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2016 Edition 1



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- THE FUTURE FOR MULTI-STOREY TIMBER CONSTRUCTION IN AUSTRALIA
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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.

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A Message from the National President Norman Faifer FAIB FAIQS FIAMA



Welcome to my Fifth (and first for 2016) Construct Magazine (February 2016) column as National President of the Australian Institute of Building. This is my second and final year of leadership of this august Institute.

On the home front, the Institute is making headway in the representation of its members with Regulators at State level being in discussion separately but at the same time with the ACT, NSW, WA and SA building regulatory regimes over the licensing of Builders whilst at the same time preparing to submit a Tender with the Victorian Building Authority for the provision of Assessment services for the registration of Registered Building Practitioners (incl. Builders) in that state.

Whilst the Council of Australian Governments (COAG) withdrew support for a National Builders licensing scheme under the National Occupational Licensing Authority (NOLA) we, the Institute, are continuing to liaise with the separate regulators to represent our members and to attempt to raise the standards required to be licensed and/or registered as Builders in each jurisdiction.

On the international scene, over the annual vacation I had cause to attend a family event in Cape Town, South Africa. Whilst there,

following an initiative of Graham Teede FAIB, a National Vice President of the Institute, I visited and held talks with the relevant School, Department and Faculty Professors and staff members of Construction Management at the University of Cape Town and the University of Pretoria; I even had a meeting with Prof. Cheryl de la Ray the Vice Chancellor of the UoP (during all their student and non-academic staff woes); all are keen to promote interaction between students in Australia and South Africa with those Universities acknowledging that an increasing number their graduates are securing positions in Australia.

As a corollary to that I also had a meeting with the Australian High Commissioner to South Africa, HE Mr. Adam McCarthy, who was also very interested and keen into promote our efforts in South Africa. I expect that more information on this South African connection will come out in the next period of time as it develops.

We continue to liaise with the relevant Federal and State Ministers on matters, building: The Hon. Greg Hunt is the Acting Minister for Cities and Built Environment, The Hon. Simon Birmingham, Minister of Education and Training and the Hon. Richard Colbeck, Minister of Tourism and International Education are but several of those Honorable people we are dealing with.

The debates on non-conforming (building) products are still at boiling point with much thought and discussion occurring; as I opined previously before, as the issues are complex and multifaceted the resolution will not be achieved over night. Whilst on this topic, when I was in South Africa I noted an article in the Property Section of the Business Report of the "The Star" Newspaper, Cape Town, 4 January 2016: "Hotel Fire sinks Emaar's Share Price" and "External Cladding is put to question"; this article referred to a recent fire in a 42 story high rise hotel building in Dubai where rapid spread fire damaged the façade with all manner of questions being raised.

Houston, it would appear that we have a global problem – a fire in Dubai reported in a Cape Town Newspaper with shades of local familiarity.

In December 2015, after seven years of great service our CEO, Robert Hunt CPA, tendered his resignation which Council sadly accepted. I personally, on behalf of National Council, the Chapters and all members pay tribute to Robert for a job well done, when Robert arrived his office shelves were full of files, but all the files were empty, the shelves now are still full of files but all the files are bursting and his handover manual fills two USB sticks, we have learnt a lot from each other on this journey. Robert leaves us to further pursue his career and he does so with our very best wishes.

At this time Council is conducting a search for a new CEO and I expect that by the time this edition is published I may be able to report positive progress. In the meantime Sue Bruce CPA, our very capable COO is Acting CEO, leading a small but efficient and dedicated office team.

At this time I wish to repeat what I said in the last Construct Edition: The Institute is making great strides in representing its members in many forums however we still require your active participation; we welcome constructive comment and suggestion (rather than destructive criticism); this Institute is only as strong as we make it so we all have a role to play and remember there are many advantages and benefits that you derive from being a member.

I wish us all well in 2016.

Yours fraternally,



Norman Faifer FAIB FAIQS FIAMA
February 2016
National President (and Chairman of
National Council)
The Australian Institute of Building



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PHOTO OF THE AIB NATIONAL COUNCIL, 26 SEPTEMBER, 2015



(Top left to right)

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(Bottom left to right)

Robert Whittaker AM FAIB, Paul Heather FAIB JP, Norman Faifer FAIB FAIQS FIAMA, Ron Webber FAIB FAIBS FRICS FCIQB MAIPM and Graham Teede FAIB.

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If you would like to keep receiving the Construct Magazine in the mail, you will need to opt-in or request for this service. Simply log into the member-only page on the AIB website and select **'Manage eNews Subscriptions'** and tick the box that says **'Receive by Post'** for the Construct Magazine.

If you have any questions, please contact membership@aib.org.au

New CEO Appointed to 'Build' On Success

The Australian Institute of Building (AIB) today announced Greg Hughes as the new CEO at the leading Institute for building and construction professionals. Announcing the appointment, National President Norman Faifer FAIB, FAIQS, FIAMA acknowledged the excellent contribution the former CEO had made and now looked forward to a fresh strategic approach.

"Greg brings a wealth of senior Not for Profit membership based experience and will take us to the next level in our

growth strategy. He will focus on our internal and external operations ensuring that we deliver the most appropriate cutting edge products and services for our members, as well as ensuring that we have a strong voice and seat at the table with regard to Government relations and reform" Norman said.

Greg will focus on driving growth through innovative membership strategies and strengthening ties with allied professionals. Commercial partnerships as well as a renewed focus on Continuing

Professional Development and media engagement will also be a priority.

"His most recent role was with Fitness Australia Limited as Chief Operating Officer and Greg is genuinely excited about working with the Board to ensure that the AIB's Value proposition is both compelling and engaging" Mr Faifer said.

Greg commences as CEO on 4 April 2016

For more information or to arrange an interview call (02) 6253 1100

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New South Wales has jumped the field in the Australian economic stakes and is now seen as the prime state in which to do business. And if your business is about building Australia, your industry is part of that boom!

If you are feeling left out, CIVENEX 2016 is a way climb on board the national infrastructure wave. If you are riding the wave already, go to CIVENEX to maintain your momentum.

Latest data shows New South Wales holds the top ranking on population growth, retail trade, dwelling starts and housing finance, while being in second place, and rising fast, for employment and equipment investment.

To join the boom and stay on the wave, come to CIVENEX 2016 on May 18-19, 2016 at the Hawkesbury Showgrounds. It is the biggest infrastructure event of the year in the biggest infrastructure boom in Australia's history that is being driven by private enterprise and government in Canberra and Sydney.

Every year, CIVENEX is the launch pad and show case for innovation in equipment, materials transport and handling, and the construction and surfacing of freeways as well as water related issues.

It is at CIVENEX where business-to-business negotiations take place and where deals are done. It is where industry meets those government bodies that generate infrastructure and where Private-Public Partnerships have their genesis.

For 61 years, CIVENEX has been the 'go to' Expo, not just for suppliers and buyers along the infrastructure chain in New South Wales, but right across Australia.

Our exhibitor's showcase offerings of all sizes, from the largest earthmoving equipment down to computer software.

CIVENEX is run by the Institute of Public Works Engineering Australasia-NSW Division (IPWEA-NSW) which has a 108 year history of leadership in national infrastructure development.

The Chief Executive Officer of the IPWEA-NSW, John Roydhouse, said that whether you are running the survey team that maps out a green-fields site for development or you are the landscaper or outdoor furniture supplier that beautifies the finished site, or sit anywhere in-between along the infrastructure chain, CIVENEX is the place to sell or buy, or to plan your future sales and purchases.

Every year private contractors, State, Federal and Local Government staff, design engineers and site managers are among the 3,500 visitors to CIVENEX. The exhibitors are the people who wish to sell their goods and services to these and other interested people who attend the Expo from the wide range of companies and organisations involved in enhancing and invigorating Australia's national infrastructure.

You cannot afford to miss CIVENEX 2016 if your business or employer is involved in Civil Construction, Outdoor Design, Plant and Machinery, Materials Handling, Software, Communications, Supply & Hire, Technical Services, Water Issues, Waste Management, Fleet, Maintenance, Roads or Drainage.

CIVENEX 2016 is a must for any business supplying Australian Local Government, Federal, State and Territory Public Works and the nation's major contractors.

If you aren't getting the benefit of the investment in this market – perhaps you are doing something wrong! A trip to CIVENEX will put you on the right path.

If you need equipment or expertise to ride that wave, CIVENEX is the place to buy or sell, or

even rent to keep your capital free - and also the place to educate yourself and your team on who and what is available if you need it now, or later in the year, so you have the capacity to channel the growth in New South Wales into growth in your business.

If you want others in the infrastructure boom to be in contact with you, your business and your team, CIVENEX is the place for you to get out into the market as an exhibitor and start that promotion and translate New South Wales' prosperity into prosperity under your own roof.

At CIVENEX 2016 you will see the very latest technology, adaptation and initiatives built into the equipment or materials you plan to buy.

All of your business aims, long, medium or short term, should be built around plans based on what your business has and will need in the way of skills, manpower, capital and ongoing staff education, training and development.

The move to the Hawkesbury Showgrounds this year offers a variety of levels of overnight accommodation for the growing number of participants from interstate and overseas as CIVENEX grows in stature, plus the option of public transport, including nearby Clarendon Station. A transit bus service will take participants between the site and motels and public transport.

At CIVENEX you can check out what you want and need now, and find out about what you will need in the future.

You can do all of this at CIVENEX 2016 on May 18-19 2016 at the Hawkesbury Showgrounds in the burgeoning North-West of Sydney.

Organisations interested in booking sites, either indoor or outdoor, at CIVENEX 2016 should call Scott Leighton on (02) 8267 3075 or email Scott.leighton@ipwea.org

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The Future for Multi-Storey Timber Construction in Australia – Overcoming the Obstacles

Alex Anderson and Robert Fuller¹, School of Architecture and Built Environment, Deakin University, Geelong, Victoria 3220, Australia, ¹Corresponding author: rjfull@deakin.edu.au

ABSTRACT: In Australia the majority of multi-storey buildings are constructed using the conventional building materials of concrete and steel, resulting in significant CO₂ emissions. To combat this, timber has been identified as a sustainable material that will aid in reducing emissions while possessing several other advantages over the conventional materials. However, the prevailing literature on the subject has indicated that there are numerous obstacles that are hindering multi-storey timber buildings in Australia. This paper identifies and analyses the major barriers that are preventing multi-storey timber buildings in Australia, while also suggesting ways to overcome these barriers. The major obstacles identified were the fire resistance, legislation, cost and maintenance, and construction expertise. In addition to this, the hesitation to adopt new technologies was also recognised as a possible factor in the slow uptake of multi-storey timber buildings in Australia.

Keywords: timber; multi-storey buildings; barriers; CLT; Australia

Research article

INTRODUCTION

As of 2009, buildings accounted for approximately 30% of total greenhouse gas emissions (GHG) globally (United Nations Environment Program 2009). At the same time, Australia was found to be the highest carbon emitter per capita in the group of 34 countries that are part of the Organisation for Economic Co-operation and Development (International Energy Agency 2014). In an effort to reduce these figures, it is vital that all buildings are designed with a sustainable focus and approach. Currently, the majority of medium to high-rise buildings are constructed using concrete and steel. Both of these materials have a large carbon footprint and require significant amounts of energy to produce. Concrete production, for example, accounts for an estimated 5% of total carbon emissions worldwide (Green 2012).

It is for this reason that alternatives have been developed in an attempt to reduce GHG emissions from the construction industry. The most promising and most discussed material to replace conventional construction materials is timber. In the context of emission reductions, the sustainable qualities it exhibits are important. For every cubic metre of timber, one tonne of CO₂ can be stored. Furthermore, every tonne of solid wood panels can sequester approximately 1.6 tonnes of CO₂ (Lehmann 2012).

In recent years there has been a significant rise in the number of multi-storey buildings that have been constructed primarily from timber and timber-related products. The most common timber product used for construction is Cross Laminated-Timber (CLT). Since 1990, medium-rise timber buildings and CLT have gained significant traction, specifically

Table 1: Global Status of Multi-Storey Timber Buildings

Year	Project	Country	Storey Height
2004-2005	Svartlamoen, Trondheim	Norway	5-storeys
2005-2006	Am Muehlweg, Vienna	Austria	3-storey and 4 storey on concrete basement
2006	Holzhausen, Steinhausen	Switzerland	4-storey on concrete base
2006	Schuetzen, Strasse	Austria	4-storey
2008	E3, Berlin	Germany	7-storey
2008	Lagerhuset, Eslov	Sweden	10-storey
2009	Stradthaus, Murray Grove, Hackney	UK	9-storey
2009	Portvakten, Soder	Sweden	8-storey
2010	Bridport House, Hackney	UK	8-storey
2010	Parkside Mixed Use, California	USA	5-storey
2011	3XGrun, Berlin	Germany	5-storey
2011	Advanced Training Baracks, Virginia	USA	5-storey
2011	Holz8, Bad Aibling	Germany	8-storey
2012	Forte Building, Melbourne	Australia	10-storey

2012	University of Washington, Seattle	USA	5-storey
2012	Earth Science Building, Vancouver	Canada	5-storey
2012	LCT-One, Dornbirn	Austria	8-storey
2013	Tamedia, Zurich	Switzerland	6-storey
2013	Cenni di Cambiamento, Milan	Italy	9-storey
2013	Wagramerstrasse, Vienna	Austria	6-storey
2013	Stella, California	USA	5-storey
2014	Wood Innovation Centre, Vancouver	Canada	8-storey
Under construction	Treet Project, Bergen	Norway	14-storey

(sources: Lehmann 2012; Lehmann et al. 2012; Wood Works, 2012; International Wood Buildings, 2014)

in European countries. In Sweden, for example, the current goal is to have 30% of multi-storey buildings constructed using timber within the next ten years (Jonsson 2009). Table 1 shows the range of multi-storey timber buildings over three-storeys in height that have been constructed over the last decade. The majority of these buildings have been constructed in Europe (14), three in the US and two in the UK, but only one in Australia.

The fact that only one multi-storey building has been constructed from timber and only two others have used CLT in Australia indicates that there are obstacles that are preventing timber from being used here on a large scale for multi-storey buildings. Xia, et al. (2014) have identified four perceived obstacles through a survey of industry experts and practitioners in Australia (see later details) and these are confirmed in this paper through an analysis of international and Australian academic and industry literature. This literature review informs the subsequent sections of the paper to allow specific local obstacles to be investigated in greater detail, including some cost comparisons between conventional and CLT construction. In addition, a further obstacle, 'new technology adoption' is suggested. The paper also discusses the 'cause and effect' between the various obstacles and suggests ways in which this nexus might be broken. The paper begins with a brief description of Australia's only multi-storey high rise building to establish the context of this research.

THE FORTE BUILDING

In 2012, Lend Lease completed construction of the Forte Building, which is located in Melbourne's Docklands precinct (Figure 1). This building is Australia's first timber apartment building and the first building in Australia to use CLT. It is also the tallest timber building in the world, with a height of 32.2 metres (ten storeys). The building contains no timber framing, but rather 759 pre-fabricated CLT panels that were imported from Austria (Wood Solutions 2012a). The ground floor of the Forte Building

consists of retail space with 23 apartments and four townhouses on the subsequent levels. The fact that the Forte Building is the tallest and first CLT building to be constructed in Australia is certainly noteworthy. However, while it is the tallest timber building in the world, it is still the only example of a multi-storey building in Australia, demonstrating that there is something preventing or slowing the implementation of timber and CLT buildings in the country.

BARRIERS to MULTI-STOREY TIMBER BUILDINGS

The obstacles to timber construction in Finland were investigated by Iloa and Riala (2014), who outline the history of timber construction within that country, before reviewing and discussing the results

of interviews with 18 relevant parties. The major obstacles identified by Iloa and Riala (2014) were the cost-competitiveness, the role of customers, their preference for particular building materials and the prevalence of concrete in the construction industry. Jonsson (2009) focused on the prospects of timber construction for multi-storey residential buildings in England, France, Germany, Ireland, the Netherlands and Sweden. Each country's history and policies with regard to timber construction were examined, as well as the economic factors impacting on the product. In a broader study, Lehmann (2012) looked specifically at the application of massive wood panel systems, mainly CLT, in architecture. A number of case studies using CLT were identified internationally, including the Forte Building. The various advantages of the product were listed in addition to the various barriers that are preventing its mass implementation. No specific details of the underlying causes were given; however an extensive list of the obstacles to CLT was provided. This included durability, acoustic properties, structural integrity, fire resistance and the energy efficiency of the product.

As previously stated, Xia, et al. (2014) investigated the perceived obstacles to multi-storey timber buildings in Australia. These authors provide a brief yet thorough investigation into the current obstacles facing multi-storey timber construction within this country. They conducted a survey of 15 experts in the field to address what they believed to be the perceived obstacles, and then produced a list of the 15 obstacles. Following this, a questionnaire survey of 176 respondents was conducted to evaluate the 15 obstacles on a 1-to-5 Likert-type scale. The respondents included architects, investors, contractors and government officials. Their paper provides a table of the varied answers to the questions and a list of the obstacles that affect multi-storey timber construction. The major obstacles identified were the fire resistance, legislation, cost and maintenance, and construction expertise and although Xia, et al. (2014) provide a list of the various



Figure 1: The Forte Building in Melbourne's Docklands (source: KLH 2014)

obstacles to the issue, they do not investigate these in great detail nor ways in which they might be overcome. The following sections address these obstacles in some detail.

LEGISLATION

Based on their questionnaire results, Xia, et al. (2014) found that legislative support from the Federal Government is ranked the fourth most important obstacle. It is vital to understand what the government does and does not allow in terms of timber construction in Australia. Thorough understanding the current policies and regulations concerning timber, it is clear that the Federal and State governments of Australia are the first and foremost barriers preventing further development. Currently, the application of timber in buildings is governed by the National Construction Code (NCC). More specifically, under the NCC Volume One for Class Two and Three Buildings, timber framing is restricted under the deemed-to-satisfy (DTS) provisions for a maximum height of three storeys, or four storeys if above a concrete/masonry carpark (Iskra 2015). It is important to note that this does not prevent buildings that exceed this height to be constructed. Timber buildings exceeding three storeys can be built if they meet the requirements of an 'alternative solution', outlined within the NCC Volume One.

For timber buildings greater than three storeys, 'an alternative solution' must be completed. The NCC defines this as follows: An "alternative solution means a building solution which complies with the performance requirements other than by reason of satisfying the Deemed-to-Satisfy Provisions [DTS]" (ABCB 2011:16). To meet the 'alternative solution' requirements, a fire engineer must gain approval to prepare a Fire Engineering Brief (FEB) and a Fire Engineering Report (FER), which will be submitted with the building approval documentation (Arup 2014). Both the FEB and the FER must meet the performance requirements set out by the Department of Fire and Emergency Services. These requirements include building fire resistance, access and egress, and services and equipment (Department of Fire and Emergency Services 2015). Once the FEB and FER are completed, the documentation is submitted to the NCC to gain approval, which varies between each state and territory depending on the fire safety requirements (Arup 2014).

While meeting the requirements of an 'alternative solution' can be a long and costly procedure, it is certainly achievable, as the Forte Building has demonstrated. In the case of the Forte Building, the requirement for an 'alternative solution' was not only due to its height, but also due to the fact that it specified CLT, a product new to Australia and hence no DTS solution existed for all performance requirements (Savery 2013). The Forte Building is a clear example of how a timber building exceeding the allowed height can be built under an 'alternative solution'. There is, however, a proposal from the Forest and Wood Products Australia Limited (FWPA) to change the allowed heights under the NCC. In 2015, the FWPA submitted a proposal-for-change (PFC) to the Australian Building Codes Board to create a DTS solution within the BCA Volume 1 for the use of timber building systems in Class Two, Three and Five buildings (Iskra 2015). If passed, this PFC would cover both timber framing and massive timber systems, allowing for timber buildings in these classes to be up to 25 metres or approximately eight

Table 2: Estimated Material Cost Comparison of Forte Building

	Forte Building	Reference Building
aCost per cubic metre (2012)	\$778	\$200
bQuantity required	485 tonnes	
1,029 m3	4,135 tonnes	
1,723 m3		
cWeight of material	470 kg m-3	2,400 kg m-3
bTransportation distances	19,433 km (estimated)	30 km (estimated)
Unit cost x quantity (m3)	\$800,562	\$344,600
Shipping Costs (World Freight Weights)	\$2,500-\$3700 per container (25 containers)	N/A

(sources: aEmmett 2012; bCrossin et al. 2013; cDauksta 2012)

storeys (Iskra 2015).

In terms of legislation, it can be argued that the state and federal governments provide a barrier to timber construction in terms of its height, as the procedure to gain approval for an 'alternative solution' can be a lengthy and costly process. However, this approval process may not be required for timber buildings up to eight storeys in height, if the proposal from the FWPA is passed by the NCC. However, while the NCC does allow buildings up to three storeys in height, none have yet been any constructed in Australia, which demonstrates that there are clearly additional obstacles preventing further development.

FIRE RESISTANCE

Fire resistance is perhaps the biggest concern that is raised when discussing timber-framed buildings, specifically the fire risk associated with timber products and their ability to perform during a fire. Due to the many historical cases of timber buildings being destroyed by fire, there is a hesitance and fear to using timber in medium-rise buildings due to its flammable nature. It is therefore essential to investigate the potential hazards that may or may not be associated with timber, and how these are preventing further timber construction in Australia.

When discussing the fire safety of timber buildings, Wood Solutions (2012b) outlines the most common hazards that need to be addressed to satisfy the requirements of the BCA for Class Two Buildings. The first hazard identified is the fire risk during the construction of timber buildings. Timber-framed buildings are at a higher risk during the construction stage as the timber elements are incomplete, possibly untreated and without fire-rated elements such as plasterboard. If a fire does occur during construction of a timber building, the timber frames and panels will burn faster and more widely than concrete or steel, if they are not yet protected by internal fire resistant plasterboard or external cladding (UKTFA 2008). Measures to ensure the safety of the building and reduce the risk associated with timber can include appointing a Fire Safety Coordinator, producing a Fire Safety Plan, reducing the amount of stored timber on site and implementing a fire detection system (UKTFA 2008).

Another risk associated with timber construction

is the possibility of load-bearing failure to structural timber elements during a fire. To meet the requirements outlined by the NCC, buildings require a Fire Resistance Level (FRL), which is the minimum amount of time that a building component must resist a fire, as determined by three separate elements (Wood Solutions 2012b). In timber buildings, fire-resistant plasterboard is the primary material that protects from the risk of fire. The perception is that in the event of a fire, if the fire resistance level of the plasterboard were to fail, the timber studs within the wall would also fail, leading to significant load-bearing failure of the building. Due to this negative perception, countless tests have been done to examine timber's ability to perform during a fire. For internal walls, plasterboard can provide a fire resistance level of 90/90/90 while for ceilings it can achieve 120/120/120. The NRCC (2012) conducted a series of tests on eight different variations of CLT, ranging in sizes between 105 mm to 245 mm, with panels either protected with gypsum or left exposed. It was found that CLT could maintain fire resistance levels for up to three hours, even when unprotected (National Research Council 2012). While CLT panels have been shown to maintain positive fire resistant levels, it is often required that they are encapsulated by non-combustible plasterboard or gypsum board to protect the CLT from heating and combustion, thereby increasing the fire resistance rating of the building.

While fire resistance is often perceived as the biggest risk of timber-framed buildings, it does not necessarily need to be. If proper safety measures and procedures are conducted on site during construction, it will greatly reduce the risk of fire. For CLT, to prevent the spread of fire, it is necessary to install fire-rated plasterboard in the building, as well as fire resistant seals to the joints and connections within the building. It should be noted that while CLT has been shown to perform adequately during a fire, although the tests that have been conducted are primarily overseas, mainly North America and Europe. Since CLT is a relatively new timber material in Australia there have been very few tests conducted in Australia. This is a significant factor is preventing more timber buildings being built as the product is perceived as untested in terms of the Australian building sector. There is still a perception



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that the risk of fire is high in a timber building, which is not necessarily the case. With additional tests of the fire performance of CLT in Australia, the product could then be utilised more frequently in the market. If the Australian public and construction sector are then informed of its positive performance, as well as timber buildings ability to perform during a fire, there would hopefully be an increase in the number of multi-storey timber buildings.

COST

The cost effectiveness of timber buildings is another concern that is raised regularly as an obstacle to their increased acceptance. While multi-storey timber buildings are generally noted for their cost-effectiveness and ability to reduce the overall project's budget, there are a lot of variables that can determine a building's cost. Perry Forsythe, a Professor of Construction Management from the University of Technology in Sydney said the following regarding multi-storey timber construction:

Timber can be realistically cost competitive and rapid to construct as long as it is designed with a view to optimising readily available material and component sizes, paying close attention to simple fabrication and erection techniques, being mindful of site constructability and prefabrication programming advantages, and ensuring that the timber design is engineered to get the most economical result in terms of the NCC performance requirements (Forsythe 2015: 2).

One of the variables that can affect the cost of multi-storey timber construction is the cost of the timber itself. Currently, CLT is not manufactured in Australia, so any project that specifies the product is required to source it from overseas manufacturers. In terms of the Forte Building, all 759 CLT panels were European spruce, imported from Austria. This requirement can increase the cost of a project, especially when compared to using a locally-sourced material such as concrete. Table 2 shows a comparison of estimated material costs of the Forte Building with a conventionally-constructed equivalent. It can be seen that while the quantity and the weight of CLT required is less than that of concrete, the cost per cubic metre is significantly higher. This figure of \$800,562 also does not take into account the cost of shipping 25 containers the distance of almost 20,000 kilometres.

In Australia, the biggest component of the increased cost of a multi-storey timber building is its prohibitive legislation. If a building exceeds the allowed three-storey height, then the 'alternative solution' that is required for its approval can add significant costs to the project. Estimates from the FWPA (2015) found that the cost of the alternative solution pathways was approximately one month of lead time lost for medium developments, costed at \$2000 per day, equating to roughly \$40,000 or 0.5% of total build costs (FWPA, 2015). While the 'alternative solution' pathway certainly affects the cost of multi-storey timber buildings, if the proposal-for-change to the NCC is passed, timber buildings up to eight-storeys would be allowed under the Deemed-to-Satisfy provisions, which would bring considerable cost savings. If passed, increased height allowances for DTS Provisions for timber framing are estimated to provide approximately \$103 million in net benefits to the Australian economy over ten years (FWPA, 2015). This figure is divided between \$98.2 million in direct construction cost savings, \$3.8 million in reduced

Table 3: Summary of Cost Comparisons

Building type	Timber construction	Traditional construction	Difference
(timber – traditional)	Earth Science Building, Vancouver	Canada	5-storey
7 storey office building	\$6,387,913	\$7,289,508	-\$901,595 (-12.4%)
8 storey apartment building	\$5,015,705	\$5,126,183	-\$110,478 (-2.2%)
2 storey aged care	\$697,020	\$809,620	-\$112,600 (-13.9%)
Single storey shed	\$216,342	\$238,861	-\$22,519 (-9.4%)

(source: Timber Development Association 2015)

compliance costs, and \$1 million in environmental benefits (FWPA, 2015).

In terms of the cost of the initial construction the Timber Development Association (2015) compared the construction costs of four different types of commercial buildings using timber and traditional materials (concrete and steel). The four types of commercial buildings were an eight-storey apartment building, seven-storey office building, two-storey aged care facility, and single-storey industrial shed (Table 3). It was found that using timber yielded lower construction costs for each type of building, resulting in timber buildings being up to 10-15% more cost effective across a range of building types (Timber Development Association, 2015).

When specifying timber as the primary material for multi-storey buildings, there are many factors and variables that need to be taken into account. In 2007, the FWPA prepared a draft proposal for AS1720.5 - Durability of Structural Timber Members, which outlines the possible risks when using structural timber and the procedures that should be taken to prevent them. These risks include both above- and below-ground decay, weathering, termite infestation and corrosion (FWPA, 2007). The most common maintenance cost identified by Xia, et al (2014) is related to termite infestation and moisture leakage leading to mould. The presence of these risks are again dependent on a range of factors, including the type of timber used, size and dimensions of timber products, site conditions, exposure factors and the location of the building. Due to the speed of erection of CLT buildings, the short-term exposure to weather conditions and moisture does not affect the timber. Like conventional buildings, CLT walls and floors should be protected using exterior cladding, vapour barriers and plasterboard. If the building is designed and constructed using correct detailing, then there should be no risk of increased maintenance costs caused by moisture.

In terms of insect prevention, AS-1604 provides various preventative treatments for a range of different timber products to combat decay and insect infestation, although these do not include variable climatic considerations. AS 3660-2000 on termite management emphasises the use of a physical termite barrier rather than the use of chemical treatments. In terms of the Forte Building, the preventative treatment for termites was to provide physical termite barriers at perimeter and service

penetrations with regular (quarterly, semi-annually or annually) inspections. Since the CLT component of the building begins on the first floor above the concrete ground floor, it removed the potential threat of termites (Savery 2014).

While maintenance costs have been identified as the third largest obstacle to timber multi-storey buildings by Xia, et al. (2014), there is little evidence that they are. In terms of mould and termite infestation, these two risks are heavily dependent on a number of factors that may or may not affect the building, and the location of the building is a defining factor, as well as how the building is designed and constructed. In most projects, including the Forte Building, exterior cladding is specified, which protects the building from weathering and the risk of mould. Simple measures including vapour barriers and air pockets can also be included to reduce the risk further. Since CLT is not currently manufactured in Australia, any project specifying the material is required to source it from overseas and transport it into the country, which will add significant costs to the project. If CLT were to be used more frequently in the market, leading to local manufacturing of the product, the costs of construction would see further reductions.

CONSTRUCTION EXPERTISE

Another obstacle preventing the increased amount of multi-storey timber buildings in Australia identified by Xia, et al. (2014) is the lack of construction expertise. Due to multi-storey timber and CLT being a relatively new concept within the country, it was identified from the survey that there is a relative lack of experience and knowledge from industry professionals. At the core of the issue is the lack of tertiary education to teach future designers, engineers, relevant consultants and contractors about both timber products and the construction of multi-storey timber buildings. In a 2006 report for the Forest and Wood Products Research and Development Corporation, one of the key issues outlined was the lack of teaching of timber engineering at Australian universities (Bayne 2006). The report outlines that compared to other nations such as New Zealand, UK, USA, Canada and Scandinavia, Australia is perceived to lack the depth of timber research, and past industry efforts to reinforce this teaching has been unsuccessful (Bayne 2006).

A number of surveys have been conducted to identify the factors that influence specifiers and their reasons for using or not using timber products

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(Truskett 1997). From this report it was found that at least 30% of structural engineers received no training in timber at all, and that a lack of knowledge from structural engineers is the core reason for timber not being adequately specified in Australia (Truskett 1997). Pratley et al. (2010) identifies a strong declining trend of graduates in the field of forestry and timber, with undergraduate pass completions declining more than 50% between 1994 and 2007 (Pratley et al. 2010). This trend is exemplified by the average number of forestry graduates from the University of Melbourne, which was only 8-10 in 2009, having fallen from 40 in the mid-1990s (Weston 2009).

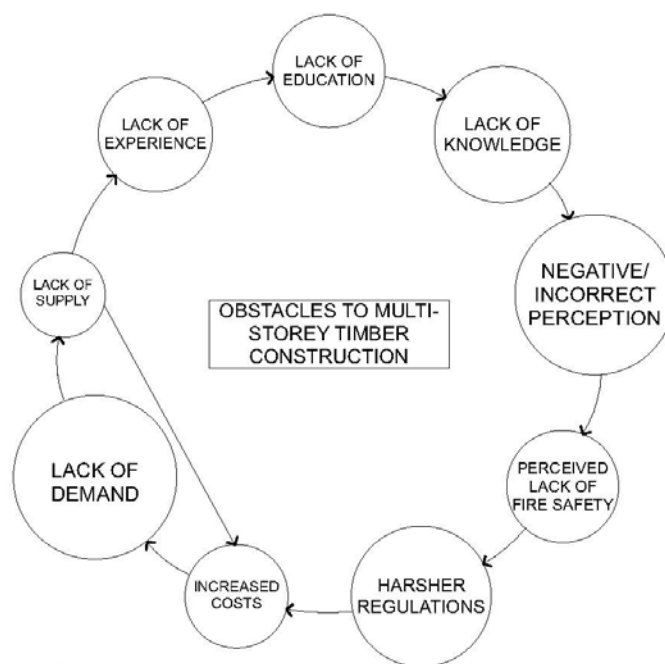
In terms of timber manufacturing, the lack of timber production and suppliers in Australia is another barrier affecting construction expertise related to multi-storey timber construction. As of 2014, there was only one plant in Australia that produced laminated veneer lumber or LVL, and a small amount of glulam production for project-to-project orders (Aliento 2014). CLT, one of the most common materials used in the construction of medium-rise timber buildings and the main product used in the Forte building, is not currently manufactured in Australia. Since construction professionals in the country are not familiar with using the product, they would have to rely on the manufacturer for connection details and manuals for using CLT. To counter this, the case can be made that it would be beneficial for CLT to be locally manufactured, which would allow it to be more easily accessible for specification and use in Australian projects. However there is currently insufficient demand volume in Australia to support the development of a CLT plant (Aliento 2014). As of 2012, it was estimated that the demand for CLT for use in Australian projects was 30,000 cubic metres per year (Lehmann et al. 2012).

As of 2013, over 20,000 projects across Europe have been specified using CLT in some form (Lend Lease 2013). With only two buildings in Australia that have been constructed using CLT and one building that has exceeded three-storeys in height, very few designers, engineers and contractors have had experience using these technologies. In addition to this, limited tertiary education on timber engineering and multi-storey timber buildings leaves many in the construction industry with insufficient knowledge and expertise.

ADOPTION of NEW TECHNOLOGY

While not identified in the literature, another possible obstacle to multi-storey timber construction and CLT is the hesitance to adopt new technologies in the construction industry. With little market acceptance and experience using these technologies, it is understandable that the construction industry would be unfamiliar and hesitant to utilise them. Innovation has been defined by Toole (1998: 323) as "an application of technology that is new to an organization and that significantly improves the design and construction by decreasing the cost, increasing the performance, and improving the business process". CLT and multi-storey timber construction can be defined as possessing innovative qualities and since it only emerged in the Australian market in 2012, it is still a very new concept for construction companies to work with.

While CLT has been identified as possessing several benefits and advantages, there are still risks associated for construction companies from



(Figure 2: Cause and effect of obstacles to multi-storey timber construction

note: size of circle indicates authors' estimate of importance)

specifying innovative and new products. These include investment reluctance, lack of supply, lack of experience, competitive conditions, institutional frameworks and seasonal and economic cyclicality (Tatum 1987). Furthermore, the nature of the construction industry is partly responsible for the difficulty to innovate effectively. These include its fragmented structure, clients' domination, uniqueness of projects, heavily dependent nature and government regulations (Prasanna 2000). In terms of multi-storey timber construction, a determining factor that prevents companies from utilising this building system is the role of the client. In many circumstances, the client will be more inclined to use proven technologies such as concrete and steel to lessen the risk factor and ensure durability and quality (Prasanna 2000). The issue once again comes down to relevant experience and expertise with the product. Without sufficient knowledge of the technology, the ability of construction companies to adopt these technologies is limited.

While the resistance to adopt new technologies is partly a factor that slows the uptake of multi-storey timber buildings, it still interlinks with the previous obstacles discussed. Without sufficient demand for timber products, local manufacturing is not possible, which then prevents reliance on suppliers to provide adequate knowledge and detailing of the product while also requiring materials to be sourced from overseas, increasing the cost.

DISCUSSION - CAUSE and EFFECT

From the analysis of the various obstacles identified above, it is clear that each of these contribute to a reluctance to design and construct multi-storey timber buildings in Australia. However while each of these are a factor in slowing the uptake of multi-storey timber buildings, it is important to note that these obstacles are all linked together and affect one another considerably. Figure 2 represents the 'cause-and-effect' caused by the lack of knowledge

and education with CLT in multi-storey timber construction.

With insufficient or incorrect knowledge about the technology, false and negative assumptions are created, such as a lack of fire safety and poor structural integrity. Due to this, harsher regulations and safety codes are required by the Federal Government in order to gain building approval, for example, the path to seek the 'alternative solution'. These harsher regulations will then result in increased costs due to both the time it takes for building approval, as well as increased safety measures. Demand for multi-storey timber is then lowered as construction companies and developers fear the increased costs associated with the technology, as well as the requirements to gain approval. With a lack of demand for CLT and timber products in the Australian market, the ability to locally manufacture the product is reduced, as there are insufficient requirements in the industry. This lack of supply then requires companies to rely on overseas manufacturers for the product as well as details and information. This can again increase costs, but also results in a further lack of experience.

Due to the cause-and-effect that is created, it is important to note that while each obstacle affects another, solutions can still be formulated to help increase the amount of multi-storey timber construction. Due to the Federal Government setting the legislation and regulations that govern the construction industry, this would be an ideal place to start as it will have significant bearing on the other barriers. Firstly, by passing the proposal to increase the allowable NCC heights of timber buildings to eight-storeys, it will make the building approvals process significantly easier for multi-storey timber construction. Furthermore, it will also benefit the construction costs as it will lower the overall costs identified above, while also reducing the amount of time it takes for building approval. In addition to this, if incentives were offered to the construction

industry for early adopters of multi-storey timber construction or CLT, it may help to increase both the number of multi-storey timber buildings, as well as the perception of timber buildings. This would have the flow-on effect of increasing the demand for timber products, and the practical experience with the technology. This increased demand and experience would also have an effect on the need for local manufacturing, as well as both the necessary education and the countering of negative perceptions.

CONCLUSIONS

There has been a significant rise in multi-storey timber construction in the past decade worldwide due to its multiple benefits. However within Australia, there has been only one multi-storey timber building constructed, and only two buildings that have specified CLT. This paper has investigated the four major obstacles identified by Xia, et al. (2014) and provided further analysis to discover the underlying causes and ways they are preventing additional multi-storey timber construction. In addition to the four obstacles identified, the hesitance to adopt new technologies is also suggested to be a possible reason for the reluctance to utilise timber in multi-storey construction.

While the various obstacles identified all contribute to the lack of multi-storey timber buildings in Australia, it seems that the underlying cause is the lack of knowledge. With only two buildings that have specified CLT and one exceeding three-storeys in height, there is little experience and knowledge using the technology. This lack of knowledge then results in false assumptions and perceptions being made such as the fire risk and the lack of structural integrity of tall timber buildings. Furthermore, this negative perception that is created hinders the implementation of these technologies in Australia as they create harsher regulations and legislation in order to gain acceptance. This can then increase the overall costs of the project, deterring the use of these products, and preventing the need for local manufacturing. Once again, it comes down to the cause and effect, as a result from the lack of knowledge.

The intention of this paper is to demonstrate that the major obstacles of multi-storey timber buildings should not be preventing further construction in Australia. In order for multi-storey timber construction to be implemented further in Australia, the negative perceptions that have been identified in this paper need to be overcome by ensuring adequate knowledge of the system and the many ways in which it can benefit the Australian construction industry.

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"As of January 2016, the NCC passed the proposal from the FWPA to allow timber buildings that are Class Two, Three, and Five, to be constructed up to 25 metres in height without the requirement for an "alternative solution." This change to the code will commence as of May 1 2016 and may have a significant effect on the future of multi-storey timber buildings in Australia."

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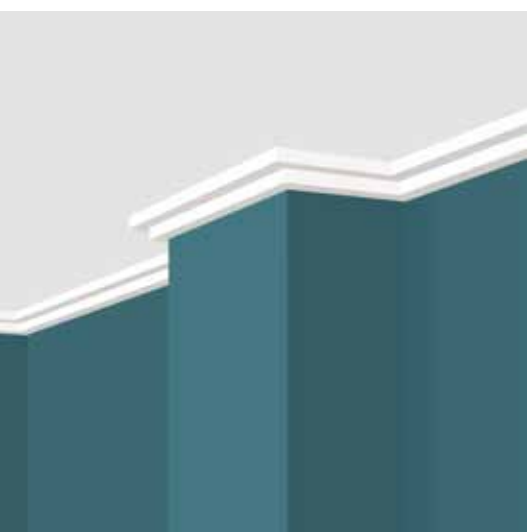
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QUEEN'S WHARF BRISBANE PDA DEVELOPMENT SCHEME APPROVAL TO BOOST JOBS

Brisbane is set for a massive jobs boost with the Queensland Government formally adopting the development scheme for the renewal of the Queen's Wharf Brisbane Priority Development Area.

The \$3 billion Queen's Wharf Brisbane Integrated Resort Development will deliver a world-class tourism, leisure and entertainment precinct for Queensland.

Deputy Premier and Minister for Infrastructure, Local Government and Planning Jackie Trad said the Queensland Government, developed the scheme which will support up to 2,000 jobs during construction and 8,000 ongoing jobs.

"This development will transform and rejuvenate the under-utilised south-western edge of the Brisbane CBD, attract significant investment to the city and most importantly, create jobs for Queensland families," Ms Trad said.

The Queen's Wharf Brisbane Priority Development

Area development scheme provides the planning framework for the assessment of the Destination Brisbane Consortium proposal.

Public submissions to the development scheme supported the area redevelopment, the Government's commitment to sub-tropical design and heritage protection and the delivery of improvements to the pedestrian and cycling network in the Priority Development Area.

"We invited the community, residents, and business operators to view the proposed development scheme and we received 37 written submissions. Some amendments were made to the proposed development scheme as a result of issues raised in these submissions," said Ms Trad.

Queen's Wharf Brisbane was declared a Priority Development Area on 28 November 2014 to facilitate the planning and delivery of an integrated resort development including a casino and other related development on the site.

All development applications will now be assessed against the development scheme.

The final Development Scheme also includes provisions for a Design Advisory Panel to assist in delivering a high-quality project for the benefit of all Queenslanders and visitors.

"This part of our city is one of the most culturally and historically significant sites in Brisbane, and the Design Advisory Panel will help ensure that Queen's Wharf is a civic landmark," Ms Trad said.

The Design Advisory Panel will be chaired by the Queensland Government Architect, and members will be drawn from the Queensland Urban Design and Places Panel.

For further information on the Queen's Wharf Brisbane Priority Development Area Development Scheme, visit www.edq.qld.gov.au/qwb-pda (<http://www.edq.qld.gov.au/qwb-pda>)

AIB FO WATTS – WT MORRIS PRIZE – RMIT PROPERTY, CONSTRUCTION AND PROJECT MANAGEMENT

Congratulations to Stephanie Keary for winning The Australian Institute of Building (AIB) FO Watts-WT Morris Prize.

The AIB FO Watts-WT Morris Prize is awarded to the student that has achieved dux in RMIT Property, Construction and Project Management in 2014.

The award recognises outstanding academic achievement throughout the student's program judged on the basis of highest accumulated Grade Point Average (GPA) attained.

Congratulations Stephanie.



Photo taken by Anthony Jones

Stephanie Keary and Tom Morris LFAIB at the 2015 RMIT Property, Construction and Project Management Industry and Research Awards Night, 22 October 2015.

Construct Magazine

Just a short note to remind you of the discounts you can receive by supporting the Australian Institute of Building **Construct** magazine.

As you are aware the **Construct** magazine goes to all members of the AIB, the last edition was distributed electronically and has received almost 10,000 reads so far from the AIB website, increasing exposure to more businesses other than members.

AIB member discounts are as follows;

Book one edition and receive 25% off the rate card price
Book two to three editions receive 30% off the rate card price
Book four or more editions receive 35% off the rate card price

Any bookings made include a free in-house design service (conditions apply). Should you require any information regarding the design service please contact Sarah Abrahams on 0412 103 569 or email design@ontimepublications.com.au

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CONNECT AT ARBS 2016

Mark your diaries for ARBS 2016, Australia's only international air conditioning, refrigeration and building services trade exhibition and seminar program, which will be held 17-19 May 2016 at the Melbourne Exhibition & Convention Centre. ARBS 2016 offers a focus on innovation and emerging trends in the built environment, with the exhibition and seminar program to host an array of topics and management issues of interest to the industry.

As the building and construction industry continues to face some serious challenges including the changing nature of the industry, government regulations and environmental concerns, it's vital to keep connected and remain current in the approach to how we design and build infrastructure and buildings.

At ARBS 2016 you'll be able to see all the latest products, talk to manufacturers and distributors about new innovations and enjoy many of the social activities including the awards presentation dinner. The ARBS seminar program runs alongside the exhibition and is not to be missed. The seminar program is a fantastic opportunity to connect with peers, share expertise, innovation and best practice across all sectors of the industry providing leading-edge education and networking for HVAC&R and building services professionals.

Of interest to building and construction professionals will be the seminar on how good projects can go wrong. With commissioning management roles becoming more common in Australian building construction projects, either driven by Green Star requirements or the recognition of the value that an overarching independent 'end to end' delivery management role can bring. The role usually provides a unique opportunity to observe common issues and themes around why projects don't proceed to plan (cause and effect) and how we as an industry can learn from this. This presentation will identify a number of commonly observed problems and share how these might be addressed.

Another seminar sure to create a lot of interest is a panel discussion moderated by Tony Arnel on wellness being the next green. As according to industry pundits, the next wave sweeping the property sector is wellness – and it's about to crash on Australia's shores.

The WELL Building Standard, established in the United States by the International WELL Building Institute, uses evidence-based medical and scientific research to harness the built environment as a vehicle to support human health and wellbeing. More than two million sqm of space has gained WELL certification in 12 countries.



A number of Australian heavyweights are lining up to register WELL projects. Lendlease has promised to explore piloting the upcoming WELL Community standard for key urban regeneration projects. Macquarie Group looks set to achieve the first WELL Building rating in Australia, while DEXUS and Frasers Property have both registered projects.

So, will the WELL Standard be the next Green Star or NABERS? How can WELL ratings help building owners and managers measure the health and wellbeing of building occupants? And will it become a new market differentiator that separates the leaders from the laggards?

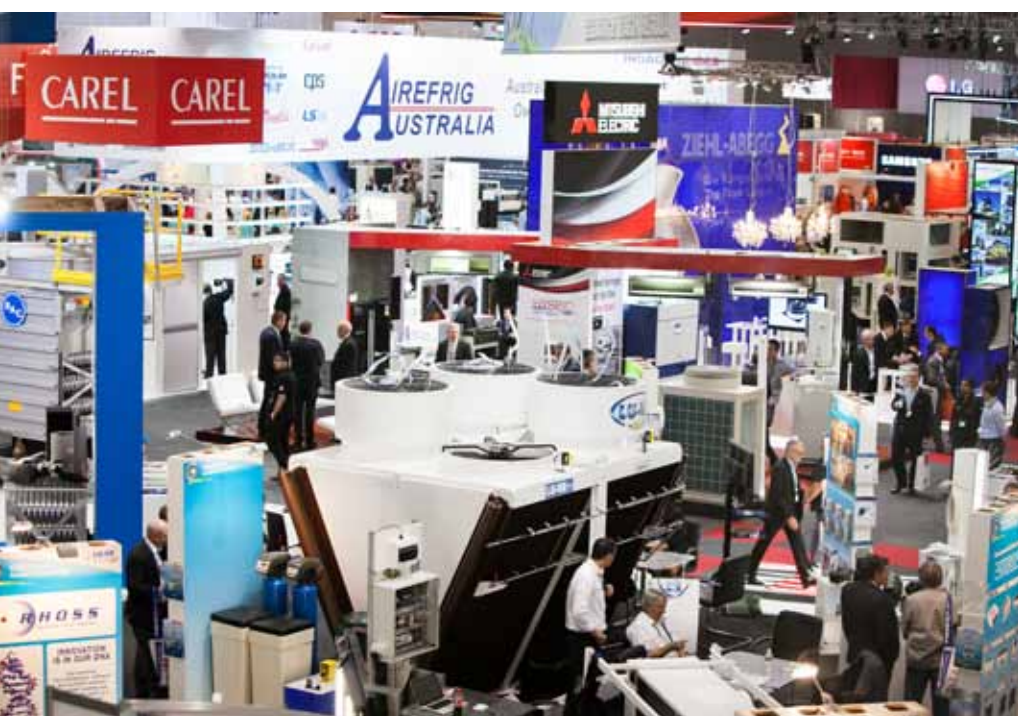
Tony Arnel's session with its expert panel discussion will provide a nuts-and-bolts explanation of the WELL Building Standard and its focus areas, explore opportunities and obstacles to its take-up in Australia, and why healthy buildings are becoming the 'next big thing'.

If you are involved in the heating, ventilation, air conditioning, refrigeration and building services industry then you cannot miss this major industry event. Quick and easy pre-registration is available online which grants free entry across all three days – visit www.arbs.com.au.

Andrew Barr is a Project Engineer from A.G. Coombs and will deliver a seminar on 'How good projects go wrong, commissioning management war stories' at ARBS 2016.

Tony Arnel is the former chair, World Green Building Council and the Global Director Sustainability from Norman Disney & Young will lead a team of industry experts in delivering a panel seminar and discussion on 'Is wellness the next green?' at ARBS 2016.

Seminar registrations will open shortly on the ARBS website www.arbs.com.au.



arbs 2016

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OFFSITE PREFABRICATION SOLUTIONS HELP KEEP NEW CANCER RESEARCH CENTRE SAFELY ON TRACK

Completed in 2015, the \$1.2 billion Victorian Comprehensive Cancer Centre (VCCC) is designed to deliver a brand new state-of-the-art medical facility and will be purpose-built for a range of cancer research, treatment, care, education and training activities.

Built by Grocon and located in Parkville in the heart of Melbourne's biomedical precinct, the VCCC facility will eventually cover 130,000 sqm of floor space across 13 levels, with over

25,000 sqm of specialised research space designed to house 1200 medical researchers.

As one of the largest and most complex construction projects in Australia, the VCCC sets a new benchmark in design and construction, and will also include two pedestrian bridge links to the Royal Melbourne Hospital, where a further 12,000 sqm of extensions and refurbishments are due to be undertaken.

Since timing is one of the key performance indicators for both the builder and the VCCC's patients, OneSteel Reinforcing was tasked to provide a suite of unique and innovative prefabrication solutions in order to save time, costs, and also to reduce a host of onsite safety risks.

With the well-being of their workers being critical to both Grocon and OneSteel Reinforcing, in terms of some of the initial safety enhancements, all the columns for the VCCC were prefabricated and purpose built offsite, which has not only reduced the overall construction time, but also greatly limited the exposure of Grocon employees to working at height.

Apart from the obvious safety benefits, offsite prefabrication of items such as piles, columns and cages offers a number of other benefits, including reducing steelfixing, speeding up building programs, as well as helping to earn Green Star rating points for a project.

The numerous advantages of working with OneSteel



Reinforcing and using their offsite prefabricated column and beam technology, along with their role in assisting with the construction was clearly underlined by David Dewars, Grocon Structural Coordinator for the VCCC site.

"Prefab from OneSteel Reinforcing on this project has been predominantly with in-situ columns - they've done all the reinforcing steel prefabbed offsite, which means we just lift in the cages and drop them over the starter bars below and then we form up our column around it."

"Some of the key benefits of working with OneSteel Reinforcing is that you can reduce your onsite construction time, with the end result being a unit that we can simply lift off the truck directly into position, and then we can walk away with it being all complete."

"Using prefabrication certainly aids in our core value of safety in that reducing your construction time also helps reduce your exposure to working at higher levels."

"We've also installed hand rails on the street so that the beams can be accessed straight away in a safe environment," noted David.

"Prefabbing offsite means we could coordinate as much as possible and see any potential problems and deal with them before using up time onsite."

"It's come together fairly smoothly - we've been able to get through this floor and move onto the next one fairly quickly."

Having access to the OneSteel Reinforcing facility, said David, "was a huge help because we could tweak the beam and get it all ready, so as much as

possible, it was all ready to go."

"The prefabricated transfer beam model has certainly been a success from our point of view; it's reduced the construction time and provided program gains for us."

"If we decided to do this in-situ, it would be more challenging and could have resulted in lengthy delays," concluded David.

PULL QUOTE: "Some of the key benefits of working with OneSteel Reinforcing is that you can reduce your onsite construction time, with the end result being a unit that we can simply lift off the truck directly into position,"

David Dewars - Structural Coordinator, Grocon



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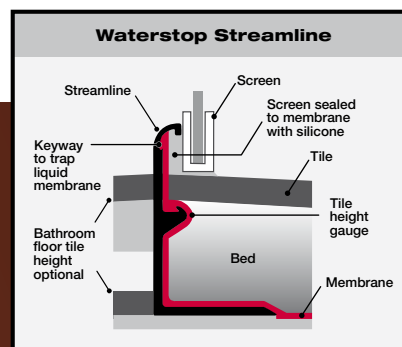
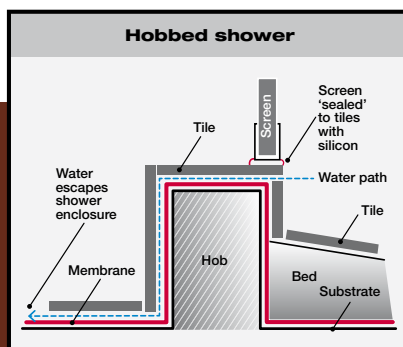
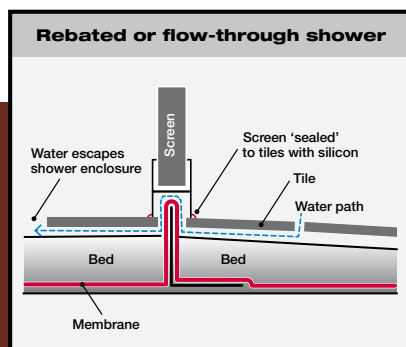
My business has expanded rapidly since we started using the Waterstop Streamline hob and I now have tilers recommending the Waterstop Streamline system - and me - to other builders. Everyone that uses it loves it.

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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Brisbane Airport reaps dividends from project management training.

As the IT Program Manager at Brisbane Airport Corporation (BAC), Kelly Wilkes is someone accustomed to big projects. Kelly is part of the BAC Assets Project Delivery Team, which crosses over the functional disciplines of civil, building, services and information technology working on a portfolio worth over \$200 million a year. Kelly was one of the BAC staff put through their paces in November 2014 when the biggest show came to town, the G20 Leaders Summit.

On what was the biggest weekend in the airport's history, BAC successfully managed the movements and logistics of 26 world leaders and their entourage. On that weekend, Brisbane Airport was able to achieve a 100 per cent safety and security result. This is testament to the project management skills of the core staff entrusted with the planning of G20.

Airports are complex, busy places. In 2014, some 22 million passengers travelled through Brisbane Airport. Going forward, BAC has set itself a very ambitious growth and infrastructure

investment plan and as part of this plan QUT was commissioned to deliver a customised Stakeholder Management course.

For Kelly Wilkes, the Stakeholder Management course was a key pillar of BAC's capability improvement program.

"The airport environment involves working in complex, technical, social and environmental conditions, project managers require much more than project process, they must be able to get the best out of their project teams, contractors and community to ensure successful project delivery.

"In this kind of environment it is not 'if something happens, but when', stakeholder management is one of the key skills required.

"As a trusted partner of BAC, it was natural for us to approach QUT to design a course leveraging their experience and expertise in project management, combined with the understanding of our business and its context," said Kelly.

Led by the expertise at QUT, a diverse group

of disciplines and experiences was pulled together to guide BAC staff through a tailored program combining academic learning with practical experience and leadership.

"The lasting benefits have improved not only capability but team dynamic, trust and relationships, with many still calling on lessons learned through the program every day," said Kelly.

BAC, like many organisations, has realised now more than ever the need for project management skills are more critical with projects growing in size, complexity and risk. Globally about 25 per cent of the world's economy is delivered through projects and in Australia that figure approaches 30 per cent.

Professor Stephen Kajewski, Head of QUT's School of Civil Engineering and Built Environment has been at the forefront of project management training in Australia and internationally. QUT was one of first universities to deliver master programs in project management and has been delivering award and corporate education for over 25 years.

"We're known as a 'university for the real world' because of our close links with industry and our relevant teaching. My goal from the outset was to have a pool of highly experienced, highly qualified facilitators drawn from industry, project managers and academic experts.

Professor Kajewski stresses that project management is no longer the sole domain of engineering, it is found in many industries from engineering, construction, infrastructure, resources, through to IT, banking and finance, and other government sector services.

"Project managers must now deal with a myriad of stakeholders across a number of areas - government, social, community and the environment. Having expertise in project management can give an organisation a competitive advantage - this can be attractive to clients looking for one-stop shop service providers."

Investing in Project Management training could be one of the best investments your organisation makes this year.

For more information on project management at QUT, please contact the Science and Engineering Faculty Business Development Team at sef.industry@qut.edu.au or +61 7 3138 1191.





QUT – leading project management for over 25 years

'QUT designed a course leveraging experience and expertise in project management, combined with the understanding of business. They put together a diverse group of disciplines and experiences led by the experts, and tailored the program to combine academic learning with practical experience and leadership.'

**Kelly Wilkes, IT Program Manager
Brisbane Airport Corporation Pty Ltd**

Project management has played an integral role in the development of today's business world, with organisations demanding the successful management of projects to meet strategic outcomes and goals.

At QUT we understand today's business world. We specialise in developing highly experienced and qualified practitioners in order to meet industry demand. As one of the first universities to offer a master's program in project management we pride ourselves on delivering advanced project management knowledge, research, stakeholder management, corporate training and skills that provide solutions that are applicable to a wide range of industries and government.

Project management has become recognised in the past 25 years as critical to successful business operation and has expanded to include almost every industry:

- Construction
- Engineering
- Government
- Health
- Infrastructure
- Manufacturing
- Resources
- Sciences
- Technology
- Transport and Logistics

The QUT project management program has been designed through careful consultation with industry practitioners, government personnel and industry leaders; and is accredited by the Project Management Institute, the world's largest professional body in the field. The course provides students with valuable industry knowledge and technical skills to manage time constraints, cost and quality control as well as social, environmental and political challenges.

If you're interested in taking your career to the next level, apply to undertake one of our exceptional courses:

- Master of Project Management
(1.5 years full time/ 3 years part time)*
- Graduate Certificate of Project Management
(6 months full time)*

*Flexible study options for both courses are available.



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ELECTRICITY EMISSIONS CONTINUE TO RISE AS AUSTRALIA MAINTAINS ITS DEPENDENCE ON COAL

National

- Electricity emissions reported by CEDEX® increased by about 3.8 Mt CO₂-e, equivalent to 2.4 % in 2015 compared to 2014 levels
- In the year to December 2015, compared with the year to November, electricity demand increased in the NEM as a whole and in every individual state (in WA to November 2015 compared to October) for the first time since 2010
- To achieve Australia's reduction target of 26-28%, total national emissions will be required to fall from current levels by around 160 Mt CO₂-e, or an average annual reduction of about 11 Mt CO₂-e every year until 2030
- Electricity emissions account for about one third of total national emissions and will have to make at least a proportionate contribution to the required reductions, if Australia is to achieve its target.

South Australia

- In December 2015, the total demand for electricity in South Australia (excluding supply from rooftop PV) was 20% higher on average than in December 2014, due to heatwaves in 2015
- Rooftop solar PV installations in the state made a valuable contribution to meeting both peak demand for electricity and the increased total daily demand for electrical energy during the longer heatwave period
- A 70% increase in demand for electrical energy during the heatwave period 13 to 19 December compared to precisely the same period in 2014 suggests that increasing the energy efficiency of buildings, air conditioning and refrigeration systems should be a high priority of the recently announced National Energy Productivity Plan.

The January 2016 Carbon Emissions Index (CEDEX®) Report by pitt&sherry and The Australia

Institute (TAI) has found that national electricity emissions continue to rise despite Australia's pledge to reduce greenhouse gas emissions by 26-28 per cent by 2030 and the signing of the Paris climate accord by world leaders in 2015 to limit global warming to well below 2C.

The Report contains data for emissions from electricity generation in the National Electricity Market (NEM) up to the end of December 2015.

Electricity emissions from the NEM in Australia in 2015 increased 2.4 per cent on 2014 levels and have increased by 5.1 per cent since their lowest point in the year to June 2014, when the carbon price was abolished.

Dr Hugh Saddler, Principal Consultant, Energy Strategies at pitt&sherry, said that the continuing rise in national electricity emissions was largely due to Australia's ongoing use of coal-fired power stations, driven by:

- an overall increase in electricity demand – for the first time since 2010, electricity demand increased in the NEM as a whole and in every individual state in the year to December 2015, compared with the year to November (in WA to November 2015 compared with October)
- a decline in gas fired generation, with gas supply being diverted to exports
- a stall in renewable energy investment over the past eighteen months as a result of policy uncertainty
- lower than usual hydro generation in Tasmania with energy storage levels below 24 per cent due to an abnormally dry winter.

The total coal share of electricity generation (excluding rooftop solar) in the year to December 2015 was 75.9 per cent.

"The Australian Government has made a commitment to reduce the country's emissions by

26 to 28 per cent by 2030 from 2005 levels, but without significant policy change, it is difficult to see how this will come about," Dr Saddler said.

"Australia is still largely dependent on coal for its electricity supply and assuming electricity demand continues to rise, Australia's carbon emissions will continue to rise, given that electricity emissions make up around one third of the country's total emissions.

"While some changes may occur in the market such as new renewable energy development and improved hydro generation, it is likely the current scenario will continue for at least the next six months, and Australia will continue to rely increasingly on coal-fired power stations for its electricity supply."

South Australia heatwaves see electricity demand soar

In December 2015, South Australia experienced two significant heatwaves, resulting in a 20 per cent increase in total electricity consumption during the month, compared with December 2014, when the weather was much milder. The larger heatwave ran for seven days, between 13 and 19 December 2015, resulting in a 70 per cent increase in demand for electrical energy compared to the same period in 2014.

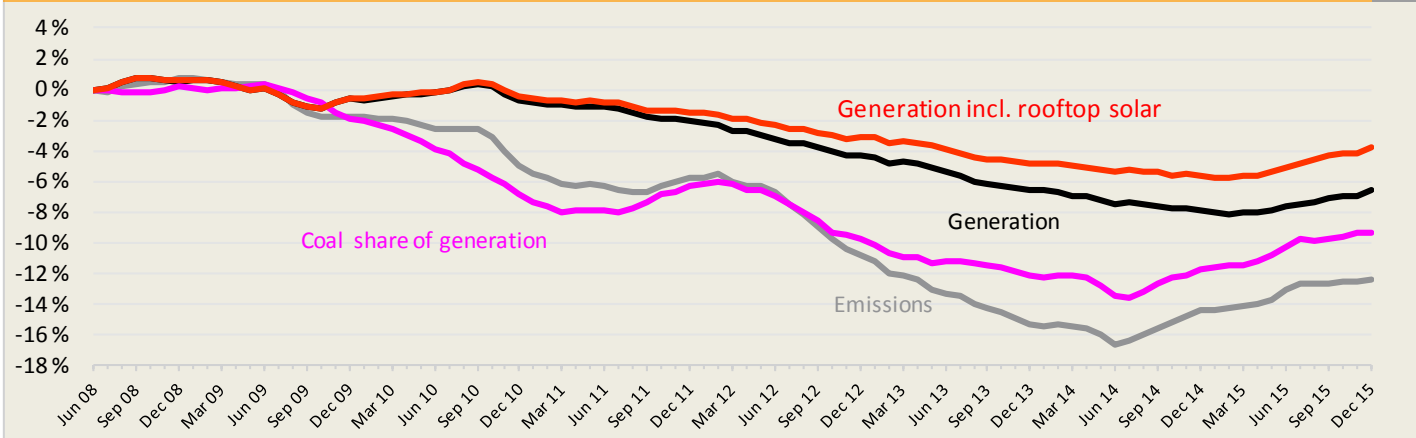
"This particularly large increase shows the massive effect of higher temperatures on demand for electricity, in terms of both total daily energy demand and daily peak demand," said Dr Saddler. "In our view, this suggests that increasing the energy efficiency of buildings, air conditioning and refrigeration systems should be a high priority of the National Energy Productivity Plan."

According to Saddler, rooftop solar PV installations in South Australia made a valuable contribution to meeting both peak demand and increased total daily demand for electrical energy during the longer heatwave period.

"During the heatwave, rooftop PV reduced peak electricity demand by 6 per cent below what it would have been without rooftop solar and also took pressure off the system on the four hottest days by supplying 5 per cent of the total energy demand during this period," he commented.

"This demonstrates a clear case for continued or enhanced support for solar energy installations, including those with more westerly orientations."

Changes in electricity sent out generation, emissions and coal share of generation



ATTRACTING AND RETAINING YOUNGER ENGINEERS THROUGH TECHNOLOGY

The skills shortage in the engineers sector continues to pain organisations in Australia. Medland Metropolis, a future-conscious consulting engineer with 70 per cent of its workforce comprising younger employees, is adopting new technology, Union Square Software, as a means to attract the incoming generation of workers.

Medland Metropolis was established in 1987 by founder Chris Medland with its first office in Sydney. Providing building services in the private and public sector, the company now also operates from Melbourne and London, with 60 staff across these offices.

Supporting the inner workings of a building, services comprise mechanical, hydraulic, and data communications. Medland Metropolis works with project managers, architects, interior designers and government, with highly notable projects including high end retailers, commercial fitouts, hospitality – restaurants, aged care and education.

When selecting a new solution, there were three priorities; flexible working to meet the needs of the next generation of employees, reducing floor space and integrating a number of disparate systems together these three would enable stronger collaboration and increased efficiency.

Investigating alternatives for two years, Medland Metropolis selected Union Square as the one solution that would meet all needs with additional capability.

Angela Williams of Medland Metropolis said, “We understand that we need to adapt our ways of working to meet the needs of graduates. This naturally has a flow-on affect directly benefiting our clients. Union Square will enable our people to work from home, on site with clients or from our offices. They thrive on flexibility.”

In the engineering sector, demand for engineers grew by an average of 6.0% per year between 2006 and 2011. This higher growth led to the skills shortage experienced in recent years*. While at the trades level, the Department of Employment expects the nation to need an extra 47,800 people**.

Will Yandell, Director Australasia, Union Square Software said, “It’s all about supporting the ‘app generation’ as they flow into the workforce. The mature construction and engineering sector has entrenched methods of operating. We have introduced software to the sector that bridges the gap with what new generations entering the workforce rely on and are seeking from employers to maintain their engagement and retention.”

Union Square Software is an international company headquartered in the UK, with offices in Australia, Canada and Sweden. The company entered the Australian market in 2013 and offers software solutions for the Construction and Architecture/Design industry.

For more information, media enquiries or interviews please contact:
Jill Stewart | jill@insideoutpr.com.au | 0414 215 285 or Nicole Reaney |
nicole@insideoutpr.com.au | 0417 303 146

**The Engineering Profession: A Statistical Overview. Engineers Australia. Report November 2015. https://www.engineersaustralia.org.au/sites/default/files/shado/Resources/statistical_overview_2015.pdf*

** *<https://sourceable.net/is-australia-heading-for-a-construction-trade-shortage>*

CONSTRUCTION INDUSTRY FACES TECHNOLOGY HEAD ON

The construction industry is one rooted in paper based systems and large volumes of complex data. But the traditional clipboard and hard hat approach is fast being replaced by new ways to track communications, monitor resources and manage multiple project documents remotely and in real time.

Union Square software has introduced construction-specific software and mobile technology for the sector giving construction companies a competitive advantage in the battle for business efficiency.

Union Square enables the project team to collaborate more effectively and efficiently the system controls email, drawings, documents and images and a broader set of project data in a central location. Essentially adopting smart phones, tablets and digital processes across the sector will mean a reduction of project risk, real-time project data and huge time savings. The morale aspect of making workflows and access to information simpler for employees shouldn’t be ignored,” says Will Yandell, Director Australasia, Union Square Software.

This new way of working is not only useful internally, but is also attractive to those entering the construction industry for the first time. Armed with information at their fingertips, university graduates and tech savvy employees are used to a digital world.

“They don’t write things down in a traditional way. Everything is app, tablet or phone based and this is the way they like it. Businesses that take a leap of faith and foster the digital working will increasingly have a competitive advantage when it comes to recruitment.”

“The skills shortage in the construction sector at both trades and engineering levels continues to pain organisations in Australia. Technology such as ours, will allow organisations to not only attract the best employees, but also retain them,” Will adds.

Union Square Software is an international company headquartered in the UK, with offices in Australia, Canada and Sweden. The company entered the Australian market in 2013 and offers software solutions for the Construction and Architecture/Design industry.

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nicole@insideoutpr.com.au | 0417 303 146

7 BIG TRENDS FOR THE QUEENSLAND CONSTRUCTION INDUSTRY IN 2016

The last five years have been a tumultuous time for the Queensland construction industry. During this relatively short period we have experienced a housing boom, the Global Financial Crisis, a mining boom and increasing technological change.

As we enter 2016, many businesses may be wondering what's next in store for the construction industry.

To help companies plan ahead, Construction Skills Queensland's Evidence and Data Team has put together a list of hot trends that will likely shape the industry over the coming year.

The return of new builds – Traditionally new builds account for about 9 out of 10 building projects in Queensland, with the balance coming in the form of additions, alterations and conversions. In the years following the GFC, many people opted to renovate instead of build anew. During this time, the proportion of new builds dropped to as low as 80%. But the data indicates the historical pattern is being restored, and CSQ predicts the share of new builds will stabilise around the 90% norm in 2016.

A healthy residential sector – Residential building has been doing everything it can to pick up the slack left by the steep wind-down in mining construction over recent years. Both 2014 and 2015 saw double-digit growth in building starts in Queensland. While this trend will soften in 2016, CSQ expects solid single-digit growth for Queensland building starts, probably around 5%.

Labour surplus to peak – The decline in total construction activity across Queensland in recent years led to a

surplus of construction workers. There are simply fewer projects than people ready to work. CSQ predicts this surplus will peak in 2016, and begin its return toward balance. It is estimated that the number of unemployed construction workers in Queensland will average around 16,000 in 2016, about 8% of the construction workforce.

Prefabrication and modular homes – An increasing amount of both residential and commercial construction work will be completed in controlled building environments. Prefabrication has the potential to offer time and cost savings over conventional construction methods. We are already starting to see whole townhouse communities built using modular components.

A timber resurgence – Cross Laminated Timber (CLT) or "tilt up timber" is popular in Europe and North America. On the back of some recent successful trials here in Australia, we expect this technology to be adopted more widely by our industry. Strong and lightweight, CLT offers an exciting alternative to concrete and can be used to form complete floors, roofs and walls. As a timber product, CLT is also often a more sustainable choice.

The Smart home – Home automation platforms are making it easier than ever before for homeowners to centrally control entertainment, airconditioning, lighting, appliances, alarm systems and locks from their tablet. These systems are becoming more common in new homes and often require complex electrical work to install.

Opportunities in installation services – The Australian Government Department of

Employment expects Building Installation Services to a substantial source of jobs growth over the next five years. The number of workers in the category, which comprises awnings, curtains, elevators, escalators, flywire screens and insulation, is set to jump by 20.7% over the next five years.

For information about starting a career in the construction industry visit www.csq.org.au or phone 1800 798 488.

For further information and media enquiries

Luke Burrows, PPR, 07 3309 4714, 0410 620 202, lburrows@ppr.com.au

About Construction Skills Queensland (CSQ)

Construction Skills Queensland (CSQ) is an independent industry-funded body supporting employers, workers, apprentices and career seekers in the building and construction industry. Funded by an industry training levy, we work closely with students, schools, employers, apprentices, industry partners, training providers and individuals across Queensland to build capability at every level of business. As a recognised industry leader, our mission is to promote the building and construction industry as a career of first choice, encourage investment in skills and training and increase the number of skilled workers in the industry.

For further information about CSQ's services visit www.csq.org.au or call 1800 798 488.

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Have you thought about post-graduate study in construction?

Introduction

The construction industry plays a significant role in the national economy that is often seen as the benchmark for the strength and health of the wider economy. According to data that is available from Australian Bureau of Statistics (ABS, 2013), nearly 10% of all employed people in Australia are employed in the construction industry. This significant number of employees means that any changes in the industry, even small changes, has a significant impact on the industry's productivity and a corresponding effect on the national economy. For instance, an estimated increase of 19,000 jobs (ACIF, 2015) across the building and construction industry in 2014-2015 due to significant construction activity during the same period time, leads directly to a reduction in the unemployment rate nationwide.

With increasing attempts and interest in improving construction industry and building procurement processes, it is believed that productivity in the Australian construction industry is lower than other major industries, particularly mining and manufacturing industries (PwC, 2013, ABS, 2013, EA, 2009).

This can be traced to factors such as inefficient design and construction methods, procurement problems, lack of innovation and technology usage and industrial disputes as well as a shortage of necessary skills and expertise (Thorpe, 2013, Daley and Walsh, 2011, EA, 2009).

The construction industry is an industry dominated by small to medium sized enterprises with an estimated 93% of firms employing fewer than fourteen employees and with a focus on construction of residential buildings. While the value of construction spending has shown an increase since 2013, the forecast by Australian Construction Industry Forum (ACIF) predicts substantial growth to continue nationwide.

The growth in the residential sector, the continuing boom in construction generally and the overall importance of the construction industry to the nation reinforces the need for improved skills and expertise in the workforce, particularly for building and construction professionals.

Why a degree in Construction Management?

A degree in Construction Management (CM) is fundamental to the success of the construction industry. CM is a professional field that is concerned with the effective procurement of built facilities in the managing time, cost and quality. During undergraduate programs in CM, a variety of fundamental knowledge is acquired regarding building materials, construction practice and methodologies, cost planning and estimating as well

as project and contract management. Increasingly, construction research and an understanding of building information systems is also required. CM programs are often linked with aligned disciplines such as civil engineering, architecture and property management to provide comprehensive knowledge of the wider construction industry. A degree in CM also develops transferable skills such as public speaking, report writing, critical thinking and problem solving. The undergraduate programs in CM have the ability to address the skills and expertise shortage in the building and construction industry. As well, construction research as part of an undergraduate Honours program establishes the foundation for innovation in the industry.

While an undergraduate degree in Construction Management is a worthwhile investment for a good career, what is also important for construction professionals is the ability to advance their career while continuing to increase their professional skills and knowledge in the building and construction industry.

Why a postgraduate degree?

Postgraduate studies in construction management have an increased focus on management for the construction industry, rather than the specific skills and knowledge provided at undergraduate level. Increased specialisation in areas such as quantity surveying, project management or sustainability can be achieved. Undergraduates from aligned professions, such as engineering, architecture and property can gain greater understanding of the construction industry to further their value to employers. A Master's degree demonstrates the graduate's ability to think independently and provide a pathway into higher management positions in Australia and globally.

Master of Construction Management at Deakin University

The journey in the construction industry, for me, commenced with my study in Civil Engineering. I graduated in Bachelor of Civil Engineering in 2003 and worked in the construction industry for almost 8 years in a few different positions, ranging from building cost planner to contract administrator and site supervisor. I then decided to pursue my study at Master of Construction Management in order to transfer and develop my general knowledge about the construction industry into more CM specific knowledge, in a professional and academic environment, rather than learning 'on the job'.

As I was working on a full-time basis in Sydney, NSW, I initially decided to enrol as a part time student and preferably in off-campus mode (Online mode). Based on these criteria and after consultations, Deakin University was recommended to me -

predominantly for its comprehensive on-line delivery method. As Deakin also matched my criteria of a university with high academic ranking and reputation with accredited MCM course I consequently applied and was accepted into their Master of Construction Management degree.

My initial enrolment was as an off-campus student however I quickly changed my mind and my lifestyle and become a full-time student by moving to Geelong, Victoria, and studying at Deakin University's scenic Waterfront campus.

Since I started my study in MCM at Deakin University, I have experienced innovative modes of teaching and learning environments, ranging from a comprehensive and powerful online delivery mode to real collaboration with the construction industry as well as learning about the most recent and advanced technologies in the construction industry. Study options provide the flexibility to suit lifestyle and work commitments of each student. Also, construction management programs at Deakin are accredited by major professional organisations including the AIB and this gives their programs strong industry credibility combined with a strong research-informed framework.

The units in the MCM program are designed to comprehensively address the needs of the building and construction industry. One of the interesting sides of the course structure, to my opinion, is that students from different disciplines of the construction industry such as architecture, construction and facility management have to undertake common units together and complete assignments in groups. This approach helps students not only to interact with their peers and professionals from other disciplines of the construction industry but also to receive new ideas about the wider industry. In addition to the units which are common between different disciplines of the industry, other units are designed to address the professional needs of the construction industry in particular, Strategic Construction Procurement, Legal Risk Management and Integrated Project Information Management. As a professional in the construction industry, having in depth knowledge about the most professional and important aspects of the industry provides the potential to improve productivity of the Australian construction industry.

Why do a PhD in Construction Management?

Completing the Master of Construction Management (MCM) at Deakin University, Waterfront campus, not only upgraded my education level and professional knowledge, but also changed my career perspective. Throughout my study in MCM, and particularly when I was doing the required research units (research methodology and thesis), I was introduced to a new approach of addressing problems and knowledge gaps in the construction industry. In fact, research

units are an integral part of the School of Architecture and Built Environment at both undergraduate and postgraduate level at Deakin University that offer students learn a valuable set of research skills and moreover, the ability to locate and analyse information, which is the essence of research, is a valuable skill both in the construction industry and personal areas of life.

The School of Architecture and Built Environment offers industry-oriented seminars on a regular basis, and it was at one of these seminars that I was introduced to Building Information Modelling (BIM), a more recent methodology in the construction industry. The seminar, was based on introducing BIM methodology and its application in building and infrastructure projects as well as introducing relevant software packages and encouraged me to research its capabilities and how its implementation can address current industry problems. This idea formed the topic for my Master's thesis.

By the conclusion of my Master's thesis, I realised that there is much more room to research about the use of new technologies in the construction industry. So, the achievements from the research units at MCM along with my industry experience provided me the opportunity to continue my study at PhD level to research about implementing new technologies (or improving current procurement processes) in the construction industry to improve the productivity and efficiency of procurement processes, in particular the use of prefabrication in buildings.

Doing a PhD can be intellectually challenging, physically tiring and emotionally draining, as a PhD program simply is not a continuation of a coursework program. In fact, doing a PhD in CM means to develop significant and original research in the building and construction discipline to innovate and create knowledge in a particular aspect of the construction industry (Figure 2). While the construction industry in Australia is suffering from lack of innovation and use of modern technologies, doing PhD and advanced research would perfectly address this gap in the industry. Moreover, a PhD in a construction discipline is not only the creation of knowledge, but is a passport to the world of research and new knowledge as well as a valuable investment that increases one's chances of more satisfying employment.

How does research benefit the construction industry

Today, design and construction firms experience a number of challenges in their business. Different client requirements drive customised design while a competitive market requires increased efficiency in the business chain in order to reduce costs and construction time as well as increase quality. Finally, technologies are developing fast and while design and construction tasks are enormous and complex, so too is the procurement process increasingly complex.

It is realised that significant industries have implemented manufacturing processes and procedures that have yet to be adopted by the building design and construction industry. With the significant progress in manufacturing industries, the argument on current procurement processes in the construction industry indicates that while processes

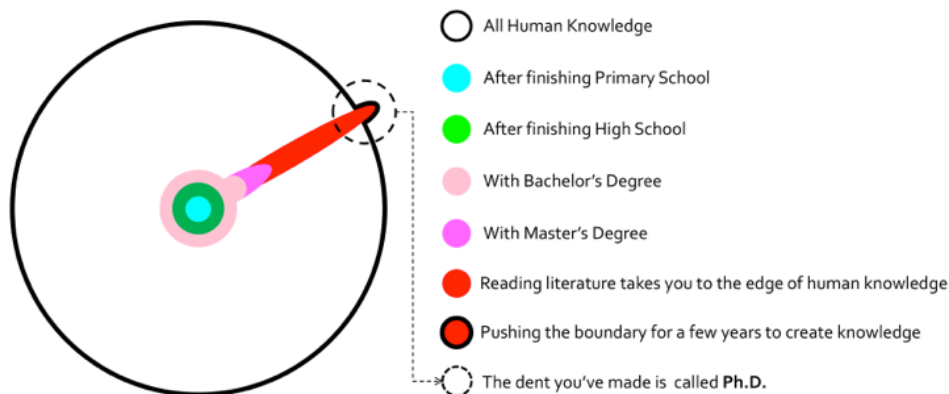


Figure 2: Main difference between different levels of education

in other manufacturing industries, including cars, aircrafts and laptops, can produce complex goods and products for people and communities in more productive and efficient ways than construction industry, so the same or similar processes can be utilised in the construction industry to produce higher quality and more affordable building products.

While the manufacturing processes and technologies in the manufacturing industry have significantly progressed since the nineteenth-century, prefabrication and modular design in the construction industry have not (Smith, 2010). Over the last 100 years, common prefabrication technologies and building procurement methods have not significantly changed, however, this is not to say that new methods and materials are not advanced. What we have learned from history is that prefabrication is about design and development of a technology (Davies, 2005) and a successful prefabrication method must come from an integrated process from early stage of planning (Smith, 2010, Gibb, 1999).

In the pursuit of this gap in the construction industry, my research is about investigating and researching modularity and modular methodologies used elsewhere in manufacturing of products. In fact, the research investigates the current state-of-the-art modular methodologies accepted and emerging in the manufacturing of products other than buildings. It also investigates where current procurement problems rest within the building industry in Australia as well as acknowledges the limitations and problems with current popular BIM software packages. It then highlights several potential processes used by other industries that could be relevant to the construction of buildings as well as provides suggestions for a new approach. In other words, the research investigates new design structures, matrices, product processes and organisational concepts that allow for several of the current problems in building procurement to be resolved. In particular, a focus on the planning and design of building services is used as an example in the implementation of a new approach.

It is expected that the outcomes of this research will create knowledge in improving prefabrication processes in construction of building projects in Australia by proposing a new approach for more effective modular design and construction, predominantly in construction of high-rise buildings. It is envisaged that the Australian construction industry would gain significant success and benefits

related to industry productivity by improving design and procurement processes, reducing construction cost and duration, reducing construction wastes and furthermore improving the quality of construction and buildings.

As we know, the contribution of the construction industry in Australia is significant to the national economy. Constructional professionals play a significant role in the construction industry and their knowledge is valuable to the industry. My pathway from a civil engineering undergraduate degree to a master degree and then PhD in Construction Management shows that academic knowledge along with industry experience provide a worthwhile investment for construction professionals and the industry. The advantages of a higher degree in Construction Management is not only a personal benefit to advance a career and to increase professional skills and knowledge, but also an industry benefit to provide innovative solutions to improve the productivity and other performance outcomes for the construction industry. A higher degree in construction management is a worthwhile investment for an even brighter future.

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CUTTING EDGE CONTAINER OFFICE UNVEILED IN WESTERN SYDNEY

A stylish two-story office building constructed completely out of shipping containers right down to its lift shaft is giving Australian businesses new inspiration for creating funky, versatile working spaces.

Located at the premium award-winning industrial estate, Quarry at Greystanes, the area's first container office features six 40-foot custom-modified units from Australia's leading supplier of shipping containers, Royal Wolf.

Benjamin Lowry, business development manager for Royal Wolf, said the modular container concept offers a strong and durable solution for commercial office spaces.

"We worked with commercial building contractors Prime Construction to design and deliver the transformed containers which will serve as three contemporary offices, a boardroom, a modern café and the company's first ever vertical lift shaft.

"Construction is straightforward when builders receive a structure that is essentially transported in its final form. It's thrilling to see the design brief transform into a beautiful, stylish, functional workspace," he said.

Situated 25 kilometres west of Sydney, Quarry at Greystanes was developed and is managed by DEXUS Property Group. The container office and café provides approximately 280 square metres of space, with 20 employees from fruit and vegetable import/export company, Fresh Solutions Group, occupying the office. The quality neighbourhood Italian eatery, Granatas, will operate the innovative container café.

DEXUS General Manager, Industrial Development, Chris MacKenzie, said: "The use of shipping containers at Quarry at Greystanes provides a sustainable

design solution that adopts the industrial theme of the estate. The modular office construct met our customer's requirements to deliver a purpose built facility within a tight time frame."

"Shipping containers today are the answer to a wide range of challenges due to their flexibility, durability and adaptability – from student accommodation, mobile exhibition spaces and retail outlets, to pop-up bars and restaurants – but for commercial offices, this is just the tip of the iceberg," Mr Lowry said.

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About Royal Wolf:

Royal Wolf Holdings Limited (ASX:RWH) is the industry leader in the hire, sale and modification of new and refurbished shipping containers, with 20 years of experience and a network of 34 facilities including 30 dedicated Customer Service Centres across Australia and New Zealand.

Renowned for its focus on product innovation, Royal Wolf has taken the design and basic engineering of the traditional shipping container to new heights and today its products are used in a wide range of applications to help solve business challenges across many market sectors.

The company has a customer base of over 20,000, supplying customers each year with containers which are inexpensive, safe, secure, easily transportable and able to be modified with doors, internal walls, windows, electricity, water supply and more.

From portable storage options for consumers, sporting associations, community groups and schools, to

accommodation units, mobile exhibitions, retail outlets, offices, kitchens, training facilities and innovative construction projects, experience shows 'You can do anything in a Royal Wolf'.

Royal Wolf containers can be specified to meet portable storage requirements for general purpose, refrigerated or hazardous goods and are available in a variety of sizes, they offer the perfect solution to many storage problems with the additional benefit of being delivered direct to your nominated site.

To cater to the construction industry, Royal Wolf offers a 'Worksite Range' which includes a selection of shipping containers that are available as a stock item and provide hoardings and gantries, construction site offices, change rooms, first aid rooms and ablution blocks.

The company also has a division focused on the freight sector, providing freight containers for road, rail, removals, bulk commodity, construction and project applications. Within this area, the business has built a particularly strong reputation amongst transport and logistics operators as a provider of specialised equipment.

The mining, defence and resources sectors have embraced Royal Wolf container solutions as seen by the extensive use of large portable camps and blast resistant buildings.

Royal Wolf was listed on the Australian Stock Exchange in 2011 and currently employs over 260 permanent staff who are dedicated to servicing the needs of customers and delivering container solutions.

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STRAMIT LONGSPAN® AT THE HEART OF THE DESIGN



Situated on a one-acre site of open Manna Gum forest, Airey's Inlet is an exquisite retirement home designed by renowned architect Allan Lamb for himself and his artist wife. Envisioned as a metal box sitting on a masonry base, Stramit Longspan® steel profile in Colorbond® Monument® is at the heart of the design.

Located in a dense forestry area, Lamb wanted to create a modern two storey dwelling that would be sympathetic to its natural surroundings. Stramit Longspan® in Colorbond® Monument® fitted the brief and was used for the wall cladding, allowing the structure to blend seamlessly into its environment. The 380m² of steel is also bush fire compliant in a high-risk area. "Stramit Longspan® in Colorbond® Monument® provided an economical and aesthetically desirable appearance, which had a strong vertical expression and suited the initial vision," says Allan Lamb.

Incorporating Stramit steel products further into the design enabled Lamb to address the core of his brief: to create a stunning dwelling that could merge well into its natural surroundings and with energy efficiency at its core. The linear footprint of the building is 40m x 6m wide and angled on the site to face due north. In a direct response to passive design principles this allows maximum solar penetration and provides good cross ventilation. The long and narrow design was required to work with the environment and

to minimize disturbance to the site and natural vegetation, with minimal tree removal.

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The design features a skillion roof, which slopes gently at 3 degrees from the east end up towards the higher living spaces and s-w deck. The sloping roof form is a direct response to shedding water efficiently. The 28 metre long skillion roof was divided into three sections using Stramit Speed Deck Ultra® decking and Stramit FarLap® roof lap joint system. Stramit's unique FarLap® roof lap joint system provided the right solution as it allows for the

management of long roof runs, especially when site access is an issue, and increases the handle ability of sheets by making them smaller in length. The system ensured that a low profile step was used at the roof joints without needing to change purlin heights.

Designed for casual living, the residence provides self-contained accommodation for guests and family on the lower level while the owners' living spaces are on the upper floor with ground level access. A full-length 1.2 m wide passage on the south upper floor serves both as a circulation zone and a linear art gallery for display of the owners' art collection. The focus of the house is a casual kitchen and dining space opening onto a deck with full width sliding doors. Conceived as an external room, the deck is partly roofed using Stramit Speed Deck Ultra® in Colorbond® Shale Grey™. This provided an economical roof decking with limited reflection, as required by council.

Stramit additionally provided Longspan® perforated sheeting for the northern horizontal sunshade. Custom cappings and flashings in matching Colorbond® were developed to ensure the desired crisp edges to the building were maintained.

Due to its location the design and subsequent building of the retirement home had significant challenges. Stramit's presence at each stage of the design and building process was integral to the end result being on hand to resolve issues at various stages of the build.

The result is sensational – "The simple metal clad box with crisp cappings and edge details in Colorbond® Monument® sits comfortably in the bush setting" says Lamb.

For more information on Stramit Building Products please visit www.stramit.com.au

About Stramit

Stramit Building Products is a major Australian manufacturer of roll-formed steel building products, including roof and wall cladding, guttering, fascia, purlins, flooring and structural formwork. These products, along with complementary products and services, are delivered through a nationwide network of manufacturing and distribution centres, strategically located to ensure coverage of major metropolitan and regional markets.

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Title: CIT responds to ACT Asbestos Taskforce with a suite of training offerings



Canberra Institute of Technology (CIT) is actively responding to the training needs of the ACT and wider regional New South Wales building and construction industry needs, in light of the ACT Government Asbestos Taskforce response.

The ACT region has a high prevalence of asbestos throughout its residential suburbs. Advice from the government in 2014 suggested that it is safe to assume any house built prior to 1990 will contain asbestos materials; especially in the eaves, internal and external wall cladding and ceilings (particularly in wet areas such as bathrooms and laundries). As a general guide, suburbs spanning from the south of Dunlop to the north of Richardson would be included within this age range, indicative of the mammoth task the local trades have in

keeping themselves and their customers safe from exposure.

On 25 June 2014, the Minister for Workplace Safety and Industrial Relations, Simon Corbell, mandated asbestos awareness training across the territory. The new regulation required all involved in the construction industry who could possibly be exposed asbestos to undertake the training within three months from the time of the announcement.

"The course will educate workers so they are confident in identifying asbestos and asbestos products and so they can understand and follow the correct safety guidelines for reporting and communicating the existence of asbestos to ensure the risks associated with asbestos are avoided," Mr Corbell said in a ministerial press release.

"It does not permit workers to disturb asbestos in any manner. There is a strict regulatory and licensing regime in place for assessing and removing asbestos."

Subsequently, a gap in training outcomes and

knowledge between asbestos awareness and the next levels of training – removal and supervising removal of asbestos – has appeared for many tradespeople in the region. Working closely with local industry, Energy Skills Australia and WorkSafe ACT, CIT has been able to commence delivery of targeted curriculum pertaining to working safely with asbestos containing materials. The five-hour face-to-face workshop bridges the gap between asbestos awareness and asbestos removal and supervision, focusing on best practice for the safe interaction with, and penetration of, asbestos containing materials. This allows local industry, such as electricians, plumbers, gas fitters, carpenters and refrigeration mechanics, to mitigate personal and residential risks associated with handling the materials on unavoidable interaction via their day-to-day jobs.

In addition to CIT's expanded curriculum, a designated training facility has been purpose built in the CIT Bruce high risk training area to allow students to engage with the materials in a safe learning environment. Students learn best practice for handling and disposing of the materials in a practical setting with simulated training tasks to carry out safe assessment and removal procedures.

CIT's asbestos training suite spans the basics; including working safely with asbestos containing materials and asbestos awareness, through to removal of non-friable and friable asbestos and supervising asbestos removal. CIT's asbestos training suite and designated facilities has allowed a front-foot approach; responding to industry needs and offering customised training solutions for building and construction trade companies.

Company and team training workshops for CIT's asbestos training suite are welcome. Training Fund Authority discounts are also available for eligible participants.

Contact CIT's friendly team to request a training solution for your business, visit cit.edu.au/asbestos or email infoline@cit.edu.au



ASBESTOS TRAINING AT CIT

Upskill your team in 2016! With purpose built facilities and industry expert instructors; Canberra Institute of Technology has a suite of asbestos training programs to suit your business.

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► Remove Non-Friable Asbestos ('Class B' Asbestos Removal License)

Statement of Attainment - training in Removal of Non-Friable Asbestos Class B [extract from CPC08]

► Remove Friable Asbestos ('Class A' Asbestos Removal License)

Statement of Attainment - training in Remove friable asbestos (CPCCDE3015A)

[extract from CPC41013]

► Supervise Asbestos Removal

Statement of Attainment - training in Supervising Asbestos Removal (CPCCBC4051A)

[extract from CPC41013]

Working in the ACT construction industry?

Approved applicants will be eligible for Training Fund Authority rebates, as well as additional discounts for NAWIC members.

Visit cit.edu.au/asbestos to view our training dates and apply!

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or contact CIT Student Services on (02) 6207 3188 or email info@cit.edu.au

ROYAL COLLABORATION DELIVERS AUSTRALIA'S FIRST 6 STAR RESIDENTIAL BUILDING

The Green Building Council of Australia (GBCA) has awarded the nation's first 6 Star Green Star rating to a residential development.

The Prince's Australian Terraces, a collaboration between the Prince's Foundation for Building Community and Defence Housing Australia (DHA), has achieved 'world leadership' status in sustainable design, after achieving a 6 Star Green Star 'Design Review' rating under the Green Star – Design & As Built rating tool.

"The impact of this achievement on the building industry cannot be understated," says the GBCA's Chief Executive Officer, Romilly Madew.

"While around a quarter of Australia's office stock is Green Star-rated, the multi residential building sector has been slower to embrace sustainability. The Prince's Australia Terraces demonstrate that world-leadership sustainable design and construction outcomes in the residential sector are attainable now."

The Prince's Foundation for Building Community was created by the Prince of Wales to raise the level of sustainability of homes, workplaces and communities. This is its first Australian project.

Executive Director Victoria Chester says the

project "brings alive" many of the Foundation's key principles.

The project "evokes the local heritage and uses local materials to create a harmonious and enduring community that focuses on environmental sustainability. Being the very first development in Australia to be awarded a 6 Star Green Star rating is a wonderful recognition of both ours and DHA's focus on meeting the urgent challenges of urbanisation and climate change," she says.

Key features of the Prince's Terrace townhouses include:

- Emphasis on local, low-carbon materials, including locally-made concrete with a recycled fly ash content, local granite, and bricks re-used from old Bowden industrial buildings
- orientation to minimise summer solar gain and maximise natural cross ventilation
- façade designed to maximise daylight access and views while managing glare
- ceiling fans control the indoor climate, complemented with small but high efficiency air conditioning systems for peak Adelaide temperatures
- LED lighting and photovoltaic solar panels

generating renewable energy reduce the building's peak power demand

- High efficiency water fittings, with toilets and laundry fittings supplied with 100 per cent recycled water.

These strategies in combination have resulted in town houses which are predicted to use 50 per cent less energy and 50 per cent less potable water than a typical urban town house, with a carbon footprint also reduced by more than 40 per cent.

DHA's Chairman the Hon Sandy Macdonald says: "For our Defence families, this means passing on not just financial savings but a lifestyle that will provide a better future for their children."

The Prince's Australian Terraces will be located in the Adelaide suburb of Bowden, which requires all developments to attain 5 Star Green Star ratings. Construction of the terraces will commence in late 2015. Bowden is registered to achieve a Green Star – Communities rating.

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INDUSTRY WELCOMES PROGRESS ON ACT'S FIRST AND LARGEST PUBLIC TRANSPORT PROJECT (FED)

The announcement of the successful Canberra Light Rail tender shows welcome progress on the ACT's first and largest public transport PPP, says Infrastructure Partnerships Australia – the nation's peak infrastructure body.

"The Canberra Light Rail will fundamentally change the face of public transport in the ACT and this announcement is a welcome development, said Brendan Lyon," IPA's Chief Executive.

"ACT commuters and taxpayers will see real benefits from the international experience of the winning consortium, in terms of innovation, quality and costs.

"The \$698 million price tag has already shown how international experience and competitive tendering have been able to deliver value for money to the tax payer.

"In addition to the transport need, this project will deliver the jobs and economic boost to the ACT to the tune of \$1.2 billion, amidst a tough economic outlook.

"Now that the successful tender has been announced the infrastructure sector strongly urges the ACT Opposition to reconsider their plans to cancel the project.

"While we understand the ACT Opposition's resistance to this project, it is very important that they understand the very real worries of business and cancelling contracts.

"Far from creating a positive precedent, the East West Link cancellation harmed Victoria's reputation and ultimately seen Victoria pay hundreds of millions in costs.

"It's hard to understand why the ACT Opposition would want to achieve the same result.

"The infrastructure sector welcomes the ACT Light Rail project."

The winning consortium comprises:

Pacific Partnerships, CPB Contractors, John Holland, Mitsubishi Corporation, Aberdeen Infrastructure Investments, Deutsche Bahn International, CAF and the Bank of Tokyo – Mitsubishi UFJ.

Media contact: Nathan Alexander 0438 380 464

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WHY 'ZERO' LIQUIDATED DAMAGES CAN BE WORSE FOR THE BUILDER

A recent judgment handed down on 26 August 2015 by the ACT Supreme Court serves as a useful reminder that liquidated damages can operate for the protection of the builder as well as the owners.

In *Adapt Constructions Pty Ltd v Whittaker & Anor* [2015] ACTSC 188, Justice Burns found that a rate of 'zero' liquidated damages in the MBA ACT New Dwellings Contract did not preclude the owners from being compensated for their actual delay costs. The case highlights that, depending on the contract, stating 'Nil', 'zero' or '\$0' as the amount of liquidated damages might ultimately end up worse for the builder than agreeing to a capped amount of delay damages.

The facts in *Adapt Constructions v Whittaker*

Mr Whittaker and Ms Luff engaged Adapt Constructions to build their house. The parties entered into a standard MBA ACT New Dwellings building contract on 10 December 2011 for a lump sum price of \$480,000.00. Among other features, the owners required a polished concrete floor within their residence.

Towards the end of the building process, a dispute arose between the parties when the builder claimed payment and the owners refused on the basis that the building work was defective. The owners claimed that the concrete slab and footings were not in accordance with the approved building plans and engineering design and that the various deviations had resulted in increased cracking in the concrete slab, with further cracking expected. The parties agreed to arbitrate the dispute, and appointed Mr Bryan Ahern.

The owners claimed for damages including the cost to rectify the defective polished concrete floor, which required demolition of their almost complete residence and reconstruction of a new residence in accordance with the approved plans. The total amount of the damages claimed by the owners was \$539,469.97.

Despite the builder's argument that the cracks in the slab did not affect the structural integrity of the house, and that a solution for rectification would be to tile over the slab, the arbitrator found for the owners and ordered that the builder pay the owners the sum of \$544,930.70, which included:

1. \$488,897.00 for the cost of reconstruction;
2. \$15,000.00 for the cost of demolition;

and

3. \$41,033.70 in damages for late completion.

Appeal to the ACT Supreme Court

The builder appealed this decision to the ACT Supreme Court. It argued (among other things) that the owners were not entitled to damages for late completion as the rate for liquidated damages in their contract had been intentionally left blank. The MBA contract standard wording said: 'if nothing stated, Zero'. The builder argued that the 'zero' amount for liquidated damages precluded the owners from claiming any damages at all for delay.

The court, however, agreed with the arbitrator, who said that:

'As there was no rate in item A17 [in relation to liquidated damages], there is no mechanism to calculate a sum as a pre-estimated liquidated damage for late completion. If the parties intended that there be no damages for the breach of Contract in not completing the works to Practical Completion by the due date, then they would have had to express that intention clearly.'

As such, the arbitrator concluded, and the court agreed, that the failure of the parties to insert a 'rate' into the item relating to liquidated damages resulted in the corresponding clause being 'inoperable' as the clause required a 'rate' in order to calculate liquidated damage. That clause being inoperable did not make another clause requiring the builder to complete the building by a date inoperable. As such an award of damages for late completion was possible based on the ordinary principles for assessing damages for breach of contract (ie. based on the losses that the owners can prove). The arbitrator had assessed these as being in the sum of \$41,033.70.

Although the MBA contract has since been amended to exclude the words 'if nothing stated, Zero' in relation to liquidated damages, leaving the item blank, or writing 'Zero', 'Nil' or even '\$0' will still have the same effect as it would have before the amendment, as a 'rate' is still required to make the clause operable.

What do I need to do to make sure that I won't be liable to pay damages for late completion?

Historically, cases considering clauses that provide for liquidated damages for late completion have been conflicting, which has

led to uncertainty in this area of the law.

In *Temloc Ltd v Errill Properties Ltd*,^[1] which was decided in 1987, the court found that when specifying the amount of 'Nil' in relation to a clause allowing for liquidated damages, the parties intended for this to be an exhaustive agreement as to damages for failure to complete the works on time. As such, the court considered that the owner had no right to claim for unliquidated damages under the principles of common law in respect of the delay.

There was evidence in *Temloc*, however, that *Temloc* and *Errill* had previously entered into a number of construction contracts in relation to different projects, all providing for 'Nil' liquidated damages. That and other evidence was taken to prove that, as the parties had a course of dealings in which no bonus would be paid to *Temloc* for early completion, the parties' intention was that no damages would be paid by *Temloc* for late completion.

Only three years later, in 1990, the decision in *Temloc* was distinguished by *Giles J* in *Baese Pty Ltd v RA Bracken Building Pty Ltd*.^[2] In that case, whilst the rate for liquidated damages in the contract was also specified as 'Nil', *Giles J* considered that the function of the clause in relation to liquidated damages was to:

'enable the proprietor, if he so desired, to cause the architect as his agent to invoke the machinery whereby liquidated damages could be assessed...in order to obviate the task which would otherwise arise of establishing an actual loss due to delay, but that if the proprietor or architect did not do so, then the proprietor was entitled to rely upon his common law right to damages for breach [of contract].'

In coming to that conclusion, *Giles J* noted that 'clear words' would be needed before a party would be taken to have given up their right to claim for unliquidated damages at common law.

The court in *J-Corp Pty Ltd v Mladenis*, decided in 2009, confirmed the decision in *Baese*, holding that an intention to exclude the common law right to damages for breach of contract must be expressed in clear and unambiguous terms.

In addition, one judge in *J-Corp* drew a distinction between contracts that provide for 'Nil' damages and those that provide for damages in a positive amount, saying that:

'The position may well be different where a

contract provides for the liability of the builder for liquidated damages in a positive amount, it being unlikely that the parties would have intended that the proprietor should have the benefit of both liquidated and unliquidated damages for the same delay.'

Conclusion

It is clear now that simply leaving a section in relation to liquidated damages blank, or even providing 'Nil' or '\$0' as the amount of liquidated damages, may not allow a builder to avoid liability to pay damages for late completion.

If the parties intend for the builder not to be liable to pay damages for late completion, they need to make sure that not only is any section in relation to liquidated damages inoperable, but that they clearly express the intention that the builder will not be liable for damages for breach of contract if the building is not completed by the date specified for practical completion. In

such circumstances, it is recommended that the parties' seek legal advice in drafting the relevant provisions, to ensure that a court will recognise the agreement that was reached between the parties.

What Adapt Constructions Pty Ltd v Whittaker & Anor shows is that in lieu of taking such action, the builder may in fact be better protected by agreeing, in the contract, to a rate (no matter how small) being payable for the costs of delay. At least that way, the amount that the builder will be liable to be paid will be capped to a certain amount.

More Information

If you would like more information about the findings made in Adapt Constructions Pty Ltd v Whittaker & Anor, or about your rights and obligations under construction contracts in general, please contact one of the members of our specialist Construction Project Delivery & Disputes Team:

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NSW BUILDING APPROVALS SLOWING DOWN

The latest Australian Bureau of Statistics figures show a drop in non-residential and residential building approvals over the last 6 months in NSW, says the Urban Taskforce.

"In a worrying sign that the property market is slowing down the latest ABS approval numbers continue a fall from June 2015," says Urban Taskforce CEO, Chris Johnson. "While the state's performance is well above the 10 year average the continual slow down means the government must be careful with any changes that affect the industry. We are concerned that statements about value capture levies along with a less focussed local government sector due to amalgamations could lead to further drops in production."

"In the high density apartment market the approvals in December 2015 dropped to 3,060 from a high in June 2015 of 3,338 approvals on trend numbers. This could be a settling down to more normal production or it could be signs of less confidence in the market through a tightening of bank loans."

"Even at the June high point NSW was not producing sufficient housing for the increased population particularly when many approvals do not proceed to housing production."

"The non-residential building approvals which are measured by value have also slowed down over the last 6 months with NSW now being behind Victoria and Queensland despite these states being smaller than NSW. Victoria approvals for non-residential buildings was \$833,198,000 in December 2015 compared to Queensland at \$692,603,000 and NSW at \$691,569,000."

"While the NSW economy is generally in good shape the role of building production needs to be carefully supported to ensure it remains robust. There has been significant state government reports referring to the concept of 'value capture' which if overplayed could make some projects unfeasible. We are also concerned that many councils are now in a transition phase towards amalgamation with restrictions on negotiations with the development industry which could slow down the approval process."

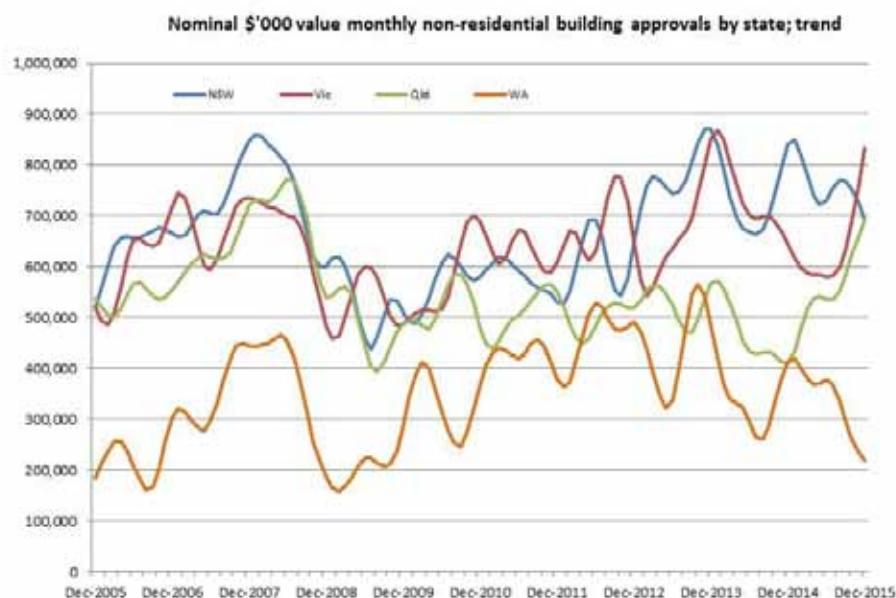
"The Greater Sydney Commission may need to

take a strong role with approvals of major projects during the transition process to ensure housing supply continues at a strong level."

See below graph based on ABS figures below:

The Urban Taskforce is a property development industry group, representing Australia's most prominent property developers and equity financiers.

Media Enquires: Chris Johnson, Chief Executive Officer: 0412 258 283



GOOD ROAD SAFETY STARTS AT THE PLANNING STAGE

Local Governments can play a major future role in improved road safety from the very start of new residential development planning, according to Adam Mularczyk, the Team Coordinator, Engineering Assessments at the Wyong Council.

Mr Mularczyk told the 2015 Conference of the Institute of Public Works Engineering Australasia - NSW that far greater benefits are realised through early intervention, such as considering less cross intersections and more 'T' intersections.

"At this early stage is the time we can get the most benefit. We may request the all-important Road Safety Audits at a later stage of a development/subdivision, but sometimes when these elements have been set in stone, it can be too far progressed to be changed."

Mr Mularczyk said 85% of all roads are managed by Local Government, 50% of all injury crashes occur on these roads and 40% of all fatalities occur on these roads.

"About 11,500 km of new roads were created in NSW in the past 10 years through subdivisions, and this trend continues. The majority of responses to a survey of a small Local Government group indicated they thought "road safety" was "designing to the respective guidelines" or during construction "having traffic controls in accordance with NSW Government rules". Although this is a good start there is far more that needs to be done.

"We have to do more than road safety audits to improve road safety," he told delegates at the IPWEA Conference, which along with the IPWEA's CIVENEX Expo, scheduled for next May 18-19 at the Hawkesbury Show Grounds, are core infrastructure events in New South Wales.

Mr Mularczyk gave several examples of local government functions that can be improved on, formalised or initiated to further improve road safety which may be the difference in saving a life or preventing a serious injury.

Planning

There are many aspects of the planning process which can improve road safety. We'll have a look

at these items below in more detail later

- ||||| Concept or master plans
- ||||| Assessment of the development applications
- ||||| Planning controls such as Development Control Plans
- ||||| NSW Roads guides, including Traffic Generating Developments.

"Road Safety Audits will always improve safety, however we need also need early intervention, otherwise we will end up providing band-aid treatments to safety issues."

Things to look at include:

- ||||| Limit, if possible four way uncontrolled intersections. They have 32 vehicular conflict points, while a staggered "T" intersections instead only has nine.
- ||||| Limiting street lengths with steep downhill grades-perhaps reorientate some streets as steep graded streets can generate unintentional speeding and further increase the speed of those who generally disregard speed limits.
- ||||| Limit street lengths, to limit the opportunity and likelihood of speeding.
- ||||| Don't provide main cycle and pedestrian path crossing points at roundabouts. Traffic signals are far safer. Mid-block refuges may also be a safer option.
- ||||| Limit street widths. Wider streets can encourage higher speeds or motorists to widen the radius of curves by flattening their travel path for more comfortable fast travel, plus encourage dual queuing at intersections (which can affect sight distance).

Austrroads new Safe Systems in the Planning Process provides more information on this.

Mr Mularczyk said Wyong's Development Control Plans (DCPs) give guidance on many planning issues along with safety requirements that include:

- ||||| Separate loading zones from customer parking and pedestrian areas to limit conflict areas.
- ||||| Increase provision of public transport

modes and access to these modes

- ||||| Increase the provision of cycleway and pedestrian networks
- ||||| Require large employment generators to provide transport plans
- ||||| Cycleway facilities to include end of journey facilities.
- ||||| Car parks as well as road systems to be self-informing, logical and coherent to assist in guiding all road users.
- ||||| Identify road safety as part of their Traffic Impact Assessment.

The NSW Roads and Traffic Authority Guide to Traffic Generating Developments is a reference document widely used and applied in the planning and development process.

This guide advises on the generation of traffic and parking for particular land uses and on road safety, which it refers to as "a primary consideration in planning developments". The road safety aspect is widely overlooked but should be a "primary consideration".

"Our Wyong Council Civil Works Guide details the design of development-related civil works and includes a matrix of Road Safety Audit and Road Safety Check intervention levels, which is based on the NSW Roads and Maritime Services matrix."

"It also includes land uses such as schools, shopping centres, etc. based on project

cost, but small projects like moving a bus stop may have significant safety implications so all projects should really consider road safety"

Condition of consent

Other elements of how Road Safety Audits are managed include the provision of a Road Safety Audit as a condition of consent. Wyong Council believed we were not getting

the outcomes we wanted, so we revised the wording of our standard condition:

"The submission to the Council of a "XXXX" stage Road safety Audit for "XXXX" prepared by an audit team of a minimum Level 3 and Level 2 Road Safety Auditor register on the

NSW Register of Road Safety Auditors. No recommendations are to be made in the Road Safety Audit to address any deficiencies. Resolutions of the identified deficiencies are to be carried out in consultation with Council with sign off of the corrective actions by Council prior to approval of the detail design."

"Many Councils just tick the conditions off as being satisfied when the Road Safety Audit is submitted. Rightly or wrongly, I go through each audit as it is required to improve road safety aspects of the development and we want to ensure that is being achieved."

"There is an expectation that audits will be a quality professional report, prepared by experienced, trained and registered auditors and audit teams. We expect audits will identify most, if not all, of the major and obvious safety deficiencies, irrespective of what disclaimers were included, however, we get great variety in the quality of audits. This is one reason we review them and why we changed our condition of consent."

"Authorities should make the condition of consent for a Road Safety Audit valuable by properly reviewing the audit to ensure it has improved the road safety of the project, and not just ticking the box," he told the IPWEA Conference.

"Importantly, make those responsible for the audit, RESPONSIBLE FOR THE AUDIT!"

"The Centre for Road Safety in NSW is investigating ways to improve the NSW

Road Safety Audit process, including improving auditing quality," Mr Mularczyk said.

Local Government can also boost road safety by:

- ||||| Fleet management principles, such as buying the highest safety rating vehicles possible, for the protection of the users.

- ||||| Buying lighter coloured vehicles. Research suggests this improves conspicuousness.

- ||||| Increased reflectivity or providing retro-reflective markings to vehicles, particularly those that operate at night or in areas that camouflage car conspicuousness

- ||||| Buying vehicles with Daylight Driving Lights to make the vehicle more conspicuous against the background, typically when headlights are not used.

- ||||| Improved Vehicle Operation and Maintenance, including,

- ||||| A Code of Conduct

- ||||| Teaching of staff, who may not know how, to:

- ||||| Check tyre pressure

- ||||| Check tyre tread

- ||||| Change a tyre

- ||||| Correctly fit and wear seatbelts

- ||||| Correctly sit in a vehicle seat

- ||||| Regularly check wiper systems and top up windscreen washing fluid

- ||||| Better human resources and training principles so staff are trained in safety by sharing of information and mentoring which can include issues such as Road Safety Auditing, heavy vehicle rollover risk, treatment at crashes and behavioural issues such as drink driving and fatigue, occupant restraints, plus advising target groups such as young males and motorcycle riders.

Mr Mularczyk said Council officials can improve asset management works to optimise road safety by looking for opportunities to upgrade, such as when doing a road overlay.

"Don't just put back what is there. I bet you have been putting the same thing back for the past 50 years. Ask yourself can I improve it at minimal cost?"

"Also, be aware of problems and complaints. Can we widen the shoulders, adjust lane width, lengthen the turn lane or enhance signage and pavement marking?"

He said Councils should also check their existing signage and reflectorized guide posts or other road alignment markers and the noses of median strips and islands, day and night, to check visibility and ensure grass or branches are not reducing their effectiveness.

"Adjoining Councils, or regional Council groups, should work collectively on auditing as this adds independence to the process. If there are no auditors at the adjoining Councils, check with the local or regional RMS office. You could ask to join one of their audit teams or for them to lead your audit. I have even asked consultants to be a part of their

audit teams to gain more experience."

From a speech by Adam Mularczyk to the Institute of Public Works Engineering Australasia - NSW Division (IPWEA-NSW) October 2015 Annual Conference.

The IPWEA-NSW also runs the CIVENEX 2016 infrastructure Expo and Seminars at Hawkesbury Show Grounds, May 18-19 2016.

COMPANY FINED FOR FAILING TO PROTECT ENVIRONMENTALLY SENSITIVE AREAS

The Department of Planning and Environment has fined Leda Manorsstead the maximum possible fine for failing to protect environmentally sensitive areas as required by its conditions of approval.

The company was required to fence environmentally sensitive areas during earthwork activities to protect them from any work associated with construction of Cobaki Estate.

A Department led whole of Government site inspection on 02 November 2015 confirmed that fencing of the site had not occurred, resulting in construction activities such as earthworks into the areas that were required to be protected.

A spokesperson for the Department said that the breach was assessed as having a high impact.

"The company is now required to pay a \$15,000 fine, construct the fence and remediate the affected areas," the spokesperson said.

"The issuing of this fine should serve as a deterrent to all companies in the State – encouraging them to adhere to their conditions of approval or face the consequences."

In August last year, the NSW Government introduced five-fold increases in penalties for companies that breach conditions. This has given NSW the toughest penalties in the country for planning offences.

Companies can also be prosecuted in court for breaching conditions, with the most severe breaches attracting fines of up to \$5 million.

The Department has doubled the number of compliance officers in the field across NSW to monitor and enforce the conditions placed on developments of state significance such as residential developments.

"In November 2015, the Department's Compliance Officers undertook 23 inspections across the Tweed and Ballina LGAs as part of an increased presence campaign in the North of the State," the spokesperson said.

"Our Compliance Officers conduct spot checks without warning, regular inspections and audits as well as work with companies and communities to ensure that companies are sticking to the rules."

For more information about the compliance team, visit www.planning.nsw.gov.au/Compliance

Department of Planning and Environment media contact: (02) 9228 6128

GLOBAL ROAD TECHNOLOGY AND QUT INVEST IN THE FUTURE OF ROAD INFRASTRUCTURE

A new research partnership will deliver health and safety benefits for mine sites, regional towns and third-world countries through spray-on, “instant” roads that can make dirt roads as hard-wearing as bitumen.

The research will deliver new polymers, which, when mixed with water, can be applied from water tankers or even helicopters, to make long-lasting roads in remote locations.

The result is longer-lasting, lower cost roads which are safer for motorists, survive adverse weather and reduce the amount of airborne dust for neighbouring workers and communities.

The partnership between Global Road Technology (GRT) and Queensland University of Technology (QUT) is expected to find more applications for the polymer solutions, and change the road infrastructure industry.

The high cost, construction time, and sustainability of current road infrastructure delivery methods is an ongoing concern for countries world-wide, particularly in regional and remote communities.

Dr Babak Abtahi, GRT Head of Research and Development, said different solutions were required depending on the environment, including soil conditions, temperature and rainfall.

“Given the vast types of soil we apply GRT technology to around the world, it is imperative we continue to develop different product solutions,” Dr Abtahi said.

GRT has already proven the success of its technology, building lower cost roads that are longer-lasting and faster, with completed projects in Australia and overseas, including an application at a PNG port facility that cut

airborne dust that was affecting workers’ health.

The company, together with QUT, has now gone further with research into the varied performance of polymers in a range of geographic locations, and the custom development of new solutions.

GRT’s internal research and development team, together with QUT’s advanced, high-tech facilities and complementary expertise, have taken their research to the next level.

QUT Research Fellow Mariam Darestani said their investigation into the interaction between soil and polymer has allowed the team to understand why a polymer works with some soil types, but fails in creating the desired mechanical strength in other soil types.

“GRT operates by considering the many different soil types, and the characteristics that they respond well to. We are also working to develop products that work with most soil types,” Dr Darestani said.

“Polymers are very different; GRT knows this and is one of the first companies internationally to develop solutions and formulate products for different applications, whilst investing in the education of others.”

Dr Abtahi said the research would have valuable, commercial outcomes.

“Major US companies have patents for polymer solutions; our investment is a clear indication of the potential this technology presents for the future of infrastructure,” Dr Abtahi said.

“The cost to build roads with the current industry-preferred method can be millions of dollars per kilometre. GRT solutions reduce not only the costs of resources, but also

time and labour.”

The GRT/QUT partnership team includes Dr Darestani and a research assistant, supported by a Chemical Engineering Professor and a Senior Lecturer in Civil Engineering, who manage the project at QUT.

Undergraduates who go on to work in engineering jobs are encouraged to work with these polymers, and GRT provides in-kind support for their research projects.

Dr Darestani said QUT and GRT view the partnership as a long-term investment in the future generation of civil and industrial engineers.

“We are educating young engineers and training on the benefits of polymers over traditional construction materials, with the view that they will go on to advocate this new technology and hopefully create change within the industry,” Dr Darestani said.

“We are looking to incorporate this content into the curriculum in the future, where engineers can be educated on the future of infrastructure technology through real world examples.

GRT and QUT’s long-term investment looks to be shaking up the industry and shape road construction and infrastructure as we know it.

“We are essentially pioneering this movement towards polymers in the next generation of engineers.”

For more information please visit our website: www.globalroadtechnology.com

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WHAT IS A SUBSTANTIAL BREACH OF A BUILDING CONTRACT?

By Justin Cotton, Partner, Lovegrove Smith & Cotton

One of the common sources of building disputes at courts or tribunals involves arguments about whether a building contract was properly terminated, was “repudiated” or whether a party was in “substantial breach” of the contract.

Putting aside arguments over termination of contract, which will turn on their own unique circumstances of each case, references to what amounts to “substantial breach” of the contract have also generated much legal debate and reflection.

In Victoria for example the industry standard building contracts for domestic construction refer to “substantial breach” of contract giving rise to a right to serve a default notice as a prelude to a possible later termination notice. However, the contracts themselves do not give a precise definition of what is a substantial breach of the contract.

For example, the relevant clause may give some specific instances of contract breach (eg failing to provide evidence of warranty insurance) in the contract provision relating to grounds for default notices, but at the end of the clause there is a “catch all” ground with words to the effect of: “or is otherwise in substantial breach of the contract”.

The phrase “substantial breach” was considered by the VCAT in a Victorian domestic building dispute, in the case of *Serong v Dependable Developments Pty Ltd* [2009] VCAT 760. In this case the contract examined had no definition of the relevant phrase. At VCAT, the Deputy President referred to a breach that was “of substance as distinct from ephemeral or nominal”. He went on to say: “If applied in the present context this would mean that any breach going beyond the ‘de minimis’ would be a substantial breach.”

Guidance has also been sought in building cases from the NSW Court of Appeal, analysing section 9A of the Workers Compensation Act 1987 (NSW). In the decision of *Badawi v Nexon Asia Pacific Pty Ltd t/as Commander Australia Pty Ltd* [2009] NSWCA 324, the 5 member bench discussed the meaning of “substantial” as something which is not “minor”, and also that “substantial” as it appears in section 9A of the specific Act means “in a manner that is real and of substance”.

In the VCAT case of ‘Serong’, the Deputy President also favoured an interpretation of a “substantial breach” as being something that was “considerable, solid or big” in the context of a building contract. This then raised questions of how significant or substantial a building defect would need to be before its existence is legally regarded as a substantial breach of contract.

The Deputy President in ‘Serong’ opined: “Given that it is difficult to avoid some defects [in the building process] and that the process of

rectification may take some time it seems inherently unlikely that a standard form building contract prepared by a builders’ association would intend to leave a builder at risk of contract cancellation for failure to rectify within 14 days of a notice any defect which was more than ephemeral or de minimis.”

It has been argued before the courts and at VCAT that the mere existence of a building defect, even if it is significant, does not necessarily mean the Builder is in substantial breach of the contract because that conclusion also turns on whether the Builder has refused to rectify the problem, and other surrounding circumstances at the key time, including whether the works have been proffered up as complete.

Because an owner has the protection of a defects liability period, the ongoing builder warranties at law and contract damages for delayed completion, the existence of a defect in and of itself should not automatically be interpreted as a substantial breach of the contract by the Builder, in this writer’s opinion. While the converse could be argued, on the grounds that only substantive, significant defects would amount to such a breach, where does one draw the line on this slippery slope of subjectivity?

The term “substantial” is capable of subjective application, which is probably why some other standard form building contracts seek to fill the gap by identifying in the general conditions what breaches of contract are to be regarded as “substantial”.

Notably, some commercial building contracts have an inclusive definition of “substantial breach”; for instance clause 44.2 in the AS 4300-1995 and AS 2124-1992 industry form contracts. A failure to use the standard of materials or provide the standard of workmanship required by the contract is referred to in the context of or as examples of a substantial breach.

It is submitted that more assistance would be gleaned from domestic building contracts in resolving some arguments over contract termination, if more definition was given of what constitutes a substantial breach of contract. It would not cure all uncertainty however, because the propensity for every building dispute to have its own unique facts will still allow some argument over the phrase’s application.

For expert legal advice and assistance on building contracts and resolving domestic and commercial building disputes, you should seek prompt advice from construction lawyers at the earliest opportunity.

<http://www.lsclawyers.com.au/elibrary/contract-breach>



DESIGN FLEXIBILITY AND EASE OF CONSTRUCTION

Builder: Stephen Edwards Construction | Architect: Francis-Jones Morehen Thorp

When it comes to great architecture and building design Kingspan creates products that inspire. The Australian National Maritime Museum's state-of-the-art Warships Pavilion is a unique building in an iconic location. The design of the building, with curves and swoops, required a bespoke approach and flat panels that could be installed quickly to minimise costs and meet construction deadlines.

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WORK INTEGRATED LEARNING AWARDS

HANSEN YUNCKEN INDUCTED INTO UON HALL OF FAME

The University of Newcastle (UON) Work Integrated Learning (WIL) Awards were established in 2010. In addition to recognising the outstanding performance of students and staff across the university, the WIL Awards have recently expanded to recognise the significant contribution of industry, business, government and community organisations who host students and support WIL related activities. In 2015, Hansen Yuncken has received this recognition and been inducted into the WIL Industry Hall of Fame.

The WIL Hall of Fame recognises the inductee's contribution to the university, the professional preparation of their students past and present, and for growing and strengthening the region in which their campuses are located.

The award was announced by the University's Vice-Chancellor, Professor Caroline McMillen, and received on behalf of Hansen Yuncken by Matt Bandy and Pat McAllister. Hansen Yuncken thanked the university for the recognition and acknowledged that work experience students and paid cadets had made solid contributions to our Newcastle business since it was established nearly 10 years ago.

A number of industry leaders attended the awards ceremony including Peter Hansen.



L - R: Peter Hansen, Pat McAllister, Matt Bandy, Professor John Smolders (UON), Professor Caroline McMillen (Vice-Chancellor and President, UON).

VICTORIAN BUILDING APPROVALS LEAD THE NATION

The latest building approval numbers from the ABS have confirmed that 2015 was a record year for Victorian building approvals.

Both residential and non-residential building approvals rose strongly in December 2015, with residential approvals setting a new record of \$21.2 billion for the year.

In December, building approvals were up 23.1 per cent for Victoria, representing a \$2.8 billion stimulus to the economy. There was a large increase in approved units and apartments of 156 per cent for the month.

The number of Victorian dwelling unit approvals increased strongly in December to be up 37.4 per cent over the month and up 1.1 per cent over the year. Victoria experienced the largest monthly rise among the mainland states. Victoria is the state

with the highest number of dwelling approvals.

Victoria's monthly rise in non-residential building approvals (52.5 per cent) was the second largest of the states. Nationally, the value of total building approvals rose by 1.1 per cent over the month.

Quotes attributable to Treasurer Tim Pallas

"Today's building approvals figures provide more evidence of the confidence returning to the Victorian economy after four inertia-filled years under the Liberals."

"Having your own home is something that many Victorians aspire to, and I am happy to see the historic increases in residential approvals that are occurring under our watch."

Quotes attributable to Minister for Planning

Richard Wynne

"Today's ABS statistics show the confidence Victorian home buyers and developers have in our new home market."

"Our apartment market continues to outpace the other states, but I am particularly pleased to see the rise in detached housing approvals because this has a greater flow-on to the construction industry and will go some way to meet buyer demand."

"The Andrews Labor Government announced a swathe of planning policy reform last year. We are making sure good policy keeps pace with development and will continue to attract more investment through the Plan Melbourne refresh, Better Apartment guidelines and our ongoing release of land."

Media Contact: Elliot Giakalis 0438 332 378 | elliott.giakalis@minstaff.vic.gov.au

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HEBEL JOINS AVJENNINGS AND STEVE WAUGH FOUNDATION FOR THE RENEE 3 PROJECT AND TO HELP BUILD A BRIGHTER FUTURE

CSR Hebel has joined forces with residential property developer AVJennings and their partner the Steve Waugh Foundation to help build charity house, The Renee 3, located in Hazelcroft, Doreen, Victoria.

The Renee 3 is the third residential home to be built by Hebel in partnership with the Steve Waugh Foundation and AVJennings, which began in 2011. The initiative involves the design, construction and sale of a residential home, with profits going directly towards the Steve Waugh Foundation, a charity which offers children, young adults and their families who live with rare diseases 'somewhere to turn.'

Hebel first joined The Renee project in 2013 helping to build The Renee II house and partnered with The Renee 3 project in donating Hebel PowerPanel XL for the external cladding. PowerPanel XL is used by builders and architects for its design, construction efficiency and sustainability benefits.

National Design Manager John Eckert, from AV Jennings, says, "We wanted a house that had a very strong impact but still matched market expectations. Hebel were able to fulfil all criteria with the added benefits of being faster to build with excellent environmental benefits."

AVJennings has named all three projects after the Foundation Ambassador, Renee Eliades, who lives with a rare disease called Geleophysic Dysplasia. The disease affects the development of bones in the body and so most children suffering from it will be very small in stature, 21 year old Renee is often mistaken for a 3 year old. Renee requires oxygen 24 hours a day, which is where the Renee 3 will assist. Profits made from the initiative will provide equipment such as portable oxygen tanks for Renee and other children in need.

The Renee 3 build is now complete and sold and Hebel has signed up for the construction of Renee 4 which is already under way in Queensland.

For Further information about CSR Hebel please visit www.hebel.com.au

For further information about the Renee3 please visit www.avjennings.com.au



From left: Ivan Van Der Wert (Business Development Mgr, Hebel), Steve Waugh, Renee Eliades & David Bishop (State Sales Manager, Hebel)

RESEARCHERS PREDICT PREFABRICATION WILL TRANSFORM QUEENSLAND CONSTRUCTION INDUSTRY

New research from Construction Skills Queensland (CSQ) and the CSIRO is predicting the construction industry will be transformed by prefabrication and modular housing over the next two decades.

The first insight from The Foresight Project reveals that new technologies will cause a major shift in the way houses and buildings are constructed.

According to the Manufacturing Excellence Taskforce of Australia, modular buildings today make up A\$4.6 billion (or 3 percent) of Australia's annual A\$150 billion construction industry.

CSQ Director Evidence and Data Robert Sobyra said this figure will increase significantly as building companies embrace the cost and time saving benefits of operating in a controlled building environment.

"Working in a factory takes a lot of the risk out of building. There are no delays due to bad weather, more efficient processes can be used, and construction can occur at any time of day.

"Automated construction technology is well suited to modular building styles and may bring costs down further. Modular buildings are constructed in a very structured, pre-defined way. This sort of predictable and repeatable process is well-suited to being performed by robots.

"Modules and materials can also be sourced from anywhere in the world allowing construction companies to access the best performing and most cost effective options," he said.

The research is highlighting several trends in the housing market which are facilitating the growth of prefabricated technology.

Advances in manufacturing technologies such as 3D Printing could create a new playing field for personalised building design and mass production. Increasingly designs are entered into the computer aided drafting (CAD) system then the "print" button rapidly creates the object to specification.

Constantly improving virtual reality software and headsets are allowing new home buyers to personalise and visualise their house at no extra cost.

Mr Sobyra said those working in this new construction environment would require a mix of old and new skills.

"The transition to prefabricated construction will not eliminate the need for human labour and traditional tradespeople. Those building modular structures will still need to know the fundamentals of building and construction.

"In many instances workers will be required to perform the same tasks that have generally been completed on-site, they will just be operating in a factory," he said.

However Mr Sobyra said modular building would take some time to be fully adopted by the industry and property buyers.

"A large number of customers will have to be won over to the modular marketplace. It will take some time for perceptions about the quality of modular housing to be erased.

"In addition, improved tools, information systems and training will help to reduce on-site costs and prolong the commercial viability of conventional construction methods," he said.

For information about starting a career in the construction industry visit www.csq.org.au or phone 1800 798 488.

*ABS, Building Activity, Australia. Catalogue Number 8752.02015, Canberra: Australian Bureau of Statistics.

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DOUBLE THE BENEFITS WITH KAESER'S LATEST GENERATION HSD SERIES ROTARY SCREW COMPRESSOR SYSTEMS

Kaeser has just announced the launch of its latest generation HSD series rotary screw compressor systems. The HSD.3 series includes a number of product enhancements to the two self-contained compressor units installed within a single housing. For the end user this translates into double the benefits!

The HSD series rotary screw compressor systems are ideal for applications that require large volumes of quality compressed air with a small footprint. The two self-contained compressors are both installed within a single housing that is no larger than a single compressor!

System availability is optimised with the HSD series from Kaeser. Each compressor section operates completely independently from the other. This means that performance can be precisely adjusted to suit requirement and costly idling can be kept to an absolute minimum.

The modern design behind the latest generation model, uses standard components and simple, cost-effective 1:1 direct drive systems to achieve superior efficiency and reliability. The drive motor and the compressor block are linked via a maintenance free coupling. This avoids the transmission losses associated with gear driven units. The benefits speak for themselves; efficient power transmission, optimal energy consumption and reduced servicing and downtime costs.

Each rotary screw compressor found in the HSD series systems feature a super-premium efficiency IE4-rated drive motor. Currently the most efficient motor available, IE4-rated drive motors comply with and exceed prevailing Australian GEMS regulations for 3 phase electric motors. For the end user this translates into reduced energy costs and a reduced impact on the environment.

Thanks to minimised internal pressure losses, the flow-optimised Sigma Profile screw compressor block and the inclusion of an IE4-rated drive motor, the latest generation HSD series rotary screw compressors additionally offer improved specific power, which further contributes to the all up efficiency of these compressors.

For the ultimate energy saving solution where compressed air demand fluctuates, the HSD series can be fitted with the Sigma Frequency Control drive (SFC).

The HSD rotary screw compressors from Kaeser feature an electronic Thermo Management system. This controls the oil temperature to ensure a safe and consistent differential from the dewpoint temperature. In addition, this feature creates energy savings by preventing unnecessarily high screw compressor block discharge temperatures.

The units are controlled and monitored independently of each other via two Sigma Control 2 controllers. Using the master-slave function, these controllers are able to precisely match performance of each compressor to suit current compressed air demand. This results in significant energy savings and optimum efficiency.

With sound pressure levels as low as 71 dB(A), the HSD series is available with total drive power 360 to 500 kW, working pressure 3.5 to 15 bar with combined free air deliveries from 42.5 to 85.2 m³/min (fixed speed drive) and 52 to 85.4 m³/min (SFC drive) at 50 Hz. For more information visit www.kaeser.com.au or phone 1800 640 611.



START THE YEAR SAFELY, URGES SAFEWORK

With the school holidays coming to an end and most of workers returning from holidays, SafeWork NSW is encouraging businesses to make it a safe start to the year.

Thousands of young workers will also enter workplaces for the first time, making the need to focus on safety even greater.

According to SafeWork NSW, young workers under the age of 25 accounted for 16 per cent of all injuries in NSW workplaces during 2013/14 with 15,708 young injured and seven killed across the State.

Executive Director of SafeWork NSW, Peter Dunphy said young workers must receive appropriate training and supervision so that they do not get injured, and experienced workers should be reminded not to become complacent.

"The return to work period at the end of the school holidays requires extra caution on the part of businesses and workers," Mr Dunphy said.

"There are many young workers entering the workforce for the first time who will be keen to impress.

"This can lead to them taking risks that more experienced workers would not and increases the chance of a workplace injury.

"Businesses need to provide appropriate training and supervision so that they don't take unnecessary risks and get injured on the job.

"They also need to reinforce to experienced workers the importance of not becoming complacent as it has been found to be a major contributing factor to workplace injuries at this time of year.

"This can be done through inductions, toolbox talks or tips for safety which highlight the business's safety culture and emphasise safe work methods, and is particularly important for workers who have had changes to their job or workplace over the break.

"That's why SafeWork NSW is urging businesses in the region to make safety a priority as their experienced workers return from holidays and their young workers commence."

Further information on young worker safety is available from www.safework.nsw.gov.au or by calling 13 10 50.

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SIMPLIVITY UNLEASHES NEW PROGRAMS AND INITIATIVES TO HELP PARTNERS HARNESS HYPERCONVERGENCE DEMAND

SimpliVity, a leader in hyperconverged infrastructure revolutionising enterprise IT, today announced new PartnerAdvantage programs and initiatives to deliver robust opportunities and strategic enablement to partners across the globe. The Cloud Service Provider Program, Technology Alliance Program, and new advanced training for solution providers will provide partners with the tools, structure, and support necessary to succeed in capturing the growing demand for hyperconverged infrastructure.

"Since inception, SimpliVity has focused 100% on the channel, allowing us to rapidly build a vibrant and prosperous partner community focused on one thing – simplifying IT for customers," said George Hope, vice president of global channel sales, SimpliVity. "Today, we're expanding the scope of our partner program by adding new revenue and engagement opportunities, demonstrating our steadfast commitment to our partner ecosystem and their customers."

New PartnerAdvantage programs and initiatives

Cloud Service Provider Program

The new Cloud Service Provider Program allows partners across the globe to deliver on-demand cloud services based on the company's highly scalable, flexible, and cost-effective hyperconverged infrastructure, providing end customers with exceptional ROI and TCO savings. Available in the first quarter, the new program will enable cloud service providers to offer highly competitive, on-demand services, including infrastructure as a service (IaaS), virtual desktops as a service (DaaS), and disaster recovery as a service (DRaaS).

An essential component of SimpliVity's program is its new, flexible, consumption-based pricing model, allowing service providers to pay based on the resources they consume using SimpliVity on a per VM basis. Service providers purchasing infrastructure using traditional pricing models often have to incur high upfront costs and wait longer to achieve profitability. They are also left with all the financial risk of unused capacity or unpredictable demand.

SimpliVity's consumption-based pricing covers all hardware, software, and support. As the only hyperconverged infrastructure vendor to provide truly elastic pricing, SimpliVity

minimises the risk of demand fluctuations for cloud service providers and accelerates their journey to profitability. This pricing option is initially available to select service providers in the United States as part of a pilot program and will be rolled out more broadly in the second half of 2016.

"SimpliVity's aggressive pricing is strategic in the industry and will be a substantial benefit to customers," Walter Cook, CEO, Core BTS, Inc. "As a hybrid cloud service provider, we understand how unanticipated usage peaks or valleys can significantly impact the bottom line. However, SimpliVity's program will provide Core BTS with the peace of mind that our, and our customers' investments, are stable and we will only be paying for the services that are consumed."

Technology Alliance Program

Available now, the new Technology Alliance Program gives technology providers and system integrators access to the high growth hyperconvergence market – enabling them to integrate their offerings with SimpliVity hyperconverged infrastructure and deliver high value solutions to customers.

A key differentiator of SimpliVity's Technology Alliance program is the ability for partners to leverage the Customer Technology Showcase, SimpliVity's global hyperconvergence demo cloud, which allows alliance partners to deploy, test, and demonstrate their technology with SimpliVity. The program also provides partners with joint go-to-market planning, alignment to SimpliVity sales, marketing, and distribution channels, access to APIs and SDKs, as well as early access to new SimpliVity solutions and product enhancements.

"Eaton's power management solutions are an ideal complement to SimpliVity's hyperconverged infrastructure, further enhancing business continuity and energy efficiency," said Hervé Tardy, vice president and general manager, Distributed Power Quality Division, Eaton. "SimpliVity's Technology Alliance Program further expands our partnership by formalising our alignment and go-to-market strategies, as well as ensuring we continue to deliver business value and seamless integration to joint customers."

"The Technology Alliances Program gives VM2020 a framework that will enhance our ability to develop, support, and market SimpliVity's hyperconverged infrastructure and

their renowned data virtualisation technology," said Bernardo Starosta, founder and general manager, VM2020. "Best of all, SimpliVity's early access to new products will allow our company to quickly and easily integrate their newest technologies with our solution, delivering faster value to customers."

"With the hyperconverged infrastructure market growing at an exponential rate, we are pleased to extend our market leading data security coverage and partner with top industry players and innovators like SimpliVity," said Arun Gowda, Vice President of Business Development at Vormetric. "Together our joint solutions and the associated partner programs and initiatives are poised to add tremendous value and benefits to the customer."

Solution Provider Program

SimpliVity has enhanced its existing Solution Provider Program by expanding revenue opportunities, investing in new partner tools for deal registration and demand generation, and building the most advanced hyperconvergence training available.

Now available, the new SimpliVity Advanced Pre-Sales Concepts Training helps strategic partners boost their in depth expertise in the highly disruptive, high-growth hyperconvergence market by focusing on technology fundamentals, competitive readiness, and specific customer use cases.

"SimpliVity has always been ahead of the curve for hyperconverged infrastructure, and now we're excited to see that they're advancing their partners' skill sets as well," said Stephen Oles, managing partner and sales director, Cordicate IT. "SimpliVity's training program will not only expand our expertise and ability to deliver the most technologically advanced hyperconverged infrastructure, but it will also make Cordicate IT a true innovator in our field."

Resources

- Learn more about PartnerAdvantage
- Service Provider Program Solution Brief
- Read more SimpliVity case studies
- Learn more at SimpliVity's blog
- Follow SimpliVity on Twitter, LinkedIn, Facebook, YouTube and Google+.

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AIB NEW MEMBERS



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

AIB NEW MEMBERS

13 November 2015 – 1 February 2016

Given	Surname	Honors
Kin Shun	Chan	MAIB
Ying Yeung David	Chan	MAIB
Hing Leung	Chan	AMAIB
Kuok Fong	Chan	MAIB
Pak Cheong	Chan	MAIB
Man Kit	Cheung	MAIB MHKICM
Ho Lun	Ching	MAIB
Ming Kwong	Chong	MAIB
Kwok Fai	Fung	MAIB
Chung Ho	Lau	MAIB
Kun Ting	Li	MAIB
Chun Wah	Tang	MAIB
Sui Ching	Tong	MAIB
Kai Chung	Wan	MAIB
Chi Keung	Wong	MAIB
Siu Hong	Lee	MAIB
Chi Hung	Chau	MAIB
Choo	Yong	MAIB
Hylton	Bloch	MAIB
Andrew	Box	FAIB
Darren	Hudson	MAIB
Sammy	Tran	MAIB
Robert	Charles	MAIB
Thanurjan	Rajendram	MAIB
Julian	Sharland	MAIB
Tedros	Zeru	AMAIB
Cuneyt	Ayan	AMAIB
John	Leone	MAIB
Kia Ching	Ngoo	AMAIB
Paul	Connelly	MAIB
Warnakulasooriya	Corera	AMAIB
Kevin	McIntosh	MAIB
Omer	Osmani	MAIB
James	Prattent	MAIB
Anthony	Wagh	AMAIB
Yat Long	Wong	MAIB
Paula	Zubowicz	AMAIB

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No more 28 day render cure delays before painting

Fresh or “green” cement render and concrete is HIGHLY ALKALINE, traditionally requiring time to stabilise before painting, resulting in costly project delays and extended scaffolding costs.

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System Component	Dulux Recommended System	Feature Benefits
Primer Sealer	AcraTex Green Render Sealer Suitable for application over 2 day old cement render	- Blocks Cement Efflorescence - Reduces Project Delays - Optimises System Performance
Crack Bridging Topcoat	AcraTex AcraSkin Available across the full Dulux exterior colour range	High Build - Crack Bridging Protection Nap Roller - Paint Like Appearance Superior Application - Low Roller Spatter

Note: GRS is “Safe to paint after only 2 days” based on adequate drying of the substrate to a stable moisture content.

For further information about Dulux AcraTex Green Render Sealer please go to our website www.acratex.com.au

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and reduce your scaffolding costs

SAFE TO PAINT
OVER RENDER IN
2 DAYS*
No more delays



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Lower Scaffolding Costs - drop scaffold faster



Restricts Efflorescence



Superior Adhesion



Water Based - low VOC

Dulux recommended system for cement render with AcraSkin crackbridging topcoat.

* Safe to paint over 2 days based on substrate adequately drying to a stable moisture content.



For further information go to: acratex.com.au
Dulux Customer Service: 13 23 77

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project delays**

**New
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- improves finish



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