

ABR


ABCB

 Australian
Building
Codes
Board

Issue 13

IN THIS EDITION YOU WILL FIND ARTICLES ON:

- Accessing the free online NCC 2015
- Case studies on the use of performance
- NCC online training
- And more...

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Dear NCC Users,

Welcome to the spring edition of the Australian Building Regulation (ABR) Online.

The ABCB has been working towards the implementation of the reform package that was agreed to by Ministers in May this year and has achieved much on this front. The reform agenda is significant and the vision – increased productivity and improved building outcomes – is ambitious. In this edition we have provided an infographic entitled *The Next Instalment of Building Regulatory Reform, What you need to know* which summarises what the Board is seeking to achieve and the key actions that it will be taking to get there, starting with NCC 2015 becoming free online from 1 February 2015.

Making the NCC free online has been a significant body of work but is only the first step in realising a reduction in compliance costs. Registration for the free online NCC will be available from 1 December and the article *Accessing the Free online NCC 2015* provides further detail. This initiative, in combination with other significant reforms such as the increased use of performance, will help to achieve the \$1.1 billion per annum in potential benefits to the national economy, in turn improving building outcomes for all Australians.

The benefits of the performance-based code have long been known and the article about the Royal North Shore Hospital demonstrates its significant and achievable benefits. Utilising a performance approach

when designing buildings can not only provide savings in overall construction costs but can allow for innovative solutions to construction issues. I encourage you to read this and the other articles discussing performance and to consider this approach in your own work.

The Board has always been committed to an informed and competent building industry and one of the ways it is contributing to this is through enhanced education and awareness. The ABCB has been working with an online training provider to improve practitioner understanding of the NCC through the development of online training. Addressing the fundamentals of the NCC, from its use in the different classes of buildings, to introductory information about the disability access provisions, the online NCC courses focus on addressing the needs of the practitioner. You can read more about online training in this edition of the ABR.

Still on education and awareness, this edition of ABR Online features four in-depth articles focussed on plumbing. The item about the WaterMark Certification scheme, its importance in ensuring that plumbing and drainage materials and products are fit for purpose and what role the ABCB plays in the Scheme's operation, is a valuable source of information and well worth a read.

Finally, keeping pace with change is Standards Australia, whose technical committees are currently involved in a range of innovative projects for building and construction. Further details about this are provided on page 10 and 11.

Neil Savery, ABCB General Manager

WHAT'S INSIDE: INCREASED USE OF PERFORMANCE:

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CALENDAR OF EVENTS

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NCC Regulation Reduction Review

Stakeholder Survey

The ABCB is currently undertaking a project to reduce the level of regulation in the NCC. This project is part of a broader agenda to increase the productivity and competitiveness of Australian industry through reducing the cost of compliance without compromising health and safety.

This project has the potential to reduce costs and increase the efficiency and effectiveness of individual building and plumbing solutions in meeting the goals of the NCC.

What does reducing the level of regulation in the NCC mean?

Over time, with changing technology, changing construction/plumbing techniques and changing community expectations, some of the NCC provisions have become redundant or unnecessary. In addition, 'regulation creep' has occurred, where regulations have been added and stringencies increased, and there have been very few occurrences of regulation reduction. In some cases the market has adapted and matured, and is better positioned to provide solutions.

The first edition of the Building Code of Australia (BCA 1988) was adopted progressively by the States and Territories commencing in 1989. Over the past 25 years, many changes or additions to the code have occurred (e.g. access for people with disabilities and energy efficiency) and the stringency of many provisions has increased. However, few code provisions have been removed or reduced over that time. Some examples of provisions that have been removed are:

- requirements for the minimum areas of rooms (removed prior to BCA 1988)
- requirements for fire hose reels in Class 2 and 3 buildings and Class 4 parts of buildings (removed in NCC 2014).

The purpose of the project is not to necessarily reduce the level of the NCC objectives (i.e. acceptable levels of health, safety, amenity and sustainability) but to identify potential opportunities to reduce regulatory content, which would include removal of redundant or unnecessary material.

While the NCC Performance Requirements are the only legal requirements in order to comply with the NCC, the scope of this review includes both the NCC Performance Requirements and the NCC Deemed-to-Satisfy Provisions.

Both the Board and the Building Ministers' Forum consider it appropriate to take stock and review the content in the NCC.

Removal or reduction of NCC provisions will be subject to public consultation and will also involve cost/benefit analysis of any subject matter as directed by the Australian Government Office of Best Practice Regulation.

Stakeholder Survey

The ABCB seeks stakeholder input into potential areas of the NCC that can be removed or reduced. No doubt a number of stakeholders have over the years identified aspects of the NCC Provisions that they believe can be reduced. The ABCB is keen to obtain feedback via a survey of all NCC subscribers. Subscribers should have received a copy of the survey by email. If you haven't and would like to participate in the survey, [click here](#). The survey closes 12 December.

This will be your opportunity to identify any specific aspects of the NCC that you believe can be removed or reduced. The ABCB looks forward to receiving this important feedback.



THE NEXT INSTALMENT OF BUILDING REGULATORY REFORM



What you need to know...

The **VISION** is increased productivity and improved building outcomes.

This will be **ACHIEVED** through increased practitioner access, awareness and understanding of the NCC, improved national consistency and reduced regulatory costs.

INITIATIVES/KEY ACTIONS:

NCC free online from February 2015	Shift from annual to 3-year amendment cycle
Better explanatory material for Performance Requirements	Quantified NCC Performance Requirements
Enhanced training tools, delivering what industry, educators and regulators want	Improved useability of the NCC and suite of supporting materials informed by industry preferences
Review the application and content of Acceptable Construction Practices	Improved digital platforms for NCC access and related materials
Improved NCC explanatory material and how it works	Remove redundant, unnecessary and duplicative NCC content
Undertake harmonisation and consolidation of the NCC and reduce State and Territory variations	Evaluate further NCC expansion for all on-site building regulation
A continuing shift towards an improved NCC product, and improved support material	Limit the application of higher prescriptive standards being set outside of the NCC

The **BENEFITS** are increased access to the NCC, reduced economic burden on NCC users and industry as a whole, increased stability through reduced frequency of NCC changes, reduced cost of construction, maximised potential productivity, increased practitioner understanding of and compliance with the NCC...

all of which lead to increased productivity and improved building outcomes.

Unlocking opportunities through performance – the Royal North Shore Hospital

Written by Peter Johnson, Principal Fire Engineer Arup and Alistair Morrison, Associate Fire Engineer, Arup

Established in 1885, the Royal North Shore Hospital is a major public teaching hospital and major referral hospital for Northern Sydney as well as a NSW Trauma Centre. The hospital campus consists of over 50 buildings, including the new nine-storey, 96,000m² Acute Services building, which contains burns, maternity, children’s and mental health wards.

The \$721m public-private partnership (PPP) development to construct this new Acute Services building and Community Health building at St Leonards, was one of the largest building construction projects in NSW. The idea of using a performance-based approach incorporating aspects of fire safety, energy efficiency, water usage, acoustic design, vertical transportation, and novel use of materials into an integrated design undertaken by Arup, played a vital role in the project from competition to handover and produced a number of innovative solutions along the way.

A large hospital development of this scale and complexity presents many issues to consider for the client and design team. Fundamentally speaking, the team has to consider how they are going to approach the development of the fire strategy and other design elements from the very beginning in order to get the best result for the project, something which is often overlooked at project conception on new projects.

The experience Arup had working closely with Thies as a contractor on previous healthcare projects, such as Westmead Hospital, had demonstrated that if a full performance-based approach was adopted from the beginning of this project, considerable benefits would be realised, including:

- greater flexibility in design
- better functionality
- easier future layout changes
- energy and water savings
- reduced whole of life costs
- equal or better safety.

Designing, assessing against the Building Code of Australia (BCA), then ‘fixing the design’ to meet the Deemed-to-Satisfy Provisions of the BCA, and if necessary providing alternative design solutions, is often the approach taken on healthcare projects. However with the tight timeframes and a vested interest in the ongoing management and operation of the building for the next 28 years, the PPP contractor Thies could not afford to wait too long to find out about what they were to build. They needed



The Acute Services Building at St Leonards (Image courtesy of NSW Health)

a highly creative design team concentrated on the functional requirements of the user groups and the project brief, with the focus on providing a design to meet the client and contractor requirements, and not to that of the prescriptive code provisions.

Consequently, the approach taken by Arup and the Thies led team with BVN Architects, was one of close collaboration, team work and early design input through a creative, performance-based approach, to unlock opportunities that the design team may not have previously considered.

One of the early ideas that was adopted into the design and which fundamentally changed the approach of the fire strategy and the whole building design was in the development of an alternative smoke control strategy that simplified the mechanical design, reduced 60% of maintenance tests and 70% of system components when compared with conventional smoke control systems prescribed in the BCA. This helped to make the hospital easier and more cost effective to manage and maintain in the long term and the simpler systems had a real benefit in terms of reliability.

The proactive approach taken by the design team in identifying fire safety, energy efficiency, water savings and other issues early in the design process enabled continued design and documentation of issues identified in the fire engineering report. Together with timely input from the approval authorities, this meant that the move into construction could occur on time.

In addition to savings in construction related to fire safety measures, the architects, contractor and engineers worked collaboratively on a sustainable design philosophy. Together they were able to develop innovative design solutions, including:

- use of a polycarbonate roof combined with sprinklers to a central atrium
- pressurised lobbies to allow horizontal evacuation across the building at the same levels
- creation of special “bridgeheads” for fire-fighting, using fire isolated routes and pressurized stairs
- special attention to an energy efficient façade design; and
- use of glazing for more extensive natural lighting.

More specifically, a large cogeneration plant coupled to the building’s HVAC and medical equipment provided a fuel shift from high carbon electricity to gas, while improving the overall energy resource efficiency. The façade of the building was tuned to provide access to views and daylight, while highly insulated opaque elements and solar shading limit thermal losses and heat gains, which help to reduce HVAC loads. Additionally, high efficiency power and lighting systems with occupancy sensing, where appropriate, limited the primary electrical demand while minimising building conditioning requirements.

These were again examples of functionality and design outcomes, based on environmentally sustainable design (ESD) principles, driving the design from a very early stage, rather than the more traditional approach of design following the prescriptive BCA provisions and standard solutions.

Arup continued to work closely with the design team and contractor through the construction period to provide solutions to issues identified on site or design changes, which helped to minimise delays. Our role then moved through to a detailed inspection process involving over 30 inspections by the fire engineering teams to monitor and feedback progress in meeting the requirements of the fire engineering report and help review the testing and commissioning of the smoke control

solution. This process being undertaken by fire safety engineers with an overarching knowledge of the various fire disciplines together with the BCA consultant, was invaluable in achieving a coordinated construction process between fire safety measures and achieved timely sign-off from the Principal Certifier. The other engineers conducted similar inspections to ensure all design aspects were correctly incorporated in the finished construction.

Our presentations of the fire strategy to the users and facility management teams also helped with knowledge transfer, as the fire engineering report used for the approvals process was very detailed due to the differing requirements of the fire brigade and other stakeholders. This handover process was further assisted by the production of a simplified fire strategy document to help identify the key fire measures and performance-based strategy for the Acute Services building. Similar approaches were used for the other engineering disciplines to ensure all the benefits for operation and maintenance of the Acute Care building could be realised by hospital facility managers.

This PPP project at the Royal North Shore Hospital is an excellent example of the significant benefits which can flow from an early adoption of a full performance-based approach where the building functionality and innovative design drive the creative design process, and not the prescriptive or Deemed-to-Satisfy Provisions of the Building Code of Australia.

Ultimately, of course, the building needs to be shown to meet the Performance Requirements of the BCA and provide the required levels of health, safety, amenity and sustainability. However, by choosing to start fire safety and other aspects of design very early, set the right approach, and stress design flexibility, systems can be designed which are more reliable, and buildings can be constructed which provide healthcare clients with better functionality and have lower whole-of-life costs. This allows governments to get best value for their investments and any savings can be directed to other important community infrastructure.



Royal North Shore Hospital

Accessing the free online NCC 2015 - Everything you need to know...

On 30 May 2014, the Australian Building Ministers' Forum agreed in principle to make the 2015 NCC and future editions freely available online, significantly contributing to reducing the burden of building regulation. The decision to eliminate costs associated with buying the code will make it more accessible to both small business and the building and plumbing industries. For further information, please refer to the [media release](#) issued by the Parliamentary Secretary to the Minister for Industry.

To assist users with the implementation of this reform, the following information on pre-registering for NCC 2015, options to obtain NCC hard copy editions, along with a series of the most frequently asked questions have been detailed below.

Pre-registration

From 1 December 2014, users will be able to pre-register for free access to the 2015 edition of the NCC as it becomes available online and as a PDF from 1 February 2015.

Access and pre-registration will be made available via the ABCB website home page with pre-registration providing you with password access details.

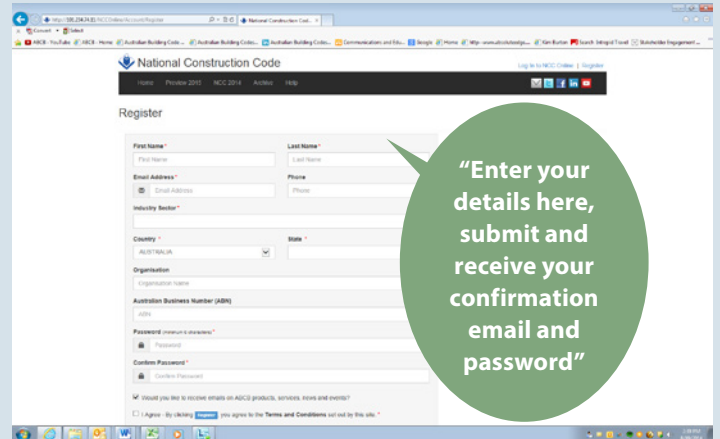


Why Register?

Registering your details will ensure you are kept up-to-date with any NCC amendments or changes.

Simply enter your details in the required fields and submit. An email will then be sent to your nominated email address with your new access password.

When free access to NCC 2015 becomes available from 1 February 2015, you will be notified by email, along with a direct link to the new NCC 2015 web pages.



Hard Copies of the NCC

As of 2015, the ABCB will no longer produce hard copy versions of the NCC. Instead, users have the option of printing the complete NCC set or individual volumes from the digital download files in A4 format. Printing has also been enabled within the online service. Alternatively, individuals can arrange for a printed copy to be purchased through their local print/copy shop for personal use from the digital download files available from the ABCB website. Each of these options are available as of 1 February 2015.

Organisations seeking to undertake production of hard copy volumes, reproduce or value add to NCC 2015 content can contact the ABCB at: ncc@abcb.gov.au for further information.

Further digital enhancements will be made to the document, its methods of access and associated on-line tools over the next 3 years.

Additional Information (FAQ's)

Q: What is the NCC?

A: The National Construction Code (NCC) is an initiative of the Council of Australian Governments (COAG) developed to incorporate all on-site construction requirements into a single code. The NCC comprises the Building Code of Australia (BCA), Volume One and Two; and the Plumbing Code of Australia (PCA), as Volume Three.

Q: How is free online access to the NCC being funded?

A: As part of the Regulatory Reform package, each of the State and Territory governments, in conjunction with the Commonwealth, have increased their funding to the ABCB to enable free online access, commencing from NCC 2015.

Accessing the NCC

Q: Can I get free access to NCC 2014 immediately?

A: No. The decision by Governments to provide free NCC online access commences with NCC 2015. NCC 2014 is in effect to 30 April 2015 and is still available for purchase until this date.

Q: Can I still purchase a hard copy of NCC 2014?

A: Yes. Hard copy purchases of NCC 2014 will be available from the ABCB online shop until it is replaced by the free online NCC 2015 on 1 May 2015. From this date, the ABCB will no longer be involved in hard copy printing arrangements; instead, users will have the option to print their own copies of the NCC in A4 format.

Q: How will I get access to the free online NCC 2015? When can I register?

A: You will be able to pre-register from 1 December 2014 by visiting the ABCB website and following the link on the homepage. Registrations will be for individuals only; there will be no shared access for organisations. Each registration will have its own unique login details.

Q: I am a current NCC subscriber. Will I still have to register to view the free NCC 2015 online?

A: Yes. Existing subscribers will still have to register on the ABCB website to view the free NCC 2015 online.

Q: When will I be able to view the free NCC 2015 online?

A: From 1 February 2015, registered users will have access to a free preview of NCC 2015 online and PDF, which will take effect from 1 May 2015. Access will be from the ABCB website, using your username and password to log in.

Q: Can I purchase a hard copy of NCC 2015?

A: As of NCC 2015, the ABCB will no longer produce hard copy versions of the NCC. Instead, users have the option of printing the complete NCC set or individual Volumes from the digital download files in A4 format. Printing has also been enabled within the online service. Alternatively, individuals can arrange for a printed copy to be purchased through their local print/copy shop for personal use from the digital download files available from the ABCB website. Each of these options are available as of 1 February 2015.

Q: Can I get access to previous NCC/BCA/PCA editions for free?

A: Yes. From 1 May 2015, all registered users will have online access to past BCA editions and PCA editions from 2011.

Q: Will the appendices for State and Territory variations and additions to the NCC still be included? If so, where will I find them?

A: Yes. However, from NCC 2015 appendices will now be contained in each volume, as opposed to previous arrangements whereby they were published as a separate document.

Q: We are a local council; do we still get a Public Viewing Copy (PVC)?

A: No. The ABCB will no longer be printing hard copies of the NCC from the 2015 edition. NCC 2015 will be available free online for anyone who wishes to view it.

IT System Requirements

Q: What format is the free NCC?

A: Registered users will be able to view the free NCC 2015 online in a web browser or download a PDF file.

Q: What if I don't have internet access? How can I get access?

A: You will need a computer or device with internet access to view the free NCC 2015 online. Free access to computers with internet is available at most local libraries or by using internet cafes or accessing free Wi-Fi zones in your local area.

Q: Can I print the NCC 2015?

A: Yes. There are no printing restrictions on downloaded PDF files or website content. For ease of printing, the NCC 2015 has been reformatted to print in standardised A4. This ensures compatibility with both an individual's printing hardware and print-shop facilities. This new size format also reduces the number of overall text pages.

Q: Can I view the NCC on my iPad/tablet/mobile phone?

A: Yes. The NCC 2015 online and PDF version can be viewed on a mobile device. The layout may change slightly based on the screen resolution available.

Technical Advice

Q: Can I still get assistance with clarification of NCC technical provisions? How do I log a technical enquiry?

A: For registered users, the ABCB will provide clarification of NCC clauses only, not project-specific advice. If you require clarification of an NCC clause, an enquiry can be logged via the ABCB website at the Contact Us page.

Q: Who should I contact for a project-specific technical enquiry?

A: For project-specific advice, contact your local building or plumbing control administration, local council or a private building certifier.

Q: How will I know if there are any updates/amendments to the NCC after I have downloaded it?

A: It is important that you supply your correct contact details upon registering and update your profile when necessary via the ABCB website. Email alerts will be sent to you when updates or changes to the NCC occur.

NCC Referenced Documents

Q: Do I still have to pay for documents referenced in the NCC such as Australian Standards?

A: Yes. The ABCB is not responsible for the sale of NCC referenced documents such as Australian Standards. Please visit the SAI Global [website](#) to purchase Australian Standards.

Save the date...



2015 National Construction Code INFORMATION SEMINARS

**Don't miss your opportunity to hear
about the NCC 2015 Amendments
and embracing Performance**

City	Date	Venue
Canberra	17 February	National Convention Centre
Hobart	19 February	Hotel Grand Chancellor
Brisbane	24 February & 25 February	Brisbane Convention & Exhibition Centre
Darwin	27 February	Darwin Convention Centre
Perth	3 March & 4 March	City West Function Centre
Melbourne	10 March & 11 March	Melbourne Convention Exhibition Centre
Adelaide	16 March	Adelaide Convention Centre
Sydney	19 March & 20 March	Australian National Maritime Museum



Visit the ABCB website from November to register www.abcb.gov.au

Details are correct at time of printing. The Seminar organisers retain the right to alter any or all of the Seminar details.

What is WaterMark?

The Plumbing Code of Australia, given effect through State and Territory legislation, requires certain plumbing and drainage materials and products to be certified and authorised for use in a plumbing or drainage installation. These materials and products are certified and authorised through the application of the WaterMark Certification Scheme.

Material and product failures in plumbing systems can cause contamination of the water system and be a public health concern. The WaterMark Certification Scheme is a mandatory certification scheme for plumbing and drainage materials and products to ensure they are fit for purpose and appropriately authorised for use in plumbing and drainage installations.

Certified materials and products are identifiable by the WaterMark label, which must be displayed on the product or material upon the granting of a WaterMark Certificate of Conformity.

How does WaterMark work?

The ABCB manages and administers the WaterMark Certification Scheme. The Joint Accreditation System of Australia and New Zealand (JAS-ANZ) accredits WaterMark Conformity Assessment Bodies (WMCABs), who in turn evaluate and certify plumbing and drainage materials and products.

The WMCABs evaluate and certify plumbing and drainage materials and products for inclusion on to the WaterMark Product Database where there is a listed Standard or Technical Specification on the WaterMark Schedule of Specifications.

Where a new material or product cannot be evaluated against an existing listed Standard or Technical Specification, the WMCAB prepares an application to the ABCB office which administers the review and approval of the new WaterMark Technical Specification for inclusion onto the WaterMark Schedule of Specifications. Once approval of the new WaterMark Technical Specification is obtained, the WMCAB can undertake an evaluation of the new material or product to be listed on the WaterMark Product Database.

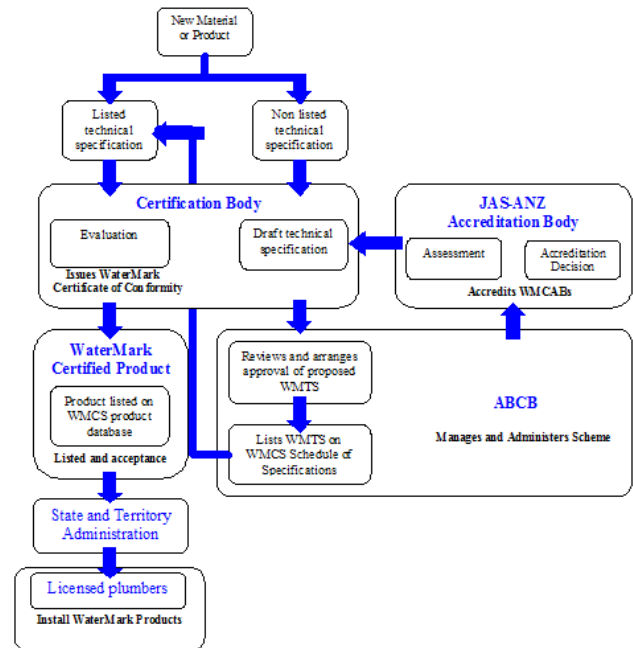
What is the ABCB's role?

The ABCB manages and administers the Scheme, which includes:

- managing the scheme rules and Approved Certifier Agreements
- maintaining the WaterMark Product Database for complying materials and products
- reviewing and approving new WaterMark Technical Specifications for inclusion in the Scheme.

The WaterMark Product Database

The WaterMark Product Database contains a range of information on complying materials and products. You can search by category such as supplier/manufacture, product model, referenced specification, WaterMark licence, WMCAB or product type. [Click here](#) to go to the WaterMark Product Database.



The above flowchart illustrates how the WaterMark Certification Scheme works.

How can I have a product certified?

The ABCB does not undertake the evaluation and certification of materials and products. Organisations seeking WaterMark certification for their plumbing and drainage materials and products need to apply directly to an approved WMCAB.

The WaterMark Certification Scheme is governed by a series of documents that outline the requirements for evaluation and certification, risk assessment and the drafting of a WaterMark Technical Specification. Any organisation that can satisfy an approved WMCAB that its material or product meets these requirements can have its material or product WaterMark certified. Individual WMCABs may have a specific application and engagement process.

A list of approved WMCABs and their contact details can be found on the ABCB website. [Click here](#) to go to the list of approved WMCABs.

How can I have a certified product installed?

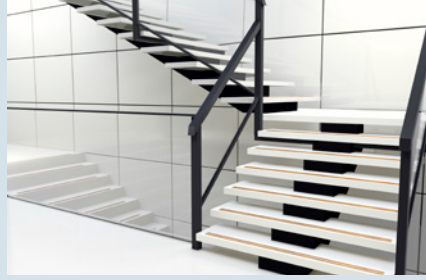
The ABCB does not have responsibility for the installation of plumbing and drainage materials and products. The State and Territory Plumbing Administrations are responsible for the installation requirements of plumbing and drainage materials and products.

Want to know more?

Further information about the WaterMark Certification Scheme is available on the ABCB [website](#) or you can contact the ABCB by phone on 1300 134 631 or e-mail watermark@abcb.gov.au.

Slip-resistance for stairways, landings and ramps

For many years the BCA, comprising Volumes One and Two of the NCC, has contained requirements for stairways, landings and ramps to have slip-resistant, non-skid or non-slip surfaces. However, the BCA did not define these terms or provide direction on how they could be measured.



landings, to comply with a slip-resistance classification specified in the BCA when tested to the 2013 edition of AS 4586 'Slip resistance classification of new pedestrian surface materials'. This requirement applies to all finishes and surface types (including carpet, tiles, timber, vinyl, concrete and metal).

The purpose of these amendments to the BCA is to provide industry with certainty and clarity on the level of slip-resistance that needs to be achieved.

For users of the BCA, this ambiguity resulted in varying interpretations. In some cases this resulted in unnecessarily expensive solutions or restricting surface finish options, while in other cases, possibly under-specifying surface finishes leading to potentially unsafe outcomes. As a result, practitioners regularly sought clarification on ways to verify compliance with the BCA.

Amendments to the BCA's Deemed-to-Satisfy (DtS) Provisions which came into force on 1 May 2014¹, specify slip-resistance classifications for:

- landings and ramps in Class 2-9 buildings
- stair treads or nosings to treads for all classes of buildings.

The DtS Provisions in BCA 2014 require treads or nosings to treads of a stairway, and for certain buildings, the surfaces of ramps and

Advisory Note

To assist practitioners in understanding the changes to NCC 2014 the ABCB has released an advisory note regarding the slip-resistance classifications. The advisory note includes information on the following:

- the changes for NCC 2014
- the different slip-resistance classifications and their applications
- methods of compliance
- transitional arrangements from the current and previous edition of the Australian Standard.

The advisory note is free and can be found under the 'Education: Events and Resources' section of the ABCB website at www.abcb.gov.au.

¹ Subject to State and Territory transitional provisions

Innovative Standards in a Changing World

Written by Jennifer Harwood, Senior National Sector Manager, Standards Australia

Standards provide a platform on which to build new and exciting ideas. As our world changes, new Standards are introduced to reflect the latest technologies, innovations and community needs. Rising up to the challenge of a constantly evolving world, our technical committees at Standards Australia are involved in a range of exciting projects for building and construction.

Windows and external glazed doors in buildings

As spring moves into summer, many home and office building owners may turn their minds towards a refresh of their building exteriors, and this may sometimes involve changing windows and doors.

Standards Australia's Technical Committee BD-021 is responsible for doors and windows. The BD-021 committee members have recently completed work on revising AS 2047:1999 *Windows in Buildings*, which is referenced in the National Construction Code.

The 2014 edition of AS 2047 - *Windows and External Glazed Doors in Buildings* was published in September. It sets out requirements for materials, construction, installation and glazing for external windows, doors, adjustable louvres, shopfronts and window walls.

Main changes to this edition include:

- adding requirements for hinged, pivot and bi-fold doors to the scope
- updating wind pressures for housing to align with AS 4055 *Wind loads for housing*
- changing the deflection/span ratio for housing and residential buildings to align with the new lower serviceability limit state wind pressures
- providing additional guidance on test results for larger-sized windows
- updating requirements for windows made from unplasticised PVC (uPVC)
- revising Appendix A: Guide to wind pressures, ensuring alignment with AS 1170.2 *Structural design actions - Wind actions*.

Prefabrication - New Australian Standard being developed for AAC construction

We understand that there is a growing prefabrication market, and are working with stakeholders to explore opportunities as they arise. The work of the BD-106 technical committee on *Autoclaved Aerated Concrete* (or AAC) is contributing to Standards within the prefabrication market. BD-106 committee members are adopting and adapting the relevant European Standards on AAC (EN 12602:2008 + A1:2013) into a series of Australian Standards in this area. Structural engineers, manufacturers of AAC and builders will be able to know more about requirements to design, produce and erect reinforced AAC panels. Keep tuned to Sector Updates on our [website](#) to find out when the Standard will be available for public comment.

Rainwater Goods, Accessories and Fasteners

From time to time, different materials and technologies become commonplace in the building industry and industry standards should reflect these changes to maintain their currency and relevance. One such Australian Standard, which has undergone revision this year and is also referenced in the National Construction Code, relates to rainwater goods, accessories and fasteners.

In August, the 2014 edition of the joint Australian/New Zealand Standard AS/NZS 2179.1 *Specifications for rainwater goods, accessories and fasteners – Part 1: Metal shape or sheet rainwater goods, and metal accessories and fasteners* was published. The principal change in this edition is the provision for the addition of aluminium/zinc/magnesium alloy-coated steel.

This Standard was prepared by Technical Committee WS-014 *Plumbing and Drainage*, and sets out requirements for prepainted metal, metal and organic film/metal laminated shape or sheet rainwater goods, and metal accessories and fasteners. It is one of three Standards related to rainwater goods, the others being AS 1273 *Unplasticized PVC (UPVC) downpipe and fittings for rainwater*, and AS/NZS 3500.3 *Plumbing and drainage – Stormwater drainage*.

World Standards Day

On 14 October, the international community, led by the International Organisation for Standardisation (ISO), International Electrotechnical Commission (IEC) and the International Telecommunication Union (IUT), celebrated World Standards Day. On this day, we paid tribute to the thousands of men and women all over the world who developed voluntary standards for the advancement and welfare of societies.

This year's theme for World Standards Day was "Standards Level the Playing Field". Standards Australia supports the view that Standards help improve market access for businesses. Small and medium enterprises that use internationally-aligned Australian standards will find it easier to compete in international markets and sell anywhere in the world. In this way, Standards help to break down trade barriers and level the playing field for everyone.

So take a moment and think about how Standards have helped to support the development of the building and construction industry. Standards Australia would also like to thank the many people who have contributed to the Standards development process in building and construction. These include Committee members, industry practitioners and members of the public who have provided their views.

New Energy Audit Standards for the Property, Industrial and Transport Sectors

Energy audits can greatly help the energy management process. They determine how efficiently energy is being consumed, identify energy and cost saving opportunities, and highlight potential improvements in building services and occupant comfort.

Standards Australia has published three new Australian Standards for energy audits. The joint Australian and New Zealand Standards replace AS/NZS 3598:2000, *Energy audits*, and assist organisations in undertaking appropriate types of audit for their activities. Of the three, AS/NZS 3598.1, *Energy audits*, Part 1 provides instruction for the energy audit of commercial buildings; while Part 2 provides instruction for industrial and related activities. Part 3 is related to transport activities.

These energy audit documents are designed to allow organisations to better assess the energy performance of their activities and to enable better energy performance. The documents constitute part of the program of work undertaken by the Standards Australia's EN-001 Energy Auditing, which comprised representatives of government, industry and professional organisations. The work was funded and supported by the Commonwealth Department of Industry, State Governments and the Government of New Zealand.



The use of alternative solutions

Written by Ken Thomson, Erbas & Associates

The intent of the NCC is to ensure all buildings within Australia meet a minimum standard for life safety, health, amenity and sustainability. Whilst it is important to achieve these outcomes so that new buildings meet community expectations and have social and economic value, a common criticism from owners and developers alike is that the NCC can increase build cost and reduce profit margins adding a significant financial burden on the construction industry.

Erbas & Associates propose a methodology to assess energy efficiency measures that allows the industry to achieve innovative design with cost-savings. Using JV3 as an example, similar principles can be applied to develop processes for Alternative Solutions to meet the Performance Requirements in the NCC.

The NCC allows two (2) main pathways for achieving compliance with the Performance Requirements, the Deemed-to-Satisfy (DtS) Provisions or Alternative Solutions. The Performance Requirements within the NCC outline the criteria that are to be met. The Alternative Solution pathway has a number of options for providing assessment; this is outlined in clauses A0.1 to A0.9 of Volume One of the NCC. It is not the intention of this article to outline each of these, but instead to present JV3 as an example of an energy efficiency Alternative Solution. The DtS Provisions are generally a quick way to meet these Performance Requirements however they lack flexibility to allow for innovative and new technological solutions.

The inclusion of JV3 has resulted in an increase of Alternative Solutions for the compliance of the building fabric and glazing. A growing number of skilled assessors are able to provide a comparison based assessment for the performance of the building fabric, glazing and building services to produce highly energy efficient building designs. The improvements in both skills of the operators and the capabilities of software have resulted in a change of attitude toward using energy modelling as an Alternative Solution for meeting the energy efficiency Performance Requirement, JP1 in the NCC.

Evolution of better energy modelling software and a greater awareness of energy performance of buildings, have guided the industry into using Alternative Solutions more frequently. The process outlined below is a result of that evolution, work and experience and may be appropriate to other performance based solutions.

Alternative Solution energy modelling is typically based on comparison with DtS Provisions. This process involves the assessment of the building in accordance with the DtS Provisions and then comparison of the proposed building against the results from the DtS model. JV3 is provided for determining this performance solution comparison and clearly sets out all the required inputs and information that is used for the



assessment. Application of JV3 has been used extensively as the basis for Alternative Solutions using energy modelling and the determination of some elements within a building.

For example: The energy efficiency DtS Provisions for glazing systems can be quite expensive as they do not take a holistic approach to the building construction, because the focus is on a balanced energy consumption for the building. Glazing is assessed based on orientation and hence requirements can vary significantly around the building. An alternative solution for glazing can be achieved by using JV3 as a basis for energy modelling the orientation specific DtS glazing performance, setting the baseline, then providing an alternative glazing that achieves a consistent system on all orientations. This provides a more cost effective optimised solution compared to the DtS Provisions.

Often International, European and US standards are equivalent or more onerous than Australian standards however in the instances where the Australian standards are more stringent it is appropriate to ensure our standards are met. For most products to achieve the compliance standards, a set of physical tests and assessments in accordance with Australian standards is required. In most instances this testing is destructive and hence can be very costly. Australian engineers have the capabilities to analyse and recommend the use of appropriate products, both local and imported, for application to meet NCC provisions, or exceed them.

Imported windows often do not meet the energy efficiency DtS Provisions of the NCC. These products are used throughout the world yet in most cases are difficult to get included in Australian buildings due to the DtS solution requiring the glass and frame performance to be assessed together as a system to Australian Fenestration Rating Council (AFRC) procedures and protocols.

To apply the Performance Requirements of the NCC to an alternative assessment of a proposed solution, the following method is outlined to demonstrate.

For example, a glazing system, where the product has not undergone the physical testing and received a compliance sticker, is to be used in the construction of a new building. Therefore to meet the compliance requirements of the NCC the following methodology may be used:

1. Identify the glazing systems proposed and how they are applied in the building.
2. Identify the Performance Requirements in the NCC, wind category/strength, impact safety and energy efficiency.
3. Identify the building classification.
4. Determine performance level from the NCC the Performance Requirements (the DtS Provisions may be used for comparison however this is not mandatory).
5. Review all the available architectural, structural and window specifications and available information.
6. Provide an engineering assessment – via engineering judgement, detailed calculations, comparison against DtS Provisions or the like.
7. Provide evidence of competency of the person having done the assessment – qualifications, experience and insurance.

8. Provide a clearly worded and simple to understand assessment of the Alternative Solution in a report.
9. Submit to the certifier or other professional for review and comment for acceptance.

This methodology should be provided in a framework that is clear to anyone assessing the Alternative Solution, including how and why it complies with the Performance Requirements of the NCC. For a wider acceptance of Alternative Solutions a fairly robust framework for providing the assessment needs to be developed, such that a certifier can look for certain items within the NCC, make sure they are referenced in the report. The report should indicate-

- what is being assessed
- what Performance Requirements are being met in the NCC
- what the critical issues are
- how the NCC performance provisions are applied
- whether compliance is achieved.

The current methods involve stating the absolute minimum against a Performance Requirement in any reporting. Development of a process, framework and reporting format is the key to removing barriers to a wider use of Alternative Solutions.

Using performance based solutions benefits most projects by increasing the ability to innovate and achieve cost effective solutions for both short and long term outcomes, as well as providing greater design flexibility and scope for the design team.

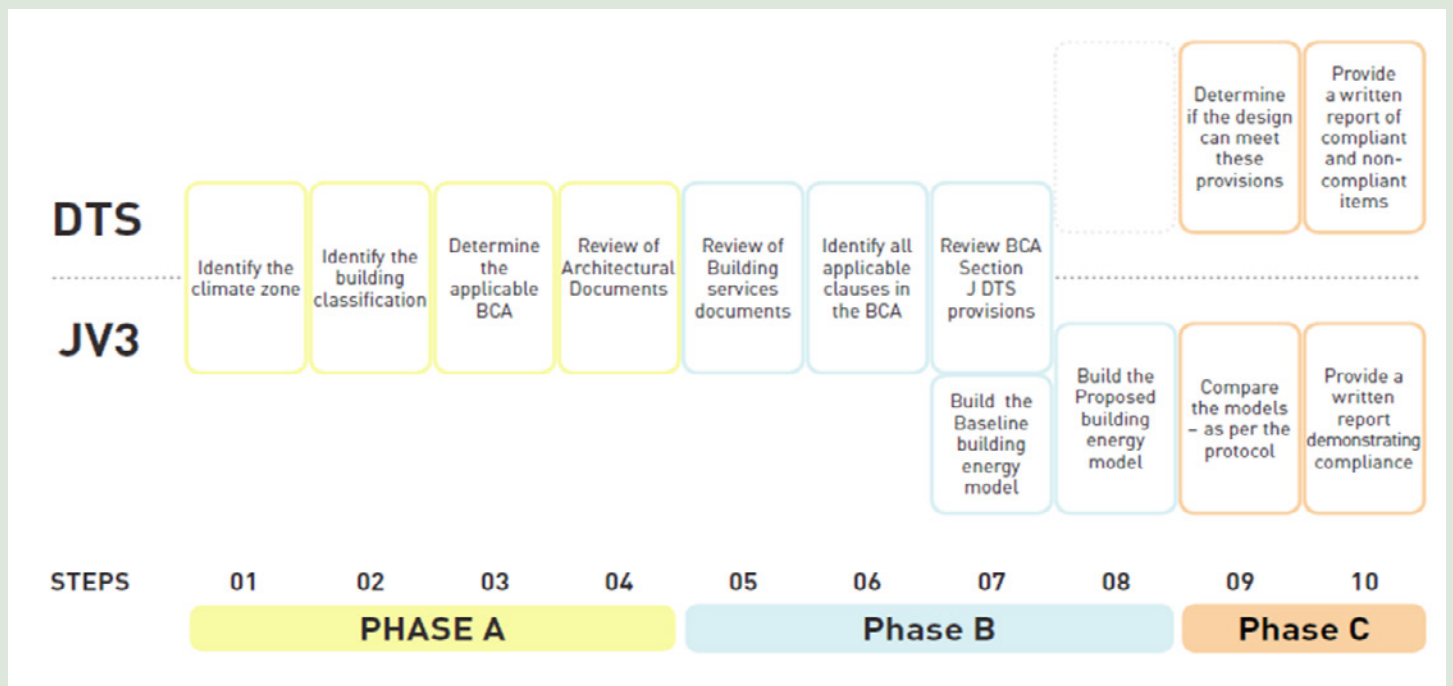


Figure 1 Process steps to using JV3 as an Alternative Solution

Project Snapshot: Part J5 Review – Air-conditioning and ventilation systems

What?

A review was undertaken in 2013-14 by the ABCB and key industry stakeholders that aimed to improve and simplify the air-conditioning and ventilation requirements in NCC Volume One Part J5.

Why?

Since 2010, the energy efficiency requirements for air-conditioning and ventilation systems in NCC Volume One have been identified as an area that needed review. The Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH) in conjunction with associated industry bodies facilitated a membership survey in late 2010 concerning Section J compliance, with Part J5 (Air-conditioning and Ventilation Systems) a primary concern.

Following on from this survey in April 2011, AIRAH and the ABCB hosted a workshop for industry, with an aim to establish the best way forward in addressing the BCA Section J compliance issues. The workshop focused on the issues identified in AIRAH's industry compliance survey, however there was limited success achieved with many issues remaining unaddressed.

In early 2013 the Board agreed to act on two key areas in relation to energy efficiency - simplifying the provisions and improving education and awareness. This resulted in the Part J5 Review Project, which aimed to improve and simplify the requirements to increase user understanding and compliance with the provisions.

Who?

Recognising that industry was best placed to assist in identifying and resolving technical issues, a project Working Group was formed, which consisted of members from organisations involved in the Heating, Ventilation, Air-conditioning & Refrigeration (HVAC&R) industry.

How?

The Part J5 Review Project considered five key categories¹ that could contribute to achieving the project's objectives. This included the industry Working Group reviewing previous Proposals-For-Change (PFCs) received by the ABCB, and then prioritising specific issues within these key categories. These issues were then investigated and where solutions reached general agreement by the Working Group, they were recommended for inclusion in the NCC.

Outcomes

The more significant proposed changes included a re-structure of the Deemed-to-Satisfy Provisions and greater utilisation of the existing defined terms. Other significant changes were technical and aimed to resolve outstanding issues that had been previously raised by industry.

Additionally, the limited guidance material available was identified by the industry Working Group as an issue that may be contributing to a lack of understanding and consequently non-compliance with the provisions. As part of the changes to the provisions, improved and expanded guidance material has been developed in the Guide to Volume One to assist user understanding of Part J5. Additional information will also be developed for inclusion in a revised edition of the NCC Volume One Energy Efficiency Provisions non-mandatory Handbook, due for release mid-2015.

In terms of the main proposed changes to the provisions, they are:

- re-structuring the provisions to consolidate the requirements and improve understanding, and make better use of the defined terms
- removal of performance type statements that do not clearly state what is required or exempted
- clarification of the defined term 'air-conditioning' to clearly exempt air-conditioning systems where the primary purpose of the system is to serve equipment or processes
- increasing the fan motor power allowances for carpark ventilation systems as the current levels are considered too low and in some cases not achievable
- clearly specifying which ductwork fittings require insulation by separating them into active or passive components, with the insulation requirements being applicable to the passive components
- specifying the insulation required for water piping on the nominal diameter of the pipe rather than the system's capacity, to provide clarity and improve consistency of application
- reducing the number of insulation variables for water piping, to reduce confusion and allow compliance to be more easily demonstrated on-site
- introducing a concession for high temperature chilled water piping, to recognise the smaller energy savings that can be achieved
- clarification of the insulation requirements for water piping by referring to 'chilled water' instead of 'cooling water', so as to reduce confusion.

¹ Outstanding technical issues, regulatory duplication & conflict, referenced documents, provision structure and educational & explanatory information.

Further information

It is hoped the project has tackled some of the key issues identified by the AIRAH industry survey and that the outcomes from the project will help contribute to improved user understanding and compliance with the Part J5 provisions. As AIRAH has noted 'this project is a great example of industry organisations working with regulators and government to solve real issues encountered in the field.'²

The proposed changes to Part J5 were released for public consultation in the NCC 2015 public comment draft, with many comments received. The final changes for NCC Volume One and the Guide to Volume One are in the process of being completed, and are due for release in the NCC 2015 preview version in February 2015, which will be available free on the ABCB website at www.abcb.gov.au.

² Aherne, V *Changes on the way for Section J?*, Ecolibrium Journal - AIRAH, July 2014, Volume 13.6, p 16

The ABCB would like to acknowledge and thank the members of the Working Group for their significant time and input into the project.



Master Plumbers Association of NSW official opening of the Master Plumbers' College of Excellence

On Wednesday 10 September the Minister for Industry, the Hon. Ian Macfarlane officially opened the Master Plumbers' College of Excellence in Auburn, Sydney.

MPA Group's Chief Executive Officer, Mr Paul Naylor says

"The Official Opening of the facility by the Minister will mark the culmination of major refurbishment work to create a state of the art college of excellence in the delivery of plumbing training. The Master Plumbers College of Excellence is owned by the membership of the Master Plumbers Association of NSW. The centre brings together apprenticeship trade training, training for contractor licensing and post-trade professional development for industry, all under the one roof. This industry operated college is designed by industry to produce industry endorsed outcomes".

The Association's investment has resulted in a state of the art facility that will provide a level of training for apprentices that will ensure a high quality of future tradesmen and women.

Training rooms have been set aside to develop, promote and provide training in the use of new products, allowing plumbers the opportunity for continual professional development.

The opportunities it has provided and will provide to underpin excellence in trade training will stand Master Plumbers Association NSW (MPA NSW) in good stead for decades to come.

MPA NSW has also worked with the ABCB in developing the ABCB Awareness Resource Kit, *Understanding the Plumbing Code of Australia*, a resource designed to assist those who are in a training profession such as teachers or lecturers. Applications for its use are available from the [ABCB website](http://www.abcb.gov.au).



The official opening of the Master Plumbers' College of Excellence

From left to right: Mr Paul Naylor, Chief Executive Officer, MPA Group; the Hon. Ian Macfarlane, Minister for Industry

The MPA Group consists of MPA NSW, Master Plumbers' Apprentices Ltd and MPA Training

NCC Online Training – something for every practitioner

Did you know that there is online training available about the National Construction Code?

Throughout 2014, the ABCB has been working with online training providers Pointsbuild Pty Ltd to produce a series of self-paced NCC courses. ABR Online is pleased to announce that the following nine courses are now available:

- *Course One: Introduction to the Australian Building Regulatory Framework*
- *Course Two: Using the National Construction Code*
- *Course Three: National Construction Code - Volume One*
- *Course Four: National Construction Code - Volume Two*
- *Course Five: National Construction Code - Volume Three*
- *Course Six: Understanding the Performance-based NCC*
- *Course Seven: Understanding the NCC Disability Access Provisions: An Overview*
- *Course Eight: Understanding the NCC Energy Efficiency Provisions for Volume Two: An Overview*
- *Course Nine: Understanding the NCC Energy Efficiency Provisions for Volume One: An Overview*



The NCC online courses have so far attracted significant interest with over 770 courses in total being purchased through Pointsbuild since their roll out mid-year.

NCC online training is ideal for practitioners interested in lifting their awareness and maintaining their competencies in the building and plumbing industries. The courses can be undertaken whenever and wherever is convenient and are considered an easy and contemporary way to learn, with each course presented in a PowerPoint format with accompanying voice over, and delivered in around 45 minutes. Participants can also opt to take a short multiple-choice assessment at the end of each course in order to qualify for CPD points. Associations currently recognising the NCC online training for CPD purposes are –

- Association of Accredited Certifiers (AAC)
- Australian Institute of Building (AIB)
- Australian Institute of Quantity Surveyors (AIQS)
- Australian Institute of Architects (AIA)
- Australian Institute of Building Surveyors (AIBS)
- Master Builders' Association (MBA NSW)
- Association of Building Sustainability Assessors (ABSA)
- Green Building Council (GBCA).

Discussions are also underway with several other key organisations including the Victorian Building Authority and the NSW Office of Fair Trading.

For more information visit www.pointsbuild.com.au or contact Pointsbuild on 1300 892 829 or info@pointsbuild.com.au



Look out for more information about online training in the coming editions of the ABRB Online, and on the [ABCB website](http://www.abcb.gov.au).

Timber Prefabrication: Using Performance for NCC Compliance

Written by: Andrew Dunn, CEO, Timber Development Association and David Barber, Principal, Arup

Heralding a new era of affordable building construction for medium-density mid-rise residential construction, The Green by Australand, is a recently completed five-storey timber frame apartment building in Parkville, an inner-northern suburb of Melbourne.

The Green complex has a building area of 5,100 square metres and sees timber's return as the key construction material. At the heart of this development are numerous design and material innovations, all interwoven to provide a faster and more efficient construction methodology. The fundamental design principles owe more to conventional detached housing construction than high-rise building techniques, centred on prefabricated components.

The building is constructed in layers, using prefabricated timber elements wherever possible. "In fact 70 percent of the building is locally sourced timber" says Australand's Estimating Manager, Kase Jong; "most walls were made using prefabricated frames of 3.6 m in lengths, which were easy to work with and manoeuvre, before frames were enclosed with full walling systems on site".

The heart of the innovation is the large format prefabricated cassette floor panels that are 'dropped in'. The largest floor cassette panel is 2.7 m wide by 8.0 m long, made from timber flange and steel web I-joists and high density cement bound matrix board floor sheets, with the complete cassette weighing just over a tonne.

The hybrid joists were used because of the large 8.0 m spans and shallow floor depth that were required and high density cement board floor sheets to provide acoustic mass.

Mr Jong advises that "The beauty of what we do is that after we have set the floors down, there is no propping of any sort required underneath because the floors span from load-bearing



wall to load-bearing wall". "Because all the internal walls are installed at each level, we are able to come in on the floor below and start roughing in all the services while work continues on the floor above". "The entire building took approximately 12 months to complete, using a timber frame design based on a 'structure first' approach, which considers the engineering capacities of timber to define design parameters."

The Green utilises five storeys of timber framing over a common car park podium, with a combination of Class 2 residential and Class 7a car park uses. A concession exists in the NCC Deemed to Satisfy (DtS) Provisions that allows 3 storeys of timber framing, but this building exceeds it by two storeys. The parts of the NCC DtS that are not met are in regards to loadbearing internal walls and shafts, as they are required to be concrete or masonry and external walls and non-loadbearing fire resisting walls and service shafts are required to be non-combustible. In addition, the NCC DtS requires elements that provide lateral and vertical support must transfer their fire resistance and non-combustibility requirements to the supporting element. Therefore as the external and internal non-loadbearing fire resisting walls require support from the floors, the non-combustibility requirement of the walls are transferred to the floor as well.

There is no means to make timber non-combustible and meet the NCC DtS requirements. Therefore the project needs to meet compliance through the performance pathways of the NCC.

To address the combustible load-bearing structure, fire safety engineering was carried out by ARUP and submitted as an Alternative Solution to the Relevant Building Surveyor and Metropolitan Fire Brigade (MFB), to show that the non-compliance with the DtS was an acceptable means of construction. The process adopted was in accordance with the International Fire Engineering Guidelines, the Society of Fire Safety Code of Practice and MFB and CFA "Guideline 33".

Building load-bearing elements require a Fire Resistance Level (FRL) to maintain the stability of the structural element in the event of a fire, to provide a sufficient time for occupants to escape to a safe place without exposure to untenable conditions, and to allow for fire brigade intervention.

The fire engineering Alternative Solution addressed the use of timber structural elements based on the fire rated plasterboard systems being utilised to encapsulate the walls and floor-ceilings. The fire rated plasterboard systems are tested and approved as meeting the DtS Provisions of the NCC (as per NCC A2.3 and Specification A2.3) in achieving the required fire resistance for structural stability, fire spread, and insulation. As the combustible timber is concealed behind the fire rated plasterboard, the load-bearing elements achieve the FRLs required. That is, although the timber load-bearing elements are part of the building structure, they are concealed behind the fire rated plasterboard, which provides the required fire separation.

To show that the timber elements were acceptable, fire test information on plasterboard systems was utilised, with analysis of test data showing that conditions within the walls are such that the timber elements would not be at a temperature where they would lose any substantive strength. Analysis was able to show that the fire rated plasterboard systems minimise the risk of failure through temperature, in the same way that fire rated plasterboard prevents fire spread to load-bearing steel elements.

The NCC currently allows a steel load-bearing structure to be constructed to any height, provided there is a tested and approved fire protection system, such as fire rated plasterboard, to prevent fire spread to the steel structure. Hence, the use of timber as part of the load-bearing fire rated structure has to be considered in context of similar construction materials, such as steel, whereby the overall system (fire rated wall system or floor system) provides a compliant FRL through the encapsulation of



load-bearing elements by approved fire rated plasterboard systems. The fire rated plasterboard systems reduce temperatures within the wall or ceiling cavity, such that the steel or timber is protected and can continue to carry the applied loads. The walls are a standard solution available from any plasterboard lining manufacturer.

As part of the design and construction process, Arup also provided advice on areas where there are interfaces, connections, joints and the like where gaps may occur, leading to a potential path for fire spread. Careful detailing and construction of these areas assists in minimising the risk of fire spread. The Wood Solutions series of Guides 1-3 (www.woodsolutions.com.au) provides

a source of information for this detailing, there is also a guide (17) on the considerations required for carrying out an Alternative Solution on a timber project.

The remainder of the structure is built to meet the NCC DtS requirements; this includes structural design, fire-resistance levels, covering material Group Numbers, protection of openings, weather proofing, termite management and so on. The lift and stair shafts are constructed from core filled masonry blocks and concrete, therefore complying with the NCC DtS.

Other Firsts

The project meets a number of other goals, particularly sustainability. True to its name, The Green has an average NatHERS performance rating of 6.2 Stars achieved through high-performance glazing (10.38 mm) and wall cladding including the new façade system, which Mr Jong explains is “a rigid cladding system with a high performance thermoset insulation core, fixed to the timber framing with metal or timber battens product that includes high-performance insulation characteristics, lightweight rigidity and outstanding thermal efficiency”.

Toilets and laundry fixtures boast 4 Star WELS ratings, while the basin mixers have a WELS rating of 6 Stars. The building also has excellent indoor environment air quality, thanks to the extensive use of low VOC paint and E0 rated skirting and architraves (formaldehyde emissions of less than 0.5mg/L), improving on the Australian standard of E1. This ensures beautifully clean and fresh air for residents and visitors.

Extending the sustainability benchmark even further, not only does the timber structure capture and store atmospheric carbon dioxide, but Australand proudly states that 70% of timber was Australian sourced and plantation certified.

Another important feature of prefabrication particularly valued by Australand is workers’ safety. Hazards associated with the construction of floor joists, for instance, are averted through the use of ‘drop in’ floor cassettes, which have a direct positive effect on worksite safety.



Australand Victorian State Manager Mr Pradolin said “WorkSafe praised the building methodology used, reducing the occupational health and safety risks. Safety was a primary driver of our approach”.

The Future Is Prefabricated

According to Mr Jong, “benefits and savings associated with the use of prefabricated timber technologies and building techniques are significant, allowing for greater design flexibility, ease and speed of installation, and excellent thermal and acoustic performance. The Green was quicker to build, resulting in 25 percent cheaper than traditional build costs, safer for workers and has many sustainable features, ticking a number of boxes for mid-rise residential construction”.

The benefits achieved through prefabricated timber elements outweigh the associated risk of performance pathways for regulatory compliance. “This enables Australand to provide more affordable housing for the average Australian in the middle suburbs where concrete construction is not economically viable. This saving will revolutionise the supply of medium rise apartments in the middle to outer ring suburbs as it creates a price point that people can afford to buy.” Mr Pradolin proudly boasts that “The cost saving makes medium rise apartment development in the suburbs far more economically viable”.



Builder/Developer: Australand Holdings Pty Ltd & Citta Property Group
Concept Architect: SJB Architects
Structural Engineer: Irwin Consulting
Fabricator: Timbertruss
Fire Engineer: ARUP
Photo credits: Australand Holdings Pty Ltd

INCREASED USE OF PERFORMANCE

Plumbing and Services sectors voice heard in relation to national training and skill development

Written by Joan Whelan, Project Manager, CPSISC

Construction and Property Services Industry Skills Council (CPSISC) represents the workforce training and skill development needs of the Australian construction and property services industries.

CPSISC works closely with its industry stakeholders to provide a truly national approach to the development and maintenance of its industry-owned Training Packages and products. *‘It is only through the involvement and input of our industry stakeholders that we can achieve excellence in the design and implementation of nationally recognised qualifications’* says CPSISC’s Deputy CEO David Magee.

In 2008, to assist with this ‘industry led’ approach to Training Package maintenance and development for the plumbing and services sectors, CPSISC formed the *National Plumbing and Services Continuous Improvement Reference Group* (NPSCIRG). The NPSCIRG provide industry intelligence and advice to the CPSISC Construction Industry Advisory Committee (CIAC) on all ongoing ‘continuous improvement’ changes or additions to plumbing and services national qualifications and units of competency.



The NPSCIRG has representation from key national stakeholders including:

- Master Plumbers Australia
- National Fire Industry Association
- Institute of Plumbing Australia
- Communications Electrical and Plumbing Union
- Air-conditioning and Mechanical Contractors’ Association
- Australian Hydraulic Services Contractors Association
- National Plumbing Regulators Forum
- Gas Technical Regulators Committee
- Australian Building Codes Board
- National Plumbing and Services Training Advisory Group.

For further information on the makeup of the NPSCIRG go to the CPSISC dedicated webpage: [NPSCIRG](#).

CPSISC value the support and expert advice provided by the NPSCIRG. This group has been instrumental in overseeing and ensuring that the Plumbing and Services national qualifications and units of competency reflect current industry practices and skill requirements. If you would like to be involved in the continuous improvement of CPSISC’s Training Packages, please visit [our website](#) and sign up to ensure that you receive updates.

PLUMBING

Plumbing Research and Development

The ABCB is currently undertaking preliminary research in a number of plumbing areas as part of the Board's annual work program. These research projects were identified as priorities during a Plumbing Code Planning Day held in Hobart in 2013. The planning day was attended by State and Territory plumbing regulators, industry representatives including Master Plumbers Australia and the Association of Hydraulic Design Consultants Australia and the education sector.

The research projects cover four important areas of plumbing:

- Backflow prevention: a review of the current Plumbing Code of Australia (PCA) Deemed-to-Satisfy and other requirements for backflow prevention
- Rainwater harvesting and reuse: a survey of existing literature and current practices to assess potential for a national approach
- Warm water systems: development of draft material for the design, installation and maintenance of warm water systems
- Fixture unit ratings review: a review of fixture unit ratings for the purpose of system design

These research projects may be expanded based on the recommendations of this initial stage and the feedback received from the Board's Plumbing Code Committee. The project scope is summarised as follows.

Backflow prevention

Performance Requirements of the PCA have specific requirements for backflow prevention and avoidance of cross contamination. This project includes a review of the current PCA Deemed-to-Satisfy Provisions for backflow prevention devices and cross connection control.

The review will consider existing backflow prevention requirements and provide recommendations regarding—

- The role of the PCA in protecting—
 - on-site water services (i.e. protection from individual hazards, or 'zone' protection); and
 - the public water supply (i.e. through 'containment' protection).
- Any gaps or inconsistencies which may exist in how the Performance Requirements address cross-connection control and backflow prevention, specifically regarding the risk approach towards potential hazards
- The current 'hazard rating' methodology
- The suitability and selection of devices, including device registration and testing/maintenance regimes
- Device installation requirements
- Other related matters.

Rainwater harvesting and reuse

This project will involve a survey of existing literature and current practices to assess potential for a national approach for harvesting and reuse of rainwater.

The project will produce a report on current policy, regulations and existing publications on rainwater harvesting and reuse, and will provide advice for decision-makers as to the feasibility and net-benefits of different models for a national approach (e.g. non-regulatory and regulatory).

Fixture unit ratings review

Fixture unit ratings are given to fixture types for the purpose of sanitary plumbing and drainage design. Current PCA Deemed-to-Satisfy Provisions for plumbing and drainage design are contained within AS/NZS 3500 Plumbing and Drainage, Part 2 Sanitary plumbing and drainage.

This project will review the current ratings used in hydraulic design in Australia. The work will include the development of a report covering the following:

- the base value of the current rating system and its origins
- an indication of the basis and value of fixture unit ratings used overseas
- potential consequential implications that might occur, or be necessary, if fixture unit ratings were to be amended, including changes to design (such as pipe grades and ventilation), drainage systems and network systems.

The report will also include discussion on the comparison between original and current fixture water usage rates (i.e. flush volumes and flow rates), the role, if any, of the frequency of use of fixtures in fixture unit calculations and the accuracy and suitability of the current ratings.

Warm-water systems

Review existing material where available, on the design, installation and maintenance of warm water systems, engaging specialist input as necessary, with the intention of developing a nationally endorsed system-design approach for use by practitioners.

A strong emphasis will be placed on the design and maintenance of systems to prevent bacterial growth and installation requirements for branch lengths, flow and return velocities, filtration devices, flushing and disinfection.

The draft material will be based on independent specialist advice for the design, installation and on-going maintenance of warm water systems which will be suitable for peer review.

The next step

If these projects recommend the introduction of new requirements they will be subject to the ABCB's regulation impact assessment process, as required under the *COAG Guide to Best Practice regulation*.

This research project is the first step in the development of accurate and nationally consistent information for the plumbing industry. An update on these projects will be included in upcoming editions of the ABRB.

Cyclonic Construction and Testing

In July this year the ABCB's peak building technical advisory committee, the Building Codes Committee (BCC) held its meeting in Townsville in North Queensland. The meeting coincided with an invitation from the James Cook University Cyclone Testing Station (CTS) Board for the BCC to tour the CTS test facilities and to observe cyclone-resistant construction practices being used in new homes in the region.

The CTS mission is: *'To be at the leading edge of wind engineering research and testing of low rise residential buildings. Delivering on quality research programs, testing and technical advice, leading to effective building practices which minimise loss and suffering as a result of severe wind events.'*

CTS undertakes a number of activities that are relevant to the work of the ABCB and the development of building standards. Examples include investigations into the effects of cyclones Larry and Yasi on building performance and similar investigations after wind events throughout Australia, including the storm in the Brisbane suburb of the Gap. Some of this work resulted in the adoption of Australian Standard AS 4505 - *Garage doors and other large access doors* into the NCC and updates to other NCC referenced documents such as AS 4055 - *Wind loads for housing*, AS/NZS 1170.2 - *Wind actions* and AS 2050 - *Installation of roof tiles*.

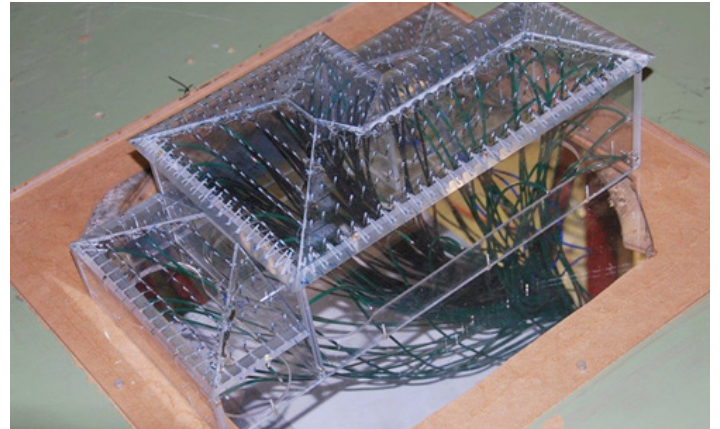
As part of the tour of the CTS testing facilities BCC members were able to observe the work being undertaken by the CTS which included:

- testing the effects of wind loads on structures.
- development of SWIRLnet portable anemometer network to complement Australia's existing fixed anemometer network and improve real time information on wind events in populated areas.
- testing of building products such as wall cladding and roof coverings, racking forces on bracing and suitability of connections used for the installation of solar/photovoltaic panels.
- wind tunnel model studies.
- assessment of wind vulnerability of various building types.
- wind borne debris testing and research.

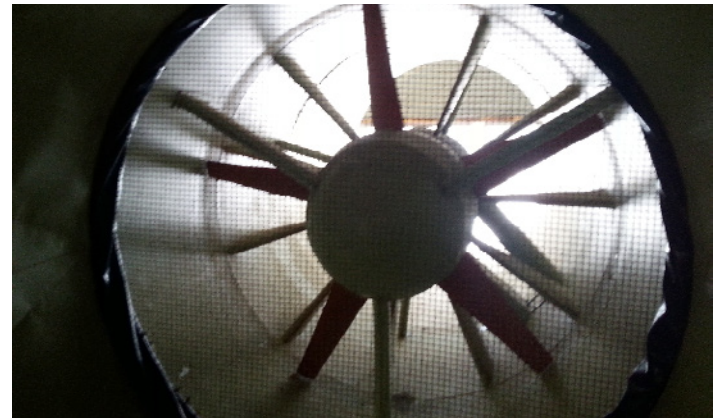
Airbox test facility

CTS staff provided a demonstration of the Station's airbox test facility, which is one of a number of laboratory tests that CTS uses for both fundamental research and testing on behalf of manufacturers to predict the likely response of products when subject to high wind pressures. The benefits of assessing product performance are much greater when it is understood that failed elements become wind driven debris and so pose a threat to people and other structures as potential missiles.

The airbox is an 11 m long, 2 m wide open topped pressure chamber used to simulate wind pressure on structural elements such as roof sheeting, wall cladding, structural panels, roof vents,



CTS use a 1/100 scale model to investigate wind pressures that would act on the roofs, walls, cladding and other features of an equivalent full scale structure.

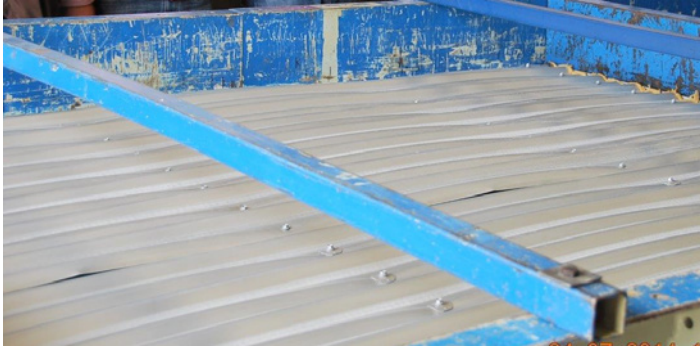


The CTS use a 2.5m x 2.0 x 22m long wind tunnel to research wind load effects on buildings and structures. Research results are often used to adapt design features and develop codes and standards.

skylights, windows, doors and other building elements. For cladding testing, a specimen consisting of a section of roof or wall is installed to become the top surface of the chamber. The air for the chamber is supplied under pressure by large fans that can generate air pressure far in excess of what the strongest tropical cyclone would inflict on a house. This pressure can simulate the positive pressure on the windward side, or the negative pressure (suction) on the lee side of a roof or building. Computer controlled valves in the system apply cyclic pressures to simulate the gustiness within a tropical cyclone (as prescribed in Specification B1.2 of NCC Volume One and Part 3.10.1 in NCC Volume Two), or steady state pressure to simulate gale winds.

The low-high-low pressure sequence testing prescribed by the NCC simulates the wind load induced by a cyclonic event. Low cycle fatigue cracking of metal roof cladding elements during tropical cyclones is a complex process where small changes in load, geometry or material properties can significantly affect the fatigue performance of the cladding system including immediate supports, fixings and cladding.

The low-high-low pressure sequence is used for metal roof cladding as described in the NCC but suppliers of other building systems must also be able to demonstrate that their systems are capable of resisting the relevant site wind conditions, including any cyclic effects where appropriate as detailed AS/NZS 1170.2.



The above image shows the testing of a metal roof cladding assembly in an airbox to simulate the effects of wind pressures. As can be seen, this test specimen includes screw fixing with and without cyclone washers and roofing screws inserted at an angle to illustrate what effect this would have on fixing performance.



Threaded rod tie down anchors connect the timber wall frame to the slab which carries through and is fixed to the top plate.

Tour of new homes being constructed in Townsville

In conjunction with the visit to CTS BCC members also visited two greenfield building estates, with new project homes under construction, to observe some of the building practices for new homes constructed in a cyclone prone region.

Townsville is located in wind region C, therefore requiring some significant tie-down and additional reinforcement to the structural frame and the associated components when compared to construction in wind regions A and B.

The houses inspected during the visit were being constructed using a concrete slab on ground and a combination of reinforced core filled masonry block walls, timber wall framing and timber roof trusses.

Some of the particular things of note included:

- the use of tie down anchors for the wall frames into the slab.
- the connection of roof trusses onto the block walls, to resist uplift and shear capacities.
- the connection between the concrete slab and the block walls.

Another area of particular interest was the construction of the reinforced masonry block walls in accordance with AS 3700 –



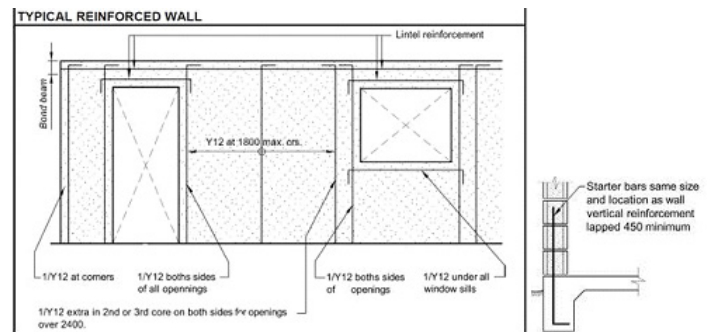
Trusses are anchored to the masonry wall, by a steel plate cleat which has the horizontal bond beam reinforcement threaded through it.

Masonry structures or AS 4773 Parts 1 and 2 – Masonry for small buildings. The block walls were constructed using reinforced concrete bond beams installed at the top of the walls with additional reinforcement installed above windows and doors, which serve as the lintel over the opening.

Vertical reinforcement bars are also installed in the wall at the sides of the openings and at specified spacings, and extend from the concrete slab/footings to the bond beam.

During the visit, CTS staff emphasised the importance of ongoing education programs, to ensure that the importance of specific construction details are understood and relevant actions taken. CTS is keen to work with ABCB and others to develop and disseminate information for construction in both cyclonic and non-cyclonic areas.

The ABCB and the BCC would like to pass on a huge thanks to the CTS Board, the staff at the CTS and the builders and tradesmen at the visited sites for providing the opportunity to experience the testing facilities and the construction techniques first hand.



The above image demonstrates the typical construction detailing of reinforced masonry walls, and the connection of the walls to the slab.

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The Australian Building Codes Board is proud to announce their next National Conference to be held at the Surfers Paradise Marriott Resort on the Gold Coast, Queensland.

13 – 16 September 2015

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If you would like further information or would like to leave your contact details, please contact us at baf2015@loudevents.com.au or on 07 3200 8299.



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**The ABCB Conference is subject to change including dates and venues. Further detailed information will be forthcoming over the coming months.*