

building
4.0 crc

Annual Showcase and Forum 2024

Housing Innovation

Wednesday 19 June 2024

10.30am – 3.30pm

Monash University Caulfield Campus



Australian Government
Department of Industry,
Science and Resources

Cooperative Research
Centres Program

Building 4.0 CRC

Building 4.0 CRC is a research initiative co-funded by industry partners and the Australian Government. It is tasked with revolutionising how buildings are designed, constructed and operated to build faster, safer, more sustainably and at a lower cost.

Building 4.0 CRC focuses on four research areas – industrialisation, digitalisation, sustainability, and people, practices and culture – with a particular drive to create significant demonstration projects where industry, government and the community can experience first-hand those buildings created or retrofitted using innovation and new methods of construction.

Now in its fourth year (of seven), Building 4.0 CRC is working with industry and governments to achieve an 80% reduction in construction waste; 50% cut in CO₂ emissions and a 30% decrease in production costs by developing a more industrialised approach to building. It is also targeting the training of 7,000 apprentices in preparation for the new ways we will build in the future, and the development of an internationally competitive, dynamic and thriving Australian advanced manufacturing sector focused on building.

The CRC undertakes three types of projects:

Industry-led – exploring a single issue in depth with one or multiple parties.

Lighthouse – real buildings that demonstrate Building 4.0 CRC research in action. These projects pair built or 'to-be-built' projects with research teams and market leading industry partners, including government departments and agencies.

Shared Interest – involving topics that affect all aspects of the building lifecycle: from development, design, construction, operation through to end-of-life.

To date, Building 4.0 CRC has been involved in 60 collaborative research projects, either active or completed, with another 40 in the pipeline.

Building 4.0 CRC delivers the following outcomes and benefits with our partners:

- **Industry:** increased profitability and productivity and the ability to generate collaborative partnerships with leading industry, government, research, education and training stakeholders.
- **Research:** ability to conduct leading R&D with global best-in-class companies and build the innovation ecosystem that will underpin Australia's future leadership in the advanced manufacture of buildings.
- **Australia:** reductions in costs and wider improvements in building functionality, sustainability and operational efficiency.
- **Government:** a stronger economy, improved competitiveness and the generation of an innovation ecosystem that will contribute to improved construction policy and regulatory frameworks and a more connected industry.

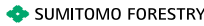


**Visit our website for more information
about Building 4.0 CRC.**

Partners

The CRC's collaborative structure enables our partners to understand the value of new thinking and to integrate innovative practices in their work.

COMMERCIAL INDUSTRY PARTNERS



PROJECT PARTNERS



PEAK INDUSTRY BODIES



RESEARCH AND EDUCATION



GOVERNMENT





TUESDAY 3 SEP 2024

SAVE THE DATE

ANNUAL CONFERENCE

building4pointzero.org/

About the Annual Showcase and Forum

With the housing crisis and cost of living pressures escalating, our work to innovate across building has never been more important. This year, the Building 4.0 CRC Annual Showcase and Forum shines a light on housing innovation, demonstrating prototype products and systems that aim to create more affordable, efficient and sustainable housing in Australia.

The Showcase includes existing CRC members, as well as new partners and their ground-breaking work across the building and construction sector. It profiles some of our current and completed projects and provides an opportunity for our partners to highlight our collaborative R&D.

Acknowledgement of Country

Building 4.0 CRC acknowledges and pays respect to the Ancestors, Elders and communities of the Wurundjeri and Boon Wurrung people of the Kulin Nation, on whose lands we live and work.

We acknowledge Aboriginal connection to material and creative practice on these lands for more than 60,000 years and celebrate their enduring presence and knowledge.

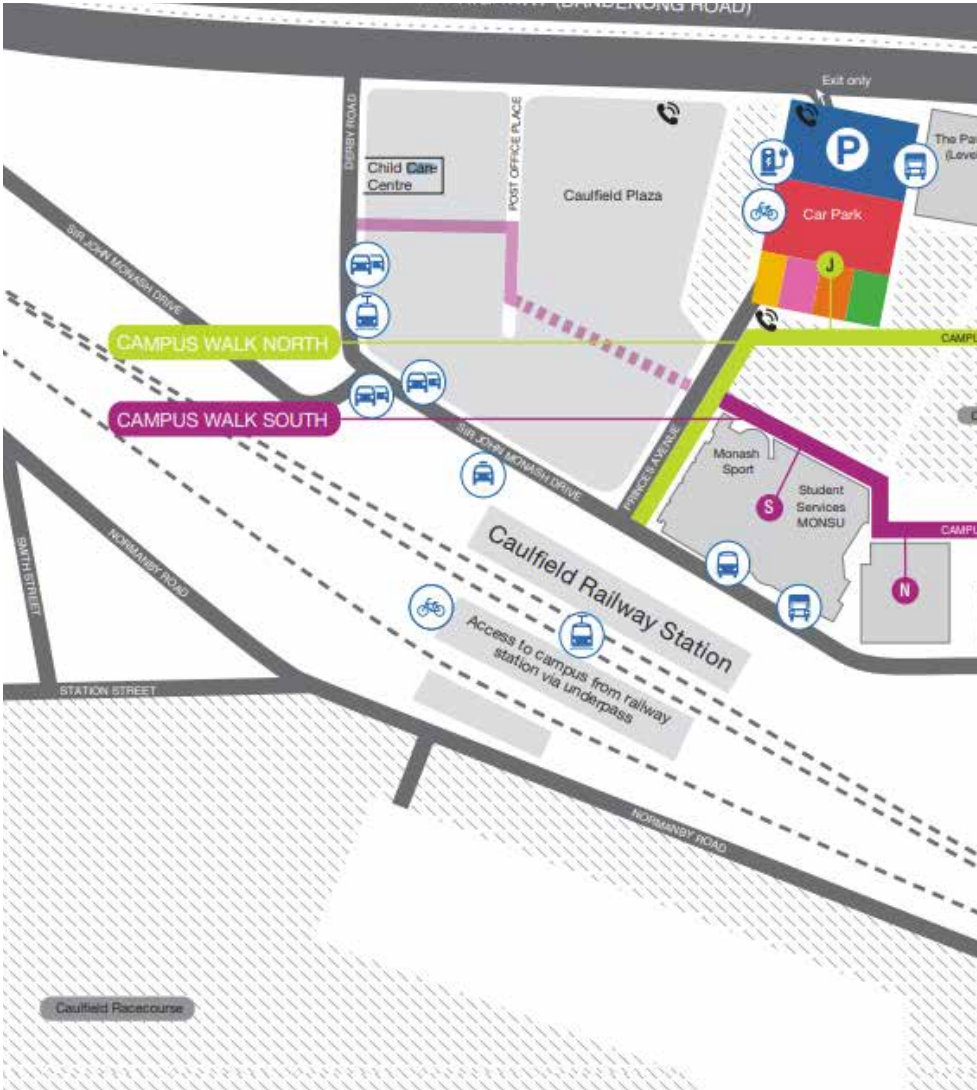
Program		
10.30am	Registration and Morning Tea	The Pavilion Building H
11.00am	Official Welcome by Prof. Mathew Aitchison, CEO – Building 4.0 CRC	The Pavilion Building H
11.10am	Opening Address	The Pavilion Building H
11.20am	Showcase Overview	The Pavilion Building H
11.30am	Showcase Tours	Monash
1pm – 2pm	Lunch and Networking	MADA Building G Concourse
2.00pm	In Conversation: New CRC Projects in Housing	Lecture Theatre G104
2.30pm	Closing Remarks by Prof. Chris Knapp, Research Director – Building 4.0 CRC	Lecture Theatre G104
2.30pm – 3.30pm	Networking Drinks	MADA Building G Concourse
3.30pm	Showcase Close	

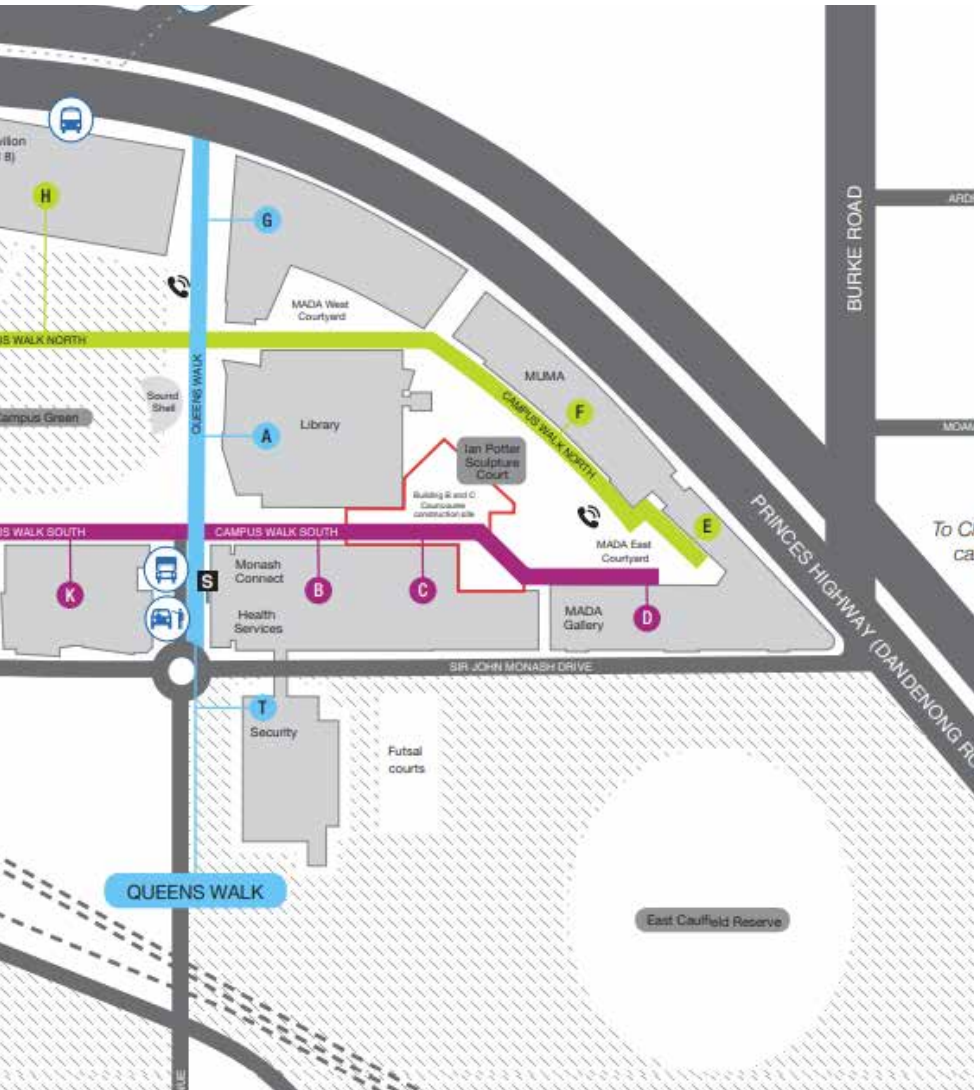
Annual Showcase Exhibitor List

Showcase Exhibitors	Prototype/Exhibition	Location
MADA Building G, Level 1		
Building 4.0 CRC	Research + Development	MADA Building G Level 1 : Atrium
Bond University	Plywood Panel System in Residential Construction	MADA Building G Level 1 : Atrium
CE Construction Solutions	CarbonCure & SmartRock	MADA Building G Level 1 : Atrium
Masslam	Social Housing Project	MADA Building G Level 1 : Atrium
Monash University	Project 32 Acoustic flanking performance of mid-rise light gauge steel (LGS) structures	MADA Building G Level 1 : Atrium
Monash University	Project 35 Prefab Housing Solutions for Bushfire and Disaster Relief	MADA Building G Level 1 : Atrium
Sumitomo Forestry Australia	Bearing Connections	MADA Building G Level 1 : Atrium
XFrame	XFrame	MADA Building G Level 1 : Atrium
Fleetwood Australia	VR Experience of Modular Homes	MADA Building G Level 1 : Project Assembly Area
The University of Newcastle University of New South Wales Earth Building Association of Australia Earth Building Solutions MudTec Integrated Biotechure	Earth Building	MADA Building G Level 1 : Project Assembly Area
MADA and MUMA Courtyards		
Brickworks	Brickworks Building Products	MADA Courtyard East
Verton	Advanced Technology for Lifting Operations	MADA Courtyard East
Candour	Candour Prefab Platform Demonstrator Pod	MUMA Ian Potter Sculpture Courtyard
SPACECUBE	Rapid Deployment Accommodation – 2 Bedroom Suite	MUMA Ian Potter Sculpture Courtyard

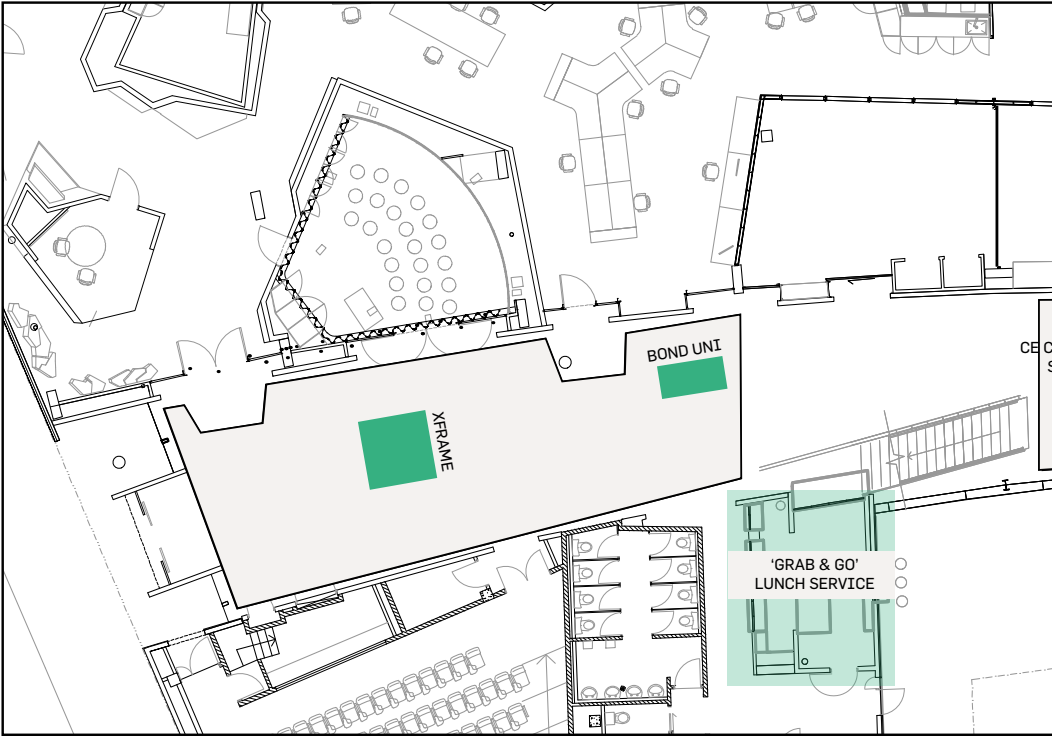
Showcase Exhibitors	Prototype/Exhibition	Location
MADA Gallery		
Finding Infinity	Carbon Positive Timber Construction	MADA Gallery
Finding Infinity	Modular Retrofit Facade	MADA Gallery
Finding Infinity	Plus Prototype	MADA Gallery
RMIT School of Architecture and Urban Design	The Same River Twice: Reimagining Density via Adaptive Reuse and Experimental Planning Opportunities in Montague (Fishermans Bend)	MADA Gallery
University of Melbourne	Backyard Futures: Movable Homes Studio	MADA Gallery
Office of the Victorian Government Architect	Future Homes	MADA Gallery
ZERO Living	Net Positive Homes	MADA Gallery
Lendlease	Podium	MADA Gallery
MADA, Monash University Future Building Initiative Building 4.0 CRC	Building 2050 – Master of Architecture Studio	MADA Gallery
Monash University	Solar Decathlon	MADA Gallery
PT Blink	Blink DMI® – Faster, Safer, Better, Less Waste	MADA Gallery

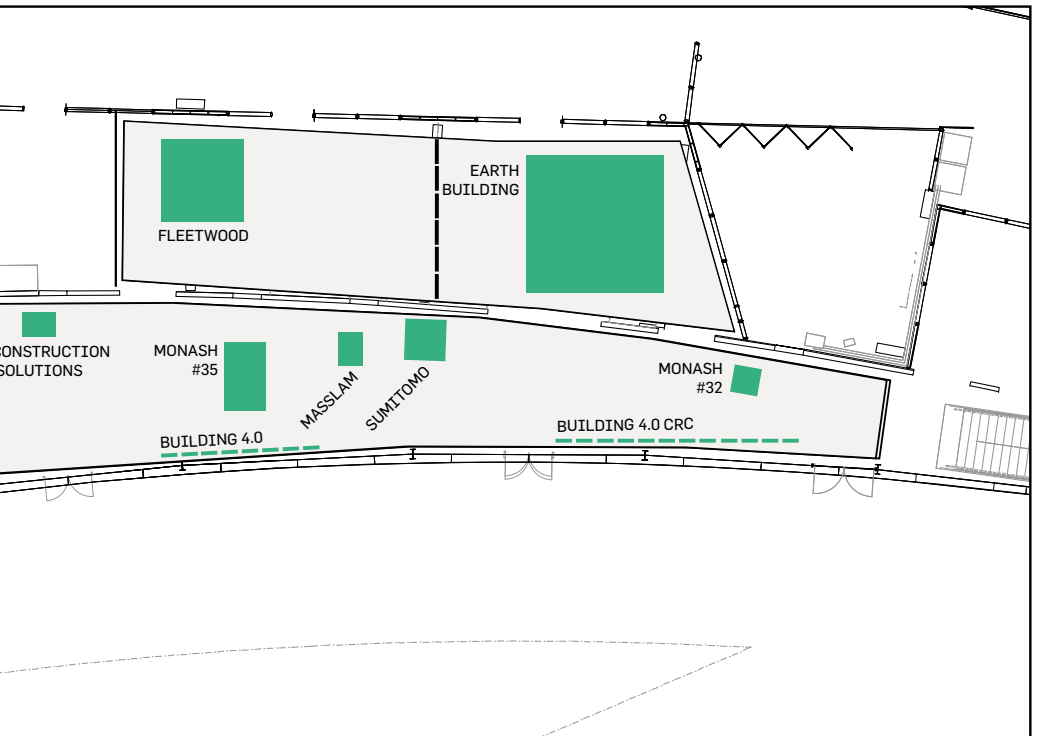
Monash



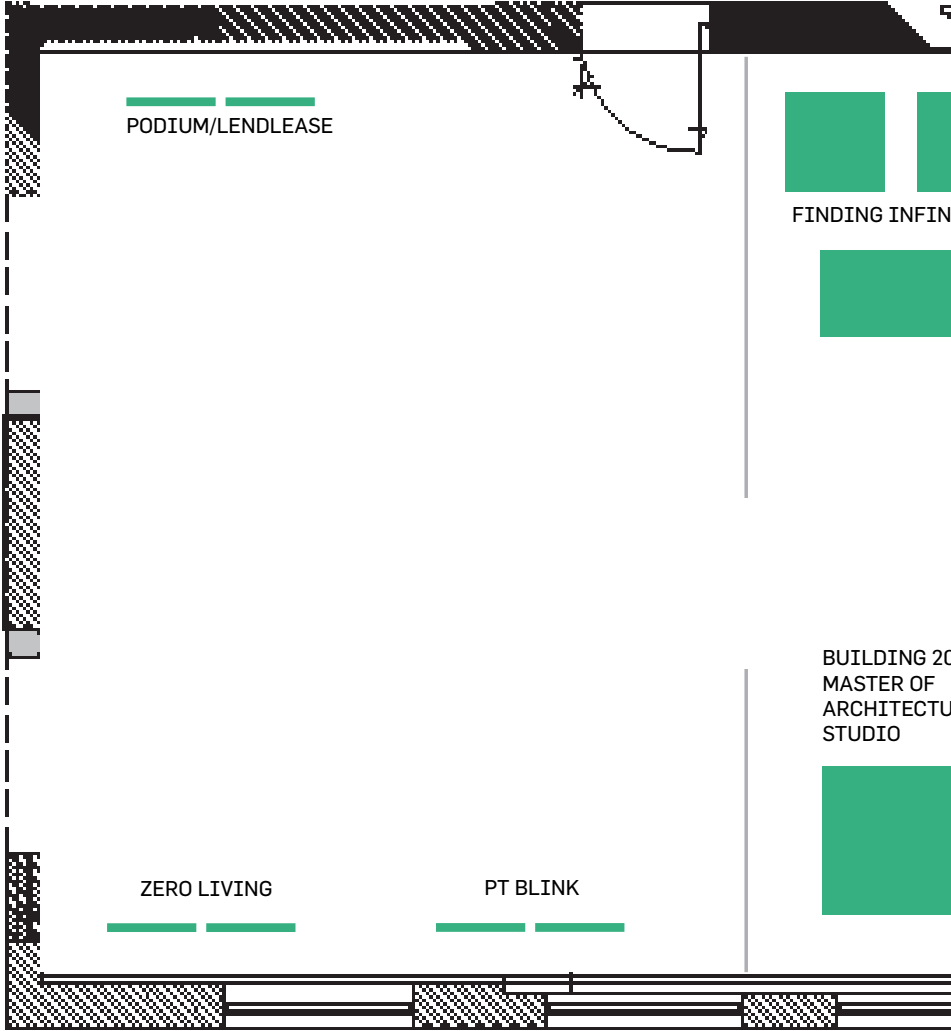


MADA Building G Level 1: Atrium





MADA Faculty Gallery





Exhibitor	Building 4.0 CRC
What's on display	Research + Development

Together with our industry and research partners, we have a range of projects that focus on housing innovation, including:

- new materials and components (e.g. componentised walls, an integrated prefab wall system, new window materials)
- new processes (e.g. a roadmap to move the building industry towards smart prefabrication, a roadmap to transition the industry to a circular economy, use of product platforms, remote compliance inspections, regulatory reform for industrialised building)
- new skills (e.g. use of mixed reality technologies in vocational education and training, recommendations for contemporary industrialised construction education).

If you're interested in partnering with us on one of our projects, please email us at info@building40crc.org.

Location	MADA Building G Level 1 : Atrium
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RESEARCH



PROJECTS



RESOURCES

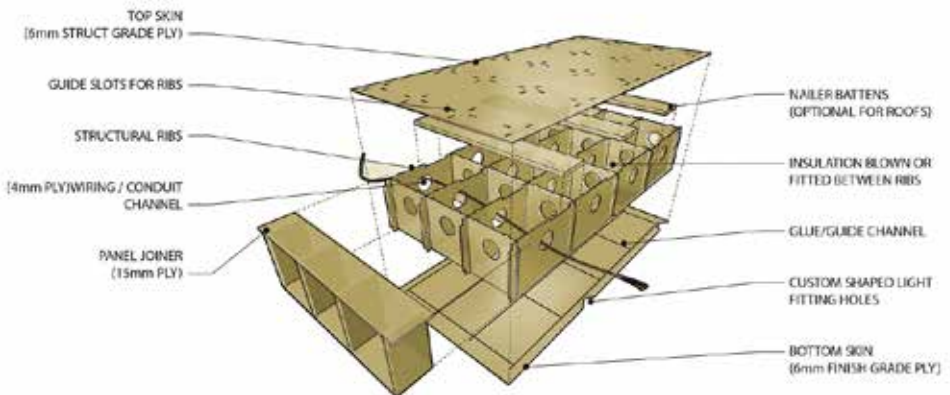
Exhibitor Bond University

What's on display Plywood Panel System in Residential Construction

These innovative plywood panels use a glue-only fixing system, eliminating the need for conventional fasteners. Each panel consists of top and bottom skins with web stiffeners running in two directions. Computer numerical control (CNC) cutting ensures precise fabrication, resulting in panels with seamless finishes and routed details.

The top skin features flush tabs for locating the webs, ensuring optimal alignment during assembly. Plywood joiners allow seamless integration of floors and walls. Additionally, a grid of variable-sized holes in the webs facilitates ducting, conduit and piping, enhancing the panels' versatility. The cells between webs provide space for various types of insulation, optimising thermal efficiency and comfort.

Location MADA | Building G Level 1 : Atrium



MADA | Building G Level 1 : Atrium

Exhibitor CE Construction Solutions

What's on display CarbonCure & SmartRock

Concrete and cement contribute to approximately 5–8% of the world's global emissions each year. CE Construction Solutions present CarbonCure, a revolutionary technology in sustainable concrete construction. CarbonCure's innovative technology is a direct way to reduce embodied carbon in concrete.

Our technology is retrofitted into existing concrete plants and enables concrete producers to inject captured CO₂ into fresh concrete during the batching process. Once injected, the CO₂ reacts with the concrete mix, becomes permanently embedded, and cannot be released back into Earth's atmosphere. Further, injecting CarbonCure enhances the concrete's strength, reducing the cement required for the concrete to meet its performance requirements.

Location MADA | Building G Level 1 : Atrium



Exhibitor MASSLAM

What's on display MASSLAM bearing connection

The MASSLAM bearing connection epitomises the synergy between Design for Manufacture and Assembly (DfMA) and structural performance. Leveraging the inherent and unique strengths of the hardwood species used for MASSLAM at Australian Sustainable Hardwoods (ASH) achieves an optimal connection solution. This approach enhances load-bearing capacity and safety-in-design while celebrating the beauty in the simplicity of traditional timber-to-timber connection.

Location MADA | Building G Level 1 : Atrium

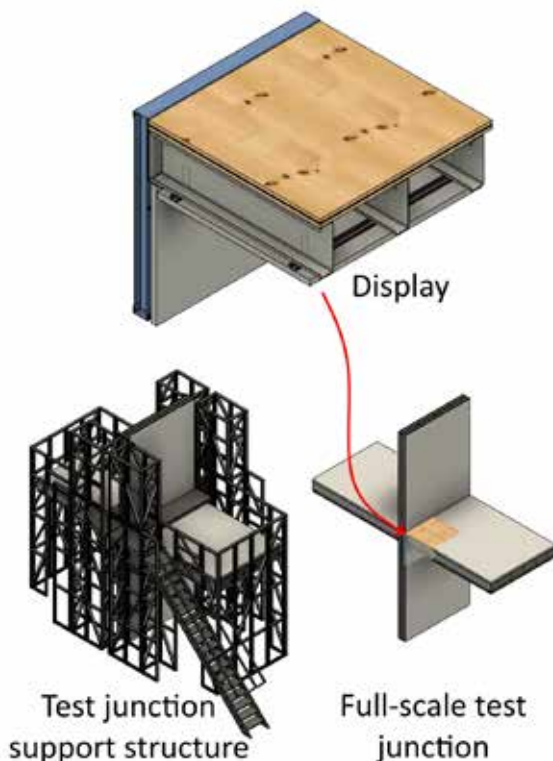


Exhibitor Monash University

What's on display Project 32 Acoustic flanking performance of mid-rise light gauge steel (LGS) structures

This display prototype represents a portion of a full-scale inter-tenancy wall-to-floor-connection we are testing to determine the amount of flanking sound transmitted through the junction via structure-borne vibration. To test this, we excite the structure with hammer impacts at 36 different locations and measure the resulting vibration at 176 locations over the surface of the structure. Results will be used to develop a model for assessing flanking transmission in multi-storey light gauge steel buildings.

Location MADA | Building G Level 1 : Atrium

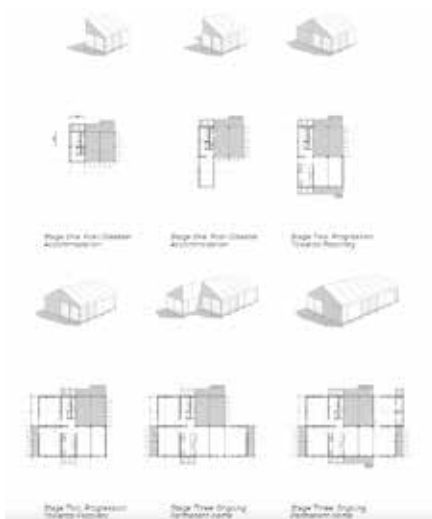


Exhibitor	Monash University
What's on display	Project 35 Prefab Housing Solutions for Bushfire and Disaster Relief

Suitable temporary accommodation options and timely reconstruction are crucial to helping communities recover and thrive after bushfires and other disasters. Unfortunately, the traditional model of rebuilding can be extremely slow and complex.

This study investigated the potential for prefabrication and advanced manufacture as an alternative to traditional construction in providing both short-term and long-term housing solutions for those affected by bushfires and other disasters. The research explored the complexities and barriers to designing, manufacturing and installing prefabricated modular homes and units in bushfire impacted regions. The project proposes a flexible 'kit of parts' or 'product platform' approach that is suitable for immediate post disaster scenarios but that can be incrementally expanded – transforming short-term temporary accommodation after a disaster into a long-term housing solution.

Location	MADA Building G Level 1 : Atrium
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MADA | Building G Level 1 : Atrium

Exhibitor Sumitomo Forestry Australia

What's on display Bearing Connection

Sumitomo Forestry, together with local and international partners, has delivered an innovative and sustainable 15-storey building in Collingwood, using local mass timber products and is proud to share its technologies and outcomes.

Location MADA | Building G Level 1 : Atrium



Exhibitor XFrame

What's on display XFrame

XFrame is a next generation light-weight structural timber framing technology – designed for distributed manufacturing, demountable internal wall finishes, efficient structural modularity and radically decreased building times.

Location MADA | Building G Level 1 : Atrium



MADA | Building G Level 1 : Atrium

Exhibitor Fleetwood Australia

What's on display VR experience of modular homes

Fleetwood offers a range of quality built affordable housing solutions, including temporary housing, modular homes, park homes and accommodation chalets. Our prefabricated buildings are architecturally designed with neutral or contemporary finishes to the exterior and interior, offering the style, comfort and practicality of a traditional home. We are specialists in multi-home solutions and do not offer single, standalone home builds.

Our temporary housing solutions are manufactured in a controlled factory environment and can be transported to just about anywhere. All our homes are built to a high standard and can withstand even the harshest weather conditions.

Location MADA | Building G Level 1 : Project Assembly Area



Exhibitor University of Newcastle
University of New South Wales
Earth Building Association of Australia
Earth Building Solutions
MudTec
Integrated Biotechure

What's on display Earth Building

This exhibition is of a series of advancements needed in earth building homes. This includes development of: new earth building materials, a new earth building manual and a pre-fabricated system for DIY earth building homes.

Location MADA | Building G Level 1 : Project Assembly Area



MUMA | Ian Potter Sculpture Courtyard

Exhibitor Candour

What's on display Candour Prefab Platform Demonstrator Pod

Candour's mission is to streamline the process of designing and building high-quality, sustainable and custom prefabricated buildings. We empower architects, designers, builders and owners with innovative tools and facilities:

- **CANDOUR TOOLS:** BIM software plugins that allow architects to select the most suitable offsite fabrication methods for their projects from a single interface
- **CANDOUR FABRICATION:** State-of-the-art in-house prefabrication facilities that link directly to our design tools, ensuring a smooth transition from digital design to physical construction.

This unique ecosystem simplifies design and manufacturing, and connects manufacturers directly to a large network of architects.

This pavilion illustrates both the design and efficiency potential of using Candour's platform while also displaying the details, materials and systems Candour uses to achieve high performance, beautiful buildings.

Location MUMA | Ian Potter Sculpture Courtyard



Exhibitor	SPACECUBE
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What's on display	Rapid Deployment Accommodation – 2 Bedroom Suite
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SPACECUBE's modular accommodation solutions offer an affordable short-term housing option.

These 1- and 2-bedroom modular homes:

- offer a clean, simple design that requires minimal fit out
- are customisable and configurable, with plug 'n' play modular components that cater for bespoke outcomes using off-the-shelf products
- are flat-packable for efficient storage and transportation
- are sustainable, with 90% of build components being totally reusable.

SPACECUBE specialises in the design, development and delivery of turn-key modular solutions.

Location	MUMA Ian Potter Sculpture Courtyard
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MADA Courtyard East

Exhibitor Verton

What's on display Advanced Technology for Lifting Operations SpinPod 7.5

The EVEREST SpinPod 7.5 unlocks improvements in safety and productivity. This adaptation of Verton's SpinPod technology provides a modular solution for precise load orientation and control through remote-controlled operation.

Problem

Handheld taglines are inherently dangerous and people in the vicinity of the suspended load are at risk of injury and death. Human interaction with, and proximity to, the load often creates a bottleneck in construction, maintenance and decommissioning projects.

Solution

The Verton SpinPod 7.5 provides a 'hands off' approach to orientating loads by removing people from the drop zone, making operations safer and more productive.

Location MADA Courtyard East



Exhibitor	Brickworks
What's on display	Mule Robot Brickworks Building Products

Imagine humans working alongside collaborative robots (cobots), laying bricks and blocks to build urgently needed homes for the growing Australian population. This human-robot collaboration project will develop a digital design to physical construction workflow for masonry construction using cobots to be employed alongside labourers. Using masonry bricks, the project elevates the efficiency of building brick walls which are essential building elements in the commercial construction and housing industry. Based on observational studies of masonry construction of highly skilled labourers, the project aims to train cobots working alongside human workers to pick and place masonry bricks with precision.

Location	MADA Courtyard East
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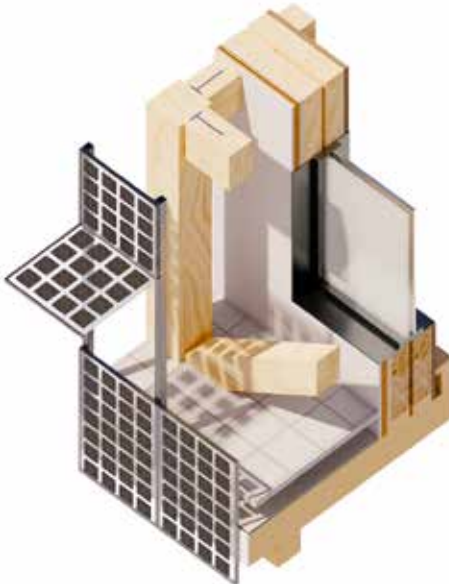
Exhibitor Finding Infinity

What's on display Carbon Positive Mass Timber Construction

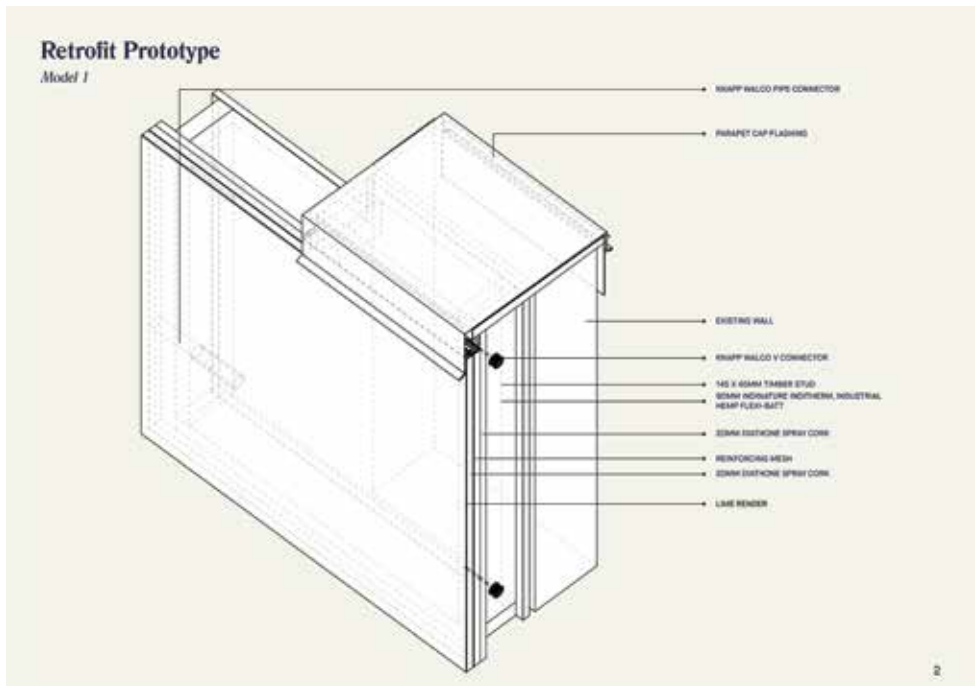
We want to build two wall prototypes at a large scale to demonstrate circular, zero carbon construction – zero emissions in construction and zero emissions in operations.

The project combines a range of cost-effective, pragmatic, practical initiatives that allow every new building to have a positive impact. It will demonstrate commercially viable initiatives that are scalable and replicable. It aims to work closely with industry to leverage collective knowledge and research to accelerate Melbourne's position towards a net-zero building code. The project will be a tool to help educate developers, builders and the broader public as an ongoing sustainability workshop.

Location MADA Gallery



Exhibitor	Finding Infinity
What's on display	Modular Retrofit Facade
<p>Retrofitting buildings is the most cost-effective way to cut energy use and greenhouse gas emissions. Existing buildings present a much larger problem—and a larger opportunity—than new buildings. Existing building stock around the globe is typically inefficient. And nearly two-thirds of the building area that exists today will still be in use in 2050.</p> <p>Reducing energy consumption through retrofitting buildings is a significant and cost-effective opportunity. We are exploring prefabricated modular walls that can be attached to an existing building to increase performance.</p>	
Location	MADA Gallery



Exhibitor Finding Infinity

What's on display Plus Prototype Model

The construction and operation of zero carbon buildings in Australia presents a logical and cost-effective solution, yet surprisingly, there are currently no examples of such buildings worldwide. The Net Zero Prototype aims to be a physical example that demonstrates the future net-zero code for new buildings in Australia, targeting zero to low carbon construction, plus energy operations, ultra-low energy demand, water neutrality and zero waste.

There are many challenges to achieving net zero buildings in Australia, however this prototype will work through these and showcase how a net zero building can be built to meet Australian codes and regulations, use only materials and technology that are currently available and be financially viable and scalable.

Location MADA Gallery



Exhibitor	RMIT School of Architecture and Urban Design
What's on display	The Same River Twice: Reimagining Density via Adaptive Reuse and Experimental Planning Opportunities in Montague (Fishermans Bend)

This project presents a future scenario of six (sub)urban blocks located in the Montague South precinct of Fishermans Bend. Collaborating with the Fishermans Bend Taskforce, we aimed to compare a traditional planning scenario with one incorporating proposed new planning controls, including Social Housing Uplift, Open Space Uplift schemes and a Development Contributions Plan for 'character' buildings.

The model illustrates the potential for increased density across six key sites under these new controls, facilitating an additional 500,000 gross floor area (GFA) of housing. This serves to incentivise sustainable approaches to adaptive reuse at the 6–10 storey limit rather than complete demolition and reconstruction.

Collaborating with Fabian Prideaux (EPIC Database UoM), we speculated on a total embodied carbon quota of 250,000 tonnes CO₂-e (A1–A3) for the precinct. This investigation aims to illuminate the implications of establishing embodied carbon quotas within adaptive reuse and urban renewal endeavours.

Location	MADA Gallery
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Exhibitor University of Melbourne

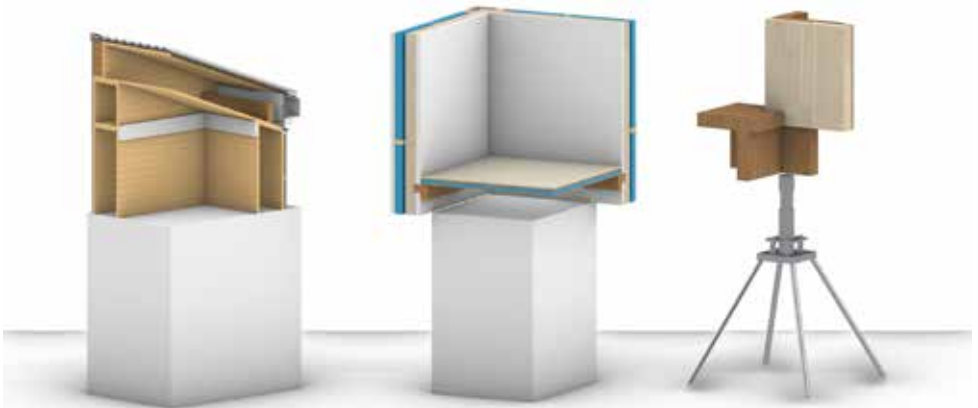
What's on display Backyard Futures: Movable Homes Studio

The University of Melbourne, in collaboration with Homes Victoria, is delivering Backyard Futures: Movable Homes Studio. Taught at Masters level, engineering students collaborate on a shared design brief that involves developing new concepts for their Movable Unit product. The Movable Unit product is a relocatable small dwelling that is constructed in the backyard of a client's family home.

Students are generating new concepts that use Modern Methods of Construction and Whole Life Carbon as primary design drivers.

Students are working on three separate projects to design innovative structural systems. The connections in these systems need to consider: production, materiality, embodied energy, assembly and disassembly. These prototypes aim to showcase not only sustainable and efficient construction techniques but also the potential for aesthetic improvements in social housing.

Location MADA Gallery



Exhibitor	Office of the Victorian Government Architect
What's on display	Future Homes

Victoria's population is set to double by 2050. Future Homes is a project led by the Department of Transport and Planning (DTP) including the Office of the Victorian Government Architect (OVGA). Delivering on Plan Melbourne 2017–2050 and forming part of the Better Apartments program, Future Homes facilitates high-quality apartments through a streamlined planning process.

Future Homes feature:

- high-quality, competition-winning designs
- ageing-in-place and family-friendly allowances
- excellent environmental performance (average 7.5 star NatHERS)
- 100% naturally ventilated and light filled homes
- excellence score in Built Environment Sustainability Scorecard (BESS)
- best practice water sensitive urban design
- gold level accessibility compliance for 50% of apartments
- generous gardens and high-quality communal and private open space.

Location	MADA Gallery
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Exhibitor	ZERO Living
What's on display	Net Positive Homes

Victoria is the first jurisdiction in the world to have series built, fully electric, net positive homes. The ZERO approach can be utilised in government building projects, volume build projects and most building projects.

- Each Zero home produces twice as much energy as it uses (200% ZERO energy rated).*
- Each home never has an energy bill.*
- Each home is black out/brown out proof.*

Engineered in conjunction with Swinburne University of Technology, ZERO homes are engineered like a Tesla, but better, because they never need to be recharged. They charge themselves and can charge your EV or someone else's. Each home has its own energy consumption sticker – just like any other appliance or vehicle..

They are also live monitored – data is sent to Swinburne and returned to the owner via the ZERO App. To date, 300 million data minutes have been recorded.

ZERO appreciates the assistance from Sustainability Victoria.

*ZERO homes are extremely energy efficient (using the tri battery approach) and 75% of customers chose to install the ZEROEnergy pack (for zero energy bills and zero blackouts), avoiding the estimated \$70,000–\$80,000 average household energy bills over a 20-year period.

Location	MADA Gallery
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Exhibitor	Lendlease
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What's on display	Podium
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Harnessing over 60 years of applied experience, Podium consists of two products that offer solutions across property from design automation and supply chain to space utilisation and customer and place insights. It's creating places where people and businesses thrive.

Location	MADA Gallery
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Exhibitor	MADA, Monash University Future Building Initiative Building 4.0 CRC
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What's on display	Building 2050 – Master of Architecture Studio
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This exhibit features design studio work by 18 MADA Master of Architecture students proposing a new 'off-site construction hub' in Fishermans Bend, Melbourne based in 2050. Nine teams have proposed individual factories and public programs that together create a new 'Construction through Advanced Manufacturing Precinct (CAMP)'. Created under the direction of Prof. Chris Knapp (Research Director, Building 4.0 CRC) and Jean-Paul Rollo (MADA), this is the work of a research-led education unit connected to Building 4.0 CRC Project #66: Future of Construction Education. This current project is supported by Holmesglen Institute, A.G. Coombs, Nexans, Master Builders Association Victoria, Sumitomo Forestry Australia, Lendlease Digital, Fleetwood Australia, Victorian Building Authority, Monash University and the University of Melbourne. Off-site Construction Hubs were the focus of Project #38.

Location	MADA Gallery
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Exhibitor	Monash University
What's on display	Solar Decathlon

Location	MADA Gallery
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Exhibitor	PT Blink
What's on display	Blink DMI® – Faster, Safer, Better, Less Waste

Blink DMI® is an end-to-end methodology to Design, Manufacture and Integrate entire multi-storey buildings from a kit of configurable parts. PT Blink has commercialised the methodology, which is available on a licensing basis for projects today. While licensing the technology, PT Blink is concurrently building a cloud-based platform and manufacturer marketplace so Blink DMI can be used independently as Software as a Service.

The exhibit demonstrates the potential for Blink DMI to solve the housing crisis today by rapidly accelerating project timelines, targeting time savings of 40–60% through a streamlined process, technology platform and distributed network of accredited manufacturers.

Location	MADA Gallery
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NEWS AND EVENTS

At Building 4.0 CRC, we hold multiple events throughout the year to showcase our work and highlight current topics in construction. Find out about our past and future events.



SOCIAL MEDIA

Follow us on LinkedIn to keep up to date with all of our news, events and commentary on the building industry.



PODCAST

Future Building podcast takes a fresh look at the opportunities for change, examining news and trends along with research and developments from the building industry.



VIDEOS

Check out and subscribe to our YouTube channel to see videos of past events, podcasts and conversations with experts in the industry.

