

FIRE AUSTRALIA

EXCELLENCE REWARDED AT GALA



**Canada fires: national resource sharing capability
Could Sydney be the next Houston?
Emotionally intelligent, or just emotional?**

PERTRONIC F220 Fire Alarm Panel

Identifies
Exact
Location of
Alarm

One Key Access to Alarm List View

Pertronic F220 Friday 11 March 2016 10:57

Alarm Events

Event	Zone	Location	Type
46	530	GYMNASIUM	Heat Alarm
47	505	LEV 1 APARTMENTS SPRINKLER	Smoke Alarm
48	524	LEV 6 DETECTION	Smoke Alarm
49	530	GYMNASIUM	Smoke Alarm
50	524	LEV 6 DETECTION	Smoke Alarm
51	525	LEV 7 DETECTION	Smoke Alarm
52	530	GYMNASIUM	Smoke Alarm
57	530	GYMNASIUM	Smoke Alarm
54	525	LEV 7 DETECTION	Smoke Alarm

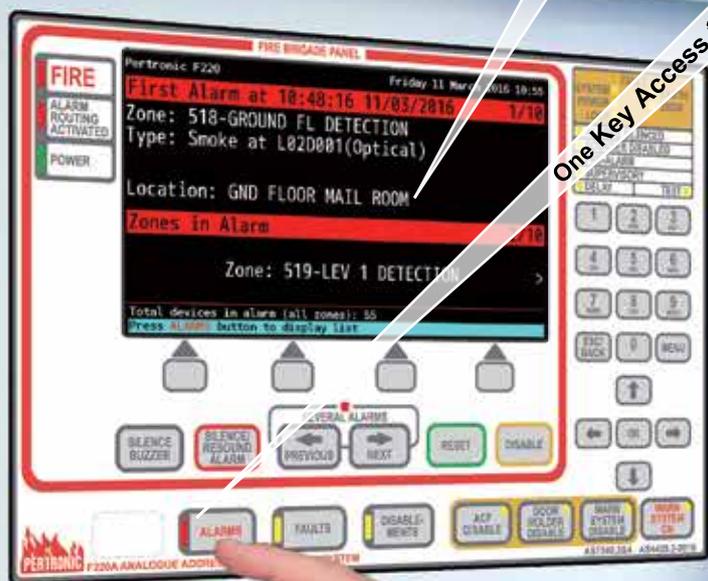
Alarm Point: 50 of 50

Item: OPT at LEVEL 6 ELECT CUFB (L020071)

Time: 10:48:21, 11 March 2016

Total zones in alarm: 10

Page Up Page Down First Page



Vital Information during Critical Incidents

The **Pertronic F220** makes it easy to track an incident's progress.

The large, 7-inch (180 mm) display allows the F220 to exceed the requirements of AS 7240.2. When the F220 detects an alarm condition, the display automatically shows the exact location of the alarm activation in big, 5mm text, in addition to the zone information required for AS7240.2 compliance.

During a fire incident at a large or complex facility, a Fire Indicating Panel may receive multiple alarm activations. The **Alarm List View** displays all the active alarms in a user-friendly format that makes it quick and easy to find out what is happening.

Contact Pertronic for more information

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EVIDENCE-BASED REGULATION

SCOTT WILLIAMS

Chief Executive Officer,
FPA Australia



Australia's fire protection regulatory environment is going through a period of significant evolution, driven by the Lacrosse and Grenfell fires and the shortcomings in enforcement and compliance they exposed.

It is important to ensure that new and changed regulations have a sound evidentiary basis and are able to show how, and by how much, they can improve community fire safety.

That was a driving factor when, three years ago, a group of fire and research organisations came together to investigate the role of fire sprinklers in low-to medium-rise residential buildings. The research was conducted by Fire & Rescue NSW (FRNSW) in partnership with Fire Protection Association Australia (FPA Australia),

the Australasian Fire and Emergency Service Authorities Council (AFAC), the Commonwealth Scientific and Industrial Research Organisation, and industry partners.

The results of that research, announced in January and covered on page 47 of this issue, are now being used to guide recommendations for regulatory reform in a new *Proposal for Change* to the 2019 National Construction Code, jointly submitted by FRNSW, AFAC and FPA Australia.

The *Proposal* calls for sprinkler protection to be mandatory in all new Class 2 and Class 3 residential buildings above three storeys and less than 25 metres in height, and provides two new cost-effective designs as options to traditional sprinkler standards. These buildings are some of the most vulnerable in Australia, and their numbers continue to increase as urban density climbs.

Backed by the research, the *Proposal* clearly shows how sprinklers can fill this fire-safety gap. It does this with a recommendation for system and design requirements that on one side drastically slow or halt the spread of fire to provide safe egress or rescue, and on the other side are affordable and even attractive to developers, thereby increasing their likelihood of adoption.

The research shows the speed of fire growth in modern residences is dramatically faster than 50 years ago due to synthetic furnishings, and residential sprinklers could therefore be the most important improvement in fire safety since the introduction of mandatory smoke alarms.

It exemplifies how members of the industry can work together to contribute to and encourage the adoption of best-practice, evidence-based, practical regulation. Advocating for the continuous improvement of legislation, codes and standards is a core mission of FPA Australia, and in future we hope to use more research like this to further that goal.

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FIRE AUSTRALIA



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OUR COVER

The best and brightest in the Australian fire protection industry were celebrated at the second Fire Protection Industry Awards in November.

PHOTO: STAVROS SAKELLARIS

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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FLOOD-WARNING RESEARCH LEADING IMPACT



Flood warning research by the Bushfire and Natural Hazards CRC has been highlighted as one of the top 10 'science meets business' innovations. *Know How* magazine has counted down the top 10 innovation outcomes from CRCs across Australia, with research from the *Effective risk and warning communication during natural hazards* project coming in at number six.

Multimedia communications encouraging specific behaviour during disasters can be challenging, with this project proving that with the right visual imagery, official emergency warning communications can help people act appropriately. Project leader Professor Vivienne Tippett, from the Queensland University of Technology, said that new versions of flood campaigns now show behaviour such as a 4WD coming to a flooded waterway and deciding not to drive through.

"This is the type of behaviour we are trying to encourage," said Professor Tippett. ■

SUBMIT YOUR ABSTRACT FOR AFAC18

AFAC18 powered by INTERSCHUTZ will be held at the Perth Convention and Exhibition Centre from 5–8 September 2018. Co-produced with the Bushfire and Natural Hazards CRC, the conference will explore the theme 'Changing lives in a changing world' and open with the CRC's Research Forum.

The Call for Abstracts for AFAC18 will close on 19 February 2018.

Abstract submissions are open to all people in emergency management and related sectors, including, career staff, volunteers, researchers and academics, industry, community and all levels of government.

Note that AFAC members have been asked to conduct an internal selection process for abstract submissions.

If you are a staff member or volunteer of an AFAC member organisation, please contact your organisation before submitting an abstract online.

Changing lives in a changing world

AFAC18 will focus on how change is fast becoming the new normal for emergency services. The theme embraces three tiers of change:

- ◆ how emergency services change lives
- ◆ how we can change ourselves and the emergency management sector for the better?
- ◆ how we can all thrive in an ever-changing and complex environment?



Bart van Leeuwen, firefighter and data expert from the Netherlands, presented a keynote at AFAC17 in Sydney.

To explore the theme, abstracts should address the following.

- ◆ **Leading through change**—In a world where change is the new normal, this topic will consider what the future holds for emergency services and what can be done to better predict, navigate, manage and lead through change.
- ◆ **Improving ourselves**—This topic asks how emergency services and the sector can change for the better. What changes need to occur now to prepare our workforces for the future?
- ◆ **Changing lives through volunteering**—Volunteers are the bedrock of Australia's emergency services. From fighting fires to marine search and rescue, our rugged terrain and geographical dispersion means we rely on thousands of volunteers every day to deliver critical services.
- ◆ **Shaping culture and communicating in a changing world**—This topic will explore how agencies are tackling cultural change against a backdrop of increasing expectations. It will examine progress towards goals, plans for the future and why sometimes the best intentions can fall short.
- ◆ **Building capability through partnerships**—This topic invites discussion of successful and not-so-successful partnerships in all areas of emergency management, from prevention to recovery. It will showcase how adept agencies are bravely relinquishing autonomy to yield great results. ■

For more information on these topics and to submit your abstract, go to: www.afacconference.com.au/call-for-abstracts.

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DEVELOPING A NATIONAL SYSTEM FOR FIRE DANGER RATINGS



PHOTO: DAVID BRUCE, BUSHFIRE AND NATURAL HAZARDS CRC

The National Fire Danger Ratings System Program is a multi-year, nationally significant project that aims to design, develop and implement a new system for determining fire weather, fire ignition and behaviour potential, as well as the impact on life, assets and the environment. This new national system will strengthen

the ability of fire authorities to accurately communicate bushfire risk to the community, improve agency preparedness and contribute to risk-management prevention.

Since the start of 2017, the NSW Rural Fire Service and the Bureau of Meteorology have been working with leading fire scientists and operational staff from across Australia to design a research prototype. The prototype is striving to better capture current understandings of fire science and observed behaviours, enabling authorities to categorise expected fire behaviour and consequences across a range of fuel types.

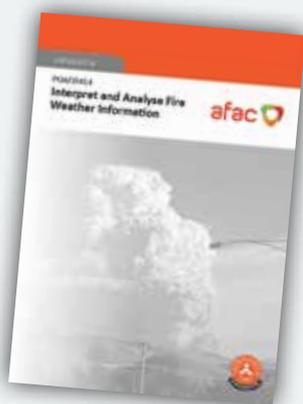
Currently, only grass and forest fuels are considered when forecasting

fire danger ratings. The prototype has mapped fuel types across Australia for the first time, including spinifex, mallee and heathlands, which allows fire behaviour tables for these fuel types to be applied when considering fire danger ratings.

The research prototype is being trialled between October 2017 and March 2018, with staff from all jurisdictions being trained in using the research prototype and reporting on how forecast ratings perform against actual fire behaviour. As the prototype is still in a trial phase, protocols are in place to ensure that it is not used for operational decision-making. Once the results of the trial are analysed, an evaluation report on the capabilities of the research prototype is expected by June 2018. ■

NEW FIRE WEATHER TRAINING RESOURCE

Weather plays a major role in most natural hazards. This is particularly so in relation to the ignition, spread, severity and suppression of bushfires. A good understanding of fire and weather factors and how they interact can greatly



improve firefighter and community safety, including during fire prevention activities such as prescribed burning.

AFAC has developed a new, comprehensive learner resource, *Interpret and Analyse Fire Weather Information* (PUAFIR414). The resource draws on the long-established 'Fire Weather 1' training delivered by several AFAC member agencies.

As the interaction between weather variables, local effects, and fire behaviour is so complex, the resource is primarily designed to provide the user with a fundamental understanding of weather concepts. This will allow users to interpret fire weather products issued by the Bureau of Meteorology (BoM) and other relevant information and provide advice to fire managers.

The learner resource is broken into seven sections.

- ◆ **Section 1** gives an overview of key meteorological concepts and major climatic influences that underpin Australia's weather.
- ◆ **Section 2** introduces key fire weather concepts and their relationship to fire behaviour.
- ◆ **Section 3** provides instruction on where weather information can be found, including information gathered through local observations and the relevant weather products provided by the BoM.
- ◆ **Section 4** provides brief instructions for collecting basic information about a particular fire event.
- ◆ **Section 5** briefly addresses the local environmental effects, such as topography, that can influence fire weather and behaviour.
- ◆ **Section 6** covers the process of interpreting and analysing weather information to produce a fire weather outlook.
- ◆ **Section 7** outlines the process of communicating a fire weather outlook as part of the incident management process. ■

AWARD FOR FIRE DETECTION RESEARCH

Research on mapping fires and vegetation by the Bushfire and Natural Hazards CRC has taken out an award for spatial excellence. The Fire Surveillance and Hazard Mapping project, led by Professor Simon Jones and Dr Karin Reinke at RMIT University, took out the Victorian Spatial Excellence Award for Environment and Sustainability for their Fuels3D smartphone application.

The app saves crucial hours by allowing land managers to rapidly collect imagery of vegetation for assessing how much fuel could be burnt in a bushfire or prescribed burn. It uses computer vision and photogrammetric techniques to calculate measures of fuel and severity metrics. The application is in beta mode and is being tested by CRC partners.

As well as Professor Jones and Dr Reinke, the award-winning team includes Dr Luke Wallace, PhD student Sam Hillman and masters student Christine Spits. ■

The new *Interpret and Analyse Fire Weather Information* learner resource is available from: www.afac.com.au/shop.



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NATIONAL MEMORIAL SERVICE TO RECOGNISE MORE THAN 500 NAMES

A FAC will hold a National Memorial Service for fire and emergency service personnel on 1 May 2018 at the National Emergency Service Memorial in Canberra. The service will be the fourth annual day of national commemoration to honour the courage and sacrifice of those who have died in the line of duty.

More than 500 people who have died protecting our communities will

be recognised through the unveiling of their engraved names on the new Emergency Service Memorial wall. This is the first time that fire and emergency service personnel will be recognised permanently on the memorial itself.

The National Memorial Service is open to all and will be attended by members of parliament, the general public and friends and families of emergency service personnel.

An AFAC memorial medallion will be presented to the families of those who are being honoured at this year's service.

The National Emergency Service Memorial is located on the northern shore of Lake Burley Griffin, at the southern end of ANZAC Parade in Canberra. The memorial service is held each year close to the date of St Florian's Day, or International Firefighter's Day, which is on 4 May. ■



Graeme Thom (centre) retired after 14 years on the Board.

NEW FPA AUSTRALIA BOARD ELECTED

Attendees gathered at the 2017 National Memorial Service to honour fire and emergency service personnel.

Fire Protection Association Australia (FPA Australia) is pleased to announce its new Board of Directors for 2017–18, which was confirmed at the AGM held on 9 November 2017. Chris Orr was reappointed as FPA Australia's President, and the Association also welcomed newly elected Director Gina Patrick. The new Board and executive positions for 2018 are:

- ◆ Chris Orr, President, Technical Director
- ◆ Trevor Voevodin, Vice President
- ◆ Graham Harris, Finance Director
- ◆ Bill Lea, Director
- ◆ Rhondel Johannessen, Director
- ◆ Alan Wilson, Director
- ◆ Gina Patrick, Director
- ◆ Hank Van Ravenstein, Director
- ◆ Patrick Conway, Director.

The AGM saw Graeme Thom retire from the Board after 14 years of service. Mr Thom was recognised for his extensive contribution to the Association's Board of Directors and the broader fire protection industry.

The Board also acknowledged the service of Mr Lea as past Treasurer and Ms Johannessen as past Junior Vice President. Both roles were retired under the Association's new Constitution and By Laws.

In the recent Board election, the Association was pleased with four strong nominations for the two positions available. The election also received the highest level of voter engagement in the history of the Association.

The Board resolved that for all future elections, nominees' share of votes will be announced in the interest of transparency. The voting results of this year's Board elections were: Chris Orr, 42.0%; Gina Patrick, 25.9%; Patrick Conway, 16.4%; and Phil Joyce, 15.7%. ■

NEW NSW FORMS MANDATORY FROM 1 DECEMBER 2017

Under the NSW building reforms, from 1 December 2017 building owners are required to use new standard forms developed by the NSW Government to submit Annual or Supplementary Fire Safety Statements and Interim and Final Fire Safety Certificates. As these forms come into use, FPA Australia reminds fire safety practitioners they are not required to sign them on behalf of owners or as an owner's agent (Section 6 or 7 for Fire Safety Certificates and Section 7 or 8 for Fire Safety Statements). This remains the responsibility of the owner or a managing agent appointed to act on their behalf. The new forms are available through FPA Australia's new NSW

reforms landing page at www.fpa.com.au/nsw-reforms-2017.aspx. This page identifies key information and resources for building owners, building certifiers and fire safety practitioners. It also brings together all available information and resources on the reforms, including:

- ◆ NSW Government guidelines and fact sheets
- ◆ NSW reforms frequently asked questions
- ◆ the Interim Fire Safety Assessor Register. ■



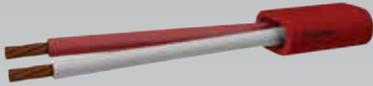


BY THE FIRE INDUSTRY, FOR THE FIRE INDUSTRY

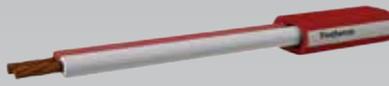
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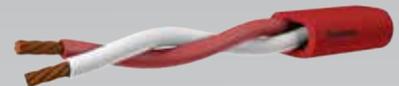
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TPS TWISTED

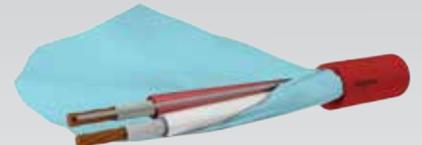
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DRAFTS OUT SOON FOR REFRESHED CERTIFICATE II & III INSPECT & TEST

Drafts of a redesigned Certificate II and Certificate III in Fire Protection Inspection and Testing were released for public comment in December 2017, following a review chaired by Fire Protection Association Australia (FPA Australia). The drafts addressed a series of recommendations made by the Australian Industry Skills Committee (AISC) to improve the qualifications. Based on an earlier stakeholder review, the AISC identified a need to:

- ◆ update several units of competency
- ◆ better align the certificates with current industry job roles
- ◆ give the qualifications enough flexibility to fit different state and territory requirements, and urban and regional delivery
- ◆ reinforce students' understanding of the need for regulatory compliance.

To implement the recommendations, AISC's Property Services Industry Reference Group established a Technical Advisory Group (TAG) earlier in 2017. The Reference Group is responsible for all nationally recognised training in post-construction fire protection activities.

FPA Australia was appointed to chair the TAG, which held its first meeting in July 2017. TAG members include representatives of fire protection businesses (both large and small), regulators, building owners, industry associations and training providers.

A key objective of the TAG's work has been to assess and determine the need for a training unit to cover the inspection and testing of all fire-related essential safety measures (ESMs) typically required in buildings. The TAG identified several ESMs lacking a nationally recognised training unit for inspection and testing.

The TAG has also updated the current qualifications to improve career development pathways for employees working in the sector and ensure that future qualifications are better aligned to job roles typically undertaken in the fire protection industry. The objectives and outcomes for the review of the two certificates are to:

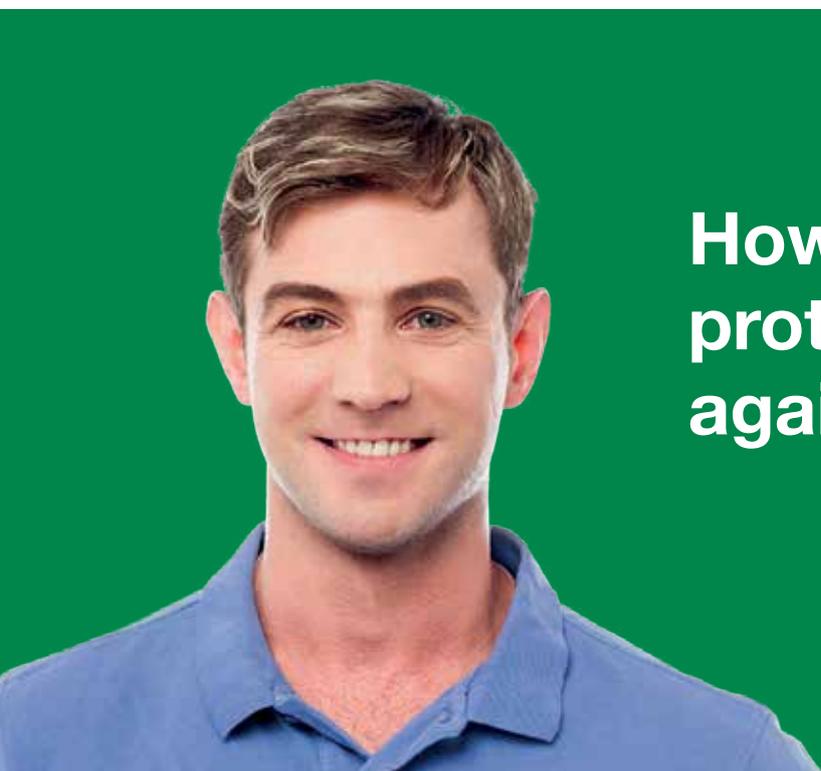
- ◆ identify and, where required, develop units of competency to cover the routine service and inspection of every fire safety-related ESM identified by state and territory governments
- ◆ ensure that where applicable, these units of competency originate

within the Property Services Training Package, with the exception of non-technical units

- ◆ ensure that qualifications and skillsets reflect the needs of all stakeholders involved in the routine service and inspection of fire safety-related ESMs, including fire protection companies, building owners, occupiers and their agents, and regulators and licensing bodies
- ◆ identify the skills and knowledge required by individuals responsible for performing routine service and inspection of fire safety-related ESMs to ensure such measures continue to perform to a level that is commensurate with community expectations
- ◆ develop qualifications and, where applicable, skillsets that reflect the current and future job roles performed by individuals undertaking routine service and inspection of fire safety-related ESMs
- ◆ ensure that appropriate units of competency within the reviewed qualifications reflect the skills and knowledge required to perform routine service and inspection that is commensurate with the
 - ◆ complexity of the tasks and actions to be performed
 - ◆ risk to community safety that could arise if the ESM failed to perform in accordance with its intended design
- ◆ establish qualifications, skillsets and packaging requirements that support industry, provide appropriate recognition of individuals undertaking these vital services and support government to implement systems for accreditation and licensing of individuals involved in the routine service and inspection of fire-related ESMs.

A draft of the proposed qualifications was released for public comment in December 2017. Consultation sessions on the draft proposal will be held around the country in the early part of 2018. ■

For more information on the review and to subscribe to the mailing list, please visit: artibus.com.au.

How does Jack protect a small premise against fire?

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CONGRATULATIONS TO PHDs

The first round of Bushfire and Natural Hazards CRC PhD students have graduated and are now sharing their research outcomes with the fire and emergency services sector. Congratulations to the following for completing their PhD.

Caroline Wenger

Caroline's PhD explored flood management in a changing climate. Her research identified institutional barriers and investigated whether disaster resilience policies led to adaptive outcomes. Caroline completed her PhD with the Australian National University.

PHOTO: MARTA YEBRA



Yang Chen scans a prescribed burn with a Zebedee measuring device.

Billy Haworth

Billy's PhD looked at volunteered geographic information (VGI), community engagement and bushfire preparation. VGI refers to the widespread engagement of citizens in the creation of geographic information, often through social media, smartphones and online mapping tools. Billy's research was conducted through the University of Sydney.

Yang Chen

Yang's research, completed through Monash University, investigated the application of the light detection and ranging (LiDAR) technique in quantifying forest fuel properties. Her findings indicated that LiDAR allowed a more efficient and accurate description of fuel structural characteristics and estimation of litter-bed fuel load at a landscape

scale. The results can assist fire hazard assessment, fuel reduction treatment and fire behaviour prediction.

Melanie Baker-Jones

Looking at social media in disasters, Melanie's thesis at the Queensland University of Technology examined government accountability for warnings given over social media. She also examined the role of governance and regulatory components in the risk-management process, investigating the extent to which responsibilities for warning and the use of social media were incorporated into the regulatory system.

Graham Dwyer

Graham's PhD at the University of Melbourne examined how organisations understand and learn from bushfires. His

thesis showed how sense-making and learning occurred during public inquiries that followed major bushfires, and how learning has continued in emergency management organisations.

Dolapo Fakude

Dolapo's research explored integrated response as a process for improving emergency management. She looked at existing functions within communities that could be used for preparedness and response functions with the goal of increasing resilience. The result was the development of an integrated response framework that combined existing community functions aligning with incident command system structure and function. Dolapo completed her PhD as a CRC Associate Student with the University of Canterbury. ■

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UNANIMOUS VOTE FOR NEW CONSTITUTION AND BY LAWS

Fire Protection Association Australia (FPA Australia) members voted unanimously to adopt a new Constitution and new By Laws in a special resolution at the Association's AGM on 9 November 2017. The new FPA Australia Constitution and By Laws replace the previous Memorandum and Articles of Association, and allow FPA Australia to fully comply with the requirements of the Corporations Act 2001 and the Australian Charities and Not-for-profits Commission Act 2012.

The new Constitution and By Laws are also contemporary in nature, reflecting the evolving maturity of the Association and its significant growth as the peak body for the fire protection industry in Australia. The special resolution to accept the new Constitution and By Laws was passed by a 100% affirmative vote, with the change effective immediately. ■

NEW HEALTH FUND RALLIES BEHIND EMERGENCY SERVICES

More than 1.4 million people who volunteer and work in the provision of emergency services are being urged by new health fund Emergency Services Health to look after their health and well-being during the busy summer season.

The health fund is now Australia's only private health insurer established exclusively for those who work and volunteer to protect our communities including; fire, state emergency service, ambulance, medical response and recovery, and water response and recovery.

AFAC is excited to announce that Emergency Services Health has come on board as a sponsored partner. As a not-for-profit private health insurer, Emergency Services Health exists to support Australia's emergency services community, with all funds being used to further enhance the physical and mental health and well-being of workers, volunteers and their families.

"It's a busy time of year for our emergency services workers, so it's important they have the support they need for the health of their mind and body", said Emergency Services Health acting CEO Rebecca Chapman.

"We created Emergency Services Health to rally behind our emergency services communities, to aid those who need us, with quality lifelong insurance that ensures peace of mind," said Ms Chapman.

The health fund has also launched a new campaign to provide Australians with a way to recognise and thank emergency service workers and volunteers.

'Find my Hero Australia' has been developed by Emergency Services Health to support the mental health and well-being of emergency service workers and volunteers who put their own safety, health and even their lives on the line to protect communities.

By enlisting help from local communities to identify and locate emergency workers, messages of thanks will find their way to those individuals to make a positive impact on their mental health and well-being.

Emergency Services Health is open to people across Australia who are currently or have been previously employed or volunteered in emergency services, and their families.

You can find out more about the 'Find my Hero Australia' campaign on their Facebook page: <https://www.facebook.com/FindmyHeroAU/>.

For more information on Emergency Services Health visit: eshealth.com.au.



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CANADIAN WILDFIRES: A NATIONAL APPROACH TO RESOURCE SHARING



PHOTO: MATTHEW SHARWOOD, NSW NATIONAL PARKS AND WILDLIFE SERVICE

In the wake of one of the worst fire seasons Canada has ever seen, maintaining international partnerships to share fire management resources between Australia, the US and Canada has proven vital.

One of the fire camps, known as 'Big Sky Camp', west of Savona, British Columbia.

BY **FREYA JONES**

AFAC

In July 2017, a record-breaking number of fires were burning across the Canadian province of British Columbia (BC), showing no signs of slowing. Faced with an escalating situation, the Canadian Government declared a state of emergency for BC that would become the region's longest—extending for more than two months.

Across the Pacific, Australia initiated its most significant deployment of firefighting personnel to North America. A delegation of 235 Australian personnel was deployed to Canada to provide much-needed support and relief to Canadian crews.

Throughout the campaign, approximately 1,263 fires were

recorded across the region. At the peak of activity, smoke from the fires could be seen from space, with images captured by NASA's satellites demonstrating their exhausting scale.

A mix of incident management, aviation and firefighting specialists made three separate deployments to Canada throughout July, August and September, representing agencies from every Australian state and territory.

Resource sharing

The Australian deployment spanned 68 days, with the first contingent departing on 16 July and the last arriving home on 26 September. This was no small feat to undertake.

Australian agencies have shared resources with Canada and the US regularly since 2001, but this was the first time that a national Australian

coordinating body, the National Resource Sharing Centre (NRSC) managed the deployment arrangements on behalf of states and territories.

Established in 2016, the NRSC operates from the AFAC office in Melbourne and is a functional capability of the Commissioners and Chief Officers Strategic Committee. It was born out of an identified need to support emergency services in coordinating national and international deployments, maintain the Arrangement for Interstate Assistance and pursue opportunities for international collaboration.

Critical to the success of the deployment was the decision from Chiefs and Commissioners to activate the NRSC and arrange support from two hub-coordination offices, based at the NSW Rural Fire Service and Emergency Management Victoria. The hubs managed



PHOTO: PAUL SIMAKOFF-ELLIMS, ACT RURAL FIRE SERVICE

and coordinated personnel deployed from individual states and territories.

The NRSC is staffed on an as-needed basis by personnel seconded from fire and emergency agencies. Barry Gray, Assistant Chief Fire Officer and Director Capability Development and Liaison from the Metropolitan Fire and Emergency Services Board, was seconded to manage the NRSC during the Canadian deployment. He was involved from the first week of the deployment until the final day.

"I was part of a group of three, with Alan Goodwin and Paul Considine, who fulfilled the role of 'Manager NRSC'," said Mr Gray. "Our responsibility was to maintain oversight of the deployment, manage NRSC Duty Officers, maintain the relationship with the requesting agency (Canadian Interagency Forest Fire Centre) and provide the definitive decision point for the management of the deployment.

"Requests inevitably are for boots on the ground in the shortest possible timeframe. There is little room for error

in the collection and dissemination of details and time pressures add to the complexity while requiring more accuracy." Mr Gray explained that keeping track of more than 200 personnel spread across a vast area of Canada was challenging. Systems were put in place with agency representatives deployed to conduct regular visits and phone calls to deployed personnel.

"Despite the best laid plans, telephone communications were not always possible," said Mr Gray. "Deployees were sometimes re-assigned within areas of a fire, or between fire grounds, making the

task of tracking and contacting personnel a constant challenge."

Just months before this deployment took place, the NRSC was instrumental in establishing an international arrangement for sharing fire management resources between Australia and Canada, and a similar agreement between Australia and the US. Together, these formal arrangements provide crucial capability and an unparalleled opportunity for learning and development.

"The real and intangible benefit is the experience and the exposure to

The Elephant Hill fire, near Kamloops in British Columbia.

"The real and intangible benefit [for deployees] is the experience and exposure to alternative fire agencies."

Barry Gray, Assistant Chief Fire Officer, Metropolitan Fire and Emergency Services Board



Property destroyed by the Elephant Hill fire near Loon Lake.

PHOTO: PAUL SIMAKOFF-ELLINS, ACT RURAL FIRE SERVICE

alternative fire agencies," stressed Mr Gray. "The practices, skills, equipment and methods of firefighting provide a rich learning experience, which translates to local benefit."

The Canadian deployment

At the time of deployment, Ellen Harper was a Forest and Road Management Officer with Forest Fire Management Victoria (Department of Environment, Land, Water and Planning). She was among the 53 Australians in the first deployment to Canada.

"I was first deployed as a Type 1 Logistics Officer and was stationed at a fire camp at Nazko, approximately eight hours

north of Vancouver," Ms Harper explained.

In her initial deployment, she undertook various roles including Service Branch Director and Ground Support. She was then deployed as a Type 1 Logistics Chief, stationed at Cariboo Fire Centre in Williams Lake, approximately five hours north of Vancouver.

"I was responsible for managing the logistics function of the centre, which had oversight of up to eight fire complexes," Ms Harper said.

Ms Harper was among the 4,700 personnel working throughout BC during the height of the fires. The 2017 fire season saw approximately 1,216,351 hectares and 300 buildings destroyed,

while more than 39,000 people were evacuated.

"I spent the first days receiving training at the Royal Canadian Mounted Police training academy on the risks specific to the Canadian fire line (e.g. bears) and the Canadian application of the AIIMS [Australasian Inter-Service Incident Management System], and practising driving on the other side of the road," she said.

While Ms Harper's existing knowledge and experience helped her to prepare, she said it was the ability to draw on local knowledge and form relationships that enabled her to successfully undertake her roles in BC.

"It was challenging to learn the Canadian systems for event management on the fly," she acknowledged.

"Identifying and engaging local experts was key to being able to learn their systems. I have seen how the AIIMS system for incident management can traverse provinces, states and countries, allowing a common understanding of incident management."

Reflecting on what she will take away from the experience, Ms Harper said:

"I've learned that I can adapt to new systems, locations and people, relatively quickly, by identifying and engaging locals. It's important for incident managers to be exposed to incidents in other countries so they can develop their skills by working without the safety net of familiar colleagues, systems and locations, and apply these learnings to their own agencies." ■

Ellen Harper (front right) with her colleagues from Forest Fire Management Victoria before departing for Canada.



PHOTO: FOREST FIRE MANAGEMENT VICTORIA

PHOTO: PAUL SIMAKOFF ELIIMS

The Elephant Hill fire
in British Columbia.





PHOTO: MARK NORTON, BC WILDFIRE SERVICE

THE CANADIAN EXPERIENCE—INSIGHTS FROM A MEDIA OFFICER

Above: One of the fires in the Quesnel area of British Columbia.

On 7 July 2017, a lightning band passed over British Columbia (BC) in Canada, sparking 143 bushfires. The following day a state of emergency was called, the first in BC since 2003. SA Country Fire Service's Media and Communications Officer Alison Martin soon joined the first of six Australian deployments to BC.

BY **ALISON MARTIN**

SA Country Fire Service

At 8.45 am on Friday 14 July in Adelaide, the bushfire season is as far away as it can be. Within my small communications team at the SA Country Fire Service (CFS), we vaguely hear corridor talk of a deployment to Canada. We joke about the absurdity of being part of such an exercise, so far from home. But things quickly take a much more serious tone when the Chief Officer asks if I would be interested in joining in a public information role.

Saying 'Yes' was my default response—but what exactly had I gotten myself in for?

Five days later in Chilliwack, BC, I met my Incident Commander, Neil Brooksbank, and the nine other Australian members of our team at the Royal Canadian Mounted Police training centre. A couple of days later were on

our way to the Cariboo to manage 10 fires in the Quesnel fire zone, east of the Nazko River.

The drive north along Highway 97 was rather strange. We passed through several road blocks where residents had been evacuated, with burned edges along roads. Other than police and firefighters, there was no one to be seen. On arrival in Quesnel it was oddly comforting to see children having fun on the local playground.

We had a two-day handover with the BC team that was already in place. They'd set up a great network and processes to get the best information out to the public, and in many cases engage with them one on one. I explained to a local journalist that there were some places in SA I'd never heard of, so I'd treated Quesnel in a similar way—it wasn't hard to settle in.

Of course there are many differences in process, but my key role was to get

timely and accurate information to the public as frequently as possible. Fire-naming conventions were a little tricky to pick up. Our largest fire—commonly referred to as the Tautri fire (later the Plateau fire) due to its location—was actually fire C10784 (Cariboo, Quesnel fire zone (1) and the 784th fire start that year). For me, it was a case of learning the number used within the Incident Control Centre and then the name used in the community.

We had a daily newsletter and attended community meetings arranged by locals or the regional district. The City of Quesnel also donated a shop front for our use, giving people in the area a place to drop in and speak to information officers about the latest developments. We took advantage of local events, such as the Quesnel farmers market, where the foot traffic offered us the chance to speak to more than 200 people in a morning. Incident Commander Brooksbank and I also attended several community meetings.

Working with First Nations Indian Bands was a new experience for me, in their culture and etiquette. For several, their Indian Reserves had been closely affected by the fire, and that had dire flow-on effects beyond their immediate homes. Many rely on the flora and fauna in the affected areas to feed their families and generate income.

Receiving information back from the fireground was difficult, with most updates provided in the nightly operations meeting. This explained the progress of that day's work and strategies to be put in place the following shift. It was therefore almost impossible to give the public updates more than once a day, but the detail in the meetings really helped us explain the overall status.

Evacuation orders added an extra layer of complexity to my role. In SA, the CFS is the control agency for bushfires, and generally we would not evacuate people; but if we did, we would be in charge of making that happen. In BC, the Wildfire Service only makes a recommendation to the regional district (in this case Cariboo), which issues the orders and alerts. In some cases, people were evacuated for more than 40 days and were considering protesting to have the order downgraded.

When it came to downgrading orders, not being the control agency did provide confusion. The Incident Commander's role was simply to comment on the fire activity. So we did our due diligence researching the impacts in surrounding areas should the fire reignite in some spots, and presented that to the Cariboo



Working with First Nations Indian Bands was a new experience for me, in their culture and etiquette. For several, their Indian Reserves had been closely affected by the fire, and that had dire flow-on effects beyond their immediate homes. Many rely on the flora and fauna in the affected areas to feed their families and generate income.

Alison Martin, SA Country Fire Authority

**Above:
The Australian
contingent at
Quesnel**

regional district. The regional district would then liaise with other parties to ensure powerlines had been replaced, highways were driveable and the police were able to help re-accommodate these areas. In reality, the same boxes are checked as would be at home, but in BC, it's in someone else's hands.

The orders also affected ranchers in the area who were in the middle of their haying season and had stock to feed. In some instances they were in town when the order was placed, and therefore could not return home. A permit system was thankfully set up to allow them to still gain an income for the season and ensure their cattle, horses and other livestock were fed.

We liaised with forestry stakeholders to go into the order zone to transport cut logs out of the area and preserve what they could. In some cases we were able to work with them to remove these piles and keep the mills running, but unfortunately, in others, the cut logs were destroyed before the foresters could get to them. The consequences of this devastation will no doubt be seen

in these areas for many years to come.

The evacuation order areas weren't the only ones affecting communities. People in alert areas or fires within 30 kilometres were unable to buy home insurance, and the real estate market basically stopped. The hospital closed in Williams Lake and was then unable to operate at full capacity until the alert was lifted. All this pressure was placed on the BC Wildfire Service and the Cariboo regional district to lift these.

This was an unprecedented fire season for BC. Resources were stretched to the absolute maximum and processes were tested at length. More than one million hectares were burnt—yet impressively, not one life was lost. There will be lasting impacts on the community for years, even decades, but to have everyone safe is the most important thing.

I have to thank the CFS for this wonderful opportunity, and my team in BC—Australians and Canadians—they were all extremely dedicated and wonderful to work with. I certainly think some of my learnings in Canada will be implemented in South Australia's next fire season. ■

EVACUATING VULNERABLE PEOPLE USING LIFTS

Australia has an ageing population, greater levels of obesity and a growing awareness of the challenges of people with disabilities. This could increase the number of vulnerable people in health and aged care buildings who need to be protected, moved or evacuated in the event of a fire or other emergency.



BY **DR IAN D BENNETTS**

Noel Arnold & Associates

PETER JOHNSON

Arup Fellow

HENDERIKUS VAN RAVENSTEIN

EMPA

NABEEL KURBAN

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In the context of this article, a vulnerable person is considered to be someone who is incapable of moving away from a fire or smoke or evacuating without some form of assistance from others. This vulnerability may be due to age (e.g. the very young or very old), a temporary disability (e.g. patients in hospital intensive care units, surgery or recovery wards), or a permanent physical or cognitive disability.

Hospitals and aged-care facilities both have a significant proportion of such persons, although vulnerable persons may also be present in other residential buildings or workplaces.

Assisted evacuation

Assisted evacuation of vulnerable persons can consist of the following phases:

- ◆ Phase (a)—Preparation of persons prior to movement, involving
 - ◆ communication, to achieve the person's cooperation
 - ◆ preparing mode of transportation if the person has ambulatory difficulties (e.g. transportable bed, type of wheelchair)
 - ◆ implementing any personal health care measures (e.g. oxygen, disconnecting or connecting drips)
- ◆ Phase (b)—Horizontal movement to a safer location, if available

- ◆ Phase (c)—Vertical movement (e.g. by stairs or lift) to a safer place or exit of the building, if required.

Able-bodied assistance from staff or other persons (e.g. colleagues or family members, if present) will almost certainly be required for all phases of such an evacuation.

Phase (a) can be potentially time consuming unless it has been carefully considered and efficient management measures adopted and practised. It may also need to be sequential, depending on the availability of able-bodied persons to assist. Therefore, trials should be conducted to test communication effectiveness and proposed preparation measures.

The time required for phase (b) is a function of the movement time and the cumulative time taken by able-bodied persons to help others to move horizontally and then return to help

other vulnerable persons. Due to the relative ease of horizontal versus vertical movement, fewer able-bodied persons would be required in phase (b) than in phase (c).

Sprinklers and compartmentation

Horizontal evacuation into adjacent spaces is possible if these adjacent spaces are adequately protected against spread of fire and smoke through suitably designed and maintained compartmentation or sprinkler systems. Smoke zones are required by the deemed-to-satisfy provisions of the National Construction Code Series—Building Code of Australia (BCA) Volume 1 for aged care (Class 9c) and healthcare (Class 9a) buildings in regards to treatment and patient care areas. The deemed-to-satisfy provisions of the BCA require sprinkler protection for Class 9c, but not for hospitals unless the effective height exceeds 25 m.

In Victoria, the Capital Development Guideline—Series 7 Fire Risk Management (2013) applies to all healthcare buildings (Guideline 7.6) owned, operated or funded by the Victorian Government, and requires sprinkler protection of bed-based care

areas in Class 9a buildings (hospitals).

The question is, if smoke zones and sprinkler protection are provided, is it necessary to consider the full evacuation of vulnerable persons from a building? Or, is it realistic to assume that vertical evacuation will never be required? The answer to this question depends on the expected effectiveness of the smoke zones in combination with the sprinkler system.

It is important for all designers to understand how each building operates, and also to appreciate that, in some fundamental sense, the buildings themselves are less important than the functions they house. What must be clearly recognised in any assessment is that the building's construction and fire safety equipment and systems are very important in ensuring adequate egress.

If the sprinkler system fails, then the smoke zone may only provide a limited level of protection. Movement into another smoke or fire zone, or vertical evacuation, will ultimately be required. If the sprinklered fire is a shielded fire and not quickly extinguished, then smoke may also contaminate the adjacent smoke zone (i.e. the safer zone). This will result in

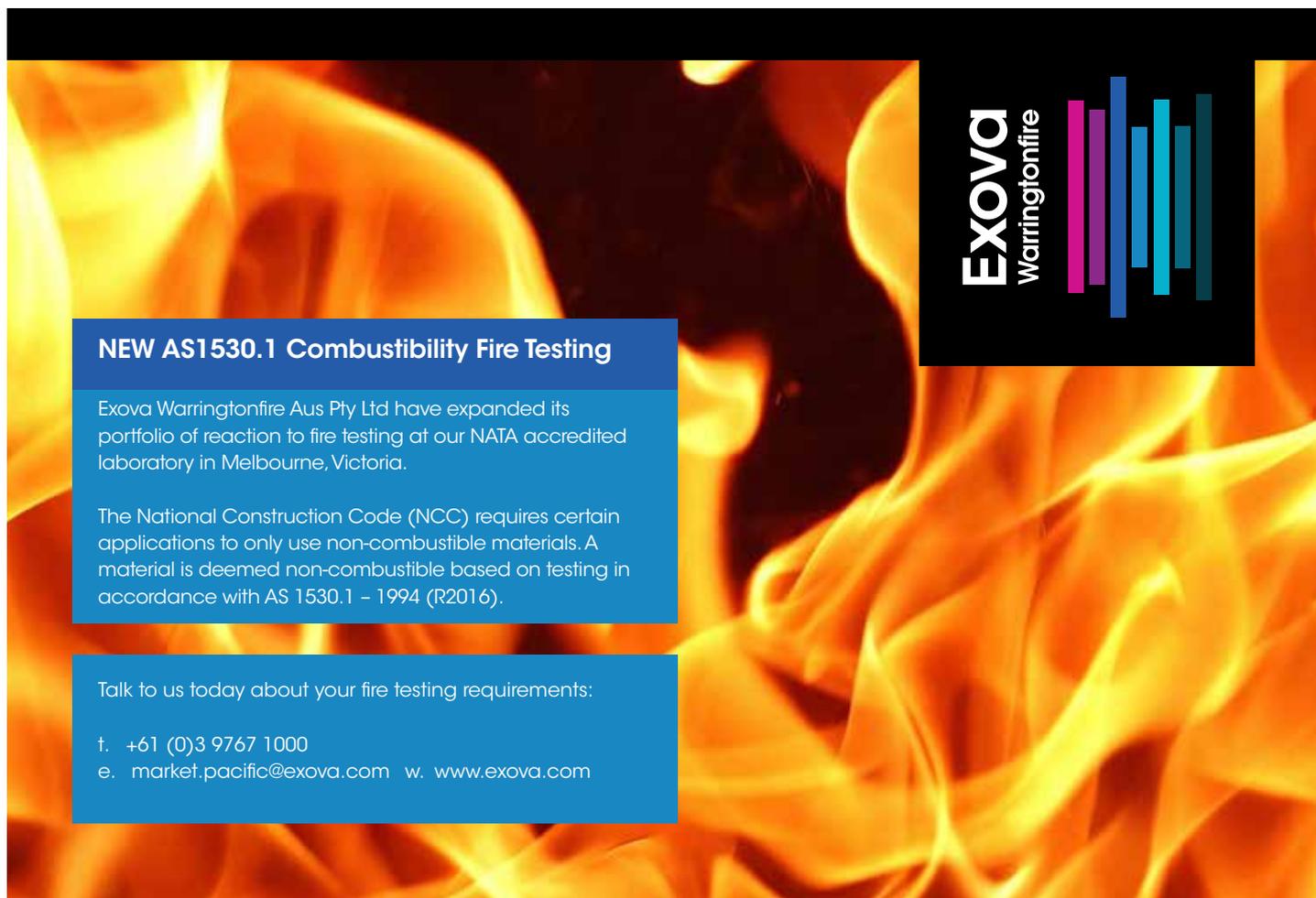
a need to transfer persons evacuating out of the adjacent smoke zone either horizontally, into an adjacent fire compartment, or vertically, by stairs or other means.

Vertical evacuation

There is a need to consider carefully how vertical evacuation could be achieved in healthcare and aged care buildings, should it be required. It is important to note that vertical evacuation may be difficult, and that the welfare of vulnerable persons may be compromised by some methods of vertical movement.

The risks associated with vertical evacuation of vulnerable persons can be reduced by:

- ◆ locating vulnerable persons as close to ground level as possible
- ◆ providing more horizontal compartments to allow progressive horizontal movement to a safer place should a fire occur in one compartment
- ◆ minimising the likelihood of a significant fire through the provision of a well-maintained and managed sprinkler system and other fire safety measures.



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In the event of fire inside hospitals and aged care buildings, vertical evacuation of vulnerable persons using lifts may be difficult. When designing new buildings, lifts and fire safety therefore need careful consideration.

Technical publication

We have prepared a technical publication to help designers with the design of lifts for evacuation of vulnerable persons. The publication reviews previous technical work on this matter and provides a design response to each of the hazards identified above. A worked example in relation to a hospital building is presented to further illustrate the importance of lift location and potential design options. ■

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Stairs are the conventional means of achieving vertical emergency evacuation. However, these can be difficult to negotiate even for able-bodied persons, and more so for vulnerable persons who must be assisted. Specific hardware such as carry chairs, 'ski sheets' or evacuation chairs are required if stairs are to be used. The use of such aids can be both time consuming and labour intensive.

Lift evacuation

With a few exceptions¹, the use of lifts to evacuate vulnerable persons has not been consciously considered by designers at the conceptual stage of hospital design projects. However, given the difficulties presented by stairs, designers should certainly consider lifts in the early stages of hospital design.

The use of lifts for evacuation is not a new idea. It has been a subject of interest since the 1980s²⁻⁷ and is recognised, to some extent, by BCA Performance Requirement DP7 and by the requirement for 'emergency lifts' for use by the emergency services. The Australian Building Codes Board (ABCB) has also recognised the potential role of lifts for evacuation in an advisory (non-mandatory) handbook⁸.

Potential hazards and issues associated with the presence of lifts in a building and the use of lifts during a fire include:

- ◆ untenable conditions within the lift shaft, due to smoke being drawn into the shaft via various mechanisms
- ◆ occupants being taken to a fire directly adjacent to the lift landing doors on the level of the fire's origin
- ◆ occupied lifts ceasing to operate due to effects of heat, smoke or water on lift controls or the lift shaft itself
- ◆ failure of power to the building due to a fire, causing the lift system to cease operation before or after persons have entered
- ◆ uncertainty about using a lift in a fire situation due to signage normally required adjacent to lift landing doors stating 'Do not use lifts if there is a fire' (e.g. BCA Clause E3.3)
- ◆ lift not controlled adequately, due to untrained or incompetent operators or confusing management protocol
- ◆ lift doors jamming due to pressure differentials within the building
- ◆ fire within a lift car or shaft and its effect on lift occupants
- ◆ lift taking persons to ground level where fire is located, or to an adjacent space that is smoke logged, and they cannot disembark.

PHOTO: iSTOCK



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DISASTER RESILIENCE — FROM GLOBAL TO LOCAL

BY **HANSIKA BHAGANI**

Bushfire and Natural Hazards CRC

On 2017's International Day for Disaster Reduction (IDDR), the Bushfire and Natural Hazards CRC gathered nearly 50 emergency management practitioners and researchers in Sydney to reflect on how at-risk communities are reducing their exposure to disasters.

IDDR began in 1989, after a call by the United Nations General Assembly for a day to promote a global culture of risk awareness and disaster reduction. Held every 13 October, the day celebrates how people and communities around the world are reducing their exposure to disasters and raising awareness about the importance of reining in the risks that they face. The theme of 2017's IDDR continued the 'Sendai Seven' campaign, centred on the seven targets of the Sendai Framework for Disaster Risk Reduction 2015–2030. This year the focus was on Target B—reduce the number of people affected by disasters by 2030.

At the Sydney forum, speakers addressed diverse topics that ranged from understanding Australia's obligations to the Sendai Framework to local public school initiatives.

Tony Jarrett, Community Engagement Coordinator at the NSW

Rural Fire Service, spoke of the need to apply worldwide research and evidence-based practice in Australian schools. He noted that while every school had an emergency plan, NSW RFS was helping schools examine their robustness. Schools could achieve this by asking questions such as: can school emergency plans deal with a fast-onset event? Are shelter-in-place options well thought through? How are students involved in emergency planning? And are drills looking at historical events or worst-case scenarios, or just done in a rote fashion?

The challenge of moving from hazard-specific and response-focused emergency strategies to recovery strategies was addressed by Feargus O'Connor from the Office of Emergency Management (OEM) NSW. Mr O'Connor spoke of OEM's move to the development of consequence management strategies, part of which involves expanding the groups OEM engages with in recovery and understanding community capability.

"At the moment recovery is a cold start," Mr O'Connor noted. "We have no idea, under the current emergency planning arrangements, [of] who's out there that we want to talk to. We have no idea who the local business chamber is, what they can do, or other social welfare and community groups. They're part of

the consequence management and recovery arrangements, and the two parts need to be brought together."

Andrew Gissing, Project Leader at the Bushfire and Natural Hazards CRC and Director, Government Business and Resilience at Risk Frontiers, spoke of what a catastrophic disaster in Sydney might look like. This included overwhelming scale, uncertainty, and the possibility of cascading events from the main disaster event.

Taking the big-picture perspective was Jessica Raine from Emergency Management Australia. Ms Raine spoke on Australia's commitments to the Sendai Framework, and the opportunity presented for Australia to reflect on the performance of its policies in disaster resilience and risk reduction. She explained Australia will be expected to report against the indicators from March 2019. Current reporting challenges include the availability of data, and making new data nationally consistent and consistent across the reporting period to 2030.

Emergency Management Australia is working with states and territories to build a roadmap for reporting, with data-collection trials to begin in early 2018. Other opportunities to grow engagement with the Sendai Framework include support for the National Platform for Disaster Risk Reduction and establishing a Sendai Champions Network.

Rounding out the forum was Beck Dawson, Chief Resilience Officer for the City of Sydney. Part of the 100 Resilient Cities program, Ms Dawson reaffirmed that resilience is about people. She discussed the challenges for Sydney in embedding resilience thinking.

"How do we get five million people thinking about these issues?" she asked. "How do we connect all the dots to make it sensible and usable?"

Within a risk cocktail of urbanisation, globalisation and climate change, Ms Dawson noted that those involved with disaster resilience need to strengthen leadership, improve community engagement, measure progress better and make investment decisions that work for diverse and multiple outcomes. ■



PHOTO: DAVID BRUCE, BUSHFIRE AND NATURAL HAZARDS CRC

The International Day for Disaster Reduction panel: L to R—Dr John Bates (host), Tony Jarrett, Andrew Gissing, Feargus O'Connor, Jessica Raine and Beck Dawson.

A video of the forum is available at: bnhrc.com.au/disasterday2017.

FACADE EXPO PUTS AS 5113 TO THE TEST

BY **TOM BICKNELL**

Fire Protection Association Australia

A full-scale AS 5113:2016 facade fire test was demonstrated for an industry group in Melbourne on 26 October 2017 at the Facade Test Expo at Exova Warringtonfire's National Association of Testing Authorities-accredited facility at Dandenong. An external cladding system from TBA Firefly and Brickworks was tested on the day, and the group also heard presentations from speakers including Fire Protection Association Australia's Senior Technical Officer Brett Dundules.

The recently published AS 5113:2016 standard, Fire propagation testing and classification of external walls of buildings, refers to testing methods in either British Standards BS 8414 part 1 and 2 2015, or ISO 13795-2, with some modifications. It is expected to be adopted as part of a new Verification Method in the out-of-cycle amendment to the National Construction Code (NCC).

The successful test at the Exova Warringtonfire facility met the requirements of AS 5113:2016 using BS 8414 test methodology, which looks at the fire safety of an overall external

cladding system, rather than individual components in isolation.

"The wall system tested was made from timber studs protected with a facade system designed by TBA Firefly and Brickworks, and utilises a number of their non-combustible and passive fire protection products," said Exova Warringtonfire's Tracy Horsley.

The NCC amendment is expected to be adopted in March 2018. The testing shown at the Facade Test Expo is therefore likely to become more common once the amendment is put into force. ■



Preparing the facade for the full-scale test of AS 5113:2016.



A large group of industry members watch as the facade fire takes hold.

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PREDICTING FIRE THUNDERSTORMS

PHOTO: STEPHEN WILKES, NSW RURAL FIRE SERVICE

BY **RICK MCRAE**

ACT Emergency Services Agency

Global monitoring of the atmosphere began in 1978. For most of this era, however, bushfires were not on the agenda. Volcanoes were an initial focus from 1982, after a British Airways 747 flew into a volcanic ash cloud, stalling all four engines. Before this, atmospheric scientists had been intensively watching for the effects of nuclear weapons tests, as these show up clearly in the clean stratosphere. And yet, cases of stratospheric aerosol injections were observed that could not be explained.

By running weather models backwards, researchers deduced that large bushfires in Canada were the source of these aerosol injections. Now the search was on for a fire event to confirm this. In 2001, the Chisholm fire in Alberta, Canada, formed a fire thunderstorm, also known as pyro-cumulonimbus, or 'pyroCb' for short. Several papers written about this fire raised key questions, and another detailed case study was sought.

On 8 January 2003, a dry lightning storm lit scores of fires across the Australian Alps. The only previous consideration of a fire thunderstorm

was the Berringa fire in Victoria in 1995, which addressed the threat to firefighters if the smoke plume collapsed. The Berringa fire started firefighters and fire managers thinking about what was going on over our heads—that we had to monitor the fire plumes, not just the flames.

When the January 2003 alpine fires formed violent pyro-convection, nobody was prepared. We had no predictive capability. These events are still the subject of scientific studies—I will go as far as saying that they are the most scientifically important bushfires ever.

From 1978 to 2001, Australia recorded two minor pyroCbs. Since then, we have 56 on record to November 2016, including some of the most intense events globally. PyroCbs have long been a problem in the forests of the United States, Canada, eastern Russia and Mongolia. They became a problem in Australia in 2001, in western Russia in 2010 and in Europe in 2017. The Black Saturday fires in 2009 had the record for the most intense pyro-convection until August 2017, when the Chezacut fire erupted in British Columbia, Canada.

How pyroCbs develop

Australia has entered an 'era of violent pyro-convection'. Bushfires are modelled

and predicted based on the assumption of steady-state spread. This includes weather, terrain and vegetation inputs to predict a fire's behaviour. For any inputs, the model gives a unique prediction of what the fire will be doing. This is the basis for all fire service preparedness, fuel management and community protection.

PyroCbs are now known to occur when a fire forms 'deep flaming' under an unstable atmosphere. Deep flaming is the depth of the active fire, as in how far back from the fire front strong heat is released. This can be some kilometres, and is not to be confused with the fire front.

A Canberra-based research group (comprised of myself, Associate Professor Jason Sharples of the University of NSW, Mike Fromm from the US Naval Research Laboratory and Rene Servranckx from Environment Canada) is developing a list of conditions under which deep flaming can occur. Two of these occur during steady-state fire spread—high rate of spread and a wind change. Other conditions are now grouped under dynamic fire spread, and include the following.

- ◆ Dense spotting creates deep flaming as the spotfires merge.
- ◆ Vorticity-driven lateral spread (VLS, or fire channelling) is the most effective source of deep flaming known.

- ◆ Eruptive growth is a concept that emerged from a fire in London’s Kings Cross Underground railway station.
- ◆ Professor Domingos Viegas from the University of Coimbra in Portugal has shown how the flame attachment involved can very easily lead to fire crew burn-overs.
- ◆ Sebastien Lahaye at the University of NSW in Canberra has recently extended our knowledge of dynamic burn-over causes.
- ◆ Interior ignition is a new concept resulting from staggered flammability of different fuels.
- ◆ A final cause of deep flaming is inappropriate use of a drip torch on a bad fire day.

Predicting pyroCbs

The unstable atmosphere is a difficult concept for fire agencies to handle. The Haines Index and its continuous variants are the main tools that have been used for decades, but they do not pick up the key elements needed. A better tool must be developed or found. Researchers in the Bureau of Meteorology, through the Bushfire and Natural Hazards CRC—including Dr Mika Peace, Dr Jeff Kepernt and their colleagues—are therefore looking closely at the instability above fires.

An extreme bushfire is defined as a fire that, on one or more occasions over its duration, will form deep flaming in an atmospheric environment conducive to the fire coupling with the atmosphere. The plume then punches through the cloud base (termed a ‘blow-up’). Our group developed a process model called BUFO—the Blow-Up Fire Outlook—which takes fire behaviour analysts through a

series of questions that mostly seek to anticipate deep flaming, with raised fire danger a prerequisite condition. The answers determine which question is next, or whether the analyst loops back to the beginning to wait for conditions to change before starting the questions again.

Note that vegetation, which forms fuel for the fire, does not currently have a role in the BUFO model. It is therefore an open research topic. Similar coupled fire-atmosphere events occur over the vast range of fuel types found in alpine ash, Siberian steppe, Albertan boreal forests, or the Great Victoria Desert.

The BUFO model has been formally tested in NSW and the ACT. I conducted the trial with formal oversight from Associate Professor Jason Sharples and Laurence McCoy (NSW Rural Fire Service). Over three fire seasons we obtained enough data to confirm the model, with several blow-up events predicted and incident management teams alerted. No pyroCbs occurred in the trial domain, but we did informally anticipate some pyroCbs elsewhere in Australia. The formal statistical results were sufficient for the model to be declared successful, and it is now operational.

Our group is now seeking to expand its implementation into jurisdictions beyond the trial area. The model is most useful south of the Tropic of Capricorn.

The Sir Ivan fire

A key part of the BUFO is its ability to distinguish the one or two fires that have the potential to develop a pyroCb on a day of widespread raised fire danger with many fires burning. On 11 February 2017, a bad fire day was predicted in north-east NSW, with an even worse day forecast on the following day. Although many fires were burning, the BUFO model successfully predicted that most would not blow-up to a pyroCb, and that only the Sir Ivan fire had the potential to do so, through VLS. An alert was issued for this fire late on 11 February, and by mid-afternoon the next day it had formed a pyroCb just as a trough-line passed, producing peak instability. Other fires nearby did not blow-up.

The Sir Ivan fire is the only fire, globally, for which a formal operational forecast of a blow-up and subsequent pyroCb has occurred. While not wishing for more pyroCbs, our goal is to anticipate their formation. We now require discussions with fire services to see how the model might be implemented elsewhere.

It has long been thought that with temperatures on the rise, the impact of climate change on bushfires would

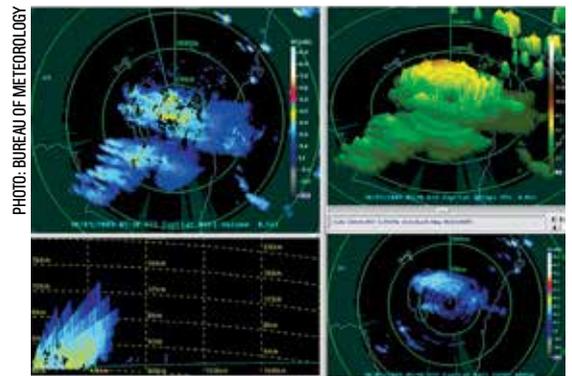


PHOTO: BUREAU OF METEOROLOGY

Weather radar is used routinely, but only recently has three-dimensional data been available that shows plume structure in great detail. New upgrades to dual-polarisation radar allow identification of smoke.

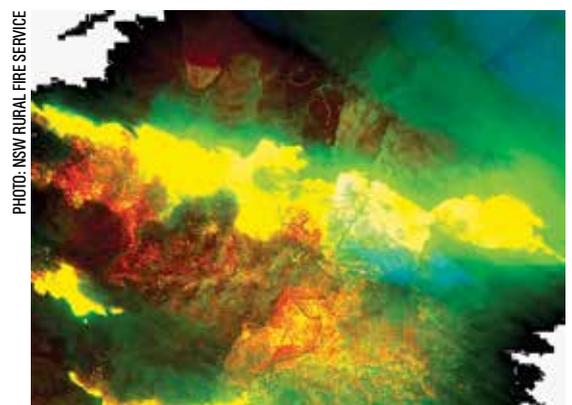


PHOTO: NSW RURAL FIRE SERVICE

Multispectral linescans provide a unique perspective on fire dynamics, especially with overlapping scans. Modern systems provide rapid access for incident management teams.



PHOTO: NASA GSFC

A satellite image from the 2003 Canberra bushfires. Satellite imagery can provide overview insights into plume development, especially if Himawari-8 is used.

involve turning up the dial. Now it is clear that there is a big switch as well—and that in Australia, this switch was flicked to ‘on’ in 2001. Blow-up pyroCb fires are the cause of much of bushfire impact on the Australian community, and they are poorly handled by the primary fire prediction tools in use. ■

PYROCB FACTS

- ◆ PyroCbs last for about two to three hours.
- ◆ As the day warms up, a slight inversion at the cloudbase is eventually breached and free convection can then reach the top of the troposphere, or even into the lower stratosphere.
- ◆ PyroCbs often exceed 12 km in height, and their cloudtops can be glaciated—a fire can form ice.
- ◆ When a fire blow-up occurs, the best approach to protecting the community is to evacuate everyone in a footprint ahead of it. Doing this ahead of the event on the basis of forecasts should be the emergency management sector’s goal.

FIRE PROTECTION EXCELLENCE RECOGNISED AT AWARDS GALA

Nine deserving winners across eight categories were given the gong at this year's Fire Protection Industry Awards Gala.

The Australian fire protection sector came together on 9 November 2017 in the beautiful Metropolis venue overlooking the Melbourne skyline to recognise its best and brightest at the Fire Protection Industry Awards Gala 2017.

This was only the second year the awards have been held, but support from the industry was strong and points to a positive future, according to Fire Protection Association Australia (FPA Australia) CEO Scott Williams. Nearly 200 people attended the event.

"It is fantastic to witness the support these awards are receiving as we celebrate all that is good about the industry," said Mr Williams as he opened the event.

The gala was hosted by TV and radio sports personality Stephen Quartermain, with live entertainment provided by internationally acclaimed Melbourne band BigCityBeat. Dignitaries in attendance included Tony Murphy, Deputy Commissioner of Emergency Management Victoria; Adam Dalrymple, Acting Deputy Chief Officer of the Metropolitan Fire Brigade; and Greg Buckley AFSM, Chief Superintendent of Fire & Rescue NSW.

It was a special evening for award organiser FPA Australia for more than one reason; 2017 was the 20th anniversary of the amalgamation of the Fire Protection Industry Association Australia and the Australian Fire Protection Association, the combination of which became the current Association.

"In that 20 years both the Association and the industry

FPA Australia would also like to thank two organisations that have made this event possible with their support. Major Partner, Alan Wilson Insurance Brokers, is the leading provider of insurance to the fire protection industry. Award Partner, Wormald Australia, is an iconic name in Australia fire protection, and this year won the Fire Protection Project of the Year Over \$1 Million category.

have come a long way," said Mr Williams. "These awards reflect that, and exist to recognise excellence and commitment across the entire Australian fire protection industry."

Tragic events such as the Grenfell fire in London earlier in 2017 underline the importance of the work the industry does, and the need to continually learn and improve.

"It is therefore extremely important to celebrate outstanding individuals and companies in front of their peers, and hold them up as positive examples of this progression," said Mr Williams.

"We aim to support everyone to reach the high standards set by these award winners."

Six independently judged award categories and two awarded by the FPA Australia Board of Directors were presented on the night to the nine deserving winners. ■



Young Achiever of the Year Jayden Snashall.

Young Achiever of the Year

Winner: Jayden Snashall, Australian Safety Engineers

Finalists: Elmo Pavish, Grosvenor Engineering Group;
Firas Shawash, Exova Warringtonfire Pty Ltd

Young Achiever of the Year Jayden Snashall started his fire protection career at 18, and is now the Fire Safety Manager for Australian Safety Engineers (ASE). In January 2016 he established his own business, Foam Samples Australia, to test firefighting foam concentrates, which he runs alongside his work with ASE.

"Jayden demonstrated his commitment to the industry with his passion for learning, training and professional development," said judging panellist Kim Brew. "He implemented many initiatives in his workplace which contributed to positive organisational change. On top of all this, he began his own company and is looking to return to university to finish his MBA and complete further qualifications." ■

PHOTO: SIMON SAKELLARIAS

PHOTO: STAVROS SAKELLARIS



Barry Lee Technical Excellence award winner Rodney Rolfe, with partner.

Barry Lee Technical Excellence

Winner: Rodney Rolfe, Wormald Australia

Finalists: Brett Staines, Staines Investments; David Sharp, Johnson Controls

The Barry Lee Technical Excellence category was awarded to Rodney Rolfe for his more than four decades of dedication to technical training of students and developing the fire protection industry.

Currently Wormald Australia's Learning and Development Manager, Mr Rolfe is also the Chair of FPA Australia's Training Technical Advisory Committee (TAC/T), and a member of TAC/2 and the Fire Protection Accreditation Scheme (FPAS) Reference Group. He is also the representative for the Australian Chamber of Commerce and Industry on the Standards Australia FP-002 committee. His previous contributions to the industry's technical development are numerous.

"Rod Rolfe was a worthy awardee," said judging panellist Barry Lee. "He has devoted an entire working lifetime to fire protection practice, with demonstrated technical excellence via strong qualifications, well-rounded field experience and continuing professional development." ■

PHOTO: STAVROS SAKELLARIS



L to R – Gary Marshall, Scott Williams, Janice Marshall and Tom Marshall.

Harry Marryatt Fire Protection Company of the Year 50+ Employees

Winner: DEM Fire & Essential Services Group

Finalist: Chubb Fire and Security

DEM Fire & Essential Services Group began as a pump maintenance company in 1977, before experiencing significant growth following a merger with young business Alliance Fire in 2004.

Training and accreditation of staff has been a major focus for the company, which has also made contributions to industry development through FPA Australia, Standards Australia and other organisations.

"DEM Fire & Essential Services Group is a family business and show a great commitment to their staff and the industry," said judging panellist Kim Brew.

"They were an early adopter of FPAS for their existing staff, and they have taken on seven apprentices to help the shortage of skilled labour in the fire protection industry. They have a clear commitment to professional development and are active participants in FPA Australia state committees. They are currently investing in the latest technology for their staff to assist in their day-to-day activities." ■

PHOTO: STAVROS SAKELLARIS



Plus Passive Fire's Peter Blain (R) with FPA Australia CEO Scott Williams.

Harry Marryatt Fire Protection Company of the Year 1–49 Employees

Winner: Plus Passive Fire

Finalists: Australian Fire Industries; Bushfire Prone Planning

Plus Passive Fire is a young business, founded in February 2016. It draws on the experience of a passive fire certifier and a chief fire officer in the form of co-founders Peter Blain and Gina Patrick. The company focuses on providing passive fire advisory and certification services for construction companies, particularly in difficult scenarios where compliance is a challenge. "Plus Passive Fire demonstrated, among other things, clear commitment to adoption of emerging best practice and particularly, we thought, to continuing innovation in a field often overlooked because the work is frequently hidden behind building features such as ceiling voids," said judging panellist Barry Lee. ■



PHOTO: STAVROS SAKELLARIS

L to R – Andrew Walter, Damien Jenkins, Matt Monger, Annie Peros, Mark Prior and John Bacon.



PHOTO: STAVROS SAKELLARIS

L to R – Scott Williams (second from left) congratulates John Lynch and the Wormald team.

Fire Protection Project of the Year Under \$1 Million

Winner: Multiplex Constructions/BOSS Fire

Finalists: Bushfire Prone Planning; Firewize

Project of the Year Under \$1 Million was awarded to an innovative project that addressed the risk of non-compliant passive fire measures at tenancy fire walls in an apartment complex. The project was a combined effort between BOSS Fire and Multiplex Constructions on a 417-apartment development in South Yarra in Melbourne.

Multiplex had identified a common risk of subtrades incorrectly installing penetration seals covering services entering each apartment, and appointed BOSS Fire to install its newly developed Fyrebox to ensure compliance. The Fyrebox is a centralised penetration seal with intumescent brushes covering all services entering an apartment, yielding significant savings in labour and improved compliance.

“Multiplex in conjunction with BOSS Fire provided an innovative approach to an issue which has been with the fire protection industry since the recognition of passive compartmentation,” said judging panellist Wayne Welton.

“Management of fire penetrations in a large apartment complex needed an out-of-the box solution. Fighting through resistance from various industries and obtaining approval of their Fyrebox solution, Multiplex and BOSS Fire were deserving winners.” ■

Fire Protection Project of the Year Over \$1 Million

Winner: Wormald Australia

This category was awarded to Wormald Australia for its project to design, develop and install fire protection systems in the Sydney International Convention Centre, Exhibition Centre and Theatre.

Completed in November 2016, the project ran for three years and was distinguished by its size. This was reflected in the installation of approximately 30,000 sprinkler heads, 1,700 detectors and more than 200 alternative solutions in the fire system design.

“Wormald’s winning submission centred around a complex and iconic project,” said judging panellist Wayne Welton. “A high level of technical expertise and project management was required to successfully complete the project.

“Throughout the project Wormald overcame external obstacles such as an evolving regulatory framework, a vast number of alternative solutions and reducing water supplies. The fire system design also involved sustainability, with substantial water saving during the lifespan of the wet systems.” ■

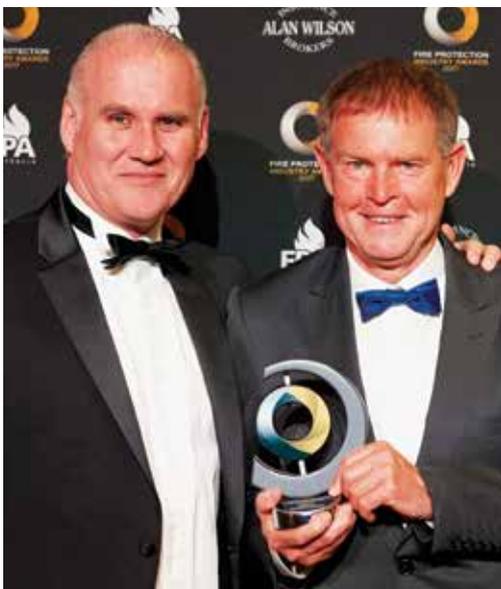


PHOTO: STAVROS SAKELLARIS

AV Viscogliosi Outstanding Service award winner Bill Lea (R) with Scott Williams.

AV Viscogliosi Outstanding Service – Awarded by the FPA Australia Board

Winner: William Lea

Over his more than 45-year career, William (Bill) Lea has worked in all aspects of the fire protection and construction industry, from apprentice to project manager. His company Infinity Fire Protection, established 35 years ago, is now a nationally significant operation. He has served as a volunteer firefighter since 1979 and is currently Group Captain in the Hornsby Ku-ring-gai Rural Fire Service.

Mr Lea has an extremely active involvement in the industry. He has chaired and been a member of several of FPA Australia’s TACs and state membership groups, and contributed to the development of numerous Australian Standards. He has been one of the main drivers behind the development of FPAS, and has committed enormous time to educational work in the fire protection industry. Mr Lea has also been a Director of FPA Australia for nine years, has served on the Executive Committee, and has been the Treasurer of the Association for many years.

Mr Lea’s dedication to improving the professionalism of the industry and leaving a legacy of education and competence are major contributions to the success of the fire protection industry. ■

PHOTO: STAVROS SAKELLARIS



Meritorious Service awardee Paul Newman (L) with Scott Williams.

Meritorious Service – Awarded by the FPA Australia Board

Winner: Paul Newman

Paul Newman is the Fire and Compliance Manager for Wormald/National Fire Solutions. Having undertaken a locksmith apprenticeship, he switched to the fire protection industry as a Key Account Manager for Tyco Australia in 2005, transitioning to Commercial Manager in 2007. In 2009, Mr Newman became the NSW and Queensland Regional Training and Compliance Manager for Wormald, and in 2014 accepted his current position.

Mr Newman has consistently contributed to FPA Australia TACs for maintenance, emergency planning and response and training. FPA Australia has also relied heavily on his local expertise in relation to the Queensland Building and Construction Commission (QBCC) Fire Occupational Licensing scheme. His assistance has been critical for FPA Australia, promoting scheme changes through representation alongside FPA Australia staff on the QBCC Fire Protection Working Group.

Mr Newman has an MBA/Graduate Certificate in Business Administration and Management and is recognised for his leadership skills and ability to engage, influence and advocate. He is also a member of the FPA Australia Queensland Leadership Team and has supported FPA Australia initiatives via this platform. He is passionate about improving outcomes for the fire protection industry and is a reliable and trusted source of information. ■

PHOTO: STAVROS SAKELLARIS



Meritorious Service award winner Greg Buckley (L) with FPA Australia President Chris Orr.

Meritorious Service – Awarded by the FPA Australia Board

Winner: Greg Buckley

Greg Buckley is a Chief Superintendent with Fire and Rescue NSW (FRNSW) and has more than 30 years' experience in operational command, fire investigation and corporate planning.

Prior to a recent return to an operational post, Mr Buckley was the organisation's Assistant Director Building Environment and Research, which included responsibility for the Structural Fire Safety, Building Compliance and Fire Investigation and Research units of FRNSW. He has represented FRNSW on the NSW Building Regulations Advisory Committee, chaired the AFAC Fire Engineering Group and been the long-standing representative of AFAC on the ABCB Building Codes Committee.

This diverse range of experience has provided Mr Buckley with a wealth of information that he shares freely and astutely. His evidence in the NSW Coroner's inquiry into the tragic death of Connie Zhang in the 2014 Bankstown apartment fire led to direct recommendations by Deputy Coroner Hugh Dillon for regulators to consider cost-effective, fit-for-purpose sprinkler systems as mandatory in residential apartment buildings. He continues to collaborate with key industry stakeholders on this project today.

Mr Buckley has dedicated a lifetime of service to the community championing improved fire safety outcomes, and future generations will continue to benefit from his work. ■

ARE YOU EMOTIONALLY INTELLIGENT, OR JUST EMOTIONAL?

Why is emotional intelligence important for fire protection and emergency services?

BY **GILLIAN ANDREWS**

Fire & Rescue NSW

Emotional intelligence is essential for building employee engagement and is a prerequisite for innovation and collaboration in fire protection and emergency services.

The benefits are concrete—this is not about ‘being more emotional’ or ‘being nice to each other’. Emotional intelligence affects our use of public dollars, our budgets, community safety and the lives of our people and health of our industry. It should therefore be a priority.

Research both locally and internationally has proven the link between emotional intelligence and employee engagement, improved safety, productivity and decision-making. It has also linked engagement to staff retention, inclusivity and mental health.

What is emotional intelligence?

The term ‘emotional intelligence’ was popularised in the 1990s. At the start of that decade, it was described by researchers Peter Salovey and John Mayer as “a form of social intelligence that involves the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and action”.

Early research showed that people who scored high on emotional intelligence tests were more resilient and were better able to respond flexibly to changes in their social environments. A 30-year longitudinal study of more than 1,000 people demonstrated that the ability to recognise and manage emotions and impulses was a predictor of personal and professional success. Emotional intelligence competencies such as self-awareness,

self-management and empathy were shown to be important for leadership effectiveness. By breaking the concept into four components it is easier to discuss and understand.

Emotional intelligence starts with self-awareness: recognition of your own emotions, your triggers and your strengths. The next step is self-regulation: managing and using your emotions in helpful ways. A good leader needs to demonstrate emotional self-awareness and flexibility, rather than just emotional control. Recognition of emotions in others includes social awareness and being able to empathise with others, and being able to recognise the emotions in a group. The fourth quadrant includes influencing others and understanding and managing the mood of the group, which allows motivation, communication and management of conflict.

Measuring and observing emotional intelligence

Emotional intelligence can be observed. When a manager in a complex and dangerous environment provides clarity and calm, it is likely that they have high levels of emotional intelligence.

It can also be measured by rigorous and valid psychometric tests. The Mayer-Salovey-Caruso Emotional Intelligence Test is a common example that focuses on behaviours. Others measure attitudes and 360-degree observations. Like all measures that rely on human beings, subjectivity can be an issue. The results should be considered and used carefully and in association with other indicators.

To see more examples of emotional intelligence tests, visit the Emotional Intelligence Consortium at www.eiconsortium.org.

Employee engagement

When a manager has a low level of

emotional intelligence, the engagement of the team is variable. The team may, for example, be highly skilled or motivated, and not reliant on the mood of the leader. But when the manager has a high emotional intelligence, team engagement is likely to be high. High employee engagement is linked to better customer service, increasing profitability and more productivity. In our industry, this means that engaged teams are safer and more efficient.

At Fire & Rescue NSW (FRNSW), higher employee engagement has been linked to lower absenteeism and overtime costs and reduced compensation claims. This has a financial impact, but more importantly increases safety, because disengaged employees are more likely to be injured.

Decision-making

Good decisions start with situational awareness. This requires alertness, perception and judgement, all of which are impaired by stress. Self-awareness and mindfulness have been shown to reduce stress.

Situational awareness also requires communication. Stress, along with a lack of empathy or social awareness, makes it difficult for a leader to communicate with and understand their team, and to be able to read between the lines. A leader must have the social awareness and empathy to hear both the words and the message from their team. Without this, the leader’s situational awareness is incomplete.

When studying decision-making in the army and fire services, Gary Klein observed fast naturalistic or intuitive decision-making processes. For this less rational style of decision-making to be effective, the decision-maker needs to have broad experience, reflective practices and to be able to trust their gut.

Good decisions start with situational awareness. This requires alertness, perception and judgement, all of which are impaired by stress.



PRIMAL LEADERSHIP, GOLEMAN 2013		
	SELF	OTHERS
RECOGNITION	Self-awareness. Recognise your emotions.	Empathy and social awareness. Understand the mood of the team.
REGULATION	Manage and use your emotions. Control impulses.	Manage emotions in the team to influence and motivate.

THE MINDFUL LEADER, BUNTING 2016

THE NEW PSYCHOLOGY OF LEADERSHIP, HASLAM ET AL 2006

THE 7 HABITS OF HIGHLY EFFECTIVE PEOPLE, COVEY 1988

In other words, they must be able to trust their emotions. Rational decisions are slower than emotional decisions, which are very fast, but may not be optimal—they bypass training and are based on fear. In contrast, naturalistic decision-making is both fast and effective, because it calls on experiences and learning, connected to feelings. A leader with more emotional intelligence is able to quickly recognise and use emotions to reach an effective decision based on experience.

Collaboration and innovation

Collaboration and innovation requires cognitive diversity within the group—that is, differences in personality and knowledge. If a new team member must emulate the existing culture and minimise differences, the organisation will not benefit from new ideas.

To take advantage of those new ideas, a group must have enough collective emotional intelligence to welcome and engage with difference, rather than see it as a threat. Where emotional intelligence and engagement are low, differences are feared and change is avoided. Energy is spent building defensive barriers, rather than looking for solutions.

Can emotional intelligence be increased?

You are probably more emotionally intelligent now than when you were a teenager. In those tough teen years, you wanted to connect, and you tried out

different behaviours to see what worked. You put energy into understanding the emotions of other people—particularly the opposite sex. You received feedback, some of it harsh, but you learned from your mistakes. In your adult life, if you continue receiving feedback, reflecting on your behaviours and seeking to improve your people skills, your emotional intelligence will continue to increase.

There is some evidence that cognition—or at least, speed and flexibility of thinking—deteriorates after a certain age. Wisdom, however, appears to increase. Research suggests that the emotional intelligence of healthy adults continues to increase with age. This means that the ability to use emotions and knowledge to make good decisions also improves with age. For FRNSW this is good news, as our staff's average age is 47 and increasing.

All leadership development programs at FRNSW start with activities to increase emotional intelligence. Our programs use the DISC Behavioural Preference model to increase self-awareness and reflective practice. The DISC model identifies four predictable personality traits (Dominant, Influence, Steadiness and Compliant). It highlights that people have different strengths and abilities, which can be the first step in building a more diverse and inclusive team. Other models and programs that can also be useful include Myer Briggs and the Strength Finder. FRNSW has now taken

140 people through the principles in Stephen R Covey's book, *The 7 Habits of Highly Effective People*, to build trust and interdependence and to help team leaders manage our head office transition to the new Greenacre location.

When we learn to manage ourselves, our emotions and actions, we make better choices and become more independent. We then learn to understand and influence those around us, leading to emotional maturity, collaboration and interdependence. Our industry continues to see bullying, turf wars, inefficiency and cultures that discourage diversity. This limits our ability to innovate, collaborate and adapt.

We need to build emotional intelligence at all levels of our industry to create a culture of connection and trust. We cannot fix current problems with the same thinking that created them. Today, there is an appetite for new types of development opportunities and a new culture in our industry. ■

RECOMMENDED READING

- The Mindful Leader, Bunting, 2016
- Primal Leadership, Goleman 2013
- The New Psychology of Leadership, Haslam et al 2006
- The 7 Habits of Highly Effective People, Covey 1988

COULD SYDNEY BE THE NEXT HOUSTON?

Is our largest city prone to similar catastrophic flooding as seen last year in Houston after Hurricane *Harvey*?

BY **ANDREW GISSING**

Bushfire and Natural Hazards CRC and Risk Frontiers, and Dr Chas Keys, Risk Frontiers

It had been some 10 years since a large hurricane had crossed the US Gulf Coast, but Hurricane *Harvey* hit Houston—America's fourth largest city—hard in August last year. Devastating floods inundated large parts of the city. Thousands of people required rescue, and the death toll reached more than 90. Much of the blame for the disaster is being placed on the significant increases in urban development in flood-labile areas.

According to research by the Bushfire and Natural Hazards CRC and Risk Frontiers, flooding in Australia has been the second-largest contributor to natural hazard deaths since 1900, behind fatalities attributed to heatwaves. In 2014, the Productivity Commission reported that Australian floods have also contributed more than \$5 billion in damages between 1970 and 2013.

Is Australia's largest city prone to similar catastrophic flooding in the future? Sydney has a different geography and climate from Houston, but has numerous populated river and creek catchments that have experienced flooding historically, albeit not for some time. A possible Sydney flood scenario would see heavy rainfall from perhaps a severe east coast low-pressure system first drenching the city's impervious streets and small creek and river catchments, causing significant stormwater and flash flooding. This flooding would occur with little specific warning, but rapidly subside.

The greater metropolitan area has seen significant flash flooding before, as a result of severe rainfall in 1984, 1986 and 1988. Areas that could be affected include the northern beaches, eastern suburbs (Randwick and Rose Bay), the inner west (Marrickville, Strathfield, Canterbury and Annandale), Parramatta, Ryde, Woronora and Fairfield. The floods would significantly disrupt the city's transport systems and undoubtedly lead to countless rescues.

Following initial flash flooding, rivers could rise to severe levels,



PHOTO: TEXAS NATIONAL GUARD (CC BY 2.0)

The Texas National Guard rescuing a Houston resident during Hurricane *Harvey*.

threatening communities along the Georges, Hawkesbury and Nepean rivers, and necessitating large-scale evacuations across the south-west and western parts of the city. These areas were hit by severe flooding in 1867, and experienced major flooding in the 1980s and 1990. If similar flood levels to 1867 were to occur today, more than 11,000 homes could be flooded in western and south-western Sydney, with their occupants requiring evacuation. Essential infrastructure would be damaged, disrupting transport, energy, water supply and businesses for days to weeks following. It would take those affected years to recover. More extreme flood events are also possible.

Communities outside Sydney could also be at risk. The 1867 flood also affected Wollongong, Nowra, Moruya, Tamworth, Bathurst, Mudgee, Dubbo, Forbes and Wagga Wagga. Such a scenario would place significant demand on the state's emergency services.

Unlike last year's experience in Houston, local governments in NSW do regulate development of flood-prone areas. Policies ensure that new development is limited to areas outside zones that would likely be flooded, on average, once every 100 years. But this standard does not provide protection

against larger floods, which may include some high-risk areas and many properties.

Large legacy issues remain in areas that have already been developed. The NSW Government has recently released a flood-management strategy to tackle flood risk along the Hawkesbury and Nepean rivers. In other areas, local governments complete floodplain risk-management plans detailing intended methods to address the risk of floods.

Flood risk management is a game of balance. It requires careful management of the often competing objectives of building prosperous communities, where economic opportunities must be balanced with maintaining public safety and the resilience of the community. To avoid amplifying the flood risk and suffering experienced in Houston, land use planning controls will remain key.

The long length of time between large floods in Sydney has meant that communities are becoming largely apathetic towards the risk. But it is inevitable that they will return. The risk is serious, requiring both prudent flood risk management by governments and action by individuals to ensure that households and businesses are prepared. ■

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CAN YOUR COMMUNITY COPE WITH RISING TIDES?

BY **TIMOTHY D RAMM**

Bushfire and Natural Hazards CRC and University of Tasmania

**DR CHRISTOPHER J WHITE,
DR CHRISTOPHER S WATSON**

University of Tasmania

DR SONIA GRAHAM

University of NSW

As Texas and the Caribbean continue to recover from last year's North Atlantic hurricane season, it's time for Australia's coastal communities to reflect on what makes a community resilient in the face of more frequent storm events, rising sea levels and changing coastal flooding patterns. Would we fare any better?

In 2016, many Australians experienced the power of the sea. Coastal storms battered houses along the east coast, destroying jetties and smashing beaches in SA. Another sort of flooding—nuisance flooding—is emerging abroad and is increasingly causing disruption to people and infrastructure in US cities such as Annapolis and Miami.

Rising sea levels and changing coastal flood patterns will place increasing pressure on governments, business and residents to minimise the impact on people, properties and the environment. As Australia debates national energy reform and seeks to meet its emissions targets under the Paris Agreement, it is imperative that planning continues for sea level rise, which will continue regardless of future emissions stabilisation.

Preparing communities for sea level rise and increased coastal flooding is difficult. Scientists know that change is underway, but are unsure exactly how much will come our way. Do coastal authorities prepare for a sea level rise of 20 centimetres or half a metre? What population change will occur? Although the extent and timing of such change may be uncertain, communities still need to start planning for it now.

The legacy of existing infrastructure

Billions of dollars of infrastructure in Australia could be threatened by rising



PHOTO: JULIE G (CC BY-ND 2.0)

Over the coming decades, existing coastal infrastructure in vulnerable communities will be tested as sea level rise drives more frequent inundation and erosion.

sea levels by the end of the century. Although such timeframes appear distant, planning and development decisions made today can have consequences many years from now. Coastal infrastructure, such as roads, utilities, rail, residential and commercial buildings, often last 20–100 years and influence future developments within communities.

Over the coming decades, existing coastal infrastructure in vulnerable communities will be tested as sea level rise drives more frequent inundation and erosion. This can cause direct and indirect losses to coastal residents, business and government.

How will rising sea levels affect us?

Climate change will not only affect our infrastructure. It will affect our beaches and our access to other coastal environments, and will have real impacts on where we socialise and undertake

recreational activities.

To better understand the important aspects of people's everyday lives, where certain values are associated with coastal landscapes, and what groups of people might be most disadvantaged by sea level rise, we studied a peri-urban seaside suburb in Tasmania.

Overall, the natural environment and the lifestyle afforded by a coastal location was most important to residents. Such values were consistent with those identified in other south-eastern Australian studies.

To understand how people in the community might be affected differently by sea level rise, we then segmented the seaside community into six groups based upon their life stage, lifestyles and unique social values. While the local beach was highly important for recreational value to families and active younger residents, for others (e.g. community-minded volunteers or

EXPLORING LESSONS MANAGEMENT NATIONALLY



One of the panel sessions that took place at the 2017 national Lessons Management Forum.

30
level

Preparing communities for sea level rise and increased coastal flooding is a difficult task.

retirees) human-made features such as community halls and ovals were likely to be of greater importance, because they facilitate important social interactions. Such considerations are commonly not well accounted for in traditional risk assessment and planning.

Our work suggests that segmenting the community into groups to support adaptation planning can help to cater for everyone's needs. It can also improve the fairness of adaptation plans by better assigning the costs and benefits of adaptation, both socially and economically. Communities and business will have an increasing role to play in maintaining the momentum behind adaptation action.

It's time to start thinking about how rising sea levels might affect you and your community, and what your local council is doing to prepare for the future. ■

This article first appeared on the OzEWEX website and has been reproduced with permission. It has been modified slightly to reflect the passage of time and is based on: A review of methodologies applied in Australian practice to evaluate long-term coastal adaptation options, *Climate Risk Management*, 2017, Vol 17, pages 35–51, and Advancing values-based approaches to climate change adaptation: A case study from Australia, *Environmental Science and Policy*, 2017, Vol 76, pages 113–123.

More than 120 knowledge and lessons management professionals came together in Melbourne for the national Lessons Management Forum on 14 and 15 November 2017.

The forum attracted practitioners from a broad range of sectors, including emergency management, defence, energy, health and local government. Key themes discussed included the value and challenges of formal reviews and inquiries, and developing a learning culture within organisations.

On day one of the forum, Katarina Carroll, Commissioner, Queensland Fire and Emergency Services (QFES), presented on the appreciative inquiry QFES undertook following Cyclone *Debbie*. Commissioner Carroll explained that appreciative inquiry was a change management approach that focused on building on what worked well, analysing why it is working well and implementing it in other areas. The process also allowed QFES to identify areas for improvement that could inform future operations and training.

Kate Brady, the National Recovery Adviser for Australian Red Cross Emergency Services, presented on 'Disaster recovery: are we doomed to keep learning the same lessons over and over?' She spoke about the barriers to implementing lessons, such as workforce continuity, political environments, limited training for staff and limited resources.

Dr Graham Dwyer, a University of Melbourne researcher and former Bushfire and Natural Hazards CRC PhD student, spoke about his research into the 2009 Victorian Black Saturday bushfires and the emotional context of bushfires. Dr Dwyer highlighted the way emotion can shape learning in emergency management organisations. In particular, he explained the trajectory of emotions that occurs during an event, immediately after and during subsequent inquiries—or in the case of Black Saturday, a royal commission.

On day two of the forum, Ashley Zohn and Andrew Jahier from the US Federal Emergency Management Agency (FEMA) joined via video link to present on FEMA's Continuous improvement program. This remedial action was built on the foundation of the Post Katrina Emergency Management Reform Act.

Kristy Hill from the New Zealand Defence Force also joined via video link, presenting on the New Zealand Army Adaptive Warfighting Centre and her role as Lessons Manager. The centre supports continuous improvement and change management through lessons learned, professional forums and adaptive learning.

Emergency Management Victoria's (EMV) Commissioner Craig Lapsley spoke about the process of major reforms. He described the work EMV is doing to embed a lessons management approach and support a culture of learning, and emphasised the need to learn from successes as well as failures.

The forum also featured breakout workshop sessions on both afternoons. EMV's Lisa Marie Jackson ran two sessions on 'weLearn—Developing a learning culture' and 'Lessons identified to lessons learned—how to create change'. Bushfire and Natural Hazards CRC and CQUniversity researcher Dr Chris Bearman facilitated a session on 'Learning lessons about teamwork', while Mark Cuthbert from the Attorney-General's Department introduced the 'Observations, Insights, Lessons (OIL) model'.

Attendees had the opportunity to network and share insights with like-minded colleagues, including a networking function in the State Library courtyard held at the conclusion of day one. The forum was a joint effort by members of AFAC's Knowledge Innovation and Research Utilisation Network and was moderated by Georgie Cornish from South Australian Country Fire Service. ■

Presentations from the event are available on the AFAC website: www.afac.com.au.



THE PATH TO CHANGE

What did it take to create the new Fire Sprinkler Standard AS 2118.1 and include it in the National Construction Code?

BY **STEPHEN CAPLE**

Wormald Australia

ANDRE MIERZWA

FM Global

It has been a long and demanding journey to implement the recent changes to the AS2118.1 Fire Sprinkler Standard—a process that started nearly eight years ago. Wormald, through its association with Fire Protection Association Australia (FPA Australia), has been a part of that journey. Here, we share some detail on what it took to implement the changes and have them included in the National Construction Code (NCC).

AS 2118.1 and the National Construction Code

The NCC currently references the 1999 version of the Fire Sprinkler Standard AS 2118.1. This means that all buildings in Australia that require a deemed-to-satisfy (DTS) AS 2118.1 fire sprinkler system must have a system that is designed and installed in accordance with the 1999 version of AS 2118.1. However, the 1999 version was only a minor update to the 1995 version, and most of the

technology at that time dated back to the late 1960s or early 1970s.

One saving grace of the 1999 version was the 'Special Sprinkler' clause. This enabled new technology to be introduced into DTS sprinkler designs by leveraging overseas standards. The industry has been using this clause over the past 18 years, predominantly for large warehouses, where the use of storage sprinklers—formally known as ESFR (early suppression fast response) sprinklers—has long been the norm.

A new version of AS 2118.1 was released by Standards Australia in 2006, with a later amendment released in 2010. Neither of these versions were adopted into the NCC, and therefore cannot be used as a DTS solution; however, they can be used as a performance solution. The Australian Building Codes Board (ABCB), which produces and maintains the NCC, has very strict protocols on how a NCC referenced standard is structured. The ABCB does not allow a NCC referenced standard to delegate the design and installation requirements to an overseas authority. This avoids changes in overseas standards from automatically affecting our local Australian Standard

without any opportunity for the Australian industry or regulators to assess any such change.

Back to the drawing board

After rejecting AS 2118.1:2006, the ABCB decided to write its own fire sprinkler standard, which it worked on for approximately three years. The standard was subjected to a regulatory impact statement in 2011, but failed. The project was subsequently scrapped, paving the way for Standards Australia to produce a new version.

After a year of preliminary work, the project kicked off in April 2012 with a technical committee consisting of 17 participating members representing 12 organisations, including the ABCB, FPA Australia, AFAC, industry association groups representing the insurance industry, the fire protection industry, hydraulics consultants and Engineers Australia.

The committee worked tirelessly to produce a modern version of the fire sprinkler standard that would contain prescriptive requirements for current technologies and be structured in a format that complied with the ABCB protocols. In February 2015 a Public

After an exhaustive eight-year-long process, the updated fire sprinkler standard will be published this March.

Comment Draft was released, which drew more than 1,000 comments. These comments were individually considered and many were incorporated into a draft, which in January 2016 was accepted by the ABCB.

Everyone thought that the journey was over. But unfortunately, an unexpected setback was in store.

The Lacrosse Tower fire in Melbourne in November 2014 spawned much debate about the installation of sprinklers on high-rise apartment balconies. AS 2118.1 had always included a requirement to protect balconies larger than 6 m² and more than 2 m deep, but the fire brigades were looking to tighten these requirements. In fact, Victoria changed its legislation to ensure all balconies were protected, regardless of what the sprinkler standard required.

The draft was reviewed again and eventually resolved in July 2017, clearing the way to publish the 2017 version in September of that year. It was initially hoped that the standard would be published in time to be referenced by the 2016 version of the NCC. However, that was not possible.

AS 2118.1:2017 is approved

The committee resigned itself to the fact that the next opportunity would not be until 2019, since the NCC is only updated every three years. Then, to everybody's surprise, the ABCB advised that it was releasing an out-of-cycle amendment of NCC 2016 to deal with the issue of combustible external wall cladding. Fortunately, the ABCB also decided to take the opportunity to reference the new fire sprinkler standard.

The ABCB anticipates that the amended NCC 2016 will be published in March 2018. From that point forward, it will reference AS 2118.1:2017 Automatic Fire Sprinkler Systems—General Systems. ■

Stephen Caple and Andre Mierzwa sit on Standards Australia Committee FP-004. They presented at an FPA Australia seminar series on AS 2118.1:2017 held in September and October 2017, alongside Carl Rickard of Australian Fire Protection Resources. FPA Australia is exploring follow-up workshops on AS 2118.1:2017 in 2018–19. To register your interest, email: events@fpaa.com.au.

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RESEARCH STRENGTHENS INCIDENT MANAGEMENT DEVELOPMENT

PHOTOS: TIM FOX, AFSSM



Scientific evidence from CRC research has been used to create and strengthen leadership, learning and capability pathways for incident management teams through AFAC’s Emergency Management Professionalisation Scheme.

BY **BRENDA LEAHY**

AFAC

The most powerful learning and leadership development often comes when you are way in over your head, according to Fire & Rescue NSW (FRNSW) Incident Controller Rob McNeil. Mr McNeil’s moment of truth came in 2011 during his deployment as NSW task force leader for the Australian Incident Management Team (IMT) that attended Japan’s Fukushima disaster. The catastrophic incident – which involved continuing earthquakes, tsunami, flooding and nuclear reactor meltdown – claimed 14,000 lives leaving devastation and destruction in its wake.

Even with three decades of operational experience, including incident management and hazardous materials (hazmat) expertise, Mr McNeil said the complexity and scale of the assignment challenged his thinking and decision making.

“At times, my legs were shaking,” he recalled. “I made good decisions and flawed decisions.”

The good decisions were due to his technical and operational expertise in hazmat and understanding of the risks of radiation. The flawed decisions were due to unfamiliarity with the complexity of multiple, converging and extraordinary risks—including tsunami, flooding, continuing earthquakes and the threat of a nuclear meltdown.

Becoming a Certified Incident Controller under EMPS

Mr McNeil had the opportunity to reflect on his thinking and decision making at the Fukushima incident and what he learned during an interview to become a Certified Incident Controller (CIC) under the Emergency Management Professionalisation Scheme (EMPS).

During the interview, candidates for EMPS are assessed by a panel of peers against a series of indicators of incident management capabilities, which include thinking and decision making in managing emergency events.

“The process challenges you to critically review your own performance. Naturally, it can make you feel vulnerable,” he said. “[But] it’s that openness to and

awareness about where you need to review and improve that provides the most insightful learning experiences.”

Mr McNeil leads the management of three regional area commands, consisting of nine zone commands with more than 150 fire stations, 2,500 on call firefighters and 300 career firefighters. He has also mentored more than 10 incident managers from FRNSW through the EMPS certification process. The agency uses EMPS internally to support the development of performance plans and their personnel who show significant potential for leadership. The capabilities have also been cross-checked with their agency training and exercising programs.

Launched in 2015 as a priority initiative of the AFAC National Council, EMPS provides the first dedicated pathway to credential incident managers in Australia and New Zealand. It sets out the core incident management capabilities for effective incident management, provides a process for certification and offers guidance for continuing professional development for IMTs and other specialist roles.



Research evidence underpins IMT capability

EMPS has been collaboratively developed and trialled with end users from the AFAC membership, and uses research evidence outputs from AFAC’s Cooperative Research Centre partners—the former Bushfire CRC and current Bushfire and Natural Hazards CRC. Over the past 14 years, the CRC program has delivered a robust evidence base in IMT capability, leadership and human factors.

The core IMT capabilities are clustered into three broad themes. These encompass leadership and teamwork, thinking and decision making, as well as critical interpersonal skills, such as self-awareness, self-reflection and giving and receiving feedback. IMT members can use these capabilities to continuously review and improve in current and future roles.

Since EMPS was established, more than 40 practitioners have been certified, including 13 incident controllers who convene as the EMPS Panel. The EMPS Panel oversees the scheme and is drawn upon to assess candidates seeking the CIC credential.

The evidence-based capabilities also underpin the EMPS guidance resource for continuing professional development (CPD). Incident controllers



A NSW task force was deployed to Japan to assist with the Fukushima disaster in 2011.

certified through EMPS can use this resource to self-assess their ongoing development needs to maintain their credential. Several activities available through the Australian Institute for Disaster Resilience’s (AIDR) national education program are recognised as EMPS CPD. AIDR clinics in decision making and debriefing, which have also been developed from the CRC research evidence base, attract EMPS CPD credit.

AFAC member agencies are drawing on the evidence-based IMT core capabilities within their own jurisdictions to develop agency-wide or multi-agency leadership, learning and development frameworks. Victorian reviews by

the Inspector General of Emergency Management into accreditation and operational readiness have also been informed by the evidence-based standards.

AFAC case study

The latest AFAC research utilisation case study features Mr McNeil’s story and outlines how the CRC research was used in EMPS and to create and strengthen leadership, learning and capability pathways for current and future incident management workforces across AFAC’s membership.

The case study focuses on use of the CRC evidence base for EMPS and



PHOTO: TIM FOX/AFISM

“The process challenges you to critically review your own performance. Naturally, it can make you feel vulnerable,” he said. “[But] it’s that openness to and awareness about where you need to review and improve that provides the most insightful learning experiences.”

Rob McNeil, Fire & Rescue NSW

The Australian USAR Task Force, working with Japanese Civil Defense Force searching through the devastation along the shore front of Minamisanriku, Miyagi Prefecture, Japan.

highlights factors critical to its successful utilisation. It also explains how Victoria’s Country Fire Authority drew on the EMPS core capabilities and the broader CRC research evidence to create a portfolio of incident management leadership

capabilities for its workforce, as well as a system to develop and expand these capabilities.

The case study is available to download from the AFAC website at www.afac.com.au. ■

For further information on EMPS, contact General Manager Paul Considine: paul.considine@afac.com.au or visit the AFAC website.



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Group 1/2018	6–9 February 2018 (sold out)	8 May 2018
Group 2/2018	6–9 March 2018 (sold out)	13 June 2018
Group 3/2018	20–23 March 2018 (sold out)	14 June 2018
Group 4/2018	17–20 April 2018	21 August 2018
Group 5/2018	1–4 May 2018	22 August 2018
Group 6/2018	23–25 May 2018	23 August 2018

NEW TRAINING COURSE FOR TESTING WATER-BASED FIRE SYSTEMS

Fire Protection Association Australia (FPA Australia) has launched a new training course titled 'Fundamentals of Testing Water-Based Fire Systems'.

The course is for anyone working in the fire protection industry who wants to develop the skills and knowledge to effectively carry out routine services of water-based fire systems.

The new course will cover routine servicing of:

- ◆ fire sprinkler systems—monthly, six-monthly and yearly, excluding water supply proving tests
- ◆ fire pumpsets—monthly and six-monthly
- ◆ fire hydrant systems—monthly, six-monthly and yearly, excluding water supply proving tests.

It also incorporates:

- ◆ an understanding of applicable legislation, codes and standards
- ◆ knowledge of the principles of operation and purpose of water-based fire systems and their components
- ◆ identification and reporting of defects, correct use of logbooks and reporting to clients.

The course is delivered by FPA Australia's expert trainers using a combination of training methods. It

begins with four consecutive days of classroom and workshop training, followed by on-the-job training conducted over three months under the supervision of an experienced tester.

Training will be conducted at FPA Australia's dedicated training centre in Sydney. Students will be taught using a variety of systems and equipment to provide a professional training outcome that builds skill and knowledge.

The first course will start in February 2018 and enrolments are now available. Places are limited so act now to avoid missing out. For more information on the course, availability and pricing or to enrol, visit goo.gl/RgS95a.

Additional water-based courses coming soon

In the coming months, FPA Australia will be releasing additional training courses to cover flow testing of fire sprinkler systems and fire hydrant systems.

We will also be releasing an Experienced Recognition Program to suit fire protection technicians who have been conducting routine service of water-based fire systems as their primary role for several years. The program will recognise this experience and avoid the need to undertake the new training course to meet accreditation requirements under the Fire Protection Accreditation Scheme. ■

FPA Australia's new training course provides the skills and knowledge to test water-based fire systems.

MORE THAN 250 ON INTERIM FIRE SAFETY ASSESSOR REGISTER

Since its October 2017 launch, more than 250 people have applied for a listing on FPA Australia's Interim Fire Safety Assessor Register. The number of customers visiting the register to search for suitable fire safety practitioners has also escalated significantly, and it is currently one of the most-visited areas of the FPA Australia website. The register connects building owners and industry looking for assistance in preparing Annual or Supplementary Fire Safety Statements with FPA Australia corporate members who do this work in NSW. It is a response to the NSW reforms that require owners to satisfy themselves that practitioners conducting this work are competent, as covered in *Fire Australia* Issue, 4 2017.

Individuals listed on the register have met FPA Australia's minimum requirements for experience, insurance, professional conduct and commitment to future accreditation under the Fire Protection Accreditation Scheme.

PERSPECTIVES ON THE SECTOR WITH CHRIS ARNOL

In this regular series, AFAC CEO Stuart Ellis interviews a senior AFAC leader for *Fire Australia*. This issue he caught up with Chris Arnol, Chief Officer of the Tasmania Fire Service. Mr Arnol was appointed to the role in March 2016.



BY **STUART ELLIS**
Chief Executive Officer, AFAC

You have been in the role almost two years now, returning to Tasmania Fire Service (TFS) following seven years at Department of Fire and Emergency Services, Western Australia. What attracted you to the role at TFS?

Although I am a born and bred Tasmanian, for me it was really important

to move away from Tasmania to gain some experience in another jurisdiction. That experience in WA working in an agency where fire and emergency services are combined has really set me up well for the direction Tasmania is heading in this space.

Key environmental factors, climate

PHOTO: LUKE BOWDEN, THE MERCURY

Chief Officer Chris Arnol is leading Tasmania Fire Service to deliver more effective and efficient services to the community.



change and economics in particular, are demanding that emergency services prepare for more frequent large scale emergencies, and deliver those services efficiently. Across Australia we are seeing more individual fire and emergency services combining into one agency to achieve these objectives. This reform makes perfect sense to me and given my experience in WA I felt I could add value to Tasmania in a leadership capacity to implement those changes.

We are seeing police, fire and emergency services integrated into the one department in Northern Territory and Tasmania. What are the advantages of this arrangement?

Integration of emergency services is essential in this dynamic environment so that we can be as efficient and as effective as possible. The benefits of collaboration and improved communications between agencies cannot be underestimated.

I often talk about the benefits of the integrated Department of Fire and Emergency Services structure in WA. As

a smaller jurisdiction, Tasmania is taking the distinct opportunity to go that one step further by also integrating with police, which is a process well underway. This maximises our performance and allows us to break down silos as we take that 'all hazards' approach to emergencies.

What synergies are you now achieving with Tasmania State Emergency Service?

Our first step was to reconfigure and combine strategies. It's fantastic to see TFS and Tasmania SES co-locating their headquarters and working in the same incident management teams. We are now adopting the same training systems, and frontline personnel have assisted each other in recent fire and flood emergencies.

This is a vision I have had for a long time and the subject of a paper I wrote back in 2003. It has always seemed obvious considering both services are volunteer organisations with the same public safety goals, similar service delivery models, and attending the same types of incidents such as road crashes, and using similar equipment.

We are one of the most bushfire-prone places on Earth and we must all learn to live with that threat. The next step is helping the community see the risk they are facing into the future and provide them with the tools they need to be more resilient in emergencies.

Chris Arnol, Chief Officer, Tasmania Fire Service

What future goals have you identified that you want to see achieved?

Our Fuel Reduction Program is leading the way in this country and I want to see us continue doing that. Our community programs are also winning awards – but we are one of the most bushfire-prone places on Earth and we must all learn to live with that threat. The next step is helping the community see the risk they are facing into the future and provide them with the tools they need to be more resilient in emergencies. Internally, we still have a lot of work to do integrating systems and working on structural alignment. Getting that right will be our focus for the next little while.

Being Chief Officer has the potential to absorb all your time. What other interests do you pursue to relax?

Indeed, sometimes it feels like I don't have time to even change my mind! My children are adults and have left the nest, but that doesn't seem to have slowed life down. My escape is my art – I try to spend a few hours a week drawing or painting. Quick visits to quiet art galleries is an enjoyable way for me to relax my mind. ■



"My escape is my art" says Chris Arnol, pictured here with his piece 'A Firefighter's Life'.

Key environmental factors, climate change and economics in particular, are demanding that emergency services prepare for more frequent large scale emergencies, and deliver those services efficiently.

Chris Arnol, Chief Officer, Tasmania Fire Service



The Tae Yon Kak Hotel fire was the deadliest hotel fire in recorded history.

TAE YON KAK HOTEL FIRE—1971

BY **BARRY LEE, OAM**

A Christmas Day fire in the 21-storey Tae Yon Kak Hotel in Seoul, Korea, was internationally the worst fire in 1971 in terms of lives lost. It remains the deadliest hotel fire in history.

The final death toll of employees, office workers and guests was 164. Of these, 40 died from falls or from jumping from the building. More than 100 occupants were rescued by the fire brigade or escaped from the building. Helicopters rescued six people from the roof, while others escaped from the lower floors using lifts. A few survived jumps from the lower floors.

The building was divided vertically into two occupancies. Several business firms occupied floor spaces from the

second to the 20th floors; the hotel portion contained 223 guest rooms from the sixth to the 20th floors.

The building was not sprinkler protected. It had a fire alarm system arranged to send evacuation alarms in the office and hotel occupancies, but the system was not connected to the fire brigade. Hydrants with 64 mm connections and hoses were installed in the office and hotel occupancies.

The mid-morning fire originated in the vicinity of a liquefied petroleum gas-fired stove in a second-floor coffee shop. It immediately involved the coffee shop and spread to the hotel lobby, which was served by a single stairway open to four lower floors and protected by hollow-core wooden doors on the remaining floors. Smoke and toxic gases filled the building as fire

progressed up the stairway to involve the third and fourth floors.

Air-handling system ducts and vertical shafts also spread smoke and heat throughout the building, soon communicating the fire to the 21st floor. Other floors became involved as fire spread through ducts and shafts, with combustible interior finish contributing to the spread.

The Seoul fire brigade received the first alarm at 10.17 am, and from that time the fire burned through most of the building for six hours. Fire attack was concentrated from outside using streams from elevating platforms and turntable ladders, but because of limited street hydrant supply, most streams were supplied from tank trucks. The building was remodelled after the fire. ■

Testing was conducted in a replica residence at CSIRO's North Ryde facility.

RESIDENTIAL SPRINKLERS ADDRESS FIRE PROTECTION GAP

BY **TOM BICKNELL**

Fire Protection Association Australia

Newly released research into effective and affordable fire sprinkler protection of residential buildings could lead to a significant improvement in Australians' safety.

In *Residential Sprinkler Research*, a report released in mid-January by Fire & Rescue NSW (FRNSW), researchers announced findings that fire sprinklers significantly improve the safety of occupants in residential buildings under 25 metres in height, preventing 90% of fires from spreading to other rooms.

The research was conducted by a partnership between FRNSW, Fire Protection Association Australia (FPA Australia), the Australasian Fire and Emergency Service Authorities Council (AFAC), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and industry partners.

It addresses a gap in fire protection of residential buildings under 25 metres, which are classified as Class 2 and Class 3 shared residential accommodation and are currently not required to be fitted with sprinklers under the National Construction Code (NCC).

The research report also covers testing of two innovative new sprinkler system designs for residential buildings that offer high levels of reliable fire protection, while reducing cost and complexity on installation, routine servicing and maintenance. These designs were developed by FPA Australia members.

Based on the findings of the study, FPA Australia, FRNSW and AFAC have jointly submitted a *Proposal for Change* to the 2019 NCC, calling for a requirement that sprinklers be fitted to all new Class 2 and Class 3 shared residential accommodation buildings of up to 25 metres in effective height, and the adoption of the two new sprinkler systems tested as options for AS 2118.1 and AS 2118.4.

"These buildings are some of the most vulnerable in Australia to fire because there is no automatic suppression," said Matthew Wright, FPA Australia General Manager Technical Services / Deputy CEO. "They are also increasingly common as housing density increases."

"Automatic sprinklers have been shown time and again to be one of the most effective ways of improving life safety in a fire. This research identifies new fit-for-purpose sprinkler designs that can greatly improve the safety of the large proportion of Australians living in these vulnerable buildings."

The residential sprinkler research began following recommendations made by the NSW Deputy Coroner after an inquiry into the Bankstown apartment fire that caused the tragic death of 21-year-old student Connie Zhang in 2012.

World-first sprinkler testing

The three-year research project tested world-first fire sprinkler designs, unique in that they use existing residential water

supplies or better harness dedicated fire water supplies to reduce cost and complexity, while still providing a high level of protection. The designs tested use innovative features such as connection to residential toilets to ensure any water supply problems are caught quickly.

The research was conducted using a near full-scale replica residence at CSIRO's North Ryde fire research facility in NSW. Funding was primarily provided by FRNSW, with technical support from FPA Australia, CSIRO and industry partners.

Fires faster than in past

The push to improve residential fire protection has been driven by the flammability of modern furnishings and building materials. Many of the current fire protection requirements were developed prior to widespread use of synthetic materials.

"Fire is a time-critical event – the earlier you know about a fire and the earlier suppression starts, the better your chance of escaping safely," said Mr Wright.

"The average speed of residential fire growth is eight times faster than it was 50 years ago because of synthetic furnishing and building materials. These two pieces of research are about addressing that change and giving people more time."

The *Residential Sprinkler Research* report is available at: <https://goo.gl/48mUJt>.

BY IAN FINDLAY

Technical Coordinator, FPA Australia

STANDARDS AUSTRALIA

FP-002 Fire detection and alarm systems

Amendment 1 to AS 1670.1 was published on 15 November.

Public comment on AS 4428.6 has recently closed. Public comment on a draft revision of AS 1670.3 closed 5 December. Draft revisions to AS 1670.1 and AS 1670.4 closed for public comment on 1 February.

FP-004 Automatic fire sprinkler installations

AS 2118.1:2017 was published on 14 September. A project proposal for an amendment to AS 2118.1:2017 has been approved. This is to address matters that were agreed to be held over to allow the publication of the standard, but will also address other minor issues identified since its implementation.

FP-008 Fire pumps and tanks

The public comment on the draft revision of AS 2304, Water storage tanks for fire protection systems, has been resolved and the document will go to committee ballot shortly.

FP-009 Fire hydrant installations

AS 2419.1:2017 was published on 6 November. Due to the nature of the standard and revision, a regulatory impact statement is required, but this is unable to be completed before the 1 May 2018 deadline for the National Construction Code 2019. For now, AS 2419.1:2017 can only be used as part of a performance solution.

FP-011 Special hazard fire protection systems

Public comment on the revision of AS 14520 (recombined and redesignated AS 4214) closed in September and FP-011 met to resolve the public comment in November. It is proposed to be published in early 2018.

FP-018 Fire safety

The relevant FP-018 subcommittee is finalising the changes required from the resolution of the public comment received on the draft revisions of AS 1530.8.1 and AS 1530.8.2 Testing of elements of construction for buildings to simulate bushfire attack.



FP-020 Construction in bushfire-prone areas

Public comment on the draft revision of AS 3959 Construction of buildings in bushfire-prone areas closed 22 November. FP-020 will be reviewing the public comment early in 2018.

LG-007 Emergency lighting in buildings

The revisions of AS/NZS 2293 Parts 1, 2 and 3 (emergency escape lighting and exit signs) are currently being updated in line with the public comment resolutions. They will be prepared for combined procedure (public comment and committee ballot) during December/January or January/February.

Technical Advisory Committees

The most recent round of TAC meetings was held in November. However, TAC/T did not meet this round. All TACs are continuing to trial the SPARK online community and discussion forum.

TAC/1 Maintenance of fire protection systems and equipment

The document on routine servicing of aspirating smoke detectors continues to be progressed.

TAC/2 Fire detection and alarm systems

With the addition of a new Senior Technical Officer, work on the stalled smoke alarm Good Practice Guide has begun anew with a new draft presented to the TAC for review. The TAC also continues to work on other projects and contribute to Australian Standards at FP-002.

TAC/3/7 Portable and mobile equipment

Work progresses on a possible revision of AS 2444 (and associated standards) as well as a document to provide guidance on working with foam fire extinguishers that considers the various discussions across Australia regarding certain foams.

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

The committee reviewed the status of related FP committees and identified the new need for project proposals to amend various standards (e.g. AS 2118.6) given precursor standards (e.g. AS 2118.1 and AS 2419.1) have now been revised. It also discussed changes required in Amendment 1 to AS 2118.1:2017.

TAC/11/22 Special hazards fire protection systems

With the addition of a new Senior Technical Officer, work on stalled technical documents for cylinder hydrostatic testing and oxygen reduction systems has resumed. FPA Australia and TAC/11/22 continue to keep abreast of regulators' discussions on firefighting foams and are proposing to hold a seminar series on this early in 2018.

TAC/17 Emergency planning

TAC/17 continues to monitor and contribute to the development of Amendment 2 to AS 3745-2010 as well as other matters relating to emergency planning in different states (particularly Victoria and NSW) and settings, such as schools.

TAC/18/19 Passive fire protection

TAC/18/19 continues to work on several technical documents, including on access panels and fire stopping systems, and to discuss associated National Construction Code interpretation issues.

NATIONAL MEMORIAL SERVICE

1 May 2018, Canberra

AFAC will hold a National Memorial Service for fire and emergency service personnel, honouring the courage and sacrifice of those who have died in the line of duty. The service will be held in Canberra at the National Emergency Service Memorial and will be open to the public. See page 8 for further details.

FIRE AUSTRALIA CONFERENCE AND TRADESHOW 2018

1-3 May 2018, Brisbane Convention and Exhibition Centre

The premier event in fire and life safety. The Fire Australia Conference and Tradeshow is heading to Brisbane in 2018, with a three-day program and the largest trade show for fire protection in Australia.

For more information, visit:
www.fireaustralia.com.au



AFAC18 POWERED BY INTERSCHUTZ

5-8 September 2018, Perth

AFAC and the Bushfire and Natural Hazards CRC are delighted to announce that AFAC18 powered by INTERSCHUTZ will return to Western Australia for the first time in six years. The event will be held at the Perth Convention and Exhibition Centre.

Key features include the:

- ◆ AFAC18 Conference
- ◆ Bushfire and Natural Hazards CRC Research Forum
- ◆ INTERSCHUTZ trade exhibition, featuring the Expo stage and demonstrations
- ◆ AFAC18 Gala Dinner
- ◆ professional development program.

The 2018 conference theme will explore *Changing lives in a changing world* and will be hosted by the Department of Fire and Emergency Services, WA, and the Department of Biodiversity, Conservation and Attractions.

For more information, visit:
www.afacconference.com.au



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Paul Smith

Dr Paul Smith has been appointed the permanent Chief Executive Officer of CFA Victoria. Dr Smith was previously the Deputy Secretary for Energy, Environment and Climate Change within the Victorian Department of Environment, Land, Water and Planning. He also led the former Department of Sustainability and Environment's response to the Bushfire Royal Commission. Dr Smith commenced in the role on 1 February 2018.



Paul Smith

Frances Diver

Frances Diver completed her term as Chief Executive Officer of Country Fire Authority on 1 February 2018 following the appointment of Dr Paul Smith. Frances was appointed as interim CEO of CFA in June 2016 and lead the agency through a challenging period, making significant improvements to governance arrangements.



Frances Diver

Georgeina Whelan

Georgeina Whelan has been appointed as Chief Officer of ACT State Emergency Service. Ms Whelan is the first female Chief Officer for ACT SES and comes to the agency following a 32-year career in the Australian Army, most recently as Chief of Staff for the Australian Defence Force Headquarters.



Georgeina Whelan

Brendan Scully

Brendan Scully has joined FPA Australia's technical department. Mr Scully brings to the team 23 years of experience in the fire and construction industry across Australia and the UK, as well as qualifications in engineering and building design. He has experience across the breadth of the fire protection industry, and brings to FPA Australia a particular expertise in special hazards.



Brendan Scully

Tim Wiebusch

Tim Wiebusch has been appointed as Chief Officer at Victoria State Emergency Service, replacing Trevor White, who retired on 15 December 2017. Mr Wiebusch commenced with VICSES in 2003 and was previously Deputy Chief Officer – Readiness.



Tim Wiebusch

Trevor White

Trevor White has retired from his position as Chief Officer, Victoria State Emergency Service. Mr White served 11 years in the role and over his career gained many years of operational experience across both VICSES and Country Fire Authority. We wish him well in his new endeavours.



Trevor White

Rob Llewellyn

Rob Llewellyn has retired from his role as Built Environment Consultant with AFAC. Mr Llewellyn leaves AFAC after 23 years with the organisation, working in fire safety, built environment, community safety and standards. We thank him for his valuable contribution to AFAC.



Rob Llewellyn



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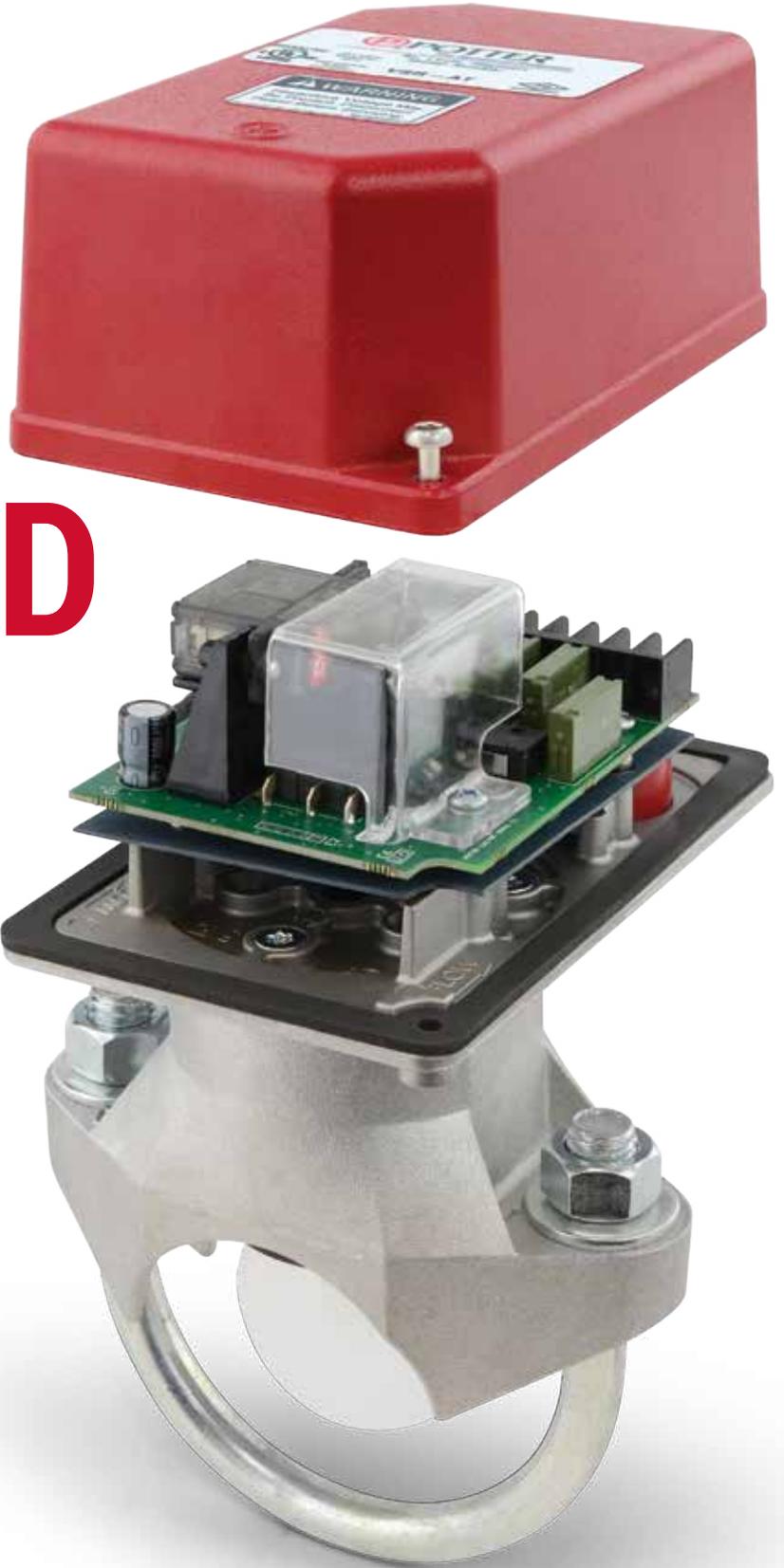


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