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ISSUE TWO 2017

Plans for a 52m-high structure they say will be **Australia's tallest timber building**

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An introduction to the Australian Institute of Building

The Australian Institute of Building (AIB) is incorporated by Royal Charter and is the preeminent professional body for building professionals in Australia and the Asia-Pacific region. The AIB has a long and proud history of supporting and serving the building profession. For more than sixty years the Institute has worked with the building and construction industry, government, universities and allied stakeholders to promote the building profession, support the development of university courses in building whilst promoting the use of innovative building techniques and a best-practice regulatory environment.

The AIB is proudly supported by:



A message from the president

BY PAUL HEATHER

National President Australian Institute of Building



Welcome to the second edition of Construct for 2017 and what is shaping up to be an exciting year ahead.

Before providing a snapshot of our activities from now through to the end of 2017, I would like to welcome the newest members to the AIB team in Canberra, Cheryl Collett – Corporate Services and Nicola Coady – Assistant to General Staff joining Sue Bruce, Membership, Learning & Finance Manager, Natalie Ngo, Events and Maithili Senthildasan, Accounts - headed up by our Chief Executive Officer Greg Hughes. Although Cheryl and Nicola are very new to the Institute, the addition of their knowledge and skills to the team has already delivered many dividends to the membership.

The 12th May 2017 marked the beginning of our annual Professional Excellence in Building Awards Dinners that showcases the highest standards of building and construction management, research and development of building projects throughout Australasia.

The award nights are unique and central to the Building and Construction Industry, recognising those Individuals' who exhibit excellence as the norm in the building and construction process as opposed to a specific project or completed structure and provides key industry professionals an opportunity to acknowledge and celebrate their many successes. I would encourage all Fellows, Members, Associates and Students to support their local Chapter by contacting the National Office (or online) and securing a place at these not to be missed gatherings.

In relation to other membership matters through the stewardship of our CEO, Greg Hughes we continue to strengthen your Institute by; engaging with the construction community seeking to develop and provide corporate partnering opportunities; to expand the membership and the recognition brought with it both internationally & domestically; the reinvigoration and re-launch of our online continuing professional development programmes;

the progressive re-accreditation of 13 Universities throughout Australia as well as the development of value add learning programmes to all Building and Construction management students.

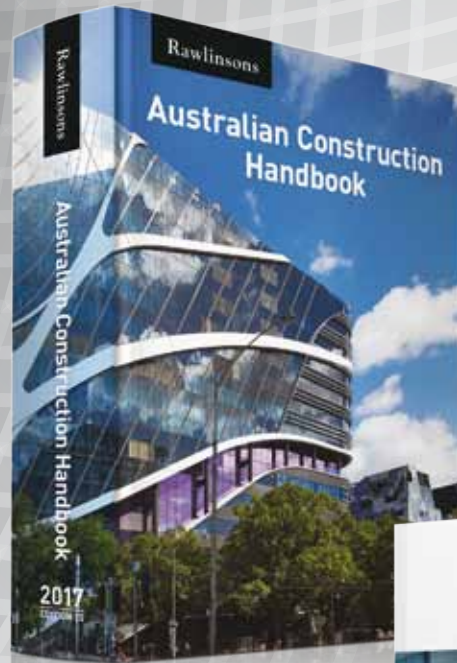
Looking a little further ahead, it was announced at the conclusion of Constructing Our World in Auckland, March 2017, the Australian Institute of Building will be hosting the 2019 Constructing Our World conference in Sydney providing an opportunity for our Industry to share and exchange ideas with the world. Having attended the conference in Auckland recently, I am very much looking forward to the local team developing the theming and other event innovations for 2019.

As I have summarised, there are many new and exciting undertakings being facilitated by the Institute with many more on the horizon and with that, I see a very bright future for the AIB, however, I will leave you all with a quote from Epictetus, and that is "No great thing is created suddenly".

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CEO's Column

Not long back from Constructing Our World, 2017 which was held in Auckland, I was excited to announce that we will be hosting the next in the series of conferences in Sydney/2019.

Under the umbrella theme of People, Performance and Purpose, the conference just gone covered such diverse topics as future technologies, off site production, productivity now, procurement as well as sustainability and design. Speakers travelled from various parts of the globe to network and share their learnings with more than two hundred delegates.

Looking forward to 2019, I look forward to welcoming delegates from around Australia as well as New Zealand, Singapore and no doubt, further afield. While an exact date and line up of speakers, themes, fringe events and other activity is yet to be announced, I can assure you that the event will be both inspirational and forward looking.

Can I also mention that tickets are on sale for the remaining Professional Excellence in Building Awards. As I have said before, it is up to you to get behind these events to not only support and celebrate with your colleagues, but to promote the profession more widely.

The National Awards will be held in Brisbane this year on September 2, so please keep that date free for what promises to be a great night.

Tickets can be purchased on line for our PEA's - just head to the front page of our website for this information. You'll also find other detail here relating to the Awards presentations.

Regards

Greg Hughes AIB CEO



Online Lodgement of DA's to Save Time

The time it takes homeowners and builders in NSW to prepare and submit a development application will go from up to 10 days to less than 30 minutes thanks to a new online lodgement beginning later this year.

"Cutting red tape and faster housing approvals are the Premier's Priorities and with online lodgement, we are doing just that," Minister for Planning and Housing, Anthony Roberts

Presently, the average time it takes to investigate, prepare, submit, lodge and track a DA manually is up to 10 days, but with the new online lodgement on the Department of Planning and Environment's planning portal, it will take less than half an hour.

"This will save people so much time and make the entire DA process easier and more efficient".

"The planning portal is up and running, but this new functionality for online lodgement will improve people's lives.

"It will also allow people to view spatial data about a property online, rather than go to council. This could take 1-3 days to complete and submit a DA, but with online lodgement a homeowner could do it 10 minutes".

Currently, a number of individual councils allow some applications to be lodged electronically; however, the new portal will eventually be the one-stop-shop for development applications and complying development certificate submissions.

"We're getting down to business making it easier for home owners and developers to lodge their applications. Copying and printing heavy tomes and delivering them should be a thing of the past in this digital age".

"This will also benefit people in the bush who live hours away from council offices.

"Eventually the portal will connect any type of application to be lodged to any council in NSW. This will provide a uniform and consistent approach across the board".

Changes to the Environmental Planning and Assessment Regulation 2000 to allow online lodgement of applications has been made public and community feedback is encouraged. To make a submission, visit the Planning Portal at www.planningportal.nsw.gov.au/publications/on-exhibition.

Australian architect Bates Smart has released plans for a 52m-high structure called 5 King, which it says would be Australia's tallest timber building.

The client for the development in Brisbane, Queensland, is LendLease. The design envisages the building's timber colonnade lined with cafés and restaurants catering to the employees of the "creative work spaces outside of the office while creating a welcoming entry" to the project.

Inside, the exposed timber structure and services create a "contemporary studio environment that balances well-being with creative collaboration space".

Large glass areas on the main south elevation maximise natural daylight and sunshades on the other façades reduce energy consumption.

According to the architect, the use of "highly engineered timber", combined with the "Queenslander" vernacular has resulted in a "site-specific and innovative tall building that meets the demands of the contemporary workplace".

The building forms part of the regeneration of the RNA Showgrounds precinct, 1.5 km north of the Brisbane's central business district.

The project follows a number of similar developments such as the world's tallest timber tower in Vancouver.



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The annual Arcadis International Construction Costs report has revealed that New York is once again the most expensive city in the world to site your construction project.

Hong Kong and Geneva have both moved up a place, but only because post-devaluation London has fallen from second to fourth place.

The full top 10 is as follows:

1. New York
2. Hong Kong (+1)
3. Geneva (+1)
4. London (-2)
5. Macau
6. Copenhagen
7. Stockholm
8. Frankfurt
9. Paris
10. Vienna (+1)

Arcadis reports that there has been a slowdown in the rate of growth in China and, as a consequence, the resource economies of countries such as Brazil and Saudi Arabia. Meanwhile, US cities such as New York, San Francisco and Denver are reporting high levels of activity, and are likely to see continuing competition for contractors and construction labour. Amsterdam is also in the middle of a mini building boom which has led to high levels of inflation in local markets.

The report shows weaker growth in demand in some markets, which has “eliminated construction inflation from cities including Dubai, Singapore and Hong Kong”.

Singapore has slipped from 10th to

15th in the rankings owing to over-supply and a slowing economy. It is still the third most expensive city to build in Asia, after Hong Kong and Macau.

Since last year’s index London has fallen from second to fourth, a move which “has been driven entirely by changes in exchange rates” due to the collapse of the pound after Britain’s vote to leave the European Union.

Arcadis’ cost assessment covers 13 building types that are said to be representative of the local specification used to meet market need. The firm says building solutions adopted in each location are broadly similar and as a result, the cost differential reported represents differences in specification as well as the cost of labour and materials – rather than significant differences in building function.

The report also highlights the 10 highest-value project under way in 2017 that are “being created to benefit both the communities of those in which they exist, and the wider global economy”. These are:

1. One belt, one road China to central Asia worth \$150bn
2. Delhi Mumbai Industrial Corridor Delhi to Mumbai worth \$90bn
3. Dubai Al Maktoum Airport Dubai UAE worth \$33bn
4. Grand Paris Express Paris

France worth \$30bn

5. Hinkley Point C UK worth \$22bn
6. Hudson Yards US worth \$20bn
7. Jeddah Economic City Saudi Arabia worth \$20bn
8. Crossrail UK worth \$20bn
9. Beijing Daxing International Airport China worth \$13bn
10. Chengdu Tianfu International Airport China worth \$11bn

The One Belt, One Road project, also known as the New Silk Road, will be partially funded by the Singapore and China Construction Bank Corporation and the Asian Infrastructure Investment Bank. It is described by Arcadis as a “strategic approach to open up new avenues to sustain its appetite for growth”.

Arcadis ends the report by saying: “With an increasingly volatile and uncertain geopolitical and economic landscape, the importance of monitoring and controlling the cost lifecycle has never been more evident.

“Fluctuating currency, commodity and politics can directly affect project capital expenditure and supply chain performance underpinning investment decisions; the events of 2016 show that these fundamentals can shift quickly and unexpectedly.”

CostX- Used by Contractors Internationally

Created in Australia, CostX has been used by contractors all over the country since its first release in Brisbane in 2004. However, since then, CostX use has spread and it is now operated by large clients in over 80 countries worldwide. Below is a case study on the US\$100M University of Michigan Athletics South Competition & Performance Project from one of our US clients, Granger Construction, on how CostX helped them achieve their goals.

Client's Requirements

The University of Michigan's AEC group required Granger to provide two milestone estimates – one at the Design Development (50% complete DD's) stage and one at the 95% Construction Document (95% CD's) stage for each of five (5) separate buildings as well as the campus sitework component for the multi-building project area.

The estimate needed to be delivered in The UofM's 3-level estimate template that is based on the CSI 2012 format. It was also a requirement to reconcile both the DD and CD estimates with an independent national estimating consultant that had already delivered a Schematic Design (SD) estimate for the project and would now also be providing their own DD and CD estimates.

Granger Construction Contributions

Granger made extensive use of the CostX system on this project and created a custom estimate template to meet The UofM's estimate format requirements. Information from multiple Revit models was leveraged as the primary source of quantity take-off information for the estimates and was supplemented with 2D take-offs from CAD and PDF documents as well. The CostX environment was the primary resource used to communicate the estimate to the rest of the project team during the estimate reconciliation meetings. At the DD estimate reconciliation Granger's take-offs proved to be highly accurate with net estimate adjustments amounting to less than 0.1%. When it was discovered that the project was approximately 15% over budget at the DD estimate, an exhaustive value engineering effort was launched and over 500 value engineering items were estimated, evaluated, and considered for incorporation into the design to bring the project back within budget.

Rather than waiting until the next milestone estimate at 95% CD's to be reassured that the adopted value engineering items had indeed successfully brought the project back with the budget guidelines, The UofM's AEC group was so impressed with the CostX estimating system that they

engaged Granger Construction to complete another DD-level estimate utilizing CostX. Once the accepted value engineering items had been incorporated into the preliminary design Granger confirmed that the project was back on budget both with this additional DD-level estimate and again with the CD-level estimate. Bid-day result ultimately proved to be very favourable with the project procurement being delivered at approximately 4.0% under the project budget.

Making the Difference

CostX proved to be an invaluable communication tool during the development of the design. It was very successful in effectively conveying the quantitative estimate information within the 3D environment in a very clear and concise way to the rest of the project team which allowed for a very timely and efficient estimate reconciliation process. When an additional DD estimate was requested by the Owner the live links established within CostX allowed for the updates to be made very efficiently so that the Estimating team was able to focus more on higher level tasks at hand as opposed to revising quantity take-offs.


To see how CostX can make the difference on your projects, please contact us today at sales.au@exactal.com or 1300 006 222.

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Be Prepared

- Is Surface Preparation for Concrete Repairs a FAD?

By HAMID KHAN, Product Segment Manager, Parchem

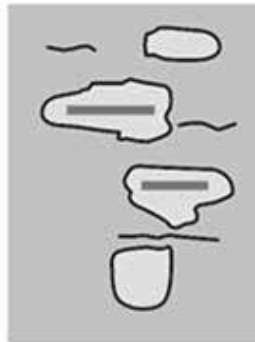
When one is to commence concrete repairs, there are three most fundamental things; surface preparation, surface preparation and surface preparation. Engineers, expert scholars and contractors are committed to enhance the durability of concrete repairs. Strong and lasting bond between a repair material and the host concrete substrate is one of the crucial aspects of durability of concrete repairs. The potential performance of the repair can be completely undermined if the surface on which it is applied has not been properly prepared.

Repair Material to Concrete Substrate – An Alien or Monolithic Bond:

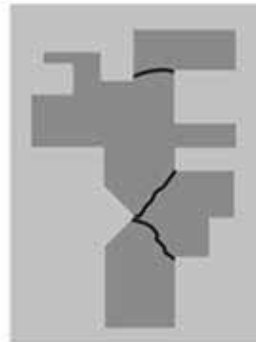
In European standard (EN1504-10:2004), the term bond refers to the adhesion of the applied material or system to the concrete substrate. Hence, adhesion has an underlying importance in the repair of concrete structures. Surface preparation of the concrete substrate is considered to be the most crucial step in a concrete repair project. A poorly prepared surface will result in the weak association to the repair zone, no matter how proficient and expensive the repair material might be. The repair material when applied, should not act as 'an alien body' to the host concrete substrate, rather, it should become an integral part of the existing concrete restoring the structure to its original monolithic strength. Lukovic et al., (2012), in their paper "Reliable Concrete Repair – A Critical Review", highlighted that the composite system by the integration of the repair material with the existing concrete, forming a monolithic bond, would allow uniform transfer of stresses in the system.

The quality of the surface preparation of the substrate is a strong determinant of the success or failure of a project regardless of the repair material cost and quality of application technique employed. It is pointless to exert efforts to achieve good adhesion to a weak friable substrate as failure of the concrete surface is eminent in such cases. Similarly, a sound surface might result in poor adhesion if the surface is not properly prepared. The good bonding of repair material to the existing substrate predominantly relies firstly upon, the mechanical bond of a well prepared substrate and secondly, upon the chemical bond amid the repair materials. Several other factors determining the bond strength of the

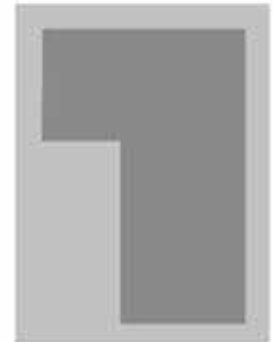
Delaminated, cracked areas



Incorrect layout



Recommended layout



repair system include exposure conditions, properties of the repair materials and concrete substrate to name a few.

Sawn Edges – Doing It Right the First Time:

Saw cutting is used to delineate the perimeter of the repair zone. A disc type mechanical grinder is used for saw cutting the edges along the perimeter of the repair area. The right angled saw cut to a depth of 10-15mm is recommended to avoid any feather edging and it should not be deeper than the reinforced concrete cover. Saw cut squared edges help contain the repair material. The saw cut edges should be roughened slightly by needle gun or hacking as polished vertical sawed face may result in poor bonding.

The geometry of the repair area should be in simple square or rectangular shapes. Sharp acute angles and re-entrant corners should be avoided. Some concrete repair field installers usually form excessive or tortuous edge conditions as they try to closely follow the geometry of the distressed concrete. Such complex and zigzag edge conditions often result in shrinkage stresses leading to cracking. Where saw cutting is not possible due to smaller areas, chipping tools should be used to remove concrete ensuring that the edges of the repair area are cut perpendicular to the substrate.

Removal of Spalled Concrete:

Most of the repairs require surface preparation comprising of roughening, exposure of the aggregates or removal of the

damaged, delaminated and loose concrete. Regardless of the type of deterioration, all weak, flaky, unsound and disintegrated concrete must be removed. Defective concrete should be broken back to a sound and dense concrete surface. Prior to the removal of any spalled concrete from a load bearing structure, certified shoring must be provided to the structure. The removal of concrete usually starts with saw cutting the repair boundaries. The deteriorated unsound concrete in the centre of the repair area is then removed. Breaking out and the removal of concrete progresses from the centre to the outwards towards the edges. The next step is to remove the concrete near the edges without damaging the sound concrete at the interface.

The extent of concrete removal depends on the extent of damage. Concrete may be removed by impacting methods using power tools or by hydro-demolition such as water blasting and water jetting. The most commonly used concrete removal techniques are impacting methods such as hand held percussive equipment, pneumatic breakers, chipping hammers and scabblers where repeated striking of a concrete surface with a high power tool to break the concrete is employed. Whenever unsound concrete is removed using impacting methods such as percussive power tools, the surface of the concrete might exhibit micro-cracking or bruising that will form a weak plane acting as 'bond breakers'. It is recommended that the remaining concrete should therefore receive additional cleaning and preparation using wet sandblasting or



Impacting Method – Removal of deteriorated concrete by jack hammer.



Steel Reinforcement Surface Preparation – Reaching Behind and Between Corroded Rebars:

On steel substrates there is a problem of corrosion. This normally takes the form of rust. Initiation of corrosion and de-passivation of reinforcement is only possible in the presence of water, oxygen and corrosive agents such as chlorides and carbon dioxide. The rust layer is mechanically weak, poorly bonded to the surface and must be removed prior to any application. According to the American Concrete Institute (ACI 546), all weak, spalled, severely cracked, damaged, and easily removable concrete should be chipped away from corroded reinforcement steel. All corroded steel in the repair area should be fully exposed to full circumference and thoroughly cleaned of all loose scale, corrosion deposits and other contaminants. An old rule of thumb is that at least 20-25mm of clearance around and behind rebar is required to ensure proper cleaning, encasement and bond of repair materials that also complies to the requirements of ACI, AS, EN and other standards.

If the deterioration of concrete has been caused by corrosion of reinforcement, the products of corrosion must be removed prior to the application of the repair material, or else the repair will be fugacious. If the structural capacity of the reinforcement is compromised due to chloride contamination, it is essential to remove all rust from the steel before proceeding. Steel reinforcement

should be cleaned to achieve a surface preparation equivalent to AS1627 Part 4, Class 2.5 or Part 2, Class 2. The preferred method is abrasive blasting (SSPC-SP 10/ NACE No. 2) or water jetting (SSPC-SP 12/NACE No. 5, WJ-1, L), (Vaughn O'Dea, 2011).

Exposed reinforcement in smaller repair sections can be cleaned manually by using hand or mechanical wire brush and emery paper to reach and clean behind and between the rebars. Exposure of steel reinforcement must also continue along its length until non-corroded steel is reached and continued at least 50mm beyond to show sound rust-free steel. If the steel has lost more than 25 percent of its cross-sectional area due to rusting, splicing of reinforcement bars should be carried out by butt welding the bars with backing plates, lapping the effected bars with supplemental reinforcement or by introducing coupler mechanical joints. The reinforcement bars used in repairs shall conform to the requirements of AS4671.



Steel cleaning and splicing by lapping after removal of concrete.

An unbroken coat of anti-corrosion zinc rich epoxy primer is normally recommended to protect the steel reinforcement within repair mortars.

Bonding Agents – Bond Aiders or Bond Breakers:

There are number of repair failures recorded when concrete surface preparation prior to repair is neglected due to a false assumption



Concrete substrate is ready to receive repair materials after final surface cleaning.



Sprayed repair mortars, in particular, do not require bonding agents as the shotcrete process exhibit excellent bonding characteristics by itself.



that poor surface preparation can be compensated by using a bonding agent (Bissonnette et al., 2012). Engineers specify bonding agents as a 'belt and braces' measure to enhance the bond at the repair interface, but it should not be considered by any means a replacement of the surface preparation. Bonding agents provide an additional step and a layer that can create a weak plane if proper instructions are not followed. If the bonding agent is allowed to cure prior to the application of the repair mortar, it would rather act as a 'bond breaker' than a 'bond aider', causing failure of the repair.

Drunken Concrete – A Safe Compromise:

When repairs are to be carried out using cementitious mortars, the surfaces must be pre-wetted to achieve a saturated surface dry (SSD) condition after cleaning in order to avoid host concrete absorbing the moisture from the repair mortar that is in fact required for its hydration. Although, the term saturated surface dry (SSD) is somewhat subjective, yet many experts consider it a 'safe compromise' for pre-soaking the concrete. If the concrete is dry and 'thirsty', pre-soaking is of utmost importance. The concrete should be thoroughly pre-soaked so that the concrete is 'drunk'. If the substrate is not pre-soaked thoroughly, the rate of movement of water from the repair mortar to the host concrete will be high due to the moisture imbalance between the adherent 'substrate' and the adhesive 'repair mortar'. In SSD condition the substrate is damp and saturated but does not contain any free water on the surface. Free water at the surface must be avoided as it can impair the bond at the interface due to shrinkage leading to lower material strength and reduced bond strength.

Surface Preparation Safety – Be in Control of Potential Hazards:

The effect of the concrete removal on the structural integrity prior to the commencement of removal of existing deteriorated concrete must be thoroughly assessed. In case of removal of spalled concrete or damaged reinforcement of structural elements, precautionary measures must be employed by providing temporary support. During the concrete breakout and removal process, dust and debris should be contained as not to pose any hazard to the stakeholders. The areas of repair should be examined to ensure there are no electric conduits, sockets or utility connection lines embedded that might get damaged during concrete removal. All effective measures should be adopted to ensure the safety of the structure is not compromised by repair activities.

Surface Preparation Testing

The tensile pull-off adhesion test of the existing concrete should be conducted as part of the condition evaluation report. To ensure that the surface preparation procedures were followed as per the specifications, the pull-off strength of the

prepared surface prior to repair application is carried out. ICRI Guideline No. 210.3-2004, "Guide to Using In-Situ Tensile Pull-off Tests to Evaluate Bond of Concrete Surface Materials" is followed by most Engineers. In case of a significant deviation of the pull-off strength of the prepared surface from the tensile strength of the existing concrete, the result should be examined by the Engineer for additional surface preparation. Such benchmark criteria would allow the Engineer to establish and specify the realistic adhesion strength requirements for the on-site repair condition.

To prequalify the quality of a repair it is vital to evaluate the quality of surface preparation and eventually the durability of bond. This is done by conducting the direct pull off test on a representative sample area for the cured in-situ repair material. This step of surface preparation testing would verify the tensile bond strength of the repair material and the existing host concrete. During the course of the project, surface preparation need to be periodically validated using tensile pull-off test method, benchmarking Engineer's specifications and the values obtained during prequalification of the reference sample. Vicroads, standard specifications, section 689 suggest that the mean adhesion or pull off strength to concrete substrate at 7 days should not be less than 0.75 MPa, with no individual result less than 0.65 MPa for substrate mode of tensile failure within existing concrete substrate. Bond values for shotcrete and form-and-pour repairs typically exceed 0.75MPa and, in most cases exceed 1.0 MPa. ACI 503R and VicRoads Test Method RC 252.02 are commonly used standards for pull-off testing.

Conclusion:

The best of repair materials despite the best of mixing and application practices are destined to fail unless the concrete substrate is properly prepared. The intent of this article is to promote precise specifications for surface preparation rather than taking a broad generic approach. The conventional approach of surface preparation for concrete repairs such as 'clean and sound' should be avoided. This commonly used phrase is too ambivalent to specify the correct level of surface preparation. There is a need to go beyond the boundaries of 'clean and sound' approach. Field technicians and installers are the cornerstone in any concrete repair project. They must be provided with thorough technical training to enhance their skills. Surface preparation will often be pivotal in determining the overall performance and durability of a repair. A successful repair means that the resulting multi-layer system acts monolithic, ensuring long service life. Proper attention to surface preparation is essential to achieve a robust bond between repair materials and the existing concrete substrate. Only a strong bond would lead to a strong and durable repair. If you want to get the most out of the repair materials, then be prepared to prepare!

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About the Author

Hamid Khan working presently as Product Segment Manager – Repairs and Grouts at Parchem (DuluxGroup), Australasia, holds a bachelor degree in Civil Engineering discipline. He also holds a double Master in Business and Strategy from the University of Wollongong. Hamid is certified in Concrete Technology and Construction, by City & Guilds of London Institute (UK) and is a qualified expert in concrete repair & refurbishment with 19 years of experience in the industry. Hamid is a regular speaker at various industry related National and International Conferences and Seminars. Hamid contributed to articles for Australasian Concrete Repair Association (ACRA)- Concrete Connection, Concrete Institute of Australia (CIA) – Concrete in Australia, Australasian Corrosion Association (ACA) – Corrosion and materials, The Australian Institute of Building (AIB) – Construct for Chartered Building Professionals and other leading construction magazines.

Hamid is also an active board member of Australasian Concrete Repair Association (ACRA). He was associated with Fosroc International in Dubai for 14 years taking up various roles in technical and management. Hamid's experience comes from the Gulf, Middle East, Europe, East Asia and Central Asia.

Temporary Movement Joints in Post-Tensioned Concrete Frames

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Are Circular Runways the Future of Airports?

A European team has designed a 100km long circular runway with a 3.5km diameter to surround an airport terminal

The “endless” runway would mean that an airport would only take up a third of space when compared to a traditional set up, with a hub airport being able to sit in the centre. However, construction costs would be around 1.5 times that of a conventional airport.

The circular runway would allow aircraft to take off and land independently of the wind direction, since there is always a point without crosswind on the circular runway. This would enable multiple aircraft to take off and land simultaneously, thereby increasing airport capacity.

Landing aircraft could also be routed away from residential areas because they are not dependent on a standard approach path.

Aerospace professionals from Germany, Holland, France, Spain and Poland have worked on the project, which has received funding from the EU.

The group say the “lack of capacity at airports is the major constraint to growth in air transport” and “unless a structural new approach is followed, the expected three-fold increase in air traffic is not realistic to achieve”.

HenkHesselink, senior research manager at the Netherlands aerospace centre, said: “Major challenges are the safety aspects. Up to now, we have taken safety as a basis for all our simulations and calculations.

“Most responses I receive however concern the safety. As NLR we always demand safety at the highest level and we need to take a step-by-step approach to keep ensuring that the operation remains safe.”

“In follow on steps, with flight trials we will further investigate all possible safety aspects. Using flight trials, we will be able to control circumstances and further test all safety issues”

Anticipation of futuristic travel rose in India recently with the start of test drilling for a 7-km undersea tunnel for an ambitious high-speed railway planned from Mumbai to Ahmedabad.

Contractors will test ground conditions 70m below the Arabian Sea near Thane, Maharashtra to see if India’s first undersea rail tunnel for its first high-speed railway, largely funded by Japan, can work.

“Passengers will get the thrill of riding under the sea,” commented The Economic Times in reporting the start of testing in preparation for a 21-km-long tunnel, of which 7km will go under water.

One of several high-speed railways planned in India, the 508-km line is

planned to cut the journey from the mega city of Mumbai to Ahmedabad in Gujarat from seven hours to just two hours, with trains running at 320km/h.

The Japan International Cooperation Agency is financing around 81% of the estimated \$14.6bn cost (Rs 97,636 crore) through a long-term, low-interest loan.

Except for the 21-km-long tunnel, most of the railway is proposed to be on elevated track ways, say reports.

\$1BN Australian Solar Plant to use World’s Largest Battery

A solar plant worth an estimated \$1bn and the world’s largest battery are to built in South Australia

The Kingfisher project, which will be located in the Riverland region, will have 3.4 million solar panels and 1.1 million batteries.

The project, which will be run by the Lyon Group, will be connected to the wholesale electricity market in Australia, and will feature two stages of development:

Stage 1 will deliver 20MW of solar PV plus a minimum of 2MWh of lithium-based battery storage. This stage will enable analysis and performance assessment of the plant in harsh desert conditions. Commercial operations are scheduled to get under way before

September 2017

Stage 2 will deliver 100MW of solar PV with a minimum 20MWh of battery storage and is expected to operate commercially before the end of 2017. Given current volatility in the South Australian energy market, the battery storage may be upgraded to an initial 40MWh.

Funding of \$150m will go towards an Australian renewable technology fund to finance research into the battery.

The combination of solar and storage means the facilities can provide high-quality, reliable power to large energy users while also potentially avoiding the costs of grid upgrades.

Are your showers ticking time bombs?

Despite builders best efforts, leaking showers are consistently listed in the BSA's top ten defects.

Sadly, sometimes this is due to sub-standard workmanship, but most of the time it is the design of the shower itself which is creating the potential for disaster.

Most contractors are at a complete loss as to why, but detailed testing has shown how, by the action of expansion and contraction, water is "pumped" along glue cavities to escape the shower enclosure, no matter how well it is water-proofed.

The best way to prevent the problem is to seal the screen directly to the membrane, and NOT to the tiles.

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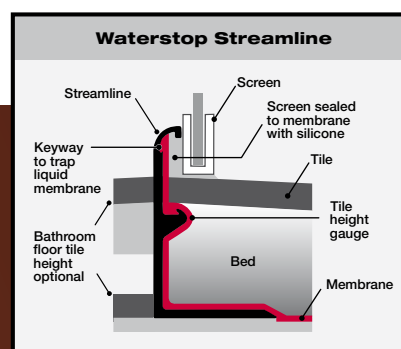
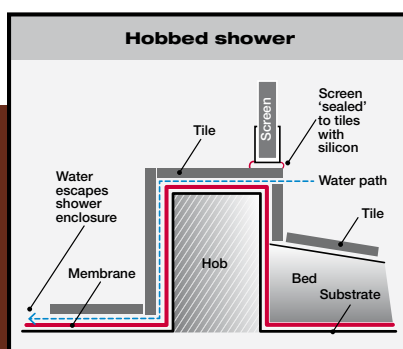
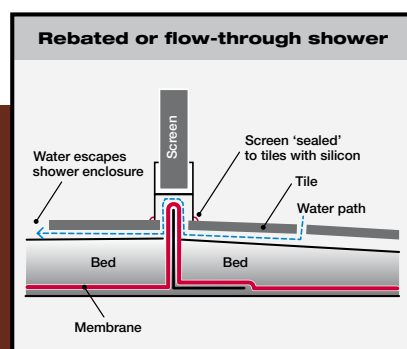
My business has expanded rapidly since we started using the Waterstop Streamline hob and I now have tilers recommending the Waterstop Streamline system - and me - to other builders. Everyone that uses it loves it.

Mr Fred Meddings, Managing Director
Watertight Australia (Water-proofers)

By using Waterstop Streamline I know the shower will be perfect every time. It has to be, because this product is designed to dictate placement of all of the other components to make up a complete shower. It's virtually impossible to stuff it up.

Mr Glen Whitehead, Managing Director
BJM Developments

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Central Queensland Rescue Device Lighting the Way

A Rockhampton company's invention to improve safety during confined space rescues is one of 10 potential new products advancing to the marketplace, thanks to a Palaszczuk Government business program.

Minister for State Development Dr Anthony Lynham said Robert and Liz Stringer's Highpoint Access and Rescue was one of 10 Queensland businesses being mentored under the new program.

"Highpoint's integrated light-camera for confined spaces could become commercially viable and this mentoring will help them get their product to market and create more jobs," Dr Lynham said.

"They are just one of 10 Queensland companies in the engineering, construction and resource sectors whose products have earned them a spot on a mentoring program.

"This is about getting innovative products off the drawing board and into the marketplace to support growth and jobs."

Agriculture Minister and Member for Rockhampton Bill Byrne said it was great to see another Rockhampton business being helped by a Palaszczuk Government initiative.

"This business mentoring program is just one of the ways we are supporting our entrepreneurs to create job opportunities," he said.

"It's never easy to turn good ideas into profitable ventures, no matter how brilliant the concept and I'm very proud to be part of a government that recognises that even the best businesses can benefit from a helping hand.

"Our Advance Queensland philosophy is all about realising the potential of ideas.

"I'll be taking a keen interest in this product."

Leading engineering and professional services firm GHD is providing mentoring to the 10 companies over the next four to six months.

Mr Stringer invented the device to meet a demand identified through their High Point Access and Rescue business, which employs 12 staff at their Glenmore Road premises.

The first stage of the mentoring program

includes business analysis and fact finding workshops, research and market analysis, strategies, identifying anticipated outcomes and opportunities across industries, geographies, markets and clients and documenting the next steps to commercialise the innovations.

"When the participating companies leave the program by July they will have important market insights and information and directions they need to get their product to market," Dr Lynham said.

Other successful applicants are:

Brisbane

- Scout Aerial Media & Surveying Pty Ltd(external site) (<http://scoutaerial.com.au/>), for an aerial sensor for gas detection and sampling
- Q-Cool Pty Ltd(external site) (<http://q-cool.com/>), for a revolutionary re-engineered air conditioning solution
- Strusol Pty Ltd(external site) (<http://www.strusol.com/>), for a cost saving building system utilising pre-cast concrete construction
- Red Button Group(external site) (<http://www.redbuttongroup.com/>), for a real-time performance management and data collection system for productive mining assets
- George's Loader Hire Pty Ltd, for an electronically controlled height detection system for heavy machinery
- kkoeee.com,(external site) (<https://www.kkoeee.com/>) for a global crowd sourcing marketplace for engineering services

Mackay

- WMMC Pty Ltd(external site) (<http://whitsundaymoorings.com.au/>), for a robotic scanner for marine infrastructure

Sunshine Coast

- Aluminium Balustrades North Coast Pty Ltd(external site) (<http://amau.com.au/>), for a highly efficient frameless modular balustrade system

Gold Coast

- CadTech Australia Pty Ltd(external site) (<http://www.cadtracker.com.au/>), for a new drawing document management platform

Chinese Insurer Completes World's Fourth Tallest Building in Shenzhen

The Council on Tall Buildings and Urban Habitat has announced that the Ping An Finance Centre, the fourth tallest building in the world, is complete.

The 599m-tall tower is the highest building in Shenzhen, the second tallest in China, and the fourth tallest in the world, behind the BurjKhalifa, the Shanghai Tower and the Makkah Royal Clock Tower in Saudi Arabia.

Designed by New York architect Kohn Pedersen Fox and developed by a Ping An subsidiary formed for the purpose, the building is located in Shenzhen's southern Futian District.

A large public atrium will sit at the base of the structure with space for shops, restaurants, and transit connections to the city, the Pearl River Delta region and greater China.

The tower will contain space for owners Ping An Life Insurance Company of China and other tenants.

The building is designed to look like a taut steel cable "outstretched by the sky and the ground at once".

At the top of the tower, the façade tapers to form a pyramid, with the shape emphasised by eight composite mega-columns that extrude beyond the building envelope.

The tower is adorned by the largest stainless steel façade in the world – 1,700 tons of the material was used in its fabrication.

Steel was chosen specifically for this project "due to its corrosion-resistance, which will keep the appearance of the Ping An Finance Center unchanged for several decades despite Shenzhen's salty coastal atmosphere".

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TIM MARGETTS, QC - Identifying the correct rectification methodology. When is remedial work both "necessary" and "reasonable"?

STEPHEN KIP, FIRE ENGINEER, BUILDING SURVEYOR AND ADJUNCT ASSOCIATE PROFESSOR, VICTORIA UNIVERSITY COLLEGE OF ENGINEERING & SCIENCE - Australia's Cladding Challenge (identifying non-compliant products and other regulatory and compliance issues).

RAY MARTIN, BUILD ASSESS CONSULTING - Emerging trends in defective workmanship and poor work practices.

RICHARD DREW, ENGINEER - Residential Roof Trusses and Footing System Interaction.

ANDREW WOODS, BARRISTER - Recent amendments to building legislation and important case updates.

LEE WILSON, PHILIP CHUN & ASSOCIATES - Universal design and safer building evacuations.



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Essendon Plane Crash: Aviation experts warn of dangers of building shops on airport land, after five killed in DFO disaster



*Investigators scour the wreckage of a light plane crash in Chelsea in 2014.
Picture: Eugene Hyland*

AVIATION experts have warned of the dangers of cramming commercial buildings onto airport land in the wake of the deadly Essendon crash.

Aircraft Owners and Pilots Association of Australia executive director Benjamin Morgan said the privatisation of airport land was one of the biggest issues faced by the aviation industry in the last 30 years and he held grave concerns for airports in fast-growing suburbs like Moorabbin.

"Moorabbin is one of those airports where we are seeing serious non-aviation developments," Mr Morgan said.

He said using up airport land for retail and other businesses left no vacant land for use in an emergency and called for the government to remove some of these developments at airports nationwide.

"Building a DFO on an airport degrades aviation safety — that fact in itself proves these buildings should not be on airports."

Aviation law expert Joe Wheeler said there was pressure to develop around airports for financial gain but the existence of these buildings in areas that should be ideally kept clear for emergencies was not the ideal thing for aviation safety.

Much of the land at Moorabbin Airport has already been developed into retail outlets like the large DFO and Costco stores.

Moorabbin Airport chief executive Paul Ferguson said planning and approval for on-airport developments at former federal airport sites including Moorabbin was covered by Commonwealth legislation and said approvals "take into account aeronautical operations and safety requirements."

"Aviation is a safety based industry and welcomes every measure to make our industry safer," Mr Ferguson said.

A spokesman for the Department of Infrastructure and Regional Development said it considered advice from the Civil

Aviation Safety Authority and Airservices Australia when deciding on on-airport development.

Those bodies assess the safety and operational impact of developments, "including their proximity to airside infrastructure such as runways," he said.

"All certified airports in Australia, including Moorabbin, are licenced to operate by CASA and must meet their safety requirements."

The 123 ha Moorabbin Airport precinct is an integrated mixed use Business Park with commercial, industrial, large format retail, leisure, entertainment and retail uses.

Plans are underway for another "Chifley South" precinct at the southern end of the airport with smaller retail and business outlets.

Just days before the Essendon crash on March 21, Coroner Audrey Jamieson raised concerns about Moorabbin Airport following a hearing into the death of pilot John Stephenson in a fiery crash into a house in Chelsea in 2014.

During the court hearing, assisting counsel Rebecca Cohen said statistics from the Australian Transport Safety Bureau revealed there were 26 accidents, 111 incidents and 46 serious incidents within 25 kilometres of the airport between 2006 and 2015.

Ms Cohen said a ATSB 2013 study found the fatal and serious injury accident rate was more than five times higher in amateur built aircraft.

"This may have serious implications for the increasingly urbanised, residential vicinity around Moorabbin Airport," she said.



A light plane crashed into a house in Lower Dandenong Rd, Moorabbin, in 2010.

The role of performance-based solutions in addressing cladding fire risks

By MARK TATAM, Technical Director, Kingspan Insulated Panels



Combustible cladding on high-rise buildings has become a critical issue, with some Australian fire brigades refusing to enter buildings constructed with combustible cladding due to safety concerns. This has brought into sharp relief the importance of using the right materials at the start of a build, and the risks of failing to carefully consider the quality and type of materials used.

It is essential for those in the building and construction industry, as well as fire brigades and regulatory authorities, to ensure they have an up-to-date understanding of the different materials available for external cladding. Ideally, building envelope and cladding solutions which not only comply with the National Construction Code (NCC), but also deliver both design flexibility and superior fire safety performance.

While deemed-to-satisfy (DTS) solutions provide a simple way to specify materials that fulfil the NCC requirements, they do not always take into account the fact that, over the years, new materials and methods have been developed that may be more effective in preventing the spread of fire. However, because those materials weren't available when the DTS provisions were made, they aren't included. For this reason, it makes sense for the construction industry to focus on ways to achieve the desired outcomes or objectives, and choose a solution that provides the best fit based on performance.

A performance based solution does not need

to follow prescriptive methods or use particular components or materials, as long as it can be shown to meet the performance requirements of the building code. This gives architects and building designers more flexibility in terms of the solutions they choose; they can use more innovative designs and materials, put together in new ways. This can open up a wide range of possibilities that would not necessarily be achievable with a DTS solution, yet still delivering a fire safety performance that meets or exceeds that of a DTS solution.

For example, a DTS solution may require the use of non-combustible materials. However, the DTS requirements do not specify how that insulation or cladding is to be installed. Errors and inconsistencies in installation can affect the overall fire performance of the cladding system. For example, it could potentially be installed using a construction adhesive, which, in a fire scenario, could cause the entire panel to fall off the structure, creating an even greater fire risk. Similarly, air gaps in the panel after assembly can create opportunities for fire and smoke spread that weren't considered in the original specifications.

To date, the adoption of performance-based solutions in Australia has been slow due to some industry confusion around performance solutions, making DTS solutions a simpler choice. Fire engineering, in particular, is an emerging discipline that is not yet broadly embraced, yet is essential for the adoption of successful performance based solutions.

A fire engineer can assist by providing evidence of how a globally tested solution may perform against Australian standards. Unfortunately, many building projects forego the input of a certified fire engineer because of perceived costs. This is usually a false economy, since a fire engineer can provide valuable input that has potential to save on expenses to the tune of many times their original hiring cost.

Adoption of performance based solutions is likely to speed up as decision-makers realise that performance based solutions can be more cost effective as well as being at least as safe as DTS options. Performance based solutions can, in many cases, deliver a safer outcome, improved flexibility in terms of building design, and better energy efficiency, to name just three benefits.

The Centre for International Economics (CIE) acknowledges the benefits of a performance based approach, such as the ability to consider new technologies, innovations, and materials to deliver a more functional or interesting building.

The CIE said, "The objectives behind a performance-based building code have been well established internationally: by focusing on the outcomes that the building is required to deliver, it is expected that the market will have more flexibility to develop innovative and cost effective solutions. The ultimate goal is to improve the efficiency of the market in delivering no less than a minimum level of building quality, without being overly prescriptive and impeding the uptake of new technologies and design principles."

Current standards don't take into account the technological advances that can mean there are far more reliable and effective methods available, but these aren't used because they don't strictly fall into the DTS requirements. Instead, standards should focus on objectives or outcomes, leaving the choice of solution or technology open so that the best choice is used, regardless of the time difference between when the standard was created and when the solutions were developed.

Kingspan's insulated panels are third-party certified for fire performance and have been rigorously tested and outperform most other cladding systems on the market when it comes to fire safety. They are also backed up by ongoing support from in-field service engineers throughout the life of the building.



Dr Mark Tatam is the Technical Director for Kingspan Insulated Panels. Mark works with a specialist team who offer advice to the building industry on building code compliance; fire, structural and thermal performance; and building design for 'future-proofing' buildings to meet changing building requirements and usage patterns. To learn more about the fire performance of Kingspan Insulated Panels' building envelope systems, visit www.kingspanpanels.com.au.

Rawson Group Finds Success with Cadets

A leading NSW housebuilder is urging the industry to consider cadet programs to bolster opportunities for graduates as the number finding full-time employment post-university continues to decline.

Rawson Group has employed 100 per cent of graduates of their cadet program. Cadets get a taste of all aspects of the construction business, including experience in contracts administration, estimating, compliance and drafting.

Started in 2008, the cadet program has seen hundreds of applicants and 18 full-time graduates employed within the business upon completion of their first year.

Rawson's rate of promotion goes against employment trends. According to research from the National Institute of Labour Studies at Flinders University, the proportion of new university graduates in full-time work dropped from 56.4 per cent to 41.7 per cent in 2014.

Rawson Homes general manager of Sydney Paul Callaghan said the company looked for cadets who demonstrate a commitment to building a career with Rawson Group. Past applicants have

come from university and TAFE courses as well as from other property sectors, with candidates looking to further their career in the construction and development sector.

"We are committed to investing time to find out what cadets are passionate about in a career, and then provide them with the support and training to get there," Mr Callaghan said.

"The use of a buddy system with a more senior staff member, who checks in with their cadet every day, ensures feedback is provided and there is continuous improvement and opportunity for the cadet. It's also great for the senior team members who's knowledge is respected and shared, helping us with retention of senior staff and succession planning."

A number of staff members who began as cadets now hold senior positions, such as Rawson's site supervisor Christopher Klothos and site manager Andrew Mantoufeh.

Mr Mantoufeh began working as a Rawson cadet while he was completing a Bachelor of Construction Management. Today he oversees up to 80 people on

site from tradespeople to building material suppliers.

"Being a cadet opened my eyes to different aspects of the internal side of the construction industry. It was an opportunity to gain practical experience rather than waiting until the end of my degree to find work and grow my career while I was learning," said Mr Mantoufeh.

Mr Mantoufeh completed his cadetship within eight months, which set him up for a career that began with a promotion to production estimator, then sales estimator and then contracts administrator before becoming a site manager.

"The cadetship provides an opportunity for people enthusiastic about the industry to get first-hand experience while studying or as their next career step. It opens doors and helps solidify where you want to head in your career," Mr Mantoufeh said.

Rawson Group advertises cadetship opportunities regularly, expressions of interest can be emailed to employment@rawson.com.au.

Amazon Employee Creates Smart, Stackable, Modular Housing

American start-up Blokable has devised a solution to traditional methods of home construction, which it describes as "too long and complicated".

The firm aims to "empower communities to build their own housing" with smart, stackable, modular units.

The homes, or "Blocs", are built to order in a factory in Vancouver and can be shipped across North America, with a cost per square foot ranging from \$150 to \$350.

Blocs can be stacked up to five storeys high, with the cost of each unit varying

from \$25,000 to \$100,000.

Blokable plans to make 25 units a month at the beginning of production, aiming to build student accommodation and housing for low-income families.

The first project the firm will embark on is creating emergency shelter for the homeless. They will also build a 24-unit apartment complex in Utah.

Examples will be on show at "various locations on the West Coast through the spring and summer of 2017" with manufacturing starting in summer 2017.

Aaron Holm, founder of Blokable, came

up with the company while working for Amazon Go and Amazon Books: "For years, he'd been fascinated with shipping containers. Here's a global movement of people turning shipping containers, which are terrible building materials, into shelters, homes, stores, and even shopping malls.

"Our whole mission is to empower communities to build their own housing. If you can acquire and title land, manage the permitting process and hire a general contractor to build a foundation and connect facilities, then you can build with our system."

ADVERTORIAL

More air and more savings with the new Kaeser DSD.3 series rotary screw compressors

Kaeser Compressors has just announced the launch of its latest generation DSD series rotary screw compressors. The DSD.3 series models set new standards in performance, availability and energy efficiency.

Kaeser is once again pushing the boundaries of compressed air efficiency and availability with its latest generation DSD.3 series rotary screw compressors;

At the heart of every DSD.3 series compressor is a high performance Kaeser rotary screw compressor block equipped with the flow-optimised and energy saving 'Sigma Profile' rotors. In these next generation models, the Sigma profile rotors have been further refined. Together with additional optimisation measures, the new DSD.3 series machines therefore boast up to six percent better power performance compared with previous models.

They also include a 'super premium efficiency' IE4 electric motor that complies with and exceeds prevailing Australian GEMS regulations for 3 phase electric motors, whilst also contributing to lower energy costs. In addition, transmission losses associated with gear or belt drive solutions are further eliminated with these 1:1 direct drive systems.

All models feature a built-in Sigma Control 2 industrial PC-based compressor controller that is responsible for dynamically adjusting the flow rate to match actual compressed air demand thereby assuring further energy savings.

Relevant information can be viewed at a glance from the easy to read display. Unique RFID technology further assures secure login, meaning that service work and system changes to the compressor can only be performed by authorised personnel. Energy saving control modes, variable communication interfaces for communication with centralised control systems, and an SD card for update and backup are just some of the many features available on the Sigma Control 2.

An innovative and sensor-controlled electronic thermal management (ETM) system can be found in the latest generation

DSD series rotary screw compressors. The ETM dynamically controls the screw compressor block discharge temperature. The control valve actuator is controlled via signals from the Sigma Control 2 controller, which is coordinated with the oil cooler's speed controlled fan. For the end user, avoiding unnecessarily high screw compressor block discharge temperatures leads to reduced energy consumption and potentially a longer fluid service life.

The latest generation DSD series rotary screw compressors from Kaeser are also available with heat recovery. All models can be optionally equipped with an integrated fluid / water plate-type exchanger and an additional fluid-thermal valve. The Sigma Control 2 controls the compressor temperature to ensure that hot process water supplied by the heat recovery system attains the desired water outlet temperature. In addition, if all of the heat energy is drawn off by the heat recovery system, the Sigma

Control 2 detects that cooling is no longer required at the package cooler and the fan on the oil cooler is shut down. This saves fan power at the oil cooler, thereby reducing energy costs.

In addition, if heat recovery is not required it can simply be deactivated via the Sigma Control 2. This has the advantage that the package reverts to operation with the lowest possible screw compressor block discharge temperature – creating further energy savings.

Where absolutely dry compressed air is required, the DSD.3 series models are available with an integrated refrigeration dryer (DSD T). Energy saving, environmentally conscious and compact the DSD.3 T models incorporate a new refrigeration dryer that requires 25 percent less power than the previous models. The refrigerant quantity has also been reduced to only 2 kg. In addition, this compact powerhouse now has a smaller footprint which has been reduced by around 17 percent on the previous generation.

Editors Notes

From 2.2 to 500 kW, Kaeser Compressors manufactures a wide range of compressors and associated auxiliary equipment that meet the varying requirements of a diverse range of industries and applications.

One of the world's largest manufacturers of rotary screw compressors, Kaeser Compressors is represented globally in over 100 countries through a dedicated network of branches, subsidiary companies and authorised partners.



The DSD.3 series models from Kaeser set new standards in performance, availability and energy efficiency.

Waterproofing requirements for doorways to decks and balconies

Water leakage below door openings has been a source of concern for the Queensland Building and Construction Commission (QBCC) and other state regulators for a number of years.

The Building Code of Australia's adoption of 'AS4654 Waterproofing membranes for external above-ground use – Part 1 Materials and Part 2 Design and installation' means that building contractors working throughout Australia are provided with clear and consistent detailing requirements to eliminate water leakage in construction. This standard came into effect in Queensland back in May, 2013.

In particular, AS4654.2 provides construction details which are aimed at eliminating water leakage at the sills of door openings that lead onto a waterproofed deck or balcony. AS4654.2 depicts how to achieve compliance using systems, such as the application of waterproofing membranes or installation of sub-sill flashings (refer to Figure 2.8 options 1 and 2).

Wind driven rain is one of the main factors contributing to water leakage that has occurred below door and window sills that open onto a deck or balcony.

High wind pressures can effectively push rain water under a door or window sill and

TABLE A1 VERTICAL UPWARD TERMINATION HEIGHTS			
Wind class Regions A and B (non-cyclonic) AS 4055	Wind class Regions C and D (cyclonic) AS 4055	Ultimate limit state wind speed ($V_{h,u}$) AS/NZS 1170.2	Termination height mm
N1	—	34	40
N2	—	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

Table A1 from AS 4654.2

into the building itself, or allow water entry into the wall cavity or frame, causing undue dampness or deterioration of building elements.

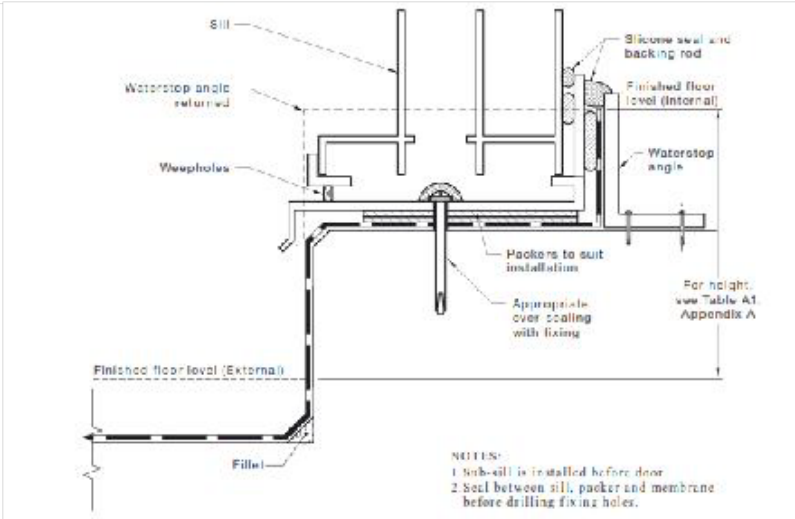
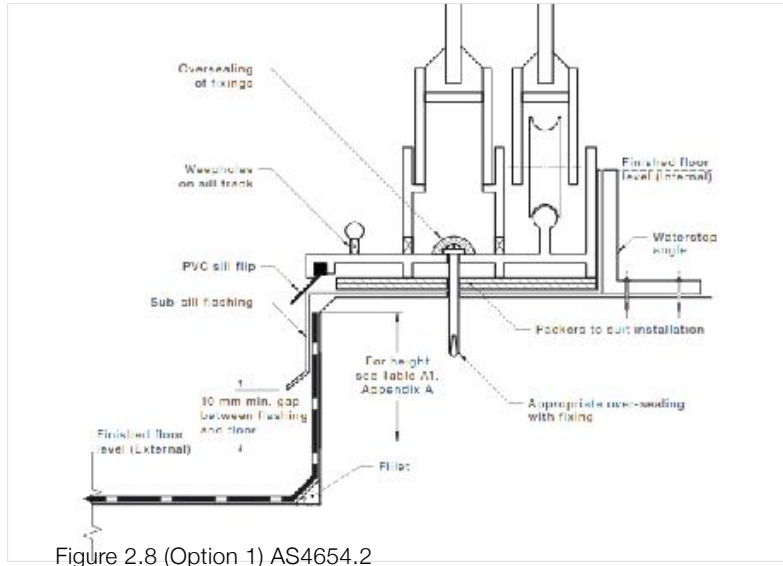
AS4654.2 includes an informative Table A1 – Vertical upward termination heights (refer to table) which specifies the minimum upward termination heights for a waterproofing membrane above the finished floor level of a deck or balcony. Table A1 also includes information for both cyclonic and non-cyclonic wind speed regions.

The QBCC has also noted an increase

in home owner demands upon building contractors to construct waterproofed deck or balcony floors at the same level as internal floors to avoid step downs. Whilst this practice is not prohibited, it does become more problematic to construct and achieve compliance.

AS4654.2 acknowledges that at times circumstances will not permit for the inclusion of a set down, for example, when wheelchair access is required.

To address this issue, the standard provides a typical design (refer to Figure 2.9) which



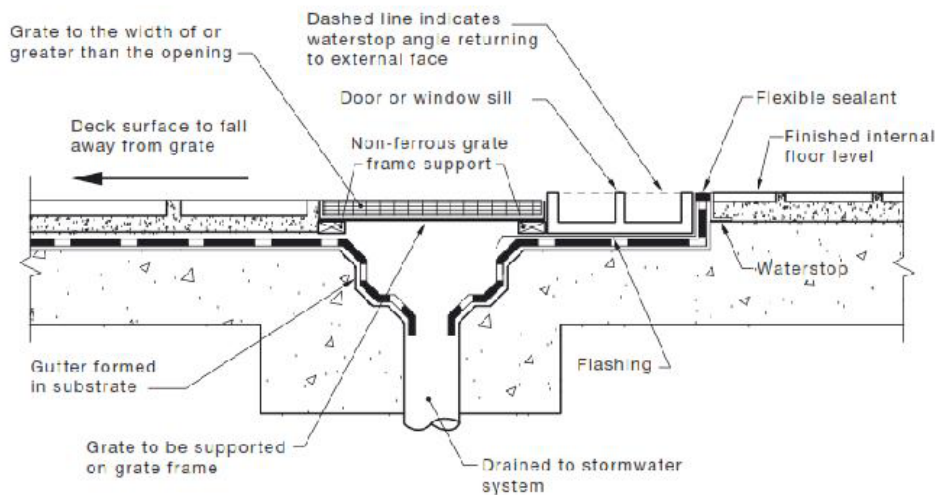


Figure 2.9 from AS4654.2

includes for a grated drain to be formed across the front of the door opening with requisite waterproofing membranes and flashing being installed under the adjoining door sill to prevent any water penetration.

The QBCC's audits of building work under construction reveal that the vast majority of building contractors are simply unaware of the fundamental requirements of AS4654 and the need for compliance.

The QBCC encourages all builders, door or window installers, and waterproofing contractors to consider what methodologies allowed under AS4654 best meet their particular building needs before construction commences. This is so all parties concerned can meet their obligations for compliance with the Building Code of Australia.

Copies of AS4654 can be purchased from

SAI Global at www.infostore.saiglobal.com

Please note: the figures and table have been copied by the QBCC with the permission of Standards Australia under Licence 1702-c008.

For more information please call the QBCC (24/7) on 139 333 or visit qbcc.qld.gov.au



A non-compliant waterproofing installation below a balcony door. Note: Inadequate turn-up height of waterproofing membrane. Membrane has not been carried up and under sill or no sub-sill flashing installed.

FORBES HOSPITAL, FORBES NSW



Clever Cooling Tower Access Saves Hutchinson 28 per cent

Clever design has shaved 28 per cent off the cost of cooling tower access equipment, netting a Hutchinson Builders refurbishment project tens of thousands of dollars in material savings and thousands more in installation time.

The refurbishment of the gutted 22-storey building in Ann Street, Brisbane, included the installation of four large cooling towers on a rooftop tightly constrained by space.

Finding the access platforms recommended by the manufacturer unworkable, Hutchinson Builders took the layout to height safety specialist, Workplace Access & Safety. The resulting redesign yielded impressive savings and

added longevity.

18 per cent material savings

While the cooling tower manufacturer's drawings called for platforms encircling the towers, consultation with service technicians revealed that, although uncompromised access was essential, just four points on each of the cooling towers required attention.

Workplace Access & Safety's redesign provided clear and easy access to maintenance points with compact, two-tiered platforms that worked within space constraints and slashed the amount of material required.

The durability of aluminium

The cooling tower access platforms were built from aluminium rated for 600kg loads rather than the fibreglass-reinforced plastic included in the original design.

Engineers were concerned the plastic's protective coating would be compromised during fabrication, allowing the material to bloom and deteriorate under the harsh Australian sun.

The change of materials reflected Hutchinson Builder's approach to the project, said managing director, Scott Hutchinson.

"We might only be on site for a few months but the quality of our work will be judged over the lifetime of the building," Mr Hutchinson said.

"I'm really pleased that Workplace Access & Safety came up with a solution that was not only more cost-effective but built to last, too."

Modular pre-fabrication saves months of on-site installation time

Construction's traditional time pressures were amplified at the Ann Street site. Hutchinson Builders understandably wanted to minimise crane time.

Any lost time would be readily measured; the cooling tower platforms would be the last crane job following the installation of roof-mounted plumbing and electrical services.

"Hutchinson Builders is not wasteful and crane time can burn through budgets very quickly," Mr Hutchinson said.

And the timing could barely have been more tricky. Workplace Access & Safety was given the order on December 7 and had the job complete by January 16. Installation of the 70-square-metre platforms took just 10 days.

The secret was a great deal of modular prefabrication, which Workplace Access &





Safety's Adam Wareing says reduced time spent on site by 70 to 80 per cent.

"We prefabricated everything in our own workshops - all but the smallest details needed to accommodate pipes and switches that were still being fitted to the cooling towers," he said.

"We installed 70m2 of aluminium platforms in 10 days and took all the waste away in two wheelie bins."

The efficiency of the installation did not go unnoticed by Hutchinson Builders, Scott Hutchinson said.

"Having Workplace Access & Safety do most of the fabrication in its own factory meant less crane time, reduced OHS risk and a smaller footprint for the works," he said.

On-site safety down to systems and consultation

Early planning with Hutchinson Builders and a dedicated pre-start meeting meant a temporary static line was available for the Workplace Access & Safety installers who worked up to 4.5 metres above the roof of the 22-storey building.

"Just falling 4.5 metres onto concrete is enough to kill someone but coupled with the prospect of falling all the way down to street level meant any incident could be truly catastrophic," Mr Wearing said.

Workplace Access & Safety holds AS/NZS 4801 certification and its systems demanded that height safety installers worked to customised safe work method statements (SWMS), were continuously supervised on site and started each day with a toolbox talk.

Scott Hutchinson said such a systematic focus on safety matched its own approach to construction site safety.

"Hutchinson is acutely aware of the risks on a construction site," he said. "Put that site another three metres on the roof of

a 22-storey building and you really can't afford to have anything go wrong."

"We were reassured by the way Workplace Access & Safety has structured its OHS. It wasn't a case of good luck that the Ann Street project was incident-free but good management and working with the right installer."

Aesthetics through to minor details the marker of success

The final close-out meeting with Hutchinson Builders confirmed the platforms met all the quality criteria.

"The platforms feel – and are – very strong and stable," said Mr Hutchinson. "They're well presented and finished, right down to the minor details like drain holes and

tagging."

"The Ann Street project was installed incredibly efficiently over the New Year break but there's been absolutely no compromise on quality."

"Hutchinson Builders seeks out partners who are market leaders in their fields because – like this job from Workplace Access & Safety – they have the right systems in place to deliver safety, cost-effectiveness, timeliness and quality work."

For more information, contact:
Workplace Access & Safety
1300 552 984

www.workplaceaccess.com.au



Servitisation: How it is Changing the Construction Industry

By KENNY INGRAM, Global Industry Director, Construction, Engineering and Infrastructure, IFS

The concept of servitisation is not a new phenomenon. The term was formally defined in the 1980s, but its essence – bundling service packages with products to add value – goes back several decades earlier, with the introduction of the “power by the hour” concept of Bristol Siddeley, a British aeroengine manufacturer later acquired by Rolls Royce. Despite its presence for more than half a century, servitisation has recently come to the fore as a shaping force in a range of industries, including construction.

A number of factors have driven this recent renaissance in service provision and development, including globalisation, high market volatility and a rising pressure for innovation as a means of attaining and sustaining advantage in increasingly competitive markets. A recent study by the University of Cambridge points to five principal drivers of this trend:

- — 5–10 percent increase in service revenue
- — Maintenance cost reductions of 25–30 percent
- — Improving product and asset performance
- — Increasing data gathering (e.g., volume, quality, data types)
- — Increasing and improving access to information

Increasingly, asset owners are looking to outsource the services required to maintain their assets over their lifecycles. Service or facilities management contracts are often offered by construction companies for assets they have built, or for assets that some other contractor has built. These service-based commercial contracts have evolved over time, typically based on, for example, asset availability or response times. There is a trend toward “contracting for outcomes” with the construction firms that build these items. These performance-based contracts are changing the business models that construction firms use to approach the market.

When talking about buildings, the term facilities management is generally what is used today. The contract is about making the facility available. A five-to-ten-year contract is awarded to a construction company to build and maintain the asset. As part of the contract, they may also have scope to rebuild, refurbish or build new assets. It's about services as much as construction per se; so it is very much the same thing as servitisation in the manufacturing sector.

SERVITISATION: WHY IS IT TRENDING?

So what's required of construction companies who want to servitise their business? Like any other major innovation in the industry, servitisation means that enterprises will need to confront change to be able to grasp the opportunities it presents. Some of these will be technology-based. The Cambridge study found consensus among capital equipment manufacturers (CEM) on five key technology requirements to enable servitisation in the future:

- 1. Predictive analytics** to anticipate specific failure modes
- 2. Remote communications** to resolve issues from a distance
- 3. Consumption monitoring** to create customer-specific service offerings
- 4. Pushing information** to employees/suppliers/ sub-contractors/ customers via mobile platforms or the Internet
- 5. Mobile platforms** to access business software remotely for maintenance techniques, production outputs, etc.

Businesses will need to assess the individual value of these and other technologies for their operations to ensure medium-term service competitiveness.

The construction industry has traditionally been slow to adopt digital technologies. But today there is a strong drive for construction companies to use digital design tools and models, and to integrate that data so it can be handed over at the point the asset is completed.

There's a huge drive for a digital handover as part of the construction process. There are thousands, if not millions, of pieces of data associated with an asset that used to be paper-based in spreadsheets, drawings and other information on paper. It's not only hard to gather and transfer that data; it's hard to integrate and make sense of it.

This issue has fuelled the fire for the industry's building information modelling (BIM) initiatives. BIM involves the generation and management of digital representations of the physical and functional characteristics of assets. Building information models are files that can be exchanged or networked to support decision-making about an asset throughout its lifecycle.

There are huge efficiency gains with the use of BIM. Companies taking on maintenance contracts haven't necessarily known what they're being asked to maintain. So by using BIM technology to build and capture the digital information throughout the process, there is greater visibility into the asset and improved ability to optimise cost of ownership over its life. The focus is now about designing the asset so that it can be maintained at minimum cost and to provide the outcome it was intended to deliver.

Other emerging technologies driving this digital transformation of construction include:

- **The Internet of Things (IoT)**, which enhances asset performance and asset assessment. The IoT helps empower construction firms to digitise, optimise and automate processes that previously were not connected to IT systems.
- **Drones and robotics**, which are employed for inspection and maintenance of complex assets and infrastructure. They help meet the physical challenges associated with many assets.

- **3-D printing** (additive manufacturing), which speeds development and delivery of components in the construction phase. It supports delivery-to-promise.
- **Mobile and social technologies**, which improve communications and increase the flexibility of the workforce. They facilitate collaboration across companies and cross-functional departments.

Companies adopting these technologies need to assess them individually as contributing components to an expanded service and asset management orientation. They also need to understand the importance of organisational change, as culture, risk and infrastructure must be aligned if these technologies are to be fully and effectively leveraged.

WHAT'S NEXT: GETTING THE FOUNDATION IN PLACE

For construction companies looking to add innovative service and asset management capabilities to their offerings, the benefits are straightforward: enhanced revenue, better margins, sustainable business growth, predictable income streams and higher levels of customer satisfaction. But many lack the foundational IT software to take full advantage of the technologies driving the change that realises those benefits.

Too many companies have a shambolic set of unintegrated systems. It hardly makes sense to plug technologies into something that isn't working well to begin with. Consequently, the essential step for leveraging the technologies enabling the dynamic development of service as a fundamental business driver is having an integrated, full-featured enterprise software solution in place.

In the construction sector, IFS has a long history of providing this solution. Facilities management provides an effective and cost-efficient IT foundation for those in construction looking to expand the service and asset management component of their business. Our customers are successfully employing these tools to keep on the right side of change as the industry evolves.

ABOUT THE AUTHOR

Kenny Ingram is the Global Industry Director for Construction, Contracting, Engineering, Infrastructure and Shipbuilding at enterprise applications company IFS and a key member of its Product Direction Board. Kenny has been with IFS for 16 years and is now regarded as one of the top specialists in Project Based Business systems. See: www.ifsworld.com/au

Metro Tunnel Project Work Commences for Australian Gas Network

Australia's leading gas distribution company has commenced work on one of the biggest infrastructure projects currently under construction in Australia – the \$10.9 billion Metro Tunnel in Melbourne.

Australian Gas Networks will relocate 1.7 kilometres of natural gas mains pipeline in Melbourne's CBD and Parkville as part of the multi-million dollar works.

The existing natural gas infrastructure (near the future Parkville Station and CBD North Station) needs to be relocated as its current location is in the path of the Metro Tunnel.

The Metro Tunnel Project will transform the way people move around Melbourne, with five new underground stations, including two directly connected to the City Loop, and improved access to key landmarks.

Twin nine-kilometre tunnels will deliver a new dedicated pathway through the heart of the city for two of Melbourne's busiest rail lines, creating space for more trains to run more often across Melbourne's rail network.

The Metro Tunnel will create a new end-to-end rail line from Sunbury in Melbourne's west to Cranbourne/Pakenham in the south-east, with high capacity trains and five new underground stations at Arden, Parkville, CBD North, CBD South and Domain.

When completed, the new rail line will enable 39,000 more passengers to use the rail system during each peak period.

"The Metro Tunnel is one of the biggest infrastructure projects in Australia at the moment and AGN is delighted to be playing such an integral role in it," said Australian Gas Networks Chief Operating Officer, Mr Andrew Staniford.

"AGN has an excellent reputation for undertaking complex construction contracts, and our involvement in this crucial rail infrastructure project is another example of that," he said.

"Our work will be undertaken in two stages - Stage 1 involves realignment of 1.1kms of steel gas mains at the Parkville Station site, and Stage 2 involves realignment of 0.6km of steel gas mains at the CBD North Station site.

"The APA Group – which operates our gas distribution infrastructure – has commenced

initial works on the project and is working closely with the Melbourne Metro Rail Authority and Metro Tunnel Early Works Managing Contractor, John Holland Group.

"The work is due to be completed in September this year."

The Metro Tunnel is one of the most complex infrastructure projects undertaken in Victoria in recent times.

It includes excavating massive shafts in the centre of Melbourne to construct the tunnels and stations, and requires the intricate and co-ordinated relocation of utilities (gas, water, sewer, electricity and telecom) away from the proposed station corridor.

Major construction is now underway on the project.

Metro Tunnel is the latest major project in Victoria in which AGN has been involved.

AGN recently constructed a \$6 million pipeline at Wandong-Heathcote Junction - about 60km north of Melbourne - to transport natural gas to the region for the first time.

Last year, AGN completed a \$14 million dollar upgrade to the natural gas pipeline that supplies Mildura, providing a major economic boost for the region.

Both of those projects were completed with financial support of the Victorian Government.

About Australian Gas Networks (AGN)

AGN is Australia's largest distribution company serving over 1.2 million consumers in South Australia, Victoria, Queensland, New South Wales and the Northern Territory.

It owns approximately 23,500 kilometres of natural gas distribution networks and 1100 kilometres of transmission pipelines.

AGN operates natural gas networks in South Australia (mostly Adelaide), Victoria (mostly Melbourne) and Queensland (mostly Brisbane), as well as in smaller centres in New South Wales (Albury & Wagga Wagga) and the Northern Territory (Alice Springs).

Each year, it invests around \$250 million in its networks to reach new areas, improve supply and replace old gas mains.

Researchers at Chalmers University of Technology in Sweden have discovered a way to store solar energy in chemical form, transport it to where it is needed, then release it as heat with an efficiency of up to 80%.

The researchers say the discovery has the potential to solve a number of problems with solar energy, including storing and moving the energy so that it can be released at the right time and place.

Professor Kasper Moth Poulsen, who is leading the research, said: “The dream is to create a universal solar battery that releases heat on demand.”

According to the team’s paper, published in this month’s edition of the journal, *Energy & Environmental Science*, the system has the potential to release heat at up to 238°C.

Although it is not yet cheap enough to compete with conventional space heating, it would already have specialist applications. The paper gives the example of providing heat in remote locations or harsh environments that are without access to full-time power, and where “the cost of delivering fuel enhances the competitiveness of renewable approaches”.

The technique is based on an organic compound called norbornadiene that alters double-bonds to single-bonds on exposure to sunlight, becoming a quadricyclane. To release the energy, a catalyst is added and the process is reversed.

This enhances the efficiency of non-photovoltaic solar receptors, which are able to make use of the full spectrum of sunlight. By contrast, a PV module has a maximum conversion rate of only 20%.

The research was initiated at Chalmers University more than six years ago. At the time, the solar energy conversion efficiency was 0.01% and the expensive element ruthenium played a role in the compound.

Prof Moth Poulsen, said: “We saw an opportunity to develop molecules that make the process much more efficient. At the same time, we are demonstrating a robust system that can sustain more than 140 energy storage and release cycles

with negligible degradation.”

He said: “Some of the most efficient systems in the world right now are capable of heating something 10°C. The molecules we have made should in principle be capable of heating something more than 100°C, so that is what we would like to show in the near future.”

Further research into the system will be based on making the chemical constituents cheaper and the catalyst less toxic. Making the liquid safer would allow the system to be used for applications such as portable cooking devices that can be “charged” with sunlight and used to cook after the sun has gone down.

The paper comments that “breaking through the barrier for commercialisation in a very competitive solar landscape would be a significant and difficult challenge, but breakthroughs are likely, given the relative youth of solar technologies and the current worldwide trend to phase out fossil fuels”.

Building Ministers’ Forum

The Building Ministers’ Forum (BMF) was held in Sydney on Friday, 21 April 2017, for Ministers to decide on a range of significant measures that will benefit the Australian building, plumbing and construction industry and the wider Australian community.

Ministers discussed the revised Intergovernmental Agreement (IGA) for the Australian Building Codes Board (ABCB), to ensure it continues to support the BMF’s priorities for the national building reform agenda. Ministers agreed in-principle to ratify the new IGA before 30 June 2017.

Ministers support the strengthening of the WaterMark Certification Scheme, and endorsed the ABCB’s approach to explore whether WaterMark could be expanded to include Point of Sale regulations within jurisdictions.

Ministers agreed to continue implementing measures through the Senior Officers’ Group, to address risks related to non-conforming building products. The implementation plan will be published in May 2017.

Ministers also supported the ABCB’s research plan into possible measures that may contribute to a reduction in jumping suicide from newly constructed buildings.

Several important issues relating to accessibility were also discussed. State and Territory Governments have made progress towards increasing the stock of universal and accessible housing. Ministers agreed to propose to COAG that a national Regulatory Impact Assessment (RIA) be undertaken as soon as possible to consider applying a minimum accessibility standard for private dwellings in Australia.

Further, Ministers agreed an RIA will be undertaken to consider expanding the National Construction Code to include requirements for accessible sanitary facilities for people with a profound disability. Ministers noted that some jurisdictions may progress requirements for accessible sanitary facilities independent of the national process.

The BMF is an important way for jurisdictions to collaborate on matters of national significance to the building and construction industry.

The BMF will reconvene in Brisbane in October 2017 to continue this important national dialogue.



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Interview with

NIGEL HADGKISS



Our readers would be interested to know of the Nigel Hadgkiss career path that led you to becoming the ABCC Commissioner

I commenced my career with eight years in the Hong Kong Police Force, half of which was with the Commercial Crime Bureau. I then joined the Australian Federal Police (AFP).

Whilst working with the AFP, I led many high profile investigations and inquiries, and served on three Australian Royal Commissions. Between 1994 and 1996, as a Commander in the AFP, I was the Director of Operations at the Wood Royal Commission into the NSW Police.

In 1997 I appeared before a Canadian Royal Commission examining the wrongful conviction of a man for first degree murder. I assisted the Commission in formulating recommendations to improve the administration of criminal justice in Ontario. As a result, in 1999 I was invited to York University, Toronto as a Visiting Fellow at Canada's largest law school, Osgoode Hall, for their 1999 Winter Semester. Later that year I presented seminars at All Souls College, Oxford University, and at the Inner Temple Inn of Court, London. In 2001, I addressed the Officers' Mess of the Royal Canadian Mounted Police in Ottawa.

At what point did you first become involved with the ABCC?

In the year 2000, I left the AFP as Assistant

Commissioner to take up a position as National Director Intelligence with the National Crime Authority (now known as the Australian Crime Intelligence Commission). During that time I was the liaison officer with the Cole Royal Commission into the Building and Construction Industry. I assisted the Royal Commission on matters pertaining to organised crime. In 2002, I was seconded to perform a role as Director of the Interim Building Industry Taskforce (an organisation set up until the ABCC could be established – a recommendation of the Hon Justice Cole). Then in 2005, when the ABCC was created, I became a Deputy Commissioner.

I left the ABCC in 2008 to become the Executive Director of the Office of Director of Public Prosecutions (ODPP), NSW. The appointment followed the Auditor-General's Report on the efficiency of the ODPP which was tabled in the NSW Parliament in March 2008.

Then, in 2012, I returned to working with the building and construction industry when I was appointed by the Victorian Government to establish and run the Construction Code Compliance Unit. This organisation was created by the State Government following the replacement of the Commonwealth ABCC with Fair Work Building and Construction (FWBC).

In my Victorian role, I assisted other State Governments establish similar units in Queensland and NSW.

Before the watchdog was abolished in 2012, what was the main thrust and goals of the organisation?

In 2013, I returned to the Commonwealth as Director, FWBC. Our "Vision" became 'That all Australian building and construction workplaces are productive and harmonious'. In turn, our "Mission" became 'To ensure that the Rule of Law prevails in the Australian building and construction industry'.

Just how rife in your opinion is illegal behaviour on construction sites?

What is important here is what has been said by a number of senior members of the Judiciary.

Firstly, in early 2016, the findings of the Royal Commission into Trade Union Governance and Corruption were tabled in the Federal Parliament. A great deal of the evidence before the Commission concerned the activities of unions with coverage of workers in the building and construction industry, and in particular the CFMEU. The Royal Commissioner, former High Court Justice, Dyson Heydon, stated:

'The conduct that has emerged discloses systemic corruption and unlawful conduct, including corrupt payments, physical and verbal violence, threats, intimidation, abuse of right of entry permits, secondary boycotts, breaches of fiduciary duty and contempt of court.'

This view had previously been, and subsequently been, supported by judicial findings in actions brought by my agency. As recently as late March this year, a majority decision of the Full Court of the Federal Court found that the actions of the CFMEU and officials involved in a blockade of the Perth Airport project demonstrated:

'a clear instance of them taking the law into their own hands.'

The Full Court went on to state that union leaders involved in the blockade had 'an extensive history of flouting the law', and that:

'The conduct of the CFMEU in this case brings the trade union movement into disrepute and cannot be tolerated.'

The court ordered a more-than ten-fold increase in penalties against the union and its officials, making a total of \$242,000.

The ABCC has five employers currently before the courts for alleged contraventions of workplace laws. In fact last year, penalties were handed down against Melbourne painting and decorating company Arteam for breaching freedom

of association provisions, whilst Brisbane-based Hutchinson was found to have discriminated against a subcontractor for failing to have a CFMEU enterprise agreement.

My agency is now undertaking activities to ensure compliance by employer of wages and entitlements in the commercial construction sector, a task that had previously been undertaken by the Fair Work Ombudsman.

In broad brush terms, what measures have been put in place to minimise/eradicate the bigger issues?

The Federal Parliament re-established the ABCC in December 2016 and strengthened its powers and penalties. Maximum penalties for coercion, discrimination and unlawful industrial action have tripled from \$54,000 to \$180,000 for bodies corporate and from \$10,800 to \$36,000 for individuals. There are also new specific laws to combat unlawful picketing.

In addition, the Minister established a new Building Code 2016. This Code is an important means by which the ABCC can promote compliance with the law by employers in the building and construction industry. The Code provides imposes the highest standards of lawful conduct by contractors that want to perform Commonwealth funded building work, including that these entities must:

- not engage in collusive tendering or illegal or fraudulent phoenix activities;
- meet strict on-site conduct standards, including in respect of right of entry and freedom of association;
- strictly comply with wages and entitlement obligations to workers, applicable safety laws, and migration rules;
- agree to only use building materials complying with Australian standards;
- advertise jobs locally before hiring workers who are not Australian citizens or permanent residents; and
- meet the enterprise agreement requirements of the Building Code.

Breaches of the Code expose contractors to sanctions which exclude them from tendering for Commonwealth-funded work for a period of time. On 31 March this year, the ABCC announced that Hutchinson Builders had been sanctioned by the Minister for Employment for breaches of the former Building Code. This means that the company is excluded from submitting expressions of interest, tendering for or being awarded Commonwealth funded building work for three months.

Is there a sense from you as Commissioner that if Labor were to be returned to power that

again, there would be a scaling down or abolishment of the commission?

The ABCC is established by a law of the Australian Parliament. As the Commissioner, my job is to faithfully carry out my legislative functions, as set by the Parliament, and to implement and enforce compliance with applicable laws in the building industry.

The opposition warns that the ABCC will have increased coercive powers without adequate oversight – what is your reaction to that statement?

The ABCC's examination powers remain the very same as those which existed under the previous legislation, those laws having been passed by the Parliament in 2012.

When conducting an investigation, the aim of an ABCC investigator is to seek relevant information to establish where the truth lies. To achieve this outcome, ABCC investigators will speak with relevant witnesses and issue notices to require the provision of documents. These investigative powers are the same as the powers held by Inspectors at the Fair Work Ombudsman, and many other Commonwealth civil law regulators.

Where, however, a witness does not provide evidence voluntarily, I, as Commissioner, have access to compulsory powers. In my experience, I have been called upon to use these compulsory powers where witnesses refuse to co-operate with an investigation for fear of retribution from being seen to co-operate with the regulator.

To access these compulsory powers, I, as Commissioner, can apply to a Presidential Member of the Administrative Appeals Tribunal (AAT) to exercise examination powers. There are similar examination powers held by a number of other Commonwealth regulators.

Having conducted 140 examinations over the years, I have found them to be an essential investigative tool for determining the truth of what has occurred. Regrettably, my experience is that there is a culture of silence for fear of retribution that prevails in the industry. This is why, over the years, the vast majority of witnesses examined have been managers and supervisors, not workers or union officials.

There are a number of important safeguards available to witnesses in examinations, including the provision of at least 14 days' written notice to attend an examination and the ability to be legally represented at the examination.

Furthermore, all hearings are tape

recorded and video recorded, with copies being provided to the witness and the Commonwealth Ombudsman's Office. The Ombudsman, in turn, provides an oversight of all examinations and produces an annual report on the use of the powers to the Parliament. The ABCC's examination powers are in fact subject to a greater level of oversight compared to those of other regulators such as ASIC and the ACCC.

As the Australian Institute of Building represents the building and construction professional (the individual) how do you think the Commission can directly assist them and or their business?

The ABCC is happy to provide education, assistance and advice to all AIB members about their right and responsibilities under workplace laws.

The ABCC has published a great deal of guidance by way of our website, E-alerts, Industry Updates, and Fact Sheets. ABCC personnel can present to AIB members on a range of issues. In fact, we have given no less than 49 formal presentations in the months of February and March this year.

We therefore encourage all AIB members who are seeking information to go to www.abcc.gov.au, call the ABCC Hotline on 1800 003 338 or email enquiries@abcc.gov.au.

Perhaps with a little crystal ball gazing, how do you personally see the health of the building and construction sector moving forward?

A recent ABS report on industrial disputes found the construction industry had the highest number of working days lost, accounting for 43% of the total days lost for all Australian industries. Clearly there is more work to be done.

Recent figures (as at 10 April 2017) show that the ABCC had 57 matters before the courts. The CFMEU were respondents in 53 of these cases, with 104 CFMEU representatives facing a total of 1,047 alleged breaches of the law. As previously mentioned, there were also cases against five employers.

The ABCC is working hard to ensure the legislation passed by the Parliament in December last year is enforced and appropriately acted upon. The main object of the new legislation is to ensure that building work is carried out fairly, efficiently and productively by all industry participants. The ABCC will continue to work with all building industry participants to deliver upon this commitment.

ADVERTORIAL

New Gyprock Mini – Repair Panel Delivers a Convenient DIY Solution



Home repairs can generally be found at the bottom of a to-do list, especially when other commitments take precedence, but with a little DIY inspiration and easy-to-use products, completing simple tasks, such as repairing unsightly holes and minor dents in the wall, could mean returning your home to its former glory. Gyprock's Mini-Repair Panel is the newest addition to its extensive DIY range, and is perfect for general plasterboard repairs around the home without the expertise of a handyman.

Designed for small plasterboard wall and ceiling lining repairs, Gyprock's Mini-Repair Panel is a 10mm thick and 530mm wide by 530mm long plasterboard panel, offering an ideal solution for small day-to-day cosmetic repairs or when sprucing up the home. It also conveniently fits a 600mm x 600mm manhole access frame kit.

"The Mini-Repair Panel is a DIYers solution for those small repairs around the home. The convenient size makes it a 'walk out the door size' repair sheet, making it easy for the home handyman to add to their shopping list," said Najwa Khoury, Gyprock Marketing Manager.

Repairing small holes in plasterboard is easy.

Here's how you can do it.

Shopping List

- Gyprock Mini-Repair Panel
- Gyprock Easy Tape
- Gyprock Rapid Patch compound
- Small container and clean water for mixing
- 100mm broadknife

- Sanding float and 150 grit sandpaper or sanding block

Step-by-Step Guide to repairing small holes in plasterboard walls and ceilings:

For holes up to 50mm:

1. Mix 1 cup (260g) of compound, such as Rapid Patch, to 150mls water to a creamy consistency. Fill the hole with the compound using the 100mm broadknife and allow to dry.
2. Apply a strip of Gyprock Easy Tape to cover the hole.
3. Apply 2 coats of Rapid Patch over the tape, allowing them to dry between coats.
4. Lightly sand ready for painting.

For larger holes:

1. Trim a Mini-Repair Panel to a neat rectangle patch slightly larger than the hole, trace an outline around it onto the existing plasterboard surface, and set it aside, the patch and off cuts for use in step 3.
2. Cut the damaged area away to the outline you've drawn.
3. From the Mini-Repair Panel offcuts, create two backing blocks and fix them to the inside of the hole with a small amount of Rapid Patch, leave to dry, then fix the pre-cut patch into the hole with Rapid Patch.
4. Cover the joints with Easy Tape and apply 2 coats of Rapid Patch, allowing them to dry between coats.
5. Lightly sand ready for painting.

Gyprock Mini-Repair Panel is available through Bunnings Warehouse nationally.

For more information, visit gyprock.com.au. To view an instructional video, visit https://www.youtube.com/watch?v=8X3__7RMgMQ

A Contract is at the Forefront of Research into Robotic Concrete Printing

Skanska UK is aiming to create the world's first commercial 3D concrete printing robot, which could be used on site to produce variety of elements including cladding panels. It hopes to have a commercial machine ready for operation within 18 months.

The contractor, which has a UK turnover of £1.4bn a year, has been working on a prototype of the robot for the last two years with partners Foster + Partners, Lafarge Tarmac and robotics maker ABB. But it has accelerated development by becoming the first construction company to join the Manufacturing Technology Centre (MTC) in Coventry.

The MTC is a partnership between some of the UK's major global manufacturing firms, including ABB, and Loughborough University. It aims to provide a competitive environment to bridge the gap between university-based research and the development of innovative manufacturing solutions, in line with the government's manufacturing strategy.

Skanska UK innovation manager David Lewis explained: "Up until December we were doing everything ourselves and had taken it as far as

we could do, but by joining MTC we now have a proper lab and research facilities to conduct further tests and work on the project full-time.”

Skanska's David Lewis uses the machine Towering above the average person, the advanced six-axis robot is fitted with a computer-controlled printer nozzle, attached to a gantry and a robotic arm, which deposits a high-performance concrete.

The nozzle extrudes a bead of concrete about 10mm in diameter and, like a normal printer, makes passes back and forth in rapid succession, laying down successive layers of concrete until an entire 3D object is created.

Lewis said: “The robot would be particularly good for use in creating different cladding components, but there are options for other areas. We've had particular interest from Highways England – for example if they needed to make one complex concrete component for a road project.”

As part of the deal with MTC, Skanska has been given an injection of funding from Innovate UK for the next two years. The Innovate UK grant was worth £950,000. Similarly, £700,000 was awarded by Innovate UK over a year ago to develop robots for the construction of Battersea Power Station phase two.

In Battersea Skanska is working with ABB and Tekla to develop robots that can be deployed on site to carry out cutting, drilling and fixing. These are being used to build “utility cupboards” which house M&E components for individual apartments. That project is still ongoing and elsewhere Skanska is also working with ABB to develop a robot for setting out rebar cages in Sweden.

When questioned on how exactly the commercialisation of the new 3D

concrete robot will work – and given that Skanska is not a subcontractor for concrete – the company said that this is another element that will be decided over the course of trials over the next two years, but that the main “emphasis of the robot is to support our supply chain”.

Sam Stacey, Skanska's director of innovation and business development, said that the main processes over the next few months will be to make the whole robot and structure more physically robust so that once completed it can be used on any site. The biggest technical challenge going forward, however, is to make sure that the mix and consistency of the concrete is the same each time.

“We want to perfect the technology, but the end plan would be to make it smaller and mobile so it can be used on any site,” said Stacey.

According to Lewis, what is vital for Skanska with the 3D concrete robot is that it is the first to complete and perfect the technology, as there are a number of competitors in the UK and abroad who are developing their own or similar projects.

In the UK, BAM has teamed up with Universe Architecture to explore 3D stone and concrete building, while Netherlands-based CyBE Construction is also exploring the technology, as are a number of companies in China.

Lewis said: “Whoever gets there first wins, and there is quite a lot of competition. However, a lot of our competitors are trying to print whole 3D houses or large objects and we're focusing on smaller cladding, curved panels and things like

Australian firm Fastbrick Robotics has developed a machine capable of laying approximately 1,000 bricks an hour – equivalent to the entire shell of a house in just 2 days.

Oliver Gray is Communications Coordinator at Fastbrick Robotics

How does the Hadrian X bricklaying robot work?

The machine resembles a regular truck, with a 30m telescopic arm mounted on the back that places bricks with precision accuracy using a laser guidance system.

The robot can be loaded with different brick sizes, or cut, grind, and mill bricks inside the trailer, to fit the structure before placement. Bricks are moved from a pack in the trailer and placed onto a “shuttle” that transports them either to the saw for cutting, a router for drilling, or a transfer robot, for laying.

Bricks ready to be laid move through a conveyor belt system within the boom arm of the robot and are placed by a laying head, guided using a laser tracker and a smart track sensor.

Is the technology already proven?

The Hadrian X model is a larger and faster version of the 105 prototype model, first

demonstrated in summer 2016, which had a 28m boom and was capable of laying 225 bricks per hour.

How much will the new version cost?

The Hadrian X will be available towards the end of this year, with a price tag of approximately A\$2m.

The machine doesn't appear to use mortar, how does it bind bricks together to create a solid load-bearing structure?

Rather than using traditional mortar, the Hadrian X uses a specialised industrial adhesive that is five times stronger than mortar, offers up to 70% greater insulation, and has a much faster drying time. This adhesive is applied by the machine prior to the placement of the brick. In addition, the interlocking precision bricks used are 15 times larger than standard bricks.

Does the machine run using conventional 3D design software used in construction?

Our standalone TAD proprietary software was

initially designed to handle production and laying data for the Hadrian 105. It has now evolved into an architectural design tool with many unique functions. A version to begin field trials this year will enable builders to design, tender work, assign contractors, purchase components and invoice for payment, all via a PC, smartphone or tablet.

What is the potential market for the robot?

We estimate a global addressable market of A\$100 to A\$200bn (figures from BDO Consulting). The most attractive markets are Australia, Canada, the US and the UK, with a total addressable market of A\$12bn.

It is difficult to predict how the global market will change over the next decade, but with the number of people inhabiting the earth increasing exponentially, the need for human dwellings and other constructions will surely be on the rise.

Will the technology eradicate the need for human bricklayers?

Our bricklaying machine is sure to displace a lot of human workers in the industry, just the same as other innovations will replace workers in other industries – it is simply the way of the future. We hope, however, that bricklayers will be able to move from their current labour-intensive roles to a more supervisory “quality assurance” role while operating the Hadrian X.

Our innovation has been widely viewed as having a negative impact on the bricklaying industry, but it in fact has the potential to be an immensely positive change by greatly improving the quality of working conditions and removing the often dangerous circumstances bricklayers have to work in.

Interview with

IAN NIGHTINGALE

Ian, if we go back in time, what prompted the need for this initiative (South Australian Industry Participation Framework) and what were the initial objectives?

There was a strong view from business and industry that as a State we weren't capitalising on the economic benefits flowing from Government expenditure.

Originally my role as the Industry Participation Advocate was to provide recommendations to the State Government on how reform to procurement policy could deliver maximum economic benefit to the State while at the same time supporting local businesses, increasing local employment and improving opportunities for local suppliers.

When it came to Government expenditure before the advent of this initiative, I assume the procurement framework was somewhat traditionalist and conservative?

Yes that's true, before the establishment of the Industry Advocate the South Australian Industry Participation Policy (SAIPP) predominantly focussed on local content, but this is a vexed question because how can you really define local when we operate in a global economy.



Ian Nightingale

In addition to this there wasn't any effective measurement framework in place, which meant the outcomes were unclear, and there were no established success indicators.

In 2012 the Industry Participation Policy was similar to most of the other states and territories, and it attempted to identify local content by physical means such as where the head office of the business was or even by using Postcodes.

In 2014 I recommended to the State Government to change focus of the SAIPP and move to an economic contribution model for assessing the economic benefit to the State by measuring labour, capital and supply inputs.

As the Industry Advocate, what powers and functions do you have?

As part of the establishment of the Industry Advocate's role it was decided by the State Government the role would report to the Treasurer and the Minister for Small Business. This enabled me to provide policy reform advice directly through to Cabinet. This meant the authority for the role came directly as a result of Cabinet decisions which always included the various implementation strategies. The other key point is that once Cabinet had made the decision it affected all state government agencies and authorities.

It's worth noting of the 40 or more policy reform recommendations I've made Cabinet has approved every one, which is an indication of the State Government's commitment to making the Industry Participation Policy work.

The function of the Industry Advocate covers a variety of activities, including building capacity of local businesses, identifying opportunities for growth and innovation and identifying barriers to business wanting to contract with the State Government.

We have moved to address some of the barriers, through our Connecting with Business events, these include our Meet the Buyer program and our Supplying to Government Workshops.

The Meet the Buyer events provide an opportunity to match the businesses product or service with the right buyer within government. These events bring together senior project and contract managers from the state government and create an opportunity for local businesses

to meet key staff with the responsibility for the design of projects, sourcing business solutions plus purchasing goods and services. Meet the Buyer events are a platform for businesses to learn how their businesses can become a provider of products and services to the state government.

Our Supplying to Government Workshops are there to assist businesses to learn more on how to be successful and savvy when tendering for government contracts. Both initiatives have been extremely successful over the last few with approximately 6,000 business people having attended both events.

Perhaps you might be able to take us through a 'typical example' of a project where the SA Industry Participation Framework really kicks in?

Even though the Industry Participation policy takes effect from \$33K and above, its most significant influence is government spending above \$4M in metropolitan Adelaide and \$1m in regional South Australia. The reason for this is, above these levels, there is a requirement for an Industry Participation Plan which measures direct labour associated with the contract, the use of local suppliers and the benefit of any capital expenditure associated with the contract. Any State Government contract requiring an Industry Participation Plan requires these plans be assessed and scored by the Office of the Industry Advocate and this score is provided to the purchasing agency which forms part of the tender evaluation.

Once the decision has been made to award the contract, the commitments made in the Industry Participation plan form part of the contract and these commitments are monitored by the Office of the Industry Advocate to ensure the economic benefit identified during the tender evaluation is being delivered.

With strategically important projects an Industry Participation Panel is established to oversee the delivery of all relevant work packages above \$100,000. If there are circumstances where I believe these commitments are not likely to be met I have the power to deliver a Notice of Direction to rectify any non-compliance with the commitments made in the Industry Participation Plan. My office also works proactively with the lead contractor to identify local suppliers and subcontractors.

What research has been done to show the short, medium and long term benefits of this initiative for local industry – things such as creation of jobs etc?

Deloitte Access Economics was engaged early in the piece to investigate various

options and in particular the methodology that could be used by the State Government and its various agencies that would deliver both short term and long term benefits to the economy - such as jobs, capital investment, innovation, and other objectives such as regional development and social objectives.

More recently, the Industry Participation policy has been reviewed to consider the application of a Benefits Realisation Framework, which would use these fundamental economic drivers as a method of measuring the long term benefit to the State and the economy.

Similar to these recent changes to the IPP also supports the number of the State's economic priorities, including Aboriginal Economic Participation, industry diversification and support for strategic industries such as the steel industry and obviously productivity benefits from major infrastructure projects.

What is your response to the issue or regular comment that 'products and services are often cheaper when buying from overseas'?

There is evidence to suggest that some procurement strategies at a national and state level are not delivering the best value-for-money outcome.

This could be because there may not be an adequate mechanism to determine which tender is the most economically advantageous.

On many occasions cost and the allocation of risk are considered to be the primary drivers of procurement decisions and in doing so it simply creates a "race to the bottom" where other qualifications are not given due consideration. This can result in more contract defaults, poor performance and an overall decrease in the quality of goods and services provided.

Value-for-money is one of the primary objectives for all the State and Commonwealth procurement policies. Governments are responsible to taxpayers for achieving the best possible outcome in both financial and non-financial terms in a timely and efficient manner, commensurate with the nature of the purchase.

However the best value-for-money outcome is achieved by applying cost-effective purchasing approaches to deliver the best overall result for money spent – not merely the selection of the lowest price.

In my opinion value-for-money must include measures of broader benefit to the nation and the State, such as employment, investment and industry development. There must also be a broader measure of

value when spending is measured across the total spend of Government.

Does the initiative cover industry, goods and services etc state wide?

Yes it does, the current Industry Participation plan covers all state government expenditure both in metropolitan Adelaide and regional South Australia, it also applies where the state government has provided financial support of \$2.5million in cash or in-kind to a private sector project. In these cases there is an expectation the private sector proponent benefiting from this support would deliver similar Industry Participation outcomes.

We are encouraging Local Government and other public institutions to adopt the same policy principles. There is no doubt that because of its collective size, public procurement can be an important means of implementing governments industry development and innovation policies, and in supporting the long-term well-being of the economy.

What has been some of the feedback you have received about the initiative?

From the very first few weeks in the role I was overwhelmed by the support from industry, business and unions and I reckon one of the main reasons the initiative has been so successful is because of the independence of my role and the independence of my Office.

Before my role was in place I suspect that most businesses paid little attention to the local industry participation requirements spelled out in the tender documentation. This has certainly changed with a significant shift in the buying behavior of lead contractors and agency staff.

In fairness, most tender periods are frantic by nature and attention is normally focused on physical delivery of the scope of work.

But the feedback I have received from industry is the process we now use to explain the nature and importance of the local industry participation principles has been well received by tenderers and once they have had the opportunity to reflect on what we are actually trying to achieve they are very supportive. This is particularly so with those companies with a long-term commitment to the State.

We have seen many genuine examples of companies amending their approach to performing works once they have fully understood the process and recognize the benefits of retaining works locally if it makes economic sense to do so.

There is no doubt the consistent message we have been rolling out across the major

infrastructure projects in the State means tenderers are increasingly aware of their obligations and recognize the benefit to the local economy of the approach we are advocating.

The consistency in approach also means they are becoming well versed in how to respond to the local participation requirements and it is a catalyst for them to think positively about how to address the issue rather than seek only to confirm compliance.

Are other states or territories considering an initiative such as this?

When the role of the Industry Advocate was established it was the first of its kind in Australia. We have been approached by a couple of the other states and territories for information on its operation because they can see the benefit of an independent office providing advice to government and the benefits to the economy from a role such as this. But at this point South Australia is still leading the way.

You have been working nationally with the Joint Select Committee on Government Procurement – what have been the outcomes of this?

You're right South Australia has led the charge to support the Australian steel industry by ensuring all state government projects use steel that meets Australian Standards and certification requirements, giving the local industry a competitive advantage against lower quality imports.

It was interesting to note that the Federal Senate passed amendments to the Commonwealth Procurement Rules in November 2016. Those amendments bear a very close resemblance to the South Australian Industry Participation Policy (SAIPP) and in particular the way the policy was used in conjunction with a Steel Certification Initiative to support the Australian steel industry.

The role of the South Australian Industry Advocate and the state government's Industry Participation Policy was recognised by Senator Xenophon when he supported the government's amendments in the Senate.

When Senator Cormann spoke supporting these amendments in the Senate he noted that free trade agreements require that Australia does not engage in prejudicial decision making, but he also recognised this does not preclude them from appropriately gathering information and looking at the full economic effects of procurement as part of the decision making process.

The State and Local Governments will need to continue to investigate new procurement policy reforms and other initiatives that can stimulate the economy by ensuring where possible, agencies procure from locally-based suppliers and suppliers who source inputs locally.

It is important to note this is not about special treatment or price preferencing, rather it is about recognising the important contribution businesses make to the economy. The physical location or the registered office of a business does not necessarily translate into economic benefit to the State.

Where are you currently with regard to having an Industry Advocate Bill introduced in 2017?

The State Government recently announced it will be further supporting local business, industry and jobs by enshrining the role of the Industry Advocate in law. The Bill – to be introduced in Parliament mid this year – establishing the Industry Advocate as a statutory position and strengthens powers to hold contractors to commitments they have made to utilise South Australian works or materials.

By establishing the Industry Advocate's role in legislation, together with a commitment from the government to maintain the Industry Participation policy, it will provide business and industry the confidence to embrace these initiatives and continue to contribute to and invest in the South Australian economy.

The Bill will also be accompanied by an updated Industry Participation policy, with changes that include provisions for strategically important industries, such as steel, how design can be used to deliver better economic outcomes for the State, a greater focus on regional development from procurement activities, Aboriginal economic participation, the concept of Economic Participation Regions to include how projects and procurement within a region could be designed to benefit businesses and the economy, finally lowering the threshold for when applicants for state government grants must demonstrate how they will contribute to local investment, jobs, business and industry growth.

Some examples of the indications of support:

- The establishment of a statutory authority to ensure compliance, will provide

the teeth necessary for the Industry Participation Policy to achieve true social and economic benefits for South Australia including regional areas of the state. (Civil Contractors Federation)

- The independence of the Industry Advocate provides an avenue for local businesses to have a voice and offer innovative policy solutions. (Consult Australia)
- The legislation will help to shore up the independence of the Industry Advocate role to continue to collaborate widely with the steel sector for the SA Governments Steel Initiative and provide on-going support and acknowledgement of the valuable contribution the steel industry is making in this state. (Australian Steel Institute)
- South Australian small to medium sized businesses are now seeing greater opportunities through the application of industry participation plans extending to sub-contractors and suppliers. The proposed legislation would give the Industry Advocate greater powers to go into bat for these businesses. (Australian Subcontractors Association).

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AIB NEW MEMBERS

Section

On behalf of the existing membership, the Chapter Committees and the National Council we extend a very warm welcome to all these new additions to the AIB family.

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27 Jan 2017 – 28 Apr 2017

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