

# FIRE AUSTRALIA

**Conflicting cues in emergency warnings**

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**Strength in shared resources**

## Home, flammable home

**Demonstration burn shows  
value of home fire sprinklers**



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# THE PROGRESS JOURNEY

**STUART ELLIS AM**

Chief Executive Officer, AFAC



One of our driving motivations at AFAC is to support the development and capability of our member agencies to ensure the safety of communities across Australia and New Zealand.

Twice a year, the AFAC National Council – comprising the chiefs of fire, emergency services and land management organisations from across Australia and New Zealand – meet to discuss the strategic direction and priorities of the sector. In April, the National Council convened in Canberra to endorse new and revised AFAC Doctrine, in response

to changes across the sector. It will ensure our agencies uphold good practice and remain agile when presented with the challenges that come with our often unpredictable and complex work environment.

These developments are, of course, made possible by the input and experience of our member agencies that contribute to the collective knowledge of the fire and emergency services sector through AFAC's collaboration framework, our network of 35 specialised groups and networks from across Australia and New Zealand, guided by AFAC's five Strategic Directions.

Our commitment to creating more diverse and inclusive workplaces has continued, with the Male Champions of Change Fire and Emergency Group marking two years since its inception and having completed a range of projects. Read more about its ongoing journey toward achieving gender balance within fire and emergency services on page 10.

We are proud to be taking steps forward in improving the safety of Australian homes with the launch of the Home Fire Sprinkler Coalition (HFSC) this year, a joint initiative between AFAC and FPA Australia. Residential sprinklers can be the difference between a small amount of damage and a disaster in your home, as shown by the demonstration burn at the HFSC launch in Sydney, covered on page 12.

Resource sharing between agencies continues to be a focus for AFAC and was the central theme of our 2019 Motorola Knowledge Event Series, covered on page 10. We also take the opportunity to look back at the latest fire season with AFAC's National Resource Sharing Centre, as seen on page 32.

I hope you enjoy this edition of *Fire Australia*.

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## OUR COVER

Flames and smoke engulf a room with no sprinklers and shatter its sliding door during a demonstration burn to launch the Home Fire Sprinkler Coalition.

PHOTO: TOM BICKNELL, 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: tom.bicknell@fpaa.com.au. For more details on submitting a contribution, please contact the editors.

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# A POWERFUL CASE FOR FUTURE RESEARCH



PHOTO: SOUTH AUSTRALIA SES

Emergency services dealing with a fallen tree and powerline.

Electricity networks have considered their future research needs and have identified the following as their highest priorities:

- ◆ risk and vulnerability
- ◆ stakeholder engagement
- ◆ regulation
- ◆ capturing data for better forecasting and modelling.

*Australian electricity networks – a statement on national research priorities for natural hazards emergency management and resilience* was released on 16 May by the Bushfire and Natural Hazards CRC, S&C Electric Company and Energy Networks

Australia. The statement forms part of a broader national research agenda in natural hazards emergency management that was developed by the CRC in 2017.

By identifying the research priorities for Australian electricity networks, the statement poses questions to guide a national research agenda and prioritises knowledge gaps to be filled, explained Dr Richard Thornton, CEO of the Bushfire and Natural Hazards CRC.

“Our electricity networks are undergoing transformation, and the research priorities represent a consensus view on what new knowledge

and capability is required for electricity networks to continue to deliver quality services in the future for the community. With our climate and demographics changing, new vulnerabilities and risks are emerging. Australia’s networks need to respond to these significant challenges. These priorities will help them.”

Four high-level priorities for research related to natural hazard resilience for electricity networks were identified:

- ◆ understanding the fundamental vulnerabilities of Australia’s electricity networks and strategies to minimise the risks posed by those vulnerabilities
- ◆ new approaches to stakeholder engagement to support better planning and implementation of resilient networks and distributed generation capability
- ◆ new concepts in operation and regulation of electricity networks (including frameworks)
- ◆ harnessing current and new data to enhance forecasting and modelling of electricity networks to better manage the risk and impacts associated with natural hazards.

These research priorities represent the consensus view of industry experts and are based on extensive consultation and discussion. By synthesising this information, the research makes it easier for researchers, policymakers and practitioners at all levels to plan and prioritise their work, thus enabling a nationally coordinated research capacity to address the major issues of our day, and supporting the uptake of that research into practice. ■

**The National Research Priorities are available at: [bnhrc.com.au/nationalpriorities](http://bnhrc.com.au/nationalpriorities).**

# WOMEN IN FIRE SPARKS CONVERSATION

FPA Australia held its first ‘Women in Fire’ session at the recent Fire Australia Conference and Tradeshow 2019 in May, drawing more than 50 professionals to hear from key figures in the industry and discuss strategies to attract more women to fire protection.

The session had one of the largest attendances of the conference, reflecting a broad interest within the industry to address the low percentage

of women in the fire protection sector.

Attendees heard from Elissa Fazio, a fire engineer with News Corp and Board Director of FPA Australia; Amanda Leck of AFAC; and Lorraine Carli of US organisation the National Fire Protection Association (NFPA). The session drew on their experience in improving gender diversity in the fire and emergency services, engineering and in the US fire protection sector.

“We have a group of young female fire engineers at NFPA, and they go out into the community and talk to young girls about getting into fire engineering,” Ms Carli said. “These women took this upon themselves and said, ‘we can do this for our community.’”

In Australia, Ms Fazio identified a



PHOTO: TOM BICKNELL, FPA AUSTRALIA

need to change the public image of fire protection to make it a visible career path for young women.

“I think we need to start really early with that message [that women can do this job],” she said. “Unless children are exposed to that opportunity, they won’t go down that pathway.” ■

**The Women in Fire session at Fire Australia 2019 drew on the experience of other industries.**



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# HEALTHY AGEING AND RETIREMENT FOR FIRST RESPONDERS

**A** FAC hosted the 'Healthy Ageing, Healthy Retirement' masterclass in April, in recognition of the continued need to address the mental health and wellbeing issues faced by fire and emergency services personnel across Australasia.

The masterclass, sponsored by Stewart and Heaton Clothing Company, aimed to raise awareness of the issues around transitions into retirement. It provided insights into good practice from across the fire and emergency services sector to demonstrate the impact of retirement on the mental health and wellbeing of personnel.

A diverse range of presenters and discussion topics painted a comprehensive picture of the current research and initiatives to assist with healthy ageing and retirement for first responders.

James Maskey, Beyond Blue's

National Engagement Manager for Police and Emergency Services, presented findings from a national survey of the mental health of 21,000 emergency services personnel. The study was conducted with support from the Bushfire and Natural Hazards CRC.

Rich Adams from Team Rubicon Australia spoke about the key values of purpose, community and identity for military veterans and first responders. Mr Adams presented on the resources available for veterans after service, including recognising the impacts of retirement on veterans' sense of identity.

Andrew McGarity, Manager, Industry Management Health and Safety at Fire and Rescue NSW, also presented at the event. Mr McGarity spoke about how inspiration was drawn from the National Rugby League (NRL) to develop the Career Transition Booklet, which supports current and former firefighters



PHOTO: ZOE KENYON, AFAC

by showing how good health is aligned with a good work ethic.

Representatives of South Australia Metropolitan Fire Service, Ambulance Victoria and Police Association of Victoria also shared their insights on mental health and a healthy transition into retirement at the masterclass.

The partnership between AFAC and Stewart and Heaton highlights the work of agencies at the forefront of practice in the mental health and wellbeing space. The event took place in Melbourne on 17 April. ■

**AFAC's event focused on mental health and wellbeing issues facing Australia's fire and emergency services personnel.**

## Fire Safety Assessment accreditation opens for applications

**A**pplications for the new Fire Safety Assessment (FSA) class of accreditation under the Fire Protection Accreditation Scheme (FPAS) opened in early April.

The launch of the new class of accreditation is the start of a yearlong process to assess and recognise the competence of fire safety practitioners in two key areas of work.

The FSA class of accreditation certifies individuals who assess the performance capability of fire safety measures to inform annual or supplementary fire safety statements.

This class of accreditation has been designed to address the requirements for certain fire protection work in NSW to be carried out by a 'competent fire safety practitioner' (CFSP) under the state's 2017 fire safety reforms.

As per the NSW Government's approval of the FSA and Fire Systems Design (FSD) classes of accreditation in February, individuals holding FSA accreditation will be recognised as CFSPs under the 2017 reforms.

That recognition will be formalised by the NSW Government after a phase-in period of approximately 12 months,

after an order has been published in the *NSW Government Gazette*, which is expected in January 2020.

Following this, relevant fire protection work in the state will be required to be undertaken by a CFSP accredited by FPAS or other future approved schemes.

The FSA class of accreditation will ultimately be available across multiple jurisdictions, however the initial launch will be focused on NSW.

The launch of the class and its recognition by the NSW Government is a major step forward in fire protection for the state, and a validation of the effort the industry has voluntarily invested in raising competency and standards.

"In recent years thousands of individuals in the fire protection industry have voluntarily gained FPAS accreditation and related training, and the launch of the new Fire Safety Assessment class is another major step in that path of industry self-improvement," FPA Australia CEO Scott Williams said.

"The recognition of the FSA and FSD classes of accreditation is a strong endorsement from the NSW Government that the industry is on the right track in holding ourselves to a high standard, in order to deliver the best fire protection services to the community that we can." ■

PHOTO: AMY MULDER, BUSHFIRE AND NATURAL HAZARDS CRC



Dr Blythe McLennan presenting at the workforce and volunteerism 2030 RAF.

## Forums firing with utilisation focus

**T**he Bushfire and Natural Hazards CRC's new-look Research Advisory Forums (RAFs) have provided an effective platform to discuss the utilisation of CRC research and projects.

Since the CRC began in 2013, the format of the forums has evolved many times to reflect the current needs of the research. The latest change allows a greater focus on the utilisation of research according to themes, rather than the previous focus on individual projects.

The first of the new RAFs was held in conjunction with the Northern Australia Fire Managers Forum and also looked at that particular region of Australia. The second RAF focused on bushfire mitigation as a workshop and formed part of the 6th International Fire Behaviour and Fuels Conference. RAFs have also been held in Melbourne on the theme workforce and volunteerism, and in Canberra on the theme economics, policy and planning. ■

## GLOBAL FIRE FOCUS ON DIVERSITY, CULTURAL BURNING AND COMMUNITIES

The latest research and lessons learned about bushfire behaviour and fuels management were shared at the 6th International Fire Behaviour and Fuels Conference, which was held from 29 April to 3 May. The focus was centred on people, with sessions dedicated to Indigenous fire management, community recovery, shared responsibility, women's careers in fire and the new National Fire Danger Ratings System research.

Michelle McKemey from the University of New England and Lesley Patterson, Banbai Aboriginal Elder and Ranger, presenting at the 6th International Fire Behaviour and Fuels Conference, Sydney.

PHOTO: ANNY MULDER, BUSHFIRE AND NATURAL HAZARDS CRC



The International Association of Wildland Fire (IAWF) conference highlighted the interconnected nature of the global fire community, simultaneously taking place in three locations: Sydney, Australia; Marseille, France; and Albuquerque, United States. The Sydney conference saw 337 delegates attend – not only from all Australian states and territories, but also delegates from 12 other countries.

The conference wrapped up with two successful field trips – one focusing on the investigation of unseasonable fires, coordinated by the New South Wales Rural Fire Service, and the other explored iconic Blue Mountains fire management sites with the Office of Environment and Heritage New South Wales.

The Bushfire and Natural Hazards CRC was a lead partner with the IAWF in all three conferences, with the New South Wales Rural Fire Service and the Bureau of Meteorology as major supporters in Sydney. ■

PHOTO: QUEENSLAND FIRE AND EMERGENCY SERVICES



The collection features best practice guidance for warnings and public information during an emergency.

## Warnings Collection launched online

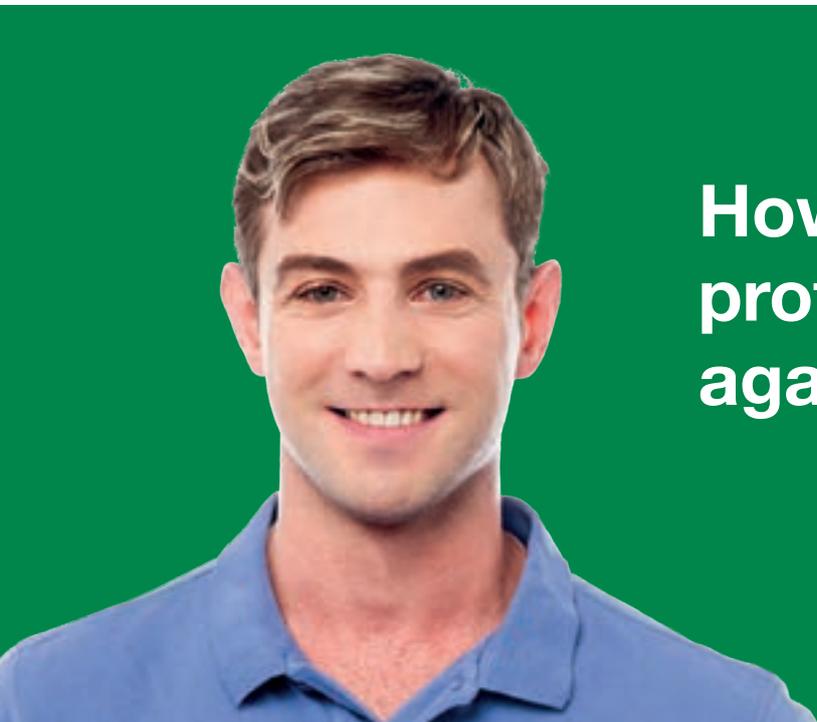
A collection of resources covering the theme of 'warnings' has been made available online. The Warnings Collection is available on the Knowledge Hub, an online initiative that supports education and learning developed by the Australian Institute for Disaster Resilience (AIDR).

The collection recognises the life-saving value of public information and warnings during an emergency. The resources available support learning and best-practice guidelines, which are informed by research featured in the *Australian Journal of Emergency Management* and the Bushfire and Natural Hazards CRC.

The collection includes a four-part video series presented by Associate Professor Amisha Mehta and Associate Professor Brooke Fisher Liu, who explore the key concepts and strategies to provide effective risk and warning information.

There is also exclusive footage from the AFAC18 conference powered by INTERSCHUTZ in Perth, which showcases a panel session about how to improve the dissemination of public information and warnings. ■

The Warnings Collection is available on the AIDR Knowledge Hub. Visit [bit.ly/2HyJt3g](http://bit.ly/2HyJt3g).



How does Jack protect a small premise against fire?



PHOTO: DAVID BRUCE, BUSHFIRE AND NATURAL HAZARDS CRC

The Northern Australia Fire Managers Forum brought together leaders to discuss emergency management within the region.

## Northern fire issues aired at forum

**A**wet and muggy Darwin was the location for the 2019 Northern Australia Fire Managers (NAFM) Forum, which brought together fire managers from across the north of Australia to discuss topics of interest to the tropical savannas. The forum was held on 3 April 2019, with a field trip the following day where the participants visited the Tiwi Islands to view Indigenous-based plantation forestry operations.

The Executive Director of Bushfires NT, Collene Bremner, opened the forum with comments on the challenges of fire management across the north of Australia, drawing on specific issues in the Northern Territory.

Other talks focused on the main highlights, activities and weather impacts of the last fire season and how these would affect the season. Despite good rainfall during the forum, the wet season, as a whole, across the Northern Territory and Western Australia received below average rainfall. Queensland, in contrast, was still feeling the effects of a severe drought and several major fires that were quickly followed by two cyclones and extensive flooding.

The NAFM Forum 2019 attracted 46 participants and was hosted by Bushfires NT, with the support of the Bushfire and Natural Hazards CRC. ■

## Children as agents of change in disaster preparedness

**I**nvesting in children's education on bushfire behaviour enables them to participate in bushfire planning, development and implementation and brings progress to their communities – that's the belief of Bushfire and Natural Hazards CRC researcher Dr Briony Towers. Dr Towers, from RMIT University, recently featured on the Emerging Minds podcast, in the episode *Disaster preparedness: myths and programs that hold promise*, which forms part of the Community Trauma Toolkit. In the podcast, Dr Towers explains that children who have been involved in the development of their family's bushfire plans have a sophisticated understanding of bushfire risk. However, being involved in developing the plans is just a starting point.

"Uncovering misconceptions and investing in children's education on bushfire behaviour enables them to genuinely participate in bushfire plan development and implementation and become agents of change for their communities," Dr Towers said. ■

Listen to the podcast at [www.emergingminds.com.au](http://www.emergingminds.com.au) or on podcast platforms.

PHOTO: AFAC/BUSHFIRE AND NATURAL HAZARDS CRC



Dr Briony Towers presenting her work on child-centred disaster risk reduction at the AFAC18 conference in Perth last year.

## STRATEGY RELEASE FOR AFAC

**T**he AFAC Strategy 2019–2023 has been released and lays the foundations for AFAC's vision, values, purpose and approach in delivering strategic support to its members into the future.

The AFAC Strategy covers future service delivery; significant organisational relationships, partners and key stakeholders; AFAC's international connections; and the advancement of the sector's capability.

The document summarises the role of AFAC within the emergency management sector. It also outlines AFAC's commitment to support the development of more resilient communities across Australia and New Zealand through assisting the membership network.

It provides an insight into the work of AFAC and how this will support member agencies into the future. Importantly, it communicates AFAC's role in building the collective knowledge and capability of the sector by collaborating across jurisdictions to discover opportunities, solve problems and promote a community-centred approach. ■

The AFAC Strategy 2019–2023 is available online. Visit [bit.ly/30FmLhs](http://bit.ly/30FmLhs).

## CRC supports Queensland's future

The Bushfire and Natural Hazards CRC has aided Queensland's future emergency management systems.

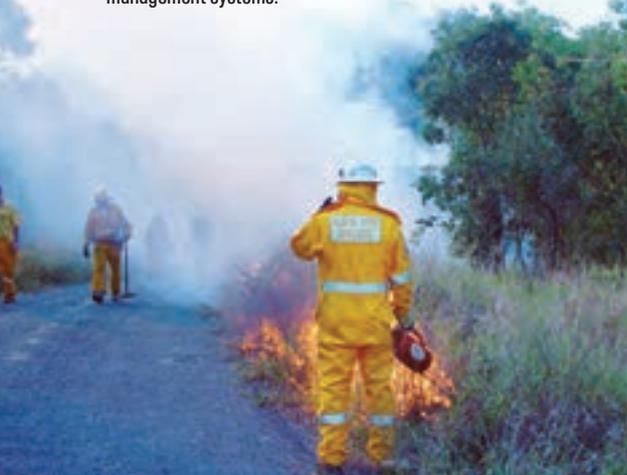


PHOTO: QUEENSLAND FIRE AND EMERGENCY SERVICES

**T**he future of Queensland's emergency services has now been set out in a strategic plan, with research and insight from the Bushfire and Natural Hazards CRC.

Queensland Fire and Emergency Services (QFES) engaged the CRC to assist with the agency's strategic planning into the next decade as part of its new Strategy 2030.

The CRC coordinated workshops, conducted additional research studies and used focus groups to contribute to the final report.

Strategy 2030 aims to position QFES as an innovative and trusted leader in community safety, making it adaptable to the changing needs and expectations of the community.

The CRC is well positioned to provide support to QFES in this process and in ensuring that the organisation has

a sound plan for the betterment of the public, explained the CRC's Partnership Development Director Sarah Mizzi.

"It is a strategy to ensure the agency is well positioned and well prepared for the future, to better meet unforeseen challenges and supporting ways to work better with communities," Mizzi said.

By partnering with the CRC, QFES was able to develop a better understanding of how it can work with the community, rather than for the community, during times of need.

Through the strategy development process, QFES has also benefited from the CRC's expertise, gained through its ongoing research across a number of programs including emergency management capability, incident management, volunteering, emergency warnings and communications. ■

# ROBOTICS EDUCATION MEETS EMERGENCY RESPONSE

Innovative ideas for building resilience and partnering agencies with schools was at the forefront at the Disaster Resilient Australia–New Zealand School Education Network (DRANZSEN) Forum in Victoria.

The first DRANZSEN event for 2019 captured a diverse range of child-centred approaches to learning about natural hazards, harmful impacts and opportunities to reduce risk and build community resilience, including hands-on robotics design.

Geelong Tech School Director Leanne Collins presented with STEM facilitator Julie Fagan, who showcased their Bot Rescue program, developed in partnership with Victoria State Emergency Service.

In 2016, the Victorian Government allocated \$128 million to establish ten Tech Schools across the state. Tech Schools partner with state, private and independent schools to offer educational programs that incorporate the 'tools of

the future' – such as virtual reality, robotics and 3D printing – and respond to real-world scenarios and problems.

The Bot Rescue program challenges students to design a robot to assist in an emergency scenario through collecting data, clearing debris or retrieval and delivery. Students also create a 3D disaster scene for the robot to navigate. This practical activity is part of a unit of learning with a focus on natural hazards, exploring local risk, harmful impacts on communities and current technologies used by response agencies.

Ms Fagan said the Bot Rescue program was popular with students because it appealed to existing curiosity about emergencies and disasters. The program also explores emerging technologies that are shifting the way emergency agencies respond to scenarios, allowing young minds to consider challenges and opportunities in the industry for themselves.

Importantly, the program demonstrates



PHOTO: ALANA BETZ, AFAC

how fire and emergency service agencies can partner with Victorian Tech Schools to engage with students and explore technological solutions to real-world problems while facilitating a conversation about disaster response and resilience. The DRANZSEN event roadshow informs the National DRANZSEN Forum taking place in Melbourne on 30 August 2019. DRANZSEN Forums are free events offered through the Australian Institute for Disaster Resilience. ■

**Julie Fagan** from Geelong Tech School presents the Bot Rescue program.

For more information on DRANZSEN, visit: [bit.ly/2JzB55C](http://bit.ly/2JzB55C).



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# RESOURCE SHARING EXPERTISE AROUND AUSTRALASIA

Confronted with longer operational seasons and the complexities of climate change, fire and emergency services are experiencing growing pressure on their existing resources, requiring an increase in response capability and cross-border deployments.

To confront these challenges, AFAC and Motorola teamed up to deliver the 2019 Knowledge Event Series on the topic 'sharing resources in response to multi-hazard events: perspectives from Texas, USA'.

Fire Chief and Emergency Manager Patrick Shipp from the City of Webster

in Houston, Texas presented on the operational lessons and challenges from multi-hazard events, including the national-level space target hazard, Hurricane Harvey, wildfires and human-made disasters.

He was accompanied by NSW Rural Fire Service Assistant Commissioner Steve Yorke, who provided an Australian perspective on resourcing. As Director, Operational and Mitigation Services at NSW RFS, Assistant Commissioner Yorke has been active in many major fire incidents and has been deployed to Canada and Tasmania through the AFAC National Resource Sharing Centre.



PHOTO: ZOE KENYON, AFAC

City of Webster Fire Chief and Emergency Manager Patrick Shipp and AFAC National Resource Sharing Centre Manager Luke Purcell answer audience questions at the Melbourne Motorola Knowledge Event.

Attendees gained valuable insights about the importance of effective coordination and communication with different agencies during operational periods. The event took place in every Australian state and territory and in Wellington, New Zealand between 27 May and 12 June. ■

## BURNING POTENTIAL AT PRESCRIBED FIRE FORUMS

Two prescribed burning forums recently addressed the current and future issues of the practice.

The North Australia Savanna Fire Forum allowed practitioners and locals in the Northern Territory to address emerging technologies and issues in delivering savanna burning carbon abatement programs.

Carbon abatement programs allow land management organisations to sell carbon credit units to the government through the Emissions Reduction Fund, or to businesses who are seeking to offset their greenhouse gas emissions. By increasing the extent of prescribed burning undertaken, the savanna burning projects abate approximately 1.2 million tonnes of CO<sub>2</sub>e each year, which represents ten percent of all carbon credit units produced across all methods.

The second forum was the Institute of Foresters of Australia Subtropical Forum, which took place in Lismore. The event focused on prescribed burning for multiple outcomes in north-east NSW and south-east Queensland.

Participants workshopped the changes they have witnessed in bushfire management and the challenges they face in addressing these changes, and they brainstormed innovative ideas to



PHOTO: DEB SPARKES

Attendees discuss prescribed burning practice at the Institute of Foresters of Australia Subtropical Forum.

overcome them. Eighty people attended the forum, from land management agencies, state and private forestry organisations, fire services and research institutions.

The participating groups agreed that the increase in cultural burning is an emerging opportunity that can provide multiple benefits for prescribed burning. The groups also recognised that an increased community understanding and involvement in prescribed burning would help to address some of the outstanding challenges and assist with ecological and risk reduction outcomes.

The Centre of Excellence for Prescribed Burning is an initiative of the Australian Institute for Disaster Resilience, and communicates the guiding frameworks and principles regarding prescribed burning. ■

For more information, please visit: [bit.ly/2J1sQya](http://bit.ly/2J1sQya).

## Two years of change in the sector

The Male Champions of Change Fire and Emergency Group marked two years since the group's establishment when they met on 30 April in Canberra.

Founder of the Male Champions of Change and former Australian Sex Discrimination Commissioner Elizabeth Broderick AO shared lessons arising from her experience with the strategy. Ms Broderick spoke about how listening and learning can build a gender diverse organisation, and about the need to address both the covert and overt unconscious discrimination that can exist in a workplace.

Ms Broderick concluded by stating that a focus on gender equality is not a "battle of the sexes". Based on her experiences, Ms Broderick said everyone benefits from a clear focus on gender equality and the overall capability of an organisation lifts in response to the change.

AFAC CEO Stuart Ellis thanked all organisations and leaders involved in the strategy for the progress made over the past two years. He reminded the 'Champions' that the strategy demands a personal and organisational commitment from members, and about the importance of consistency between words and actions.

The Male Champions of Change strategy is about male leaders advocating for, and acting to advance, gender equality. The initiative is convened by the Victorian Human Rights and Equal Opportunity Commissioner Kristen Hilton, alongside a group made up of men and women who are leaders from across the fire and emergency services sector, including AFAC members. These Champions work together to advance gender equality and support an increase in the representation of women in leadership positions across the sector. ■

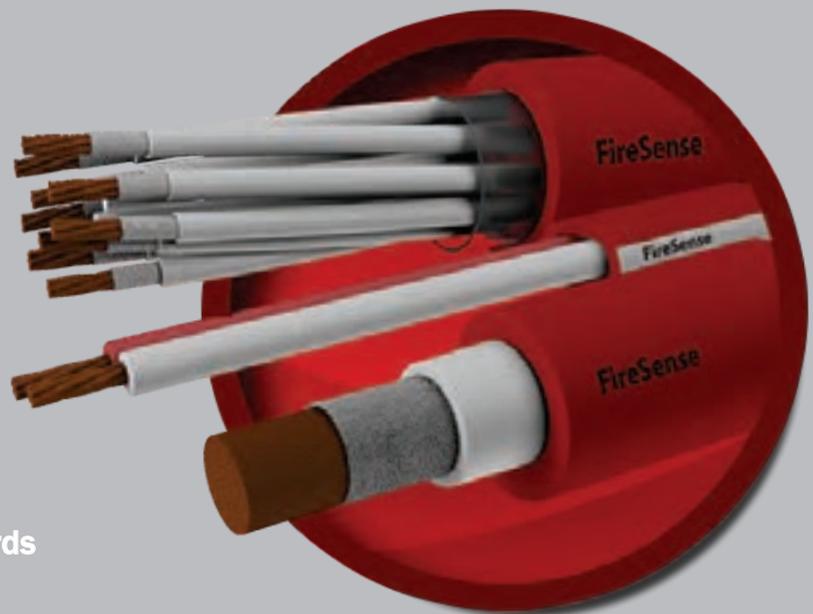
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A FRNSW firefighter extinguishes the blaze that took hold of the room without a sprinkler at the demonstration burn.

PHOTOS: FPA AUSTRALIA



# HOME, FLAMMABLE HOME

Identical rooms, identical furniture and an identical spark: two demonstration burns to launch the Home Fire Sprinkler Coalition have shown the life-saving value of installing automatic sprinkler systems in modern Australian homes.

BY **ALANA BEITZ**

AFAC

**J**ust four minutes and 30 seconds after a small fire was lit in a purpose-built reproduction of an average apartment lounge room, the inside of the structure reached a deadly 1,245 degrees Celsius.

Next door, an identical lounge room replica reached just 90 degrees – the temperature and flames dulled by a single residential sprinkler installed into the structure’s roof.

The demonstration burns took place on 29 April at Fire and Rescue NSW’s (FRNSW) fire research and testing

facility in Londonderry to highlight the life-saving value of residential sprinklers. The event preceded changes to the National Construction Code (NCC) 2019 introduced on 1 May, requiring all newly constructed shared accommodation buildings under 25 metres and over three storeys to have sprinklers installed, going beyond previous requirements for sprinklers only in residential buildings above 25 metres.

To ensure the public and industry stakeholders are aware of the new NCC 2019 regulations and the safety

value of residential sprinklers, the Home Fire Sprinkler Coalition – a partnership between AFAC and FPA Australia – has been established to provide independent, non-commercial information about sprinklers.

**Synthetics spark concern**

The new NCC 2019 regulations respond to the risks of modern Australian homes, namely the increase in synthetic materials used to build and furnish them. Fuelled by these materials, residential fires can reach deadly flashover (the complete ignition of combustible materials in a compartment due to radiant heat) in as little as three minutes.

Speaking to the media at the demonstration burn, FRNSW Commissioner and AFAC President Paul Baxter conveyed the deadly potential of modern furnishings.

“Most people don’t realise when they settle in to watch Netflix at night, they are sitting on basically a drum of petrol – that is what all of our furniture is made out of these days.”

Research conducted by FRNSW, AFAC, FPA Australia and CSIRO following the coronial inquest into a tragic 2012 Bankstown apartment fire confirmed the increased fire risk of modern Australian homes.

The investigation found that a fire in a modern home can spread in less than five minutes, a fatal reduction in the time residents can escape compared to older homes built between 1950–70, which

took 29 minutes.

Many synthetic items of furniture and other belongings also create a deadly smoke as they burn. The same research found that home fire sprinklers provide dual protection to residents during a house fire by suppressing the spread of flames and acting as a physical barrier for smoke movement within the space. This creates a safer operating environment for firefighters when they arrive on the scene of a sprinkler-controlled fire.

**Hitting close to home**

The demonstration burns were specifically designed to reflect the typical living conditions of everyday Australians. In each test structure, a small fan heater sat beside a couch with a blanket draped over it – a familiar scene in many homes during

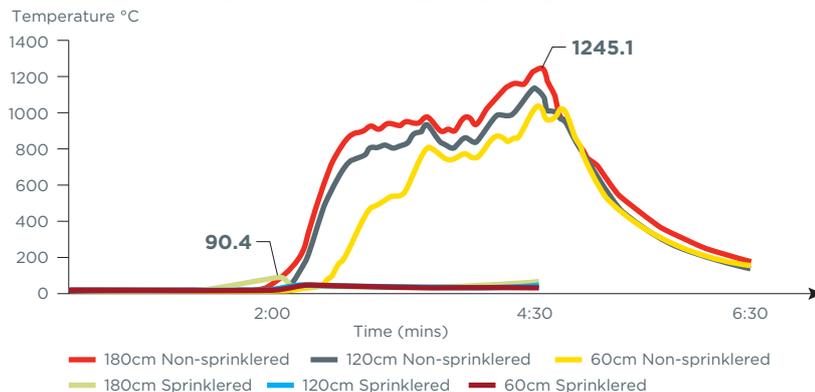
winter as the temperature drops. The demonstration burn replicated what could occur if a spark from a heating device or fireplace escaped and caught hold.

Each room was 3.6 m by 6 m in size, common dimensions for a room in a modern apartment. Maintaining consistency between the two rooms is key to the integrity of a side-by-side demonstration burn and the focus of the FRNSW Fire Investigation and Research Unit.

“We replicate everything, so one room is an exact clone of the other, from the paint and the hangings on the walls down to the carpet on the ground,” FRNSW Fire Research Team Leader Morgan Cook explained.

Common house items were used in each room, including two couches, a coffee table, a lamp, a bookcase,

**Room temperature readings (by height intervals)**



The room with no sprinkler and its synthetic, flammable contents were completely destroyed during the demonstration burn.

The residential sprinklers contained the blaze to just one area of the room during the demonstration burn.



curtains, cushions, a rug and a child's play tent.

"It's really important that these burns are identically laid out and accurately recorded, both for the credibility of our research and to show how much impact a sprinkler will have during a home fire," Mr Cook said.

Conditions outside the rooms were closely supervised, and the wind direction and speed, air temperature, humidity and pressure were measured to monitor their impact on the burns.

Inside, three temperature readings took place in each room every two seconds for the duration of the burns – one at average head height (180 centimetres), one at sitting height (120 cm) and one at floor level (60 cm).

### A tale of two burns

Two minutes after each spark was lit, the temperature in both rooms hit 90 degrees, activating the sprinkler in one room.

While the temperatures dropped in the room equipped with a sprinkler, the heat in the room without one continued to climb, jumping from 90 degrees to 314.1 degrees in just 15 seconds. Another 15 seconds later, the temperature more than doubled, reaching 752.3 degrees.

The temperature continued to rise, reaching a maximum of 1,245 degrees and collapsing the roof and shattering the glass sliding doors before firefighters intervened. In these conditions, a person would not survive.

In comparison, the temperature in the room with a sprinkler reached a

maximum of 90.4 degrees. At the time of the sprinkler activation, the temperature of the room at mid-level (120 cm) had only reached 33.4 degrees, and the ground level (60 cm) temperature was just 20.3 degrees.

After firefighters extinguished both fires, the difference between the two rooms was clear. The room without a sprinkler had reached flashover point at about 2 minutes and 30 seconds, engulfing every item in the room and leaving nothing to be salvaged.

Comparatively, the room with a sprinkler contained the blaze to just one side of one couch, damaging some of the items in the room but leaving the majority untouched by flames.

"In almost all circumstances, the fire will be limited to sometimes just the object of origin, but most likely the room of origin," Commissioner Baxter explained at the demonstration burn.

"That provides the critical time for the occupants of the building to be able to escape."

FRNSW's Morgan Cook said the launch of the Home Fire Sprinkler Coalition was a success and generated an important discussion about home fire safety and building regulations.

"The visual impact of a demonstration burn is a really powerful tool in changing public understanding of home fires.

"It's really simple when you see both of the rooms after the fires have been extinguished – without a sprinkler a room is completely destroyed in no time at all. Seeing that really pushes people to act," Mr Cook said. ■

**More information about automatic residential sprinklers, including regulation changes in the NCC 2019, is available on the Home Fire Sprinkler Coalition website: [www.homefiresprinklers.org.au](http://www.homefiresprinklers.org.au).**



FRNSW Commissioner and AFAC President Paul Baxter addresses the media at the Home Fire Sprinkler Coalition launch.

# US LESSONS FOR HOME FIRE SPRINKLER ADOPTION

BY **TOM BICKNELL**

FPA Australia

In the US, 80 percent of fire-related deaths occur at home, from an annual average of 368,000 home fires. That number was a driving factor behind the establishment of the US Home Fire Sprinkler Coalition in 1996, formed to educate the public about the life-saving value of fire sprinklers in the home.

Australia's own recently established Home Fire Sprinkler Coalition (HFSC) is modelled after the US organisation, and the local industry heard some of the key lessons learned by the US HFSC in its 23 years of operation at the recent Fire Australia Conference and Tradeshow 2019 in Melbourne.

Lorraine Carli, President of the US HFSC and Vice President of Outreach and Advocacy at the National Fire Protection Association, spoke about the US experience with home fire sprinklers.

"We know that 80 percent of fire deaths happen in the home, so if we're going to solve the problem we have to go to the home," she said.

The speed of fire spread in homes has dramatically increased in the last half century due to the ubiquity of synthetic materials in furnishings, she explained, as well as the trend towards open-plan living spaces that allow faster fire propagation.

"We know the solution exists in home fire sprinklers," she stated. "More than 90 percent of the time, home fires can be controlled by only one sprinkler head."

In the US experience, consumers have been on board. In surveys of homeowners, the US HFSC found that 74 percent would be more likely to buy a home with fire sprinklers, and 70 percent said a sprinklered house had more value.

Some of the key hurdles to overcome, however, are in perceptions that sprinklers cost too much and will stall construction, said Ms Carli. But the data doesn't support this concern; in US jurisdictions that have introduced requirements for sprinklers in new one

and two-family homes, no reduction in building has been seen, and installation costs have averaged only US\$1.35 per sprinklered square foot.

Efforts to increase home sprinkler adoption in the US have also run into resistance from a residential construction industry unfamiliar with sprinklers, and a sprinkler industry unfamiliar with residential construction.

But despite the challenges, work to increase home fire sprinkler adoption in the US and in Australia will continue, spurred on by another number shared by Ms Carli with conference attendees: "The risk of dying in a home fire decreases by 85 percent if sprinklers are present." ■

US consumers are on board with home sprinklers, according to Lorraine Carli.

"We know the solution exists in home fire sprinklers. More than 90 percent of the time, home fires can be controlled by only one sprinkler head."

— Lorraine Carli

PHOTO: TOM BICKNELL, FPA AUSTRALIA



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# IMPACTS OF CONFLICTING CUES IN EMERGENCY WARNINGS



New research confirms a long-held suspicion that emergency warnings do not always have precedence when other sources conflict with official advice.

BY **DR PAULA DOOTSON,**  
**ASSOCIATE PROFESSOR**  
**DOMINIQUE GREER,**  
**SOPHIE A. MILLER** AND  
**PROFESSOR VIVIENNE**  
**TIPPETT**

Queensland University of Technology and  
Bushfire and Natural Hazards CRC

**A**ustralia's emergency services agencies face immense challenges when responding to natural hazards. Evacuating people in affected regions requires time, influence, coordination and expertise.

Triggering large-scale public evacuations in time-critical situations of flood or bushfire is problematic, as there is always some uncertainty about whether, or how, a natural hazard will occur. Compounding this problem is the fact that emergency services are not the only source of information that the public uses when considering taking

action. Environmental cues such as the weather outside, information offered by the media or the actions peers are taking all influence people's decisions and can inhibit taking timely protective action.

When cues from different information sources are in conflict, such as when a flood evacuation warning has been issued but the weather conditions in the immediate area appear sunny and fine, it can cause uncertainty about the right action to take.

Our team, through the Bushfire and Natural Hazards CRC project 'Effective risk and warning communication during natural hazards', found that conflicting cues do exist across multiple hazard types and can affect information processing of risk perceptions, and therefore prevent appropriate protective action.

## Undertaking the research

This research draws on two models to explain the effect of conflicting clues: the Risk Information Seeking and

Processing model and the Protective Action Decision model.

The Risk Information Seeking and Processing model proposes seven factors that influence the extent to which people seek out information and the time they spend analysing it. These include:

- ◆ individual characteristics
- ◆ perceived hazard characteristics (i.e. risk perceptions)
- ◆ affective response to the risk
- ◆ social pressures to possess relevant information
- ◆ information sufficiency
- ◆ one's personal capacity to learn
- ◆ beliefs about the usefulness of information in various channels.

The Risk Information Seeking and Processing model is built on the idea that just because information is available does not mean people will do anything to respond to it.

The Protective Action Decision model suggests that an individual's

Research has shown that environmental cues, such as the weather outside, influence how individuals react to warning messages.



PHOTO: CFA

decision to engage in a protective action is informed by how they process socio-environmental cues alongside official communications. Environmental cues include smells and sights, while social cues incorporate the behaviour of others. This can produce modelling behaviours, media coverage as a form of authority to effect behaviours, and information from unofficial sources as another behavioural influence.

Previous research indicates that many situational and personal factors will affect an individual's behaviour in an emergency, such as age, gender, language, country of birth and past experience with hazards.

Our team surveyed 2,649 adults across all Australian states and territories about bushfires and floods. The respondents were randomly assigned to one of 32 experimental conditions that presented them with an emergency warning ('prepare to evacuate' or 'evacuate now') and either an

environmental cue – e.g. a gif (an image file that supports both animated and static images) of a sunny day, bushfire or flood – or one of three social cues – e.g. a media article suggesting evacuating or staying, an organisation releasing an unofficial warning suggesting evacuating or staying, or observed behaviour of neighbours evacuating or staying. Taking protective action in the event of bushfire or flood can mean any number of things, including preparing property and family for evacuation, calling for emergency assistance or telling friends or family about the event. The survey also collected information on participants' age, gender, language, country of birth and past experience with hazards to ascertain whether these impacted the likelihood of taking protective action.

Our research has confirmed emergency services agencies' suspicions that conflicting cues can affect information processing of risk

perceptions, and therefore prevent appropriate protective action. The significant results were evenly spread across hazards, suggesting the problem is not unique to one hazard.

## Findings

### CONSISTENT CUES

Consistent cues refers to when the instruction in the emergency warning was consistent with the environmental cue and social cues of media, a warning from an unofficial organisation, and peer behaviour. When presented with consistent cues, participants were more likely to intend to evacuate; perceive risk about the event; share information with friends, family and peers; find emergency warnings to be effective; comprehend the information; and have a higher current information level.

**Behavioural intentions to evacuate:** participants were more likely to intend to evacuate under the 'bushfire, evacuate now', condition when the emergency warning was consistent with a social cue from the media.

**Risk perceptions about the flood/bushfire:** perceived hazard characteristics were higher for participants when they received consistent instructions from emergency warnings, environmental cues and social cues of media and unofficial warning organisations across bushfire and flood, and across both escalations of warnings.

**Sharing information with friends, family and peers:** information sharing was more likely for participants who received consistent environmental and media cues across 'flood, prepare to evacuate' and 'bushfire, evacuate now' warnings.

**Perceived effectiveness:** perceived effectiveness has to do with how attention-grabbing, powerfully informative, meaningful and convincing the emergency warning was, and whether it was worth remembering. Participants perceived emergency warnings to be more effective when social cues from the media and unofficial warning organisations were consistent with emergency warnings or 'evacuate now' messages across flood and bushfire.

**Perceived comprehension:** perceived comprehension has to do with how easy it was for participants to understand the message and comprehend the information in the message. Perceived comprehension was higher for participants who received a 'bushfire, evacuate now' warning that was consistent with the social cue of an unofficial warning organisation.



PHOTO: SOUTH AUSTRALIAN SES

WORD FROM THE EMERGENCY SERVICES



To have empirical evidence of how conflicting cues can impact what the community thinks and how they act is important for us because it helps emergency services agencies tailor the information and warnings it delivers to the community during emergency events. These findings, combined with the next stage of the research project, will help us develop ways to address ambiguity caused by conflicting cues to encourage the community to take protective action. Specifically, we will use these findings and future work to inform how we can tailor warnings and the key messages delivered by operational personnel to acknowledge the lack of environmental and visual cues of the immediate threat.”

– **Hayley Gillespie**, Executive Manager Media at Queensland Fire and Emergency Services

This is the first research to offer empirical evidence of the impact of conflicting cues and how they influence public behaviour in Australia.

**Current information level:** current information level refers to the participants’ perceived knowledge of a hazard. Participants perceived they had a higher current information level when they received a ‘flood, evacuate now’ emergency warning consistent with a social cue from an unofficial warning organisation.

CONFLICTING CUES

Conflicting cues refers to when the instruction in the warning message conflicted with the environmental and social cues, unofficial warning organisations and peer behaviour. When faced with conflicting cues,

participants were more likely to seek out additional information, while their information processing and self-efficacy were affected.

**Seek out further information:** information-seeking refers to the participants’ likelihood of searching for information about a hazard in order to understand it better, as opposed to tuning out when the topic of the hazard comes up. Participants were more likely to seek information when a ‘bushfire, prepare to evacuate’ emergency warning conflicted with the social cue of an unofficial warning organisation. While seeking out additional information is sometimes encouraged and thus could be considered a protective action, it can result in milling behaviour – a communicative process whereby individuals come together in an attempt to define the situation, confirm the threat or risk, and propose and adopt new behaviours (known as protective actions). Getting stuck in the milling process for extended periods of time can potentially place individuals in danger.

**Process the information:** heuristic information processing happens when individuals skim through information, do not spend much time thinking about the information, or believe they have been presented with far more information than they personally need about a topic. Heuristic information processing was higher for participants who received a ‘flood, evacuate now’ warning that was consistent with the social cue of peers

evacuating. Seemingly, the social cue was enough confirmation so they did not need to read more of the warning or seek further confirmation. Conversely, heuristic information processing was found to be higher for participants who received a ‘flood, prepare to evacuate’ emergency warning that was in conflict with the social cue of an unofficial warning organisation.

**Ability to follow the instruction:** self-efficacy has to do with a person’s perceived ability to complete a task or engage in a specific action. Participants perceived their self-efficacy to be higher when the emergency warning was consistent with the social cue of peers performing evacuation actions in the bushfire context. Interestingly, participants perceived their self-efficacy to be higher when the ‘bushfire, evacuate now’ emergency warning conflicted with the media social cue.

What next?

Our team is planning to develop and test intervention to mitigate the negative effects of conflicting cues to improve protective action. Among other things, the intervention could include an acknowledgment of the potential existence of conflicting cues in official emergency warnings. It could also require emergency warnings to better convey a sense of urgency. The outcomes of our research have the potential to optimise emergency warnings and encourage community compliance. ■

Note: This stimulus has been changed and stylised graphics used for the purpose of this article.



Conflicting cue instructions for a flood warning (presented after the emergency warning message): You look outside the window and see it is a sunny day.



Consistent cue instructions for a flood warning (presented after the emergency warning message): You look outside the window and see it is raining.

# NEW SA ROUTINE SERVICE REGISTRATION CONFIRMS FPA AUSTRALIA PROPOSAL

New restricted plumbing registrations covering routine service work in South Australia better align with industry and will improve community safety.

BY **TOM BICKNELL**

FPA Australia



PHOTO: FPA AUSTRALIA

The South Australian Government announced in late May changes to the restricted classes of plumbing registration, which cover individuals performing routine service work on fire protection systems.

The changes reflect a proposal to the SA Government by Fire Protection Association Australia (FPA Australia) last year, and are the outcome of negotiations between the Association, Consumer and Business Services (CBS) SA, and the state's Deputy Premier, the Hon Vickie Chapman MP.

Two new classes of restricted plumbing registration have been introduced with the changes, one covering routine service of fire hydrants up to six-monthly inspections and hose reels up to yearly inspections, and one allowing individuals undergoing training to conduct routine service work under supervision.

They complement a single existing class of restricted plumbing registration in SA, which was introduced in 2017 and covers routine service of all fire protection systems connected to the mains water supply. This class has been amended to add the ability to repair some hose reel components, and remove one required unit of competency.

The SA Government is currently evaluating a phase-in period for the new classes of registration, in consultation with industry.

FPA Australia is delighted with the announcement of the changes, which follow two years of negotiation between the Association and the SA Government after the 2017 introduction of the routine service work restricted registration.

"Following the 2017 restricted

registration introduction, the Association has fought hard for a revised system that better aligned with industry practices and delivered improved community safety outcomes, despite opposition from other stakeholders who were against any changes being implemented," said Chris Wyborn, FPA Australia's General Manager of Education and Bushfire Services.

"These new restricted classes of registration do just that, and we would like to recognise the willingness of the SA Government and Minister Chapman to work with industry on an improved approach."

CBS has invited FPA Australia to continue that collaboration, with an eventual extension of these new restricted classes of registration, once the new routine service training package is available. ■

South Australia's new classes of registration cover the routine service of all fire protection systems connected to the mains water supply.

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# STRONG GROWTH FOR FIRE AUSTRALIA 2019

In 2019 the Fire Australia Conference and Tradeshow focused on both the major problems facing the fire protection industry and their solutions.

BY **TOM BICKNELL**

FPA Australia

**T**he Fire Australia Conference and Tradeshow is the largest dedicated fire protection event in the Southern Hemisphere, and in 2019 it attracted more than 1,500 visitors across three days. Running from 14–16 May, it offered delegates access to local and international expert speakers, exclusive off-site tours of fire protection facilities, a view of the latest products and services, and much more.

The conference returned to Melbourne this year and the program kicked off with a consumer's perspective on the regulatory and compliance failure underlying the combustible cladding problem. The presentation was given by apartment owner Brad Bloomfield, whose building Neo200 caught fire in February this year.

"Our expectation as consumers is that a home, when we buy it, should comply with all the relevant codes. A building is an expensive asset, but we've got less consumer protection with that asset than with a car or a toaster," Mr Bloomfield said.

Conference delegates also heard about outcomes of the Grenfell fire in London from Gary Strong of the Royal Institution of Chartered Surveyors (RICS) in the UK; the experience with home fire sprinklers in the US from Lorraine Carli of the National Fire Protection Association; and a range of other topics from other speakers.

On the tradeshow floor, the event experienced a 25 percent growth in exhibitor numbers on the previous year, with a large number of attendees attracted by a tradeshow program that included live demonstrations and presentations.



Brad Bloomfield kicked off the Fire Australia 2019 conference with a consumer's view on combustible cladding.



Johnson Controls was winner of the Best Exhibition Stand over 12m<sup>2</sup>.



“

Eighty percent of all fire deaths happen in the home. So how do we solve the problem? We know the solution exists. The risk of dying in a home fire decreases by 85 percent if sprinklers are present.”

– Lorraine Carli NFPA (US)

### The Southern Hemisphere’s largest fire protection tradeshow

The Fire Australia 2019 tradeshow attracted 74 exhibitors from Australia and around the world, including equipment suppliers and manufacturers, testing facilities, software companies, service providers and more. The tradeshow was officially opened by Sue Eddy, CEO of the Victorian Building Authority.

In addition to being the largest dedicated fire protection tradeshow in the Southern Hemisphere, it also included, for the first time, a dedicated stage for exhibitor product demonstrations. The

tradeshow featured presentations on small business management and marketing, a seminar for end users, a technicians’ breakfast and a presentation on FPA Australia’s SPARK discussion platform.

This year saw an increased number of facility managers, building owners and developers attend the show, fulfilling a strategy to connect more end users with the fire protection industry.

“We are really happy with the level of engagement from the tradeshow attendees,” said Tracy Horsley of exhibitor Warringtonfire. “As a sponsor also, it’s been a worthwhile event.”

This year saw an increased number of facility managers, building owners and developers attend the show, fulfilling a strategy to connect more end users with the fire protection industry.



FireMate Software was winner of the Best Exhibition Stand People’s Choice Award.



“

I would say fire doors are a bigger issue than ACP cladding right now, because we know how many buildings have cladding in the UK now, but we don’t know how many don’t have working fire doors, like those in Grenfell.”

– Gary Strong RICS (UK)

Victaulic was winner of the Best Exhibition Stand under 12m<sup>2</sup>.



“

[For the Shergold-Weir report] we asked every state and territory what audit programs they had in place for commercial buildings, and none of them had one. This is a sector that has been developing at a rapid rate, with no effective oversight.”

– Bronwyn Weir Weir Legal and Consulting

**Off-site tours**

Fire Australia 2019 conference delegates attended four off-site tours around Melbourne on the final day of the event. The four tours visited:

- ◆ Warringtonfire: a live AS 5113 test burn and facility tour (Photos 3 and 4)
- ◆ CROWN Melbourne: an exclusive tour of the casino’s fire protection systems
- ◆ CSIRO: a look inside CSIRO’s Fire System Laboratory
- ◆ MCEC: a tour of the fire protection systems in the new Melbourne Convention and Exhibition Centre expansion (Photos 1, 2 and 5).





Charity Dinner attendees heard from Professor Fiona Wood AM about the Foundation's work.

**Charity dinner raises funds for burns treatment**

Around 200,000 Australians suffer burn injuries and an average of 82 die of fire-related causes each year. Half of those admitted to hospital with burns are children, and 40 percent require skin grafts.

These are the figures that drive the work of the Fiona Wood Foundation, one of the world's premier burns treatment research organisations and FPA Australia's Official Charity Partner. For those affected by burns, the Foundation is at the forefront of improving treatment of the cosmetic, functional and psychological issues related to burn injuries.

As part of the conference, FPA Australia held the annual Fiona Wood Foundation Charity Dinner to raise much-needed funds for the Foundation's life-saving work. The evening raised a total of \$20,653 for the Foundation.

This year, the Association was pleased to play host to Professor Fiona Wood AM herself, the head of the Foundation and FPA Australia's Ambassador.

In an interview with the evening's host, Andrew Daddo, Professor Wood spoke about the path she took into burns treatment and research, the experience of leading the team treating survivors of the 2002 Bali bombings, and promising research that points to future potential burns treatments.

Nearly 300 attendees also enjoyed an appearance from comedian Lehmo, and helped raise funds for the Foundation's work through a raffle and silent auction. The Association also thanks Charity Dinner Sponsor Chubb. ■



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Emergency managers from Cook Islands, Tonga, Tuvalu, Samoa and Niue participated in the Polynesia workshop in Auckland, New Zealand.



PHOTOS: THE PACIFIC COMMUNITY (SPC)

# PARTNERSHIPS BUILD CAPACITY IN THE PACIFIC

To improve domestic capacity to respond to emergencies and disasters among the Pacific Islands, three regional training workshops have been rolled out across the nations.

BY **ALANA BEITZ**

AFAC

Countries in the Pacific are particularly vulnerable to natural disasters such as tropical cyclones, earthquakes, tsunamis, volcanic eruptions, floods and droughts, and these can seriously disrupt the countries' economies. Climate variability and extreme climatic events caused by global warming are also exacerbating the situation.

Based on the severity and complexities of such events, there is a constant need for the Pacific Community (SPC) and other development partners to assist Pacific governments to upskill their workforce for improved coordination, preparedness and response to disasters. This includes a multi-agency approach where agencies

are cohesive, consistent and operate holistically.

The Pacific Islands Emergency Management Alliance (PIEMA) project is funded by the governments of Australia and New Zealand and implemented by SPC to improve the partnership between key umbrella organisations and emergency management agencies – the National Disaster Management Offices (NDMO), Police and Fire and Emergency Services.

During March and April 2019, the PIEMA project and Building Safety and Resilience in the Pacific (BSRP) project teamed up with 16 trainers from Australian and New Zealand fire and emergency service agencies to deliver regional workshops for 77 trainers, including 14 women, from regional emergency response agencies across

Melanesia, Polynesia and Micronesia.

The workshops focused on the delivery of two courses – the Working in Emergency Operations Centre (EOC) course and Pacific Incident Management Systems (PacIMS) course. The PacIMS course is adapted from the Australasian Inter-Service Incident Management System (AIIMS) and contextualised for the Pacific by the PIEMA project to promote a common language and understanding of basic emergency management standards between agencies across the region.

For participating fire and emergency trainers from Australia and New Zealand, the workshops were a professional development exercise that provided a deeper understanding of the challenges faced by their neighbours in the Pacific. ■

## TESTIMONIES FROM WORKSHOP PARTICIPANTS

“

My expectation is to learn and understand the concept of this training and go back and give an update in my country, which is Vanuatu. In this training I learned that different countries have different EOCs [emergency operations centres], but the functions – they are all the same. One of the challenges of this training is that the context is international, so when I go back to train my participants, the first thing I will do is change the language so my participants will understand what the concept of this training is about.”

– **Ms Naomi Lacha**

Constable, Vanuatu Police Training College



“

One of the challenges in working with multiple agencies is coordination, and that is something that we need to work on. From working with different agencies and governments, I have found that the structures are different and it is difficult to operate around some of the scenarios. But this is a good exercise and something that should be done, because when we go over to wherever they are and walk into their EOC, we will know how they operate and what is going on.”

– **Yetta Aliven**

Information Management Officer, Office of the Chief Secretary, Marshall Islands



“

Working beside people from Fiji, Timor-Leste, Vanuatu, Solomon Islands and Papua New Guinea has been a real pleasure, and to also work with other trainers from Australia, so we can network and share our information we use back home as well. My main benefit I'll take from here is knowing that these people will be able to go home and assist with training programs back home.’

– **Brenden Flynn**

Inspector, Queensland Fire and Emergency Services



“

I've been lucky enough to work with the people of Kiribati, which is part of our twinning arrangement in the Country Fire Service. I've learned a lot about their emergency and disaster management procedures in the Pacific. The challenges we've come across during this training relate directly to the lack of resourcing that the people of Kiribati have, the tyranny of distance they have as a country relating to disaster and incident management, and particularly that they are very new to this space and therefore going on a learning journey through this program.”

– **Heidi Davis**

Incident Management Coordinator, SA Country Fire Service



“

I found it a really rewarding experience and found that working out the challenges [Pacific Island countries] face gave me a better appreciation and understanding of how we can assist if we are ever deployed there. We're dealing with smaller island nations that don't have the resources that we would expect in our own agencies. And that is something that I really learned from, these challenges and how they face them day to day, and also the benefits of having these kind of training programs, so we can work with them but also learn from them.’

– **Superintendent Greg Rankin**

Zone Commander, Fire and Rescue NSW



“

In a previous disaster managers' meeting we were trying to come up with a standardised approach for training in the region, so we are not only able to learn from each other, but also have some type of gauge to know where other countries are at. I really appreciate the effort of the partners to come up with the common approach and put these different systems together that all have their unique signatures to them. I feel that the week was kind of wishful thinking, to cram everything all into one, but I think this is a very successful pilot exercise for this kind of standardised approach to EOCs.”

– **Waymine Takeo Towoi**

Executive Director, National Emergency Management Office, Republic of Palau



PHOTOS: THE PACIFIC COMMUNITY (SPC)



Right: A participant is congratulated as he receives his credentials at the end of the Melanesia workshop in Fiji.

Below: Heidi Davis with workshop participants at the Micronesia workshop in Pohnpei, Federated States of Micronesia.



The outcomes and learnings of the workshops will be reviewed and will integrate into the future program planning and design of the PIEMA Program for 2018–2021. Additionally, AFAC members have endorsed a strategic and coordinated approach to strengthen interoperability of disaster and emergency agencies across the Pacific.

In-country needs analysis will be completed for up to 12 Pacific countries and territories in 2019 and 2020 to build an effective and sustainable model supported by contextualised activities that align to the PIEMA Strategic Agenda.

PIEMA was established in 2013 by founding partners the National Disaster Management Offices, Pacific police forces, fire and emergency agencies and AFAC. Other stakeholders include the United Nations Office for the Coordination of Humanitarian Affairs, Ministry for Civil Defence and Emergency Management, NZ and non-government organisations (NGOs). The PIEMA Program 2018–2021 is supported by the Australian and New Zealand governments.



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PHOTOS: SOUTH AUSTRALIA SES

South Australian State Emergency Services crew managing a fallen tree during the September 2016 Adelaide floods.

# DIVULGING DATA – HOW NUMBERS AND FIGURES ARE HELPING SOUTH AUSTRALIA

The South Australian Fire and Emergency Services Commission (SAFECOM) is well aware of the power of the data at its disposal, and thanks to research by the Bushfire and Natural Hazards CRC, now has the ability to consider how the future will impact on their fleet and the services that the Metropolitan Fire Service (MFS), Country Fire Service (CFS) and State Emergency Service (SES) provide to the community.

Headed by researcher Dr Andre Costa (University of Adelaide) and undertaken specifically for SAFECOM, the project has resulted in a data analysis tool used to visually assess the resource use of the South Australian emergency services.

The tool was born out of a discussion that former SAFECOM CEO Malcolm Jackman had with Bushfire and Natural Hazards CRC CEO Dr Richard Thornton around the principle that better understanding data supports better decision making about capability.

“We had this conversation about, can you take all the data, pull it together, analyse it and can you tell us what it’s saying in terms of response times, in terms of call-outs utilisation?” Mr Jackman said.

“We are continually looking at what our footprint looks like. Changing demographics and risk profiles mean that our existing footprint may not be the contemporary footprint of the future.”

Now in use across South Australia’s

In our technologically driven world, data is everywhere. And smart use of data will help emergency services understand complexities and make informed decisions.

BY **GABRIEL ZITO**

Bushfire and Natural Hazards CRC

In the world of emergency services, data can be overwhelming, and understanding the usage – or lack thereof – of a fire truck, a brigade or station is an essential part of providing support and services to the public when needed.

How can our emergency services make the best sense of the general capability of their units? More importantly, what does this data mean as our demographics change, our population grows and risks evolve – and create new vulnerabilities?

emergency services, the tool's primary aim is utilisation. It uses the historical information of the past seven years from the South Australian emergency services to measure response times, allocation of resources and dispatch systems of the network of fire emergency appliances and personnel.

**Using data at your disposal**

At the core of the tool is data – lots of it. “We take about 45,000 calls a year responding to any emergency,” explained Mr Jackman. “We looked at the data from around 300,000 individual incidents.”

It was the power of this real world data that most excited Dr Costa.

“People are becoming a lot more open to the idea that there is some value to be extracted from the data they already have,” Dr Costa explained.

“The great thing about data analytics is that people give you their real world data sets, actual things they care about, and they want to extract information from it.

“We spent a bit of time with the chief people responsible for data in the MFS, CFS and the SES and asked them to check if we were interpreting the data correctly.”

All up, the software tool encompasses the statistics and visualisation of events and utilisation of appliances and stations spanning from 2012 to 2018 across South Australia's three emergency services – the MFS, CFS and SES.

“What the software tells us is what would happen if we pulled this asset (out of service) or if we pulled this location (out of service), what would the response look like then?” Mr Jackman explained.

The functionality gives senior management at the MFS, CFS and SES the ability to visualise years of data

more simply, and to highlight the areas where capability and capacity gaps have occurred or are likely to occur. This can then help make decisions easier and provide an insight into how to better plan and prepare for the future.

The software provides the keys to access this window into the future, explained Dr Costa.

“So once [SA's emergency services] make the decision and change how they do things, they are going to be able to see those changes and track that within the tool.”

**Looking ahead**

This planning is at the core of ensuring South Australia's emergency services are ready for the coming decades.

“What we've been able to do with this tool is not just look at individual units but look at groups of units,” Mr Jackman said.

“We've been able to look at the three services combined or an individual service by itself. We can slice and dice it in many ways.

“In places where we know population growth is going to happen, we can say ‘well look, the usage [of an individual truck, brigade or unit] five years ago was this, it now looks like this – if you run it out another five years, what's that going to tell you?’

“The next step is, if you see an increase in usage, is it because of increasing population or industry? What's driving that? Is it a sustained trend? And if it is a sustained trend, what do we think it's going to look like in the future?” Mr Jackman said.

Time series of activity levels and rolling response time statistics, a calendar activity view that drills down to show detailed event timelines and appliances/units' history, heatmaps and distribution charts of station/unit/

appliance utilisation are all part of the tool's interactivity and way of displaying data in a much more user-friendly format.

The tool is set to provide a better understanding of how the resources that make up South Australia's emergency services are used at various times, for various events. In doing so, cost management, resource allocation and future emergencies will be managed far more efficiently and directly.

The scope of the data analysis, and its potential to be applied to a wide variety of other organisations within the emergency sector, are essential elements for the management of natural hazards, both now and in the future.

“There are a number of avenues that applied research could go down,” explained Dr Costa.

“We actually want to try and predict what might happen or do ‘what if’ experimentation, and the next step is to try and build a model of the system to forecast what would happen if we added resources here, how would that affect response times?”

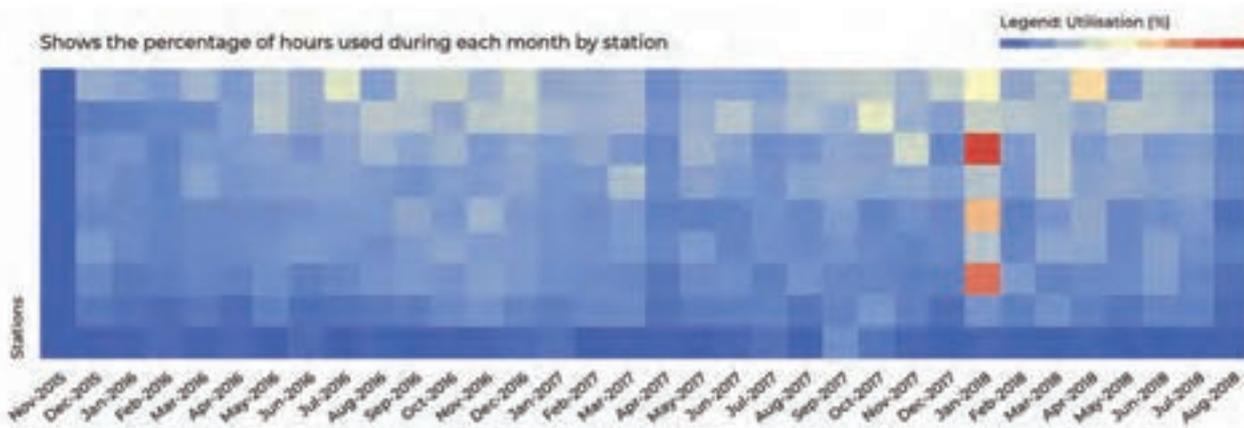
And now the agencies are armed with the tool to best make sense of the data at their disposal, South Australia's emergency services will be able to tackle the future head-on. In a time where technology rules and budgets are struggling to keep up with the costs of delivering services, working out how to optimise assets is essential.

“At the end of the day, there's only a finite amount of money left to spend,” said Mr Jackman.

“Where do we spend it? Why do we spend it, and what are the consequences of this expenditure? This is what the tool allows us to achieve.” ■

Find out more about this research at [bnhrc.com.au](http://bnhrc.com.au).

**HEATMAP OF SITUATION UTILISATION (%) BY MONTH**



An example utilisation map from the tool of South Australian stations.

SOURCE: BUSHFIRE AND NATURAL HAZARDS CRC

# PROFESSIONALISING FIRE SAFETY ENGINEERING: THE EDUCATION REPORT

To improve fire safety engineering in Australia, we need to look for consistency in education and accreditation.

BY **PETER JOHNSON**

Arup

AND **ASHLEY BRINSON**

The Warren Centre

This is the second of three articles concerning the latest research from the Warren Centre at the University of Sydney. The project is examining the role, responsibilities, competence, education and accreditation of professional fire safety engineers. As highlighted in the first article, published in the previous edition of *Fire Australia*, the combustible façade issue and recent high-profile fire incidents have served to focus attention on the industry-wide issues of poor performance, quality and safety of some buildings, particularly residential structures.

The evolution of the performance-based National Construction Code (NCC) has allowed the creation of some wonderfully innovative buildings through flexibility in design and a fundamental approach to fire safety, resulting in very sound fire protection systems. On the other hand, a number of government inquiries into building quality and certification have questioned the culture in the building industry and cited examples of poor construction. The national Shergold-Weir inquiry made significant recommendations for change, including calls for improved competency. Fire Protection Association Australia

(FPA Australia) has been at the forefront of a push for greater competency and accountability of fire safety practitioners, leading the development of the Fire Protection Accreditation Scheme (FPAS) for fire protection system designers and installers and those undertaking inspection and testing roles. FPA Australia has also been successful in getting government recognition of fire safety assessors, who undertake annual fire protection assessments of buildings, as well as of fire system designers, who design sprinklers, detection and other fire protection systems.

The Warren Centre research sits very much in parallel with and complements FPAS. It addresses the competency, education and accreditation of fire safety engineers undertaking holistic fire safety designs and developing the whole fire safety strategy for buildings and infrastructure.

## The Education Report

The first article and the Warren Centre's Regulation Report highlighted the lack of consistency in the control of the practice of professional fire safety engineers in Australia, with major differences in regulation and registration among the states and territories.

The second major piece of research completed at the Warren Centre has been published as the Education Report. It looks much more clearly at the issues of competency, education and accreditation of fire safety engineers, focusing on current status but with a view to the future in the recommendations.

## Competency

The Education Report starts with the proposition that the role of fire safety engineers "must be fulfilled by

individuals who collectively possess the competencies, comprising professional attributes, skills and knowledge, required to demonstrate that a societally acceptable level of safety has been obtained".

This research team, led by Dr David Lange from the University of Queensland and Professor José Torero from University College London, found:

- ◆ Competencies for fire safety engineers in Australia have not been updated in the past 30 years; they are almost all based on simple statements of knowledge required without reference to higher skills and attributes of learning.
  - ◆ As a result, there are no agreed definitions of the attributes and skills of a professional fire safety engineer.
  - ◆ This leads to the fact that the accreditation process for the fire safety professionals, at least in Australia, and likely in many other countries as well, is misaligned with that of other engineering disciplines, which exhibit full and proper 'professionalisation'.
  - ◆ The recent façade fires illustrate the pitfalls and dangers of continuing as the discipline has done for so long; the continued evolution of design practices and the introduction of new design goals, materials and technologies in the built environment will challenge the professionalism of fire safety engineers into the future.
  - ◆ Working in the current regulatory, educational and accreditation environment, the discipline is unable to address these new challenges robustly and yet is forced to engage with them in practice.
- This all suggests an imperative to recognise the current deficiencies in



competency and make some significant changes to lift the professionalism of fire safety engineering to a new level.

### Education

In relation to fire safety education in Australia and globally, the report:

- ◆ notes that “There are some inconsistencies in model curricula, which exist when describing the knowledge required of a fire safety engineer. Nevertheless, these curricula have remained largely unchanged over the past 30 years while the challenges which fire safety professionals face have continued to evolve.”
- ◆ benchmarks the Australian university courses for fire safety engineering against more than 20 other international courses and against two sets of globally developed model curricula
- ◆ observes that the major fire safety engineering courses taught in Australia, only the Bachelor of Engineering and Master of Engineering course at the University of Queensland is accredited by Engineers Australia
- ◆ highlights that internationally, there is a wide variety of fire safety engineering courses with varying curricula that do not appear to be linked to contemporary or future competency requirements.

### Accreditation

In Australia, there are two major accreditation schemes: the National Engineering Register (NER) operated by Engineers Australia, which has a category for fire safety engineering; and the Chartered Engineer (C.Eng) scheme operated by the Institution of Fire Engineers (IFE).

The report outlines the importance of both First Tier Accreditation, related to qualifications and academic studies, and Second Tier Accreditation, related to supervised professional experience, and their respective contributions to overall competency.

### Summary

This Education Report concludes with a call to action to:

- ◆ review the competencies and attributes required of future fire safety professionals in Australia
- ◆ transform educational and accreditation processes through which competence is attained and acknowledged

- ◆ reform the regulatory environment in which a true fire safety engineering professional should work to ensure they work both competently and ethically.

The Education Report and other reports can be downloaded free of charge from the Warren Centre at: <https://info.thewarrencentre.org.au/firesafety>. ■

The Education Report is the second of three reports on the Warren Centre's research into professionalising fire safety engineering.

For more information about the project, go to: <https://thewarrencentre.org.au/activities/fire-safety-engineering>.

A summary of the third project report, **The Methods Report**, which is based on a comparison of the utility, benefits and risks of the **Fire Safety Verification Method**, the **International Fire Engineering Guidelines** and the **Society of Fire Safety Practice Notes**, will be available in the next edition of *Fire Australia*.



Country Fire Authority fire trucks convoy towards the fire ground during the Bunyip fire in early March.

PHOTO: KEITH PAKENHAM, CFA

# SHARING THE LOAD

With unprecedented fire conditions challenging local agencies in both Tasmania and Queensland, and significant fires threatening communities in Victoria, the AFAC National Resource Sharing Centre (NRSC) has wrapped up its busiest domestic season and demonstrated its critical role in the future of fire management.

BY **ALANA BEITZ**

AFAC

**S**ince its first deployment in April 2017 in the wake of Tropical Cyclone Debbie, the AFAC National Resource Sharing Centre (NRSC) has grown and evolved with each new request for assistance.

Two years on, the AFAC NRSC continues to identify opportunities to streamline resource requests and personnel deployments to ensure fire and emergency service agencies can come together to respond effectively in times of emergency, both interstate and overseas.

Cross border resource sharing is a collective effort and supported by agencies across Australia and New Zealand. All deployments arranged through the AFAC NRSC are authorised by the Commissioners and Chief Officers Strategic Committee (CCOSC).

Domestic arrangements include New Zealand, and while resource sharing across borders is not a new practice between agencies – with major interstate deployments occurring in Australia since 1994 – more frequent and intense weather events driven by climate change have highlighted the need for a central and coordinated approach.

With longer fire seasons and more



PHOTO: TASMANIA FIRE SERVICE

## In preparation for more complex and intense future incidents, the AFAC NRSC analyses past deployments to inform stronger and more streamlined resource sharing.

Various fire agency members come together to form the Incident Management Team at the Tasmania Fire Service's Southern Region Headquarters during the 2018–19 domestic fire season.

challenging storms and cyclonic activity, interstate and international resource sharing will become the most cost-effective and practical approach. If natural hazards compound or occur concurrently, even the most well-resourced jurisdictions can have their capacity stretched beyond an independent response. The AFAC NRSC supports an Australasian response to large-scale events.

In the last domestic fire season, the AFAC NRSC assisted in deployments in Queensland, Tasmania and Victoria. In total, over 3,000 individual movements took place across Australia and New Zealand.

In preparation for more complex and intense future incidents, the AFAC NRSC analyses past deployments to inform stronger and more streamlined resource sharing. Current developments include the launch of a NRSC Registry for both international and domestic deployments, the establishment of common terminology for resources across state and national borders, more efficient communication processes and a mentoring program to invest in the skills of future NRSC representatives.

### Queensland

The domestic fire season for the AFAC NRSC began when unprecedented fire conditions threatened lives and property in northern Queensland. In late November 2018, Queensland Fire and Emergency Services made a formal request to the AFAC NRSC to assist with the coordination of interstate resources to support their ongoing firefighting operations.

The Queensland fires were significant because they triggered a 'catastrophic' fire danger rating in Queensland for the first time in the state's history. Faced with these challenging new conditions, local Queensland crews were supported by a total of 1,202 personnel and additional aircraft and equipment from other Australian states and territories.

In total, 647 personnel travelled from NSW to Queensland, 161 from Victoria, 133 from SA, 94 from WA, 87 from Tasmania, 77 from the ACT and three from the NT. Once they landed in Queensland, the deployed personnel filled both line crew and Incident Management Team (IMT) roles. An AFAC NRSC representative was stationed in the Queensland State Operations

Centre to support ongoing resourcing requests.

When responding to the request for assistance, Emergency Management Victoria used the NRSC Registry to coordinate their 161-strong team to Queensland. Over time, AFAC NRSC aims to have the Registry in place and available for use for all interstate, as well as international, deployments.

### Tasmania

In early January, dry lightning and high temperatures sparked fires across Tasmania, prompting the Tasmania Fire Service to submit a formal request to the AFAC NRSC to coordinate interstate resources.

A total of 1,084 personnel deployed to Tasmania from other parts of Australia and New Zealand over a challenging three-month period. The Tasmanian fires burned through parts of the state's Wilderness World Heritage Area, a remote and notoriously difficult terrain requiring the specialised skills of winch-capable and remote-area, arduous firefighters.

The request called for personnel to fill both line crew and IMT roles. The

Severe fire conditions broke out in Deepwater, leaving residents waiting while firefighters took action.



A firefighter from NSW Rural Fire Service assists his Queensland counterparts at the Deepwater fire.

response was swift and significant and included 728 personnel deployed to Tasmania from the ACT and NSW, 94 deployed from WA, 93 from SA and 81 from New Zealand.

The length of the fire response period, and the specialised skills required to respond to the challenging conditions of the affected Tasmanian landscape, highlighted the important role of the AFAC NRSC in coordinating much-needed resources over an extended period.

**Victoria**

In early March, Emergency Management Victoria requested assistance in response to significant fires burning in Victoria. Coordination

of resources was complicated, as significant incidents were occurring simultaneously in Victoria, Tasmania and New Zealand. This highlighted the importance of the AFAC NSRC in maintaining overarching visibility of what resources were available on a national scale.

During February and April, 741 personnel were deployed to assist with firefighting operations in Victoria. More than half deployed from NSW, providing 197 strike team personnel, five Fire Behaviour Analysts (FBAN), 96 arduous firefighters, ten aviation personnel, 69 IMT personnel and ten Liaison Officers.

They were supported by 26 arduous firefighters from the ACT, 17 FBANs

from Queensland, 203 South Australian personnel (primarily strike teams), 50 deployments from WA, 49 from New Zealand (primarily arduous firefighters) and three NT personnel.

A collaborative and national approach to resource sharing ensures incidents are better managed and jurisdictions are adequately equipped. Embracing this approach also facilitates important relationships across borders, opening personnel to new work environments and colleagues, and allowing agencies to develop a common language and procedure in the process – a goal the AFAC NRSC continues to strive toward as it matures. ■



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# THINKING ABOUT THE FUTURE AT AFAC19

Explore the future capability of emergency management alongside practitioners, researchers, policymakers and government representatives at AFAC19 powered by INTERSCHUTZ.

PHOTO: AFAC



Deb Sparkes, Centre of Excellence for Prescribed Burning, hosting a panel session at AFAC18.

BY **COSTA HARITOS**

AFAC

Last year saw the extension of Australia's bushfire season, as well as cyclones, floods and drought also permeating parts of the country. These conditions put stress on the delivery of emergency services, and they were evident across the globe

too – from Sweden to the United States, Greece to Mozambique.

An understanding of natural hazard risk and capacity will minimise the impacts of these events and to enhance disaster resilience in Australia. Natural hazards will always occur, but equipping the community with the tools to mitigate them will ensure that hazards do not become disasters.

These ideas will be a central focus as delegates arrive in Melbourne for AFAC19, powered by INTERSCHUTZ, held at the Melbourne Convention and Exhibition Centre from 27–30 August.

Registrations are still open for the three-day conference, which will be full of global insights, robust discussions and networking opportunities, with the purpose of developing critical thinking in the sector.

PHOTO: AFAC



The trade exhibition also features the Knowledge Lounge, which has hundreds of research-informed posters on display.

Accordingly, the theme is 'A shift to the new norm: riding the wave of change'.

The four-stream conference will begin with the latest research and utilisation initiatives as part of the Research Forum, presented by the Bushfire and Natural Hazards CRC. Then, on days two and three, the conference will explore several themes including aviation, diversity, risk assessment, climate change, volunteerism, communities and more.

The conference will run concurrently with the Australian Disaster Resilience Conference and in partnership with the Institution of Fire Engineers Conference.

It will be the largest exhibition yet, at 12,000 square metres, and will showcase the latest technology in the sector, incorporating live demonstrations.

A range of highly qualified keynote speakers will present at the conference, including:

◆ **Dr Robert Glasser:** the former Head of the United Nations Office of Disaster Risk Reduction and the previous UN Special Representative of the Secretary General for Disaster Risk Reduction

◆ **Eliane Miles:** a social researcher and strategist who interprets the impacts of generational, social, demographical and digital change

◆ **Dr Lance O'Sullivan (NZ):** a leading medical entrepreneur who is using emerging digital technologies to increase access to better quality healthcare

◆ **Bronwyn Weir:** a lawyer who specialises in government law and best-practice approaches for the regulation of the building sector.

Britain's first full-time female firefighter Josephine Reynolds will also present at the conference. Ms Reynolds was 12 years old when her family home burnt down, inspiring her to write a memoir and encourage women to "be brave and let your light shine".

"I loved my fire service life. I want everyone to be able to have this same chance in life," Ms Reynolds says.

The conference encourages international collaboration and ideas, said AFAC CEO Stuart Ellis. "One of the things that a conference like this can

provide is external input.

"It's really important to get international thinking and exposure as well, and I'm really pleased that we're able to provide that," Mr Ellis said.

Delegates will have the opportunity to celebrate the achievements of the sector at the annual AFAC Gala Dinner at the end of day two.

The dinner allows delegates to unwind and network with new contacts or reconnect with old friends.

The conference will conclude with a panel session on the lessons learned from Australia's most catastrophic natural disaster – Black Saturday. The learnings from these fires will inform the future of effective bushfire management.

Last year's conference in Perth attracted more than 2,500 delegates, who came together to connect, learn and grow in the emergency services sector. This year's conference promises to be just as successful. ■

**AFAC19 will be held at the Melbourne Convention and Exhibition Centre from 27–30 August 2019. To register go to: [www.afaconference.com.au](http://www.afaconference.com.au).**

# A TIME TO REMEMBER AND REFLECT

The National Memorial Service for fire and emergency services was held on a chilly Canberra morning in May, on the banks of Lake Burley Griffin.

BY **LEONE KNIGHT**

AFAC

In a solemn ceremony, dignitaries, colleagues, families and communities came to remember all fire and emergency service personnel who have lost their lives in the line of duty.

The 2019 National Memorial Service, held on 1 May, commemorated eight individuals from NSW Rural Fire Service, Fire and Rescue NSW and, for the first time, NSW State Emergency Service.

His Excellency General the Honourable Sir Peter Cosgrove AK MC (Retd), Governor-General of the Commonwealth of Australia, presented AFAC memorial medallions to the families on behalf of all Australians.

The Memorial Wall, created in 2018, lists the names of 528 Australian and New Zealand fire and emergency services personnel who have lost their lives while keeping communities safe since records began. This year, 23 names were added.

AFAC CEO Stuart Ellis AM, an ex-serviceman, reflected that Australian communities might not always appreciate the level of sacrifice experienced by fire and emergency personnel.

This year's National Memorial also saw the participation of the New Zealand High Commissioner, Her Excellency Dame Annett King DNZM, who read the 'Christchurch statement'. Young SES volunteers from each state and territory were also given the opportunity to participate in the event and interact with the wider fire and emergency services community. ■

The updated honour roll can be viewed on the Memorial website: [memorial.afac.com.au](http://memorial.afac.com.au).



PHOTOS: AFAC

“We remember and mourn the brave fire and emergency service personnel who have paid the ultimate price in their service and protection of their fellow Australians.”

— Sir Peter Cosgrove

Governor-General Sir Peter Cosgrove officiated the ceremony, which was held on the banks of Lake Burley Griffin.



“More fire and emergency service personnel have died in the line of duty than in the Vietnam War, and we want these families to know our country acknowledges their loss and that we offer our support.”

— Stuart Ellis AM

Joining the Memorial's 528 names, 23 were added to the National Memorial Wall this year.



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# COEXISTING WITH COMBUSTION: THE FUTURE OF BUSHFIRE MANAGEMENT

Dr Timothy Neale (left), with Karen Patterson, Harley Douglas, Andrew Saunders, Amos Atkinson and Mick Bourke at djandak wi (healthy fire) burn on Dja Dja Wurrung Country.

PHOTO: TIMOTHY NEALE

Given that we cannot completely control fire and there are no absolute fixes, we need to create a better and more honest relationship of coexistence.

BY **DR TIMOTHY NEALE**

Deakin University and Bushfire and Natural Hazards CRC

I first became interested in fire during my doctoral research in Far North Queensland. It's a landscape where fire and smoke are a reliable everyday presence through the dry season – seeing people not treat fire as an emergency started me off in thinking about the diversity of relationships we can have with it.

Since the end of the Second World War, Australians in the nation's south have increasingly aspired not only to own their own homes, but to own homes close to coastlines and forests – close to nature. Unfortunately, these same landscapes are places that, for millennia, have regularly experienced bushfires, meaning that many things we care about – like houses, humans and animals – are put at risk.

One of the key difficulties, as I think of it, is that human and ecological timescales are very different. Someone can live in a landscape for years and

never experience a significant bushfire, and therefore reasonably not think of it as a high-risk area, but that landscape's rhythm is actually ticking away on a timescale of decades or centuries, preparing itself for a major fire.

In addition to these mismatched timescales, anthropogenic climate change is impacting the frequency and intensity of the fires on this continent, changing the weather and the vegetation we can expect in a location, and often increasing the fire risks.

Given that we cannot completely control fire and there are no absolute fixes, we need to create a better and more honest relationship of coexistence – that's the headline message from recent social science research into bushfire.

Agencies and communities are already doing a lot in this direction, seeking to know more about the positive and negative outcomes of fires in the environment and to understand the risks different communities face. However, there is much more to do, including

engaging much more extensively with Aboriginal peoples.

A major aspect of my research is looking at the many benefits from engaging with Traditional Owners and Indigenous Australians about bushfire management. Many Indigenous Australians have immense pride in their long history of skilful fire use, and we have solid evidence about the clear ecological, economic, social and health benefits to being engaged in caring for Country.

When European settlers first began invading the continent over two hundred years ago, many saw Aboriginal peoples' fire practices as an annoyance or a threat. Only a few settlers, often farmers, saw the positive effects these practices could have on promoting regrowth and reducing the fuel available for future fires, and even fewer respected their importance in hunting, ceremony and communication.

In recent years, there's been renewed interest in Aboriginal peoples' fire practices and knowledge, thanks in

part to books such as Bruce Pascoe's *Dark Emu*; however, it is interesting to note that non-Indigenous scientists have been influenced by these ideas for some time. If we look at early ideas of fuel reduction burning, developed at CSIRO in the 1960s and 1970s, they were drawing on ethnographic and archaeological evidence about how, when and why Indigenous Australians used fire in the landscape. Regrettably, that influence was not matched with any real engagement with contemporary Aboriginal peoples.

That said, the mistake that many government and other agencies can make, in Australia and overseas, is that they can be too focused on what Aboriginal peoples might have to tell non-Indigenous peoples. We have to understand that, in Australia and elsewhere, many Indigenous peoples' past and present experiences of sharing their knowledge have frequently been negative and exploitative. It's pretty galling, if you think about it, to follow up centuries of dispossession by asking for more.

There are better alternatives, and one has to think in terms of respectful partnership. As Indigenous scholars and



PHOTO: TIMOTHY NEALE

activists have been saying for a long time, non-Indigenous peoples have to give up some of their power and control if they want to work together. We have to start from the premise of Aboriginal peoples' rights, as the First Peoples of this place, to speak authoritatively about Country. They must be supported to use their own knowledge and be treated as leaders in the management of their Country. ■

Dr Timothy Neale is a co-lead on the CRC project *Hazards, culture and Indigenous communities*, which focuses on the risk and resilience priorities of Indigenous communities in southern Australia, the emergency management sector's priorities for these communities, and how these interests interact. In 2018 he was awarded a Discovery Early Career Researcher Award from the Australian Research Council for his project 'Pyrosecurity: understanding and managing bushfires in a changing climate'.

Mick Bourke, a Dja Dja Wurrung man and district planner at Forest Fire Management Victoria, lighting a cultural burn.



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# THE PARTICLES MAKING BUILDING CLADDING FIRE-SAFE

Inspired by the insulation on a humble electrical cable, researchers and industry have found that tiny ceramic particles can make plastic-backed cladding fire-safe.

BY **ANDREW TROUNSON**

University of Melbourne

**H**ow do you make a lightweight cladding material that doesn't catch fire? It's a question the global building industry is wrestling with in the wake of the 2017 Grenfell Tower blaze in London, which cost the lives of 72 people.

But according to University of Melbourne research, the answer is under your desk, in the plastic insulation around the electrical cable powering your computer.

The cladding on Grenfell Tower was a widely used plastic-backed aluminium, and it's this that is being blamed for the

speed with which the fire spread, as the polyethylene core melted and then combusted.

Various building codes have since tightened up on the use of combustible cladding, and bans on cladding comprised of more than 30 percent polyethylene have recently been introduced in two Australian states – New South Wales and Victoria.

The new codes make it virtually impossible for any plastic-backed cladding to pass combustion tests, leaving the industry facing much higher cladding costs. Cladding typically accounts for ten to 30 percent of a high-rise building's total costs.

Cladding is preferably lightweight; the

secret is to use organic (carbon-based) composite materials like plastic, but organic materials are, by their nature, combustible. Non-combustible materials like steel, ceramic tiles or concrete are much heavier and involve significantly higher material and installation costs.

So, when construction materials company EnviroSip approached Dr Kate Nguyen, research leader at the University of Melbourne's Innovative Fire Engineering Group, to develop a cost-effective, non-combustible, lightweight cladding material, her first thought was that it was almost impossible.

Dr Nguyen had already done some research showing that when particles of clay and ceramic resin are incorporated inside a plastic composite, they can effectively stop the material from combusting. But, she says, the high cost involved currently makes the technology impractical.

Instead, she went searching for ideas in the research literature and it was here she discovered that the answer might be in the way electrical cables are insulated.

"Instead of using the ceramic resin that I'd been looking at, the plastic insulation around electrical cables uses tiny ceramic particles that effectively do the same thing," Dr Nguyen said.

"At high temperatures, the ceramic particles activate and chemically interact with each other, forming and spreading a heat-resistant network through the material."

Of course, cladding needs to be able to withstand much higher temperatures than the insulation around electrical copper wires – 750 degrees Celsius, to be exact. In cooperation with EnviroSip and a third-party chemical company, Dr Nguyen began experimenting with different ceramic particles at the University's own testing furnace at Creswick, north-west of Melbourne.

After several false starts, Dr Nguyen and her partners came up with a formulated material that passed the test.

"When it passed I was excited, of course, but I immediately started panicking because I knew it might just be a mistake – independent testing sites are required to test materials at least five times before they can be approved," she said.

"But even after it passed the fifth test I still couldn't quite believe it, so I turned to my research assistant and said we'd better do a sixth one just to be sure."

She needn't have bothered.

An independent testing facility approved by the National Association of Testing Authorities later came up with exactly the same results. The

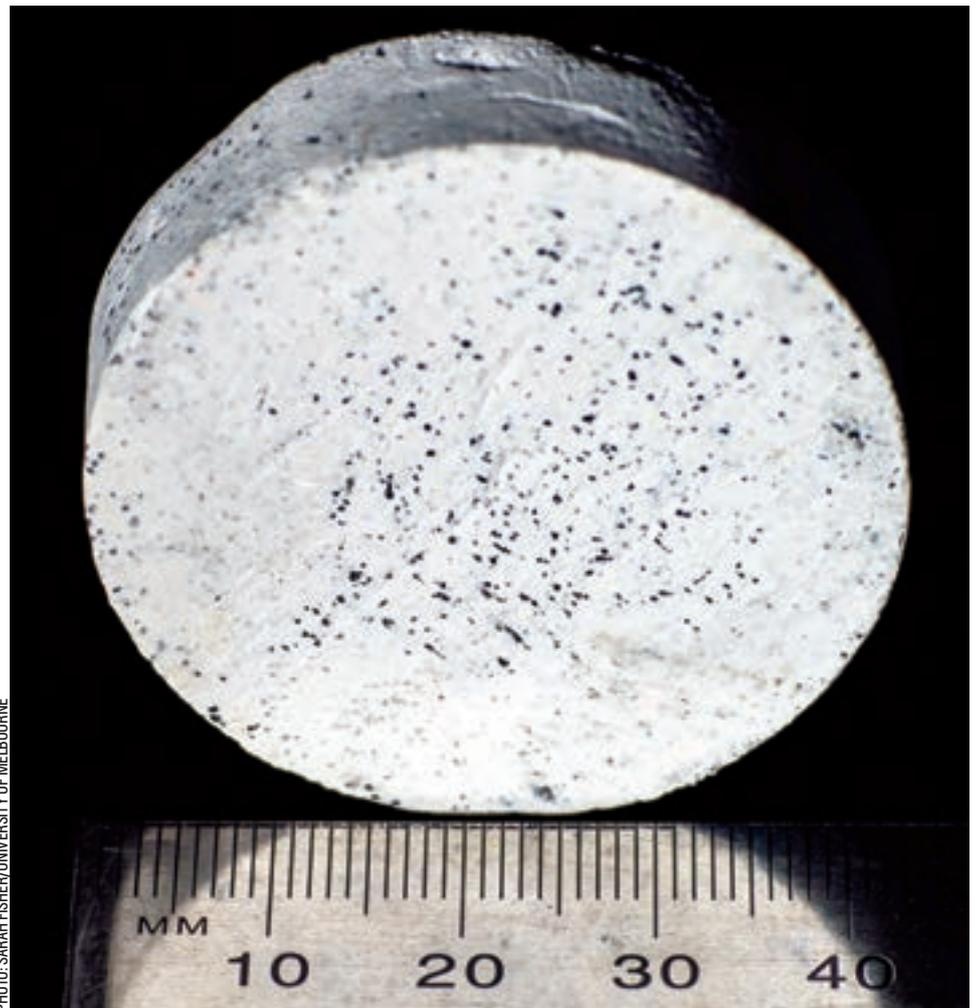


PHOTO: SARAH FISHER/UNIVERSITY OF MELBOURNE

**“At high temperatures, the ceramic particles activate and chemically interact with each other, forming and spreading a heat-resistant network through the material.”**

– Dr Kate Nguyen

The lightweight cladding core material showing the tiny ceramic particles.

product not only achieved the Australian combustibility standard AS 1530.1-1994 (R2016), but also the more exacting ISO 1182:2010 standard that is used internationally.

"I was really nervous because when I arrived they kept telling me about all the times they'd had samples fail. But when we passed the first test I knew we had something that would work – it was a great feeling," Dr Nguyen said.

The material itself is lightweight and feels like a compressed powder. A pale grey colour, the tiny ceramic particles appear as dark specks. At high temperatures these particles blend with the rest of the material, turning it a dark grey and rendering it non-combustible.

The research team is working further

on a sprayable form of the material as a non-combustible membrane.

EnviroSip and the University of Melbourne will now work to commercialise the development work, which has been carried out as part of the Australian Research Council's Centre for Advanced Manufacturing of Prefabricated Housing.

"When you are doing research, not all ideas will become successful," Dr Nguyen said. "To go from success to commercialisation is another big step as well, but we believe we have developed something special that will be significant for the industry." ■

This article was first published on *Pursuit*. Read the original article: <http://ow.ly/7AC550uq1Ge>.

# PERSPECTIVES ON THE SECTOR WITH KATARINA CARROLL

## 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*. This issue he caught up with Katarina Carroll, former Commissioner, Queensland Fire and Emergency Services.

### What were your initial impressions on joining Queensland Fire and Emergency Services (QFES)?

I originally thought 'oh my, what have I got myself into?' – it was a very difficult first couple of months. As an outsider I was not trusted, and I didn't know who was who. It's funny – I recall comments made to me that they didn't mind that I was a woman, but they didn't like that I was a police officer! I understood why people felt the way they did about my appointment and that it wasn't just hard for me, it was difficult for the department as well. But after a short time we got past the initial resistance and I saw a wonderful group of people, totally dedicated to their community and serving the public. I learned early on that the organisation was ready for change and I have worked hard at this with them over the past four and a half years, with dramatic results.

### What drew you to take on the role as Commissioner, QFES?

I am a true believer in public service for the community, so when the government asked me if I would take on the role, I felt compelled to accept the offer. I was ready for a new challenge after the 2014 G20 Summit in Brisbane and this was a really unique opportunity. However, it was during my time as Interim Commissioner between December 2014 and August 2015, when I was formally appointed, that I knew I wanted to be the Commissioner

of QFES. I had learned so much and could see how to help improve the organisation, and I wanted to be the person to do that. It has been a wonderful journey and I am truly blessed to have been offered such a remarkable opportunity.

### What do you identify as your biggest challenges as Commissioner?

I came into the organisation as a result of some serious issues that had occurred from poor behaviour and also poor management practices. Changing the culture of any organisation is not an easy task and certainly cannot be done quickly when there are such strong connections to historical beliefs and traditions.

The other major hurdle that we continue to work on is bringing the four distinct emergency services together into a modern department, while maintaining their service identities. We started with a slight name alteration to read 'One QFES'. I'm pleased to say that we don't have to emphasise the 'one' anymore, as it has organically become a part of who we are as an organisation and embraced by all the services.

### What achievements as Commissioner are you most proud of?

There are so many great things we have been able to achieve as an organisation in quite a short amount

of time. For example, we have brought the services together to work efficiently and harmoniously during emergencies, we have seen a cultural transformation where managers are trained and equipped to confidently manage difficult workplace issues, and we have set up a robust governance structure that will ensure strong strategic planning and management will continue beyond my time at QFES. We now engage with the organisation differently. This started small, as the monthly 'Commissioner's update' newsletter, and has grown into a directorate focused on organisational engagement across full-time staff and volunteers. Most recently, I am proud of the hard work we did to make an adjustment to regional reporting for all our services. What sounds like a logical shift for people outside of the organisation was actually difficult to achieve because of the fierce connections to service origins and the perception of a loss of identity. But since the change, the reports of the benefits have been apparent and, most importantly, the identity of the services has remained as strong as ever.



PHOTO: QFES

QFES Commissioner Katarina Carroll.

PHOTOS: QFES



**In bringing the agencies within QFES closer together, what have you identified as the capability enhancements?**

The incredible improvement during disasters in coordination, information flow, reduction in duplication and the ability to make informed decisions at all levels. As you know, Queensland has been hit by our worst bushfires in recent history, followed closely by devastating flooding in Townsville. The cooperation that we achieved during disasters across Fire and Rescue, SES and Rural Fire Service as a result of our connection, combined with training exercises and cooperation during normal work activities, means we are more effective in our service to the public during their time of greatest need.

We are still working on digitally connecting our IT systems so that we can achieve a common operating picture that will enable our leaders to make informed decisions in a timely manner. I am confident we will get there and we will become a leader in combined emergency management operations.

**How will your time as Commissioner of QFES assist you in your new role as Commissioner of Queensland Police Service (QPS)?**

I have learned a lot in my time in QFES. We have made huge progress in cultural transformation in the department. I have learned about the balance of moving too quickly for some, but not fast enough for others, and to accept that not everyone shares the vision of the future of the department. Navigating through this reality is a new skill.

I have also used new and different ways of engaging with the people of QFES. We have a unique structure of



full-timers, part-timers and a massive volunteer workforce that does not necessarily use or access IT on a daily basis. We have such a diverse workforce that there is no single communication method that is effective at reaching all. However, I have learned that to truly understand the issues affecting their people, and to communicate what you are doing to help them overcome these challenges, workforce engagement is critical for leaders of all levels.

**You have been Deputy President AFAC and an AFAC Board Member. Can you comment on what AFAC brings to the sector?**

AFAC is such an important organisation for current and future operations in the fire and emergency services. We are

not isolated departments – we share borders, we share disastrous weather events and we share the desire to help Australians and people around the world, irrespective of where they live, in their challenges during emergencies. Having a coordinating body that overarches all the various emergency service agencies ensures that as a sector we are unified, we are efficient, and we are leveraging off each other's work and learnings to ensure that all agencies within AFAC are prepared for whatever may come our way in the future.

I am most grateful to the other AFAC Board Members. They are my friends, my confidants and my professional colleagues who I learned so much from, and was able to bring their knowledge back into QFES. Thank you. ■

A major part of Commissioner Carroll's leadership at QFES involved bringing the four services together while maintaining their unique identities.

# BRADFORD CITY STADIUM FIRE – 1985

PHOTOS: WIKI



In only minutes, the fire had taken hold of the entire stadium.

BY **BARRY LEE OAM**

**T**he worst fire disaster in the history of British football, the Bradford City stadium fire in May 1985, killed 56 people and injured some 300. This tragedy, most likely caused by a dropped cigarette or match falling into a void area beneath one of the ground's stands, soon engulfed the whole structure, including the roof. Many victims were found piled up against locked exit barriers.

The antiquated stand was about 90 metres long and located on the side of a hill. A 1.5-metre high wooden fence divided it lengthwise into two equal sections. Above the fence, spectators were provided with timber seats fixed to a timber frame; below the fence were polypropylene seats fixed to concrete. Access to and from the seating sections was via a long corridor extending along the length of the back of the stand. The corridor was at the highest point of the stand, next to the perimeter wall containing exit doors and turnstiles leading to the outside road.

Due to the slope of the hill, there was a void underneath the wooden floor of the stand varying in depth from 0.21 to 0.75 metres. Gaps in the flooring and between the seats allowed combustible rubbish to accumulate to a depth of about 0.2 metres. The stand roof was close-boarded and covered throughout its length with bituminous roofing felt.

The fire started about 3.40 pm in the void beneath the wooden seats just above the wooden fence near one end of the stand. Flames spread upward



Prime Minister Margaret Thatcher surveys the damage.

through the void and appeared through gaps above the floor at 3.43 pm. By 3.45 pm flames reached the roof structure, and two minutes later the entire stand, roof and seats were alight.

Most of the people who died were trying to escape through the back corridor. In the first few minutes of the fire, there was no major effort by spectators to escape because the fire did not appear to be threatening. However, once it covered several metres above the floor, the rush to escape started, particularly upwards to the corridor at the back of the seats. Most of the exits at the back were locked shut, and there were no stewards to open them. The exits could not accommodate the number of people attempting to use them in the minute or two available for escape, and the majority of the people who died did so near exits at the centre of the corridor and near the end of the corridor where the fire started.

The subsequent enquiry led to



Spectators tried to escape the flames by fleeing onto the pitch.

legislation requiring more stringent fire safety measures at sporting and recreational venues – including banning the construction of new wooden grandstands. ■

A similar disaster was narrowly avoided across the Atlantic in 1993. Fire originated in an unattended food heater in a luxury box in the Atlanta-Fulton county baseball stadium. It took firefighters 30 minutes to reach the fire because there was no stairway leading directly to the boxes. Fortunately, this outbreak occurred pre-match and no one was injured. A 1994 article in *Fire Engineering* magazine noted: "Constructed in 1956, before the city adopted codes mandating that stadiums be sprinklered, the stadium had no standpipes (hydrants) and only partial automatic sprinkler protection."



FFES Commissioner Katrina Carroll

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BY **JESSICA TEMPLE**

Technical Administrator – Projects and Standards,  
FPA Australia

AND **IAN FINDLAY**

Technical Officer – Projects and Standards, FPA Australia

## STANDARDS

### **CE-030 Maritime structures**

The draft revision of AS 3962 Marina design was released for public comment on 20 May, with public comment to close on 22 July. This is being piloted on a new, online public comment platform at <https://comment.standards.org.au>.

### **FP-002 Fire detection and alarm systems**

Work continues on revisions of AS 1603.17 (warning equipment for people with hearing impairment), AS 1670.6 (smoke alarm installation), AS 4428.3 (fire brigade panel) and AS 4428.16 (emergency warning CIE).

### **FP-004 Automatic fire sprinkler installations**

Work continues on Amendment 2 to AS 2118.1-2017, as well as revisions of AS 2118.2 (drencher systems), AS 2118.6 (combined systems) and HB 147 (sprinklers simplified).

### **FP-009 Fire hydrant installations**

Work continues on AS 2419.4 (new standard for STORZ connections).

### **FP-011 Special hazard fire protection systems**

Work on the revision of AS 4587-1999 (water mist systems) continues, while the FPA Australia's proposal for revision of AS 3772-2008 (kitchen systems) is awaiting approval.

### **FP-018 Fire safety**

FP-018 is currently working on a number of national and international projects.

### **FP-020 Construction in bushfire-prone areas**

Taskforces have been formed and now have met to set the scope for review of several outstanding items from the recent revision.

### **LG-007 Emergency lighting in buildings**

AS/NZS 2293.2:2019 was published on 9 April.

### **TS-001 Building commissioning**

Work continues on a new project to develop a technical specification on building commissioning.

## TECHNICAL ADVISORY COMMITTEES

The most recent round of Technical Advisory Committee (TAC) meetings was held in March, with the next round to be held in July.

### **TAC/1 Maintenance of fire protection systems and equipment**

The draft technical documents on fire doors and exit doors, replacement of detection devices, and external barriers to evacuation are still being developed to incorporate comments received to date.

Issues related to smoke curtains and fire curtains were also thoroughly discussed.

### **TAC/2 Fire detection and alarm systems**

A possible technical document to address confusion regarding fire detection and alarm systems for car parks is still in progress.

A speaker layout document is currently being reviewed by the TAC.

A working group was established to further discussions on ways by which the fire services could gather more information from fire detection systems.

### **TAC/3/7 Portable and mobile equipment**

The TAC discussed the possibility of developing several new technical documents, including one on the replacement of extinguishing agents after use.

Current draft project proposals for revision of extinguisher standards were also discussed.

### **TAC/4/8/9 Fire sprinkler and hydrant systems, tanks and fixed**

Discussions continued on the ongoing impact from the NSW building reforms and the development of guidance to industry.

The TAC also discussed a number of technical documents (in particular the draft GPG on hydrant commissioning and routine service), with several put on hold as the proposed topics may be addressed in the draft Amendment 2 to AS 2118.1.

### **TAC/11/22 Special hazards fire protection systems**

A project proposal for revision of AS 3772 has been submitted to Standards Australia, and a further proposal for revision of AS 5062 is being developed by the TAC. Work continues on revising IB-06 *Selection and use of firefighting foams* to address ongoing developments in this area. FPA Australia continues to engage with regulators regarding firefighting foams, including making a submission to the federal senate inquiry on the provision of rescue, firefighting and emergency response at Australia airports. The TAC was provided with an update on the ongoing global use and management of halon.

### **TAC/17 Emergency planning**

The possibility of a revision of AS 3745 is still being considered. Various technical documents and document ideas were discussed in detail, including updating IB-11 *Evacuation diagrams* to reflect changes from Amendment 2 to AS 3745-2010. Developments in regards to emergency planning in different states and areas were also discussed (e.g. changes to NSW legislation to require retirement villages to have emergency procedures).

### **TAC/18/19 Passive fire protection**

TAC/18/19 continues to work on a wide range of technical documents including ongoing projects on polyurethane foams, access panels and intumescent dampers, as well as newer projects to advise the industry of changes as a result of the NCC 2019, including updating PS-05 *Product compliance and evidence of suitability* and developing a document to explain the effect of the change to the note on AS 1530.4.

### **TAC/20 Bushfire safety**

The TAC discussed a number of technical documents and document ideas including a draft document on sarking (currently being reviewed by the TAC) and a general BAL assessment guide (proposed to encompass the information that would have been in the technical document regarding site inspections, as well as broader information on the site assessment process). Discussion also took place on AS 3959 future work.



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PHOTO: FPA AUSTRALIA



Fire Protection Industry Awards Gala 2018.

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## Katarina Carroll

Katarina Carroll has departed as the Commissioner of Queensland Fire and Emergency Services to become Commissioner of the Queensland Police Service. Ms Carroll will become the first woman to hold the title in the 155-year history of the state police service. She began her career with Queensland Police in 1983.



## Malcolm Connellan

Fire and Rescue NSW Assistant Commissioner Malcolm Connellan will depart the position after joining the organisation in 1983. Mr Connellan also held the position of Executive Director People and Culture and chaired the AFAC Mental Health and Wellbeing Network.



## Malcolm Jackman

Malcolm Jackman has retired from his position as Chief Executive of the South Australian Fire and Emergency Services Commission (SAFECOM). Mr Jackman joined SAFECOM in 2015 after leaving his position of Chief Executive at Defence South Australia.



## Dominic Lane

Former Head at ACT Emergency Services Agency Dominic Lane will take over the South Australian Fire and Emergency Services Commission Chief Executive role. Mr Lane brings 35 years of experience to the new role, including the last six years at ACT Emergency Services Agency.



## Paul McGill

With almost 40 years of fire service, Paul McGill will retire from his position as the Urban National Commander of Urban Fire and Emergency New Zealand. Prior to the rural and urban amalgamation in 2017, Mr McGill was the Chief Executive and National Commander of the New Zealand Fire Service.



## Greg Nettleton

South Australia's Country Fire Service Chief Officer Greg Nettleton will retire, leaving the agency after more than eight years of service in the role. Prior to his current position, Mr Nettleton was the Director and Chief Fire Officer for the Northern Territory Fire and Rescue Service.



## Kevin O'Connor

Kevin O'Connor has retired from his position as National Manager Rural with Fire and Emergency New Zealand. Mr O'Connor started his career as a ranger with the Department of Conservation, New Zealand and was instrumental during the rural and urban amalgamation in 2017.



## Mark Smethurst

Mark Smethurst has resigned from his position as NSW State Emergency Services Commissioner. He was appointed to the position in February 2017. Mr Smethurst was previously a brigadier in the Australian Defence Force, where he spent 35 years.



## Georgeina Whelan

Georgeina Whelan has taken on the role of Acting Commissioner at the ACT Emergency Services Agency. Ms Whelan joined the service in 2017 after 32 years of military service with experience in military disaster response. In 2015 she was named ACT Telstra Business Woman of the Year.

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<b>Model Number:</b>	VK514
<b>Base Part Number:</b>	22894
<b>Listings/Approvals:</b>	FM, UL
<b>K-factor:</b>	28.0 (404)
<b>Connection:</b>	Threaded 1" NPT 25 mm BSP
<b>Temperature:</b>	165° F (74° C) 205° F (96° C)
<b>Operating Element:</b>	Fusible Link
<b>Finish:</b>	Brass
<b>Item Price Group:</b>	V150
<b>Occupancy/Hazard:</b>	Storage
<b>Technical Datasheet:</b>	F_010715

\*FM Approval offered in addition to the VK514 sprinkler's existing K28 ESFR UL Listing.

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