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CONSTRUCT MAGAZINE

ISSUE TWO 2018

A Quick Ten with
Claire Veervart

Reflections – 30 years of
Australian Parliament House

Problem Solving on Site;
a construction manager's
perspective

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.

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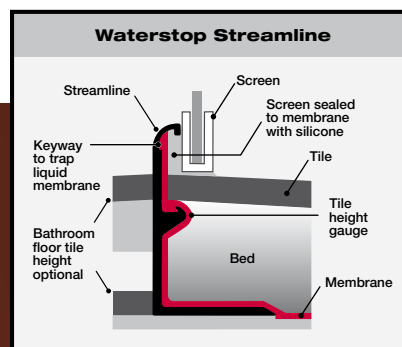
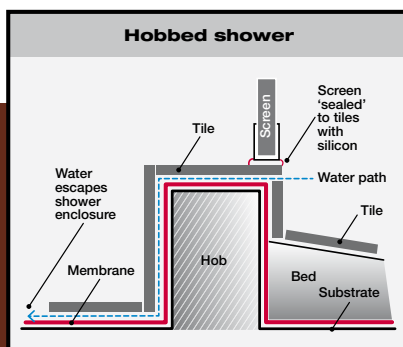
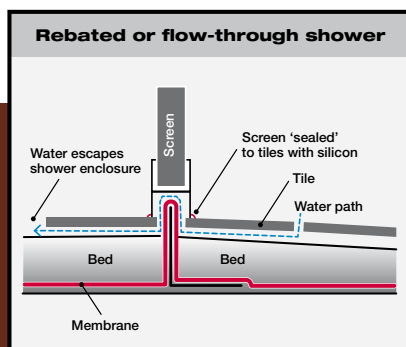
My business has expanded rapidly since we started using the Waterstop Streamline hob and I now have tilers recommending the Waterstop Streamline system - and me - to other builders. Everyone that uses it loves it.

Mr Fred Meddings, Managing Director
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Mr Glen Whitehead, Managing Director
BJM Developments

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An introduction to the Australian Institute of Building

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

The AIB is proudly supported by:





A message from the president

BY PAUL HEATHER, AM, FAIB
National President Australian Institute of Building

Welcome to the second issue of Construct for 2018 and as always, I will take this opportunity to acknowledge the National Council, Chapter Committee's and the many hundreds of member and non-member volunteers that continue to altruistically give of their time to the AIB.

At the time of the writing of this column, the much anticipated report authored by Professor Peter Shergold AC and Ms Bronwyn, titled "Building Confidence, Improving the Effectiveness of Compliance and Enforcement Systems for the Building and Construction Industry Across Australia" was released to the building and construction and the broader community.

Within the "terms of reference" of the Shergold / Weir report, a wide range of known issues and problems our profession has been working toward resolution for decades were examined that included, but not limited to:

- "Roles, Responsibilities, Accountabilities".
- "Education and Training"
- "Licensing and Accreditation"
- "Accuracy of Design and Documentation"
- "Quality Control and Quality Assurance"
- "Competencies of Practitioners"
- "Integrity of Private Certification"
- "Inspection Regimes"
- "Auditing and Enforcement Practices"
- "Product Importation and Chains of Custody".

As it is with most reports of this nature, the outputs typically rely upon other reports, industry inputs, personal views, comments, communications and opinions provided by a significant number of government, industry

and private consultations which included a communication by the AIB which follows. This ultimately culminated in some 24 recommendations to the relevant Minister's.

"Over recent years, The Australian Institute of Building (AIB) has published Policy Positions and made Submissions to Inquiries in to Building Regulations, National Licensing, Asbestos, Building Products – non-conforming and non-complying, flammable and non-flammable as well as other relevant building and construction related issues. The latest Institute submission was presented to the Senate Economics Committee Public Hearing into Building Products in Sydney, 19 July 2017. The Institute wishes to confirm that submission and those issued prior and/or presented earlier on other related topics. At this point in time the Institute is particularly concerned that the administration of building and construction processes in Australia due to the Federation model of Government is subject to nine (9) jurisdictions: six States, two Territories and one Federal administration - all administering different Building Acts and companion Regulations. At times these Acts and Regulations have stark differences, notwithstanding that we do have a common Building Code of Australia (BCA), Plumbing Code of Australia (PCA), which when combined, form the National Construction Code (NCC) which reference Standards Australia documents. Compliance and Enforcement regimes differ between jurisdictions and at present there are many inquiries into building matters spread throughout the jurisdictions all ultimately reporting to the Building Ministers Forum. Positive initiatives have already come from most of the States; however there is no overriding compulsion to universally adopt any one recommendation, cognisant of the Lacrosse, Docklands,

Melbourne or the disastrous and fatal Grenfell fire in London issues. Of importance to the Institute is the dissemination of relevant, easy to read and comprehensible information of the Deemed to Satisfy versus Performance Based solutions under the BCA/NCC. Testing regimes, interpretations and definitions (both local and overseas), Certifications, Compliance, Enforcement and the education of all licensed builders and/or registered building practitioners. Indeed the whole building process chain requires it: Architects, building designers, Engineers (all classes), Building Surveyors, Building Inspectors, Quantity Surveyors, testing authorities and laboratories, building product manufacturers, importers, distributors and resellers and possibly customs/border personnel.

The whole industry requires education from the University graduate and post graduate to the licensed builder or registered building practitioner who has come through the trade and completed a Certificate IV in building - each may have the same opportunity to make the same incorrect decision or poor choice which ultimately could lead to a catastrophic outcome. Of importance as well is the (re)education of those practitioners who obtained builders or practitioners tickets through a grandfather clause scheme and those who completed their initial course years ago and have not done any Continuing Professional Development (CPD) to bring them up to current legislation and regulation; CPD not being compulsory in sections of the industry. It is acknowledged that several years ago the Council of Australian Governments (COAG) set up the National Occupational Licensing Authority (NOLA) to investigate the "harmonising" of the differing jurisdictions in five industries, building and construction being one of them, however due to a number of factors,

this was not possible when COAG could not agree on a unified way forward. In building and construction the Federated model has done us little favour as the states teach to their own set of rules. Universities teach to a “universal norm” and not necessarily to a local jurisdiction as they all differ”

**Paul Heather - National President
Australian Institute of Building
15 December 2017”**

There will be much direct and tangential information to disseminate, digest, comment on and reply to for some time to come from the Shergold / Weir report, however, be assured that the AIB will continue to strongly represent the building profession through the credentialing of individuals in all matters pertaining to maintaining integrity and standards.

Accordingly and in line with raising industry standards, the AIB is working through the design and development phases of a new tranche of training services to the membership. Envisaged will be a program of relevant short “continued professional development” courses focusing on key areas of daily business operations for the construction professional, catering to companies and firms that are committed to delivering up to date and more importantly relevant training such as PAYG and GST, End of Financial, WHS Systems, Introduction to Quantity Surveying and Estimating, Contract Management, Stakeholder Management and Introduction to Construction for the Home Builder. If these topics are of interest simply drop the National Office an email via events@aib.org.au

Looking forward to the next several months, our 2018 Professional Excellence Award programme will be run within the States and Territories that will showcase the highest standards of building and construction management, research and development of building projects both in Australia and overseas.

As articulated on many occasions, these awards are unique as they are the only Australian awards that recognise the individuals’ professional excellence in the building and construction process, as opposed to the project or completed structure.

The 2018 award recipients will be announced at Chapter presentations held between May and July 2018 with all Chapter Professional Excellence Award winners being eligible for judging at the National awards in September this year being held in Canberra.

To all members of the project delivery teams involved with the works, thank you for showing us all how it is done and so well



CEO's Column

It only seems like yesterday that we were on Christmas holidays preparing to face a new year and here it is, now six months down the track.

- The AIB has in the main been extremely busy across many fronts as we continue to examine our Value Proposition and why you should be a member of the Institute. Some of the initiatives and thinking to date has included (but certainly not limited to):
- The appointment of our first female National Councillor (well certainly in a long time) – we welcome Claire Veervart from Tasmania.
- The appointment of an adviser on student and graduate matters to National Council with the joining of Adam Rennie from New South Wales.
- The confirmation of Constructing Our World – the international conference set for 18 – 20 September 2019 in Sydney.
- The staging of the inaugural Hong Kong Professional Excellence in Building Awards set for July 2018.
- Direct communication with our overseas members outside of Hong Kong and Macau (the first time in many years).
- The commitment to refine and develop new online course material for our Continuing Professional Development program.
- The ramping up of our Accreditation of Universities both in Australia and overseas.
- The commitment to better connect with members and external stakeholders through social media channels.
- Exploration of how we can deliver training to members/firms through effective face to face short course continuing professional development.
- The implementation of collaborative joint ventures.

Notwithstanding the initiatives mentioned here, the landscape for not for profit member based associations is constantly changing and for us to grow, we must always be on the lookout for new ways of delivering services to our members and further afield which in turn maximises our revenue for the organisation.

Finally in this column, I am looking forward to catching up with some familiar faces as well as new ones as we travel around the country for the 2018 Professional Excellence in Building Awards. These Awards are a must on the AIB calendar and remind me at every turn why we exist and how we must showcase cutting edge and world class work to the wider profession and indeed the wider community.

Take care everyone.

**Greg Hughes
AIB CEO**



A Quick Ten for Construct

with Claire Veervart

Each edition, Construct Magazine features a snapshot of a significant contributor to the building and construction sector.

This edition, we talk with Claire Vervart from Green Wave Projects in Tasmania:

1. What inspired you to begin a career in the construction industry?

Growing up as the eldest of 3 girls I was always involved in fixing and making things with my dad. My love for building and creating spaces began very early and I always held a passion for Architecture and Engineering. Building & Construction Management created an intersection of these two interests and I've been deeply immersed in the industry ever since.

2. What's the best thing about your job?

Being part of shaping and changing the built environment in which we live and contributing towards a more sustainable future for humanity in terms of well designed and built structures with healthy interiors and low operating costs.

3. What is the current project that you are working on?

I'm currently working on a refurbishment project for Physiotherapy Consulting Suites and I have two minor projects with Parks and Wildlife Services (PWS) for amenities upgrades. I am also developing concept designs for prototypes of modular

prefabricated small footprint dwellings.

4. How do you see your career progressing from this point?

I see myself at a stage where my career is about to extend into new areas and expand my skills and contribution towards construction in Tasmania. Perhaps a steep learning curve but all upwards from here.

5. Why did you join the Australian Institute of Building?

It was for the recognition of my university studies in Construction Management and application of those skills developed and applied in my career.

6. What is the most rewarding aspect of your AIB membership?

Networking with my peers in the industry and being in-touch with the changing environment of Construction.

7. Where do you see the building and construction industry in the next ten years?

I firmly believe that the building and construction is evolving to reduce waste, improve productivity and trend towards modularization and prefabrication.

8. What would you like to see change in this space?

I'd like to see more women entering this industry and being supported by their male peers.

9. Do we need to be more regulated across the sector?

If regulation fosters transparency and greater control in the sector then it should be encouraged.

10. What advice would you give a student of building and construction as they look to enter the profession?

Be an active participant in your education and engage with the industry as early as possible. Real life skills and experience contribute towards increased employment opportunities, but this is underpinned by the educational system.

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New South Wales transport minister Andrew Constance confirmed that the UK’s biggest private contractor, Laing O’Rourke, will build an underground station complex in Sydney to knit an ambitious new transit system to the city’s existing network.

The A\$955m (US\$746m; £538m) project will see Laing O’Rourke transform Australia’s busiest commuter hub, Central station, digging deep to make it the downtown gateway to the new multi-billion-dollar Sydney Metro City & Southwest network. Describing the scale of the change to Central station, and claiming it would untangle Sydney’s train network, minister Constance called the project “open-heart surgery on Central”, broadcaster ABC reported.

The contract win is good news for Laing O’Rourke, and will confirm its claim to be in turnaround mode after shrinking annual losses to just £60m in its latest results.

State opposition party, Labor, complained that the work will add chaos and disruption to an already stretched network, with more than 270,000 people using the station daily and the number projected to rise.

But the minister slammed Labor for failing to deliver the new Sydney Metro scheme during its 16 years in office, despite promising it five times.

The Sydney Metro project sees a 30-km-long railway connecting downtown to Bankstown in the south west, going under Sydney Harbour. It has been estimated to cost up to \$11bn.

The state government says that when complete in around 2024, the new line will help 100,000 extra daily commuters get across Sydney, and will bump up the number of train services from about 120 an hour now to up to 200 an hour.

Laing O’Rourke’s contract involves building the new Sydney Metro platforms approximately 27m below the existing platform level, and a pedestrian concourse, Central Walk – a 19-metre-wide tunnel from Chalmers Street, linking to new metro platforms under Central Station.

Working alongside global architecture firm Woods Bagot and its partner John McAslan + Partners, and with designers GHD and Aurecon, the British builder will also construct a new roof for the Northern Concourse that will “transform the space and emphasise the historic features of the

Central Electric Building”, Laing O’Rourke said today.

“We have a strong track record in complex transport precincts around the world – and with this experience we have assembled a team who will deliver a world-class result for the NSW Government, the people of Sydney and the businesses and customers who rely on Central every day,” said Laing O’Rourke managing director Cathal O’Rourke.

“Our recent experience delivering the \$100 million upgrade of Wynyard Station allowed us to develop construction techniques that will ensure minimal disruption throughout the life of the project. The station needs to be kept running, and its history and heritage protected, as we also upgrade it to the modern transport solution Metro offers.”

The state’s indicative schedule sees Laing O’Rourke completing station fit-out in mid-2022.



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Mirvac wins trifecta of International Property Awards for 200 George Street

Mirvac has achieved the rare accolade of winning three categories at this year's International Property Awards (IPA) for its landmark office building EY Centre, 200 George Street. The distinctively designed tower in Sydney's CBD won IPA awards in the High Rise Development and High Rise Architecture categories, as well as the Office Interior category for Mirvac's headquarters located within the building.

Mirvac's Head of Office & Industrial, Campbell Hanan, said, "The International Property Awards are open to developers from across the globe. For EY Centre, 200 George Street to win against all the other commercial buildings entered from the Asia Pacific Region, in not just one, but three categories, is a clear endorsement of the exceptional calibre of the building.

"It's a fantastic achievement for Mirvac, together with our architects Francis-Jones Morehen Thorp, and our workplace advisory firm, Davenport Campbell, who significantly contributed to the creation of this world-class building and our state of the art headquarters."

Mirvac undertook a unique co-creation approach to the development of the EY Centre, leading to the buildings. At the heart of the building's success and development was co-creation with all stakeholders including anchor tenant EY. Mirvac's unique co-creation approach to the development of the EY Centre saw early collaboration at all levels of the project

between the architectural, development and construction teams, as well as external partners and all stakeholders. This approach ensured exceptional delivery of the building and allowed the Australian-first design concept to come to life.

Underlining Mirvac's commitment to delivering one of Australia's most environmentally advanced and sustainable buildings, EY Centre, 200 George Street recently achieved its targeted 5.5 Star NABERS Energy rating.

EY Centre, 200 George is Australia's first fully LED lit building, resulting in reduced power consumption costs, lower maintenance cycles and a reduction of landfill. It also features the world's first closed-cavity façade and timber blind system, which enables tenants to control the light and heat radiating from outside. The high performing façade reduces the need for a large energy plant and engineers significant cost and energy savings.

These features also contributed to Mirvac's headquarters achieving Australia's first Gold WELL rating from the International WELL Building Institute in 2017.

"EY Centre, 200 George Street is the perfect example of how Mirvac, together with its partners, has harnessed innovative design and emerging technology to create a building that actively promotes sustainability, as well as the health and wellbeing of its occupants. We are proud and delighted to have delivered a building

that both enriches its communities and raises the bar for future workplaces in Australia," added Mr Hanan.

To date 200 George Street has won or been highly commended at the following awards:

- AIB Professional Excellence in Building Awards (Adam Sutherland)
- Architecture and Design Sustainability Awards (Commercial Development)
- Australian Institute of Architects National Architecture Awards (The Harry Seidler Award)
- UDIA (Commercial Development)
- Urban Taskforce Awards (Commercial Office City Development Best Office Tower of the Year)
- Council of Tall Buildings and Urban Habitat Awards – Finalist Construction category
- Green Globe Awards
- Australian Construction Achievement Award
- Sydney Design Awards (Architecture, Commercial, Constructed – Silver Winner)
- Facility Management Awards (Sustainability and Environmental Impact; Occupant Safety and Wellbeing; People and Productivity)



Simple checks to protect your company

The Australian Taxation Office (ATO) is working with the property and construction industry to help you get your tax obligations right, the first time.

To protect your business from unscrupulous operators, we recommend you do your research before starting work with a new client, worker or supplier.

Simple checks that you can do

- Confirm the registered business name, ABN and ACN (if they are a registered company), via the Australian Business Register at abr.business.gov.au
- Do their quotes include GST? If so, check that the business is registered for GST (this can also be done through the Australian Business Register).
- Search ASIC's banned and disqualified register to see if the business or director has previously been involved, or is currently involved, in a liquidated entity.
- Check their licences, qualifications and registrations. You can verify licence details by checking with the relevant state or territory bodies.
- Ask for references. Call referees and ask questions such as:
 - would they recommend the contractor?
 - what kind of work did the contractor complete for them?
 - did the contractor finish on time and within budget?
 - were there any problems?
 - did the contractor listen to concerns and willingly make any necessary changes?
 - were they satisfied with the contractor's work and how it was done?



— were there any issues with communication or any other problems?

- Search the contact numbers and addresses provided by the contractor on available directories
- Make sure you get a physical or street address – not just a postal address
- Do a web search – this can alert you to issues that might make you think twice about entering into a business relationship. Visit their website and social media to check for reviews.
- Ensure you learn the warning signs of an illegal phoenix company to protect your business.

These include:

- Companies that significantly underquote
- Directors that have been involved in liquidated entities
- The company name may change, but the staff remain the same
- They pay invoices late
- They request payments to a new company

If you can't find anything on their business, or there are any 'red flags', we recommend you invest in paid checks as an extra precautionary step.

Advice for the property and construction industry

The ATO is committed to making things easier for those working in the property and construction industry.

To help you get your tax and super obligations right we have developed a new destination webpage to provide specific guidance for the property and construction industry.

The webpage provides advice on:

- Checking an ABN
- Checking for GST Registration
- Support for contractors
- The difference between an employee or contractor
- Taxable payments annual report
- Illegal phoenix activity
- Help with paying debt

You can view the webpage at:

ato.gov.au/propertyandconstruction



Australian Government
Australian Taxation Office

Accreditation – A Snapshot

By RON WEBBER

As the Chair and on behalf of your AIB Courses Assessment Committee, I would like to provide a brief update on committee activities. We expect to see several additional Australian and overseas universities become AIB accredited university courses in the not too distant future. This has some important implications for the AIB in terms of university and Vice Chancellor recognition of the Australian professional Institutes (AIB) and the AIB branding with Australian Universities.

Given the changing built environment in Australian and overseas e.g., robotics, BIM, componentry building, insurances, computerisation and changes to laws affecting construction management, there will be marked changes to the built environment. Consequently, our association with our accredited universities will, no doubt assist in keep AIB members abreast of many of these changes before they occur.

These changes to the built environment will not only affect the AIB but our kindred Institutes. Therefore, the AIB will need to maintain and enhance its associations with Australian universities and our kindred professional Institutes, such as the Australian Institute of Quantity Surveyors and the Australian Institute of Building Surveyors. This will strengthen our position from falling behind with various changes, here and overseas, and against overseas interests trying to covet our membership territory.

While the AIB is the predominant Institute in our built environment that accredits Construction Managers, we should not forget to recognise broader employment outcomes of our graduates, like construction procurement, contract management, estimating and costing, a director in building insurance area, fire engineering to name but a few. The AIB has a broad church of membership and as such, we need to include all our employment areas to ensure the inclusiveness of our membership as seen by members.

To further strengthen the AIB position we need to increase our membership and this

will mainly come from increases in both younger and female members. Given that two thirds of the Australian population are made up of young men and women, it becomes very clear where our membership growth strategies are to be applied.

This potential for an increase in membership needs to be reflected through our National Council members to ensure younger members and women can assist in developing these same strategies that will increase membership growth in these two important areas. If the collective body of our Institute want our National Council to provide diverse, increased benefits and services then we all need to encourage new members to join.



Dr. Ronald J. Webber has served the AIB as Chapter President, National Councilor, Chair of the Universities Courses Assessment Committee and previously as Senior National Vice President. Ron has qualifications and experience in Building, Building Surveying, Building Design, & Project Management and is an Associate Professor at the University of Canberra.

REFLECTIONS - 30 YEARS OF AUSTRALIAN PARLIAMENT HOUSE

Thirty years ago Queen Elizabeth II officially opened the new Australian Parliament House. Since then, the building has been praised worldwide for its design and visual aesthetics. What is sometimes overlooked however is the incredible contribution of the construction industry to the development of this iconic building – an effort led by Construction Director of the project and Adjunct Professor in the School of Computing, Engineering and Mathematics David Chandler OAM FAIB.

Mr Chandler – who took part in a panel discussion about the construction at the official 30th birthday celebrations in Canberra on 5 May – says the completion of Australia's New Parliament House (NPH) in 1988 involved a magnificent team effort from over 10,000 professionals and a "workforce united for one purpose."

Reflections about making the New Parliament

"The completion of Australia's New Parliament House in 1988 involved a magnificent team effort from the over 10,000 professionals and a workforce united for one purpose. That purpose



Reflections – 30 years of Australian Parliament House

required the collaborative combination of unique management, design, craft, fabrication, construction and commissioning skills to deliver one of the highest quality projects ever undertaken in Australia. These skills have flowed into almost every facet of the industry, having a major influence on many important public and private buildings since”

“Constructing the New Parliament House saw in the early adoption of computing and communications technologies while it saw off-the last of the hand-drawing of major projects such as NPH by Computer Aided Design and Building Information Modelling (BIM). Since 1988, displacement of the shortcomings of two-dimensional design in the Australian Construction industry has seen enormous changes. However, I believe that while these new capabilities are technically more able, it would be impossible to re-create the amazing drawing and communication skills of the NPH design team”

“The NPH project had many tough days to negotiate. Industrial disputation, constant design changes, administering over 3000 contracts, co-ordinating



complex off-site and on-site inputs, a negative media and politicians always on the look-out for stories about delay or cost over-runs seemed at times insurmountable. But, this was soon turned around as the Australian public and the on-site team saw the progressive realisation of a new national icon for which all became duly proud. Memories of the tough days were displaced by the times ahead. There were none prouder than the 1500 constructors and their families who gathered on the building's grassy slopes to observe the Queen formally open the NPH for Australia's bi-centenary in 1988”

“1988 was a year of national celebrations and some hastily finished buildings that were offered up for official opening which seemed compromised. But none were brought to the completion standard that was captured by leading photographer John Gollings and the lucky F18 pilots who did the ceremonial fly over of the project on its opening day. And, there were many memorable moments such as

the giant flag atop the building's famous flag-pole being unfolded for the first time (above) and of course, Jim Hacker (Yes Minister) pulling the first beer in the then Non-Members bar”

“The project team developed a level of camaraderie and pride in their involvement with the NPH project. These are friendships and memories that will endure forever. But, perhaps this was best reflected in the over 10,000 NPH team members who applied for and received their signed certificates by Hon Bob Hawke PM, Gordon Peatey AM, CEO NPH Construction Authority and me as Construction Director, CHJV acknowledging their special contributions. I still see proudly framed certificates testifying ‘I proudly helped build Australia's NPH’ and of course we are always reminded of this on our \$5 note.”

“The project was blessed with so many dedicated team members. Hal Guida who never had a problem going on site to draw his design in 3D on a concrete floor



for tradespeople, Roger Baird from John Holland ensured the site infrastructure and safety was always up to scratch and the fun times when he designed the CHJV golf day card depicting the Federal Golf course carefully laid out over the NPH site. The project was able to boast that not a single worker was killed during its construction. Concrete's Tony Taylder (Mr Smith) was the lead services engineer and much-loved bachelor who always seem to achieve 'I love Mr Smith' lips drawn on the mirrors of the lady's restrooms during team functions. And there were characters like Tony Bailey who had the first piece of turf for the grassed roof delivered to me in my office between two huge slices of bun and labelled 'good enough to eat' "

"There were non-more memorable occasions than those when the project's humble and most wonderful architect Aldo Giurgola was asked to speak to the politicians, the public, to on-site constructors and off-site manufacturers. It was Aldo's gentle but convincing articulation of his vision of our nation's new capital building that inspired the efforts and love that went into making it. And this was only matched by the oratory of Sir John Holland who was able to reflect back to Aldo the team's pride in our being part of this. Master Designer and Maker at work"

'For me a proud and memorable moment was my wife and I being invited to represent the project team for lunch with the Queen at the Lodge after the official opening along with the PHCA's CEO Gordon Peatey and PM Bob Hawke and their wives – wow!"

Reflections about the project if it were being built today

"30-years ago, the traditional demarcations between the professions and crafts held sway. Over the last 20-years these edges have blurred as the industry gives way to the modern forces of the digital economy, industrialisation and globalisation. There is regularly publicised reporting of declining industry skills and capabilities. 30-years ago 80-percent of the NPH was made on-site. In my view, if it were made today that percentage would have fallen to 60-percent and by 2030, the percentage will be closer to 40-percent. It would be hard if not impossible to assemble the same on-site construction skills needed to make NPH in the 1980s if the building was made in 2018. Governments, industry and educators still do not see

the implications of all of this as they attempt to backfill skill shortages to continue with business as usual. The reality is that the nature of on-site and off-site work will be radically different for all projects and jobs into the future."

"30-years ago the Australian construction industry justified business as usual by not seeing the implications of the massive reduction in the global cost of construction transportation. It is possible to ship a container from any point in the world to another for roughly \$2000/container. It is estimated that the cost of transport making up the retail cost of goods is now about 1-percent of the price. Negligible. Since 1988, the cost of construction in Australia has outstripped the cost increases in any other industry by about 2 times; there has been falling productivity and quality (compliance). The industry's response has been to increase the off-shore component of off-site. If 40-percent of all construction inputs today are off site and these rise to 60-percent within 10-years we could be seeing 30-percent of today's construction workforce inputs going off-shore. That's about 300,000 jobs. So when governments try to stimulate the economy through massive capital works projects in future, they are increasingly stimulating other economies."

"Making the NPH required an uncompromising application of building design specifications, Australian Construction standards (Law) and the conditions of the contracts (Law) under which work was commissioned. If work was not done properly it was done again. This set the tone and most complied, all in the end. The building has not been plagued with quality or defects issues since it was made 30-years ago. Over that time governments have progressively dumbed down their public works procurement capabilities and ability to regulate. The industry's standards have been on a slippery slope since. The recent Banking Royal Commission could suggest a similar impotence of construction industry regulators. The public interest slippage of the people who elect politicians seems to have a parallel."

"The Australian construction industry (US\$300bn t/o pa) represents about 3-percent of global construction turnover (US\$15 trillion by 2025). Our politicians and industry leaders seem more minded to put up the barriers to defend business as usual in the face of a 'wave-force'

of change that they cannot stop. We have no national construction industry strategy that imagines how we may establish a global construction position that boxes above our weight as is the case for the UK, Germany, Singapore, New Zealand, Sweden and China. The global construction industry is very different in 2018 to what it was in 1988. If we were building the Parliament today we would have an endless parade of overseas industry advocates all making a case for their pieces and parts to be accepted to make up the project"

Gratitude

"To this day, I still reflect on how we took a project from its progress at the end of 1984 to completion by 1988. As a young 34-year old constructor, this leadership challenge seemed daunting at the time. But I had been benefited with an amazing construction learning career prior, starting on the tools, becoming formally qualified and being mentored by some of the industry' greats. My hope these days is that we can inspire and enable our next generation of construction professionals to successfully embrace the amazing opportunities of a modern construction future. This will require new national leadership and investment that has yet to become obvious"

"My main efforts these days are with the Centre for Smart Modern Construction - c4SMC at Western Sydney University. c4SMC involves an industry and academic collaboration that is aimed at preparing tomorrow's construction professionals to be 'future-ready'. The first mover supporters of this initiative are already seeing the enormous potential of their collaborative investments in the Centre being realised. If you want to know more about the c4SMC and to become involved a link to the Centre's web site is below. I encourage the industry to become involved - this is a time to put back into our industry."

David Chandler was the Construction Director of the Concrete Holland Joint Venture who led the construction of Australia's New Parliament House. He has over 40 years' executive experience in the major projects, property development industry and related corporate management. He is a passionate advocate for the need to transform the Australian construction industry and grasping the emerging opportunities in a digital, industrialising and global construction market.

Would you know if a phoenix company was stealing from you?

An illegal phoenix company is one that deliberately racks up debts then goes into liquidation to avoid paying them. The operators then set up shop under a different name – completely debt free.

This dodgy behaviour is hitting the building and construction industry hard. Honest contractors and workers are left in the dust without their entitlements, super and bills being paid.

What are the warning signs?

Get suspicious when:

- You don't receive a payslip
- The company name and ABN changes, but the phone number stays the same
- Your super hasn't been paid
- Your pay is late, or underpaid
- Equipment isn't replaced.

How does this affect me and my family?

- Illegal phoenix companies avoid paying workers and suppliers
- They often pay invoices late, rack up debts and don't pay tax, ripping off everyone from tradies to the wider Australian community
- They undercut honest competition and drive the legitimate ones out of business.

What is the ATO doing about it?

- We're heading the Phoenix Taskforce with 27 other government agencies to track phoenix operators
- Working with government to change laws and close loopholes
- Conducting around 600 audits and reviews a year
- Launching criminal investigations into the most serious offenders.

Right, how can I help?

- If you raise the alarm early, phoenix companies can be caught before they fold and rob you of your pay entitlements and super
- Use the *ABN Lookup* at abr.gov.au to check if an ABN has been cancelled
- Search the registers at asic.gov.au to check if a company is registered
- Call your super fund and check your super has been paid
- If you have concerns, use the *Tax Evasion Reporting Form* on ato.gov.au or reportevasion to report possible phoenix activity.

To find out more about Phoenixing visit ato.gov.au/phoenix



Australian Government
Australian Taxation Office

Blockchain technology could dramatically improve the transparency and security of collaboration in BIM, including the tracking of onsite deliveries, a report from Arup has revealed.

The 72-page study on the distributed ledger technology behind the cryptocurrency Bitcoin, authored by computer scientists Christopher Kinnaird and Matthias Geipel and based on a two-day industry workshop at Arup's offices in Berlin, concludes that Blockchain will have a "major impact" on the built environment, similar to that of the World Wide Web.

The fact that Blockchain is a "trust less" proof mechanism, under which all transactions on a network are immutable and transparent, could have major benefits for BIM, which itself aims to encourage trust, collaboration, and accountability in the supply chain.

According to the report's authors, Blockchains could permanently record changes to BIM models when they are shared with external collaborators or clients, effectively time-stamping data so it cannot be changed or tampered with.

This could become particularly relevant with the roll out of Level 3 BIM, which proposes that all parties work together on a single, shared model, to create deeper levels of collaboration.

The report says: "Increasing trust amongst project collaborators would go a long way towards reducing corruption and inefficiencies caused by contractual disputes." Blockchain has the ability to indelibly link digital components in 3D models to their physical counterparts on site. Real-life components fitted with internet-connected microchips could be securely tracked on the Blockchain, from the manufacturer's warehouse to their final location in a scheme.

This approach could ensure installed components precisely match the

number of objects in the BIM model, in the process reducing waste and carbon emissions associated with the overproduction of parts and materials, says the report.

Using a Blockchain for product tracking would make the data transparently available to all parties in the supply chain, unlike existing methods using RFID tags, where data is often controlled by a single company.

BIM projects currently share models via a Common Data Environment (CDE), a central cloud-based repository where all construction project information is uploaded and stored and accessible by authorised project parties.

The fact that CDEs are centralised raises security issues and vulnerability to hacking, especially problematic on sensitive projects related to areas such as the military, prisons, or government buildings.

A Blockchain/cloud storage hybrid could provide a decentralised form of CDE more resistant to abuse. The report provides the example of US-based company Storj34, which offers a state-of-the-art platform for decentralised, end-to-end encrypted cloud storage. The system shreds data into small pieces called "shards" and stores them in a global, decentralised network of computers.

The report states: "The technology makes the platform faster, cheaper, more secure, and more readily available than centralised counterparts." The authors envision a future scenario in which as-built BIM models are able to display real-time data transmitted by IoT devices in a building, giving a powerful overall picture of operation to help drive improvements to efficiency.

They claim Blockchain could provide the platform to securely connect thousands of IoT devices from different manufacturers into a single eco-system. "The Internet of Things needs a Ledger of Things in the form of a Blockchain, to provide the level of security required. Bitcoin has proved its worth, securing actual money, and has never been hacked, making the technology the obvious choice to secure IoT devices and networks," the report says.

Blockchain was relatively unheard of until the recent rise of Bitcoin, which is based on the software platform. It is method of recording transactions, whether assets, agreements or contracts, across a peer-to-peer network of computers. Data is stored as "blocks", bound cryptographically together into a "chain". This digital ledger cannot be altered, only added to, and anyone on the network can access the latest version at any time.

The implications of the technology for construction are far-reaching, potentially enabling trustless smart contracts that automatically pay out when certain criteria are met, or even creating a market for construction information.

Neil Thompson, CEO of industry think tank dotBuiltEnvironment, and former head of digital research and innovation at Balfour Beatty, told BIM+: "The coverage of construction's poor productivity is extensive. Technology such as distributed ledgers will open up information bottlenecks that plague our business models and provide an opportunity to build a market for construction data and information flows."

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Improved Contracting; Changes resulting from the amendments to the Construction Contracts Act 2004 (WA)

By PROFESSOR PHIL EVANS FAIB SCHOOL OF LAW
UNIVERSITY OF NOTRE DAME (AUSTRALIA)

Introduction

In June 2015 the Western Australian government commissioned the author to conduct an independent statutory review into the operation and effectiveness of the Construction Contracts Act 2004 (WA). On 22 November 2016 following consideration of the review report, the West Australian parliament passed a number of amendments to the Act and the amended Act commenced operation on 15 December 2016. This article discusses the effects of both the amended Act and the introduction of a number of new policies designed to enhance security of payment procedures in Western Australia,

The Construction Contracts Act 2004 (the CCA) commenced operation on 1 January 2005. The main purpose of the CCA is to provide a speedy resolution (adjudication) process for resolving payment disputes under construction contracts. The CCA provides that payment disputes are determined on an interim basis pending any formal dispute resolution provided in the parties' contract for example arbitration, or court process. The CCA also;

- prohibits paid-if-paid or paid-when-paid provisions in construction contracts;
- implies fair and reasonable payment terms into construction contracts where those terms are not expressed in writing;
- provides a right to deal with unfixed materials when a party to a construction contract becomes insolvent.

Prior to the introduction of the CCA where there was a dispute relating to payment for work done or materials supplied, the beneficiary of that work had a significant advantage in that they were able to retain any monies owing until a determination by either court or arbitrator. The difficulties, expense, time and delays inherent in receiving a judgement clearly deterred many from pursuing this course of action and those who did may have had to wait months if not years for payment. Sadly, history indicates that by the time

of payment many bona fide claimants had become insolvent. Additionally the common law did not provide a party with a right to suspend work when a payment due under the contract was not paid.

The 2016 Amendments to the CCA

On the 22 November 2016, following an independent statutory review of the CCA Parliament passed a number of amendments to the CCA. Most of the amendments commenced operation on 15 December 2016. These amendments included:

- extending the time for making an application for adjudication from 28 to 90 business days;
- amending the definition of a payment claim in the Act to include previously disputed or rejected payment claims (recycling of claims);
- removing the exclusion of 'wholly artistic works' from the definition of construction work in the Act;
- clarifying when a payment dispute arises for the purposes of the Act;
- amending the time measures in the Act for counting days for applications, responses and the adjudication determinations from calendar days to business days;
- narrowing the "mining exclusion" under the Act to exclude only fabricating and assembly of plant used for works for extracting or processing oil, natural gas and minerals from the definition of construction work;
- allowing adjudicators to deal with other adjudication applications simultaneously, if satisfied they can do so without time, cost or efficiency costs to any parties;
- permitting the adjudicator to decide substantial compliance with the section 26(2)(a) of the Act when deciding the validity of an application;
- providing a formal mechanism for applications for adjudication to be

withdrawn, and or for adjudicators to issue a determination giving effect to a settlement reached between the parties; and

- providing a faster means for determinations to be enforced through the courts, by removing the need for leave of the court to be granted.

The Review Report may be found at; https://www.commerce.wa.gov.au/sites/default/files/atoms/files/cca_review_report.pdf;

On 3 April 2017, the remaining amendments to the CCA commenced operation.

In particular, where a construction contract provides that payment shall be made more than 42 calendar days after it is claimed, it will be read as requiring payment within 42 calendar days. The amendment to the Act applies to all construction contracts executed after 3 April 2017.

New Government initiatives

An important issue with respect to the Review was whether the CCA should be amended to assist in preventing the alleged unfair conduct from occurring and whether issues of complexity should be introduced into an Act that has been considered by stakeholders as being successful in providing a rapid determination of payment disputes.

One possibility would be to expand the prohibitions currently listed in pt 2 div 1 of the CCA. However the scope and coverage of the CCA is now well settled and any changes by way of introducing provisions in the CCA dealing with unconscionable conduct or unfair terms could potentially add legal complexity and hinder the principal objectives of the CCA. One recommendation was that the state government should consider the introduction of contract review legislation similar to the Contracts Review Act 1980 (NSW).

Additionally it was considered that the amendments to the Australian Consumer Law (ACL) that apply the unfair contract

terms provisions to small businesses would also have a significant effect in reducing many examples of the conduct complained of during the Review.

Building and Construction Industry Code of Conduct

In consideration of the recommendations contained in the report together with its awareness of a number of current unacceptable practices in the construction industry, the state government, in addition to adopting most of the recommendations regarding amendments to the CCA, has introduced a number of other measures to improve both security of payment and contracting practices in the Western Australian construction industry. These include proposed legislation to make it an offence to intimidate, coerce or threaten a person or business; to improve the use of the Building Services (Registration) Act 2011 as a means of investigating and disciplining registered building contractors who have engaged in unfair behaviour or systematic non-payment of subcontractors; and to introduce a code of conduct for tenderers on state government funded construction projects in order to eliminate unacceptable behaviour on building sites and anti-competitive behaviour.

Subsequently on 5 December 2016, the Western Australian Building and Construction Industry Code of Conduct 2016 (BCI Code) was introduced. The code applies from 1 January 2017 to new tendering processes for state projects with a value in excess of \$10 million. It is anticipated that in the future the code will apply to additional contracts. The Code has been developed to ensure that when expending public funds, Western Australian government agencies contract with building contractors who conduct themselves in a reputable, fair, safe and responsible manner, both in dealings with the State of Western Australia and within the building and construction industry more broadly.

The BCI Code is comprehensive and includes measures to protect smaller contractors in both the building and the wider construction industry. These measures include prohibitions on anti-competitive behaviour such as price fixing, sham contracting, harsh or unfair contract terms, and to ensure compliance with the provisions of the CCA. In addition to the BCI Code, the Department of Commerce has published implementation guidelines on its website to provide further guidance and information on the obligations contained in the BCI Code.

In conjunction with the introduction of the BCI Code, a Building and Construction

Code Monitoring Unit (BCCMU) has been established within the Department of Commerce. The BCCMU will undertake not only monitoring and compliance activities including investigating alleged breaches but it will also promote awareness of the BCI Code through a range of information and educational activities.

As with most codes of practice there are no coercive powers within the provisions of the BCI Code but where the BCCMU believes that a contractor has breached the code, after investigation the contractor will be 'invited' to rectify the breach or the BCCMU may report the breach to the appropriate government agency or body.

Project Bank Accounts

In addition to the amendments to the CCA and the introduction of the BCI Code, the state government has also introduced Project Bank Accounts (PBAs), following a three year trial on seven government contracts. These PBAs will be used on the majority of projects administered by the Department of Building Management and Works for tendered projects with a construction value over \$1.5 million and which utilise an AS2124 contract. PBAs are an alternative payment mechanism that use a dedicated trust account to facilitate payments directly and simultaneously from a principal through to the head contractor and participating subcontractors involved in a project.

However, PBAs do not seek to alter the existing contractual rights and responsibilities of the parties to a traditional construction contract. They will not prevent a head contractor from experiencing financial difficulty or managing the performance of subcontractors by withholding payments when contractual obligations are not met. Additionally, they do not constrain any party from seeking adjudication under the CCA or from commencing legal proceedings in the event of a dispute. The issue of PBA's and smaller contracts are currently being considered by the state government.

Future Amendments to the CCA

Two recommendations in the Review Report were not accepted by the state government. The first was that construction contracts for the purpose of the CCA should be in writing as a consequence of numerous problems existing in the industry as a consequence of oral agreements particularly at the lower end of the contracting change. There should be a pecuniary penalty for noncompliance and the contract should be voidable at the option of the aggrieved party. No recommendation was made regarding any monetary limits with respect to the writing

requirement as it was considered that these are to be determined by parliament.

Secondly it was recommended that where the state government is a principal in a contract or is the contract administrator, the Australian Standard forms of general conditions of contract be used on the project.

However on 23 February this year the Commerce and Industrial Relations Minister Mr Bill Johnston announced that an Industry Advisory Group would be established to consider issues relating to security of payment generally and the issues to be considered will include, in part;

- Simplifying and standardising construction contracts by mandating minimum documentation requirements;
- Prohibiting unfair terms and implying certain reasonable terms into construction contracts; and
- Mandating the use of standard form construction contracts.

Conclusion

Through the speedy adoption of the review report recommendations generally and the subsequent amendments to the CCA, the introduction of awareness programs and the introduction of the BCI Code, the state government has indicated its commitment to the provision of protection and assistance for small businesses in the construction sector. At the same time these changes and policies are limited to those areas where the government can and should influence behaviour. In acknowledging this, state governments can do only so much in this area, as corporation's law, insolvency and bankruptcy are matters regulated by the federal government.

The Review and the subsequent amendments to the CCA have been described as the sectors 'biggest shakeup' in a decade (Amendments to the Construction Contracts Act Unveiled'. Clyde and Co., 27 October 2016. Available from: <http://www.clydeco.com/insight/article/amendments-to-the-western-australian-construction-contracts-act-unveiled>)

Additionally the introduction of the BCI Code will hopefully ensure that when expending public funds, all Western Australian government agencies will contract with building contractors that conduct themselves in a reputable, fair, safe and responsible manner, both in dealings with the State of Western Australia and within the broader building and construction industry.

Where do young constructors go to hear about amazing careers in construction?

The Centre for Smart Modern Construction – c4SMC recently interviewed HY’s Nick Luzar.

There is a growing band of construction and construction related organisations who are investing in the Centre for Smart Modern Construction - c4SMC at Western Sydney University. These organisations understand that the modern construction era presents new challenges as the industry transforms into its future-self, they also see the amazing potential for the best of tomorrow’s construction professionals to make a difference.

The Centre will be asking these organisations to share their insights about themselves and how they see the future for tomorrow’s graduates. In the following interview, State Manager Nick Luzar shares his insights about how Hansen Yuncken is responding to today’s client needs and how the company sees the future for Western Sydney construction graduates.

The Centre asked Nick to answer four questions that are relevant to construction undergraduates at Western Sydney University

and for Australian Institute of Building members who are thinking about their future careers in a modern construction industry.

1. How has Hansen Yuncken demonstrated the use of modern construction methods?
2. What is one of the biggest challenges faced by the industry?
3. Why is Hansen Yuncken investing in the c4SMC?
4. What does Hansen Yuncken look for in cadets and graduates?

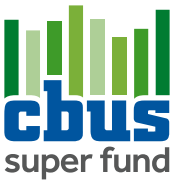
The ability to share or promote construction career opportunities has changed dramatically over the last 20 years. Social media has played a large part in the communication shift, but it is hard to do better than meet the leaders in modern construction face to face. I recall my own induction to the industry back in 1969. Then, industry stalwarts like LW Giles and Alan Kell founder of Kell and Rigby Builders dedicated their time to provide one-on-one mentoring and career advisory for prospective construction professionals. This is where my career started.

The 1918 partnership between Otto Yuncken and Lauritz Hansen has proved a durable one. The ability to evolve and adapt, to anticipate changing conditions and demands, to nurture innovation and plan for the long term while continually solving problems are key to Hansen Yuncken’s enduring success. A reputation that continues to the present, just as Nick Luzar describes in this interview.

In 1989, the company commenced operations in New South Wales, initially in joint venture (coincidentally with LW Giles) but now operating in its own right. In 2006 a decision was also made to open an office in Newcastle to better service our clients in this area and the Hunter Valley region. Since, Hansen Yuncken has been the starting place for many successful construction and property industry careers. They have an eye to the future.

Nick Luzar comes from a family steeped in construction and property development.

So, do many of the students studying Construction Management at Western Sydney University whose families live and construct in the Western Sydney community. The Centre is deeply indebted to the support that Hansen Yuncken provides to invest in the university’s capabilities to help prepare the next generation of constructors to be future ready.



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Problem solving on site; a construction manager's perspective

By Peter Davis, Thayaparan Gajendran, Josephine Vaughan,
Mohammad Tanvi Newaz of School of Architecture and Built Environment,
The University of Newcastle

Introduction

Problem solving is contingent on many factors. Complexity plays a part in construction problems as does the unique nature of construction projects and their delivery. In construction problem solving, the majority of contemporary construction contracts ensure that problems are dealt with at the earliest opportunity. However, the process of problem solving on the construction site not formalized. Hence, this research aims to identify the on-site problem-solving process in construction. This research approach is exploratory and qualitative in nature and uses primary data from the Australian Institute of Building in Australia's (AIB) annual Professional Excellence Awards (PEA). This paper offers a comprehensive discussion on how construction professionals reflect on problems, solve problems and provide innovation through problem solving processes

Background

Problem solving in construction projects is contingent on many factors. The procurement delivery method has an effect, for example problem solving can be proactive when participants anticipate events in more relational-type procurement approach that produces high levels of collaboration. Conversely problem solving can be reactive to events, most particularly in traditional types of procurement or where unforeseen circumstances unfold and levels of collaboration are limited (1). Complexity of construction projects affects problem solving. Many construction industry related problems are identified and dealt with using knowledge preserved from past projects, whether from recent experience or the distant past. Using a 'Johari window' approach, problems may be identified as known knowns, where predictable events with adequate data are identified (2). A lack of these known knowns, or clear identification of the problem, results in messy, or 'wicked problems' which with no identifiable clear

solution at hand, present significant risks to the construction team and its associated stakeholders. This dilemma leads to the research question; What is the on-site process of construction problem solving?

Problem-solving process

The difference between successful and less successful problem solving can often be attributed to how individuals think about and think through a problem-solving process (3). Strobel and Pan (4) posit that in recognition of the importance of the approach to problem solving that many institutions (including the University of Newcastle, NSW) utilize education strategies such as problem-based learning (PBL) and incorporate resilience training coupled with academic engagement into their management processes (5, 6). A problem-solving process is identified in Figure 1.

Identify/define the problem

Educators have historically assumed that a general (and generic) problem-solving model is sufficient and that problem-solving skills acquired through working on simple and well-defined problems would easily transfer into more complex and ill-defined problem-solving tasks (12). In their examination of workplace engineering

problems, Jonassen et al(13) identify several distinct features, for example, that workplace problems can be solved in many ways, that they are ill-structured and complex, and that success is rarely measured solely by engineering standards.

Unlike an engineering situation, construction problems are notoriously difficult to define due to many unknowns and no easily recognized finite set of variables (14). Construction problems largely remain ill-structured with multiple variables identified as a consequence of social, economic and environmental backgrounds. Construction problems can be generally found within three highly variable domains; those of people, organization and process. Complexity plays a part as does the unique nature of construction projects and their delivery, together with the adversarial nature of the stakeholders. Typical areas where problems may manifest in construction include; error (a lapse in work flow or mistake) (15); a lack of correct information (16); poor, inappropriate documentation (17); scope changes (18); time changes (19); or Work Health Safety (20). This leads to the next phase of problem-solving, which in our model is the ability to select the optimal solution.

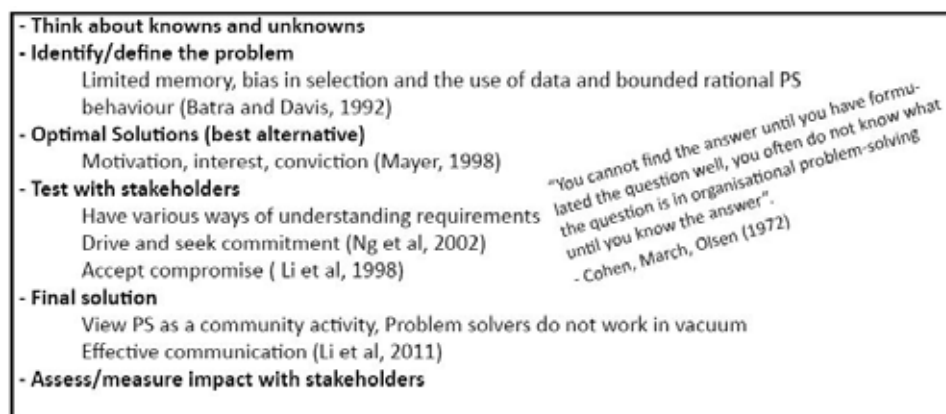


Figure 1 The Process of Problem-solving (7-11)

Choose the optimal solution

Present studies in expertise generally show that experts perform better than novice in selecting optimal solutions and several common features of expertise can be identified across different areas. It has been found that experts have; the ability to recognize similarities among situations (7, 21), the ability to form abstract conceptualizations and decompose problems explicitly (22), and skill at perceiving large meaningful patterns, encoding new information quickly, adapting decision strategies to changing task conditions, and generating a holistic understanding of a problem (23, 24).

Test with stakeholders

Multiple variables make a clear-cut solution difficult in construction problem solving, and in this situation, bargaining amongst multiple stakeholders and persuasion or reasoning comes to the fore. Smith (12) refers to coalition building, a notion that is supported in the general thrust of relationship building and maintenance suggested by Davis and Love (25). There are elements of politicality (26), where different parties promote their own agendas

in their approach to an 'amicable' solution (27). Chang and Yu (28) outline an example where quality problems discovered in the design phase of a project trigger a design change and scope amendment. They suggest that associated rework may be the catalyst for dispute. Appropriate problem-solving should be targeted and timely to afford a resolution that will identify problems when they are still at the stage of potential issues (29).

Final solution

The literature identifies several aspects that lead to a final solution. Ng, Rose, Mak, & Chen (9), when referring to project partnering, suggest that to determine a final solution, stakeholders should be empowered with decision making authority for efficient problem-solving. Experience and commitment also play a major part, and it is suggested that open and honest communication is an imperative (14). When provided via a formal contact document, early warning has also been shown to positively affect every aspect of problem-solving in construction, although it has not been found to reduce recurrence (29). Other notable aspects arising from Ng et al.'s (9) study that

may limit achievement of a final solution, included the attitude towards the project deliverables and project delivery method, the consequence of ignoring issues and allowing them to slide or escalate and an unwillingness to compromise. Trust is an important component in the negotiation of a final solution. As alluded to earlier, in relationship development and most importantly relationship maintenance trust is fundamental (25, 30).

Assess/measure impact with stakeholders

In this phase, there is a need to review how successful or otherwise the solution was. In construction problem-solving the majority of contemporary construction contracts ensure that problems are dealt with at the earliest opportunity (29), thereby potentially reducing the impact borne by the majority of stakeholders. Collaboration, described by Walker et al. (31) is useful at this juncture and mitigates the assessment process. Referring to the list of potential problems in the problem identification section it may be observed that timely intervention is required. An example from Meng (29) suggests simple issues become more complex, positions harden and

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stand-offs required information mutuality and communication to avoid escalation.

Innovative outcomes?

In order for problem-solving to develop innovative outcomes, the solutions employed in one situation must be learned, codified and deployed for the future. This suggests that innovation is a process that is project-related in nature and affects the type of innovation that is deployed during project implementation. Evidence of this was found in the AIB-PEA case studies presented later in the paper. Since core activities of construction companies revolve around contracting engagements, system integration and assembly methods, it is during these stages that innovation comes into play and needs to be negotiated with those taking part in the project (32-34).

Methodology

The present research approach was exploratory and qualitative in nature and used primary data from historic Australian Institute of Building in Australia's (AIB) annual Professional Excellence Awards (PEA). Document analysis was used to assess the submissions in order to elicit meaning and develop empirical knowledge

(35).

A total of 348 AIB Professional Excellence in Building Awards (AIB-PEA) submission documents (every single entry from 2011 to 2014) were analyzed and coded. Information submitted in the project difficulties and innovations section of the AIB-PEA submission was classified using the data analysis software Nvivo and other sections were reviewed for pertinent data.

The project difficulties and innovations section of the AIB-PEA submission document is a representation of how professionals narrate their experience in the on-site process of a project. Therefore, analysis of these documents is underpinned by an interpretive paradigm, as in hermeneutic inquiry. This research approach shows how problem-solving is contextualized in addressing project difficulties and innovation.

Discussion

The project difficulties and innovations section of the AIB-PEA application typically suggested that most site managers in the sample (n=317) initially identified project unknowns, in a similar way that someone using the 'Johari window' method would

(although no site managers reported the use of that particular method). These unknowns were found as project risks, usually in the form of physical items that were either hidden or not recorded prior to the start of work (for example hidden services or structures, unlogged in-ground utilities), or incorrect/absent reporting by others (for example different ground conditions for foundations), or contamination (uncontrolled fill). In many instances, there was mention of risk mitigation. To retain anonymity of the sample, they are identified using the convention (AIB_201x_0xx) in the following, where 201x is the submission year and 0xx is the source.

Problem Identification and Definition

Across the data, several applicants reported attempting to identify problems early in the project. In these situations, problems were discovered and defined using quality assurance systems. For example; tracking systems (whether propriety or bespoke), complex and integrated organizational systems (BIM was mentioned in only 17 submissions across the 4 years) or relatively simple systems, i.e. spreadsheets or check lists. These quality assurance systems were utilized to resolve



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problems of work health safety (WHS), logistics, buildability, clashes, material supply, sub-contractor engagement or documentation (i.e. specification, BIM and/or contract). For example, in one project, to avoid unplanned maintenance of plant and equipment causing problems across various processes, a system identification system was employed for tracking purposes (AIB_2011_045). Safety issues and associated work practices that required intervention were identified in the same way in another project (AIB_2013_007). Identification of cost problems was widespread across the data and examples of solutions to avoid cost issues included setting up “systems of flagging potential variations” to ensure the client was aware of potential cost overruns and in another project, trades (sub-contractors) were “warned” to submit variations immediately (AIB_2011_045).

Optimal solution and testing with Stakeholders

In the source documents, relationships figured highly in the discourse from the site managers with respect to finding an optimal/ innovative solution (many were catalogued in the data analysis – but few are outlined in the paper for brevity). There were extensive examples in the sources of open and transparent, close, real time decision making and issue management facilitated by relationships (AIB_2011_002). Noticeably, site managers were aware of developing and maintaining relationships (25, 30). Several examples in the source documents described the effect of an expert on the project team. In one case, a mature (expert) site manager described the ability to allow problem resolution to flow through to younger staff and their (sub) contractors so they were able to look at problems in ‘a different way’ that would lead to a solution. This was described as ‘intra-organisational learning’ that opened up the younger staff to a different thought process (AIB_2014_078). The applications also often mentioned working through the options in conjunction with stakeholders, sometimes this step was deeply integrated with the optimal solution stage. An applicant from 2014 reported that “Quick and efficient (timely) solution finding was required to avoid impact on budget and program. This was typically a process of workshoping and ‘close consultation’ with the wider project team and associated stakeholders” (AIB_2014_061).

Final solution and assessment with stakeholders

The literature suggests that trust, experience and commitment are necessary for attaining a final solution, this was borne out from the analysis of the sample from the AIB-PEA documents analysed. Davis, Jefferies (36) outline the concept of a Psychological Contract (PC) that is analogous to ‘reading between the lines’ of a formal contract document when making decisions in project delivery. Realising these less tangible characteristics of construction management in the Psychological Contract serves to provide the professional with a framework from which to enhance their decision-making capability. Davis, Jefferies (36) suggested that a strong Psychological Contract enables the project delivery team to remain resilient and committed when challenging situations are encountered, thereby producing effective solutions in a timely way which are mutually win-win.

An example from the source data described a situation where “The team exceeded targets and achieved all objectives through a joint team commitment and consistent approach to addressing project difficulties, acknowledging the “fast-track” requirements and implementing innovation or a change to the standard way of delivering projects. This involved process mapping, and investigation of possible efficiencies within the process for both our business and the client. As a result of collaborative thinking, systems were developed which managed, controlled and reported on the implementation of that efficient process” (AIB_2011_00D).

From Figure 1, effective communication was identified as an attribute associated with determining the final solution; across the data this focus of efficiency was often mentioned. For example, in one project, “Quick reference meetings were held regularly for a fast and frank flow of ideas and solutions. They were not held in the office, they were ‘at issue’ discussions and involved close liaison with all stakeholders. There were no formal minutes associated with these discussions which allowed them to be dynamic in nature allowing the project to move forward” (AIB_2014_002). In other cases, teamwork (community activity) was identified as a method to resolve problems quickly. Respondents utilised workshops to resolve problems as they were responsive and quick to assist providing united collaboration (AIB_2013_039). Another contractor noted relationships formed during the early phase of project delivery as an example of profound teamwork that was perpetuated through the project (AIB_2012_080).

These final solutions were then often tested by the project team to determine if there was an effective solution to the problem. In one project from 2011, the “client and contractors met weekly where they looked over a single sheet of paper (sometimes referred to a ‘micro program’) that identified problems faced (on both sides). Action items would not be removed from the list until both parties agreed that each particular problem had been satisfactorily resolved, (this was) a process which ensured that nothing was missed.” (AIB_2011_064).

What can be learnt from this exercise?

Notwithstanding machine learning and artificial intelligence intervention, the process of problem-solving may be outlined as a distinct five step process contingent on cognitive ability and experience in many ways. In actuality, on the construction site this would be an iterative process. The case studies that provided the secondary evidence support this notion, and examples have been furnished. However, as the documents do not require reflection from the applicants with respect to the actual process of problem-solving, the authors are unable to provide an authoritative solution to this aim. What can be drawn from this paper is the manner in which professionals reflect on problems, solve them and provide innovation through their solutions. Future research in this area can be directed at developing a revised process or a new model or problem-solving thinking based on the research and available data. This could be achieved via a process of reflection on and cataloging of problem-solving examples. If typical problems are identified and solutions handed on, everyday occurrence of construction problems might be reduced.

Acknowledgement

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Managing Email Clutter for Project Management

Do you sometimes feel like you're drowning in emails? Do you get the impression you spend your whole day sorting through incoming messages? Does it take you forever to find a relevant email because you don't know where it has been put? You may be suffering from email overload!

Email clutter can clog up our lives and steal our focus. Many studies have been conducted that show email is often not the best tool for staying productive and stress-free. Reading and replying to emails can occupy between 20-50% of the working day, and on average, an employee will check their work email 36 times an hour! When we receive an email and check it, we then need to refocus afterwards, which wastes even more time, and causes stress and disjointed thoughts. Think of what we could be using this extra time for!

It becomes especially hard to handle when it's related to project management. Emails can go back and forth in regards to your project, and in the end, you don't know what stage you're up to as there are multiple different email chains. As an example in the building industry, a project may require precast

panels, which the consultant has included on standard drawings used at tender time. However, some of the updated drawings call for more detail or a stronger connection method. The Precast subcontractor must raise an RFI to the General Contractor (GC), which the GC then forwards to the consultant for approval. Once approved, the GC has to advise the subcontractor to proceed with the new method which now means the subcontractor has the right to a variation claim, which can mean dealing with different collaborators again throughout the project.

This is only one scenario but you can see how it could get out of hand quite quickly, with separate conversations trying to control access permissions to information through your inbox. Something can easily get overlooked, and just one missed click of "Reply All" can break the chain of communication. It can also slow down the entire process and decrease productivity dramatically. However, while clutter is something we will always have to deal with, it can be controlled if you find a way to steer the stream of consumption in your favour.

To help combat this, we are pleased to announce that ConnectX can be now purchased through Exactal. ConnectX is a project management system that allows users to collaborate and control their projects. With ConnectX, you can save time from sorting through email clutter: with the forum set-up, messages regarding the project can all be found in one place - even when not everyone uses their log-in! With the above example on precast panels, everyone can quickly and easily see where the RFI is up to, and access the most up-to-date details for the project in one place. Ensure everything is clear and the right people have access to the right documents through a secure central sharing system with a comprehensive data trail.

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A Japanese company has revealed plans to build a 350m high tower made predominantly of timber, which, if ever built, would dwarf the wooden structures currently being constructed or contemplated.

In recent years a global competition has developed to build the world's tallest timber tower, with Norway, Canada, Austria and Australia entering the race – and arguing over whether it is cheating to including non-timber structural elements (see further reading for more on this). But Sumitomo Forestry's vision for its mixed-used "W350" tower would be three times higher than its nearest rival, 40m higher than London's Shard and the 34th highest building in the world.

Sumitomo Forestry is the timber and housing arm of the Sumitomo keiretsu, a group of autonomous companies organised around the Sumitomo bank. It is planning to complete its W350 project in 2041 to mark the 350th anniversary of the company in 1691.

The structure would be a hybrid, made up of 90% wood, including all the internal elements. It would use a "braced tube" structure, with the timber element forming a hollow rectangle stiffened by a steel frame and diagonal struts.

The delight element would be enhanced by filling much of the tower with live plants, and

giving apartments generous balcony space to enjoy sunshine filtering through the foliage.

Altogether, the mixed-use building will contain 185,000 cubic metres of wood, and would cost something like \$5.5bn, about twice the price for a similar tower built with conventional materials, however the company says it hopes that costs will fall as technology improves. And wood is a fast developing area for materials scientists – as GCR reported last week, scientists at the University of Maryland have discovered an inexpensive treatment that can increase the strength of wood by a factor of 10 while solving the all-important problem of dimensional stability.

The hope is that the increased use of wood and other natural materials will help to make cities a friendlier environment for humans and other animals. "Under this concept, greenery on the earth will contribute to buildings and cities, making over cities as forests," the company says.

"Buildings that are full of greenery will form a network that is linked to the biosphere of

living creatures such as wild birds and insects, contributing to the biodiversity of cities."

The ultimate aim, the company said, is to create an environment-friendly city of high-rise buildings made of wood that also helps to "transform the town into a forest". The company is working with Tokyo architect Nikken Sekkei on the design.



French firm Coldefy & Associates has unveiled its design for "the world's largest tropical greenhouse under a single dome".

The \$62m "Tropicalia" biome, a tourism scheme financed by private investors, will be situated in Rang-du-Filliers, 4km south of the tourist resort of La Touquet on the Pas-de-Calais, and will cover an area of 2ha. Inside, the architect is planning a tropical forest complete with "dozens of species of animals, trees and flowers", turtle beach, a pool for Amazonian fish and a one-kilometre-long walking trail.

According to Coldefy, the project will be insulated by double-glazing – there will be two ETFE foil layers to store heat from the sun. The aim is to maintain a steady temperature of 26°C. It will also make use of

earth insulation, by being partially buried in its landscape.

The energy component of the design was carried out by Dalkia, the industrial energy subsidiary of EDF. Denis Bobillier, the technical director of major projects at Dalkia, commented: "Our main objective for the Tropicalia project is to optimise the energy efficiency of the dome while minimising the impact on the external environment.

"We have therefore designed a double-dome producing its own energy, able to maintain the tropical atmosphere regardless of the outdoor climate because one of the main stakes for the performance of the greenhouse

is its heating system."

As well as the recreation of a rain forest, the dome will contain laboratories and a range of hospitality offerings. Work is due to begin construction in the first quarter of next year and to complete in 2021. The business case for the project is based on its attracting about 500,000 visitors a year.

Coldefy was founded by Thomas Coldefy and Isabel Van Haute, and is based in Lille, in northeastern France. Its work is mainly divided between France, China and Hong Kong. The firm was chosen for the Tropicalia project on 22 March.

A simple three-step process for making wood so hard it can stop bullets has been developed by a team at the University of Maryland.

It consists of boiling the wood in a bath of sodium hydroxide and sodium sulfite, heating it, then subjecting it to compression. "This new way to treat wood makes it twelve times stronger than natural wood and ten times tougher," said Liangbing Hu, research team leader. "This could be a competitor to steel or even titanium alloys, it is so strong and durable."

"It's also comparable to carbon fibre, but much less expensive," added Hu, assistant professor in UMD's department of materials science. The team shot bullet-like projectiles at their super wood to test it. These blew straight through the natural wood, but were stopped by the new material. The discovery, described in the latest edition of Nature magazine, could make even soft woods, such as balsa, more useful in buildings.

"Soft woods like pine or balsa, which grow fast and are more environmentally friendly, could replace slower-growing but denser woods like teak, in furniture or buildings,"

Hu said.

"It is as strong as steel, but six times lighter," said Teng Li, associate professor and co-leader of the team. "It takes 10 times more energy to fracture than natural wood. It can even be bent and moulded at the beginning of the process." According to the researchers the process will work on any kind of timber.

Timber alchemy

Scientists have been looking for a way to "densify" wood for many years. If successful, it could make trees into an abundant and ecologically sound construction material.

Although many methods have been tried, such as exposing the wood to steam or ammonia and then rolling it, like a steel bar, the results have been less than ideal, particularly with wood's tendency to expand and contract in response to the amount of water vapour in the atmosphere. Wood consists of cellulose microfibrils

bound with two other polymers, lignin and hemicellulose.

The process of turning wood into paper and cardboard consists of freeing the cellulose from its polymers, which is the purpose of the sodium bath. Once the polymers are partially removed, the compression collapses the cell walls and causes the hydrogen atoms in the cellulose to form new bonds with other atoms around it, which "aligns" the cellulose to create a hard, light, dimensionally stable material.

The challenge in the process is to remove just the right amount of lignin to form maximum hydrogen bonding. Hu and Li have previously led project to turn wood into a clear material for replacing plastic, "photonic paper" for improving solar cell efficiency and a battery and a super capacitor. These wood-based technologies are being commercialised through a UMD spinoff company, Inventwood.

An international team has formed to build Europe's first 3D-printed house. Being printed in a marquee in the central square of Milan, it will be assembled at the city's Salonedel Mobile design festival.

The 3D Housing 05 project is being carried out in the Piazza Cesare Beccaria by UK consulting engineer Arup and CLS Architetti of Milan. Dutch concrete printing specialist CyBe Construction is supplying the robot that is carrying out the work and Italcementi is providing advice on the concrete mix.

When complete, the one-bedroom house will have a floor area of 100 sq m.

Guglielmo Carra, Arup's Europe Materials Consulting Lead, says the aim was to create a "paradigm shift" in the way the construction industry operated by reducing the amount of materials required to build and "repurposing or reusing" them at the end of their life.

The house is designed to be disassembled and reassembled, and Arup argues that it will help construction to move away from the make, use, dispose model and adopt a more circular approach. The house in Milan will remain in the square until the end of April after which it will be moved to Italcementi's headquarters in Bergamo.

Luca Stabile, Arup's Building Practice Leader for Italy, adds that the company would use the technology to build larger structures in the future. "3D printing will contribute to breaking the conventional barriers in engineering and architecture. The use of new technologies alongside a new digital approach to the built environment will be instrumental to

creating complex multi-storey 3D printed buildings," she says.

CLS Architetti comments that the technology interiors have been designed "with reference to archetypes of the past, in a dialogue with the 3D language". The interior fittings will include brass window frames and kitchen fittings and marble bath fixtures. The concrete has a layered appearance, which CLS says helps climbing plants to colonise it.

Italcementi says the house will cost about twice as much to create as a traditional dwelling, but adds that that would be reduced over time.



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PS STRUCTURES

Global construction firm Multiplex transforms its projects with IFS Applications

In recent years Multiplex has grown both geographically and with increased numbers of projects in key markets. With projects at the core of its global business, maintaining growth requires continual improvements in Multiplex's ability to manage projects effectively and efficiently.

Benefits

- Enhanced contract management
- Single repository for all business data
- Improved project transparency and control
- Greater visibility into, and control over, business processes
- Enhanced flexibility via mobile solutions

Multiplex is one of the world's leading construction companies. With over 5,000 employees and US \$4 billion in revenue, it has completed over 1,000 large-scale projects since 1962 – including commercial, sports and healthcare – in Europe, Canada, Australia, the Middle East and India.

After a review of its information technology systems, the company realised it needed stronger support for its core business processes. Multiple systems with limited functionality had been implemented separately in different regions. Processes were inconsistent, and Microsoft® Excel™ spreadsheets were often used to fill functional gaps.

It was time-consuming to pull information together to produce reports – even when analysing a single project. With some systems nearing 20 years of age, staff had to navigate outdated user interfaces and switch between applications to do their work. Support for mobile devices was also lacking.

Cost control with a strong project solution

Multiplex's senior management could see that many benefits would flow from a single-instance software solution that allowed them to drive global consistency in contract and project management processes coupled with increased visibility and control over project costs and revenue.

In a search for a new technology partner to replace its legacy systems, the company found a good fit with IFS Applications. "One

of our decisions in selecting IFS Applications for our preferred ERP software was that we believe it is agile and has the flexibility to cope with our growing needs," said Charlie Bolt, Chief Risk Officer at Multiplex. "We're not using all of the components yet but there is a level of confidence that if we can define what we want, IFS will work with us to deliver it in the most efficient way."

IFS understood the importance of cost control through all stages of a project, one of Multiplex's key focus areas. It offered a strong project solution – an essential tool in managing project costs. "At Multiplex we use IFS Applications to manage the end-to-end process of multi-million dollar projects," said Lidia Ribarovska, Global Business Systems Manager at Multiplex. That includes managing customer orders and contracts, subcontractor management, purchase orders, project planning, time and expenses, procurement, materials handling, progress tracking, and project accounting, with full electronic document management and approvals. Additionally, IFS Applications can handle Multiplex's other requirements such as providing a platform for integrating new technologies like building information management (BIM) and virtual reality.

With Multiplex's global project portfolio, of particular importance is a focus on project accounting with multi-country, multi-currency capabilities. Since the implementation of IFS Applications, Multiplex has successfully integrated the management and cost control of its projects with other accounting functions, including the finance and general ledger requirements for international reporting. That integration "has gone very well with IFS Applications", said Bolt.

Specialised support for complex contracts

To achieve this goal, Multiplex needed more than a strong project solution. It also needed IFS's contract management solution to manage its many types of contracts. This includes complex contracts, where client variations and application for payments are the norm, and complex subcontracting activity, both of which Multiplex required.

"Our construction is complex, using a subcontracting model with lots of interaction and claims both upstream to clients and

downstream to subcontractors," said Bolt. "IFS Applications handles our management of subcontracts and the variations that go with them very well. We can manage the variation orders as one row or a hundred – IFS Applications allows us to go into as much detail as we want."

"As more functions are available via mobile phones, for example, our efficiency will vastly improve. I think there are no limits to the technological advances that IFS can provide." Will Lane, Quantity Surveyor, Multiplex, London

Integrated solution with one source of truth

IFS Applications has become a valuable business asset. "IFS Applications has created an unprecedented global repository for us," said Ribarovska. "We've got our data in one system and it is one source of truth." This has streamlined the management of Multiplex's projects, saving time in the production of reports and in everyday tasks such as managing payments and variations for subcontractors."

"IFS Applications gives you up-to-date information on exactly what costs have hit where – basically live information on what our users are doing on a project," said Brent Peterson, Quantity Surveyor for Multiplex in London. "Whether you work as a quantity surveyor, site manager, or as a commercial director in head office, all users see the exact same information. We've got a huge amount of transparency in the system which we never had before."

"Performing everyday tasks on our previous system was quite difficult in terms of what you could see on the screen," said Peterson. "IFS Applications puts everything at your fingertips. You can see all the reports from one platform – where your subcontracts are at, how many purchase orders have gone out. It's a very clear-cut process and simple to use."

Benefits in contracts, subcontractors and purchasing

Since implementing IFS Applications, Multiplex has reaped the benefits with more accurate and up-to-date cost reporting. It has increased efficiencies in managing contracts, subcontractors, purchasing and

materials, and can deliver better services to its customers.

"IFS Applications lets you look at details we couldn't access before to really interrogate where our numbers are sitting – both cost and revenue," said Erin Pidcock, Operational Development Manager for Multiplex in Australia. "Because we spend less time on manual processes, and have a greater understanding of our numbers, we can better serve our customers by administering contracts better."

Because the cost control component of IFS's project solution supports both a work and cost breakdown structure model, it allows project cost reviews to be managed in an integrated way without resorting to Excel spreadsheets.

"Our accounting and finance team and our project teams work closer together with IFS Applications as a central system," said Will Lane, Quantity Surveyor for Multiplex in London. "There are no Excel spreadsheets, there's no system that's not quite up to speed."

IFS Applications has also been designed to manage project change – a perennial challenge in the construction industry. It offers a range of integrated features, including change requests, document management, project baselining, project budgeting and forecast revisions, contract change management and audit trails, and approval workflow. Being able to clearly identify scope changes and manage them with a proper integrated workflow can significantly improve a project's profitability.

"Now everything is inside IFS Applications we're able to spend several more hours per week focusing on what really matters to a construction project, which is providing value to our clients," said Lane. "Our project teams are far more efficient, which means we can employ less staff, and they can focus more on managing subcontractors on site. With the size of our projects, the savings can be in the millions."

"IFS Applications gives you instant, up-to-date information on exactly what costs have hit and what our users are doing on a project," said Peterson. "With subcontractors, it's very clear whether things have been done correctly and whether any amendments need to be made. The system is also very flexible in handling those amendments."

"One of the biggest benefits I've seen on site has been in purchasing," said Peterson. "Because it's not on paper, nothing gets lost, and the new receipting process makes it completely transparent what goods have and haven't arrived."

"Our quantity surveyors and contract administrators out on our construction sites are seeing the value that IFS brings," said Ribarovska. "They are finding increased



accuracy around the materials handling process, for example, and are able to get better results."

Mobility benefits, now and in the future

Multiplex has also benefited from IFS Applications' mobility support and is looking to expand the use of mobile devices for real-time data collection on-site.

"IFS is the perfect partner for advances in our mobility – for example, taking a real-time view of cost and using mobile devices to collect information on-site," said Pidcock. "An example of how mobility has already helped Multiplex is the document management system. The IFS mobile app allows board members and others to click on and approve documents no matter where they are in the world."

The document management capability within IFS Applications allows all project documentation to be managed, including revision control, document deliverables and approval workflow, with full support for mobile devices.

"IFS Applications manages the approval process very well – better than our previous system – and that's enhanced by the fact that there is mobile access," said Bolt. "People may not want to approve things while on holidays, but if it's a requirement, they do. We've got support for iPhones etc. that enable approvals to be made as if you were at your desk."

"I think as our appreciation grows of what mobility means for our business, I have a level of comfort that IFS will give us what we need," said Bolt.

Growing in partnership with ifs

Since selecting IFS, Multiplex has expanded from 35 active projects to over 100 across its four major regions. "An advantage of IFS is its global footprint," said Bolt. "Wherever in the world we choose to go, I have confidence I'm going to have IFS support."

The relationship between IFS and Multiplex is open-ended, with a view to future developments. "What makes the future exciting is that we now have a software

supplier that partners with us to help us grow," said Pidcock. "We can grow by integrating cost planning, document management and mobility, for example."

Avenues for growth now arise organically from staff. "There are now people at different levels within Multiplex suggesting, 'What if we partner with this?' or 'What if we build a link to that?'" said Pidcock. "It's really exciting for the company to be able to work that way rather than just concentrating on things that we've always done."

Global consistency with regional flexibility

Key to Multiplex's transformation has been a change in culture to make software integral to the business. In the commercial area, the company's processes are defined by a common project administration manual with some regional differences. Because adherence to those manuals was previously enforced by people, it was open to interpretation. With a single system ensuring global alignment, Multiplex can better manage its project portfolio.

"We thought we were all doing the same thing before, but we all had our own tweaks and were going in different directions," said Pidcock. "IFS Applications has brought us all back to a central core. The way that you're looking at a project in Australia is the same way you're looking at a project in the Middle East or in the UK. That's enabled greater control without sacrificing flexibility."

"Some of the biggest rewards were from bringing regional differences into the core system to enhance everyone's understanding of how every region worked," said Pidcock. For example, Multiplex now has global transparency into its tax liabilities in India.

At the same time, the flexibility to configure regional differences within IFS Applications assisted the implementation. "IFS helped us cope with those changes within scope while achieving the overall objectives," said Bolt.

"Probably the key improvement from our previous system is that the approval authority requirements are now enforced

in the system rather than simply being a set of instructions on a piece of paper,” said Bolt. “IFS has been able to help us do what we say we do in relation to approval processes.”

Better decisions and improved team dynamics

The enforcement of consistent business processes in IFS Applications has improved the quality of information delivered to Multiplex’s management, speeding up decision making and producing better business outcomes. It has also benefited team dynamics and staff morale.

“The delegations and automated controls we implemented in IFS Applications allow management to trust that the information that the system is giving them is true and reliable,” said Ribarovska.

“Since implementing IFS Applications I’ve got more confidence in the IT systems,”

said Peterson. “The cultural dynamic has definitely benefited staff morale and team dynamics because the process is always within the central system and it dictates exactly what needs to happen. There’s no ambiguity between where people think we are and where we actually are.”

“IFS Applications has also expanded my ability to develop skills that are applicable anywhere in the world,” said Peterson. “Having a uniform system means you can move freely from Australia to London to Dubai to Canada without having any issues. From a career perspective, it has really opened doors for my development within Multiplex.”

No limits to what future technology will bring

Having completed the first stage of its transformation in partnership with IFS and seen the benefits, Multiplex is now looking to the future benefits that technology can

bring.

“Future developments enabled by IFS will make the working lives of quantity surveyors and others on construction projects very exciting,” said Lane. “As more functions are available via mobile phones, for example, our efficiency will vastly improve. I think there are no limits to the technological advances that IFS can provide.”

“I think our future is looking extremely bright,” said Pidcock. “Multiplex has really taken an interest in technology and how it can form part of our future. Partnering with IFS, and being able to look at ways we can bring new technology into our systems, was the start of that. Further improving processes with real-time cost and revenue apps – and beyond that things like BIM and virtual reality – will see us really being able to move into the future.”

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WODONGA FACILITY SUPPORTS CLT BUILDS WITH LOCALLY MADE PRODUCT – FROM DESIGN TO INSTALL

Australian building professionals now have convenient access to locally made Cross Laminated Timber (CLT) after XLam opened the world’s most technologically advanced CLT facility in Wodonga, Victoria.

The \$30 million plant is the latest in a series of investments the company has made in an effort to transform the construction industry. In other initiatives, XLam is providing a full integration service. At the centre of its offering is the opportunity for clients to engage in design services (engineering and shop drawings etc.), installation services (site construction advice or a complete installation service) or merely purchase CLT for projects built in Australia, from Australian timber, by Australians and to the relevant Australian standards.

XLam has been making CLT in New Zealand since 2012, with its product used in commercial and residential construction across Australia and New Zealand. The expansion into the Australian market provides a more convenient method of procuring the technology, with a much reduced risk profile than procurement from

the European Union.

XLam’s CLT is produced from sustainable timber sources and represents a great opportunity to construct buildings using a renewable resource – timber. CLT is gaining momentum in the Asia Pacific region as part of the new wave of pre-build construction offerings. XLam’s suite of technology products and services is experiencing an increased uptake across Australia and New Zealand.

Gary Caulfield, XLam Chief Executive, says he has seen dramatic increases in demand for the product and services in the last 24 months, with 2017 turnover doubling year-on-year.

The opening of the Wodonga facility ensures quicker lead times in supply. XLam, which is Australasia’s largest manufacturer of CLT, can offer a ‘one stop shop’ service from conceptual structural design to installation for both residential and commercial CLT projects.

“We have professionally qualified structural engineers and installers and can provide guidance for on-site construction teams to

assist in local builds ensuring customers get the maximum benefits from the use of CLT.

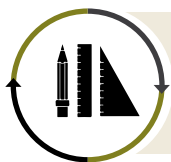
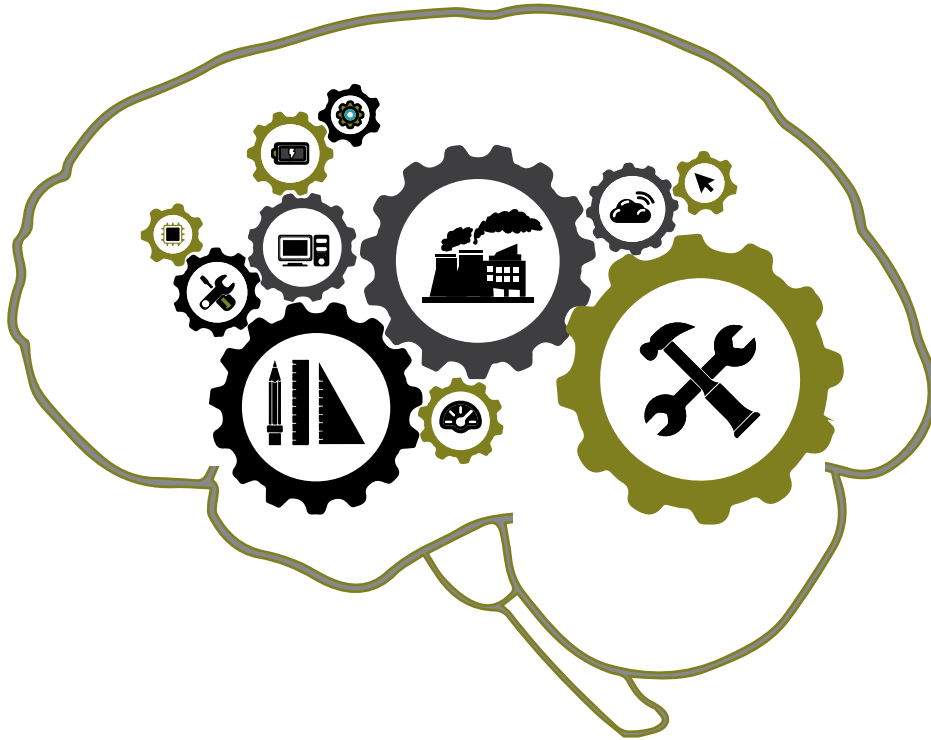
“Front end preparation helps achieve fast build times on-site, so we provide early practical assessment and advice and work closely with project teams. While manufacturing lead time varies depending on the project, we can generally turn product around in 12 weeks from the signing of a purchase agreement to delivery on-site of finished CLT panels for a small to medium building,” Caulfield says.

Caulfield says the use of large structural CLT building panels can cut on-site build time by up to thirty percent, while also providing cost benefits due to ease of assembly and the high accuracy/quality of factory prefabrication.

Since opening in March, the new facility has seen a steady flow of orders. Caulfield says the factory can produce 60,000m² of CLT each year – enough to construct the equivalent of Melbourne’s 10-storey Forte Living green apartment block every week.

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CSR Gyprock Supports Perth's Most Iconic Project

Perth's most iconic project, Optus Stadium in Western Australia, opened its doors on the 21st of January 2018 after 36 months of construction. With a 'fans first' approach to planning and design, the multi-purpose venue will offer an unrivalled spectator experience for a crowd of up to 60,000 (in AFL mode) with exceptional event atmosphere and cutting edge stadium design and technology. With the planning of the project being in progress over a 10-year period, the state-of-the-art venue had long been on CSR Gyprock's radar with the aim to support the project with high performance products. There were a number of other factors that assisted the Gyprock bid to supply this project, including a reputation for innovation and technical leadership – having achieved success in delivering state and national level landmark projects including Royal Adelaide Hospital (RAH) and the Victorian Comprehensive Cancer Centre (VCCC).

Gyprock were delighted to be chosen by the wall and ceiling contractor Cubic Interiors WA to supply this project, partnering with Cubic to guide product specification and providing technical support on site. The proximity of Gyprock's factory in Welshpool, approximately 12 kilometres from the stadium construction site, was also a major catalyst in the tender process, as it helped to save freight costs and lead-time. It also allowed for Gyprock's technical team to provide on-site assistance as required. Gyprock products including EC08 Complete, Gyptone and Rigitone, were specified for the project, with 80 semi-trailer deliveries made, transporting approximately 200,000m² of plasterboard to the construction site.

Gyprock EC08 Complete is a premium plasterboard and made up approximately one-quarter (58,000m²) of the plasterboard product used on the project. It was specifically used in the corridors, lounges, general admission areas and food and beverage outlets due to its superior performance for mould, impact, fire, acoustic and moisture resistance. With consideration of the

volume of EC08 Complete required in the project, Gyprock's Welshpool factory responded by expanding its manufacturing capabilities to produce the premium plasterboard locally and to specific project requirements, including size of rooms, height and length of walls, and to help reduce wastage on site. Functional acoustic performance was high on the list of requirements for the dining, conference and private entertainment areas of the stadium, but at a competitive cost of the aesthetic finish of the spaces.

Balancing acoustic excellence and visual impact, the panel perforations of the Gyprock perforated plasterboard range, combined with the products acoustic fabric lining and insulation as required, deliver reduced echo and noise reverberation to create more comfortable environments. In the corporate suites and entertainment boxes, Gyprock Gyptone 12mm Square perforated plasterboard was specified for its ability to improve sound attenuation. Providing a grid-like patterned ceiling, Gyptone's high level of aesthetic appeal was complimented by matching access panels that provide functional access to the ceiling cavity while ensuring an uninterrupted look across the surface.

Throughout the restaurants and the Victory Lounge, Gyprock Rigitone Astral perforated

plasterboard was specified for its design and acoustic properties, improving sound quality and delivering a continuous pattern across the whole ceiling. Both Gyptone and Rigitone perforated plasterboard products are lined with an acoustic fabric backing which contributes to acoustic performance, whilst concealing framework and helping to prevent dust falling through from the ceiling cavity.

Another key feature is Activ'Air, a patented technology that converts formaldehyde into non-harmful inert compounds that are permanently locked in the board and cannot be released back into the air. This can reduce the

concentration of formaldehyde within an environment by up to 60 per cent when installed in ceilings. "The Optus Stadium project was Cubic's first landmark engagement with CSR Gyprock WA and we were impressed with Gyprock's proactive approach – this assisted with a successful handover several weeks ahead of schedule. This was made possible with Gyprock's fabrication being local and close to the project. I believe this will be the first of many more projects that Cubic and Gyprock will complete," says Adam Monson, State Manager, Cubic Group.

For more information visit www.gyprock.com.au



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Wood a key plank in the business case for bringing nature into the office

Builders and specifiers looking to construct buildings that boost worker productivity should consider using more of one of the world's oldest and most sustainable materials in their office fit-outs: wood.

That's the takeout from world-first research by strategic market research firm Pollinate and the University of Canberra. Based on a survey of 1000 indoor Australian workers, the research provides fresh evidence to underpin the business case for biophilia – the principle that exposure to nature increases human wellbeing.

The study paints a bleak picture of workers' current access to nature at work with less than half (47%) enjoying access

to natural light, only two in five (38%) being able to see indoor plants, a quarter (26%) unable to see any natural looking wooden surfaces and almost half (46%) spending less than an hour outdoors on work days.

The study found that the more natural looking wooden surfaces workers could see from their workstation, the higher their workplace satisfaction and wellbeing.

Associate Professor Jacki Schirmer from the University of Canberra said the results held true even after rigorous analysis that controlled for factors known to impact on the wellbeing of workers such as age, income, gender and workplace culture. "These results are exciting, for the first time

providing solid evidence to support the use of wood as part of bringing nature into workplaces," she said.

"We are always looking for ways to improve health and wellbeing, and this research points to ways we can achieve that in the places many people spend a lot of their time – the workplace.

"The work has implications for businesses, because a large body of research has shown that workers who are more satisfied with their work and have higher wellbeing have better work productivity, and reduced rates of absenteeism – which means improving worker wellbeing has real benefits for businesses."

Consulting engineer Max Fordham has created a room in its north London office that can create a sound picture of a future building for its clients.

The "SoundSpace" puts the listener in the centre of a sphere of 14 loudspeakers that create an "auralisation" of an existing or prospective space.

The technique is especially useful for buildings such as concert halls, which are judged on their acoustic performance, but it can also model areas such as offices, in which too much sound can interfere with communication and too little make workers feel self-conscious.

To recreate the sound of a building that already exists, the engineers use a 3D microphone that can capture the location of sounds. The data is encoded into four components, corresponding to the X, Y and Z axes of Cartesian space, coupled with an omnidirectional component labelled "W" to give an aural "image" of a point in space.

When the SoundSpace is being used to predict the acoustics of a building yet to be built, the sounds are produced using a computational model that mirrors that used

for lighting design. Calculations are made based on the materials and dimensions of a room, and then are used to demonstrate how changes in design will affect the soundscape.

Pedro Novo, an acoustics engineer at Max Fordham, said: "We are able to say, 'if you don't have any acoustic treatment, it will sound like this, and if you do, it will sound like this', and it's the difference between the two that we're trying to illustrate.

"All software like this has its limitations, and of course we cannot profess to know exactly how the acoustics in any given space will sound, but we can give a good simulation. Often our clients haven't considered the detail of aspects such as sound, so allowing them to experience it for themselves can be insightful and as well as, we hope, entertaining."

The sounds themselves can be experienced with the help of a virtual reality headset, the projection of images onto a screen,

combined with sounds from a headset, or using the loud speaker system.

Over 80 per cent of workers (82%) exposed to eight or more wooden surfaces in their workplace reported being 'satisfied or very satisfied' with work, compared to over two thirds (69%) exposed to five to seven wooden surfaces and half (53%) with no wooden surfaces. Employees working in offices with natural wooden surfaces on average also reported higher personal productivity, mood, concentration, clarity, confidence and optimism. The effect on wellbeing was greatest when wood was used in combination with other natural elements such as plants, water features and natural light. Associate Professor Schirmer said: "We know it's good for us to spend time outdoors interacting with nature, but with people spending so much time indoors, there's increasing recognition of the potential benefits of bringing nature into the workplace and the home.

Fungus put to good use

Researchers at an American university may have found a way to use fungus to repair cracks in ageing concrete. If this proves to be true, it could offer an inexpensive way to deal with the widespread underinvestment in the country's physical infrastructure, especially crumbling bridges.

The idea of using fungus in this way has been developed by engineers at Binghamton University in New York State. The process works by adding the spores of a type of fungus called *Trichoderma reesei* to the concrete as it is being mixed, together with nutrients. Then, when cracking occurs, this allows water and oxygen to enter the concrete mass, which triggers the spores to germinate.

Trichoderma reesei, a fungal type that was originally found in the Solomon Islands during the Second World War, has the capacity to secrete calcium carbonate, which seals the crack.

Congrui Jin, an assistant professor of mechanical engineering, says the process works by healing the micro-cracks that are the first stage of the weathering process.

"Without proper treatment, cracks tend to progress further and eventually require costly repair," she said. "If micro-cracks expand and reach the steel reinforcement, not only the concrete will be attacked, but also the reinforcement will be corroded."

She adds: "This idea was originally inspired by the miraculous ability of the human body to heal itself of cuts, bruises and broken bones. For the damaged skins and tissues, the host will take in nutrients that can produce new substitutes to heal the damaged parts."

Jin worked with Professor Guangwen Zhou and associate professor David Davies, both from Binghamton, and associate professor Ning Zhang from Rutgers University.

The research is still in its early stages, with the biggest problem being finding a way for the spores to survive the mixing process and lie dormant in the concrete.

Jin said: "There are still significant challenges to bring an efficient self-healing product to the concrete market. In my opinion, further investigation in alternative microorganisms such as fungi and yeasts for the application of self-healing concrete becomes of great potential importance."

Office in Waterloo, Ontario set to be Canada's greenest building

Impressed by its use of geothermal energy, a solar wall and other features, the Canada Green Building Council has just awarded its first zero carbon certificate to a 9,300 sq m, triple-glazed office in Waterloo, Ontario. When complete the Evolv1 building should produce more energy than it consumes, if the design performs as intended. One member of the hard-to-please public criticised the size of its car park, however, but the developer said even that had good, green credentials (explained below).

Developed by the Cora Group, a local office specialist, the Evolv1 complex in Waterloo's David Johnston Research + Technology Park will have accountant EY as the anchor tenant. It is one of 16 projects across the country selected by council to participate in a two-year pilot of its Zero Carbon standard.

To receive the certification, Evolv1 demonstrated that it had computer models showing a zero carbon balance over the year, that it had suitably efficient envelope and ventilation system, and onsite renewable energy systems capable of providing at least 5% of building energy consumption.

As well as triple glazing, the building's envelope incorporates a solar wall for preheated ventilation, geothermal energy and variable refrigerant flow technology, a three-storey green wall and photovoltaics. The building was designed and engineered by Stantec, and constructed by Melloul Blamey.

Richard Williams, principal with Stantec (pictured), commented: "We are proud of how Evolv1 expands the definition of sustainability. This project advances the business case and economic model for sustainable design in a multi-tenant building. It is a building that supports human health and wellness, important characteristics for today's premiere tenants and their employees."

Adrian Conrad, the chief operating officer of Cora Group, added: "This has been a building several years in the imagining, planning, and making. It is the result of a collaborative effort by The Cora Group, our design partner Stantec, and our many stakeholders. We firmly believe Evolv1 sets a new benchmark for green building design and construction."

The announcement did provoke one nit-pick from Twitter-user Mike Boos, who commented: "There's no good reason to have that much parking right next to a light rail stop and the Trans Canada Trail."

To that criticism, Cora Group replied that it had installed 28 electric vehicle chargers, secure bike storage and that "most parking is located under solar panels".



AIB NEW MEMBERS Section

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

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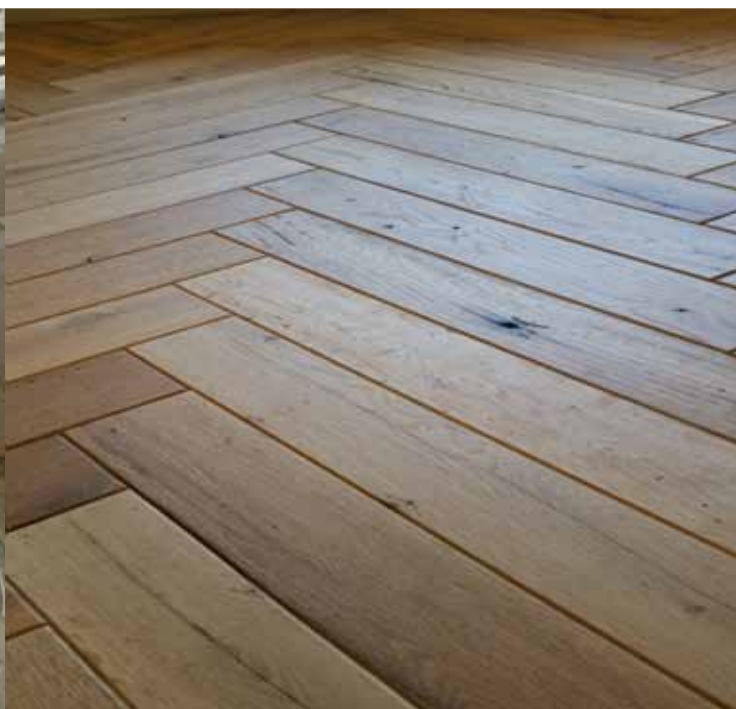
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