

FIRE AUSTRALIA

**Opening doors: WA's new
Bushfire Centre of Excellence**

**Improving evacuations
through engineering**

**How research is delivering
better emergency management**

A woman with glasses and a black blazer is speaking at a podium. There are two water bottles on the podium. The background is a blue wall.

Fire Australia 2021

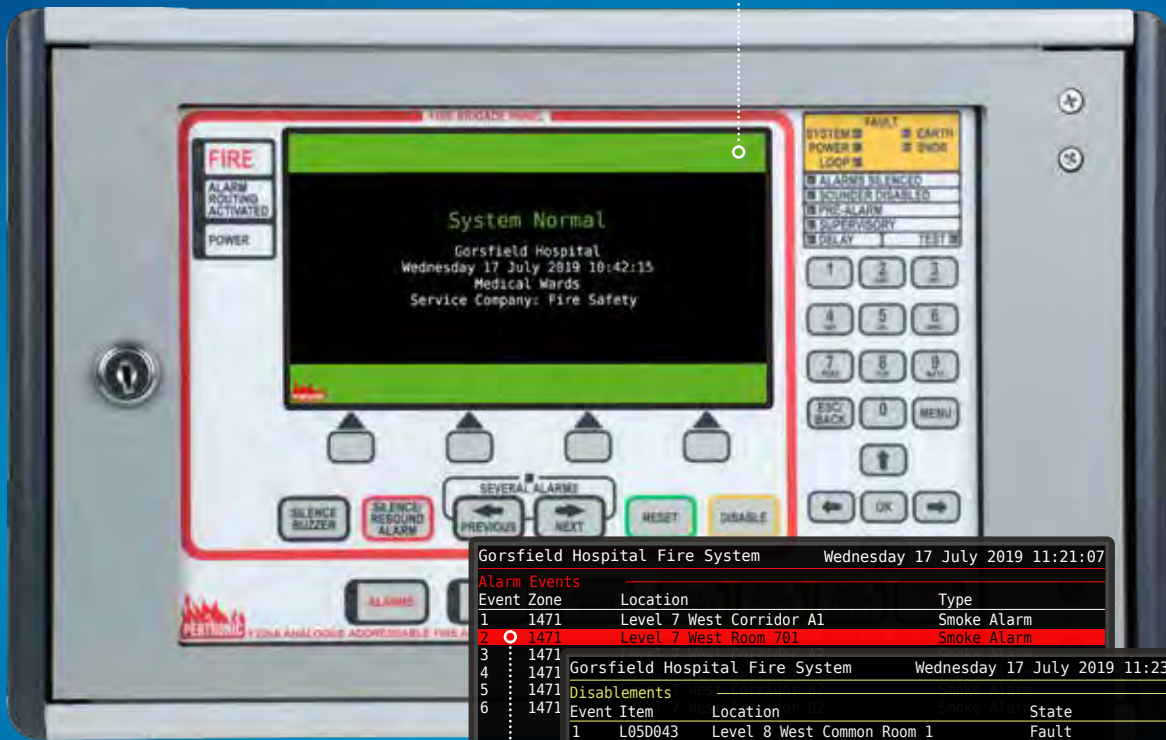
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The green **normal** screen shows that everything is OK

Gorsfield Hospital Fire System Wednesday 17 July 2019 11:21:07

Alarm Events

Event	Zone	Location	Type
1	1471	Level 7 West Corridor A1	Smoke Alarm
2	1471	Level 7 West Room 701	Smoke Alarm
3	1471		
4	1471		

Gorsfield Hospital Fire System Wednesday 17 July 2019 11:23:03

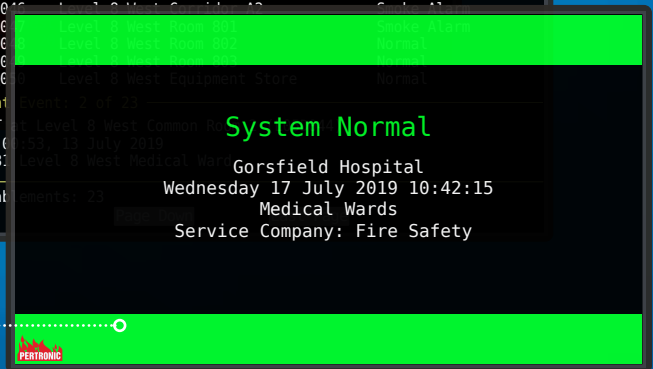
Disables

Event	Item	Location	State
1	L05D043	Level 8 West Common Room 1	Fault
2	L05D044	Level 8 West Common Room 2	Fault
3	L05D045	Level 8 West Corridor A1	Smoke Alarm
4	L05D046		

Alarm Point

Item	AC	Time	Zone
5	L05D043	11:23:03	L05D043
6	L05D044	11:23:03	L05D044
7	L05D045	11:23:03	L05D045
8	L05D046	11:23:03	L05D046

Total Zone: 8



The Pertronic F220 & Net2 product range is ActivFire listed under AS 7240.2, AS 7240.4, AS 7240.13, and AS 4428.3.

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A RETURN TO NORMAL

NATHAN SEMOS

Chief Operating Officer,
FPA Australia



I'm sure we can all agree—2020 was a strange year. Almost immediately, the global pandemic changed the way we did everything—new procedures, new technologies, and a whole workforce communicating from their living room, kitchen or bedroom. Such adjustments came out of necessity, though one unfortunate consequence was the cancellation of FPA Australia's flagship event – Fire Australia. However, it's now 2021, the lockdowns have eased and Fire Australia is back on! Despite a bit of uncertainty, and with government policy still relatively changeable, we are pushing ahead with our plans for the largest fire

protection event in the Southern Hemisphere.

We believe that the industry needs to reconnect—fire practitioners need to meet, share ideas, and develop and learn with their peers. The wellbeing of our people depends on human contact and engagement, and Fire Australia 2021 is the ideal place for that to happen.

This doesn't mean that we're not taking precautions. This year we've worked closely with the experienced staff at the International Convention Centre (ICC) in Sydney to keep all attendees safe and protected from the risk of the coronavirus. We've been watching government announcements carefully and paying close attention to every potential change, and we are confident that everything is returning to normal. Just in case, we've introduced a virtual stream into our event, so that those who can't attend will still be able to participate, and we plan to be agile in our response to any changes.

So, what can you expect from Fire Australia 2021? From 11 to 13 May, you'll get three days of interesting, thought-provoking topics, networking events and informative tours of inspiring facilities. We've assembled some of the best speakers from Australia and overseas to cover issues relevant to fire protection and to pass their knowledge on. Come along to hear about the lessons from Grenfell or the 2019–20 bushfires, how to minimise your legal risks from routine service work, and what to expect from ongoing state and territory reforms.

Visit our Tradeshow and Exhibition—filled with leading suppliers in the industry—and examine innovative fire safety ideas and products.

You can network with your peers at the Welcome Cocktail Reception, celebrate excellence in the industry at the Fire Australia Conference and Awards Gala while raising money for the Fiona Wood Foundation, or just grab a coffee while you wander through the Tradeshow.

FPA Australia is conscious that it's hard for people to adjust to the idea that everything is returning to normal, but we're optimistic and planning for a fantastic conference. Fire Australia 2021 will be a fresh chance to re-engage with your peers and inform yourself, after a year of lockdowns and restrictions. I hope you decide to come and look forward to welcoming you to the ICC in May.

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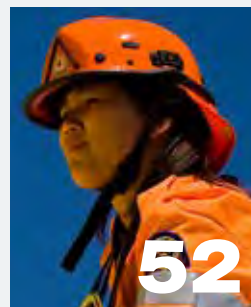
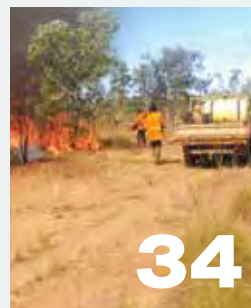
FIRE AUSTRALIA

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OUR COVER

Shergold-Weir report author Bronwyn Weir returns to share her views on progress with fire safety reforms at Fire Australia 2021. PHOTO: FPA AUSTRALIA

ABOUT FIRE AUSTRALIA

Fire Australia is a joint publication of Fire Protection Association Australia, AFAC and the Bushfire and Natural Hazards CRC. We aim to bring the latest news, developments and technical information to the fire protection industry, emergency services and natural hazards research organisations. *Fire Australia* is produced quarterly and distributed throughout Australia and New Zealand. Editorial submissions are welcome and can be sent to: magazine@fpaa.com.au. For more details on submitting a contribution, please contact the editors.

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RESEARCH DRIVEN BY REAL-WORLD NEEDS

For the last eight years, the main priority of the Bushfire and Natural Hazards CRC has been to provide useful, high-quality, needs-based research through partnerships with universities, emergency service agencies, international research organisations, government departments and non-government groups. The aim is to drive changes in the way Australia prepares for, manages and responds to natural hazards.

To distil and make sense of the plethora of research completed since 2013, the CRC has created an online resource called Driving Change.

“Driving Change provides the all-important first steps into using the project outputs with overviews and many great examples of utilisation, all linking back to the underpinning research,” said CRC CEO Dr Richard Thornton.

Driving Change collects and curates the best and latest research from across the eight years of the CRC’s research program. It highlights the CRC’s partnerships by collecting and presenting all research into ten themes according to how the research is now being used by emergency services, government and the community.

The ten themes are: disaster

resilience; economics, mitigation and value; education and communications; extreme weather; fire predictive services; future workforce; Indigenous initiatives; infrastructure and impact; managing the landscape; and policy, political engagement and influence.

Each theme showcases the key findings and achievements of CRC research. From those theme pages, visitors to the site can access curated online tools, inspiring case studies of research in action, and a selection of the best news, resources and publications, culminating in a collection of all research projects relating to that theme.

No matter which research area visitors are interested in, they can easily find and explore the real-world impact of all research relating to that topic. From a selection of key outputs to the full collection, users now have everything they need to know about the vital research of the CRC and how it is driving change at the operational and practical level.

CRC Communications Director David Bruce explains the thinking behind



Driving Change collects and curates the best and latest research from across the eight years of the CRC’s research program.

the site and the value of a collection of curated research.

“If your questions are about what you need to know, where to find it, how to use it or how others are using it, then Driving Change is the place to start,” Mr Bruce said.

Driving Change highlights the ways that partners have shaped and supported all research completed by the CRC, and supports ongoing discussion of the importance of collaborative, partner-driven research in future natural hazards research. ■

You can access the Driving Change section of the CRC website at www.bnhcrc.com.au/driving-change.

LAUNCH OF FPA AUSTRALIA’S NSW TRAINING CENTRE

On 30 April 2021, FPA Australia’s NSW Training Centre will officially be launched by the NSW Minister for Police and Emergency Services, David Elliott MP, and Commissioner Paul Baxter of Fire and Rescue NSW (FRNSW).

After two years of planning and development, stage one—the wet services training room—has been completed.

The Training Centre is located in the grounds of FRNSW’s Emergency Services Academy at Orchard Hills. It represents a significant step forward for the Association—a dedicated NSW training space for the fire protection practitioners of the future, the result of an effective partnership between FPA Australia and FRNSW.

Special thanks go to those who

have spent significant time and effort to bring the room to life, led by Chris Wyborn, Shae Mete, Johna Parmar and Bill Lea. FPA Australia particularly wishes to acknowledge the support from our generous volunteers and contributors:

- ◆ **Independent Pipe Fabrication**, which created the high-quality and complex fabrication work for this entire project
- ◆ **Forcefire**, which contributed expertise and excellent workmanship, delivering a highly demanding suppression system installation
- ◆ **our equipment donors:**
 - ◇ 2020 Fire Protection Pty Ltd
 - ◇ 2Link Innovations Pty Ltd
 - ◇ ADT Fire Monitoring
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We look forward to welcoming new students to the room and beginning work on stage two of the project. ■

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BUSHFIRE PREDICTION TECHNOLOGY TO BOLSTER EMERGENCY RESPONSE EFFORTS



PHOTO: CFA

listening to Australia's frontline responders to deliver a real-world solution that works for them.

"Spark is a cutting-edge platform, based on today's breakthrough technology but built on a strong foundation of research into understanding and predicting the behaviour and spread of bushfires."

AFAC CEO Stuart Ellis said the new technology will support fire agencies to keep communities safe.

"Spark Operational will play a significant role in allowing our emergency response teams to effectively plan for and respond to fire emergencies in a variety of landscapes and climates," Mr Ellis said.

"It was identified as the best solution to use to help achieve a nationally consistent system that will take the nation to the next generation of firefighting intelligence, and ensure we are protecting as many lives and assets as possible across multiple scenarios, mitigating the dangers of bushfire."

Through a partnership with AFAC, Minderoo Foundation is funding the development of Spark Operational as part of its Fire Shield Mission, which aims to detect and extinguish dangerous fires within an hour by 2025.

CEO of Minderoo's Flood and Fire Resilience Initiative, Adrian Turner, said the development came at a critical time.

"The Black Summer bushfires burned with devastating impact, in extremely dry fuels and at a scale that is rarely seen, driving extreme fire behaviour, which meant that the modelling was not able to accurately predict spread," Mr Turner said.

"The experience last summer has highlighted the need for better decision support tools to help firefighters protect people and the environment.

"Fire services will be able to test this tool during this next fire season, and this pilot project is a critical step towards better supporting firefighter decisions across a full range of fuel types to inform the earlier detection of fires in the future."

The creation of a nationally consistent bushfire modelling and prediction capability was recommended by the *CSIRO Report on Climate and Disaster Resilience* to the Commonwealth Government last year. ■

Over the next three years, Spark Operational will be developed to provide nationally consistent bushfire modelling for Australian fire agencies.

Australia will develop a nationally consistent bushfire modelling and prediction capability, under an agreement announced between CSIRO and AFAC.

The partnership involves the development of Spark Operational, a cutting-edge bushfire simulation tool based on CSIRO's 'Spark' fire prediction platform.

Fire and emergency service agencies across Australia will be able to use Spark Operational, opening bushfire prediction opportunities across borders and over different landscapes.

CSIRO's Spark platform combines current fire behaviour knowledge with state-of-the-art simulation science to produce predictions, statistics and visualisations of bushfire spread, as well as simulating hours of fire spread across a landscape in a matter of seconds.

AFAC's Fire Prediction Services Group will work with CSIRO to improve existing technology and build a national system that allows for consistent bushfire predictions to support emergency service and response teams across borders.

Phase one of the technology's implementation commenced in January

2021, with further developments ensuring it will become fully operational over the next three years.

With each phase of its implementation, Spark Operational will be grown and adapted into a tool that all agencies nationwide can tailor to specific landscapes and bushfire behaviour, enabling them to better predict—and thereby protect—local environments.

CSIRO Chief Executive Dr Larry Marshall said the innovation built on decades of expertise.

"Our solutions from science have protected Australians from the threat of bushfires for over 70 years, from roadside fire danger signs to advanced burnover protection materials. But 2020 changed the game forever. So, we have changed our game too, by unleashing new science and technology to protect our firefighters and Australian communities," Dr Marshall said.

"We believe this advanced system will help firefighters out-think fire, to anticipate its actions, and to get ahead of it, so they can beat it. Spark is a great example of combining environmental, digital and materials science and

NSW CHANGES LAWS ON THE USE OF PFAS

Following the lead of Queensland (in 2016) and South Australia (in 2018), the NSW Government has gazetted a new regulation that will ban the use of per- and polyfluoroalkyl substances (PFAS).

This move is in response to the National PFAS Position Statement, which articulates the shared view of Australian governments that the use of these substances in Australia should be reduced, where practicable, to minimise damage to the environment.

The new regulation constitutes the first stage in the NSW Government's commitment to supporting the objectives of the National PFAS Position Statement.

The ban would prevent the use of PFAS for firefighting for training and demonstration purposes from April 2021, and restrict use in other circumstances from September 2022.

By then, it will be an offence to sell portable fire extinguishers containing PFAS, except to relevant authorities,

the owner or master of a watercraft, or anyone who has been granted an exemption by the NSW Environment Protection Authority. At the moment the regulation does not provide details as to what circumstances might warrant an exemption.

The intent behind the proposed ban is to reduce the impact of these substances on the environment, while still enabling emergency services to fight catastrophic fires that might have devastating impacts on life and property. A catastrophic fire is defined in the regulation as being one involving combustible accelerants such as petrol, kerosene, oil, tar, paint or similar.

However, FPA Australia has raised concerns that the immediate ban of PFAS for training and demonstration ignores the need for industry to have time to develop alternative practices and/or source new or additional equipment to use in its place.

While we agree with phasing out long-chain PFAS firefighting foam, FPA

Australia noted in a submission that short-chain foams (perfluorosulfonates with fewer than six carbons, perfluorocarboxylic acids with six or fewer carbons, and their precursors), are still essential for some applications. These substances should still be allowed, even if they may sometimes contain trace levels of perfluorooctanoic acid as a result of the manufacturing process.

This position is in line with the Commonwealth Government's own advice that "C6 [PFAS] chemicals are not considered to pose an unreasonable risk to workers health". Fortunately, as a result of our advocacy, this definition was removed from Section 3B of the regulation.

FPA Australia welcomes the NSW government's intention to restrict the use of long-chain PFAS. However, we will watch the implementation of this policy closely to ensure that moves to protect the environment do not come at the expense of community safety. ■



PHOTO: SHUTTERSTOCK

NEW WEBSITE TO KEEP HOUSES SAFE IN CYCLONES AND STORMS

The new Weather the Storm website helps improve your home's resilience to extreme wind.

PHOTO: BUSHFIRE AND NATURAL HAZARDS CRC



Researchers at James Cook University's (JCU) Cyclone Testing Station, in partnership with Geoscience Australia and the Bushfire and Natural Hazards CRC, have developed a new website called Weather the Storm to inform builders and homeowners about how to improve an existing home's key structural connections against extreme wind.

The website is based on the findings of the CRC's eight-year research project, *Improving the resilience of existing housing to severe wind events*. This project explored the ways different types of maintenance and retrofitting can protect homes from damage at different wind speeds, and devised practical and economic options for upgrading existing houses. The findings of this research were built into the new Weather the Storm website.

Dr Korah Parackal, one of the researchers at JCU, explained how the website can be helpful for Australian homeowners, especially those in storm-prone areas.

"There are many online resources about preparing houses for storms, but they are usually focused on North American houses, with homeowners being directed to see a builder for more information," Dr Parackal said. "One of the aims of Weather the Storm was to give homeowners the tools to be able to understand the effect of winds on their homes and communicate to builders what they need done to strengthen them."

The website is packed with helpful information about how to improve the strength and safety of a house. It guides users through three levels of protection: general maintenance, window and door protection, and roof tie-down retrofitting (offering the most protection). It can also be used as an educational guide for homeowners or builders when planning a new house or renovations to an old house, such as window and door protection that reduces the chances of future damage from water and general wear and tear.

Other partners that contributed to the development of Weather the Storm were the Queensland Department of Housing and Public Works; the Queensland Building and Construction Commission; the NSW Department of Planning, Industry and Environment; the Western Australia Department of Mines, Industry Regulation and Safety; the Northern Territory Department of Infrastructure, Planning and Logistics; the Insurance Australia Group; Willis Reinsurance Australia; Risk Management Solutions; Munich Reinsurance; Suncorp Australia; the Master Builders Association; Engineers Australia; the Australian Roof Tile Association; Stramit Building Products; A. Gabrielli Construction; and Townsville City Council. ■

Weather the Storm is online at www.weatherthestorm.com.au. Learn more about the research behind the website at www.bnhcrc.com.au/research/housingresilience.

"One of the aims of Weather the Storm was to give homeowners the tools to be able to understand the effect of winds on their homes and communicate to builders what they need done to strengthen them."

— Dr Korah Parackal



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Other key projects recently completed include the Norwest Metro, Crown Resort, Barangaroo, Equinix data centre and Castle Towers shopping centre so you can be confident we can deliver.

We look forward to meeting you at Fire Australia 2021 to discuss any upcoming projects.



Stand 306

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VBA FIRE PROTECTION REGISTRATION DEADLINE APPROACHING

Routine service practitioners in Victoria working on fire protection equipment in areas covered by restricted classes have until 31 July 2021 to become licensed or registered.

The Victorian Building Authority (VBA) has defined such activities as plumbing work and requires practitioners to be appropriately qualified.

Following consultation with industry, the VBA introduced four new restricted classes for the routine servicing of fire protection equipment:

- ◆ ongoing restricted classes:
 - ◇ fire protection restricted to the routine servicing of fire hose reels
 - ◇ fire protection restricted to the routine servicing of unpumped hydrants and valves
- ◆ transitional restricted classes:
 - ◇ fire protection restricted to the routine servicing of pumped hydrants and valves

- ◇ fire protection restricted to the routine servicing of fire sprinkler systems.

Ongoing classes can be performed by practitioners who gain registration or a licence, while temporary classes will be available up until 31 July 2021, after which time practitioners will have to be enrolled in the Certificate III in Fire Protection.

Practitioners must complete the Certificate III by 31 December 2025 in order to keep performing this work.

After 31 July 2021, unregistered or unlicensed practitioners carrying out the above routine service work will be subject to VBA enforcement action.

Practitioners will not need to apply for one of the new routine servicing restricted classes if they already hold accreditation in one of the following classes:

- ◆ Fire Protection
- ◆ Fire Protection—Restricted to Hydrants and Hose Reels

- ◆ Fire Protection—Restricted to Residential and Domestic Fire Sprinklers.

If accredited in one of the restricted classes, practitioners can continue to undertake routine servicing on the equipment types specified for that class. However, to perform routine servicing of equipment outside that accreditation, a practitioner will need to apply for accreditation in one of the other restricted classes. ■

More information can be found at: www.vba.vic.gov.au/plumbing/registration-licensing/fire-protection-restricted-classes.

Applications for registration can be made at: www.vba.vic.gov.au/plumbing/registration-licensing/apply-fire-protection-restricted-classes.

FPA Australia is providing training for practitioners who wish to obtain registration—information can be found on the website at www.fpa.com.au/training/routine-service-training/vba-fire-protection-restricted-classes.

QBCC LICENSING CHANGES

The new Queensland Building and Construction Commission (QBCC) licensing regime is due to commence on 1 May 2021 for the fire protection industry.

FPA Australia is aware that many practitioners are not ready for the changes, nor will they have sufficient time to gain the qualifications as a pre-requisite for the proposed licence changes.

We have increased our communications with the relevant ministers asking that needs of the industry be appropriately addressed to ensure there is no negative impact on community safety.

While some six-month extensions have recently been granted by Minister Mick de Brenni – for electrical mechanics, hydrants and hose reels – this concession has not been extended to most areas, such as passive fire protection, portables or special hazards.

Without appropriate time to comply, this means there may be a lack of appropriately trained practitioners to service fire systems. This could place people and property at risk.



PHOTO: FPA AUSTRALIA

From 1 May, 2021, most routine service work will need to be licensed in Queensland.

FPA Australia will continue to liaise with the Queensland Government to seek further extensions for all areas of

the fire protection industry in that state, and are ready to be involved in any consultative. ■

We have increased our communications with the relevant ministers asking that needs of the industry be appropriately addressed to ensure there is no negative impact on community safety.

FPAA101D AND FPAA101H UPDATED

After an extensive consultation period FPA Australia Technical Specifications FPAA101D and FPAA101H have now been updated.

These were initially published in 2018 and adopted in the National Construction Code in 2019, which for the first time prescribed residential sprinkler systems to protect buildings of four or more storeys, but under 25 metres in height.

The designs were developed by FPA Australia based on testing funded by Fire and Rescue NSW (FRNSW) and conducted by CSIRO in conjunction with FRNSW staff and FPA Australia members. These designs provide fit-for-purpose, cost-effective sprinkler protection for such buildings and are, therefore, attractive for builders.

FPAA101D and FPAA101H have some key advantages over other designs, in that they:

- ◆ reduce costs by using an existing drinking water or hydrant water supply, rather than requiring a dedicated fire sprinkler water supply
- ◆ reduce or eliminate ongoing routine testing and the associated cost to owners and tenants
- ◆ are cost-effective, due to fast construction methods and the elimination of conventional sprinkler valve assembly
- ◆ reduce the incidence of smoke inhalation by occupants
- ◆ increase safety for firefighters by lessening the severity of the fire
- ◆ reduce insurance premiums and protect property by minimising damage
- ◆ reduce the effects of other fire protection defects that may exist within a building, such as unprotected penetrations or high fuel loads
- ◆ assist with the emergency evacuation of residents, especially the elderly and people with disabilities.

Overall, they have been shown to reduce statistical risks of death and injury from fire in residential buildings by at least two thirds.

FPA Australia is now seeing these systems being installed throughout Australia—championed by the Home Fire Sprinkler Coalition (HFSC), which is working to educate the public. We are monitoring their successes and challenges to enhance future iterations of the Technical Specifications.

A significant response to FPA Australia's recent call for public comment has allowed us to update the Technical Specifications to make them more adaptable and useful for practitioners.

The introduction of FPAA101D and FPAA101H was a significant step forward in fire safety, and the latest versions will make these easier to implement, and make the community even safer than before. ■

PHOTO: BUSHFIRE AND NATURAL HAZARDS CRC



Dr Lachlan McCaw AFSM

AUSTRALIA DAY HONOURS FOR CRC EXPERTS

A Bushfire and Natural Hazards CRC end user and a CRC Board committee member were recognised with the Australian Fire Service Medal (AFSM) in the 2021 Australia Day Honours List.

Dr Lachlan McCaw AFSM

Dr Lachlan McCaw, Regional Duty Officer and Level 3 Planning Officer at the Western Australian Department of Biodiversity, Conservation and Attractions, has had a long history with the CRC and with the previous Bushfire CRC. He is currently the lead end user of four core research projects, has supervised two postgraduate student projects, and was on the research team of the *A guide to develop bushfire case studies—a case study of cropland fires* Tactical Research Fund project.

Dr McCaw's recognition includes his work in the 2009 Black Saturday bushfire taskforce, where he was part of a team of fire scientists assembled by the Bushfire CRC to investigate the behaviour of the Black Saturday Victorian bushfires.

The AFSM acknowledges Dr McCaw's academic and operational experience, his commitment to the

Department of Biodiversity, Conservation and Attractions, and his noteworthy contribution to the fire safety of the wider community.

Jeremy Fewtrell AFSM

Deputy Commissioner Jeremy Fewtrell at Fire and Rescue New South Wales (FRNSW) is a member of the Research and Utilisation Committee of the CRC Board.

Deputy Commissioner Fewtrell received his AFSM as recognition of his distinguished and exemplary service to FRNSW and public safety. This includes his work in fire investigation, public safety, research capability and strategy for response to high-rise and complex buildings, as well as significant projects into smoke alarms and sprinklers, which resulted in key changes to the Building Code of Australia.

Congratulations to Dr Lachlan McCaw and Jeremy Fewtrell on the recognition and acknowledgement of their work in the Australia Day 2021 Honours List. ■

Read more on the Governor-General's website at www.gg.gov.au/australian-honours-and-awards/australian-honours-lists.

NATIONAL APPROACH TO FIREFIGHTING CHEMICALS

The use of suppressants and retardants for bush firefighting can give firefighters tactical advantages by slowing down fire spread. Retardant is usually lain by aerial firefighting assets, whereas water enhancers (gels) and foams can be used by both aerial and ground fighting resources.

During the 2019–20 bushfire season, pressure was put on the existing stocks of retardant, which is imported from overseas. As a result, the Royal Commission into National Natural Disasters Arrangements made the observation that “governments should ensure that Australia’s procurement plans match, or can accommodate, anticipated requirements [of retardant]. If these cannot be met, consideration should be given to domestic manufacturing”.

Apart from investigating means to assure the supply chain of retardant and suppressants, it has been suggested

that an Australian chemical testing and approval system be established. AFAC currently has a national position *Use of Chemicals in Bushfire Control and Prescribed Burning* that states: “AFAC supports the use of chemicals in bushfire control and prescribed burning that have been qualified under the US Department of Agriculture’s (USDA) Wildland Fire Chemical System, or equivalent”. As well as requiring qualification under the USDA’s Wildland Fire Chemical System, individual jurisdictions may impose additional requirements on the use of chemicals in bush firefighting (in particular, around local environmental and occupational health and safety considerations).

To enable a national approach that captures these additional requirements to be designed, without duplicating the work done in the US, a national users’ group has been established with jurisdictional representatives. The group will also define supply requirements

for forthcoming seasons, not just for retardant but all chemicals used in ground and aerial bush firefighting. Understanding national stock levels and identifying any potential supply issues could prove highly beneficial, especially if Australia is faced with another season like 2019–20.

The Minderoo Foundation and NSW Rural Fire Service have offered their support to conduct a retardant trial that could assist in developing a domestic market. The nature of the trial and its objectives will be informed by the subject matter experts of the users’ group. It is anticipated that the trial will take place in NSW during 2021.

AFAC’s *Use of Chemicals in Bushfire Control and Prescribed Burning* is available online: www.afac.com.au/insight/doctrine/article/current/use-of-chemicals-in-bushfire-control-and-prescribed-burning.

PHOTO: CHARLES MILES/FLICKR



AIIMS ONLINE COURSE NOW AVAILABLE

The new Australasian Inter-service Incident Management System (AIIMS) 2017 Principles online course and the AIIMS 2017 Awareness online course are now live.

The AIIMS 2017 Principles online course is designed to provide a comprehensive overview of the fifth edition of AIIMS 2017. There are 14 modules and five assessment tasks in this course. The content covered is developed for organisations that have adopted, or intend to adopt, AIIMS, and for those personnel who may be

required to:

- ◆ perform a role within an incident management structure
- ◆ assist an incident management team in a support capacity
- ◆ know the principles and processes that underpin AIIMS.

The AIIMS 2017 Awareness online course will develop an understanding of the key concepts that underpin AIIMS. There are seven modules and three assessment tasks in this course and all assessments can be completed online. The training will provide students

with an awareness of these concepts and is suitable for anyone who might be involved in supporting emergency management processes in their workplace or in support of emergency operations.

Further information about the courses, including links to additional resources, the onboarding process and commonly asked questions can be found on the ICT AIIMS Support Portal: <https://aidr00.atlassian.net/wiki/spaces/IASP/overview>.

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RECONNECT AT FIRE AUSTRALIA 2021



Fire Australia is back, with an informative program, interesting speakers, stimulating off-site visits, innovative suppliers and the Fire Protection Industry Awards.

BY **PAUL WATERHOUSE**

FPA Australia

It may have been delayed, but Fire Australia is finally coming to Australia's premier convention, exhibition and entertainment venue – Sydney's International Convention Centre (ICC).

For three days—from 11 to 13 May—delegates to Fire Australia 2021 will be able to hear from some of the leaders in fire protection, network with their peers and discuss new technologies with industry suppliers. The largest fire protection event in the Southern Hemisphere, this year's conference is sure to inform and interest people from across the fire protection industry.

Our program has an array of leading presenters sharing their perspectives, such as Grenfell Inquiry Chair Dame Judith Hackitt, co-author of the *Building Confidence* report Bronwyn Weir, and Warren Centre contributor and former FPA Australia President Peter Johnson.

They, and others, will be speaking on a variety of topics ranging from the NSW construction industry reforms and

improvements to practitioner competency, how to manage legal risks arising from routine service work, the fallout from the Grenfell Tower disaster and lessons from the 2019–20 bushfires, to the evolution of fire engineering and the increasing role of women in the industry.

Attendees will be able to stock up on their continuing professional development training, thanks to a two-and-a-half-day technical stream packed with industry tips and insights.

And, once the main part of the program has ended, we will once again be running offsite visits to enable delegates to witness leading examples of fire systems and state-of-the-art training facilities.

This year's event will provide plenty of opportunity to catch up with peers, particularly with the Welcome Cocktail

Reception and the Fire Australia Conference and Awards Gala.

This year the dinner has been combined with the Fire Protection Industry Awards, allowing attendees to recognise excellence in the industry while raising money in support of the vital work performed by our charity partner, the Fiona Wood Foundation.

Our COVID-safe conference has been carefully planned in consultation with the ICC, so you can be comfortable in the knowledge that we have done everything we can to protect you.

Fire Australia 2021 is an event not to be missed— we look forward to seeing you there.

For details, or to register, visit www.fireaustralia.com.au

This year's event will provide plenty of opportunity for networking with peers and learning from industry leaders.



**PANELLIST:
DAME JUDITH HACKITT
DBE FRENG**

Dame Judith Hackitt is a chemical engineer of many years' experience, and a Fellow of the Royal Academy of Engineering, who became Chair of Make UK: The Manufacturer's Organisation in 2016. She was appointed by the UK Government in 2017 to lead the inquiry into the Grenfell Tower disaster, and her work in that forum has influenced fire safety regulatory systems across the world. She is also a member of the Victorian Government's Building System Review Panel. Dame Judith will be participating in an international panel at this year's conference, discussing Grenfell and its implications.

**PRESENTER:
BRONWYN WEIR**

Bronwyn Weir has over 22 years' experience advising all three tiers of government on regulatory practice and procedure. In 2018, Ms Weir was co-appointed with Professor Peter Shergold by the Building Ministers' Forum to prepare a report on building regulatory systems across Australia, which was published in April 2018. Since then, she has spent part of her time advising Building Commissioner David Chandler on his reforms of the NSW construction industry. Ms Weir will be moderating the international panel on Grenfell, and she will also give a presentation about models for improving association and practitioner competency.

**PRESENTER:
PETER JOHNSON**

Peter Johnson is well known to the fire protection industry as a fire engineer with over 40 years' experience, a Principal and Fellow at the global consulting firm of Arup, and a Fellow of Engineers Australia. A former president—and Honorary Life Member—of FPA Australia, Mr Johnson has been spending a lot of his time recently contributing to research, most recently on the Warren Centre's fire safety engineering project at the University of Sydney. He will be presenting some of the findings of the Warren Centre's research and discussing the future of fire safety engineering.

The Fire Australia Conference and Tradeshow is the largest and most influential fire protection event in the Southern Hemisphere.

Around 80 exhibitors will be showing their services at the Fire Australia 2021 Tradeshow and Exhibition, revealing the latest in fire protection technologies and solutions.

OFFSITE VISITS



Once the Fire Australia 2021 program is finished, take the opportunity to be inspired by cutting-edge training facilities and innovative fire protection systems.



PHOTO: FRNSW

Fire and Rescue NSW's Emergency Services Academy and FPA Australia's NSW training centre

Come and visit the world-class training academy out at Orchard Hills and learn how the firefighters of the future will develop their skills.

While you are there, drop in to FPA Australia's new fit-for-purpose training rooms to see the resources the Association is dedicating to training fire practitioners.



PHOTO: CSIRO

CSIRO North Ryde Fire Experimental and Testing Laboratories

Get an inside look at the Fire Experimental and Testing Laboratory in North Ryde, one of Australia's most important testing facilities.

Learn how CSIRO conducts its assessments of materials and develops the science that supports fire protection.

For more details on the conference program, visit www.fireaustralia.com.au/program/

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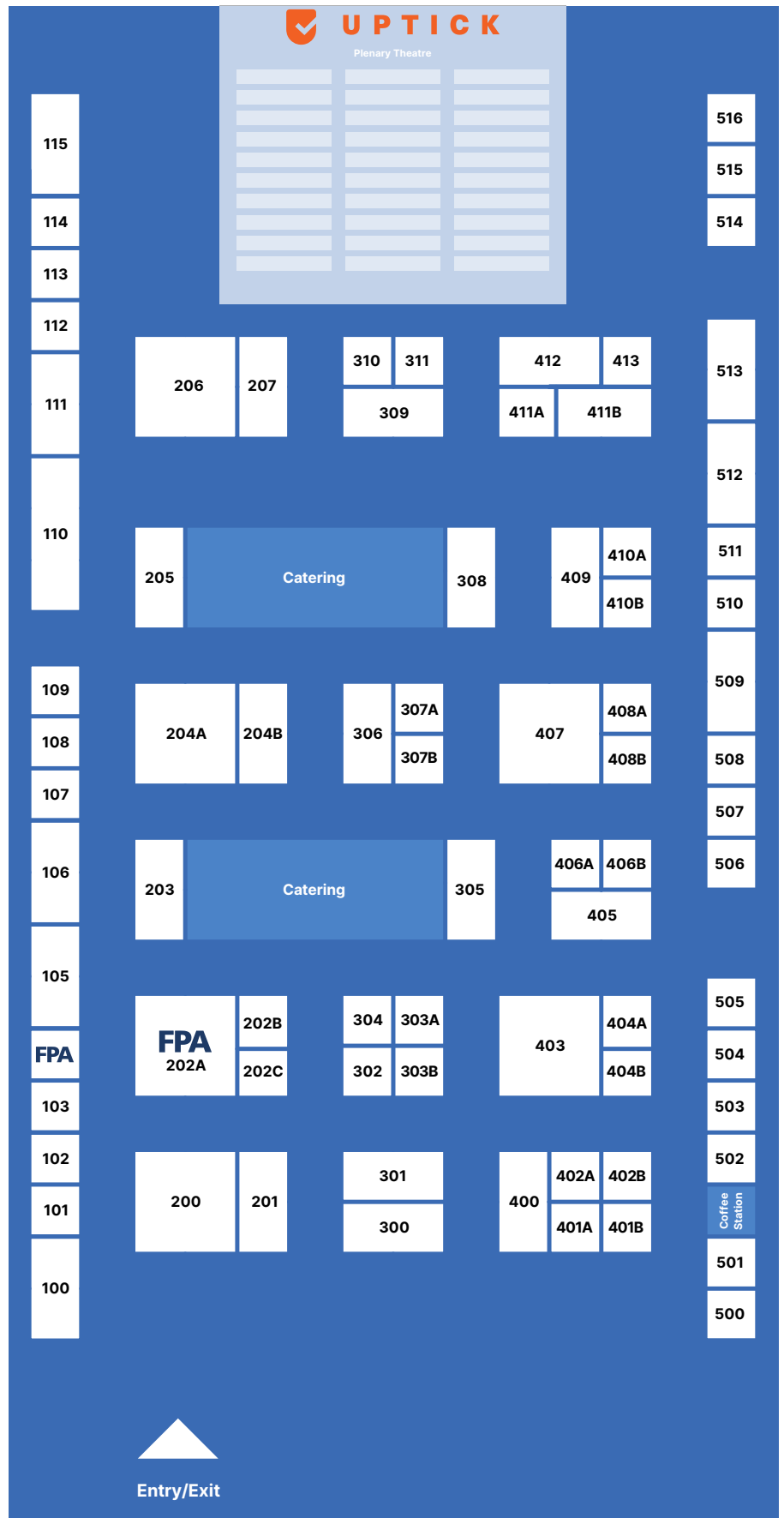
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FlameStop	509	TBA Firefly	100
Fire Protection Association Australia	202A	The Tank Inspectors	501
Fusion Fire Systems	307B	TOA / Australis Music Group	303B
Gould Instruments	413	United Safety & Survivability Corporation	310
Greene Fire	303A	Uptick	206
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The Bushfire Centre of Excellence facility in Nambeelup, WA.



CULTURE AND COLLABORATION: WESTERN AUSTRALIA'S NEW BUSHFIRE CENTRE OF EXCELLENCE

The Department of Fire and Emergency Services Bushfire Centre of Excellence is the first of its kind in Australia. The new centre will draw upon ancient and emerging fire knowledge to build capacity across Western Australia.

BY **ALANA BEITZ**

AFAC

On 25 January 2021, the Department of Fire and Emergency Services (DFES) celebrated the completion of its state-of-the-art Bushfire Centre of Excellence facility.

Located about an hour's drive south of Perth in Nambeelup, the facility opened for business in January and provides a range of training spaces, meeting rooms and general bushfire information.

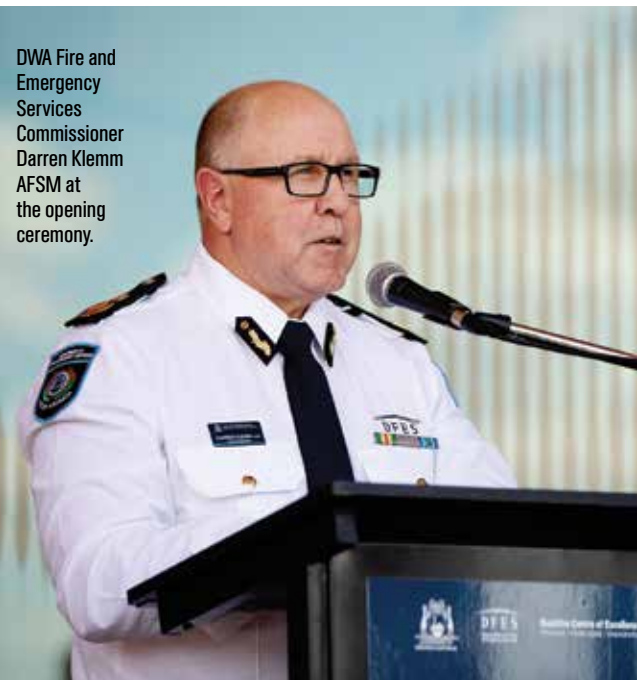
The centre's expansive grounds and outdoor areas will host a diverse mix of programs and events.

In addition to supporting the knowledge and professional development of the bushfire sector and its stakeholders, the centre is open to the public to provide everyone with the opportunity to learn about the history of fire.



PHOTO: DFES

PHOTO: DFES



DWA Fire and Emergency Services Commissioner Darren Klemm AFSM at the opening ceremony.

Above: DFES Traditional and Cultural Fire Officer Clifton Bieundurry and Traditional Fire Programs Coordinator Wayne Davis.

DFES Commissioner Darren Klemm AFSM said the centre will facilitate a greater understanding of bushfires than ever before.

“We are all facing the challenge of a changing climate and the increased threat of bushfires to our livelihoods,” Commissioner Klemm said.

“The centre will be an education hub where we can share our diverse ideas, knowledge, experiences and skills. This type of collaboration will be key to facing the challenges of the future.”

The principles of good fire practice are reflected not only in the education programs and information within the centre, but are also embedded into its surrounds. The landscaping of the facility follows fire design guidelines and incorporates Indigenous heritage and local vegetation, providing a tranquil and educational environment for visitors.

Traditional Owners of the region, the Bindjareb community, provided input during the design and development of the facility and gave the centre the Nyungar name *Karla Katitjin*. *Karla* means fire and *Katitjin* symbolises knowledge and learning in a way that brings understanding.

Development grounded in bushfire lessons

The Special Inquiry into the January 2016 Waroona Fire (Ferguson Report) recommended that the WA Government create a rural fire function to enhance the capability for rural fire management and bushfire risk management. The report also recommended that this function should establish a centre for fire management.

In 2017, the concept of a Bushfire Centre of Excellence was discussed at the Bushfire Mitigation Summit and the Western Australian Prescribed Burning Forum. It was agreed that creating and capturing learnings through a Centre of Excellence would build bushfire capability for the future.

In 2018, the WA Government announced a rural fire reform package in response to the Ferguson Report recommendations. Changes included the establishment of a DFES Rural Fire Division and a Bushfire Centre of Excellence.

Consultation with more than 200 stakeholders through workshops, presentations and forums informed the Bushfire Centre of Excellence’s key functions and service delivery.

In March 2019, the Shire of Murray was selected as the preferred location for the new facility, and in January 2021 the Bushfire Centre of Excellence became the first building to be completed in the Peel Business Park.

DFES Chief Superintendent Bushfire Centre of Excellence John Tillman AFSM said that the while the team had been operating at an interim facility for close to 18 months, the opening of the centre marked an important milestone.

“It is fantastic to see two years of engagement, planning and design culminate in the opening of this first-class facility,” Chief Superintendent Tillman said.

“The centre will be a leading facility in bushfire learning and skills development and will draw on the latest in technology, science, academic and traditional land practices. This will help us all to better

protect our environment and communities from the impacts of bushfire.”

Collecting knowledge, delivering education

As visitors enter the foyer of the Bushfire Centre of Excellence, they encounter the first elements of an interpretive learning centre, a library, shared meeting spaces and reception area. An administration wing and a training wing branch off from this central foyer, which give the building the shape of a boomerang.

The training wing can cater for up to 100 training participants and comprises a central breakout and meeting space, three large training rooms and a series of smaller collaboration rooms with capacity to support training in bushfire management systems and software.

These formal learning environments are complemented by networking spaces for participants to connect with each other, including courtyards, lounge and dining spaces, a yarning circle and fire pit.

Workshops, seminars and training at the centre are accessible to volunteer firefighters and other stakeholders in the bushfire sector. Training development is done collaboratively with a range of subject matter experts and, importantly, is delivered at the centre as well as in the regions.

Training programs are informed by the Bushfire Centre of Excellence’s growing knowledge base, including fire knowledge and traditional practices of Aboriginal people, academic and experiential bushfire knowledge, as well as bushfire research.

The centre aims to be the focal

point for research, knowledge sharing, training and collaboration in bushfire management for the entire state.

Ancient knowledge guides future practice

The Bushfire Centre of Excellence supports Aboriginal traditional and cultural knowledge about fire practices and is working closely with Traditional Custodians, land managers and local communities to better understand the application, uses and cultural connection with fire.

The Centre's Traditional Fire Program aims to merge this traditional knowledge with contemporary fire management methods.

Traditional Fire Program Coordinator Wayne Ampetyane Davis explained the process as intertwining Indigenous knowledge and modern understanding to influence practice and better mitigate fire risk across the state and the country.

"The idea is to bring an ancient cultural practice and to gently ease it into a contemporary way of looking after Country," he said.

"We had the opportunity to grab that while our old people were around, we gained experience by working with our Elders, and captured that transfer of knowledge. At the moment we've got a lot of it up here in our heads, and now have the opportunity to share it."

The centre will promote existing uses of traditional fire and facilitate knowledge sharing opportunities between communities, local



PHOTO: DFES

governments, land and fire managers and Aboriginal Land Councils.

Traditional and Cultural Fire Officer Clifton Tjapanangka Payirntarri Bieundurry said that this collaborative approach to knowledge building and sharing was core to the program and provided a space for Indigenous and non-Indigenous people to come together to learn about fire and Country.

"One of the things I love about having the space right now and to bring in cultural methods of fire is the fact that there is a deep connection to the land and sea and flora and fauna and there was a deep spiritual connection to each other, and the responsibilities that we've had from a cultural sense," he said.

"I believe the Bushfire Centre of Excellence has brought fire to the forefront to help solve a lot of issues that we've had, but I think it's done something bigger than that, something that the world needs: connection. Connection not only for ourselves to the land, but connection to each other."

The Traditional Fire Programs aim to increase community understanding of cultural burning practices and support the growing application of traditional techniques across the state. ■

Wayne Davis, WA Premier Mark McGowan, Clifton Bieundurry and Minister for Emergency Services Francis Logan complete a traditional water blessing ceremony at the centre.

More information about the Bushfire Centre of Excellence, including its training calendar, can be found at www.dfes.wa.gov.au/bushfirecoe.

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MAKING BETTER USE OF RESEARCH

The latest bushfire science is becoming better understood and used by the emergency sector through tailored training programs by Bushfire and Natural Hazards CRC researchers.

BY **BETHANY PATCH**

Bushfire and Natural Hazards CRC

A key aim of the Bushfire and Natural Hazards CRC has been to ensure that high-quality research outcomes are easy to access, use and understand. To achieve this, researchers have been running a range of targeted tutorials and training workshops that enhance and support the capabilities of those working in emergency management (EM), industry and government. In these sessions, practitioners are guided through the process of applying new research in different contexts through online or local workshops.

Over the coming months, more training will be made available to CRC partners, including a collection of training and research materials on fire science that will help people understand the current research into different fire behaviours.

Following are a few examples of current training programs.

The use of economics in natural hazard management

The CRC recently hosted a training course called *How to use economics in natural hazards management*, in

partnership with the University of Western Australia (UWA). Informed by the CRC's *Economics of natural hazards* project at UWA, the course was designed to upskill and build capacity within the EM sector to give natural hazard managers and practitioners more confidence in the commissioning and use of economic information to aid their decision-making.

Hosted by Dr Veronique Florec and Dr Abbie Rogers at UWA, small groups were guided through the basics of economics and how they apply to natural hazards, learning how to conduct and interpret benefit–cost analyses of mitigation options.

Dr Florec also presented two new economic tools that have been made available through the CRC—the Economic Assessment Screening Tool and the Value Tool for Natural Hazards—which help practitioners to become familiar with economic evaluation methods, understand data requirements, learn how to integrate non-market values into economic analyses, and use and interpret the information derived.

You can find more information about this training at www.bnhcrc.com.au/events/2021-economics-natural-hazards.

Hazard management in northern communities

The CRC's *Northern Australian bushfire and natural hazard training* project has spent the last five years working closely with communities in northern Australia, an area that comprises 360,000 people, with remote areas mostly populated by Indigenous Australians.

The research highlighted the need for training materials that provide practical and respectful support and reinforcement to remote Indigenous communities. These communities face unique stressors and opportunities when meeting the evolving and challenging requirements of bushfire and natural hazard management in a changing climate, requiring enhanced EM capabilities.

Working closely with communities and their leaders, researchers from Charles Darwin University, led by Steve Sutton, developed a suite of ten fire and natural hazard emergency management training units that bring together the essential elements of Indigenous and non-Indigenous emergency management training in a vocational-style program. The units reflect a key aim of the project: to respect and observe flexible cultural arrangements, such as training on Country, following



local structures for decision-making and including family and Indigenous practices.

These training units are now being used in a number of locations in northern Australia, and skills and knowledge are being shared with and between communities. By working with communities, researchers have helped support a cohort of vulnerable people with skills and knowledge to control fire and manage a fire regime that suits their landscape. This reduces the risk of bushfire and increases community safety.

You can read more about the training and this research at www.bnhcrc.com.au/research/hazardtraining.

Future hazard scenarios

Associate Professor Benjamin Brooks and Dr Steven Curnin from the University of Tasmania facilitated a number of workshops in October 2019 and March 2020, with participants from local governments and emergency management in WA, including the WA Local Government Association and the Department of Fire and Emergency Services (DFES).

The Stretch Thinking for Crisis and Emergency Management workshops

were based on a new technique for scenario planning called 'stretch-thinking loops', a technique developed by A/Prof Brooks and Dr Curnin to support innovation in strategic planning. In crisis management, scenario planners need to be able to imagine future environments, even in the most uncertain conditions. Stretch-thinking loops provide an opportunity for decision-makers to dynamically consider the scale of potential scenarios and correlating EM strategies. Stretch-thinking loops combine research on creativity, divergent thinking and creative constraints into one method.

The workshops used this new technique, inviting participants to apply convergent and divergent thinking to a scenario exercise that encompassed social, environmental, infrastructural and economic considerations. These sessions, constructed around the extensive research conducted by the research team, empowered participants to improve their understanding and skills in effective decision-making during a crisis.

The workshops formed part of the CRC's *Improving decision-making in complex multi-team environments* project.

Dr Curnin, who has previously run regular masterclasses for the critical

infrastructure sector, was awarded a research grant under the Discovery Early Career Research Award for 2021, to continue his longstanding history of effective collaboration with emergency management agencies.

You can read more about this research and the workshops at www.bnhcrc.com.au/research/multiteamenvironments.

Recognising disaster resilience in communities

CRC research at the University of New England, led by Dr Melissa Parsons, developed the Australian Disaster Resilience Index, an industry-first assessment of the state of disaster resilience across the country.

The Index draws on a suite of comprehensive materials and existing data to make it easier to understand the contributors to, and variability in, disaster resilience. Presented as an interactive map of resilience across Australia, the Index provides a clear pathway for businesses, governments and community organisations to improve their decision-making about planning, development, policy, engagement and risk assessment, so that they can take informed and practical steps to improve

Steve Sutton (Charles Darwin University) with ARPnet researchers and community members in northern Australia.

the disaster resilience of their local communities.

From the outset of the research, a critical aim was that the Index would be widely shared and actively used by businesses, governments and organisations.

At the CRC-hosted online launch of the Index in July 2020, Dr Parsons led a large participant group through the research that underpinned the Index, providing a guided tour of the website itself and ensuring that audience members were able to clearly understand how to begin applying the Index in different contexts. Dr Parsons has also been working one-on-one with various government departments and organisations to help them adopt the Index as part of their usual resilience-building initiatives.

You can watch a recording of the launch and training session at www.bnhcrc.com.au/events/2020-adri or learn more about the research behind the Index at www.bnhcrc.com.au/research/resilienceindex.

Predicting fire storms

CRC research conducted with the Bureau of Meteorology (BOM) and led by Dr Kevin Tory has developed and implemented a new tool that

Stretch-thinking loops provide an opportunity for decision-makers to dynamically consider the scale of potential scenarios and correlating emergency management strategies. Stretch-thinking loops combine research on creativity, divergent thinking and creative constraints into one method.

helps to understand, forecast and predict the formation of fire-generated thunderstorms (also known as pyrocumulonimbus or pyroCb).

Covered in the first 2021 issue of *Fire Australia*, the Pyrocumulonimbus Firepower Threshold (PFT) is backed by research from the CRC's *Improved predictions of severe weather to reduce community impact* project. It is a diagnostic tool that can determine when the atmosphere is conducive to both deep plume development and large, hot fires, which is helping fire agencies and BOM weather forecasters to predict when these dangerous storms might occur, and to provide accurate and timely warnings to communities and firefighters.

In November 2019, Dr Tory conducted a CRC training session to introduce the PFT, explaining how it works, providing examples of it in action and working with participants to ensure those who would use it had a clear understanding of the tool's foundations, strengths and weaknesses.

The PFT is now used by fire behaviour analysts within fire agencies and state government departments across Australia to analyse fires, identify fire-generated thunderstorm risk, assess pyro-convection and fire-atmosphere interactions, and provide accurate guidance on potential storm developments. BOM forecasters also regularly use the PFT, working closely with fire agencies to advise on severe weather.

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PHOTO: BUSHFIRE AND NATURAL HAZARDS CRC

Dr Tory was recognised with an Insight and Innovation Award in 2020 from the BOM for his research conducted for this project, with state fire agencies applauding the value of the PFT during the 2019–20 bushfires, when it was used to inform advanced warnings of nearly 30 fire-generated thunderstorms.

You can watch the recording of Dr Tory's training session at www.bnhcrc.com.au/resources/PFT-training or find out more about this research and the tool at www.bnhcrc.com.au/research/predictingsevereweather.

Risk modelling

Sophisticated modelling software—called the Unified Natural Hazards Risk Mitigation Exploratory Decision (UNHaRMED) support system—is being used across Australia to explore current and future coastal flood risk. The software was developed by the CRC's *Improved decision support for natural hazard risk reduction* project, led by Professor Holger Maier and his team at the University of Adelaide.

UNHaRMED is a modelling platform that integrates various natural hazard models that calculate disaster risk using demographic, infrastructure and environmental data to show how this risk might change in the future.

Researchers have trialled UNHaRMED through a mitigation and planning exercise with South Australian

agencies, who explored mitigation options for the changing coastal risk at Port Adelaide Enfield. The exercise brought together a diverse multi-agency team—including state and local government—to explore the likelihood and consequences of future coastal inundation in the area.

Through a series of workshops with similar multi-agency groups in WA, Tasmania and Victoria, users in these states have also been trained to use the software. UNHaRMED is now being deployed in a variety of ways to support understanding and decision-making about disaster risk reduction, address vulnerability as an aid for future planning, and to focus attention on the key policy issues to be addressed and resolved to mitigate future risk.

You can read more about this research and UNHaRMED by visiting the CRC project page www.bnhcrc.com.au/research/naturalhazardriskreduction.

Supporting volunteer leadership

In partnership with Curtin University, UWA and DFES, the CRC conducted an online showcase in October 2020 to present the new Recruitment and Retention Toolkit for Emergency Volunteer Leaders—the main product from the CRC's *Enabling sustainable emergency volunteering* project.

The Toolkit is grounded in organisational psychology research

and uses firsthand experiences of WA State Emergency Services volunteers and leaders to provide highly relevant, evidence-based resources that support all stages of volunteer management. The research team, led by Associate Professor Patrick Dunlop (Curtin University), worked very closely with DFES to develop the Toolkit, consulting directly with volunteer leaders across all services, DFES district officers, and partner associations and their leaders.

The showcase trained volunteer leaders on the resources in the Toolkit and how to apply them to their volunteer management processes. Additionally, DFES has been using the Toolkit to support volunteer leaders as part of its Volunteer Hub, which ensures this research is widely available to 26,000 DFES volunteers across 800 brigades, groups and units, and operating between five volunteer emergency services. The Toolkit is being further developed to be more relevant to emergency service agencies across Australia, and to support and enhance the way that volunteer leaders recruit, retain and manage Australia's volunteer workforce. ■

You can watch the recorded Toolkit training showcase at www.bnhcrc.com.au/events/2020-recruitment-and-retention-toolkit and learn more about the research at www.bnhcrc.com.au/research/sustainablevolunteering.

Dr Kevin Tory presenting the Pyrocumulonimbus Firepower Threshold at the AFAC19 powered by INTERSCHUTZ conference.

EMERGING RISKS IN AUTOMATED WAREHOUSES DEMAND CAREFUL MANAGEMENT

An increase in ecommerce and automation in warehouses creates new fire risks that need to be mitigated.

BY **MICHAEL STUCKINGS**

Operations Chief Engineer, FM Global Australia

If you order something online and it arrives in a couple of days or less, it is highly likely that a robot was involved in fetching it from the warehouse for you. This kind of nimbleness is an attractive proposition for brands. It is an opportunity to set themselves apart through customer experience, to minimise labour costs and increase utilisation of warehouse space.

The COVID-19 pandemic has accelerated the growth of ecommerce, driving demand for automated storage and retrieval system (ASRS) warehousing. Commercial real estate company JLL reveals the take-up of Australian warehouse space by retailers surged to more than 800,000 square metres in the first nine months of 2020, as annual online sales hit new records. Companies including Woolworths, Coles and Kathmandu are all reported to have turned to robots and automation to cut costs and manage their warehousing.

FM Global has seen a significant uptick in ASRS warehouses in Australia—including those that make use of mini-load, top-load systems and shuttle carrier automation systems. As an engineer with 20 years in fire risk mitigation, I view the increasing uptake of ASRS as a significant area of emerging risk.

Key challenges

The main threat presented by these solutions is the increased density of storage. What was once spread over huge areas in traditional warehouse arrangements is now compressed down in an automated warehouse, with aisles removed, commodities densely packed together and access limited to robot retrieval.

This configuration and density of materials in top-loading ASRS systems—where all spacing between stored commodities is removed and a robot runs along the top of the storage area to extract items as required—presents a particularly high likelihood of a very deep-seated fire when combustible containers are used. Critically, fire protection solutions that involve water are designed to suppress or control the fire, they are not designed to extinguish a fire—this requires manual intervention from the fire brigade.

In the case of the deep-seated top-loading ASRS warehouse fire, the smouldering components will need to be separated in order to ensure the fire does not re-ignite. However, by removing aisles, we have made it much more difficult for fire brigades to carry out this separation successfully. In addition to establishing a pre-incident plan to address dismantling of the

storage array, as well as extending the water supply duration out to four hours, the installation of fire brigade access platforms, remotely operated monitor nozzles and other instruments may be needed to help the fire brigade extinguish the fire.

The type of container used in an ASRS storage arrangement is also very important to the level of fire protection required. Most containers used in today's ASRS arrays are not only made of unexpanded plastics but are open-top as well. The presence of unexpanded plastics creates a large heat-release area that can cause a fire to last a long time. Open-top containers also collect water discharge from operating sprinklers, preventing water from getting to the base of the storage array in a timely fashion. It is important to consider whether a container has solid walls or has vent openings as this will impact the level of protection needed for the ASRS storage arrangement.

The products stored within the containers also need to be evaluated to ensure they are compatible with available sprinkler protection. While there are fire mitigation strategies for many types of commodities, we don't have reliable fire protection solutions in automated warehouses for all products. For example, ignitable liquids





PHOTO: FM GLOBAL AUSTRALIA

or flammable aerosols may not be protectable if maintained in open-top plastic containers.

However, the fire challenges associated with open-top plastic containers can be mitigated with the use of properly designed, open-top non-combustible solid-walled and bottom containers; however, these are not currently available from ASRS distributors.

Warehouse storage is a fast-moving space—almost as fast as the consumer demands that are driving its evolution. Governance processes associated with standard settings means published national standards for storage fire protection, including Australian Standard AS2118.1-2017, often do not take into account the latest technologies, the risks they create and how to best manage them.

FM Global Property Loss Prevention Data Sheet 8-34, *Protection for Automatic Storage and Retrieval Systems*, includes recommendations such as those outlined in this article, as well as numerous other critical considerations to mitigate fire risk in ASRS environments.

Owners should get relevant stakeholders such as the fire brigade, ASRS providers, fire protection consultants and insurers involved at

an early stage when establishing a warehouse. This will ensure owners have the best advice about what is feasible. It is also key that the fire brigade understand what a fire might look like in the environment should it occur, what fire protection is available, and what infrastructure is being installed to enhance their access should a fire occur. To assist in this process, FM Global has developed a training program for fire services to help them better understand top-loading ASRS and how to extinguish a fire within them. This free training is available on the FM Global Fire Service Learning Network.

A high-stakes choice

Ultimately, when it comes to fires in these new warehouse configurations, even a 'successful' outcome in which a fire is controlled can look bleak. While FM Global's global loss data reveals more than 270 warehouse fires with average gross loss per incident of more than US\$1.6 M, these were mostly likely fires that were easy for the sprinkler protection to control and accessible for the local fire brigade to extinguish.

If a fire breaks out in an advanced, automated warehouse with associated value density issues, costs could escalate to hundreds of millions of dollars. When a warehouse fire gets out

of control, not only can it destroy the entire building, it has major impacts on a company's ability to service its clients and its reputation.

The good news is that if systems and their fire protection are designed right with input from experts, consideration of best available practice and current constraints, and support of your local fire brigade, risk can be significantly reduced. A hands-on, risk-based engineering approach to mitigating and managing fire risk in automated warehouses can be particularly helpful, especially given that it is a new and emerging risk area.

Brands spend a lot of time thinking about how to get their name in the media. This is one occasion when you want to do everything you can to avoid just that. With the right fire protection, companies can significantly reduce the chances of warehouse automation costing far more than it is worth in efficiency gains. ■

The free Global Fire Service Learning Network training on top-loading ASRS is available at www.fmglobalfireserviceresources.com.

Closely packed flammable materials and limited access for fire fighters can exacerbate fire risk in automated warehouses.

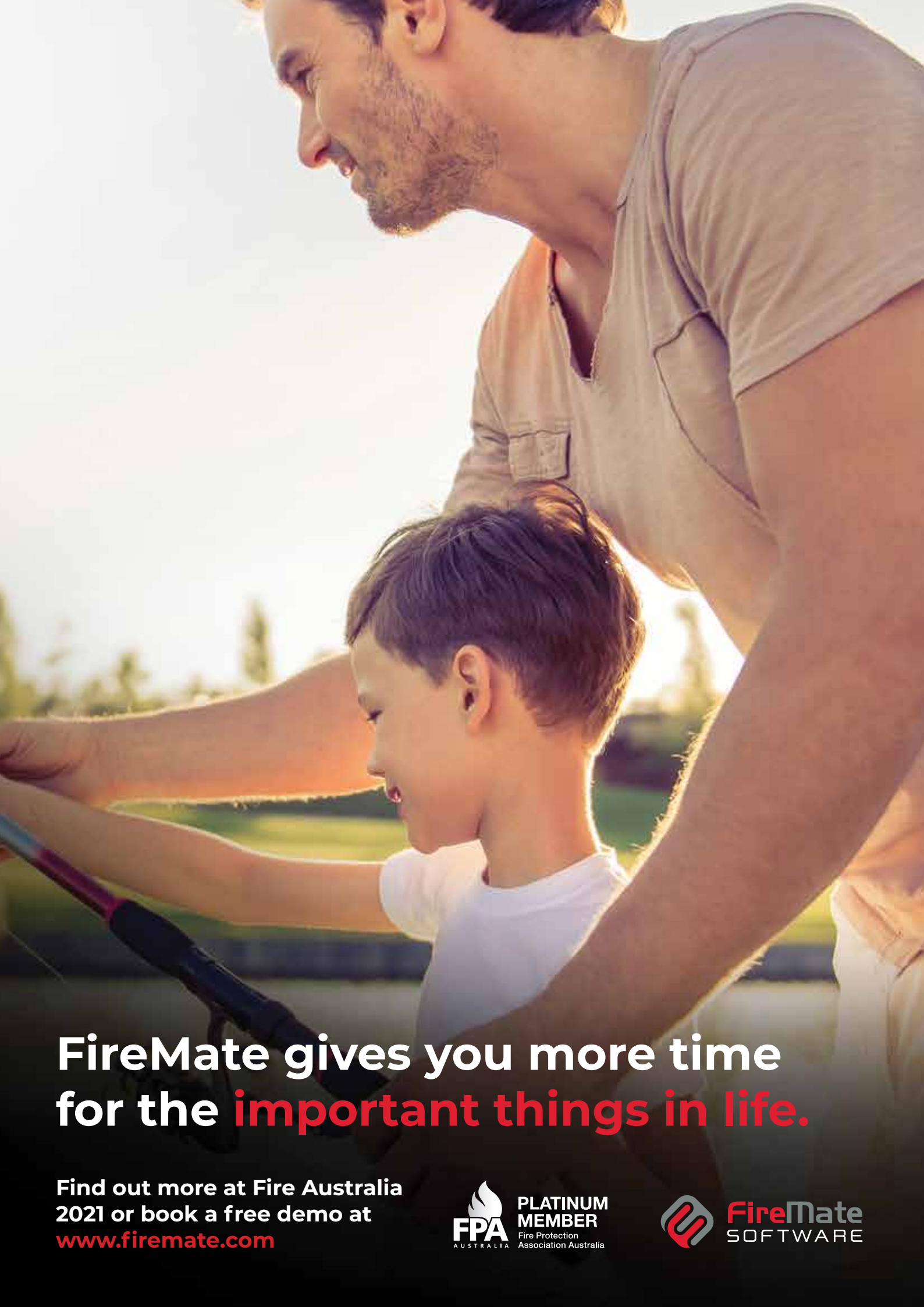


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OPERATION PAIA TRUKS: QUEENSLAND DELIVERS

Above:
The last of
five trucks
is offloaded
from HMAS
Choules in
Port Moresby.

Five fire trucks donated by Queensland Fire and Emergency Services will assist the Papua New Guinea Fire Service to develop capacity and capability in firefighting services.

BY **ALANA BEITZ**

AFAC

The nine-month 'Operation Paia Truks' (translation: fire trucks) project culminated in the landing of five ex-service Type 2 fire appliances in Port Moresby on 19 February 2021.

Australia has a long and collaborative relationship with Papua New Guinea, developed over many years. The relationship is formalised through Memorandums of Understanding (MOU) between Queensland Fire and Emergency Services (QFES) and Papua New Guinea Fire Service (PNGFS) for firefighting capacity development that dates back to 1992 and also through a

higher-level MOU between Queensland and Papua New Guinea (PNG).

QFES had previously provided breathing apparatus (BA) and compressors to PNGFS in 2018 prior to the Asia-Pacific Economic Cooperation Summit, but the request to provide five fire appliances was a significantly bigger initiative. Early engagement through the QFES fleet identified suitable trucks that were due to be withdrawn from service. Five low-mileage trucks were returned to the Eagle Farm workshops by December 2020 from across four regions.

The Isuzu Type 2 appliances retained all markings, lights, sirens, road crash rescue equipment and ladders, with a significant amount of equipment provided from regional storerooms to complete the inventory. A full mechanical service and coupling change overs were conducted at the Eagle Farm workshops to convert the appliances' pumps, standpipes and branches to British Instantaneous fittings prior to transport. The transformation was completed with the rebadging to PNGFS signage and crests on each appliance.

An additional 16 new Draeger BA sets and 16 spare BA cylinders were provided through a funding grant from the Department of Foreign Affairs and Trade (DFAT) to ensure that the equipment was fit for purpose on arrival in PNG.

A nine-month ex-service protective clothing collection drive resulted in over 150 sets of Generation 3 structural firefighting clothing being provided to PNG, as well as a similar amount of bushfire jackets and trousers, and additional protective equipment including gloves and boots.

Getting there

Transport of the appliances to Port Moresby was always going to be a big consideration, and stringent measures were put in place to minimise the risk of transmitting COVID-19 to the Pacific.

Project lead Chief Superintendent Brad Commens sought to engage the Australian Defence Force (ADF) to provide the logistics and transport capability, with an official request from Commissioner Greg Leach to the Head of Strategic Military Commitments, Major General Roger Noble DSC AM SCS being approved in January 2021. The final run to the line required a concerted effort by teams from the Specialist and Technical Response Branch and the QFES workshops to have the appliances and documentation ready for loading aboard HMAS Choules.

A momentous achievement

Chief Superintendent Commens said it was the largest single donation of equipment to PNGFS since the commencement of the MOU 29 years ago.

“A project like this is only possible through engagement and commitment of multiple partners within QFES and, in this case, with DFAT and ADF to successfully deliver the result,” he said.

“With the appliances and equipment provided by QFES, the new BAs and appliance refit funded through DFAT, and the transport provided by the ADF, we have shown the effectiveness of joint civilian–military operations for exceptional results.”

The five appliances were loaded aboard HMAS Choules on Saturday 13 February 2021 using the ship’s cranes, with Commissioner Leach officiating the handover to the Navy and exchange of plaques to mark the occasion.

“It is a pleasure for QFES to gift these five appliances to the PNGFS. They are good quality ex-service appliances with a comprehensive inventory of firefighting and road crash rescue equipment, making these trucks valuable assets for the PNGFS,” Commissioner Leach said.

A valued gift

The appliances transited to Port Moresby via the Whitsunday Islands and were offloaded as PNG fire appliances on 19 February. Chief Fire Officer Bill Roo, PNGFS, expressed his appreciation for the donation.

“I am excited and lost for words, but from the bottom of my heart I thank you for all the effort and energy you have put

into this successful project,” he said.

“I also take this time to thank Commissioner Leach for the heartfelt decision he made to donate those trucks to the PNG Fire Service”.

A number of AFAC members have been working in cooperation with their Pacific counterparts to support capability development of fire and emergency agencies in the region for many years. AFAC member agencies have technical expertise and capacity to support emergency and disaster management planning, preparedness and response initiatives across the disaster management cycle.

Where there is a need identified by Pacific disaster and emergency management leaders and stakeholders, AFAC is available to assist in a number of ways. The AFAC Pacific Partnership Group (formerly the Pacific Islands Liaison Officers Network) has been established for AFAC members and key strategic partners to collaborate, share information and work towards a coordinated approach to supporting emergency management and disaster preparedness capability development in the Pacific region.

AFAC member agencies are committed to supporting fire and emergency services in Pacific Islands countries and territories as a partnership of equals and in a spirit of mutual cooperation. ■

The AFAC Pacific Partnership Group Strategy 2020–2023 is available online at www.afac.com.au/docs/default-source/nrsc/afac-pacific-partnership-group-strategy.pdf.



PHOTO: QFES



PHOTO: QFES

Top: QFES Commissioner Greg Leach officiated the handover to the Navy in Brisbane.

Above: HMAS Choules and trucks transiting the Whitsunday Islands enroute to Papua New Guinea..

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INDIGENOUS EXPERTISE IS REDUCING BUSHFIRES IN NORTHERN AUSTRALIA

It is time to consider similar approaches for other disasters

Above: Waanyi Garawa rangers reducing fuel load with low-intensity burns.

Through coregulation, government and industry will deliver more professional, skilled and reliable fire protection practitioners.

BY **KAMALJIT SANGHA**

Charles Darwin University and Bushfire and Natural Hazards CRC

AND **ANDREW EDWARDS**

Charles Darwin University and Bushfire and Natural Hazards CRC

AND **WILLIE RIOLI SR**

Fire Coordinator for Tiwi Islands

Northern Australia is by far the most fire-prone region of Australia, with enormous bushfires occurring annually across thousands of square kilometres. Many of these vast, flammable landscapes have precious few barriers to slow down a fire. Infrastructure and resources are limited, and people are widely dispersed across the region.

Fire risk reduction in the recent past included very local prescribed burning operations. The overall effect was small, with huge greenhouse gas emissions from out-of-control savannah wildfires.

So, what might a better approach look like?

Our team at the Charles Darwin University's Darwin Centre for Bushfire Research has been working with Indigenous land managers, conservation, research and government organisations in northern Australia for the last 25 years to find more effective ways to manage wildfires.

These collaborations have led to a new approach, blending modern scientific knowledge with traditional Indigenous land management practices to reduce bushfire risk.

How? By reducing fuel load through

a patchy mosaic of small, low-intensity burns early in the fire season that cut the risk of late dry season fires when greenhouse gas emissions are much greater.

By collaborating with Indigenous ranger groups, this experience shows Australia can develop economically sustainable long-term solutions to manage bushfire risks—and shows what might be possible for other natural hazards such as cyclones and floods.

Such collaborations deliver benefits, including:

- ◆ reducing the risk of wildfires and other natural hazards
- ◆ engaging widely with dispersed remote communities
- ◆ building community resilience to bushfires and other natural hazards
- ◆ reducing greenhouse gas

emissions (which soar when savannah fires get out of control)

- ◆ saving government costs
- ◆ protecting biodiversity
- ◆ conserving water.

When done well, a collaborative approach to emergency management can create opportunities on country, enhance cultural and learning opportunities for Indigenous peoples and deliver environmental benefits for everyone.

Making fire management economically sustainable: a case study

Indigenous fire management skills and traditions have long been practised in Australia but part of the challenge, as one study¹ put it, is “finding the economic means to reinstate this type of prescribed strategic management”. In other words, how do we pay for it?

After Australia ratified the Kyoto Protocol in 2007, there was renewed focus on reducing wildfires in Australia’s tropical savannahs due to their significant role in creating greenhouse gas emissions.

In collaboration with Indigenous land managers and others, our collective efforts helped to develop what is known as the savannah burning methodology. This system incentivises management of fire in the north.

Under this method, Indigenous land managers in tropical savannahs can earn income for managing fire on their land to reduce greenhouse gas emissions. This is done through a tightly controlled system in which their emissions savings are measured in terms of carbon credit units.

Global and local benefits

This approach has allowed a new carbon economy to bloom in remote northern Australia. As one study² put it:

Since the development of the first savannah-burning methodology determination in 2012, 25% of the entire 1.2 million km² eligible northern savannahs region is now under formally registered savannah-burning projects, currently generating [more than] A\$30m per year.

These self-acquired funds go far to support Indigenous rangers to develop and improve skills so they can continue improving fire management across the north.

As Dean Yibarbuk, fire ecologist and senior traditional owner in West Arnhem Land has said:

This fire management program has been successful on so many levels: culturally, economically and environmentally. Through reinstating

traditional burning practices, new generations of landowners have been trained in traditional and western fire management, hundreds of thousands of tonnes of greenhouse gas have been abated, and the landscape is being managed in the right way.

A consistent and reliable flow of funds from carbon contracts, as well as other government and philanthropic sources, further offers many other socio-economic benefits. It has been instrumental in allowing art centres, weed and feral animal control businesses, rock art conservation projects and bi-cultural schools to flourish.

Investing money to save money

This system shows what is possible with the right engagement and policy levers. Perhaps one day a similar approach could help reduce risk from other kinds of natural disasters, all while building community resilience.

In the future, could we have similar systems where flood mitigation projects or cyclone risk reduction projects are made economically viable for local communities?

This would reduce reliance on emergency services. It also makes it less likely cultural protocols are breached when non-local emergency personnel are sent in. For example, tree removal is a common cyclone risk reduction practice but it is important to know which trees are culturally significant in a community, and why you need to leave them alone.

For these approaches to work, genuine and ongoing engagement with Indigenous peoples and dispersed remote communities is essential.

As a start to this engagement, we brought together Indigenous leaders, government representatives and

emergency management agency personnel from across the north for a meeting at Charles Darwin University late last year, supported by the Bushfire and Natural Hazards Cooperative Research Centre.

Many of the key personnel in these groups were meeting for the very first time, despite having worked for years on trying to address the same problems.

With appropriate funding, we could make such gatherings regular events so it is easier for these stakeholders to work together. Long-term collaborations can reduce disaster risk for northern Australian communities who live there permanently, build their resilience, and cut significant costs for Australian governments.

Resources to cover training, transport and logistics are crucial to implement such an integrated approach.

Long-term solutions cost money. But by drawing on local Indigenous knowledge and expertise on disaster risk reduction, we can make huge savings in the long term. ■

¹Russell-Smith J, Cook G, Cooke P, Edwards A, Lendrum M, Meyer C & Whitehead P, 2013, ‘Managing fire regimes in north Australian savannahs: applying Aboriginal approaches to contemporary global problems’, *Frontiers in Ecology and the Environment*, 11, August 2013.

²Russell-Smith J, Edwards A, Sangha K & Yates C, 2019, ‘Challenges for prescribed fire management in Australia’, *International Journal of Wildland Fire*, 29, January 2019.

For more information about this research, visit www.bnhcrc.com.au/research/remotecommunities and www.bnhcrc.com.au/research/firemanagement.

Note: This article originally appeared in *The Conversation* on 25 February 2021.

Below: Funds from the system go far to support Indigenous rangers with prescribed burning management.



PHOTO: SKAMALJIT SANGHA

FIRE SAFETY ENGINEERING APPROACHES TO BUSHFIRE EVACUATIONS

Risk management techniques and analysis methodologies drawn from engineering can help to ensure that communities can be prepared to evacuate quickly and safely.

BY **DR ERICA KULIGOWSKI**

School of Engineering, RMIT University, Melbourne

AND **DR STEVE GWYNNE**

Movement Strategies, a GHD company, London, UK and Lund University, Sweden

Since the Black Saturday fires in Victoria in 2009, Australian emergency officials have emphasised evacuation planning and preparation, but such planning can fail to consider and account for multiple evacuation scenarios. This includes 'credible worst-case scenarios' that 'stress current capabilities.'¹

Worst-case scenarios are those that pose the biggest threat, strain emergency response operations and potentially endanger people. For example, rapidly spreading fire conditions can block roads originally allocated as evacuation routes and leave residents trapped.² Fires can also cause power losses,³ hindering the receipt and implementation of evacuation orders. In such cases, evolving fire conditions

affect evacuations. This should be considered when planning for bushfire evacuation—especially when assessing the robustness and resourcing of a plan and developing contingency plans.

Little guidance exists on the scenarios that decision-makers should consider when planning for bushfire evacuation, making it difficult up-front to know which will be most credible. Evacuation modelling and projections can help to identify the scenarios that pose the greatest challenges.

The Royal Commission into National Natural Disaster Arrangements mentioned the need to model events using credible scenarios and projections, considering climate, weather, hazard, fire behaviour and other contributing factors.

However, while modelling a wildfire's spread and severity is critical and has enormous benefits, an understanding of the vulnerability of a population and its capacity to reach safety requires a quantitative assessment of both the hazard and community evacuation.

Learning from fire safety engineering

Fire safety engineering can help. Engineers determine the level of safety provided by particular building designs as part of a performance-based design (PBD) approach. This involves comparing the required safe egress time (RSET) (the time to evacuate all building occupants) and the available safe egress time (ASET) (how long until conditions become untenable). A building is considered safe where ASET is greater than RSET by some margin.

Fire safety engineers develop credible fire and occupant/egress scenarios for their building design—selected according to their probability and the challenges posed—and use these to quantify ASET and RSET.

This PBD approach could equally be adopted to assess the threats posed to a community by credible bushfire scenarios and planned responses.⁴ The authors contributed to the development of such a concept for bushfire (WildfireRSET and WildfireASET) as part of a recent international research project funded by the US government, influenced by the original work of Li et al.⁵

Performance levers

Some guidance exists for fire safety engineers on the types of fire and evacuation scenarios that should be considered when running PBD analyses of buildings.^{6,7} Nilsson and Fahy⁷ have suggested that occupant-based evacuation scenarios consider:

- ◆ the building and its uses, to account for the types of people who will use that building. This is particularly important when considering a building with multiple functions and, in turn, different occupant populations

The Black Summer event demonstrated the need for quick responses to, and carefully planned evacuations for, major bushfires.



PHOTO: HELEN FRANK, DEPARTMENT OF DEFENCE



PHOTO: ANNE WOODBRIDGE

Fire safety engineering principles can be applied to community evacuations by testing scenarios and developing evidence-based contingency plans.

- ◆ the layout of the building, since it shows the egress paths available (and their capacity to accommodate an evacuating population). Some exits and paths may be more familiar to occupants than others, which is important to take note of during analysis
- ◆ the occupants of the building and their response characteristics: permanent versus transitory occupants; trained versus untrained; adult versus young/old; the presence of cognitive, sensory or mobility impairments; awake versus asleep (or unconscious/inebriated); role; and social relatedness.

Scenarios are then formed from building design, use, population characteristics and response factors.

Nilsson and Fahy⁷ note that these characteristics are important because of the way they can influence evacuation. For example, permanent or trained individuals are more likely to be familiar with the building's evacuation plan and procedures, whereas others may not. Age and even some types of disabilities may impact a person's ability to make independent decisions and/or affect

their ability to physically move to safety. Other impairments (e.g. sensory) or states (e.g. sleeping) may hinder a person's ability to receive cues from their environment signalling that a fire is threatening their safety. Social groupings can play a role since families, for example, are more likely to assemble and move together.

Nilsson and Fahy⁷ note that scenario development is an iterative process that requires consideration of the building's layout, its use, the users of the building, and the fire. The ultimate goal of these analyses is for the engineer to develop scenarios that are severe, yet credible, to test the building's fire safety design.

How is this relevant to bushfire evacuation?

Such guidance might be adapted to develop evacuation scenarios for communities exposed to bushfire. Here, planners can view the community as an engineer would view the building by:

1. identifying the evacuation routes, possible modes of transport and ultimate destinations/locations that provide safety
2. identifying the community members

present, e.g. given building types and their characteristics (resident versus visitor, trained versus untrained, etc.)

3. establish the nature of these people's responses.

These factors can be used to develop credible evacuation scenarios that can then be compared with credible fire scenarios to establish:

1. whether the community can evacuate to a place of safety before fire conditions become untenable
2. if not, what types of interventions or design changes (if possible) should be made to allow for safe evacuation. This type of analysis allows evacuation to be quantified and the impact of different factors to be determined.

Many of the occupant characteristics identified by Nilsson and Fahy⁷ for building fires are relevant to the development of evacuation scenarios for bushfire. That said, there are important characteristics unique to households' response to bushfire that are not necessarily relevant in buildings. Those of lower socio-economic status, for example, may not have access to personal vehicles and may require carpooling or public transport to evacuate. Additionally, individuals with pets or livestock may be less likely to evacuate their homes, especially if shelters are not equipped to accommodate them. Many articles have been written about the factors that influence evacuation decision-making during bushfires,^{9, 9} and while less has been written about the factors that influence evacuation movement during bushfire,¹⁰ these articles provide some understanding of the characteristics that matter.

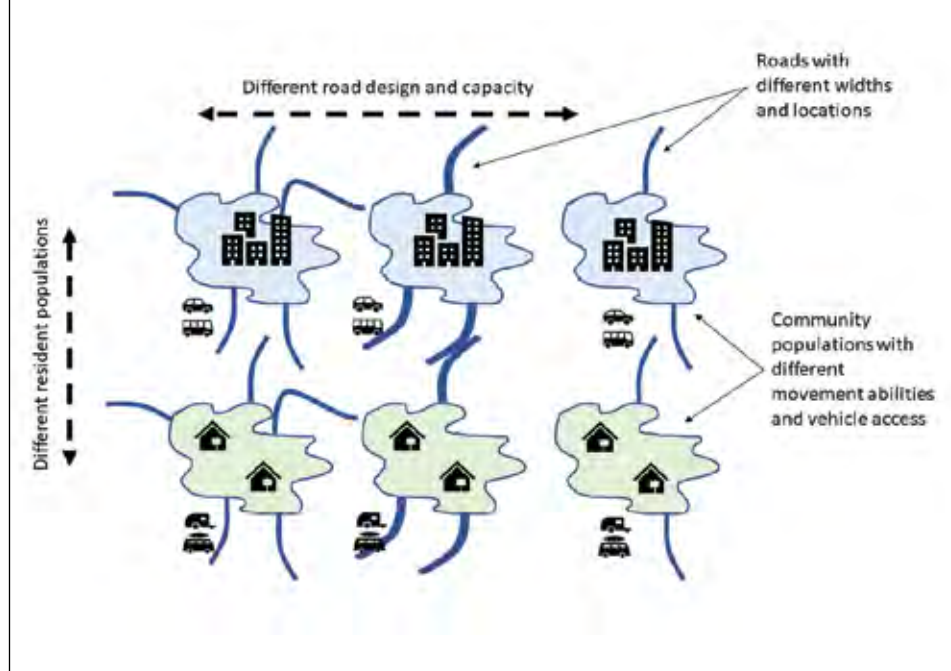
Candidate scenarios

Below is a list of several factors (and example settings) that may form candidate scenarios when planning for bushfire evacuation. In each case, a factor is named, and then possible settings identified.

Evacuee (resident/community member) response:

- ◆ evacuees (some percentage) decide to stay and require rescue
- ◆ evacuees (some percentage) leave 30 minutes, 1 hour, 2 hours after the emergency warning is given (these evacuees may be unaware of the fire, unaware of the procedure, etc.)
- ◆ most evacuees (e.g. greater than 60%) start their evacuation movement around the same time (i.e. potential for congestion to occur at particular locations)

FIGURE 1. The same community layout with different road connections (horizontal) and different resident populations (vertical). Roads are shown as blue lines with road capacity indicated by the width of the line.



Mode choice:

- ◆ evacuees (some percentage) require public transport or assistance to evacuate
- ◆ evacuees (some percentage) evacuate with multiple personal vehicles (per household) of various sizes (cars, trucks, campers, trailers, etc.)

Route choice:

- ◆ evacuees (some percentage) use the most familiar route (e.g. main highway) to evacuate the community, rather than the planned route
- ◆ evacuees (some percentage) use the longest route to evacuate the community, rather than the planned route (e.g. tourists/visitors)
- ◆ evacuees (some percentage) choose to travel to other locations within the areas of risk before evacuating (e.g. to pick up loved ones)

Destination choice:

- ◆ evacuees (some percentage larger than available capacity) decide to travel to the community fire refuges for safety

Fire conditions:

- ◆ after time (X minutes), at least one evacuation route becomes blocked due to fire

This last factor might be represented using results from modelling of the fire itself. However, the simple approach identified here might enable the modeller

to determine the sensitivity of the community to fire should the fire block various routes before evacuation starts.

Simple example

Figure 1 shows a simple example of how the PBD approach might be applied to the evacuation analysis of a bushfire-threatened community. This community is to have the surrounding road network upgraded, with several designs being considered. This expensive endeavour has to be costed according to traffic demand of the road network variants during routine (non-emergency) scenarios. This upgrade is also examined for its potential impact on evacuation using the PBD approach. The community's characteristics (i.e. demographics, training/familiarity, longevity, vehicle ownership, etc.), estimated response, viable emergency procedures and refuge locations are identified and used to develop evacuation scenarios, which can then be simulated to calculate evacuation times. These are then compared against projections of credible fire conditions and how they progress over time.

Analytically, a planner might quickly be able to determine the capacity of the road network designs and intuitively establish realistic traffic loads. However, this will not necessarily capture the dynamics of the evacuation in conjunction with the evolving fire conditions, such as when evacuating populations are

most exposed, or where the system is under/overutilised. In contrast, the use of a PBD will calculate evacuation times and the number of residents not able to evacuate before fire conditions become untenable (for each scenario or across all of the scenarios examined). It would at least provide some basic evidence for comparison—both of the outcomes and the conditions that are produced during the evacuation simulation.

The same community layouts can be tested with different populations (larger numbers, older, less familiar, etc.) to see how susceptible the community is to changing demographics, as well as different fire conditions. Similarly, road availability, resident evacuation delays, vehicle availability, etc., along with fire severity and location, can be varied. Such analysis enumerates the vulnerability of the community to bushfire and provides insights into their capacity to cope with the bushfire scenarios posed and the robustness of the road network to cope with the demand.

Discussion

Without quantifying evacuation under different fire scenarios, it is difficult to develop evidence-based contingency plans to address issues ahead of a fire event. By quantifying the outcome of each scenario (e.g. the time taken for the community to reach a place of safety), it allows for:

- ◆ a comparison between different fire scenarios to determine which incident poses a particular threat
- ◆ a comparison between different behaviours or official interventions (e.g. procedural changes, different resource allocation, etc.)
- ◆ the identification of underlying conditions that contribute to the projected outcomes (e.g. where routes are overloaded or causing congestion, where routes are underutilised, etc.), suggesting possible changes.

Such an approach has enormous value in routine times where a bushfire might be the only threat posed in a particular area. However, 2020 has taught us the importance of considering simultaneous threats when planning for evacuation. At present, evacuation planners are also forced to consider how the COVID-19 pandemic may influence emergency response procedures and protocols for bushfire events. The Royal Commission report notes that compound disaster scenarios require attention.¹

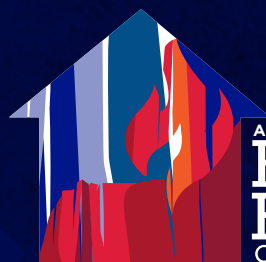
The presence of the pandemic may affect the community response to a bushfire in several ways:¹¹

- ◆ a higher or lower number of people may reside in a community because of COVID-19-related travel restrictions
- ◆ delays or non-evacuation behaviour may occur because individuals are concerned about spreading or catching the virus
- ◆ fewer people (than previously planned for) will be able to use public transport or shelters because of social distancing requirements
- ◆ evacuees may choose different destinations than previously planned
- ◆ emergency responders could fall ill, or be reallocated in the regional/national response to the pandemic, or they may be unable or hesitant to perform some tasks, given the pandemic (e.g. going door to door to notify households of evacuation warnings).

We do not know precisely how such a compound event will affect evacuation response. However, we can identify the underlying factors that it might affect. We might then vary the extent of this effect during evacuation modelling to quantify the potential influence that such a compound incident might have on a bushfire evacuation and help identify the preparations required to mitigate these effects. ■

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AFAC NRSC: A SEASON OF DEPLOYMENTS AND DEVELOPMENTS

The 2020–21 severe weather season was one of achievements for the AFAC National Resource Sharing Centre (NRSC). Although the AFAC NRSC assisted with significantly less deployment activity compared to the 2019–20 season, COVID-19 complications and state border closures presented novel challenges.

BY **MOLLY PRICE**

AFAC

Recent AFAC National Resource Sharing Centre (NRSC) efforts—including a multi-jurisdictional State Emergency Service (SES) deployment to Queensland, Large Air Tanker (LAT) assistance to Western Australia and national collaboration to develop a COVID-19 deployment protocol—reflect the growing maturity of the sector.

Recovery support for Queensland storms

On 31 October 2020, a series of severe thunderstorms across south-east Queensland delivered significant damage to homes in the Ipswich and Logan local government areas. As a result of these storms, over 2,800 SES requests for assistance were received, the majority of which were in the

Springfield Lakes and Logan areas.

While NSW and Queensland regularly exchange storm and flood resources within their cross-border arrangements, the need identified by Queensland Fire and Emergency Services (QFES) required the activation of the AFAC NRSC to facilitate formal interstate assistance. This subsequently resulted in support from both NSW and South Australian SES crews.

From 4–11 November, a total of 102 interstate SES personnel from NSW and SA, including liaisons and an AFAC NRSC Deployment Manager, deployed into QFES state operations. Personnel assisted with storm recovery activities, including tarping of roofs and working at heights in severely impacted areas. The successful deployment highlighted AFAC NRSC’s capability to respond to SES resource sharing requests as effectively as for bushfires.

Large Air Tanker assistance to Western Australia

In early January 2021, WA experienced extreme fire conditions. To assist with pre-planning for timely response, AFAC NRSC and the National Aerial Firefighting Centre (NAFC) cooperated with AFAC member agencies to facilitate the movement of aviation resources from eastern Australia to Busselton Airport in WA.

In February 2021, additional Large Air Tanker (LAT) support was provided to WA to assist the bushfire response efforts in the Perth Hills and Yallingup areas. In total, five LATs were deployed to WA.

The deployments leveraged the newly established NRSC Standard Operating Procedure: Redeployment of Aviation Resources. This outlines the cooperation procedures between NRSC and NAFC when facilitating aviation resource movements between AFAC member agencies who are party to the NAFC Resource Management Agreement.

COVID-19 planning and national protocol

Early in September 2020, following a request from the Prime Minister’s Office, Emergency Management Australia (EMA) contacted AFAC NRSC to seek a discussion about national COVID-19 planning for interstate deployments. The NRSC Resource Managers Group met during September and agreed to work on a national protocol for interstate deployments of fire and emergency service workers. The intent was to produce a document similar to the National Freight Movement Protocol and Freight Movement Code, to support a request to the Australian

Below: Damaged homes in Ipswich following severe weather in October 2020.



PHOTO: QFES



PHOTO: DFES WA

Health Protection Principal Committee (AHPPC) for the introduction of standard waivers of quarantine requirements relating to interstate deployments.

EMA and NSW Rural Fire Service, with the support of AFAC NRSC and NAFC, worked to produce a protocol and supporting model plans for interstate deployment of fire and emergency resources. A specific plan was also developed for aviation, given the different considerations that apply.

The COVID-19 Interstate (Fire, Emergency and Other Essential Services) Deployment Protocol sets baseline COVID-safe requirements for sending, receiving and transiting jurisdictions and the deployed personnel. It has been endorsed by the jurisdictions through the Commissioners and Chief Officers Strategic Committee and National Cabinet. The protocol was a substantial piece of work and is the result of a coordinated effort between Australian states and territories, the Commonwealth Government and New Zealand to enhance national consistency and collaboration.

National Situation Awareness Reporting

During the 2020–21 season, AFAC NRSC worked with the NRSC Resource

Managers Group to trial the development of a weekly national situation report. The report provides regular national awareness of multihazard resource commitment levels across Australia and New Zealand, with a focus on bushfire, severe weather and flood. The report has considered the need to limit reporting to potentially high operational periods and utilises a simple and efficient approach to requesting and collating data from jurisdictions.

US deployment planning

On 23 August 2020, there were 93 large fires burning across the US, impacting more than 1.6 million acres (650,000 hectares) over 13 states. On 24 August 2020, the US requested 55 personnel from Australia and New Zealand to deploy in support of fire suppression activities in the west of the country.

Despite the COVID-19 risks, Australian agencies were prepared to provide support and AFAC NRSC undertook significant deployment planning to ensure it could be achieved in a COVID-safe fashion. Ultimately, the US reassessed its needs and determined in early September that the deployment was not required to go ahead due to decreased fire activity and increased availability of local personnel at that time.

National capability statement

AFAC NRSC has finalised the 2021 edition of the *National Statement of Capability for Fire and Emergency Services*. The document provides a consolidated picture of the capabilities that enable Australia to respond to the challenges posed by the increasing frequency and intensity of disasters. It was first developed by AFAC in 2015 and has undergone a process of continuous improvement, with updated editions in 2017 and 2021.

The national capability statement quantifies Australia's fire and emergency service resources in a number of key areas, facilitating a national understanding of available capability and supporting the appropriate direction of requests for assistance during large-scale and or multiple severe to catastrophic disasters, as well as providing a basis for state and territory governments and the Commonwealth Government to better plan future capabilities.

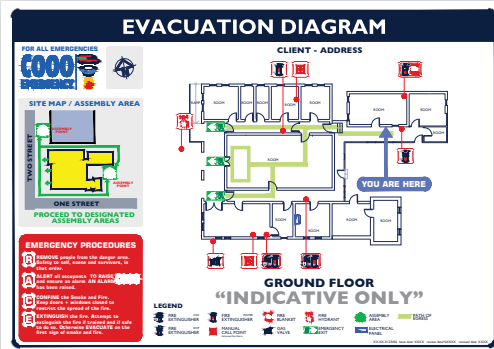
This season has seen significant collaboration across the sector and demonstrates the ongoing commitment of AFAC NRSC to facilitate national cooperation and consistency. ■

Above:
The AFAC NRSC and NAFC worked together to provide Large Air Tanker support to Western Australia in February 2021.

FIRE SYSTEM DRAFTING

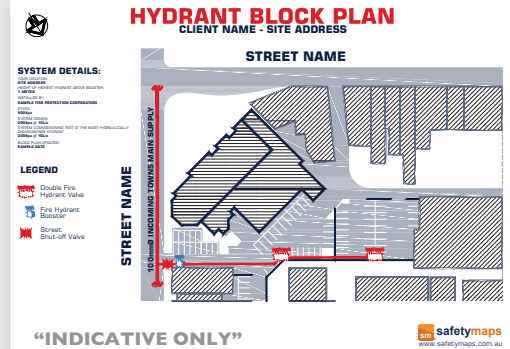
Safety Maps can supply all of your Fire System Drafting in accordance with **Australian Standards** so that you can get back to your core business.

EVACUATION DIAGRAM



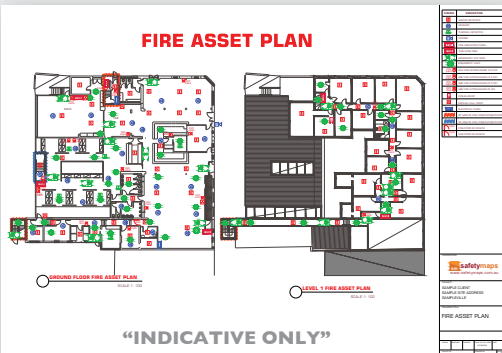
AS:3745-2010 compliant, Your evacuation diagrams can be created from your own architectural plans, or let our in house specialist team create them for you.

HYDRANT BLOCK PLAN



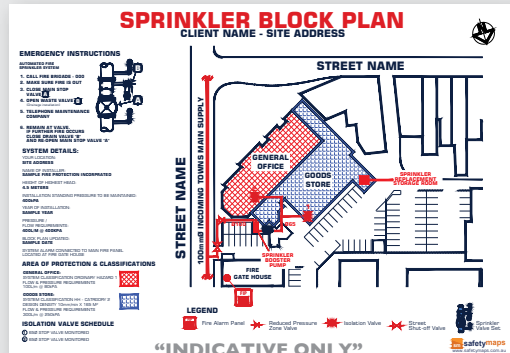
Block Plans that can be printed on any medium of your choice, PVC, Brushed Alloy or Anodised. A3 displaying all necessary information about the buildings hydrant system.

FIRE ASSET PLAN



A plan that display's all the existing fire protection equipment and devices (Smoke Alarms, Fire Extinguishers, Emergency Lighting, Exit Signs, Fire Blankets, Fire Hose Reels, Manual Call Points, etc.)

SPRINKLER BLOCK PLAN



Block Plans that can be printed on any medium of your choice, PVC, Brushed Alloy or Anodised. A3 displaying all necessary information about the buildings sprinkler system.

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GET YOUR TEAM ACROSS THE LINE WITH RESEARCH- BACKED TOOLS

A suite of team management and strategic decision-making tools, drawing on the latest research, is helping emergency managers and their teams to function well during a crisis.

BY **BETHANY PATCH**

Bushfire and Natural Hazards CRC

Incident management teams and emergency management teams (IMT/EMTs) respond to emergencies day and night, often coordinating multiple incidents at once and making sense of complex information from disparate sources.

They must quickly provide accurate information and warnings to numerous stakeholders.

While everyone is expected to play their specialised roles, teamwork enables IMT/EMTs to manage under this sort of pressure. Effective collaboration in these situations depends on a range of skills—both technical and non-technical in nature—to manage stress, fatigue and heavy workloads.

Over the last five years, Bushfire and Natural Hazards CRC researchers have been working closely with emergency

managers to ensure that people working in these critical roles have the latest knowledge to support them when the heat is on.

Associate Professor Chris Bearman at CQUniversity led the CRC's research team for the *Improving decision-making in complex multi-team environments* project. The team developed six tools to help emergency management leaders and teams function well during a crisis.

"If we're going to ask people to operate in increasingly complex environments, we need to give them the skills and tools to do so effectively," A/Prof Bearman explained.

This added complexity means that decisions are now more complicated than ever. Helping people to cover all of the bases is critical, explained Dr Steven Curnin, one of the researchers who developed the strategic decision-making tools at the University of Tasmania.

"Humans are fallible, and during a crisis our decision-making can suffer.

Simple tools like these can help," Dr Curnin said.

Rob McNeil AFSM, Assistant Commissioner of Regional Operations at Fire and Rescue NSW, agrees, reiterating the importance of strategic decision-making in any type of disaster.

"The outputs from this project will greatly assist the industry in preparing our future leadership for disasters and the decisions they will be expected to make," Mr McNeil said.

Together, the six tools form an effective suite of resources that IMT/EMT leaders can draw on to support the overall functioning of their teams. They are helpful when onboarding and training new members, and useful during emergencies or in after action reviews and debriefs to reflect and improve upon teamwork capabilities.

The tools all draw from a vast amount of research and expertise from the research team, as detailed below.

Team management

The team management tools—developed by A/Prof Bearman and Dr Sophia Rainbird at CQUniversity, and Dr Christine Owen and Associate Professor Benjamin Brooks at the University of Tasmania—were designed to assist emergency management teams to monitor communications and deal with any breakdowns that might impair operational performance. This will help strengthen teamwork before, during and after response and recovery efforts.

◆ **The Emergency Management Breakdown Aide Memoire**

is a simple checklist that helps teams recognise communication breakdowns through their outputs (e.g. incident action plans), and in their formal and informal organisational networks. Intended to be used by a senior officer, it identifies issues at a general level and provides five practical solutions to resolve any further breakdowns: delegate, resource, mentor, assert, replace.

◆ Taking a slightly different approach, the **Team Process Checklist** is more of a health check for effective teamwork and is used to build upon issues identified by the previous tool. It helps leaders think through three aspects of effective teamwork—communication, coordination and cooperation—to determine the nature of the problem, using queries such as ‘Are team members passing on information in a timely manner?’ and ‘Are appropriate communication procedures being used?’.

These tools were initially based on an extensive literature review of methods used to monitor teams, before being refined and evaluated by state-level end users during large-scale emergencies.

The other two team management tools were developed by A/Prof Bearman and Dr Peter Hayes (CQUniversity), with the support of Mark Thomason (Country Fire Service) and Peter Bremner (CQUniversity) on the Key Tasks Cognitive Aid.

◆ **The Emergency Management Non-Technical Skills** checklist is designed to help emergency management individuals and teams

to enhance their cognitive, social and personal skills to complement technical skills and strengthen individual and team capabilities. This tool focuses on seven non-technical skills—communication, coordination, cooperation, leadership, situation awareness, decision-making and coping with stress/fatigue—and provides descriptions and behavioural markers that can be used to determine how effectively these skills are being used and where improvements can be made.

◆ **The Key Tasks Cognitive Aid** is a checklist for regional and state control centres. It is designed to prompt leaders during a crisis to ensure their teams are undertaking the tasks most important to effective performance. It covers five phases of a control centre’s incident management process: readiness, escalation, coordination, de-escalation and termination or closing the centre. Within each phase is a checklist that can be used to tick off the key activities required.

“Anyone will find the tools invaluable during operational responses, debriefings or training, whether they work in incident management and strike teams, at regional or state operations centres, as team leaders, or as neutral observers.”

— Mr Thomason, AFSM

The research explored the complexities of strategic decision-making during emergencies



PHOTO: FIRE AND RESCUE NSW



PHOTO: MARK THOMASON, SA COUNTRY FIRE SERVICE

Strategic decision-making

Developed by A/Prof Benjamin Brooks and Dr Steven Curnin at the University of Tasmania, the following cognitive tools recognise the growing number of tasks required in IMT/EMTs and the need to address human capability in changing environments. They help to identify and address some of the most fundamental cognitive issues associated with decision-making errors or biases.

- ◆ The **Psychological Safety Checklist** provides simple strategies to help people feel safe while enhancing and establishing trusting relationships. It outlines a cyclical strategy that a team leader can adopt when the team is first formed, and can repeat when new members join, to create a psychologically safe environment. It also suggests possible actions to take, such as 'clarify roles and make them visible', to ensure safety is maintained.
- ◆ The **Cognitive Bias Aide Memoire** can be used to identify cognitive biases in decision-making. It is designed to be familiarised by a nominated team

member, who would then act as the 'devil's advocate' to challenge any existing team biases and mitigate the effect of those biases. It is best used for key decisions and involves two steps (each broken down into checklists):

1. assess available information, intelligence and decisions
2. determine its meaning.

These tools are now being used to support Australian emergency services and local government to lighten the load of managing emergencies by enhancing and supporting more efficient teamwork—an essential piece of the emergency management puzzle.

Mark Thomason AFSM, Manager Risk and Lessons Management at SA Country Fire Service, highly recommends the tools to other emergency managers.

"The straightforward, practical tools developed through this research are of great benefit to emergency managers to ensure their teams are functioning to the best of their ability," Mr Thomason said.

"Anyone will find the tools invaluable during operational responses, debriefings or training, whether they work in incident management and strike

teams, at regional or state operations centres, as team leaders, or as neutral observers." ■

All six tools can be found on the CRC's Driving Change resource, under the 'Teamwork tools' section: www.bnhcrc.com.au/driving-change/tools. You can also learn more about the research project behind these tools at www.bnhcrc.com.au/research/multiteamenvironments.

Read more about:

Emergency Management Breakdown Aide Memoire and Team Process Checklist in Hazard Note 33 www.bnhcrc.com.au/hazardnotes/33.

Psychological Safety Checklist and Cognitive Bias Aide Memoire in Hazard Note 73: www.bnhcrc.com.au/hazardnotes/73.

Emergency Management Non-Technical Skills checklist in Hazard Note 92 www.bnhcrc.com.au/hazardnotes/92.

Key Tasks Cognitive Aid in Hazard Note 93 www.bnhcrc.com.au/hazardnotes/93.

Above: These tools are used by the Country Fire Service to ensure its teams are working safely and efficiently during an emergency.



PHOTO: AFAC

BALANCING IMPACT AND EXPECTATIONS AT AFAC21

The award-winning AFAC21 powered by INTRSHUTZ Conference and Exhibition returns to Sydney in 2021.

BY **ZOE KENYON**

AFAC

As recent emergency events have shown, there is an evolving extreme that is producing new challenges in terms of impact on the community, environment and economies.

The community expects the emergency management sector to

stay ahead of these events, but with resourcing challenges, overlapping seasons here and abroad, and the surge in reviews, inquiries and recommendations, what do agencies do differently?

AFAC21 powered by INTERSCHUTZ is returning to Sydney on 17–21 August 2021 to focus on how we manage the consequences of major events, while meeting the expectations of

communities and governments. The program will explore how the sector can continue to learn and find opportunities to deliver with new and innovative approaches.

Back better than ever, AFAC21 will build on the success of the hugely successful AFAC19 in Melbourne that saw a record number of over 4,000 practitioners, researchers and leaders from across the sector.

For keynote speakers and program announcement visit the AFAC 21 powered by INTERSCHUTZ website www.afacconference.com.au

What can you expect at AFAC21?

AFAC21 powered by INTERSCHUTZ is Australasia's largest and most comprehensive emergency management conference and exhibition brought to you by AFAC and Deutsche Messe.

On rotation around Australia's major cities, AFAC21 will be hosted by AFAC members in the ACT and NSW: ACT Emergency Services Agency, ACT Parks and Wildlife Service, Fire and Rescue NSW, NSW National Parks and Wildlife Service, NSW Rural Fire Service and NSW State Emergency Service.

AFAC21 will offer you an unrivalled opportunity to learn from local and

international thought leaders across the multi-streamed AFAC conference, which includes access to the Institution of Fire Engineers (IFE) Australia National Conference and the Australian Disaster Resilience Conference, which will again run concurrently.

Day one of the conference will begin with the AFAC Research Day, highlighting research and innovation that supports the work of the fire and emergency service sector. The day will conclude with the Welcome and Awards Ceremony, where much-deserving key innovators and leaders will be acknowledged for their contributions to the sector, before moving to the comprehensive powered by INTERSCHUTZ exhibition for the Welcome Drinks function.

Days two and three of the conference are focused on knowledge sharing, with a multi-streamed program offering insights into the latest research and practice. The conference program is centred on the theme and also draws on supporting topics:

- ◆ communities

- ◆ embedding research into practice
- ◆ new approaches
- ◆ supporting ourselves and others.

There will be many opportunities for networking throughout the conference in the Australian Institute for Disaster Resilience (AIDR) Knowledge Centre, where delegates can participate in the 'Meet the Speaker' and poster presentation sessions. The Gala Dinner is the highlight of the social program, providing a night of entertainment and the chance to reconnect with colleagues and make new connections.

Following on from the conferences, the fourth day will be dedicated to professional development and will feature practical workshops, forums and field trips for hands-on learning.

AFAC21 will also feature its renowned world-class exhibition. Every year, the exhibition attracts a comprehensive range of exhibitors covering all facets of emergency management equipment, technology and services. All attendees will have access to the very popular live demonstration zone and practical expo stage presentations.



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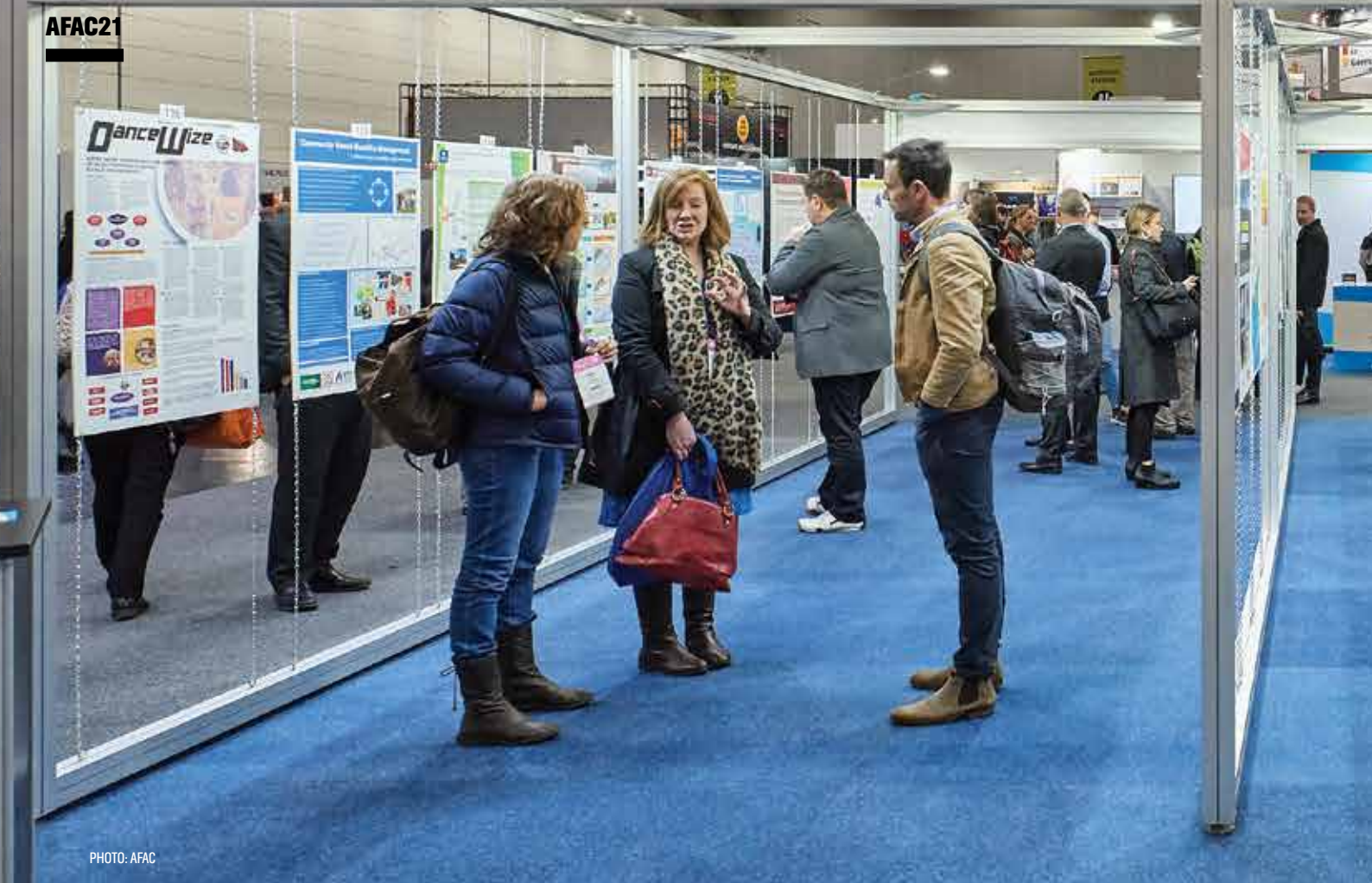


PHOTO: AFAC

The co-location of these three conferences provides a unique opportunity to build connections and share knowledge...

Above: The AIDR Knowledge Centre in the AFAC21 Exhibition is a central location for delegates to explore and share learning.

Right: Presenters and organisers are excited to return to an in-person event after the 2020 event was postponed.

Concurrent conference program

Following the success of the co-location at AFAC19 in Melbourne, AFAC21 will be co-located with the IFE Australia Conference and the Australian Disaster Resilience Conference (ADRC).

The co-location of these three conferences provides a unique opportunity to build connections and share knowledge between the emergency management, the disaster resilience and the fire engineering sectors through a shared keynote speaker program and networking lunches. As an added benefit, AFAC21 delegates are able to attend concurrent sessions in the IFE and ADRC program as part of their AFAC Conference pass.

The **IFE Australia Conference** will explore how the fire safety engineering and firefighting sectors shift in culture

to enhance safety, sustainability and resilience, through their conference theme 'Vision 2021: Shifting the culture; enhancing safety, sustainability and resilience'. The conference will explore topics including how can building be built better, how quality can be assured, and how competency is enhanced and maintained.

AIDR will again host the **ADRC** with a focus on the theme 'Meeting in the middle: community voices and complex choices'. The ADRC will ask, how do we truly enable communities to be in the driver's seat to ensure they are community-led, and how do we tackle

systemic risks influencing communities that arise from public policy legacies and past decisions? The ADRC is aimed at the community, local government, business, education and not-for-profit sectors, and will take a broad look at disaster risk reduction in action across a range of sectors and partnership areas.

Registration open

Registrations are now open for AFAC21 powered by INTERSCHUTZ. Register before 30 June 2021 to take advantage of the Early Bird rate on the conference website at www.afacconference.com.au.

PHOTO: AFAC





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FIRE-SAFE TIMBER BUILDINGS: AN INDUSTRY COMMITTED TO INNOVATION AND INFORMATION

With extensive and ongoing research, and information about compliance with the National Construction Code 2019 Volume One, timber and wood products can now be used confidently and safely in appropriate situations.

BY **BORIS ISKRA**

National Codes and Standards Manager, Forest and Wood Products Australia Limited (FWPA).

In 2019, the National Construction Code (NCC) introduced Deemed-to-Satisfy (DtS) provisions that permitted all classes of buildings up to 25 metres in effective height (typically eight storeys) to be constructed of fire-protected lightweight timber-framed or massive timber structural elements.

The DtS solution requires the use of fire-protected timber building elements that comprise fire-protective grade coverings (e.g. fire-grade plasterboard), automatic fire sprinkler systems throughout, non-combustible insulation and, where required, cavity

barriers. The DtS provisions enable fire-protected timber to be used in mid-rise construction wherever non-combustible construction is required, such as external, common and internal loadbearing and non-loadbearing fire-resisting walls.

These changes were accepted following extensive fire testing of timber building systems and fire safety analysis of the various building classes and configurations.

For example, to demonstrate the effectiveness of fire-protected timber systems, full-scale loadbearing fire tests were undertaken to demonstrate and confirm the performance of fire-protected lightweight timber-framed floor and wall frame assemblies. Loadbearing engineered timber floor systems were tested and achieved both 90-minute and 120-minute fire resistance levels, and various timber wall frame assemblies were tested investigating the effects of penetrations as well as fire performance up to 180 minutes.

These test results informed the detailed fire engineering safety analysis/modelling, which demonstrated that structural timber building elements (wall frame, floor/ceiling, shafts) protected by specified fire-protective grade coverings could achieve a higher level of safety than traditional non-combustible construction for mid-rise buildings.

Testing and evaluation processes

help to ensure that the NCC does not constrain the choice of the most effective or beneficial materials for a particular project. Using wood products on a project is subject to the requirements of the NCC, which may call for fire test reports or other formal documentation.

Wood and wood products, including the emerging mass timber building systems, offer advantages unmatched by other materials. From off-site prefabrication to lighter weights and reduced footing requirements to quieter, less-trafficked worksites and reduced carbon footprints—the benefits build a compelling case.

Forest and Wood Products Australia's *WoodSolutions Technical Design Guides* offer extensive information, including details of fire proofing solutions in different classes of building. Some of the current titles are *Fire Design, Timber-framed Construction—Sacrificial Timber Construction Joints*, a range of *Performance Solution* titles and many more. ■

See the WoodSolutions website (www.woodsolutions.com.au/articles/fire-test-reports) for free access to the most commonly requested fire test reports, an article explaining 'designing for fire', and a discussion about fire regulation compliance using performance solutions.



PHOTO: PEREXIS

Fire-protected timber passes all classes.

Class 8
Laboratory
or factory

Class 4
A dwelling in
a Class 5, 6, 7, 8
or 9 building

Class 9
Health-care,
school, aged care

Class 5
Office buildings

Class 3
Multi-residential,
other uses
e.g. hotels

Class 2
Multi-residential,
apartments

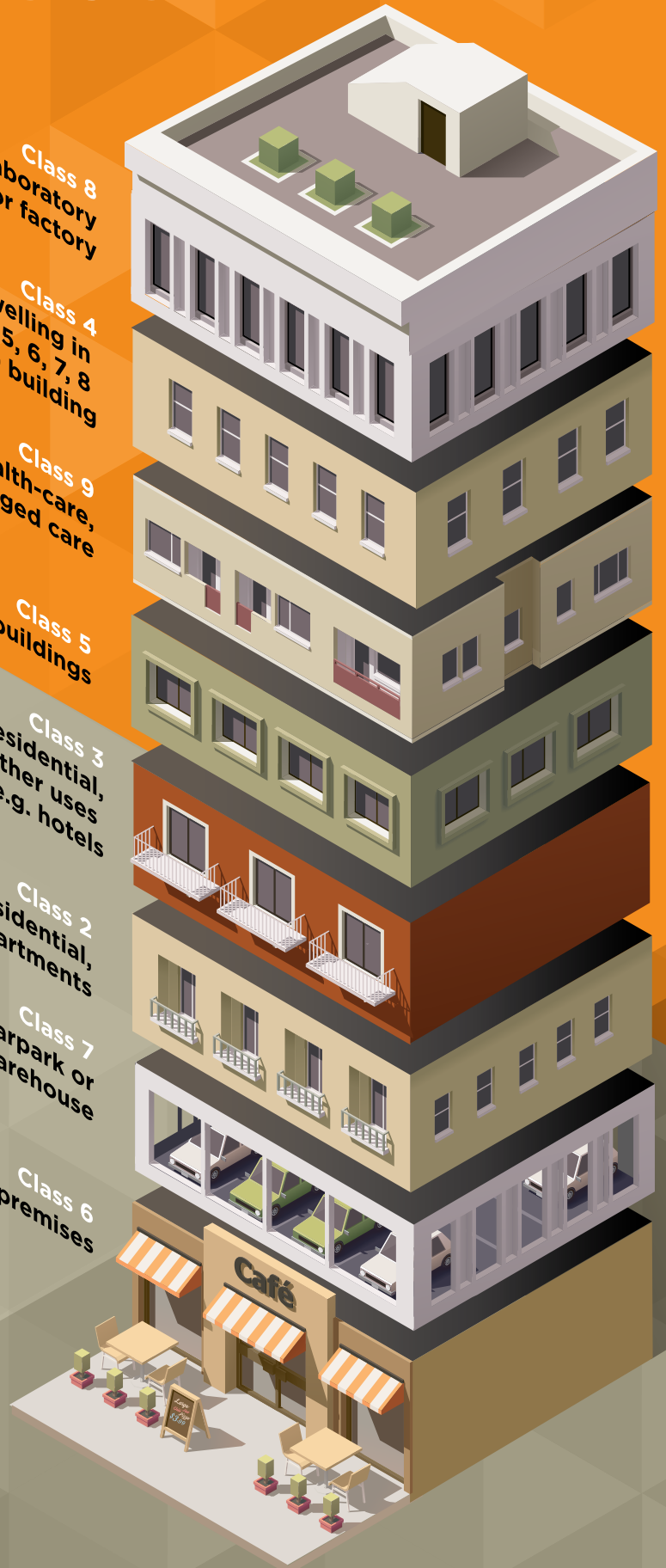
Class 7
Carpark or
warehouse

Class 6
Retail premises

In the 2019 edition of the NCC, a Deemed-to-Satisfy solution was extended to permit construction in fire-protected timber building systems to an effective height of 25 metres (typically 8 storeys) for all classes of building, enabling the use of timber building systems in aged accommodation, schools, retail and hospitals.

Timber building systems include traditional lightweight timber framing and the newer mass timber options, including cross laminated timber (CLT), laminated veneer lumber (LVL) and glue laminated timber (glulam).

For more information use the QR code below or Search '2019 NCC' at the WoodSolutions website.



INSIGHTS TO INCLUSION: VALUING DIVERSITY IN VOLUNTEER WORKFORCES

Volunteers are critical to the fire and emergency services sector, with AFAC member organisations collectively engaging over 250,000 volunteers, or around 87% of the sector's capability. Inclusive volunteer management is key to maintaining and recognising this crucial workforce.

BY **MOLLY PRICE**

AFAC

Volunteers are a significant workforce who provide the additional capacity required to respond to major or coinciding disasters. In rural, regional and remote areas of Australia, volunteers are the main responders. The involvement of volunteers makes the difference between organisations achieving their purpose and objectives, or not.

Across the fire and emergency services, increasing demands are placed on volunteers' time and effort as emergency events become more frequent and intense, and extend for longer periods of time. As a result, volunteer-based fire and emergency service organisations are facing increased challenges to sustain membership. In these organisations, where members elect to give their time, knowledge and skills to a greater purpose, inclusion is crucial.

AFAC's new *Volunteer Inclusion Guideline* supports the efforts of AFAC and its members to create an inclusive 'way of doing things', where volunteers are engaged in decision-making and their diverse opinions are valued and leveraged to derive mutually beneficial outcomes.

Faye Bendrups, Vice Chair of the National State Emergency Service (SES) Volunteers Association, says that in an era where people are finding it harder to commit to emergency services as volunteers, the sector has struggled to

keep up with social and demographic change.

"It is limited by its historic reliance on a model of frontline response that is gendered (male) and white. If it is more inclusive, there will be increased gender diversity, less unconscious bias and a broader pool of people from which to recruit," Ms Bendrups said.

Organisations that have a shared understanding of inclusion and its benefits are more likely to succeed in building an environment that supports diversity. Diversity and inclusion are related but discrete concepts, with equal importance. An inclusive organisation embraces the leveraging of individual differences (diversity), creating a sense of belonging for all.

Trina Schmidt, Executive Director of Membership and Strategic Services at NSW Rural Fire Service and Chair of the AFAC Volunteer Management Technical Group says that inclusion helps organisations thrive.

"Inclusion puts people at the heart of everything you do. When people feel genuine inclusion, they give their best selves, and everyone prospers," she said.

"Members are more engaged, resulting in more effective and innovative decision-making, improved service and better community outcomes."

The *Volunteer Inclusion Guideline* is intended for use by AFAC members who work with, and engage, volunteers. It may also be useful to other emergency service providers, local government bodies, non-government organisations

and not-for-profit organisations that also work with, and alongside, volunteers.

The guideline:

- ◆ details the benefits of volunteer inclusion in the advancement of organisational outcomes
- ◆ highlights the important interplay between diversity and inclusion and provides a framework for understanding an organisation's maturity in this regard
- ◆ outlines key considerations for volunteer inclusion in organisational planning and decision-making
- ◆ guides AFAC and its members in the development of strategies and actions to improve consideration and involvement of volunteers earlier in planning and decision-making.

The *Volunteer Inclusion Guideline* is evidence-based and draws on the latest research and practice. It is not prescriptive in its intent, but rather serves as guidance for organisations to build their own framework that reflects the context of their operating environment and the needs of their own volunteers.

Ms Schmidt said the guideline helps AFAC members to thrive through the inclusion of volunteers.

"It supports organisations to understand how they are faring in terms of inclusion, and to chart a deliberate course of action for advancement," she said.

"It relies heavily on the understanding of leadership that 'diversity is a fact and inclusion is a choice', and the conviction to act."



In volunteer organisations, where members elect to give their time, knowledge and skills to a greater purpose, inclusion is crucial.

“Inclusion puts people at the heart of everything you do. When people feel genuine inclusion, they give their best selves, and everyone prospers.”

— Trina Schmidt

Ms Bendrups is Volunteer Deputy Controller at Victoria SES in Footscray, celebrated as one of Melbourne’s most culturally diverse suburbs. She says the Footscray SES Unit reflects the community it serves, with members who come from a range of cultural and linguistic backgrounds.

This spirit of inclusion enables the unit to form positive relationships with local communities, creatively approach local problems and leads to improved outcomes in emergencies.

“There is no barrier to joining the unit, whether you are a refugee, LGBTQI, old or young, you are welcomed,” Ms Bendrups said.

“Footscray SES members are embedded in their communities and recognised and respected by them. They are not outsiders, they all belong together.”

By choosing to develop a volunteer inclusion framework and actively fostering an inclusive culture, organisations can expect many positive flow-on effects. These include better engagement and retention of volunteers, the creation of a more diverse and sustainable volunteer workforce, and improved organisational outcomes.

Inclusive organisations are psychologically safe places where members can truly be at their best and where diversity of membership is valued and leveraged for the benefit of all. ■

The Volunteer Inclusion Guideline can be accessed on the AFAC website: www.afac.com.au/insight/doctrine/article/current/volunteer-inclusion-guideline.

PERSPECTIVES FROM THE SECTOR

**STUART
ELLIS AM**

Chief Executive Officer,
AFAC



In this regular series, AFAC CEO Stuart Ellis interviews a senior AFAC leader for each issue of Fire Australia. In recognition of International Women's Day (8 March) Stuart set aside this interview to reflect the views of three leading women involved in Champions of Change Fire and Emergency Group to discuss gender bias and progress across the sector.

Ariana Henderson, Manager Regional Delivery, Melbourne Divisional Operations at Parks Victoria

Bronnie Mackintosh, Manager Inclusion and Diversity, Fire and Rescue NSW

Georgeina Whelan, AM, CSC and Bar, Commissioner, ACT Emergency Services Agency

What needs to be challenged in the fire and emergency services sector to achieve gender equity?

Ariana Henderson: I believe there are a broad spectrum of challenges that women face within society, our careers and the fire and emergency sector. We can all challenge what we see, hear and experience. For example, the media and perceptions of the 'male hero fighter' can be a barrier for encouraging girls and women to enter careers in fire and emergency. From a young age, our children see these representations—male firefighter costumes, female Barbie dolls and princesses—and the gender roles are influenced early. We are taught, subliminally, what we can and can't aspire to be.

As a sector we have an opportunity to challenge this stereotype and show current and future generations 'you can be, what you can see'. Although there have been small steps in breaking stereotypes, progress isn't happening fast enough to see real, tangible change. We must continue to raise the profile of the fantastic women out there working in fire and emergency, not just the 'blokes on the hose'. This includes telling women's stories, changing the images and honouring women through rewards and recognition.

Bronnie Mackintosh: What we need to challenge are the systems that are unintentionally deterring women from promoting or undertaking specialist skills training. These opportunities impact the number of women in leadership roles and gender pay inequity.

The systems need to be challenged with bold action that considers innovative solutions for rostering, childcare and sponsorship. We also need to challenge the narrow parameters by which we work in the gender space and include the whole gender spectrum.

Georgeina Whelan: There is a need to review recruitment standards to reflect an evidence-based, modern day fitness for duty requirements, especially tests or criteria that may favour men. Existing rules around time in rank prior to promotion and promotion courses need to be challenged, especially when women take time out of the workplace during pregnancy and caregiving.

How can we challenge gender bias and inequality in the sector?

AH: As well as challenging our paradigms, images and stories, we need to challenge the underpinning systems that support the ongoing, unconscious bias and sometimes

deliberate discrimination. Every agency must thoroughly and officially investigate their recruitment, promotion and retention processes to ensure women are not inadvertently disadvantaged. Recruitment must be based on the real skills, knowledge and capabilities required to do the job well. Training processes must be fair, equitable and transparent. Eliminate opportunity for bias and 'mates picking mates'.

We are all attracted to people like us, it's human nature, so if the decision-makers are all the same demographic, they are likely to continue to recruit, train and trust that demographic. To break this perpetual cycle, and make different decisions, we need changes in decision-makers. We need to disrupt the system. That might mean putting in targets and quotas, until we see a move towards 40:40:20 gender equity in our agencies and know that bias in decision-making and opportunities has been reduced.

BM: We can challenge gender bias by investing in training and education. Training is a lever that could help sector employees to better understand what gender bias is, and why challenging the systems that reinforce it will help us be a more inclusive organisation. We are still lacking a solid understanding of why diversity, equity and inclusion is good for



PHOTO: FRNSW

PHOTO: PARKS VICTORIA



Above: Ariana Henderson, Manager Regional Delivery, Melbourne Divisional Operations, Parks Victoria.

Above right: Bronnie Mackintosh, Manager Inclusion and Diversity, Fire and Rescue NSW

Right: Georgeina Whelan AM, CSC and Bar, Commissioner, ACT Emergency Services Agency.



PHOTO: ACTESA

PHOTO: NEAL HERBERT, US DEPARTMENT OF INTERIOR



us all. Training is such a big component for positive change, but it requires us to come up with innovative solutions to overcome the budget restrictions associated with it.

When everyone feels supported, connected and able to contribute and thrive, our service delivery improves, and we look after each other.

GW: The industrial bodies that champion 'no change to the status quo' need to be called out and debated. It is time we put some intellectual rigour to the Enterprise Bargaining Agreements that benefit both genders.

What is an example of change in your agency or area?

AH: I'm proud to say it's on the agenda and we are making change through awareness and education. Across Forest Fire Management Victoria and Parks Victoria we have developed Diversity and Inclusion Action Plans, with goals to specifically address gender equity challenges. We have seen an increase in recruitment of female project firefighters into our workforce, and a focus on identifying and removing the barriers to support women into fire leadership roles.

We have greater honesty and openness in discussion around biases and barriers for women. We have a few

male champions standing up beside our women to encourage change.

We are linking in with sector partners to have a greater impact and influence. It's happening slowly, we are beginning to turn the Titanic, but we need greater resourcing, capacity and commitment to action across the sector to start to make a real difference. We will know we have had some success when there are no more 'first female [insert position, rank, accreditation here]' recognitions!

BM: We have had massive changes at Fire and Rescue NSW in the last 18 months. We've worked with the Champions of Change to develop the sector's first stand-alone Sexual Harassment Prevention Policy and Toolkit.

This formed part of a new Inclusion Toolkit and learning modules aimed at providing awareness and improving understanding of inclusion among staff. In response to COVID-19, we also facilitated an alternate duties project for pregnant firefighters, which instantly enabled flexible and remote work arrangements.

We are improving the capability of our senior managers to lead inclusively using strengths-based coaching and trying to increase engagement through employee networks and changes to systems that

are barriers to diversity and inclusion.

A huge change in our agency is the energy and resources going into mental health and wellbeing. Our staff are more educated about psychological health and the impact of incidents, and negative and exclusionary cultures. They are also more likely to access the resources now available to them.

We have also launched our Men's Employee Network to sit alongside our other equity groups. This is symbolic in terms of equity and reflects a broadening of attitudes about men's health, gender and firefighter stereotypes, and normalising personal vulnerabilities.

GW: ACT Emergency Services Agency (ESA) currently has three women leading within our executive team in the areas of People and Culture, Logistics, and myself at the head of our agency as the first female appointed as ACTESA Commissioner.

Meaningful communication strategies implemented by the ACTESA have also helped to shape the role of a firefighter as a desirable career option for women. Through our strategic communications and marketing campaigns, ACTESA has increased the number of females applying to be a firefighter by 500%. ■

Above: Working side by side: efforts are underway across the fire and emergency services sector to promote equal gender opportunity and recognition.



PHOTO: REDDIT.COM



PHOTO: FIRE BRIGADE UNION, UK

The fire quickly spread after starting in a disused plastic kiosk and engulfing flammable materials.



PHOTO: NOEL HOWARTH, THE SUN, UK

A lack of disciplined evacuation and locked fire exits contributed to the significant death and injury toll.



PHOTO: PA PRESS ASSOCIATION

SUMMERLAND LEISURE CENTRE FIRE, ISLE OF MAN—1973

BY **BARRY LEE OAM**

Summerland was an unsprinklered leisure centre in Douglas, on the Isle of Man, that opened in 1971. A climate-controlled building occupying 1.4 hectares on the Douglas waterfront, it had a floor space of 4,600 square metres and cost £2m. Designed to accommodate up to 10,000 tourists, it included a solarium, an indoor heated pool, saunas, restaurants and bars, a children's theatre and an underground disco.

Extensive flammable surfaces were incorporated in the multi-level structure and were major factors in the fire disaster. The roof and much of the wall area consisted of large panes of Oroglas (methyl methacrylate). Abutting the Oroglas and stretching upwards from an amusement arcade to the top of the building was a wall of Galbestos cladding (steel sheeting surfaced on both sides with resin). There was a cavity 0.3 metres wide and 12 m long between the steel sheet outer wall of

the amusement arcade and a Decalin (fibreboard) inner wall.

At about 8.00 pm on 2 August 1973, with 3,000 people in the centre and a concert in progress in the solarium, fire and smoke were seen at the far (closed) end of the amusement arcade. Caused by children smoking in a disused external plastic ticket kiosk, the fire ignited the external wall of the centre and spread rapidly along the length of the amusement arcade, quickly involving the upper levels, the Oroglas wall and the whole of the wall and roof.

Fifty occupants—men, women and children—perished in the blaze and a further 80 were seriously injured. There was no disciplined evacuation procedure. The main electricity was switched off prematurely, plunging the building into complete darkness. Many died on an open stairway attempting to escape from upper levels; it was fully exposed to flames that issued from the open end of the amusement arcade. Stairway congestion was compounded by some parents trying to rush upstairs

to locate children in upper level play areas. A number of fire exits were locked. This further impeded prompt evacuation, adding to the general confusion and, almost certainly, to the toll of injuries.

The centre was subsequently demolished, rebuilt on a smaller scale, and reopened in 1978. It closed in 2004 and final demolition commenced a year later. ■

POLY(METHYL METHACRYLATE) PMMA

A lightweight, or shatter-resistant, alternative to glass. Trade names include Oroglas, Lucite, Perspex and Acrylite.

Chemical formula: $C_5H_8O_2$
Density: 1.18 g/cc. Melting point: 180°C. Ignition temperature: 460°C.

BY IAN FINDLAY

Technical Officer—Projects and Standards, FPA Australia



TECHNICAL ADVISORY COMMITTEES

The most recent round of TAC meetings was held in March via web conference. The next round will be held in July.

TAC/1 Maintenance of fire protection systems and equipment

The TAC has begun work on its 2021 work program, which will continue to focus on the draft project proposal for the revision of AS 1851-2012, as well as several outstanding technical documents.

TAC/2 Fire detection and alarm systems

The TAC continues to seek to progress the draft Good Practice Guide on speaker layout and draft Information Bulletin on building occupant warning systems. The TAC continues to actively contribute to the work by FP-002.

TAC/3/7 Portable and mobile equipment

The TAC has completed its input to the ACCC mandatory safety standard and is awaiting its progress through the relevant ACCC approval processes. The TAC has begun work on its 2021 work program, particularly possible project proposals and technical documents.

TAC/4/8/9 Fire sprinkler and hydrant systems, tanks and fixed fire pumps

The TAC continues to monitor and contribute to the work of FP-004 and FP-009.

The TAC also continues to discuss the development of several outstanding technical documents.

TAC/11/22 Special hazards fire protection systems

The TAC continues to monitor changing requirements in regard to PFAS and firefighting foams, including the recent NSW EPA Regulation changes. The TAC has also begun work on its 2021 work program, including some potential new technical documents.

TAC/17 Emergency planning

The TAC has begun work on a potential project proposal for the revision of AS 3745, particularly to address the current COVID-19 situation and what that means in regards to emergency evacuation procedures and any future guidelines that may be required. Progress is being sought on several technical documents.

TAC/18/19 Passive fire protection

Discussions on the topic of passive training continue. Progress is being sought on several technical documents including the update of *PS-05 Product compliance and evidence of suitability* and other documents.

TAC/20 Bushfire safety

The TAC discussed potential ways of addressing some issues associated with fuel load assessments for Performance Solutions; the testing of roof systems in regard to Appendix H in AS 3959; the need for clarity around some definitions on a national level; and the need to clarify the complex method used in the Bushfire Verification Method Handbook.

STANDARDS

FP-002 Fire detection and alarm systems

Public comment on the amendments to AS 1670.1, AS 1670.3 and AS 1670.4 is currently being resolved. Progress on the AS 1670.6 revision continues.

A new project has been approved to revise AS 3786 *Smoke alarms* to be an adoption (with modification) of ISO 12239 *Smoke alarms using scattered light, transmitted light or ionization* now that these two standards are so closely aligned.

FP-004 Automatic fire sprinkler installations

Public comment on the revision of AS 2118.2 is currently being resolved. Progress on the revision of AS 2118.6 continues.

FP-009 Fire hydrant Installations

Public comment on the revision of AS 2419.1 is currently being resolved. The draft new standard for STORZ connections (2419.4) is expected to be published soon.

FP-018 Fire safety

New projects have been approved for revisions of AS 1530.1 (combustibility test) and AS 1530.4 (fire resistance tests).

FP-020 Construction in bushfire prone areas

A project has been approved for the development of a handbook for 'maintenance of construction in bushfire-prone areas'.

FP-022 Fire protection of mobile and transportable equipment

Progress on the revision of AS 5062 continues.

LG-007 Emergency lighting in buildings

Public comment on the amendments to AS/NZS 2293.1 and AS/NZS 2293.3 is being resolved.

LG-011 Photoluminescent exit signage

Public comment on the draft new Australian Standard AS 5358.1.1 *Photoluminescent exit signage: Product Specification, Installation, and Operation* is being resolved.

TS-001 Building commissioning

Peer review on the draft new Technical Specification for building commissioning (DR SA TS 5342) is currently being resolved.



PHOTO: 123RF

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NATIONAL MEMORIAL SERVICE

14 MAY 2021

CANBERRA, ACT

AFAC will hold the seventh National Memorial Service for fire and emergency service personnel, at the National Emergency Service Memorial in Canberra. The service is a free event, open to AFAC Members and the general public.

For more information, see the AFAC National Emergency Services Memorial site: <https://memorial.afac.com.au/>

LESSONS MANAGEMENT FORUM 2021

6-7 JULY 2021

BRISBANE, QLD

The 2021 Lessons Management Forum will bring together lessons management practitioners, those interested in this area, and those new to the area to share good practice, learnings and innovations. This year's theme is: 'What does success look like?' The forum will be hosted as a hybrid event, allowing attendance in person, or virtually for those unable to travel to Brisbane.

For more information, see the AFAC events page: www.afac.com.au/events

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Explore more online: www.afacconference.com.au

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We run a range of technical events, covering all aspects of the fire protection industry.

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For anyone who has missed a webinar, we have made recordings available on our website.

A full list of upcoming events, and links to previous presentations, can be found at: www.fpa.com.au/events.aspx.

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