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About the Cover

The only TL-2 TMA currently available in Australia to have been successfully tested, passed & certified to MASH Standards, the Scorpion II® Metro delivers the ideal combination compact manoeuvrability and live-saving MASH TL-2 protection for work crews on suburban streets and local roads.

► Turn to Page 10 for the full story.



IMPROVING SAFETY ALONG BIKE PATHS AND RECREATIONAL TRAILS

Dear Readers,

From relatively simple paths, through to fully-engineered paved bikeways (complete with bridges, underpasses and even floating and/or elevated 'boardwalk' sections) bike paths and recreational trails now represent a significant infrastructure investment for councils and road authorities throughout Australia.

In addition to these 'purpose-built' facilities, there is also an extensive network of 'on-road' dedicated cycle lanes ranging in size from small, partial-lane, through to full-lane, and even 'half road' bike lane space allocations. In fact, in many areas, the bike path and lane network has been developed to such an extent that it now transcends a simple recreational facility - moving instead into the realm of a legitimate - and critical - transport corridor.

While the development of high quality bike path infrastructure has played a major role in encouraging people to take up cycling, scootering, etc., it's nothing compared to the boom in cycling and scootering that has occurred as a result of the COVID-19 pandemic.

The move out of 'lock downs' and away from working from home has been accompanied by a strong reluctance by many to re-engage with public transport. And while this has resulted in a significant increase in commuter vehicle numbers, it is

also a key factor in the massive increase in the number of people now using bicycles, scooters and similar forms of transport to commute to and from work and for other regular journeys. One only has to look at the growth in usage along major bicycle infrastructure corridors around the country to appreciate just how significant the growth in demand for these facilities has been over the past year alone.

Interestingly, the increase in bicycle infrastructure, together with the massive increase in the popularity and use of these facilities, has raised a number of important issues - particularly in relation to managing usage and safety issues.

First and foremost is the question of 'traffic' speeds and hierarchies. Even though the majority of these facilities have been designed for use by both pedestrians and cyclists - with many line-marked in an attempt to separate the two - the apparent lack of understanding of how this 'shared use' system should work often results in an extremely dangerous situation for cyclists and pedestrians alike.

This problem is further compounded by the significant speed variables that prevail both between and within the two user groups (eg. walkers vs joggers / slow cyclists vs fast cyclists) and between other users, such as those on electric bikes, electric scooters and any other number of fast-moving, hybrid devices now available in the marketplace.

With an ever-increasing number of people now using bike paths and recreational trails on a regular basis, I believe that the time has come for us to make every effort to educate the community as to the correct use of these facilities. We may even need to consider separate 'higher-speed' lanes.

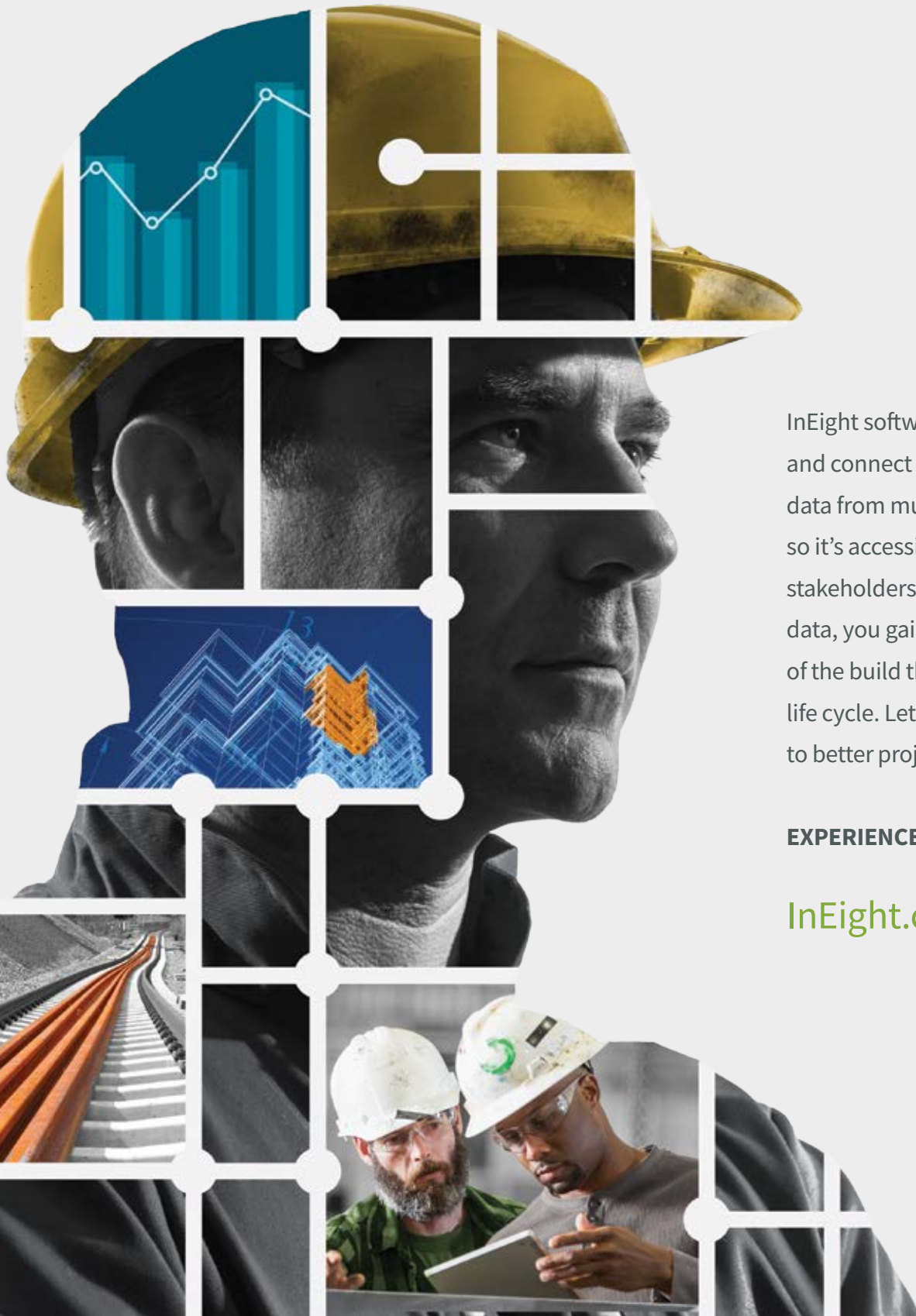
Although it may seem fair to assume that most people would know (instinctively or otherwise) how they should behave when using these facilities, and what rules apply - both in terms of acceptable usage and traffic rules - the evidence would suggest that this is regrettably not the case.

Put simply, I believe that if we are to succeed in encouraging more people to use these facilities, either for recreation and fitness or as a legitimate form of sustainable transport, we need to ensure that these facilities are well managed, well maintained and safe for all to use. And for this to happen, we will also have to invest in an education campaign that teaches people how to use these facilities correctly and safely.



Anthony T Schmidt
Managing Editor

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CALLS FOR CONSTRUCTION SECTOR TO TAKE LEADING ROLE IN SKIN CANCER TESTING AS CASES CONTINUE TO RISE

Despite a deluge of information on the dangers of skin cancer over the last few decades, Australia remains a global skin cancer hot spot, with mortality rates continuing to rise.

Health experts have long stated that early detection is key to preventing its proliferation, yet clearly not enough is being done to reverse the numbers. And with many Australians not regularly getting skin checks after hours, there are calls for construction businesses to lead the charge and set up skin testing at work, in the same way that many businesses organise flu injections.

As the most common cancer affecting working age Australians between 15 and 39 years old, workplace health expert Kristina Billings says "...when you consider the amount of Australians, affected by this each year, the workplace really is the best place to start."

A former employee of food distribution company Monde Nissin is just one example of how workplace skin checks can be ultimately life saving. In 2019, the company organised for a workplace health program to visit the site and conduct skin checks.

"I thought 'okay, I'll give it a go'," said the former employee. "They found a suspicious

spot, so I followed it up with a trip to the doctors shortly after - it turned out to be melanoma."

"I had the spot cut out as soon as possible. It's scary to think that, if it weren't for the program, I probably wouldn't have gotten checked at all. I'm incredibly grateful."

Kristina Billings, founder of the program that conducted the skincheck, *Health at Work*, says "When it comes to health, Australians are unfortunately somewhat nonchalant by nature."

"So, telling the public to go and get their yearly skin check through plain, repetitive marketing is not effective. It has become white noise."

"Conversely, the workplace can be a convenient place for employers to role model to their staff the importance of protecting yourself against sun dangers."

Losing a close friend to cancer was the driving catalyst for Ms Billings to launch *Health at Work*, a workplace health services provider that conducts thousands of skin checks every year.

In 2019, *Health at Work* conducted 3,440 skin checks, detecting over 800 suspicious moles, lesions, sunspots and cancers. Of those, 133 (17%) turned out to be melanomas.

"This year, I'm calling on Australian CEOs and HR professionals to join our fight in saving lives - take the lead by implementing skin check programs," said Ms Billings.

"I want Australian workers to feel like getting their skin checked is no skin off their nose."

For further information, please visit: <https://www.healthatwork.net.au>

VBA EXTENDS THE DATE FOR REGISTERING VICTORIAN ROUTINE SERVICE PRACTITIONERS

The deadline for being registered or licensed to carry out routine service work on water-based fire protection systems has been extended from 31 December, 2020, to 31 July, 2021.

The Victorian Building Authority (VBA) has accepted Fire Protection Association (FPA) Australia's request to extend the date in order to facilitate the transition of the industry to the new requirements.

Restricted registration and licensing for the routine service of water-based fire protection systems was introduced by the VBA earlier in 2020. The changes mean that, after 31 July, 2021, any practitioners

performing routine service work on fire hose reels, fire hydrant systems, or fire sprinkler systems must be registered or licensed by the VBA. Unregistered or unlicensed individuals will not be able to carry out such work from that date.

For routine service work on fire sprinkler systems and pumped hydrant systems there will be additional requirements following 31 July 2021.

FPA Australia has launched training and assessment pathways to help the fire protection industry to comply with the VBA requirements.



For further information on training and assessment for each restricted class, please contact FPA Australia's Training Team by email at: training@fpaa.com.au or phone on: (03) 8892 3182.

INSTITUTE OF CONCRETE TECHNOLOGY LAUNCHES ICT YEARBOOK 2019-2020 25TH 'SILVER' EDITION

The latest edition of the *ICT Yearbook* is now out – a 'silver' edition to celebrate 25 years of publication. And it is a bumper edition, with new features and additional content.

A foreword by Prof Peter Hewlett, the long-standing chairman of the editorial panel, reviews the Yearbook's growth over the period since 1996, and two articles introduce the ICT's most recent developments: the Institute's webinar programme and the new partnership with RILEM.

The core content consists of eight technical papers presented at the annual *ICT Convention*, commencing with a keynote paper by Prof Phil Purnell, *'Between a rock and a hard place'*, but is extended by several commissioned papers from members of the Institute. These papers address such subjects as

superabsorbent polymers, the water ponding curing method and carbon neutrality for concrete.

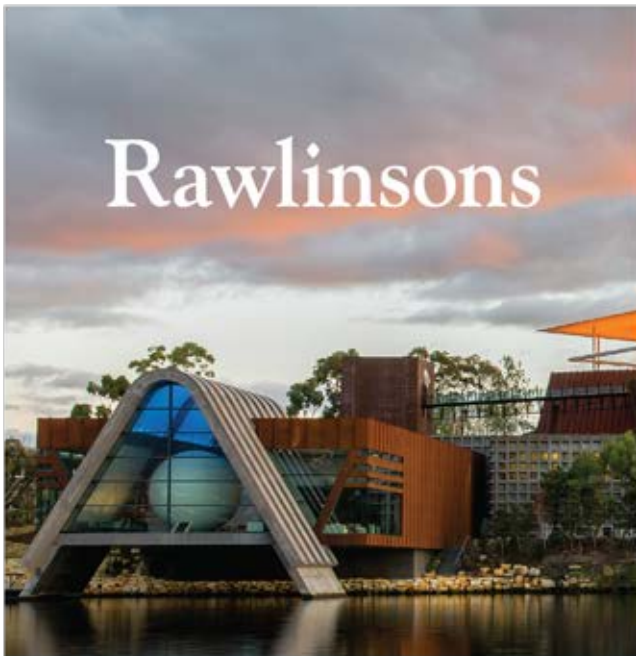
A short piece on site acceptance of concrete entitled *'What not to do'* distils members' experience of poor practice, to illustrate the value of training and qualification.

Regular features are retained, with Prof Rod Jones the subject of this year's 'face-to-face' interview, and John Lay describing the work of the Examinations Committee. Historical topics are treated with Wilhelm Michaelis (1840-1911) this year's *'Pioneer of concrete technology'* and the GPO Building this year's *'Significant concrete structure'*.

A guest piece by the World Cement Association's chief executive considers *'The global cement industry and technology: past present and future'*. As usual the Yearbook concludes with abstracts of the

latest dissertations and project reports to have been awarded the Diploma or MSc in Advanced Concrete Technology.

Copies of the Yearbook are available for purchase. Please email: ict@concrete.org.uk for more information.



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THE CROSBY GROUP INVESTS IN VERTON TECHNOLOGIES

The Crosby Group, a global leader in lifting, rigging, and load securement hardware, recently announced that it has completed a significant investment in Verton Technologies. Australian-based Verton has developed and commercialised disruptive advancements in load orientation technology that remove the need for human held tag lines in lifting applications. These innovations play a critical role in improving the safety and productivity of global lifting operations.

The Crosby Group and Verton will collaborate in the market to accelerate the adoption of this game-changing load orientation technology. By leveraging The Crosby Group's global footprint, Verton will bring an elevated level of safety to an increasing number of workers.

Robert Desel, CEO of The Crosby Group, said: "We are thrilled to partner with Verton in this rapidly growing space."

"This investment is a perfect strategic fit due to our common end user base and our shared values of safety, reliability and innovation."

Verton's solutions include *Everest 6*, a 20-ton load orienting spreader beam, *Everest 30*, a modular load orienting system for a broad range of working load limits, and *Windmaster*, a load orientation device for wind turbine erection.

Trevor Bourne, CEO for Verton added: "With this new partnership Verton can dramatically increase the pace of innovation and the penetration of our products in the market."

As a global leader with strong brand recognition, The Crosby Group creates an exciting platform for Verton's future," Trevor Bourne added.

This marks The Crosby Group's fourth transaction in the past 24 months including the acquisitions of Straightpoint, Gunnebo Industries and Feubo.

ABOUT THE CROSBY GROUP

The Crosby Group is a global leader in the innovation, manufacturing and distribution of products and services used to make lifting and load securement safer and more efficient, with premier brands such as Crosby, Gunnebo Industries, Crosby Straightpoint, Acco, McKissick, Crosby Feubo, Trawlex, Lebus, and CrosbyIP. With global engineering, manufacturing, distribution and operations, the company provides a broad range of products and solutions for the most demanding applications with uncompromising quality that exceed industry standards.

For further information, please visit:
www.thecrosbygroup.com

ABOUT VERTON

Verton is an innovative technology firm and inventor of the world's first remote-controlled load orientation system. This revolutionary system makes taglines obsolete, removing the need for workers to be near moving or suspended loads, keeping them out of harm's way.

Verton's range of lifting products also integrate smart technology to facilitate more precise load placement, faster task turnover, and superior analysis and oversight of operations. The technology will greatly benefit lifting operations by moving towards 'hands free' lifting and keep workers clear of potentially high-risk zones.

For further information, please visit:
www.verton.com.au



NEW ONLINE CONSTRUCTION COURSES TO BOOST SECTOR CAPABILITY

A range of new and innovative online courses are being provided to constructors as the NSW Government's state-of-the-art digital training platform expands its offerings.

NSW Building Commissioner David Chandler OAM said the digital platform, which is a partnership between the Office of the Building Commissioner and TAFE NSW, was produced to help to lift skills and capabilities in the ever-changing building and construction sector.

"All the modules are being developed in consultation with representatives from across the industry – architects, designers, builders, certifiers, engineers and so on – responding to their feedback on the priority learning gaps that are common across the field."

Two new modules, the *Value of Australian Standards* (cost \$140) and the *NSW Planning Portal* (free) were published recently.

"The modules are short and sharp, only taking up to 2 hours each, and they can be done anytime, including when you're offline."

Another three modules relating to ethics, communication and the new Design and Building Practitioner also went live recently, with an additional 18 modules expected to be rolled out throughout 2021.

"I encourage everyone in the construction industry to visit the platform and consider taking a module to help them enhance their professional capability. As we rebuild from COVID we want to establish a more capable and innovative workforce that is able to deliver NSW a pipeline of trustworthy buildings."

The platform is part of the NSW Government's Construct NSW transformation strategy that is establishing new benchmarks of industry performance to restore public confidence in residential construction.

For more information please visit:

<https://training.tafensw.edu.au/constructnsw/>

ROBERTS CO PURCHASES PIZZAROTTI SHAREHOLDING TO BECOME FULLY AUSTRALIAN-OWNED FIRM

The Roberts Co Group recently announced it has acquired the remaining 50% shareholding previously held by joint partner Impresa Pizzarotti & C. S.p.A., an Italian construction and civil engineering firm. As a result, the company will officially change its name to Roberts Co to reflect the new ownership.

This ownership change consolidates Roberts Co as a global business under one name with established operations in Australia, the Middle East and Europe.

In Australia, Roberts Co has enjoyed significant success over the past four years delivering both private and public projects across the commercial, health, education and hospitality construction sectors. Projects include the iconic Zurich Tower in North Sydney, North Shore Health Hub, redevelopment of Concord Hospital, upgrades throughout the Liverpool Hospital

precinct and The Schools at Meadowbank Education and Employment Precinct for the NSW Government.

Commenting on the transition to a fully Australian-owned company, Australian CEO Alison Mirams said: "We're extremely proud of the success achieved to date and believe this move will allow us to direct our energy into further growth and expansion in Australia. We have over \$650million in current contract value on the books with a team exceeding 140 employees."

Ms Mirams said Roberts Co will continue to drive change within the construction industry where it has already gained a reputation as a positive disruptor and innovator. The organisation continues to differentiate itself from its tier one competitors by introducing a series of industry-leading initiatives.



Roberts Co. Australian CEO, Alison Mirams

Of note is the implementation of a 5-day working week and a concerted organisational drive towards higher female participation (32% of the company's employees are currently women, including 65% of its executive team) and supporting a major focus on work/life balance among all construction personnel.

"People, relationships and a unique approach to business are at the heart of our organisation," said Ms Mirams.

"We are a team of thinkers, continually developing innovations to improve and simplify how the industry operates, empowering our workforce, finding smarter ways to work and delivering enhanced value to our clients."

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BIO-INSPIRED: HOW LOBSTERS CAN HELP MAKE STRONGER 3D PRINTED CONCRETE

New research shows that patterns inspired by lobster shells can make 3D printed concrete stronger, to support more complex and creative architectural structures.

Digital manufacturing technologies like 3D concrete printing (3DCP) have immense potential to save time, effort and material in construction. They also promise to push the boundaries of architectural innovation, yet technical challenges remain in making 3D printed concrete strong enough for use in more free-form structures.

In a new experimental study, researchers at RMIT University looked to the natural strength of lobster shells to design special 3D printing patterns. Their bio-mimicking spiral patterns improved the overall durability of the 3D printed concrete, as well as enabling the strength to be precisely directed for structural support where needed. When the team combined the twisting patterns with a specialised concrete mix enhanced with steel fibres, the resulting material was stronger than traditionally-made concrete.

Lead researcher Dr Jonathan Tran said 3D printing and additive manufacturing opened up opportunities in construction for boosting both efficiency and creativity.

"3D concrete printing technology has real potential to revolutionise the construction industry, and our aim is to bring that transformation closer," said Tran, a senior lecturer in structured materials and design at RMIT.

"Our study explores how different printing patterns affect the structural integrity of 3D printed concrete, and for the first time reveals the benefits of a bio-inspired approach in 3DCP.

"We know that natural materials like lobster exoskeletons have evolved into high-performance structures over millions of years, so by mimicking their key advantages we can follow where nature has already innovated."

3D printing for construction

The automation of concrete construction is set to transform how we build, with construction the next frontier in the



The special 'lobster inspired' patterns improve the overall strength of 3D printed concrete, and enable the strength to be precisely directed for structural support where needed.

automation and data-driven revolution known as industry 4.0. A 3D concrete printer builds houses or makes structural components by depositing the material layer-by-layer, unlike the traditional approach of casting concrete in a mould.

With the latest technology, a house can be 3D printed in just 24 hours for about half the cost, while construction on the world's first 3D printed community began in 2019 in Mexico.

The emerging industry is already supporting architectural and engineering innovation, such as a 3D printed office building in Dubai, a nature-mimicking concrete bridge in Madrid and The Netherlands' sail-shaped "Europe Building".

The research team in RMIT's School of Engineering focuses on 3D printing concrete, exploring ways to enhance the finished product through different combinations of printing pattern design, material choices, modelling, design optimisation and reinforcement options.

Patterns for printing

The most conventional pattern used in 3D printing is unidirectional, where layers are laid down on top of each other in parallel lines.

The new study published in a special issue of 3D Printing and Additive Manufacturing investigated the effect of different printing patterns on the strength of steel fibre-enhanced concrete.

Previous research by the RMIT team found that including 1-2% steel fibres in the concrete mix reduces defects and porosity, increasing strength. The fibres also help the concrete harden early without deformation, enabling higher structures to be built.

The team tested the impact of printing the concrete in helicoidal patterns (inspired by the internal structure of lobster shells), cross-ply and quasi-isotropic patterns (similar to those used for laminated composite structures and layer-by-layer

deposited composites) and standard unidirectional patterns.

Supporting complex structures

The results showed strength improvement from each of the patterns, compared with unidirectional printing, but Tran said the spiral patterns hold the most promise for supporting complex 3D printed concrete structures.

"As lobster shells are naturally strong and naturally curved, we know this could help us deliver stronger concrete shapes like arches and flowing or twisted structures," he said.

"This work is in early stages so we need further research to test how the concrete performs on a wider range of parameters, but our initial experimental results show we are on the right track."

Further studies will be supported through a new large-scale mobile concrete 3D printer recently acquired by RMIT – making it the first research institution in the southern hemisphere to commission a machine of this kind. The 5x5m robotic printer will be used by the team to research the 3D printing of houses, buildings and large structural components. The team will also use the machine to explore the potential for 3D printing with concrete made with recycled waste materials such as soft plastic aggregate.

The work is connected to a new project with industry partners Replas and SR Engineering, focusing on sound-dampening walls made from post-consumer recycled soft plastics and concrete, recently supported with an Australian Government Innovations Connections grant.

'Influences of printing pattern on mechanical performance of 3D printed fibre-reinforced concrete', with collaborators Luong Pham (first author and RMIT PhD researcher) and Professor Guoxing Lu (Swinburne University), is published in *3D Printing and Additive Manufacturing* (DOI: 10.1089/3dp.2020.0172).

COVID-19 DRIVES INTERNATIONAL SMART CITIES MARKET BOOM

It appears that the Covid-19 global pandemic has helped to drive an international Smart Cities market boom with 500 urban areas around the world expected to adopt Digital Twin technology by 2025. The need to increase resilience and optimise resource management in light of COVID-19 will be among the key drivers for the growth of Digital Twins over the next five years, according to *ABI Research*. The global tech market advisory firm expects the number of urban Digital Twins to exceed 500 by 2025, and that implementation will expand beyond limited pilots to widespread multi-purpose deployments.

The latest quarterly report from ABI Research entitled *Smart Cities and Smart Spaces* positions Cityzenith alongside Bentley Systems and Microsoft as businesses best placed to capitalise in this expanding market. It is estimated that the Digital Twin market will grow from \$3.8 billion in 2019, to \$35.8 billion per year by 2025, at a CAGR of 45.4%

Dominique Bonte, Vice President, End Markets at ABI Research, said: "Real-time 3D models of cities-built environment allow scenario analysis through the simulation of the potential impact of natural disasters like flooding, [adoption of] generative design principles for new city developments [which optimise] energy savings and solar capacity, and saving costs by operating cities more efficiently and effectively."

He noted that since the first Digital Twins were deployed in cities such as Singapore around three years ago, features have quickly expanded to enable a much wider range of application areas including infrastructure coverage planning and green infrastructure management.

Boston is one US city to have already employed the use of Digital Twins, alongside Helsinki, Jaipur and Dublin.

"The Digital Twin ecosystem system activity is growing quickly with more suppliers announcing more deployments in more cities," said Bonte. "Vendors like Dassault Systèmes and others are paving the way for extending urban Digital Twins to marketplaces and opening access to key metrics and dashboards to the citizens themselves, increasing their overall involvement and helping gain approval of city government decisions and policies."

In order to help cities achieve carbon neutrality, Cityzenith announced in October 2020 that it will donate its Digital Twin software to up to 10 cities over the next year as part of their Clean Cities - Clean Future campaign. Additionally, Bentley Systems partnered with Microsoft to integrate *Azure IoT Digital Twins* and *Azure Maps* into its *iTwins* platform.

Michael Jansen, CEO and founder of Chicago based Cityzenith, said "We at Cityzenith welcome this news and are delighted to be a part of the growing Digital Twin industry. We believe our *Clean Cities - Clean Future* campaign can be a key component of this global effort towards cleaner cities and a safer environment."



Cityzenith's Digital Twin software SmartWorldPro2

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Needless to say, since being approved for use and recommended for acceptance throughout Australia by ASBAP (Austroads Safety Barrier Assessment Panel) early last year, the Scorpion II® Metro has been rapidly gaining in popularity with councils, contractors, road authorities and traffic management professionals alike, with units now in service around the country.

Janine Bartholomew, Manager with A1 Roadlines - the exclusive Australian distributor of Scorpion TMA's – commented:

"As a fully MASH certified and ASBAP approved unit, the Scorpion II® Metro TL-2 TMA provides the ideal worksite protection solution for councils and contractors with crews working on suburban streets and rural local roads."

"In fact, these units are ideal for use along any road with a speed limit of

70 km/h or less – providing the perfect combination of compact manoeuvrability, ease of operation and, most importantly, MASH TL-2 certified protection."

"What's more, the fact that it can be fitted to any suitable compliant host vehicle with a minimum vehicle mass of 3000kg (including ballast), means that in some jurisdictions, the Scorpion II® Metro TMA vehicle can even be driven on a car license," Janine added.

MASH APPROVED TL-2 PROTECTION

With the MASH testing and assessment standards now being referred to in the Australian / New Zealand Standard AS/NZS 3845.2:2017 in place of the previous NCHRP-350 testing, it's extremely important that newly designed equipment is tested, passed and eligible under the MASH requirements. Indeed, the Austroads Safety Barrier Assessment Panel (ASBAP) *Transition to MASH* program for safety barrier systems and devices mandates that all such products - including Truck Mounted Attenuators (TMA's) - MUST now be

tested and approved to the newer MASH standards before they can be approved for use and recommended for acceptance throughout Australia.

With that in mind, when it comes to selecting and purchasing a TMA, the most important question for equipment purchasers to ask is: **"Is it MASH Approved?"**

When it comes to the new Scorpion II® Metro TL-2 TMA the answer is a resounding **YES**.

"Whether it's a TL-2 or TL-3 rated unit, ensuring that your new TMA is fully MASH tested and approved, and subsequently Approved and Recommended for use throughout Australia by ASBAP are critical factors in ensuring that it can be used on Australian roads," Janine said.

"But it's not just about compliance," she added.

"MASH testing and certification is specified for a reason. It involves a series of strictly controlled crash tests and a fully-audited reporting and compliance process that ensures the accuracy of results and data reporting."

"In short, when you purchase a TMA that has been successfully tested and certified to MASH standards, you can be sure that it's going to perform as expected when you need it most... during an impact."

"After all, out on the worksite, the difference between a TMA working as it's supposed to and failing can quite literally be a matter of life and death," Janine said.

"With the new Scorpion II® Metro TMA, equipment owners can be confident that their TL-2 TMA is fully MASH tested and certified, ASBAP Approved and Recommended for use throughout Australia, and is capable of delivering reliable life-saving protection for workers on suburban streets and local roads with a speed limit of 70 km/h or less," Janine added.





'INFINITY TESTING'

THE ULTIMATE TEST OF PERFORMANCE

The Scorpion II® Metro TL-2 TMA underwent a total of four MASH crash tests, three of which (MASH 2016 Tests 2-50, 2-51 & 2-52) were conducted as 'Infinity Tests' – widely regarded as *'the ultimate test of performance'* for TMA's.

Janine Bartholomew explained: 'Infinity Testing' is without a doubt the harshest method of testing the performance of a TMA during an impact."

"In short, testing the TMA on a host vehicle which is anchored in place makes it much more difficult to meet the pass criteria for *IS values*, as all of the Ridedown Acceleration must be provided by the TMA absorbing the energy from the impact."

"It's a much tougher testing regimen and is considered a worst-case scenario test condition from the perspective of testing the TMA's capacity to absorb and dissipate 100% of the impact energy without the benefit of the host vehicle roll-ahead," she said.

"Using 'Infinity Testing' not only confirms that the TMA alone is capable of absorbing the energy of the impact without having to rely on the host-vehicle rolling forward, it also means that the Scorpion II® Metro is the only TL-2 TMA to be MASH certified with no upper weight limit for the host vehicle."

"What's more, the fact that the tests were conducted at 'TL-2 Plus' levels, means that this performance has been proven at 80km/h – which is a full 10km/h above the MASH TL-2 requirements," Janine added.

Needless to say, the Scorpion II® Metro passed all four MASH tests with 'flying colours' and has been certified as 'fully tested, passed and eligible' – or in common terms, fully tested and certified - to MASH 2016 testing and assessment standards. The official eligibility letter (CC-158) is available from the U.S. Department of Transportation website for all to see.

All of the documentation, including full details of the MASH tests, is also available on the A1 Roadlines website: www.a1roadlines.com.au



MODULAR DESIGN REDUCES REPAIR COSTS

As with the larger TL-3 model, Scorpion II® Metro TL-2 TMA incorporates Scorpion's unique modular design. This not only plays a critical role in absorbing energy during an impact, it also plays a major role in helping to reduce the cost of repairs - particularly after moderate impacts and/or in the event of accidental damage - with only the damaged components requiring replacement.

With most non-modular units, even minor damage caused by a driver inadvertently reversing into an object or colliding with a stationary object while positioning the vehicle, can have extremely costly consequences. In fact, with some units, even minor impacts can result in having to replace the majority of the TMA unit. Needless to say, with very low speed and minor impacts accounting for around 80% of the total impacts into TMA's, the cost and inconvenience of having to replace an entire unit or the majority of a unit any time minor damage occurs can be considerable.

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

MASH 2016 Test 2-50



MASH 2016 Test 2-51



MASH 2016 Test 2-52





SUITABLE FOR USE ON A WIDE RANGE OF HOST VEHICLES

Importantly, due to its compact size and low total weight (690kg), the Scorpion II® Metro TL-2 TMA is suitable for use on a wide range of host vehicles. Indeed, the Scorpion II® Metro is recommended for acceptance throughout Australia by ASBAP on any suitable compliant host vehicle with a minimum vehicle mass of 3000kg including ballast.

What's more, thanks to the fact that the Scorpion II® Metro has been successfully tested and approved to MASH TL-2 Plus (80 kph impact) using 'Infinity Testing', there is NO MAXIMUM HOST

VEHICLE WEIGHT LIMIT. As long as the support vehicle meets the minimum weight requirement and is compliant with local vehicle regulations, and the TMA mount is structurally certified, the Scorpion II® Metro TL-2 TMA can be used – regardless of the brand of host vehicle.

A1 Roadlines is able to supply the Scorpion II® Metro on a wide range of cab-chassis models from leading manufacturers including ISUZU, UD, FUSO and HINO to name a few, with trucks available in a range of body and wheelbase configurations to suit any application.



MINIMAL ROLL-AHEAD DISTANCE

While 'Infinity Testing' is clearly the most demanding testing regimen for TMA's – and a critical factor in certifying the Scorpion II® Metro with no upper weight limit for host vehicles - it's important to note that the Scorpion II® Metro also performed extremely well in standard 'Roll-Ahead' type MASH testing.

For the fourth MASH crash test (MASH 2016 Tests 2-53), Scorpion II® Metro TL-2 TMA was fitted to a stationary unrestrained host vehicle in second gear and with the park brake engaged. The TMA was then impacted at an angle of 9.9 degrees by 2014 Dodge RAM 1500 with a curb mass of 2295kg travelling at 81.6km/h.

Impressively, even during this extreme impact, the host vehicle measured a roll-ahead distance of only 12.4 metres.

MASH 2016 Test 2-53



FOR FURTHER INFORMATION, CONTACT:

A1 ROADLINES PTY LTD

P: 1300 217 623 (1300 A1ROAD)

E: sales@a1roadlines.com.au

www.a1roadlines.com.au



Fast site dewatering

For construction site dewatering, self-priming trash pumps are cost effective, reliable and easy to set up. Aussie Pumps heavy duty 6" trash pump, powered by a Kubota 18.5 kW water cooled diesel engine, handles solids contaminated water and delivers flows to 4,200 litres per minute.

Reaching maximum heads of 35 metres, the QP60TDK will draught water through a vertical suction lift of seven metres. The impeller is a heavy duty non clog style, manufactured from high SG cast iron. The hydraulic design of impeller and volute is superbly balanced to obtain the best result in flow, pressure and co-efficiencies.

The pump body is cast iron and a ductile hardened wear plate is provided as standard equipment. The pump's 6" suction and discharge ports are flanged bolt on style.

The easy cleanout port means that if the pumps internals become clogged, it is simple to clean out without the need to disconnect

the pipework. The pump's body can be opened simply by releasing four toggle style hinged levers giving access to impeller and volute for cleaning and service.

A separate drainage sump is also accessed by levering toggles, enabling easy draining of the pump. Removal of sediment from the sump is a simple matter of flushing.

Sealing is achieved by an oil bath mechanical seal running in turbine oil (viscosity ISO 32). The mechanical seal is tungsten carbide to provide long, trouble free operation, even in trash laden or muddy liquid applications.

The engine selected by Australian Pump for the drive is a Kubota four cycle, three-cylinder diesel engine, model D1105. It comes with a 60-litre fuel tank that provides 10 hours of run time. The pump also comes with engine protection in a form of low oil, high water tank cut out.

The standard unit is mounted on a sturdy skid steel base, fitted with an integrated centre mounted lifting bar, that enables easy crane on and off trailers or utes.

Aussie's compact design, in spite of its high performance characteristics, weighs in at 790 kilos, which means it can be mounted in a trailer or transported by a utility vehicle if necessary. Like all Aussie QP pumps, the QP60TDK is covered with a five-year warranty.

Not surprisingly, the new 6" trash pump has generated a lot of interest across a number of key industry sectors, including: quarries, councils (as an emergency sewage bypass pump) and for general construction site dewatering.

For further information on the new 6" trash pump, including a list of authorised distributors throughout Australia, please visit the Australian Pump Industries website: www.aussiepumps.com.au

Ideal for fast filling water carts and construction site dust suppression, Aussie's Kubota powered 6" trash pump can be mounted on a trailer or transported by utility vehicle.



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SMART THINKING

**The Smart Aussie invention that SAVES TIME, SAVES WASTE, SAVES WATER
and helps to deliver A COVID-SAFE CONSTRUCTION SITE!**



Together with its enviable reputation for saving thousands of litres of water per week through recycling, preventing waste sediments being flushed into pipes or stormwater, and saving plasterers and tilers an average of over one hour, per person, per day in time spent moving between the work face and washout facilities,

the remarkable Australian-designed and internationally patented Mobile Smart Sinks unit has also become an invaluable front-line tool in helping to establish COVID-SAFE construction sites.

By providing tool washing/washout facilities at the work face rather than at a centralised location, Mobile Smart Sinks

units not only save time, save waste and save water – they help to significantly reduce movement around the construction site while also eliminating issues associated with social distancing and maximum density requirements at centralised tool wash/washout locations.

Since its launch in 2015, the Australian-designed Smart Sinks technology has gained an enviable reputation for its ability to keep waste sediments out of drains.

Originally developed as a built-in unit for use in dental and medical facilities as an effective, affordable, and easy-to-use method of preventing plaster residues from washing into drains (an extremely common and expensive problem for the dental and medical sectors), Smart Sinks inventor Craig Hanson soon realised that the technology could also provide an ideal solution for the construction sector - particularly when it came to plasterers' and tilers' washout and tool washing needs.

Introduced to the Australian market in 2016, Mobile Smart Sinks incorporate the patented Smart Sinks filtration technology, together with additional water recycling capabilities and foldable stainless steel trays, to deliver a 100% mobile tool washing/washout facility that is easy to use, highly affordable, keeps washout and tool

washing residues out of pipes and drains, uses filtered recycled water, and doesn't even require a nearby water source to operate.

Interestingly, while Mobile Smart Sinks rapidly gained popularity with construction companies and tradies around the country for their outstanding environmental performance and convenience, it's only with the advent of the COVID-19 pandemic and subsequent workplace controls, that Mobile Smart Sinks are now also widely considered to be an ideal solution to workplace OH&S, social distancing and density requirements on construction sites large and small. Craig Hansen explained:

"When we designed and developed the Mobile Smart Sinks, our focus was purely and simply on the environmental benefits – helping plasterers and tilers to keep plaster residues out of pipes and drains, while also helping them to significantly reduce the amount of water being used for tool washing and washouts."

"After the first couple of units had been out working in the field for a couple of months, we were also starting to hear about how much time it was saving the plaster and tiling teams by having the washout facilities right there at the workface, rather than having to travel to a central washout facility, which on most sites, is located in the basement," he said.

"Then, with the advent COVID-19, and the introduction of strict workplace density limits and controls on movement around building sites, it became clear that Mobile Smart Sinks also provide the ideal solution to these challenges."

"Each team can have their own Mobile Smart Sinks unit, right there with them. As they move between locations or floors, they simply take it with them, plug it in to the power and start working – no need for a nearby water source, and no need for a central washout facility," Craig added.

PATENTED FILTRATION TECHNOLOGY

Designed and developed in Australia, Smart Sinks' unique filtration design has been awarded a total of nine Australian and international patents – including two US Patents. Smart Sinks use a series of interlocking sinks and disposable filter bags to remove particulates from the washout water.

Based around a 240 litre MGB, Mobile Smart Sinks incorporate two additional filtration stages (5uM and 1uM) as part of the water recycling system. The filtered recycled water is used for the tool washing/washout activities, after which it passes through the filtration system again ready for reuse.



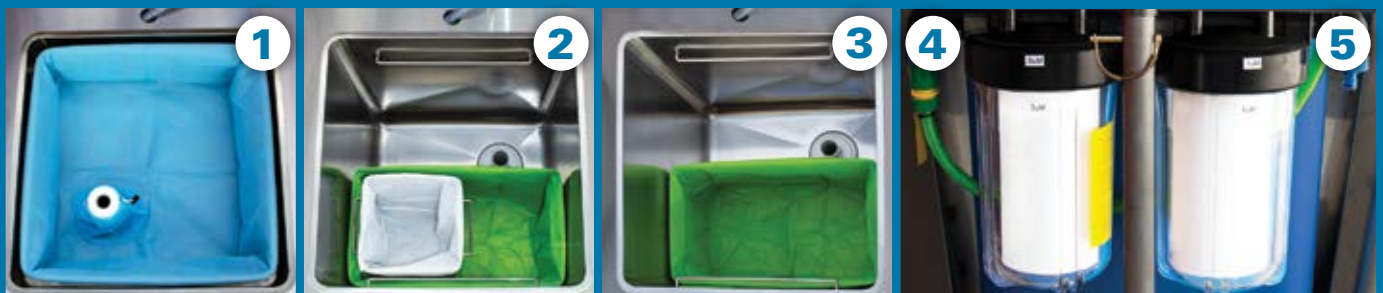
100% MOBILE

Mobile Smart Sinks are extremely easy to move and manoeuvre around the construction site.

Once positioned near the work face, all that remains is for the foldable trays to be lifted into position and secured with the support legs, and for the unit to be plugged in to a standard 240v power outlet.

The fact that the Mobile Smart Sinks unit filters and recycles the water as part of the tool washing process, means that it doesn't need to be connected to a water source to operate.

5-STAGE FILTRATION SYSTEM



Mobile Smart Sinks' unique 5-stage filtration system filters the wash water down to 1 micron, removing particulates and allowing you to reuse the water, or dispose of it down the drain when you're done.

SIGNIFICANT WATER SAVINGS

As well as eliminating the issues of particulate waste from tool washing/washout being disposed of down sinks, in drains or stormwater side-entry pits, Mobile Smart Sinks result in a significant reduction in water use.

For example, using an average minimum flow rate of 18 litres per minute from a standard domestic water supply, the average 5-minute tool washing/wash out process uses around 90 litres of water. Based on an average of five plaster box & tool wash outs per day, one plasterer can use around 450 litres of water per day, or 2250 litres per week for washout water.

The Mobile Smart Sinks unit only requires 60 litres of water to operate, and that water is filtered and recycled every time the unit is used, for up to a week – that's a saving of almost 2200 litres of water, per person, per week. That can equate to tens of thousands of litres of water saved on every job.

What's more, as a Trade Waste Approved unit, at the end of each week the clean filtered recycled water can be disposed of down a drain.

MASSIVE PRODUCTIVITY BOOST

One of the biggest responses to come from users of the Mobile Smart Sinks, is how much time it saves compared to using traditional 'centralised' tool washing/washout facilities.

Perry Richardson, Managing Director of Pro Plaster, exclusive Australian distributors of Mobile Smart Sinks, commented:

"The feedback we've had from our customers has been amazing. They can't believe how much time and money the Mobile Smart Sinks units are saving them."

"Whereas in the past, tool washing/washout was taking an average of 15-20 minutes by the time they travelled to and from the basement and used the shared central washout facility, by having the washout facility right there with them at the work face, they're able to complete the process in around 5 minutes," Perry said.

"Even working on an average of only 5 box wash outs per day, that's a saving of around 60-75 minutes per day, per person, which is not only a massive boost in productivity, it's

also a huge cost saving," Perry added. "In fact, we've had a number of customers say that the Mobile Smart Sinks units have paid for themselves after only the first job!"

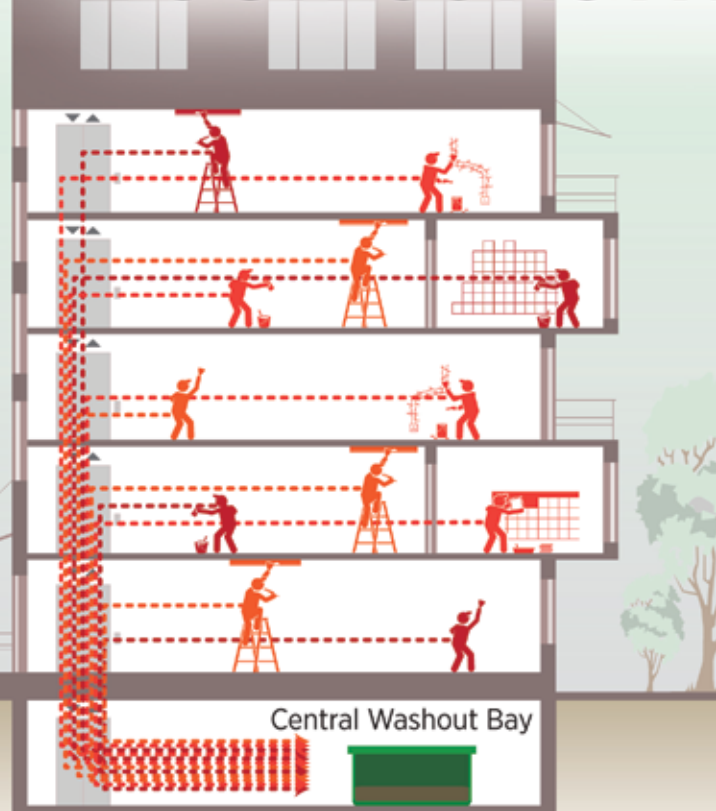


'TRADITIONAL' CENTRALISED WASHOUT FACILITY

- ✗ Multiple movements between worksite and washout facility
- ✗ Excess use of lifts
- ✗ Social distancing & hygiene challenges
- ✗ Lost time & productivity travelling to and from central washout facility
- ✗ Increased water use
- ✗ Waste management challenges including sediment in drains/tradewaste



HOW 'COV' YOUR CONSTR



COST-EFFECTIVE SOLUTION

With an average weekly operating cost of around \$60 per unit (based on recommended daily replacement of the top filter bag, weekly replacement of the middle filter bag and fortnightly replacement of the lower filter bag), Mobile Smart Sinks are also an extremely cost-effective solution. Indeed, Mobile Smart Sinks can work out to be as little as 1/10th of the cost of some centralised tool washing/washout solutions.

COVID-SAFE CONSTRUCTION SITES

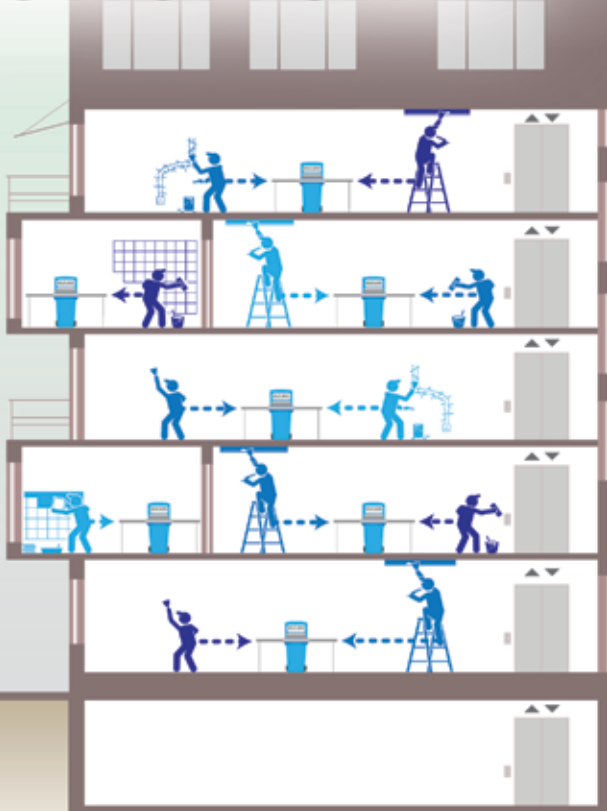
While there can be no doubt that Mobile Smart Sinks have set a new benchmark in waste sediment control, water saving and productivity gains for tilers and plasterers, they have also, quite unintentionally, proven to be a critical front-line tool in establishing COVID-SAFE construction sites.

By providing a tool washing/washout facility at the work face rather than at a traditional centralised location (usually in the basement), Mobile Smart Sinks significantly reduce movement around the construction site, including lift usage. They also eliminate issues associated with social distancing and maximum density requirements at centralised tool washing/washout locations.

For further information, please contact the exclusive Australian distributor, Pro Plaster, Phone: 1800 652 267, email: sales@proplaster.com.au or visit: www.smartsinks.com.au



'COVID SAFE' IS CONSTRUCTION SITE?



smart sinks®

Waste Water Filtration & Recycling Systems

- ✓ REDUCES movement of personnel around the site - washout facility at the work face
- ✓ REDUCES lift use
- ✓ IMPROVES social distancing & hygiene
- ✓ NO LOST TIME travelling to and from central washout facility
- ✓ REDUCES water use through recycling
- ✓ ELIMINATES waste management issues
- ✓ NO sediment in drains/tradewaste



A portrait of Jason Bolt, Managing Director of Master Builders Solutions Australia & New Zealand. He is a middle-aged man with short brown hair, wearing black-rimmed glasses, a dark blue blazer over a light pink shirt, and a silver watch on his left wrist. He has his arms crossed and is smiling slightly. The background is a blurred cityscape with tall buildings.

(re)Building for a Bright Future

There's little doubt that 2020 has been one of the most challenging years in recent history. Together with the horrendous personal impact of the Covid-19 pandemic, travel bans, lockdowns and other COVID-related restrictions have brought much of the global economy to its knees – laying entire industry sectors to waste. With restrictions ranging from workplace limitations on personnel numbers and safe social distancing measures, through to complete sector-wide shutdowns – often for months on end - for business, 2020 truly has been a year like no other.

With that in mind, imagine if you would, having to negotiate the many challenges of 2020 while at the same time finalising the 18-month global sale of one of the world's largest and best-known specialist construction materials manufacturers. That's exactly what's happened with BASF Construction Chemicals and Master Builders Solutions!

As a large part of the former BASF Construction Chemicals business, Master Builders Solutions was included in the world-wide sale of BASF Construction Chemicals to an affiliate of global equity giant Lone Star Funds. The sale, which was finalised on October 1st 2020 after some 18-months of planning and negotiations, not only saw the creation of the new MBCC Group of companies, it also resulted in a total restructure of the group's global operations.

Importantly, the sale and subsequent restructure has seen a renewed standalone organisation with a stronger focus on localising each of the company's respective businesses within their countries of operation, including the development and supply of high quality, sustainable solutions for the building and construction industry that are specifically suited to each particular market.

In Australia and New Zealand, the person charged with the task of effectively driving and launching the Master Builders Solutions brand and its products to their many customers under the new corporate identity is Managing Director Australia & New Zealand Jason Bolt, a 20-year veteran in the chemical and construction industry.

Jason, who first joined the company back in early 2008 shortly after BASF's purchase of the Degussa Construction Chemicals business in Australia and internationally, says that as challenging as the past 18 months have been, moving to a more focused 'localised' business model will not only play a major role in reconnecting the business with its many customers across Australia and New Zealand, but will also ensure that it will be able to better develop and deliver products and solutions to meet the needs of the local markets.

"A change in ownership for a business of this magnitude is always going to present

some major challenges," Jason said.

"Add to that, the fact that we were only halfway through the sale process at the start of the year when COVID-19 started impacting everything, it's fair to say that completing the sale in 2020 made it a particularly challenging task."

"Unfortunately, one of the biggest challenges for any business going through a major transition is staying connected with clients," Jason added.

"Put simply, selling or restructuring a business requires a significant amount of time, effort and resources and if you - as a company - are focused on tasks associated with the sale and/or restructure, it's always going to leave you somewhat 'behind the eight ball' in terms of running your day-to-day operations."

"Now, with the sale finalised and the restructure to build a standalone organisation completed, I'm pleased to say that we can now all get back to focusing 100% on the job at hand, namely: working with our customers across Australia and New Zealand to ensure that we're able to provide them with the same level of expertise and professionalism of supply of high quality, innovative, sustainable and reliable products and solutions they've come to expect from the Master Builders Solutions brand over the years," he said.

"We are adjusting prices in the aftermath of the impact of COVID-19 in 2020 - not only as a result of the supply chain shortages that became the challenge globally for all business, including ours, but also due to the increases in raw materials prices that have occurred as a result of COVID-19's impact on global oil prices," Jason added. "These issues have been further compounded by both the shortfall in availability and the significant increase in cost for freight from Asian countries to Australia."

"Fortunately, being part of a global company allows us to source materials from other regions, thereby ensuring our customers that we're able to continue to supplying all our projects in Australia despite these added challenges. The price increase will help to ensure that we can continue playing the role of the 'innovator' in the market, while still delivering high quality service and products to our customers," he said.

"Importantly, despite the many challenges of the past 12 months, compared to other markets across Asia, Australia has fared relatively well, and the strong pipeline of Infrastructure projects is promising," Jason added.

"On a more exciting note, 2021 holds a great deal of promise for us, and looks set to provide a number of major developments, including the launch of several new technologies into the Australian market," Jason said. "We will also be focusing on optimising and streamlining both our front-of-house and back-of-house service and operations, while at the same time, expanding into a number of new markets."

HISTORY OF INNOVATION

The establishment of Master Builders Solutions as a 'standalone' business and brand represents the latest step in the company's long and successful history.

Indeed, with a history stretching back more than 111 years in Australia, in many ways, the new identity with a reinforcement on localised business model - with a dedicated senior management and team in both Australia and New Zealand and a specific focus on products for each market with a long-term innovation plan - is not only a significant step, it is a major vote of confidence in the Australian and New Zealand markets.

Steve Jobs once said *"Innovation is the ability to see change as an opportunity - not a threat"* and this holds especially true in this day and age.

"Right back to the earliest days of MBT, through to Degussa and most recently BASF, we've always been squarely focused on delivering innovative solutions to meet our customers' needs," Jason said.

"A key part of achieving that goal is ensuring that we have a thorough understanding of the specific challenges and requirements of the markets we're working in."

"We're committed to the Australian and New Zealand markets. We've delivered a raft of innovations over the past 50 years, and we fully intend to keep supporting the future needs of both markets," he said.

"Importantly, even though the Australian and New Zealand operations are being locally managed and run, as part of a global group we're still able to take advantage of the massive world-wide knowledge base, R&D capability and production capacity that comes with that,"

Jason added. "Basically, it means our customers get 'the best of both worlds' in terms of products, service and support."

"Being 'locally' staffed and managed not only helps us to be much more responsive on the ground, it also means we have and understanding of local conditions and requirements which enables us to better work with our customers to deliver solutions to meet their needs," he said.

"Like all good businesses, Master Builders Solutions is really about its people," Jason said. "We're so much more than just the products we sell."

"With that in mind, we've invested heavily in our staff, many of whom have been with us for many years."

"We've also been hiring new people - expanding the team and our customer service capability. So while there'll be many familiar faces, there will also be new additions, including specialists in a number of key fields such as BIM modelling and sustainable construction materials," he said.

From a customer perspective, the change in ownership was relatively subtle.

Visually, the major difference will be the removal of the BASF branding from products and livery. The Master Builders Solutions branding, product names and other branding will all remain the same.

"The major benefit of reverting to just the Master Builders Solutions brand, is that it's also enabled us to keep the existing product names and branding the same," Jason said.

"This not only makes it significantly easier for specifiers - in that they won't have to rewrite all of the specifications that stipulate our products - it also means our customers are able to continue using 'the same products' that they've come to know and trust, he concluded.

For further information, please visit:
www.master-builders-solutions.com/en-au

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Teretek® Fills Underwater Voids to Stabilise Kimberley Rail Bridge Piers Following Floods

The heritage listed Kimberley Rail Bridge is a vital part of Tasmania's Burnie to Hobart Rail Freight Corridor. Originally built in 1884 and then extended in 1976, the bridge stretches 76m over the Mersey River and is one of three remaining wrought iron structures still in use in the Tasmanian rail network.

During the devastating floods in 2016, one of four Kimberley Rail Bridge spans collapsed as a result of scour (erosion in the riverbed) affecting the western abutment. This left the rail line between Burnie and Brighton impassable, impacting the State's freight transportation.

Urgent works were undertaken to rebuild the collapsed western-most span and abutment with modern materials, creating a new superstructure made of steel, supplementing the original wrought iron spans. Once the rail line resumed operation, TasRail identified further scour under the edges of two of the mass concrete piers supporting the bridge. The two piers form part of the original bridge construction and consist of 3m wide and 8m long mass concrete columns that are founded in the river bed, with an elevation of 7.7m-8.6m above the riverbed.

To determine the extent of scour a carefully coordinated inspection was led by engineering consultants Pitt & Sherry, using a team of divers and a 3D sonar survey. It was determined that the riverbed had scoured away around some edges of the piers exposing the underside of the pier footing.

Numerous remediation approaches were considered, including installing concrete sheet piles which would require temporary damming of the river and excavating, or the more extreme measure of decommissioning the bridge entirely and rebuilding it.

Based on prior experience, Pitt & Sherry recommended that Mainmark's proprietary Teretek® resin injection solution be used to bind the aggregate and reduce the voiding, to increase the longevity of the scour resistance protecting the bridge piers. Mainmark was contracted to complete remediation works under project managers, VEC Civil Engineering.

Objectives

The key objective was to restore long-term stability of the Kimberley Rail Bridge piers, by remediating all areas that had been undermined by scour to the piers and to protect each bridge pier from any further scour.

Mainmark was required to inject Teretek resin into the aggregate to fill 8 underground voids surrounding the bridge piers and to restore structural integrity without impacting the Mersey River.

Solution

Prior to injecting Teretek, dive teams needed to clear underwater vegetation, place the aggregate into the voids and insert one 50mm galvanised water pipe into the centre of each void to allow Mainmark technicians to guide the resin injection tubes directly into the treatment area.

A single self-contained Mainmark Rig, with all equipment and material needed for project delivery, was positioned as close to the injection site as possible on the bank of the river. This allowed the crew to run the resin delivery hoses along the ditch in the railway deck during specified "safe times", to deliver the Teretek resin to the affected areas.

Teretek increases ground bearing capacity, fills voids, and has no detrimental effects on the environment. Following injection, the engineered resins immediately expanded to fill the space, binding with the aggregate to create a consolidated mass which filled each void and prevented further scouring under the bridge piers.

Although two days were allowed for project delivery, Mainmark successfully completed works within a single day, and without causing any major disruption to the rail service.

The bespoke methodology proved to be far quicker, more efficient and much less disruptive than the alternative options considered for remediating the bridge piers.

Project Manager Tristan Burns stated that TasRail was satisfied with the project results, considering the unique nature of the project and the complexities involved:

"The works were undertaken adjacent to an operating rail line and a sensitive site with environmental and local stakeholder constraints. VEC and Mainmark undertook the works in a safe and methodical manner. The repairs will ensure structural integrity of the piers in future floods which will preserve the heritage structure for many years to come."

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mainmark

Mainmark's Teretek® resin injection solution has been used to improve the structural integrity of a number of traffic bridges, including this two-lane concrete bridge Queensland which had become unlevel due to underlying ground settlement. Teretek was used to remediate the bridge so that it could continue to safely bear the weight of constant traffic, including heavy vehicles.

Why now is an ideal time to invest in essential infrastructure maintenance

Extending the lifecycle of bridges, culverts, tunnels and arches

There are currently billions of dollars being invested into infrastructure projects to help drive the economy out of a post-pandemic slump. However, while a flurry of new civil construction works will fuel growth, boosting jobs and productivity, it is equally important to service and maintain existing assets that provide essential services for Australian communities.

An increasing number of structures are reaching the end of their expected 50-year lifecycle and ageing infrastructure has been identified as an urgent issue in Australia. Bridges and tunnels continue to absorb growing volumes of traffic, and culverts are showing signs of deterioration due to the environmental effects of extreme weather.

To help extend the life of essential infrastructure, a range of engineered remediation solutions are able to help asset managers rejuvenate urban and rural infrastructure and complete scheduled maintenance works faster and more cost effectively than ever before.

Regardless of how large or structurally solid an asset may be, every asset has a design life. Over the longer-term, these assets can degrade due to the environmental impact of geological changes in the ground, which in turn affect load bearing capacity. What happens beneath the ground can affect

foundations and cause serious structural issues.

If left untreated, structural issues can be costly to fix, or may require demolition and rebuilding. However, a timely and proactive approach to remediation using engineered solutions can add years, if not decades, to an asset. Ground remediation can also help to preserve heritage assets for future generations as was the case in Tasmania after devastating floods caused millions of dollars in damage to public infrastructure including the Kimberley Rail Bridge which spans the Mersey River.

The heritage listed bridge had partially collapsed after raging floodwaters caused the riverbed to erode (otherwise known as scour). Urgent works were required to rebuild sections of the bridge and remediate two original concrete piers. Before commencing the remediation work, a team of divers undertook an underwater 3D sonar survey to identify the extent of the damage. The survey revealed scour had eroded the edges of the piers exposing the underside of the pier's footings where large voids had formed. Engineers considered several remediation options to help restore the bridge's structural integrity, including the extreme measure of decommissioning the bridge and rebuilding it.

After a thorough review, Teretek®, an engineered resin injection solution from Mainmark, was selected to remediate and re-support the bridge piers. Teretek has excellent ground bearing and void filling capabilities and is also environmentally inert, an important consideration given Tasmania's pristine waters. Teretek utilises a precise, discreet, and efficient delivery process with injections applied beneath existing structures in a procedure likened to keyhole surgery. The solution immediately expands on application, filling voids and increasing ground bearing capacity.

The Kimberley Rail Bridge project was further complicated due to the extremely limited site access to the fast-flowing river. There was no road to the riverbank and the ground surrounding the embankment was soft soil. However, Mainmark was able to overcome the access issues by parking a single Mainmark rig containing all the equipment and injection hoses near the railway deck and injecting the solution into the treatment areas during predetermined safe times. Despite the project complexities, Mainmark successfully completed the work in a single day, providing a far quicker, extremely efficient and much less disruptive process compared to alternative methods.

Mainmark's Teretek resin injection solution has also been used to improve the structural

integrity of a number of traffic bridges including a two-lane concrete bridge in the Mackay-Whitsunday region of Queensland that had become unlevel due to underlying ground settlement. Teretek was used to remediate the bridge so that it could continue to safely bear the weight of constant traffic, including heavy vehicles.

Culverts and tunnels are also vital infrastructure that manage the flow of water and can degrade over time. Whether they have reached their end of life or been impacted by corrosion, soil erosion or ground subsidence, in many instances these assets can be rejuvenated using technologically advanced products designed to revitalise and restore their stability.

Underlying issues, such as ground subsidence, can be a catalyst for issues such as voids, which can lead to soil destabilisation and cause the asset to crack and leak. Mainmark has extensive experience in the structural restoration of culverts, tunnels and arched passageways. Its team of engineers and skilled technicians work closely with asset owners and contractors to identify and deliver appropriate rehabilitation such as ground strengthening, re-levelling, void filling, re-lining and other bespoke engineered solutions for individual projects.

Below: Mainmark recently engineered a multi-faceted re-lining solution to remediate seven reinforced concrete culverts beneath the Toowoomba Bypass which had cracked longitudinally and lost structural integrity.



Above: Mainmark re-lined the Toowoomba Bypass culverts using a custom manufactured corrugated metal pipe lining which was placed inside the culverts and positioned using a specially designed landing skid, reel and winching system. The void between the concrete culvert and new corrugated pipes was then filled with Terefil®, Mainmark's lightweight cementitious void fill solution.

For example, Mainmark recently engineered a multi-faceted re-lining solution to remediate seven culverts beneath the Toowoomba Bypass, a 41km long dual carriageway connecting Toowoomba to the north and west of the city. The original reinforced concrete culverts had cracked longitudinally and lost structural integrity. Mainmark drew on its breadth of infrastructure and asset remediation experience to re-line the culverts and restore their structural integrity quickly and efficiently by creating a custom manufactured

corrugated metal pipe lining that was placed inside the culverts and positioned into place using a specially designed landing skid, reel and winching system.

The void between the concrete culvert and new corrugated pipes was then filled with Terefil®, Mainmark's lightweight cementitious void fill solution designed for geotechnical applications and developed to comply with specific project requirements determined by the Queensland Department of Transport and Main Roads. Due to site constraints, the grout was pumped from a single injection point quickly and easily. Mainmark's remediation approach delivered significant cost and time benefits while providing a 100-year warranty for the customer.

While asset preservation is a critical factor in protecting infrastructure, selecting the right engineered solution that is fit for purpose is key. The most effective solutions – ones that maximise longevity and performance – respond to the material of the structure and the conditions to which it is exposed. Selecting the wrong product can often result in failure and greater expense over time.

For further information, please visit: www.mainmark.com



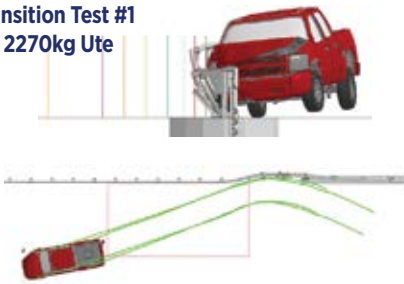
ABOUT MAINMARK

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

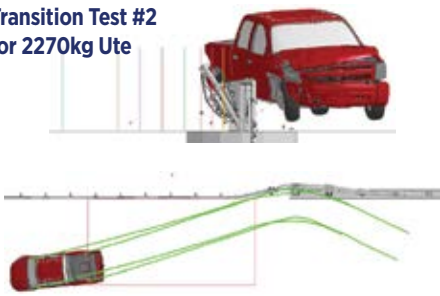
Committed to excellence, Mainmark's state-of-the-art solutions are backed by more than 25 years of engineering expertise.

Mainmark has 15 sites across Australia, New Zealand, Japan and the UK. Mainmark products and services include solutions for ground stabilisation, void filling, stopping water ingress, raising and levelling on-ground and in-ground structures, fixing anchors into rock faces and embankments, and other related ground engineering processes.

Transition Test #1
for 2270kg Ute



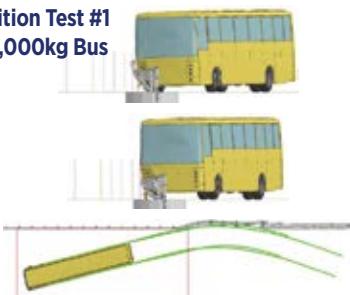
Transition Test #2
for 2270kg Ute



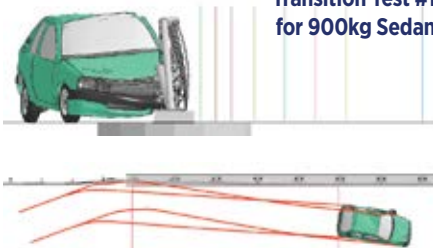
Transition Test #3
for 2270kg Ute



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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ACRS 2021 CERTIFICATES ARE ONLINE WITH SOME IMPORTANT CHANGES

Philip Sanders, Executive Director, ACRS



While 2020 has been a year we would all like to move on from, the effects of the last year have created some perverse effects we all need to be aware of and manage. Together with the pain and disruption to all our lives from the pandemic, most businesses have been severely impacted - few more so than steel traders and suppliers, and steel certifiers due to highly globalised supply chains and associated implications for continued effective verification of product conformance in Australia and New Zealand.

As many of you would have read in previous ACRS features, a number of new Standards were released during 2019 and 2020, some suppliers left the local market whilst others entered, and numerous projects have found that their basic assumption that materials specified and purchased would consistently meet the required standards and specifications have been severely challenged - including that materials would be supplied to projects under ACRS certification, as required.

Additionally, and separately, the ACRS traceability scheme supports and enhances ACRS product scheme certification, but care still needs to be taken in a more volatile and changeable supply environment.

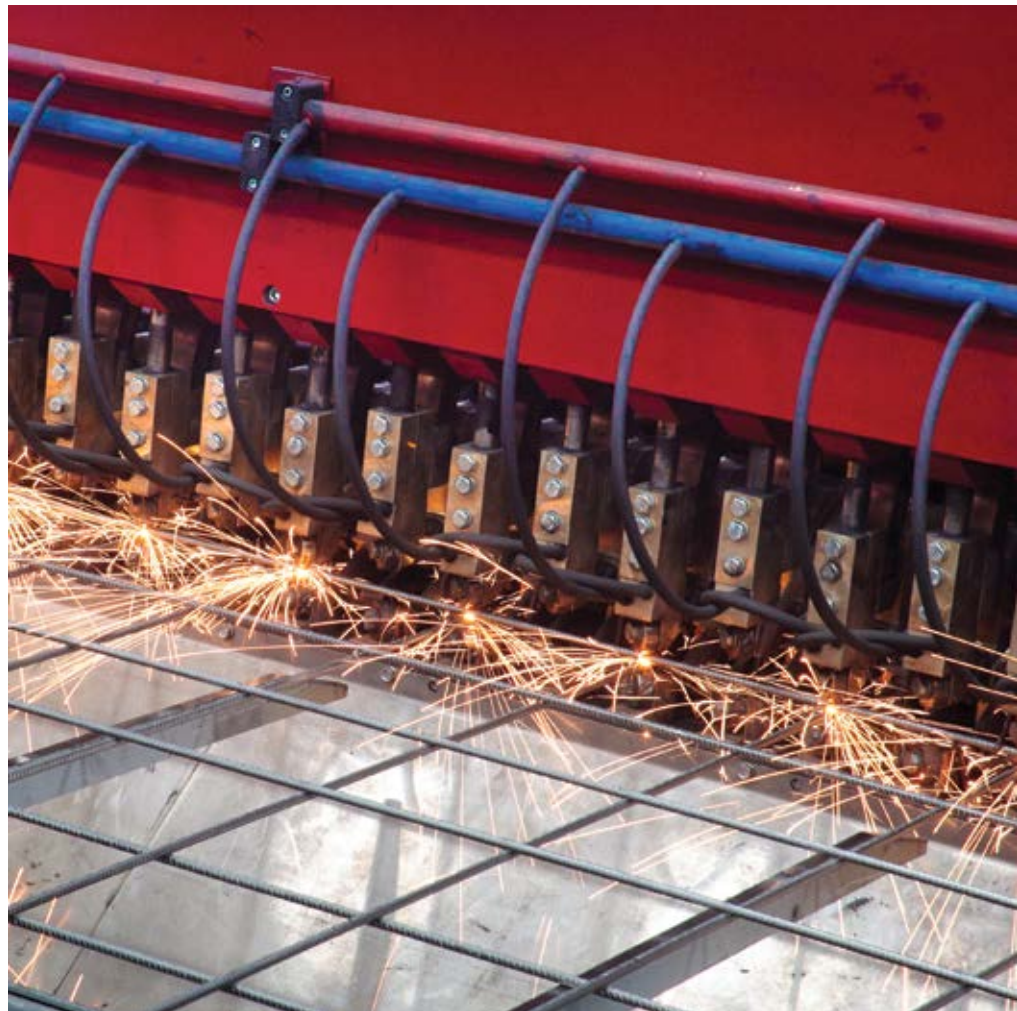
This article covers some important recent developments in construction steels and steel supply, and some adjustments and additions to ACRS certification to reflect the new realities and provide continued confidence that materials supplied meet Standards, including:

- Further developments in the certification of AS 4671:2019 for steel reinforcing materials;
- ACRS accreditation to AS 4100:2020 Steel Structures complementing ACRS longstanding JAS-ANZ accredited certification of welded sections to AS/NZS 3679.2 2016 *Welded I-Sections* and AS/NZS 5131: 2016 *Steelwork Fabrication*;
- Traceability concerns and use of ACRS certification to effectively manage materials traceability (and awareness of misstatements regarding ACRS certification to avoid effective scrutiny of supply of affected materials), and resultingly;
- Changes to ACRS certification and practice (particularly rebar processing and structural welded sections fabrication) to assist steel customers easily confirm the unbroken chain of ACRS certification required to verify only ACRS certified materials have been supplied.

ACRS Certified Steel Reinforcing Materials – Manufacture and Processing

The recent release of AS/NZS 4671:2019 and its product requirements initially caused some confusion in the marketplace - particularly whether the 2001 edition of AS/NZS 4671 remains valid, or whether the 2019 edition must apply to any supply delivered under ACRS certification. A transition period of 2 years is currently operating, and suppliers are progressively moving to the new Edition.

ACRS early JAS-ANZ accreditation to certify to both AS/NZS 4671:2001 and AS/NZS 4671:2019 has continued to assist suppliers, building surveyors, government departments and consumers retain confidence in the uninterrupted supply of compliant materials. ACRS is continuing to issue certificates to AS/NZS 4671:2001 and seamlessly update suppliers to AS/NZS 4671:2019 as they complete their transition.





ACRS Certified Structural Steel – Manufacture and Fabrication: An Integrated 2-Stage System

AS 4100:2020 *Steel Structures* was released in August 2020 with ACRS JAS-ANZ accredited to include this new edition in certification from November, providing an important link with ACRS existing JAS-ANZ accredited certification of structural welded sections to AS/NZS 5131:2016 *Structural Steelwork Fabrication*.

With this latest extension to our accreditation, ACRS provides certification across all the necessary standards and government specifications forcibly ending the false claims by some parties that ACRS certification of structural welded fabricated sections does not cover AS/NZS 5131, leaving customers and government departments without their expected coverage by ACRS certification, with consequent contract problems when this was discovered.

As with steel reinforcing materials manufacture and any subsequent processing or fabrication, ACRS certification of both **Stage 1 - Manufactured Product** and **Stage 2 - Fabricated Product** (structural welded sections) remains a requirement. Any break in the chain of certification renders the materials uncertified, and materials conformity and compliance to regulations must be demonstrated by other means and approved by the appropriate decisions making body. If you have any questions about:

- a) the ACRS integrated 2-stage process, or
- b) questions about the ACRS chain of certification, or
- c) where ACRS certification is required and you are told that ACRS does not certify structural welded sections to AS/NZS 5131,

please contact ACRS directly on T: +61 (0)2 9965 7216 or E: info@steelcertification.com

ACRS Certified Traceability

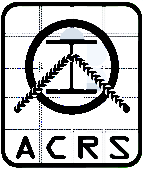
ACRS certification covers traceability between *Stage 1 (Manufactured Product)* certificate holders and *Stage 2 (Fabricated Product, e.g. processed rebar, steel mesh, and welded structural sections)* certificate holders.

Separately, the standalone ACRS traceability scheme provides an additional, complementary assessment and verification system for non-producers and intermediaries in the increasingly complex steel supply chain.

ACRS Traceability Certification, derived from long-established European best practice, showed its value in both prestressing strand and structural sections supply in Australia and New Zealand during 2020. For example, in prestressing supply, ACRS certification and associated

ACRS services to stakeholders assisted a longstanding and valued international supplier maintain its supply to both infrastructure and commercial projects.

In other cases, the break in ACRS chain of certification between *ACRS Stage 1* and *ACRS Stage 2* or *ACRS Traceability Certification* alerted engineers, builders and government authorities to structural steels supply breaching purchase and supply conditions. Whilst ACRS has worked with affected parties on several such incidences, regrettably from January 2021 - due to the sheer increase in these incidences during 2020 and the resulting demand on ACRS resources - ACRS will be unable to provide comment and assistance for parties not holding the necessary ACRS certifications.





Important ACRS Certificate Wording Updates: January 2021

To assist users of ACRS certificates more clearly understand the scope of each certificate there have been some significant wording changes this year that you should be aware of.

For the various Manufactured Product categories, wording will be similar to:

"Products listed on this Manufactured Product certificate may be relied upon as having the benefit of ACRS Product Scheme certification after any subsequent processing only where cut, or bent, or welded by an ACRS certified processor. For Approval of processed reinforcing bar, refer to the bar processor's ACRS Fabricated Product certificate."

For the various Fabricated Product categories, the new certificate wording will be similar to:

"Products listed on this ACRS Fabricated Product certificate may only be relied upon as having the benefit of ACRS Product Scheme certification where fabricated from appropriate Approved Materials manufactured by an ACRS certified Manufacturer with the appropriate Scope of Certification."

It is therefore a very important part of your risk management process that you ensure you receive an unbroken chain of certification for both the steel manufacturer(s) and the steel processor(s) or fabricator(s).

For further information or enquires please contact ACRS at: info@steelcertification.com or phone: +61 (0)2 9965 7216

Takeaways:

- 1) Always obtain the ACRS certification from all the sources of steel supply, both manufactured steels and processed/fabricated steels. Where necessary, also demand the *ACRS Traceability Scheme Certification* from your trader or steel stockist to ensure the steel is traceable to origin and the correct standard of supply;
- 2) Check the scope of each certificate to be sure that what you have ordered is what you have received, and importantly;
- 3) Remember, "ACRS certification" of fabricated materials has always covered more than the just the mill of manufacture: **You need an unbroken chain of ACRS certification from source to site.** Therefore, you must have the appropriate ACRS Stage 2 certification from the rebar processor, mesh manufacturer, or structural welded section fabricator, for those materials to be ACRS certified – not just the ACRS certificate of the mill of origin from which the processor or fabricator sourced their basic steel.

If you don't confirm this, you could be in trouble – as so many projects unfortunately discovered during 2020.



Game Changer

Combilift's new Aisle Master-OP looks set to change the face of warehouse design, truck-to-rack handling and order picking operations across the globe

Leading materials handling equipment company Combilift officially launched the latest addition to its product portfolio in a virtual press conference on February 3rd. The NEW *Aisle Master-OP* (AME-OP) is a pioneering stand-on electric powered model that combines the advantages of a narrow aisle articulated forklift and an order picker for versatile operation in warehousing applications.

The development of this model was influenced by customer feedback - as has often been the case with Combilift's innovations - as well as the recent soaring growth of e-commerce.

"Customers already using the Aisle Master for space saving, storage and efficiency in their warehouse asked if we could redevelop the Aisle Master to meet their ever-growing demand for order picking customised orders," said Combilift CEO Martin McVicar.

Research & Development carried out in 2019 & 2020 has created the *Aisle Master-OP*. The main feature of this unit is the step-through operator compartment which has design copyright protection (European Design Registration No. 002676809-0001) across multiple markets worldwide. The low floor height of just 280mm enables convenient, single step access from both sides of the truck which speeds up order picking compared to

the operator having to get on and off from a seated position. The AME-OP truck has all the key advantages of the conventional Aisle Master - indoor/outdoor, for loading/offloading and for stock replenishment at other times during shifts when order picking is complete.

The Aisle Master-OP is available in a number of variants, with lift capacities from 1,500kg to 2,500kg, lift heights up to 12.1m and can operate in aisles as narrow as 1650mm. It features a patented chain steering system (EU Patent No. 3008008), which allows the truck to articulate more than 205°, with an in-line drive motor and front drive axle assembly, all of which enable narrower aisle operation. The multifunctional programmable joystick control lever in the operator compartment, which includes controls for the hydraulics and traction, is adjustable to enable comfortable and ergonomic working conditions for operators of all sizes.

The *Operator Presence Detection* floor pad engages the parking brake automatically when the operator steps off the truck to carry out Order Picking.

"Before we officially launch any new model, Combilift carry out extensive field testing on customer's sites, this was the case with the Aisle Master-OP," Martin McVicar said.

The AME-OP is now a production model within Combilift, with units currently in build for customers in the United States and in New Zealand - one of which is Sorted Logistics based in Christchurch New Zealand, a third party logistics provider and freight forwarder who will be receiving eight AME-OP units shortly.

"This is a major innovation in the warehousing sector," added Martin, "and the versatility to use the one Aisle Master for multiple applications - narrow aisle operation, truck to rack handling, bulk picking and item order picking - will result in strong demand for this new product in our home and export markets around the world."

For further information on the new Combilift's range of products, including the new Aisle Master-OP please visit:

www.combilift.com



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RAW, SUBTLE, ELEGANT: THE SANDS HOUSE, TORQUAY

Project: The Sands House

Location: Torquay, Victoria

Architect: James Dean and Associates Architects

Engineer: Harrington Gumienik and Partners

Master Precaster: Otway Precast

The recently completed Sands House in the coastal region of Torquay, Victoria features a bespoke application of precast concrete in a residential context. The architecturally designed residence features floor to roof glazing, exposed steel and polished concrete floors, all of which are framed by unadulterated precast concrete walls.

Precast concrete walling has realised the architect's vision of consistent, expressed materials and consistent surface finishes. Such elegant details of the Sands House are exaggerated by the surrounding scrubby coastal landscape.

James Dean and Associates Architects engaged National Precast Master Precaster, Otway Precast for both the supply and installation of 31 precast concrete walls. Each precast wall element includes a fillet along its vertical edges, resulting in articulated gaps between panels.

To emulate the formwork holes of an in-situ concrete wall, Otway Precast has cast a subtractive hole pattern repeating across each wall's face that emulates the board formed style popularised by Japanese architect Tadao Ando.

The precast manufacturer opted to use custom-cut HDPE plastic formwork to maintain a consistent finish quality across the set of supplied elements.

As per the architect's specifications, these small details result in the Sands House expressing the look and feel of in-situ concrete construction without sacrificing site efficiency or finish quality that would likely arise from in-situ concrete.

Precast concrete walling has realised the architect's vision of consistent, expressed materials and consistent surface finishes.





Precast concrete walling can provide an unmatched surface quality and lustre in both residential and commercial architectural applications. The Sands House is a prime example of off-form precast concrete used in an architectural finish.

The ability for precast concrete to be coloured with pigments, patterned, or finished to varying levels of coarseness is why it is such a versatile medium for architects. As precast concrete is manufactured in a factory-controlled environment, the appearance of all elements remains consistent across the project.

The 31 precast walls in the Sands House meet not only the design specifications of the architect and client, but also integrate meticulously with the structural system of the building. Each wall panel has a loadbearing capacity and provides an engineered fixing solution for the roof structure.

To the specification of engineer Harrington Gumienik and Partners, the roof structure integrates via through-wall plates and inverted dowels.

Off-form precast concrete walls have provided a material sensibility to The Sands House in Torquay. Both the subtle faux-formwork

holes and carefully considered fillets have aligned precast concrete with the architect's raw and elemental design philosophy that is evident throughout the entire house.

This application of precast concrete has integrated well with the building's structural system and has offered a low cost, efficient construction timeline due to the integrated supply and installation solution provided by Otway Precast.



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NATIONAL PRECAST WELCOMES NEW BOARD MEMBERS

Michael Waeger of Waeger Constructions will continue in the second year of his two year term as President and several other existing Board members were re-elected at the organisation's November 2020 AGM.

In addition to Michael being re-elected, also back for another year are Craig Zinn from Stresscrete, Paul Adams from Humes, Ian Coulter from Precast Concrete Products, George Spiropoulos from Euro Precast, Daniel Nassar from Alpha Precast, Alberto Ferraro from PERMAcast and Riccardo Musella from Reinforced Earth Company.

New to the Board are Adrian Cahill from Reinforced Concrete Pipes Australia (RCPA) and Karen Thompson from Rocla. Daniel Coutts from Austral has stepped down and is thanked for his contribution.

Craig Zinn will continue to serve as Immediate Past President and Paul Adams has been appointed Incoming President.

National Precast's CEO Sarah Bachmann is delighted with the new appointments.

"Michael's leadership has proven outstanding throughout the recent challenges we've all endured and his enthusiasm for the Association is having an impact. We had one more than our Constitution allows nominating for Board roles, and we recently put a call out to other Board members about the incoming president role. This is the first time we have had three Board members offer to fill the role," Bachmann comments.

"It's wonderful to see such positivity and enthusiasm. Unlike many operators in the industry, these people – both Board members and members generally – think beyond the confines

of their businesses and are really invested in the Association. They are genuinely committed to making the precast industry better for everyone.

That alone is a good reason to give preference to a member over company which is not a member," Bachmann says.

National Precast's 2020-21 Board of Directors

Michael Waeger	Waeger Constructions (President)
Craig Zinn	Stresscrete (Immediate Past President)
Paul Adams	Humes (Incoming President)
Ian Coulter	Precast Concrete Products
George Spiropoulos	Euro Precast
Daniel Nassar	Alpha Precast
Alberto Ferraro	PERMAcast
Riccardo Musella	Reinforced Earth Company
Adrian Cahill	RCPA
Karen Thompson	Rocla

NATIONAL PRECAST SETS INDUSTRY MEETING DATES

Just as National Precast announced that its usual quarterly national member meetings would resume, Brisbane went into lockdown.

Association CEO Sarah Bachmann comments that the lockdown was a reminder that COVID is still very much with us. "Until a vaccine has had widespread implementation, attempting to organise national face-to-face meetings is problematic," she comments.

"With the risk of sudden lockdowns and mandatory isolation, most of us don't want to travel if we don't have to."

Until such times that the new world with COVID has somewhat normalised, National

Precast has decided to organise lower key, informal local events.

The first of these is being held in Brisbane. It will consist of a tour of Precast Concrete Products and a look at some city construction sites, followed by a city lunch. Local issues will be on the agenda for discussion over lunch.

"Local members will be invited to attend. It is one thing we have all really missed, and it's one of the most valued membership benefits.

"Precasters who are not yet part of our community are also welcome to attend provided they have a genuine interest in membership," says Bachmann.

Anyone interested in attending the Brisbane event or other events throughout the year can contact Ms Bachmann at exec@nationalprecast.com.au or by calling 0414 880 351.

2021 National Precast events

Thursday 25th February - Brisbane QLD
Friday 12th March - Perth WA
Thursday 25th March - Hunter Valley NSW
Friday 28th May - Adelaide SA
Thursday 26th August - Launceston TAS
Thursday 25th November - Melbourne VIC

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CSR Hebel can look back over a long history. With over 25 years of experience, a focus on knowledge, innovation and high standards of production has enabled Hebel to stand out as a supplier of Autoclaved Aerated Concrete (AAC). In fact, Hebel is Australia's only manufacturer of high performance AAC for residential, commercial, civil and infrastructure applications.

Recently the company invested in a new cage welding plant in order to meet expanding requirements for their business. Their previous manufacturing plant was all manual, with each process requiring several operators. The new line automated the entire process.

CSR HEBEL: A WIDE-RANGING PORTFOLIO WITH TRADITION

Hebel is the only Australian made AAC on the market. The company can count on a highly experienced local technical and engineering support team. Hebel has developed a patented hoisting solution, making it much easier to install boundary and intertenancy walls in areas with limited access.

The company has about 120 employees and offers innovative building solutions that are strong, versatile and sustainable. Hebel panels

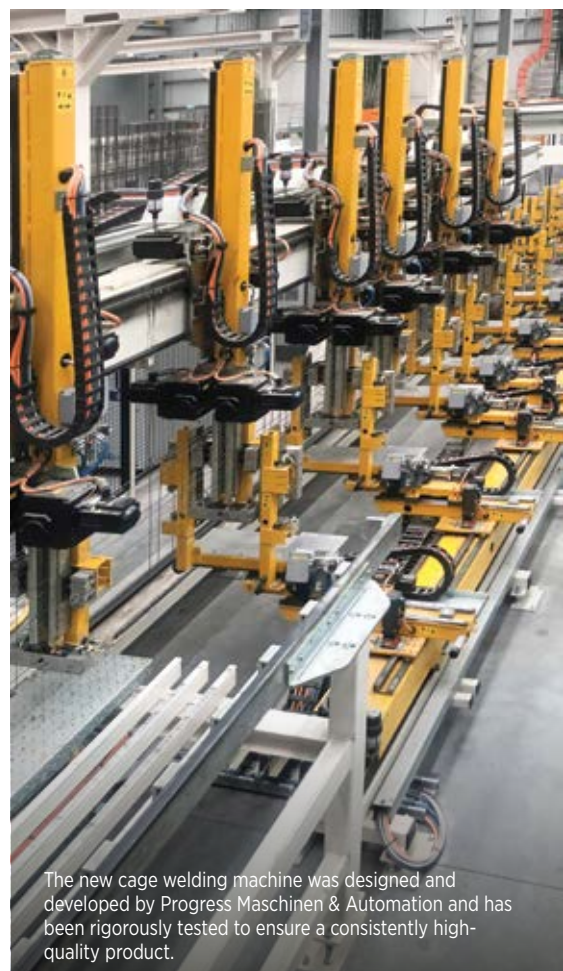
are high-performance products containing steel reinforcement for added strength with an anti-corrosion layer on the steel for maximum durability.

Not surprisingly, CSR Hebel's focus on quality, safety and innovation – together with the quality and performance of the AAC applications being manufactured at the plant – has seen the company become a preferential contractor for builders, developers, resellers and installers, and a formidable supplier in the construction industry of Australia and New Zealand.

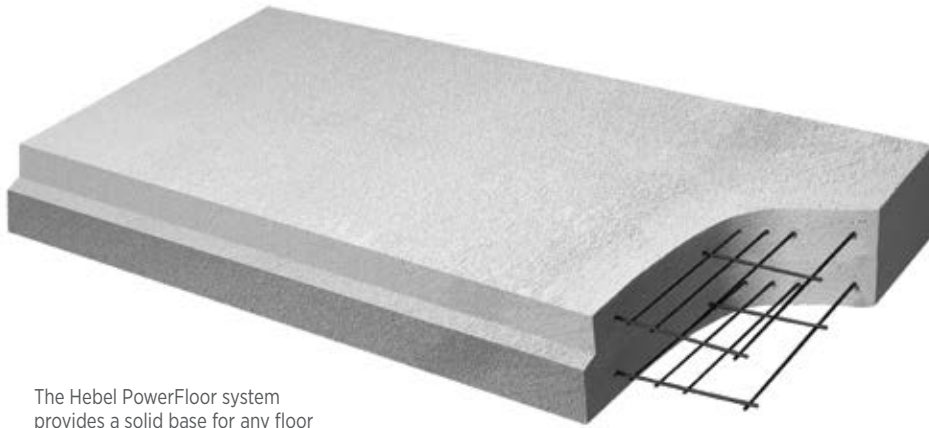
AAC APPLICATIONS

AAC is a solid yet lightweight building material that's widely used in construction throughout the world. In the AAC manufacturing process water and readily available dry ingredients – sand, lime and cement – are mixed with an expansion agent to form a semi-liquid mix called slurry which is poured into a mould. If panels are being produced, then steel mesh reinforcement will be appropriately placed in the mould before the slurry pour.

AAC is much lighter than traditional concrete, yet strong and solid with excellent thermal properties.



The new cage welding machine was designed and developed by Progress Maschinen & Automation and has been rigorously tested to ensure a consistently high-quality product.



The Hebel PowerFloor system provides a solid base for any floor covering and offers excellent acoustic performance.

CONVINCED BY RELIABILITY

The fact that the choice fell on the customized cage welding plant from Progress Maschinen & Automation, one of the companies in the Progress Group, was no accident.

“The reason for our partnership with *progress* is the reliability of the machines and services,” says Engineering and Reliability Manager Tim Grabham.

“We felt *progress* had expertise in mesh handling that we had not seen with any other supplier, and this is what we needed for our new plant,” he added.

Located at CSR Hebel’s state-of-the-art manufacturing facility in Somersby, north of Sydney on the NSW Central Coast, the new cage welding plant was built with a focus on providing cost-effective manufacture of bespoke reinforcement mesh for AAC applications. The entire machine was designed in collaboration with progress engineers to meet the requirements of the new plant.

The The M-System AAC works between 2 and 3 shifts per day, with a daily output of approximately 4000 meshes per day.

THE HIGH-PERFORMANCE CAGE WELDING PLANT M-SYSTEM AAC

Two fully automated Twin-MSR straightener and cutters produce the line and cross wires for the mesh in the required lengths, quantities and diameters. The wires are then automatically transferred to the welding gantry.

The resistance spot welding gantry is equipped with multiple welding heads whose computer control system allows the programming of welding parameters according to different wire diameters.

While one pair or single meshes are being welded with connector bars made by another JIT working progress machine, the stork takes the next meshes and places these in a similar line adjacent to the first one in order to keep to high-speed volumes required. During the various handling processes, the welding gantry is already welding the next meshes.

The integrated *progress control* system facilitates CAD-CAM input from a master computer and enables full system monitoring and error diagnosis.

For further information, please visit: www.progress-m.com



Each panel in the pack is inspected and undergoes a series of quality control checks prior to leaving the plant.



2021 Courses Available

IPWEA have developed some brand new short online courses. Make sure you book early.

- Mentoring For Workplace Outcomes
- Managing Workplace Conflict
- Managing Risks To Council
- Developing Work Priorities For New Leaders
- Presenting for Impact and Outcomes for Leaders

Special Offer:

Course price is \$200/per participant. However, book three or more courses and save more than 10%. (i.e. three courses for \$500 and five courses for \$750).

Participate in three or five of these essential skills short courses to obtain the maximum embedding of content and cost benefit.

These short courses will be delivered by one of our top facilitators, Colin Emerson. Colin has more than 36 years of leadership, business, government, banking, speaking, training and customer service experience. He holds an MBA, with a focus on leadership development.



CEO Update

resilience and capacity to problem solve, and assist with participating in our states economic recovery through building infrastructure, maintaining and improving road safety, and driving sustainability and development to improve our communities.

We have a number of innovative initiatives planned for this year, and are ramping up to finalise the 2021 Regional Forums and State Conference programs. We are delighted to bring these networking events to our regions, and be able to spend time collaborating and sharing information amongst our members and stakeholders. It feels like it's been a long time...

Please make sure you save the dates and register to attend. Looking forward to seeing everyone in 2021.

Fran Binns

CEO - IPWEA NSW & ACT

Goodbye 2020 and hello 2021! Last year it was the unrelenting disasters of drought, bushfires and floods for many of our members. This year, we will continue to face disruptions from the pandemic and our endurance will be tested to build our

IPWEA NSW and ACT Regional Forums

'Unlocking Local Government Potential'

IPWEA face to face Regional Forums are back with a bang. For over a decade, the Institute has steered the conversation across the Engineering Industry through the annual Regional Forums.

The Forums are one day, seminar style events held in twelve different towns across New South Wales and the ACT. Under the theme 'Unlocking Local Government Potential', Partners and Suppliers of the Public Works Industry present topical case studies, demonstrate their latest products/technologies, share their experiences, discuss emerging challenges and provide innovative solutions for ongoing projects.

COVID-19 SAFETY

Your wellbeing is IPWEA NSW & ACT's first priority. All Regional Forums will follow strict COVID safe policies to ensure your health and safety and will have complimentary face masks as well as hand sanitiser.

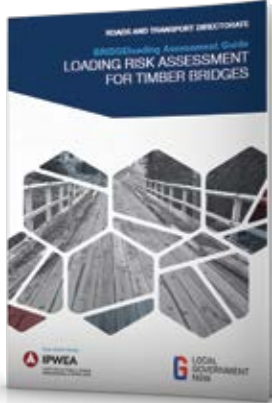
Immerse yourself in Public Works innovation and connect with local peers like you have never before.

For more information or to register visit:

www.ipweansw.org/regional-forums

Central West	Orange	Orange Ex-Services Club	Monday 8th March
Orana	Mudgee	Parklands Resort	Wednesday 10th March
Northern Inland	Gunnedah	Gunnedah Cultural Precinct	Friday 12th March
South West	Griffith	Quest Griffith	Monday 19th April
ACT	Bungendore	The Carrington Inn	Wednesday 21st April
South East	Bega	Bega Valley Commemorative Centre	Friday 23rd April





Bridge Loading Assessment Guide

Over a long period of time, Transport for New South Wales (TfNSW) and its predecessors has published a range of guides aimed at allowing councils and other bridge owners to establish the load capacity of timber bridges.

The purpose of this Guide is to determine the application of a known load applied to critical elements of a bridge, if the structure is behaving in accordance with expected deflections obtained by calculation. The difficulty in calculating the expected deflections for a timber bridge is determining the value of the parameters necessary to complete the assessment. This Guide includes data sources that provide a means of estimating these parameters.

The complementary Guide is available for download with member council access or by registering at: www.roadsdirector.org.au



IPWEA NSW & ACT Inhouse Training

Determine your teams exact upskilling requirements and we will tailor-make a program for your organisation/council. IPWEA will use relevant course material such as case studies and storytelling to maximise the learning objectives and outcomes.

What are the Benefits?

- **Tailored** - We match our highly acclaimed intellectual material, with your organisation's internal professional development needs, to ensure our training is practical and aligned to your workplace
- **Cost-effective** - We will work with you to plan an efficient 'one-stop shop' solution for all your training needs

- **Convenient** - You choose the time and location. No travel or venue hire costs required
- **Credible** - Leading industry practitioners develop and facilitate our courses
- **Flexible** - Choice of half-day, full-day or a series of courses, our client focused team will support your training journey.

Our main priority is the health and well-being of our delegates and training staff; therefore IPWEA NSW & ACT will follow all Government Guidelines. Measures will be in place to practice good hygiene and social distancing throughout the training.

For more information, please visit: www.ipweansw.org/inhouse-training

IPWEA NSW & ACT State Conference

Tuesday 23rd – Thursday 25th March 2021
Crowne Plaza, Hunter Valley

This three-day premier event provides a unique platform to discuss significant challenges and opportunities presented in the Public Works and Engineering sectors.



Returning to the Crowne Plaza Hunter Valley in 2021, the State Conference will feature numerous keynote speakers, a bustling exhibition hall, technical streams, engaging

panel discussions and a variety of social events.

For more information and to view the program visit: www.ipweansw.org/state-conference

IPWEA NSW & ACT

The Institute of Public Works Engineering Australasia (IPWEA) NSW and ACT Division is the professional membership organisation who provides services and advocacy for those involved in and delivering public works and engineering services to the community.

IPWEA has been established as a charity with the purpose of advancing the public works sector in Australia, particularly in NSW and ACT. Our mission is to enhance the quality

of life of NSW and ACT communities through excellence in public works and services. We seek to inform, connect, represent and lead public works professionals in NSW and ACT.

Many of our members are engaged in local government, the tier of government that has at its heart the provision of public infrastructure, works and services, management of roads, bridges, community health, road safety, sport and recreational facilities, water and sewer,

emergency management which are all key areas of responsibility for local government engineers.


To become involved in this prestigious membership organisation, please visit our website <https://www.ipweansw.org/> and sign up via our new system and membership portal, or contact us via email at: nsw@ipweansw.org

Don't miss out on the opportunity to be a part of something special.



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

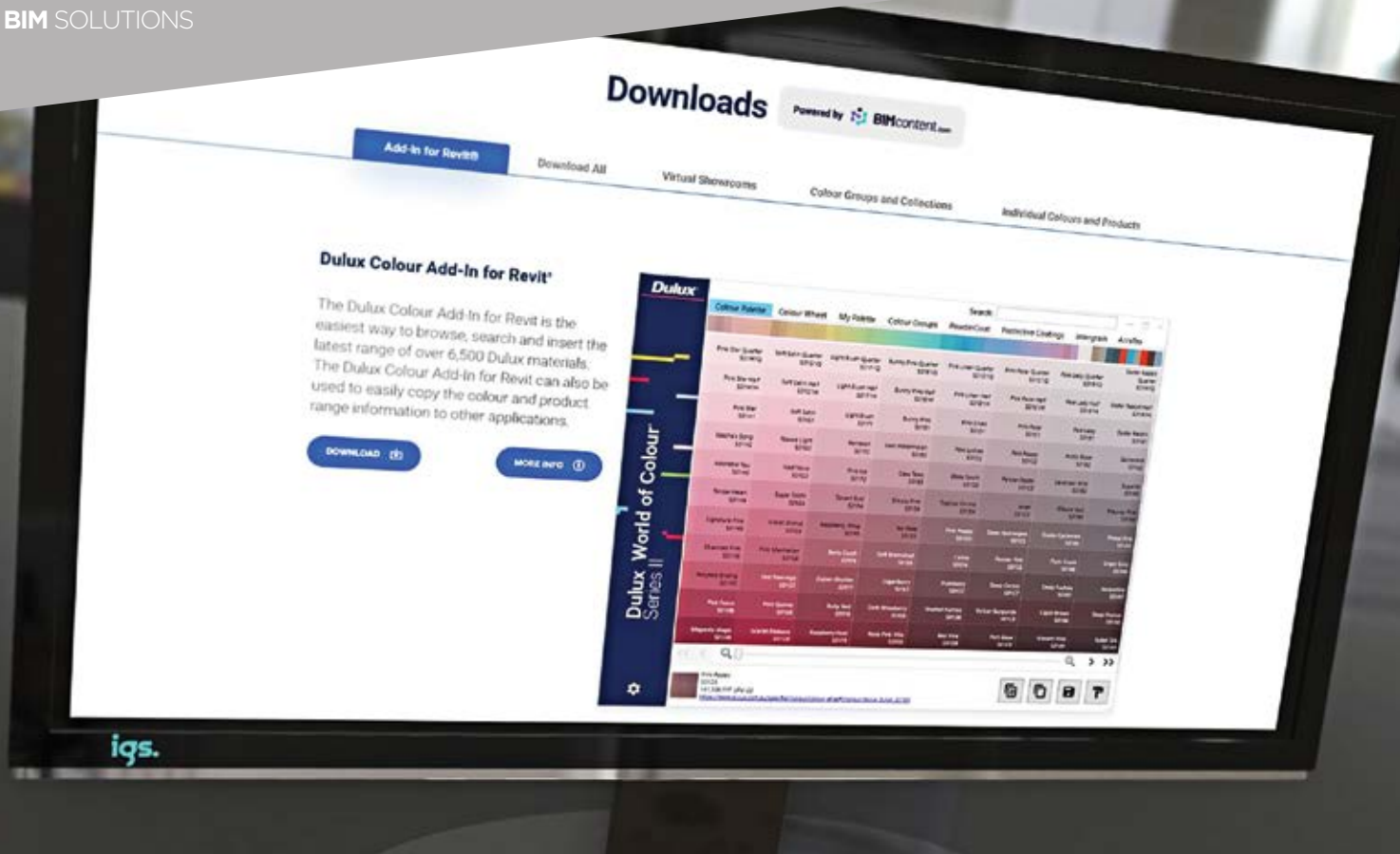




Just as the Conductor uses all the instruments
at his disposal to create the finest music...



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Bring projects to life with newly relaunched Dulux BIM Solutions

The enhanced suite of features and content updates across Dulux BIM Solutions gives Architects and Design professionals an array of Dulux materials that can be seamlessly integrated into their Autodesk® Revit® and GRAPHISOFT® Archicad® projects. BIM Solutions

In keeping with Dulux's reputation for excellence and efficiency, Dulux BIM Solutions' expanded offering now presents over 6,500 colours and product ranges from the Dulux World of Colour, Dulux Powder Coatings, Protective Coatings, AcraTex and Intergrain Timber finishes; and are all a mere click away in a download option to suit a user's preference and needs.

The user benefit is the automatically generated colour and product information into project schedules that saves time, as well as reduces manual entry and data entry errors.

Dulux Project Manager Sarah Nadenbousch says, "...the upgrade of Dulux BIM Solutions with inclusion of a selection of Dulux AcraTex products, the enhanced features of the Dulux Colour Add-In and the new Virtual Showroom download for Revit, combined with the entire 6,500 Dulux

materials now available in Archicad® are all intended to help save designers valuable time by providing easy to use BIM content."

Rhys Hall, Associate and BIM Manager at John Wardle Architects, has experienced the Dulux Colour Add-In for Revit® benefits firsthand.

"When it comes to material selection there is always a disjoint between the tactility of the physical and the digital representation."

"Dulux BIM Solutions removes the need to interpret between these two realms, providing not only significant time savings but a more accurate and consistent result. The ease of use means we have been able to integrate it into our current configuration with minimal overhead or training," Hall said.

The ability for saved palettes to be imported, exported, and shared across teams is just one of the benefits.

"The My Palette Saving and Sharing feature means working with project teams is much easier. Creating palettes as we design and adding feedback for our teams to comment on is invaluable for large projects."

Hall also cites that with over 6,500 Dulux materials available in both Revit® and Archicad® is hugely beneficial.

"One of the key features we are excited about is working collaboratively on projects with other design firms, with the BIM content available in multi formats, information can be easily transferred between each firm's preferred authoring platform."

Additional enhancements across Dulux Colour Add-In for Revit® include an updated 'Copy to Clipboard' feature, which allows relevant information to be readily copied into a finishes schedule in Word, for example, as well as an option to copy the colour hex code to facilitate transfer into Photoshop, or similar.

Installation of Dulux Colour Add-In has also been improved and now allows for office standard material naming conventions to be confirmed. Another feature of the upgrade is the new Virtual Showrooms download option in Revit®.

"This opens up access to the Dulux World of Colour and product ranges as individual virtual showroom project files, which allows designers to 'browse the aisle' in the Revit® project environment, and to easily select a specific colour or product range," Nadenbousch says. "Material colours and specifications are then automatically translated into the live Revit® project and modified to match the firm's standards."



Furthermore, the entire Dulux BIM Solutions offer is also now available as product image downloads. The consistent image format of the Dulux materials opens the door to designers of other applications to access and utilise over 6,500 Dulux colours and products in their preferred design software. Some of the popular applications supported by Dulux BIM Solutions are Photoshop, Indesign, Word, Outlook and Paint.

Dulux BIM Solutions colour and product ranges can be downloaded as product images to be used in other applications. These are consistently sized at 2000x2000 pixels and represent 500mmx500mm of the product. All downloads include relevant material, colour, and specification information, reducing manual data entry and streamlining workflow.

Whether you need one colour or product range, or the entire Dulux BIM Solutions, there are download options to suit your needs – and they are FREE!

To learn more about Dulux BIM Solutions, a series of how-to videos is available at: www.dulux.com.au/bim

What is Building Information Modelling (BIM)?

Drawings have continually become more sophisticated and have leapt from flat 2D to computer aided design (CAD), to animated drawings in 3D.

BIM is the next step as it will take this 3D design from being a static drawing to 3D modelling technology and design process that has already begun to change the way buildings are designed, built, operated, and decommissioned.

So rather than an upfront “rough sketch” which then gets added to and detailed by various people in the chain using various and separate systems, a building designed using BIM has a front-end skill set and detail from which the whole project can flow, and information can be exchanged.

Dulux BIM Solutions provides easy to use BIM content and Add-Ins so users can add Dulux colour and product ranges to Autodesk® Revit® and GRAPHISOFT® Archicad® models quickly and simply.

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informit

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

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It is about time the construction industry had a digital revolution

Rob Bryant EVP, APAC InEight



The construction industry consistently ranks near the bottom compared to other industries when it comes to the adoption of new technologies to improve efficiency and increase collaboration. However, that is not to say firms cannot benefit from digitising physical processes and information. In fact, with large and complex builds, such as capital construction projects that involve multiple stakeholders, digital transformation initiatives may be the key to boosting ROI and reducing the risk of overruns and rework.

REDUCING BUDGET BLOWOUTS

A recent McKinsey study found that the construction sector has recorded the lowest productivity gains and profit margins of any industry in the last 20 years. It should

therefore come as no surprise that as much as 90 percent of capital projects experience some form of cost or schedule overrun. According to the Grattan Institute, Australian governments spent A\$34 billion on transport projects completed since 2001. This is a whopping 21% more than figures initially given to taxpayers pre-construction.

Regular pain points that can lead to overruns include: working with a multitude of contractors and suppliers, logistics and supply chain disruption and even local politics and bureaucracy. Many capital projects also require collaboration across multiple firms and specialists. This can create a highly complex project management environment that can easily become disjointed or disconnected, which can directly impact profit margins, cost and productivity.

It is when projects become large and complex that digital transformation initiatives can truly shine. Digitisation of construction project management allows for the complete centralisation of project data and information, regardless of how many workers and stakeholders are involved. This information gives project managers a complete picture of the entire project, from planning to ground-breaking, all the way to completion and delivery.

BETTER ANALYTICS MEANS BETTER RISK MANAGEMENT

A lack of actionable data during the

pre-construction and construction execution phases of a project is a major contributing factor to capital project overruns. This assertion is backed up by the Grattan Institute that recommends the issue of chronic cost blow-outs be addressed via the collation of detailed project data.

The collection and digitisation of project data for a unified view across the entire life cycle is the very first step in allowing managers to explore emerging technologies like artificial intelligence and to accurately predict future productivity and identify potential pain points before they impact budgets.

Using an advanced connected data solution affords managers the time to primitively set the course of the project as well as continually monitor each process to ensure smooth operations and minimal disruption.

Through the correct use of centralised and connected data, project managers can decrease risk by tackling duplicate entries, process inefficiencies and other problems that often arise when information is captured, stored and managed in siloed and offline solutions.

The efficient gathering of project data allows for timely reporting and improved transparency of project performance and progress. Reporting consolidation that previously took a week out of every four can now be presented almost instantaneously via dashboard reporting.

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IMPROVED DOCUMENT MANAGEMENT

There is no denying the importance of clear and well managed documentation in capital construction projects. With projects often under a high degree of public and government scrutiny, it is essential that project managers keep clear and accurate records to ensure they are acting within regulation and to contract at all stages of the project.

This is often easier said than done when it comes to large scale-projects where managers are under huge pressure to complete the job in a short timeframe. Many a seasoned project manager has seen signs of poor document control, whether it be mis placed USB drives, poorly managed shared drives or deleted folders. From contracts to work orders to project drawings to RFIs and submittals not communicated to the impacted teams and even the inability to locate critical negotiation notes for project contracts. It is typical for a drawing or document to receive upward of seven versions in a project lifecycle. Determining if the version

being viewed is the latest and locating that can be a major disruption on the work site.

Nonetheless, poor document control is not only a time-consuming headache for site managers, it can result in significant expense and disruption to a project if incorrect plans are referred to or correspondence and documents critical to variation or dispute resolutions are lost or hard to locate. By adopting purpose designed secure solutions, managing version control and providing an audit trail, digital transformation initiatives in document control, ensure that time and money are not lost to missing or poorly managed project documentation.

MORE FLEXIBILITY FOR STAFF

It is important to understand that the benefits of digital solutions adoption extends beyond improved efficiencies on site. One of the most significant changes we've seen in the industry this year is the shift to remote work. COVID safe environments favour digital documents, accelerating the adoption of digital over paper-based drawings for review and mark up. Virtual meetings have

enabled improved collaboration, bringing together parties that are located remotely.

Front-line supervisors such as project managers, superintendents and foremen are still very much required to manage the day-to-day site operations.

However, when it comes to back office support workers such as estimators, planners, business managers, procurement managers and document controllers, there is little operational need for on-site work. For these employees, working from home affords significant advantages, including improved employee satisfaction, increased productivity, and decreased turnover and cost savings to both the company and the employee.

Increasingly project owners are demanding transparency, visibility and accountability through every stage of an asset build lifecycle. As more construction firms are beginning to realise the benefits of effective digital transformation, those stuck in the old ways of project management risk falling behind to more efficient, digitally savvy firms that made the right investments early on.

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