takes multidirectional capability to the next level.

The Combi-MR4 is a 4-wheel electric-powered multidirectional reach-truck, which incorporates Combilift's new Dynamic 360°™ steering, which provides rotation on each wheel, enabling seamless directional change of the truck while on the move. The system allows this extremely agile forklift to work in forward, sideward and crab steer mode, guaranteeing swift operation and excellent manoeuvrability. Hence the full name of the new model: the **Combi-MR4 Dynamic 360.**

The impetus for the development of this latest addition to Combilift's portfolio was to develop a multi-directional truck, with a very low platform to maximise storage density within racking. The Combi-MR4 is available in two unique models, with capacity ranges of 2,500Kg - 3,000kg and 3,500Kg - 4,500kg respectively, and can operate in aisles as narrow as 2265mm when guided (based on 1200mm deep material). To maximise all storage space in racking systems the wheel configuration of two drive wheels at the rear and two sets of smaller dual front wheels provides a platform height as low as 380mm, allowing otherwise redundant areas towards the floor to be used.

In keeping with Combilift's common overall design ethos, the highly versatile Combi-MR4 can handle long loads as well as palletised goods with ease and can load and offload from delivery trucks. Driver comfort and safety are also major considerations, and this new truck definitely delivers the goods from an ergonomic point of view: a high visibility operator cabin, multi-function control joystick, AC-electric



power steering and joystick operated hydraulic mast functions all make for a smooth ride and straightforward operation. The articulated rear axle with two rear rubber drive wheels provides optimum traction for outdoor use, while still ensuring nimble and accurate truck placement.

To achieve this level of manoeuvrability, Combilift utilised its newly developed-in-house Dynamic 360°™ steering. This novel steering concept enables operators to manipulate the truck's positioning and orientation without the need to stop and change driving mode. Intuitive and easy-to-operate, this is achieved by simply twisting the control joystick right or left to adjust the wheel positions simultaneously – providing crab steering and allowing direction change on-the-go.

Combilift always likes to ensure that any new product has been thoroughly tried and tested in the field to make certain that it is 100% fit for purpose. Following the initial operation of 3,000kg Combi-MR4 units, a 4,500kg model was developed after receiving a request from Combilift's dealer in the BeNeLux region - Mabo BeNeLux, for a larger capacity unit for their customer TABS (Timber and Building Supplies Holland).

One of the Netherlands' leading suppliers of timber products and building materials, with 104 outlets across the country, TABS has partnered with Combilift and operated its multidirectional trucks for more than 15 years. It now has MR4 trucks at several locations in the Netherlands and is about to take delivery of its 15th and 16th



trucks, which will work at its distribution centres in Zaandam and Bleiswijk.

Combilift CEO Martin McVicar, commented: "TABS are delighted with the ongoing successful implementation of their Combi-MR4s and the improved levels of efficiency thanks to the overall design and features such as low platform height as well as the advanced Dynamic 360°™ steering system."

"I have no doubt that this new additional electric model will grow Combilift's customer base," Mr McVicar added. "We are looking forward to showcasing the Combi-MR4 to our existing dealers, and potential new customers during the LogiMAT Intralogistics exhibition in Stuttgart at the end of May."

With the first of the new Combi-MR4 units set to land in Australia, Chris Littlewood from Combilift Australia said the new Dynamic 360°™

steering system stands as an ideal example of the benefits of Combilift's focus on innovation and ongoing investment in R&D and technology.

"Fundamental to Combilift business practice is to invest significantly in research and development and further, to field-test our products before bringing them to general market," Chris Littlewood said.

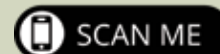
"The MR4 is a robust, versatile unit highly suited to Australian conditions, and we believe that it can play a major role in boosting productivity and efficiency across a range of industries, while at the same time helping our customers to optimise storage space and usability across their warehousing operations," he added.

For more information on the new Combi-MR4 Dynamic 360 unit, please visit: <https://combilift.com/combi-mr4/> or scan the QR CODES.



See the Combi-MR4 and Dynamic 360°™ Steer in action.

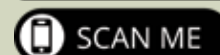
MR4 Promotional Video:



Dynamic 360 in action:



New 360°™ Steer:



COMBI-MR4
Dynamic
360°



DA approval for Stage 1 of Sydney zero-carbon Norwest Quarter

Norwest Business Park parent developer Mulpha has released the first apartments in its \$1billion zero-carbon, master-planned Norwest Quarter development in the Hills, Sydney, following development approval this month. Award-winning builder Parkview Construction has been appointed to commence work in June 2022, after working extensively with Mulpha to quality control and deliver new benchmarks in sustainable design and construction.

Located within 400 metres of the new Norwest Metro Station at 40 Solent Circuit, Norwest in Sydney's Hills District, the first stage of Norwest Quarter will include two residential apartment buildings, Banksia and Lacebark, with a total of 196 apartment homes, and more than 3,000 sqm of specially curated and sustainably led retail and commercial space including a full-floor commercial gym, fresh food grocer, medical services and restaurants.



Strong interest in the apartments has seen over a third of the first apartments released off the plan selling in the first two weeks to a mix of owner-occupiers, including young families, and local investors.

The 115-apartment Banksia building, designed by leading architects Bates Smart, will offer a choice of one-, two- and three-bedroom open-plan apartments, with the best views north towards Castle Hill Country Club or southwest over Norwest Lake. Banksia's design prioritises outdoor space and connecting to nature, with each apartment having one or more oversized balconies with lush landscaping.

The 81-apartment Lacebark building by Smart Design Studio is also selling off the plan, and will offer generously sized one, two, and three-bedroom apartments and three-bedroom penthouses, all with curved balconies and angled blades designed to bring in more sunlight in the winter and protection from the sun in the summer.

Banksia has a resident-only podium rooftop with swimming pool, sunlit garden, resident lounge, work from home pods, and function room for hire, while Lacebark has a resident lounge and a beautiful garden, complete with a kitchen, sundeck, and BBQs. An enormous open public plaza linking Banksia to Lacebark next door will feature a wild botanical garden with an amphitheatre, timber walkways, water and wild play for children, decked areas and seating, all contributing to the 70 percent of open green space within the precinct.

The Norwest Quarter environment has also been designed to minimise the urban heat island effect (UHIE) through substantial re-wilding of the natural landscape, which in turn promotes local flora and fauna. Initiatives to enhance long term re-wilding include pollination and soil health management. This all contributes to the creation of a cooler and healthier environment throughout the precinct.



Apartments in Norwest Quarter will consume two thirds less energy than a typical apartment, and one third less water from the grid. Due to the strong sustainability credentials of the apartments, purchasers may be eligible for discounted green mortgages from some lenders, potentially providing a lower interest rate on their mortgage.

Both buildings also offer innovative upgrade options that transform the floor space of your spare room or home office, a direct response to the changing way people live in a Covid-world, working from home more and needing more flexibility in apartment design.

Both buildings will feature rooftop solar panels, electric vehicle charging with fast charges, and high-performance, centralised air-conditioning. The apartments will have high efficiency lighting and appliances, and are 100% electric with, induction cooktops and electric hot water. Other sustainable community initiatives will include communal electric BBQs, communal gardens, productive beehives for enhanced pollination, worm farms, composting and natural landscapes.

Mulpha Head of Developments, Tim Spencer, said: "We are very excited to launch the first apartment buildings in Norwest Quarter which we believe will set a new benchmark in lifestyle design with its focus on community, sustainability and harmony with the natural environment.

"The design of both buildings far exceeds standard sustainability regulations with best practice passive design principles and high-performance environmental initiatives throughout.

"I believe people will choose to live here for the opportunity to be part of a community, aiming for a better future, targeting 100 percent renewable energy, reduced waste, and efficient use of resources including water."

When complete, the Norwest Quarter masterplan will transform over 3.8 hectares of greenfield land into a vibrant village centre for over 2,000 residents. There will be nine residential towers containing 864 apartments, with 6,000m² of space provided for cafes, restaurants, neighbourhood shops and childcare facilities. Norwest Quarter is within walking distance of the Norwest Metro Station and the emerging Norwest town centre as well as extensive parklands, pathways and cycleways.

ABOUT MULPHA AUSTRALIA

Mulpha Australia Pty Limited acquires, develops, and manages a range of property and lifestyle investments. These include InterContinental Hayman Island Resort, Intercontinental Hotel Sydney, Sanctuary Cove Resort and Bimbadgen winery.

As well as developing the master-planned communities of Bella Vista in the Hills District and Mulgoa Rise in Western Sydney, Mulpha Australia is transforming the 377-hectare Norwest Business Park into a world-leading innovation, lifestyle, and economic hub, with all the features of a 'Smart City'.

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MAINTAINING CULVERTS - AUSTRALIA'S VITAL HIDDEN INFRASTRUCTURE

By Steve Piscetek, Divisional Manager, Mainmark Civil and Mining

Culverts are the hidden heroes of the infrastructure sector and while they are often not as prominent as bridges, tunnels and road networks, they are an essential asset that protects roads, rail, buildings and structures. Unfortunately, culvert maintenance and repairs are not always prioritised appropriately.

One of their common functions is managing stormwater runoff, allowing water to flow freely under road and rail corridors. In many cases culverts also provide fauna with safe access. Because of these important functions, the construction and maintenance of culverts need to adhere to standards that protect waterways, the community and other infrastructure like roads, pathways, and rail lines. They must also be designed with a hydraulic capacity capable of handling runoff water with AEPs (annual exceedance probability) up to two per cent, or ARIs (average recurrence intervals) up to 50 or 100 years.

The '1 in 100 year' rule commonly referred to by engineers, defines significant flood incidents that have a one per cent chance of occurring in any given year. Unfortunately, as we learn more about weather events, it has become clear that heavy floods can occur more frequently than we originally estimated which increases the strain on a culvert's passable hydraulic capacity. Many culverts are now considered undersized which increases the risk of damage to roads, rail, and other critical infrastructure.

THE CHALLENGE OF BUILDING AND MAINTAINING EFFECTIVE CULVERTS

Over time, culverts are susceptible to deterioration that can diminish performance and structural integrity, including clogging

with debris, scouring at outlets, and abrasion and corrosion. The main challenge with maintaining culverts is that they are invariably located underground, often under critical infrastructure. As a result, replacing the culverts can be very expensive and disruptive. Therefore, asset owners have sought innovative ways of monitoring the condition of and repairing and refurbishing their culvert assets.

MAINTAINING HEALTHY AND EFFECTIVE CULVERTS

Mainmark recommends proactive culvert damage mitigation which includes performing regular inspections to ensure all blockages are removed. Monitoring to consistent standards by checking for corrosion, settlement, joint or compression failures, water ingress and fire damage should be carried out. Any potential hazards affecting a culvert's structural integrity should be dealt with immediately.

The conventional approach to remediating and maintaining culverts is to patch or line the culverts with new materials. Often cementitious materials are applied as a shotcrete or gunite solution to remediate damaged or deteriorated areas.

Unfortunately, this approach can compromise culvert effectiveness over time. For example, if a 2m diameter damaged culvert is remediated using a 100mm repair layer of cementitious material, its diameter is reduced to 1.8m. This significantly reduces the overall hydraulic capacity of the culvert making it less effective.

Alternatively, 're-sleeving' – which involves inserting a smaller diameter pipe into a culvert and grouting the space between them – is another widely accepted option. However, while these methods are effective, they can also contribute to the capacity dilemma.

NEW INNOVATIONS

New solutions, that have been developed by Mainmark and our partners, are more cost-effective and time-efficient than conventional methods and do not significantly reduce culvert hydraulic capacity. For example, relining culverts with vinyl ester structural coatings can replace the strength of the culvert without the added thickness of conventional cementitious material. The thin 12-15mm coating minimises the loss of hydraulic capacity.

Teretek® engineered resin has also been used to fill voids around culverts, increase ground bearing capacity and to realign culverts that have moved due to settlement. When all else fails and a culvert needs to be abandoned, Mainmark's Terefil® is a lightweight cementitious-based flowable filler that is an ideal solution for decommissioning ageing and redundant culverts and pipes.

Mainmark has remediated hundreds of culverts over the years using these techniques, including relining seven major culverts in the Toowoomba Bypass with Terefil® cementitious void fill. The project subsequently received a Good Design Award in the Engineering Design category.

While culverts may not always be highly visible, they contribute significantly to our everyday lives and our communities rely on their ability to perform correctly. It's therefore important that they are taken care of, and the right remediation solution is adopted.

About the author: Steve Piscetek is the divisional manager for Mainmark Civil and Mining. Steve has extensive experience working in construction, road and water infrastructure, the mining and resources sectors and offshore construction.



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Philippines Precast Concrete Pioneer Megawide celebrates 10 years of Innovating for Affordable Housing Market

The Indian Economic Times defines affordable housing as follows: 'Affordable housing refers to housing units that are affordable by that section of society whose income is below the median household income. Though different countries have different definitions for affordable housing, it is largely the same, i.e. affordable housing should address the housing needs of the lower- or middle-income households. Affordable housing becomes a key issue especially in developing nations where most of the population isn't able to buy houses at the market price.'

With this in mind, we should consider the increasing importance of this issue worldwide. Housing prices are rising in a matter pay scales cannot hold on to, so more and more people will be needing affordable living space. The UN estimates that by 2030, three billion people will need affordable housing in cities. Many building developers and the majority of the building industry are searching for good methods to implement the provision of affordable housing into their business plans and develop solutions that benefit both the population and the companies.

AFFORDABLE HOUSING IN THE PHILIPPINES FUNDED AND SUPPORTED BY THE GOVERNMENT

Like the industry, many governments are conscious of the need for affordable housing and make considerable efforts to support their citizens. In the Philippines, the issue is covered by the Home Development Mutual Fund (HDMF), more popularly known as the "Pag-IBIG" government fund. The biggest backlog is for the lower-income residents and overseas workers with Filipino citizenship.

Within the five categories covered by this fund, leading Philippine infrastructure and engineering innovator Megawide Construction Corporation is showcasing how prefabricated precast concrete elements are able to deliver a range of benefits. Megawide focuses on the two most economic options for their projects, namely:

- **Socialized housing:** with a unit size of 18-24m² and a sale price of around 520,000 Peso (Approx. AUD\$14,000).
- **Economic housing:** with a unit size of 42-48m² and a sale price of around 2 million Peso (Approx. AUD\$54,000).

Both categories incorporate a range of dwelling types and configurations, including row houses (townhouses), duplex houses, and single attached.

Markus Hennig, Executive Vice President, Business Units at Megawide Construction Corporation shared some insights on the current affordable housing projects in the Philippines and shows, based on the company's success model, that large-scale affordable housing projects with limited margins and precast elements can and should be a part of the future planning of builders all around the globe. Megawide is the contractor for one of the biggest housing projects in the Philippines, a country where affordable housing is in high demand and supported by the government.

BUILDING AFFORDABLE HOUSES WITH STATE-OF-THE ART CENTRAL FACTORIES AND SATELLITE PRECAST FACTORIES

For over 10 years, Megawide has been building high-rise and mid-rise projects with prefabricated precast elements and believes that this method of construction will define the future of affordable housing.



Above: The automated machinery from PROGRESS GROUP helps to reduce the physical labour, while also increasing the speed and safety of precast production.

Megawide is currently building six projects with prefabricated precast elements, totalling around 12,000 units. For these projects, the company is either the EPC Contractor (Engineering, Procurement and Construction) or the Precaster only. Two of the projects will be the first for horizontal housing developments and will be delivered as turnkey.

The projects are located in the provinces of Luzon and on Mactan Island in Cebu. Producing precast concrete elements in factories significantly reduces on-site construction time, while also ensuring the quality of the walls and slabs is consistently high.

The projects in the Manila metropolitan area are covered by the centralized factory in Taytay, Rizal. For the other projects, the prefabricated precast elements are produced in a satellite factory on-site, resulting in more cost-effective production. This is due to the fact that logistics and transport costs are too high to deliver economically from centralised factories to all of the housing development locations in the provinces.

Importantly, this doesn't mean that the satellite factories are any less productive. Even in the satellite factories, the machines are equipped with modern technology, with much of the equipment provided by the Progress Group - one of the biggest precast machinery developers in the world.

With this innovative technology, the elements can be produced with less manpower and within a short period of time. The precast slabs and walls, as well as the already prefabricated bathroom units, can be installed quickly on-site.

Interestingly, despite the obvious advantages, there are still those in the industry who are unsure if this way of building can also be profitable for the company. The answer is a resounding yes! Using the latest precast concrete equipment and technology, focusing on affordable housing construction can also be commercially successful.

More and more builders are counting on the precast concrete's faster construction process and high-quality standardisation, as well as on-time delivery to clients. That is why precast elements are increasingly preferred over other building methods.

Markus Hennig, Executive Vice President, Business Units at Megawide commented: "Our precast system, from engineering to production and installation, as well as high technical know-how for less costs, are the keys."



The precast elements include 100mm thick solid walls all around both floors as a minimum code requirement. The 120mm solid floor slabs are also provided as one piece.

Megawide is planning to add two projects every year, as they see an increasing need in the future.



“One of our clients was searching for an entire year to find an alternative supplier but could not find anyone who could supply the quality for the price we offered,” Mr Henning said.

“We are fast in setting up a factory, ramping it up quickly, and performing as per agreed schedule to complete enough units per month.”

“Yes, with precast the costs are higher. But with a conventional method, nobody can complete as many units per month and year as we do with precast,” he added.

TOWNHOUSES IN TANZA

One of Megawide's projects with a focus on townhouses is located in Tanza, at Cavite,

Luzon. Encompassing an area of 28 ha and incorporating a total of 2,800 units, the main client's design is 42 m² per unit. Every developer has its own design, but the majority of the economic houses are planned as townhouses ranging in size from 42m² to 48 m². The projects also incorporate some larger units ranging from 50m² to 65m² in size. These are designed as single attached or duplex units and have a higher sales price. The main customers for those buildings are overseas workers who, as per the funding guidelines, can buy these houses for an amortization of 3,000PHP/month (Approx. AUD\$81). They have an average purchase price of 1.8 M Philippine peso (Approx. AUD\$48,500) which varies across different regions.

Two to three units are installed per day, resulting in 60 to 70 units per month, which can be finalised with precast elements. The goal is to complete 600 plus units per year per location with one production facility and one installation team and crane.

Together with the townhouses built with precast elements, these affordable housing projects also incorporate the development of supporting infrastructure such as town halls, sports facilities and other community facilities.

MULTI-STOREY BUILDINGS FOR IN METROPOLITAN MANILA

Another of Megawide's projects is a 14-storey mid-rise affordable housing built with 90% precast - shear walls, half slabs, external



14-storey mid-rise affordable housing built with 90% precast concrete components.



and internal walls, stairs, and prefabricated bathroom units.

The pre-COVID plan was to create 23 buildings with 900 units each, all within five years of building time. Understandably, the schedule for the construction finalisation has expanded, however, with even with this big floor area Megawide is able to construct one floor within 10 days.

The majority of buyers are singles or couples working in the metropolitan area of Manila who don't want to travel much to their homes in the provinces. Designed for one or two people with maximum of two young children, the apartments encompass 24 m² of living area in single bedroom-only flats, with a few bigger double condos.

The wall versions vary between shear walls or gravity walls, depending on which floor it is. The higher you get, the thinner the walls. For affordable housing, the external and inner solid walls are produced 100 mm thick. The prefabricated bathroom unit (PBU) is 80 mm thick with at least two sides.

Megawide is the first company in the Philippines to work with PBUs. The PBUs can be made with a special 3D mould system and installed on-site as one already finished bathroom unit, which saves time, and manpower, and provides better quality. The fundamentals are conventionally made without precast elements. The infrastructure will be planned with the developer and Megawide will deliver the turnkey part.

Above: The prefabricated bathroom units (PBU) are being delivered as a finished unit ready to be installed at the construction site with less manpower needed.

The backlog is the same, but COVID changed the working habits, and with that, the demand for one's own home and its location. The trend is said to switch from living close to the city to more likely living in provincial areas, as working remotely is getting very common in all businesses. Building with precast elements made in satellite factories is flexible and can work with this change of habits perfectly, without losing any time and at a much better financial benefit than thought.

Building with precast elements is more cost intense than other methods, but due to the highly increased production and building speed, it is still lucrative and gives the real estate developer a higher level of commitment and safety regarding the delivery time. It also helps to ensure that they don't lose buyers due to a much higher finalisation time than anticipated.

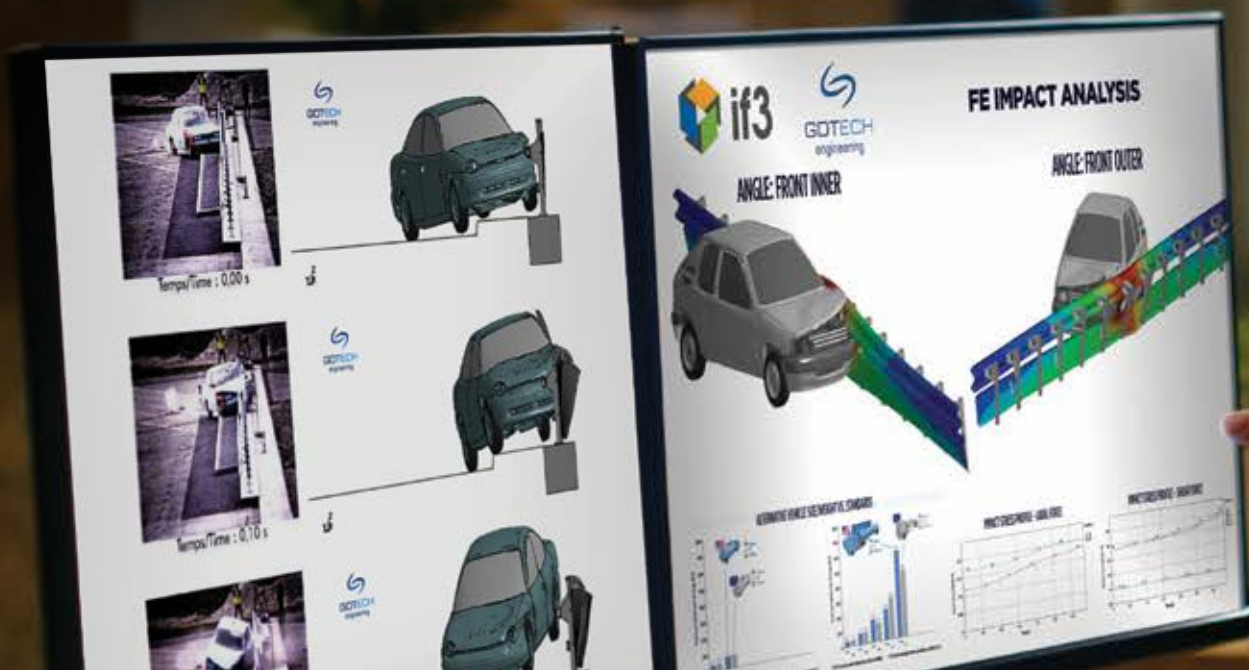
"With the precast elements, we can provide a significant advantage and additional opportunities for the developers, thanks not only to the high-quality finished products but also to the significantly shorter turnaround times they offer when compared to conventional construction," Mr Hennig said.



The PBU's are made in a fully automated mould system from PROGRESS GROUP. They can be filled from above or through the side by a pump system.



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





Just as Conductors use all the instruments at
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NATIONAL PRECAST MEMBERS' SNAPSHOT

Established in 1990, National Precast is the only industry body representing precast concrete manufacturers. Membership comprises precast manufacturers of all capabilities, across all states, as well as product and service suppliers, industry professionals, tertiary institutions and allied organisations. As it unites the industry through national members' meetings and dinners, National Precast empowers, represents and promotes its members. Following is a snapshot of some of the projects being undertaken by National Precast members across Australia. For more information, or to find a Precaster for your next project, visit: www.nationalprecast.com.au

Project: Veolia recycled mix design

Location: Launceston, TAS

Master Precaster: Hudson Civil Products

National Precast Master Precaster, Hudson Civil Products is committed to sustainable initiatives throughout the precast concrete supply chain and being manufactured offsite, Master Precasters such as Hudson are able to explore sustainable new mix designs. A recent collaboration between the precaster and waste management giant Veolia has envisioned recycled by-products being incorporated into a prospective new mix for precast concrete.



Project: Solar Traffic Operations' Products

Location: Pilbara, WA

Master Precaster: AusPrecast

A set of Solar Traffic Operations Products – or STOP – has been deployed at the BHP Pilbara site. This innovative solution - incorporating a precast concrete foundation - will improve traffic safety without the need for mains' electricity in rural locations. AusPrecast, a National Precast Master Precaster, was responsible for the manufacture of the solution's precast elements.



Project: Rapid Bay Ford Crossing Replacement

Location: Rapid Bay, SA

Master Precaster: Civilmart Rocla

Precast concrete has proven a long overdue, yet effective answer to rising water levels in the coastal town of Rapid Bay. National Precast Master Precaster Civilmart Rocla supplied a set of precast concrete culverts, which form the foundation of a new, trafficable bridge that replaces an outdated, often flooded ford crossing.



Project: Nine by Mirvac**Location: Willoughby, NSW****Master Precaster: Advanced Precast**

Nine by Mirvac, a welcoming mixed-use development in Sydney's North, has shown a promising start with an array of gracefully concave precast concrete spandrels having been installed by National Precast Master Precaster, Advanced Precast. This subtle solution elegantly frames the development's second-floor balcony.

**Project: Botanic Apartments****Location: New Farm, QLD****Master Precaster: Advanced Precast****Industry Supplier: ECOTONE**

National Precast Industry Supplier ECOTONE has achieved an outstanding result on the angular precast concrete façade and balconies of the soon-to-be-completed Botanic Apartment complex. Rendering the complex a standout architectural work for the region, ECOTONE's long-life penetrative stain requires minimal maintenance and can be complemented by a range of environmentally beneficial coatings that preserve and self-clean concrete surfaces while purifying the air.

**Project: Tattersson Park Culverts****Location: Keysborough, VIC****Master Precaster: Reinforced Concrete Pipes Australia**

30 large precast concrete culverts measuring 2400Lx1500Wx2400H, prefabricated by National Precast Master Precaster Reinforced Concrete Pipes Australia, have recently been installed throughout the Keysborough wetland development. The project was initiated by the Greater Dandenong Council and is set to maximise water passage and rejuvenate the natural site.

**Project: Beyond Hurstville Apartments****Location: Hurstville, Sydney, NSW****Master Precaster: Advanced Precast**

Construction continues in Sydney's South, with an architecturally designed multi-story complex that features an exemplary precast concrete façade. Featuring graceful curves and a bright finish, the panels were manufactured by National Precast Master Precaster Advanced Precast.

**REID CONSTRUCTION SYSTEMS CELEBRATES 100 YEARS**

Longstanding National Precast Industry Partner, Reid Construction Systems has recently celebrated 100 years of business. As an Industry Partner, Reid Construction Systems has been recognised for an expansive product range including formwork, connections, and reinforcement solutions.



ONLINE LEARNING AND WEBINARS ON PRECAST NOW AVAILABLE

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

Architects, engineers, builders, precast manufacturers and students alike will benefit from a new range of webinars and online learning modules that are now available at:

<https://nationalprecastonline.com.au>

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

AS 3850 PREFABRICATED CONCRETE ELEMENTS WEBINAR

A must for every precast stakeholder

Every stakeholder in precast construction should understand the requirements and responsibilities under AS 3850. The Standard has been revised to include civil construction as well as buildings, and

this webinar covers the most important aspects of the standard. It is presented by three longstanding members of the BD-066 committee which is responsible for the standard's development and review – Simon Hughes from Precast Concepts, Rod Mackay Sim from hillside Engineering and Steve Roach from the ACTU/CFMMEU.

INTRODUCTION TO PRECAST

Perfect for precast first-timers

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



UNDERSTANDING GROUTED PRECAST JOINTS

Technical course for builders, engineers & erectors

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

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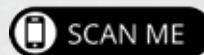
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