

THE MAGAZINE FOR FIRE INDUSTRY PROFESSIONALS



ISSUE 9 | SEPTEMBER 2014

RISK & *responsibility*



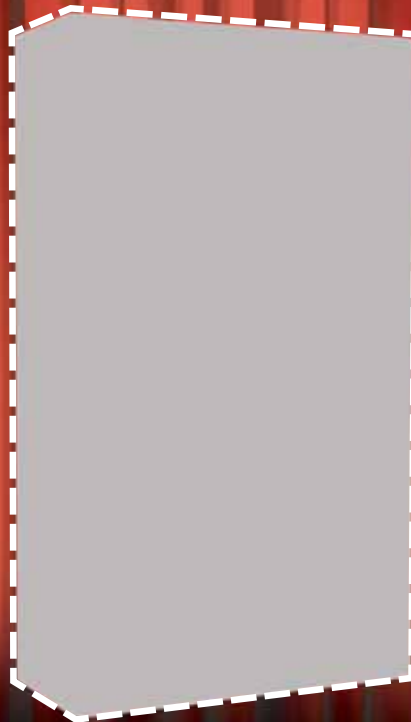
THE INSTITUTION OF FIRE ENGINEERS
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THE MAGAZINE OF THE FIRE PROTECTION ASSOCIATION NEW ZEALAND, THE INSTITUTION OF FIRE ENGINEERS (NZ BRANCH)
AND SOCIETY OF FIRE PROTECTION ENGINEERS (NZ CHAPTER)



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Fire NZ welcomes articles and letters from our readership. These can cover any aspect of fire protection, fire engineering (performance and design), legislation, fire safety practice, fire industry product development, firefighting operations, techniques, equipment and case studies and technical news. All articles will be assessed by an editorial panel prior to publication who, at their discretion, reserve the right to either decline use of the article or seek amendments. Articles should inform, debate, educate and help our readership through sharing of both knowledge and expertise.

Themes for the upcoming magazine production will be promoted in advance of editorial committee deadlines to ensure all contributors are able to meet the final magazine delivery timelines.

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Editorial

Welcome to this edition of the FireNZ magazine, the first for 2014. And why is that? In the past we have had published up to three magazines in a year, and more recently we have published the FireNZ magazine in April and then in September, in advance of the FireNZ Conference and Exhibition, a pre-conference edition.

The FPA NZ has gone through a period of change with new staff now in the office and Executive Director Mike Connolly taking an opportunity to move back to Wellington. With this change has come a period of time requiring key focus on preparing for the FireNZ Conference and Exhibition and the bleeding-in of staff and processes.

The previous eight editions of the FireNZ magazine have been a compilation of information and communication from the Fire Protection Association New Zealand and the Institution of Fire Engineers New Zealand Branch to their membership at large, key stakeholders and the fire industry.

This ninth edition sees the addition to the contribution and FireNZ magazine distribution to the membership of the Society of Fire Protection Engineers – New Zealand Chapter. As a partner in the putting together and conference organising committee for the FireNZ 2014 Conference and Exhibition, the SFPE add a key aspect to the industry representation of our annual industry representative event.

This edition of FireNZ magazine will arrive before the FireNZ 2014 conference and exhibition in mid October. This year's conference will be held at the Ellerslie Convention Centre, in the grounds of the Ellerslie Racecourse, Auckland. The exhibition hall will be fully booked and packed out with the latest industry equipment, techniques and products for promoting the latest in our fire industry.

The middle section of this edition of the FireNZ magazine features this year's conference information and program to entice you to register and attend this world class event. With the full conference program and technical streams to focus your preference for learning and updating your knowledge, the opportunity to mix and mingle in the exhibition hall with your fellow conference registrants and fire industry exhibitors and conference supporters bodes well for a successful event.

The conference theme is "Risk and Responsibility". Our industry deals in the elements of risk of fire and all the necessary practical, legislated and technical means we have to provide for a safe built environment in New Zealand. The responsibility to achieve this is vested in key people and activities that begin with design and engineering, installation, sign off and compliance and the ongoing maintenance and upkeep of these fire protection systems and practices. Sounds like a reasonably simple process, but there are 50 shades of fire protection from historical codes and standards to current industry regulation, codes and standards, work practices and variances in skill, knowledge and professionalism. All this coupled to the primary driver, what the building owner is prepared to pay for and expect to receive against what the minimum requirements are!

If you were to invest in your business, yourself or to better inform and prepare yourself for the current market place and future fire industry direction – then you MUST register and attend this year's FireNZ 2014 conference and exhibition, 15-16 October at the Ellerslie Convention Centre, Auckland. The networking that enhances relationships and business acumen is a key feature of the conference and exhibition with the break sessions in the exhibition hall, the conference exhibition opening and conference dinner being great social events to celebrate our fire industry. Register early, see you there and be part of making this year's FireNZ Conference and Exhibition the great event that it will be.

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From the Presidents



Greetings from the IFE. The Institution of Fire Engineers is an international learned body, founded in 1918 and incorporated in New Zealand in 1924, with the following main objectives:

- To promote, encourage and improve the science and practice of fire extinction, fire prevention and fire engineering, and all operations and expedients connected therewith.
- To give an impulse to ideas likely to be useful in connection with or in relation to such science and practice to the members of the Institution and to the community at large.

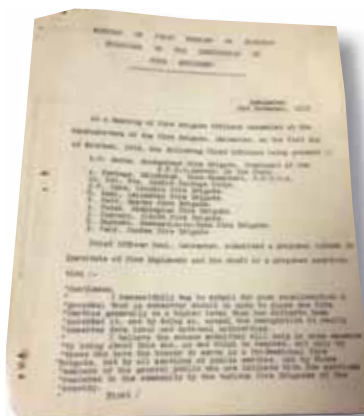
As President of the New Zealand Branch each year I attend the International General Assembly held in the UK. As the Institution nears its 100 year centenary in 2018 the Board has been working on the strategic direction and updating its content to reflect modern times.

The description above is based on the original charter document that Chief Fire Neal submitted as a proposal to those like minded officers assembled at the time in Leicester as his vision. His words included *"to place the fire services generally on a higher level, compel the recognition it deserves from local and national authorities"*. He went on to add *"to bring about this end not only by those who have the honour to serve in a fire brigade but by all sections of public service and those members of the general public who are intimate with the services rendered to the community by various fire brigades..."* Remember this document was written nearly 100 years ago. As our discussions developed on the direction of the Institution, the IGA discussed the modern

environment and the changing roles of our members. There was discussion held on the possibility of changing the name to reflect changing times. At this point I introduced a photo I had taken of the charter document with the above words of wisdom. Have we really changed or moved greatly away from the founding document? I believe not and find the vision and the subsequent proposal submitted at that time ground breaking and incredible that it can remain so relevant over 100 years.

A suggestion of retaining the historic name but editing the accompanying mission statement to reflect recent times is personally more palatable. Even the use of the term Fire Engineer was revolutionary as this facet of engineering is relatively new in comparison to other forms of engineering.

In conclusion may I invite you all to attend the FireNZ conference in Auckland and continue to expand your knowledge or should I say *place yourself at a higher level*.



Graeme Quensell Grad. Dip Building
Fire Safety & Risk Engineering FIFireE FNZFBFI NCAET
President Institution of Fire Engineers NZ Branch
Vice Leader of the International General Assembly
Institution of Fire Engineers

This year's conference topic is a fantastic opportunity to explore how the fire community make choices about risk, its allocation, and even compensation for harm caused when risks go unmitigated. The topic aligns well with the SFPE's work this year;

- With the 2012 changes to the Building Code still bedding in, it has been another exciting year for the SFPE working with industry as we get used to the regulations. We have taken *responsibility* for giving constructive actionable feedback to the relevant authorities and for providing our technical sessions as direct consultation sessions with regulators and local authorities.
- The SFPE have been working closely with IPENZ with input from our allied organisations to develop Practice Note 22 to make clear which members of the design team are *responsible* for detailing each of the design elements set out in the fire report. By following this updated Engineering Practice Note users will mitigate the *risk* of fire design details being lost during construction or lost during the buildings life when it is required to be maintained. This mitigates fire life safety *risk*, and the *risk* of costly remedial works. The Practice Note also mitigates reputational risk to the industry by presenting a united, informed and mature industry that takes full *responsibility* for its respective part of the design, construction, operation and maintenance process.
- SFPE has been working closely with IPENZ on fire engineering competence assessment topics to



mitigate reputational *risk* for Chartered Professional Fire engineers by providing a level playing field for assessment. We have produced information on the updated SFPE website to make clear the requirements for aspiring applicants, and have been exploring ways to bring greater consistency to assessments.

- SFPE has fulfilled its learned society *responsibility* in education, by arranging a wide range of CPD sessions including lectures from international professors, practical life fire training, house burn viewings, sprinkler standard updates and many other technical topics. We are grateful to all who have given their time and effort to arrange the many varied and informative CPD sessions.
- SFPE has also been working hard to mitigate the consequences of a shortage of fire engineers by putting on highly successful careers sessions for potential young engineers to encourage them to undertake a career in Fire Engineering.

As you may expect this work and the many other activities that do not fit on this page have taken a significant amount of work by our valued volunteers. On behalf of the organisation I give sincere thanks to those individuals and their families for all of their hard work and borrowed time. The recognition of risk and attempts to manage it are defining features of modern society and the Society of Fire Protection Engineers NZ is working hard to fulfil our *responsibility* to mitigate risk.

Claire Williams

CPEng IntPE MIPENZ PMSFPE

*President, New Zealand Chapter of the
Society of Fire Protection Engineers*

This years' FireNZ conference and exhibition theme – "Risk and Responsibility" – seeks to interrogate the risks and responsibilities we encounter in ensuring the safety of our community from fire. I am sure this will be actively debated and participants will leave with a range of views to consider.

Now into its 16th year as a joint conference and exhibition, this years' theme is again supported and represented by the FPA NZ, the IFE and SFPE all working together for the benefit of the Fire Industry at large. By joining forces and sharing the conference speakers, exhibitors and conference sponsors for the greater benefit of our delegates and members.

Each year the bar is set even higher. The organising group want to create a higher level of engagement from members, the exhibitors look for more exposure to a broader range of industry people and last but not least, our members look for new stimulations and continuing professional development opportunities.

This year FireNZ responds with a number of new initiatives: A series of workshop seminars covering a broad range of topical interests has been included after lunch on day one to provide those involved in the design, installation and servicing of all fire protection systems with an opportunity to engage with specialists. Latest technology and techniques can be learned here.

Exhibitors will also be running CPD sessions which delegates and other industry people can engage with.

It was 14 years ago back in the year 2000 that the executive of the FPA held

its first strategy meeting in Wellington. The most significant outcome from this was the adoption of a 'mission Statement. Today that mission remains unchanged ... "to provide a professional forum and be the unified voice of the fire protection industry by drawing on our expertise and collective knowledge to reduce the impact of fire in NZ."

This mission is still upheld by the board and Council of the association today and can regularly be seen in the work carried out by our various SIG's (sector industry groups)

In times of change, it is good for us to test how we have coped and how we are responding. For many years now we have operated in a de-regulated environment and have had to take charge of providing for the future needs of our industry by creating and controlling our own trade training / qualifications. Many companies in the industry have actively engaged in providing NZQA training for their people and are to be commended. As an industry, we still have work to do in this area with our regulators as many active and passive fire systems are designed, installed and serviced by people without the appropriate skill set and that is definitely a RISK that our industry needs to seriously take RESPONSIBILITY for.

I am grateful to the Board and Council members for their continuous support and work on behalf of the FPA NZ. Many provide a significant and caring contribution to the association and to our industry in general.

David Nathan

President, Fire Protection Association New Zealand

THE FUTURE OF FIRE PROTECTION SYSTEMS ENGINEERING IS IN GOOD HANDS

Phil Faidley

GDipFI TIFireE

Branch Councillor,
Institution of Fire Engineers,
New Zealand

When one considers the developments in all facets of engineering, the rate of discovery of innovative concepts and the speed at which technology seems to be changing, it can cause us to reflect on "where is this all heading?"

One may consider also whether simplicity is becoming a lost art, and with all of our new found abilities, if we are losing sight of taking care of basic needs in favour of the overly complex.

A group of secondary school students from Mission Heights Junior College in Flat Bush, Auckland, has taken a basic need and developed an elegantly simple solution that on closer inspection has far-reaching implications in the world of Fire Protection Systems – specifically non-aural alerting systems for the Deaf, hearing impaired, and those working in noise-filled environments.

Project Alert originated as a Year 9 Regional Science Fair project at the College in 2013 and has since scaled unprecedented heights to achieve local, national and international acclaim for the young people who developed the solution.

Upon recognising a need – survey results taken in their school identified that deaf students (part of a satellite unit of the Kelston School for the Deaf) were unaware of the sounding of fire alarms, an issue when the children were not in the classroom – the Project Alert team brainstormed a solution that was non-aural – a vibrating pager – that could be activated by broadcast radio signal from a central location to alert any number of Deaf students simultaneously, regardless of their location on campus.

A Proof-of-Concept design was prototyped, with the assistance of Fisher & Paykel Healthcare's Brendan

Vercoelen, acting as mentor and guide, in a largely hands-off role. Brendan's involvement was facilitated by Futureintech, an initiative of IPENZ.

The prototype, along with a detailed explanation of how the project came about and the development path, secured an IPENZ/Transpower Neighbourhood Engineers Senior group and merit Awards, and the Codeworx Challenge for innovation and design using open source software in late 2013.

The team had decided to refine their proof of concept into a functional device and proceeded to develop a miniaturised version using integrated circuitry that could be worn by the user. An additional development was to use sound recognition software to respond to the sound of an alarm or other audible alert and to automatically activate a broadcast to the devices in the field, eliminating the need for manual activation.

The refined design was presented to the Future Problem Solving International Conference in Iowa, USA in June this year, scooping the Human Services category first prize, as well as the "Beyonders" supreme award for problem solving that "... outdistances the others so far that they are not even on the same scale", and to a team who have "demonstrated exceptional depth, passion and commitment in the project that goes above and beyond what would normally be expected."

The team has committed to continuing development of the solution, re-investing some of their prize money into new equipment and further miniaturisation. Their goal, according to College Principal Joan Middlemiss, is "that by the end of this year, every single deaf child in the school will have their own device ... and it will be much, much smaller. They're talking about something that you could strap a wrist band through and wear like a watch – and I'm confident they can get there."

The acclaim that this group of young people has received has elevated Engineering as a discipline and career to a previously un-thought-of level of interest among students at Mission Heights.

Joan Middlemiss said "I have seen students who've never mentioned the concept of engineering now seriously considering engineering as a future career option."

To see young people who are embarking on their career as engineers employing tried and tested methodologies of problem solving gives this old timer a great deal of confidence that our future is in good hands.

For further information
about Project Alert you can
contact Mission Heights
Junior College Principal,
Joan Middlemiss by email
jmiddlemiss@mhjc.school.nz



PROJECT TEAM WITH PRINCIPAL AND AWARDS

Pictured with their project display are young innovators (L-R) Dylan Townsend, Cailey Dayu, Courtney Powell and Mission Heights Junior College Principal Joan Middlemiss

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New South Wales USAR Base and Training Facility INGLEBURN VISIT MARCH 2014

Peter McGrail
Canterbury IFE Group

Marcel Sanders
Auckland IFE Group

During our visit to Manly for the Institution of Fire Engineers (IFE) International General Assembly and Conference, myself (Peter McGrail from the Canterbury IFE Group) and Marcel Sanders from the Auckland IFE Group had the opportunity to visit the NSW USAR base and newly constructed training facility.

This facility is based in an industrial area of Sydney, Ingleburn, which is conveniently located close to main Hume highway which runs north and south of NSW, next to a military Airport and main highway to the international airport.

Within the warehouse the international cache is readied for deployment, spare cache and working cache of equipment are stored. Through the warehouse and into the rear yard you will find storage of multiple 40 ft containers which are being placed to mock many different training scenarios. Training props for all emergency services to practice at.

The base is used to house operational equipment & appliances which are on call 24 hrs a day for response to building collapse or other technical rescue incidents. USAR 1 being an articulated vehicle ready to respond with a career crew 24/7. This is also responded as part of a task force deployment to domestic natural disasters.

They also house a decontamination vehicle, these 2 vehicles are manned by trained career personnel from NSW fire & rescue and NSW USAR task force.

The warehouse also contains training facilities which are housed within large containers which have replaceable scenarios that can be set up through the side of the containers accessed through doors. Mock ups of pancake collapsed buildings have been set up within these containers and confined space training, search and rescue and use of tools can be carried out in a controlled training environment.



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Three story 40 ft containers provide space to set up many different mock scenarios for all sorts of emergency services who use these facilities for training. Those that use these include, NSW F&R service, NSW Police, NSW emergency management group.

This visit gave us the opportunity to see first hand all the hard work which has been done to build a world class USAR training site which gives USAR staff the capability to locate, provide medical assistance and to remove victims who have been trapped or affected by structural collapse.

Globally we face continued threat of terrorist attacks and natural disasters. We have experienced incidents that have tested the capability of our response agencies. As a more coordinated approach to disaster assistance response is required, the need for multi-disciplined teams has come to the forefront. NSW and New Zealand have developed a capability with an all hazards approach to disaster response. The NSW team referred to as New South Wales Taskforce 1 (NSWTF/1) has become the nucleus for a more sophisticated approach to the way NSW tasks major incidents.

The NSW Fire Brigades in partnership with other state government agencies, have developed a sophisticated equipment cache and a multi disciplined response team. This team has the ability to respond, fully self sufficient, at short notice to a range of disaster related environments.

As a capability, USAR combines a multi agency, taskforce style response group with the ability to combat almost all natural and man-made disasters maintaining self sufficiency for up to 10 days. The capability is referred to within NSW as a Disaster Assistance Response Team (DART). This Team provides the incident with Rescuers, Canine Search, Hazardous materials experts, Engineers and Specialist Medical assistance, along with a support infrastructure and extensive equipment cache.

The emergence of rescue training based strategically around structural collapse has produced a blending of other rescue areas, such as Confined Space, Trench and Vertical, combined with firefighting techniques of entry and salvage, to evolve as a single capability referred to as Urban Search And Rescue.

The USAR course is conducted over three weeks culminating in a 48 hour exercise during the final week. The course focuses on the disciplines necessary for work in this type of environment. These include shoring, concrete breaking and cutting, and technical search.

This visit was of great interest to Marcel and myself as we are both members of the NZ USAR team and the information gained during our visit will help with the development of new training facilities to meet the needs of the New Zealand USAR teams.



- 1 Part of the NSW USAR Training Complex with a simulated tilt slab building collapse
- 2 The inside of one of the containers showing three separate entry areas for collapse scenarios
- 3 A close up of a confined space training area, set to simulate the interior of a commercial building. Note the tight space between ceiling and floor, with a services space showing at the bottom.
- 4 A view from inside a confined space training area, further highlighting the constricted working area.

THE SILENT THREAT

Paul Smith

Project Manager Firefighter
Carcinogen Project,
New Zealand Fire Service

Firefighters are regularly exposed to chemicals, metals and minerals that are known to cause cancer. These are a silent threat and a fact of the job firefighters do. As a result of this exposure, firefighters are more likely to develop some cancers than the rest of the population.

The Fire Service has established a programme of work which is aimed at limiting this exposure. It involves people from across the Fire Service and is supported by the Professional Firefighters Union (PFU) and the United Fire Brigades Association (UFBA).

Deputy National Commander Paul McGill says the Fire Service Carcinogen for 2020 is leading integrated fire and emergency services for a safer New Zealand.

"One of the most goals within that vision is improving our people's safety.

"There are things we can do to reduce our exposure to cancer-causing substances. And there are things we can do to stop those substances getting through our skin and into our lungs when we can't avoid being exposed to them," he says.

George Verry, Chief Executive of the UFBA says the risk of being exposed to some terrible things is one firefighters take every time they respond to an incident, but it is a risk they are willing to take.

"Research indicates firefighters with more than ten years' service can be up to four times as likely to develop certain cancers than the general population.

"They are more likely to contract brain cancer, kidney cancer, Non-Hodgkin's lymphoma, bladder cancer, leukemia and testicular cancer. Firefighters are also more likely to be affected by breast cancer, a cancer that affects both men and women," he says.

Derek Best, Secretary of the PFU says there's a perception in fire fighting that a dirty face is a badge of honour.

"In reality, it's a badge of unsafe practice and a sign that we haven't used our gear properly. It's essential firefighters wear their gear correctly and properly clean themselves and their equipment after a fire or similar call," he says.

Paul Smith, Project Manager of the Firefighter Cancer programme says the Fire Service is raising the awareness of all firefighters to the dangers associated with exposure to known carcinogens.

"This includes taking all practical steps to isolate contaminants to their site of origin; reviewing appliance design, and looking to improve station design to allow the separation of clean and contaminated work processes.

"We are part way through a process of installing exhaust extraction solutions in all fire stations to limit the health risks from diesel fumes. But firefighters also need to do things better."

Paul Smith says many of the things firefighters need to do to reduce their cancer risk are simple but involve a change in the way they historically do things.

- If you don't have to be in the smoke, don't be in it
- Protect your lungs
- Don't get into your truck dirty
- Wash as soon as you can after a fire.
- Most importantly, other simple measures can be introduced.
- Wear your gear correctly and properly, clean yourselves and your equipment after a fire or similar call;
- Use whatever exhaust extraction system you have in your station every time the truck engine is running;
- Use breathing apparatus; this is the main thing that reduces your exposure to carcinogens; the lungs are hundreds of times more efficient than any other pathway at getting things into our bodies.
- Wear the proper PPE all the time; it protects you and your skin from carcinogens.
- Shower within the hour. Have a shower and wash your uniform after a fire. If you don't, you are continuing to expose yourself, and possibly your colleagues, to carcinogens.

The increased risk of cancer may never be eliminated from the firefighters' job description but it can be reduced. Firefighters are encouraged to take all possible steps to ensure this outcome can be achieved.

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The Fire Protection Association New Zealand in association with the Institution of Fire Engineers NZ Branch and the Society of Fire Protection Engineers NZ Chapter, invite you to participate in FireNZ 2014, New Zealand's key annual event for the fire protection industry.

THE THEME: **RISK & RESPONSIBILITY**

No matter what role you have in the industry, the on-going story for us all is the responsibility to mitigate the risk of fire. This year's FireNZ conference and exhibition theme seeks to interrogate the risks and responsibilities we encounter in ensuring the safety of our communities from fire.

The fire industry's primary role is to mitigate risks, but in doing so may expose practitioners to a higher level of risk than most other professions.

As we continue to improve outcomes for our clients with alternative solutions and new technologies, if a fire occurs, could the assumptions underpinning designs and system installations stand up to being challenged? So who decides how much risk is acceptable? How far should we go? Which tools and systems should we use to quantify and minimise these risks?

THE PARTNERS

FPANZ

The Fire Protection Association NZ is the primary organisation which represents the fire protection industry in New Zealand.



The Association liaises closely with relevant government departments and ministries and has strong links with other building related associations. The Association has been operating now for nearly 40 years and has grown significantly by representing more and more companies and organisations that work in the fire protection industry.

Our membership base includes businesses that are involved in fire alarm manufacturing, fire alarm services, fire protection sprinkler industry, evacuation consultants, fire equipment distributors, insurance companies, fire engineers, the New Zealand Fire Service and Territorial Authorities.

IFE

The Institution of Fire Engineers New Zealand Branch is part of an international learned body which was founded in 1918 and incorporated in New Zealand in 1924 with the following main objectives:

- To promote encourage and improve the science and practice of fire engineering, fire prevention and fire extinction, and all operations and expedients connected therewith.
- To give an impulse to ideas likely to be useful in connection with, or in relation to such science and practice to the members of the Institution and community at large.

Membership of the IFE is drawn from a large cross section of the community, all with a common interest in fire engineering. Examples of organisations that members belong are NZ Fire Service, Airport Rescue Fire Service, Rural Fire Service, the Insurance Industry, the Building Industry, the Fire Protection Industry, Fire Engineering Consultants and organisations tasked with emergency incident management.



SFPE

The New Zealand Chapter of the Society of Fire Protection Engineers is the primary organisation representing the fire engineering professionals of New Zealand. SFPE NZ is the Institution of Professional Engineers New Zealand's (IPENZ's) Technical Interest Group for matters of Fire Engineering.



The purpose of the SFPE is to advance the science and practice of fire protection engineering and its allied fields, to maintain a high ethical standard among its members, to develop fire protection engineering guidelines and standards and to foster fire protection engineering education.

In accomplishing this purpose, SFPE NZ has engaged in activities that are educational, scientific, charitable or promote the practice of fire protection engineering since 1994.

SFPE NZ members include representatives of all sectors of the fire protection industry with an interest in the development, application and promotion of scientific and engineering methods to reduce the risks of unwanted fires.

FireNZ Conference Organiser: Fire Protection Association NZ

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As the leading supplier of fire alarm systems in NZ, Pertronic Industries prides itself on its ongoing commitment to research and development, as evidenced by the company's comprehensive range of analogue addressable and conventional fire control panels and accessories. R&D and production is based at the NZ-owned company's Lower Hutt headquarters, with a sales/support office in Auckland and branches in all Australian states. Recent innovations such as FireMap® PC-based graphics allow fire alarm installation companies to develop and maintain this interactive fire management system directly for their clients in a cost-effective manner. New introductions to the product range, in addition to FireMap, will be on display at the Pertronic exhibit.

Silver Sponsors



VICTAULIC

Since 1919, Victaulic has been the world's leading producer of grooved mechanical couplings and pipe-joining systems. Used in the most demanding markets including commercial building and fire protection, oil and gas, chemical, mining and power, Victaulic innovative piping technologies and services put people to work faster while increasing safety, ensuring reliability and maximizing efficiency. The company has 15 major manufacturing facilities, 28 branches worldwide and over 3,600 employees who speak 43 languages across the globe. Victaulic mechanical pipe joining systems can be found in projects across New Zealand including The Warehouse's National Distribution Centre and the Americold storage facility at the Auckland International Airport. As a leader in the industry, Victaulic continues to develop accredited training and certification programs for the industry's latest trends and technologies.



THE TASMAN TANK CO.

Tasman Tanks New Zealand - 0800 826 526. With operations in Christchurch and Hamilton and

backed by our Head Office in Sydney, Tasman Tanks NZ has the experience and expertise to design, fabricate and construct your Fire Water solutions. Delivering hundreds of bolted steel tanks a year, up to 30ML, we have built our reputation through commitment to quality in design, documentations, manufacturing and onsite installation. Our core range consists of galvanised, stainless and protectively lined tanks. Tanks are custom engineered, swiftly erected and long-lasting. Each Tasman tank is certified to relevant codes/standards. Tasman are proud members and sponsors of FPANZ.

Key Sponsors



TYCO FIRE PROTECTION PRODUCTS

Tyco Fire Protection Products is a division of Tyco, the world's largest pure-play fire protection and security company. As an industry leader, Tyco Fire Protection Products uses its global scale and deep expertise to drive innovation, advance safety and solve the unique challenges of customers in more than 190 countries worldwide. Every day, Tyco Fire Protection Products manufactures and delivers an unmatched range of detection and suppression systems, extinguishing agents, sprinkler systems, valves, piping products, fittings, fire-fighting equipment and services that helps its customers save lives and protect property. Its global technology portfolio includes fire suppression, fire detection and mechanical building product offerings sold under many of the world's best-known brands.



BROOKS

Brooks have firmly established themselves as a quality manufacturer and supplier of fire products and engineered solutions. With over 25 years' experience and utilising fire technology from their strategic partner Panasonic Eco Solutions in Sweden Brooks manufacture Conventional and Analogue Addressable Fire Panels. Brooks are also the leading supplier of Residential Smoke, Heat (Thermal) and CO (Carbon Monoxide) alarms. Brooks have been supplying Smoke Alarms throughout Australia for more than 20 years. Our smoke alarms are manufactured in Ireland by Ei Electronics. With over 45 employees, offices and warehousing in Sydney, Melbourne, Brisbane, Adelaide, Perth and Auckland, New Zealand, we are large enough to offer our customers a level of reliability and quality expected of larger companies, whilst still offering a personalised level of service and support that is the hallmark of a family business.



HILTI

Hilti provides leading-edge technology to the global construction industry. Hilti products, systems and services offer the construction professional innovative solutions with outstanding added value. Hilti excels through outstanding innovation, top quality, direct customer relations and effective marketing. Two-thirds of the employees work directly for the customer in sales organizations and in engineering, which means a total of more than 200,000 customer contacts every day. Hilti upholds a clear value orientation and pursues a policy of stakeholder value. Integrating the interests of all the company's partners - customers, suppliers and employees - into its strategy and actively honoring its social and ecological responsibility creates the foundation of trust that makes possible the long-term success of the company.



AMPAC

The Ampac Group of Companies specialise in the design, manufacture and distribution of world leading fire detection and alarm systems for commercial, industrial and multi-residential complexes. We at Ampac, strive to maintain and improve the vitality of our customer relationships for it is through understanding the needs of our customers that we can truly achieve sustained long term growth. Our aim is to ensure that the entire Life Cycle of our products is supported by our comprehensive After Sales Service. Along the way, we have gained the reputation of a company that operates with integrity coupled with a clear focus and commitment-providing customers at every level with superior customer service. Ampac is a business focused on long term growth. Whilst we always consider the implications on a wider scale, no detail, imperative for the success of any undertaking, is compromised.

Fire NZ is the annual forum for Fire Protection and Fire Engineering professionals. This two day event provides a comprehensive national forum for fire industry professionals and draws delegates from a variety of places and countries throughout the Pacific.

This year, keynote speakers have been invited from the USA, Australia and New Zealand. The conference programme is designed to provide insight and learning and to extend current thoughts on the various speakers presentation topics, and will provide robust debate around key industry issues.

If you have an interest in fire safety, you should attend. The Conference will provide information for, amongst others:

- Fire Protection Contractors
- Fire Consultants
- Fire Engineers
- Architects
- Building Surveyors
- Property Developers
- Distributors and Installers
- Insurance Professionals
- Fire Equipment Manufacturers
- Fire Survey Personnel
- Regulatory Authorities
- Fire Service Operational and Volunteer Personnel
- Fire Risk Management Personnel
- Property and Facilities Managers

Fire NZ delegates are industry professionals, with a strong interest in the latest developments across fire protection and related products and services. To meet this demand we have set up a new series of interactive events.

WEBSITE PAGE

The FireNZ website will again be fully operational with news of FireNZ 2014. The website will be the means by which we keep delegates and exhibitors up to date with the event. The website can be accessed through either the FPANZ, IFE or SFPE Websites.

HOTELS

There are a number of hotels and motels within close proximity to the conference venue:

- Novotel (on location)
- IBIS Hotel Ellerslie (on location)
- All Seasons Ellerslie Motor Inn
- Best Western Ellerslie International Motor Inn

We have organised special rates at the IBIS and Novotel as follows.

You can secure these rates when making your booking by contacting reservations on **(09) 529 9090** and using reference code **"FIRE-PROTECTION"**.



IBIS HOTEL ELLERSLIE

- NZ\$139 (Incl. GST)
incl breakfast for one/ per room per night.
Max. 1 person per room
- NZ\$164 (inc. GST)
incl breakfast for two/ per room per night.
Max. 2 persons per room.



NOVOTEL

- NZ\$224 (Incl. GST)
incl breakfast for one/ per room per night.
Max. 1 person per room
- NZ\$249 (inc. GST)
incl breakfast for two/ per room per night.
Max. 2 persons per room.

CONTRACTORS BREAKFAST SESSION

This year to enable site staff the opportunity to participate in the conference, we are holding a technicians breakfast session on October 16th from 6.40am to 8.00am.

This event is to encourage those site and administration/ supervisory staff who may not usually get the opportunity to visit the conference, to have a free breakfast and then walk the exhibition space mix with the variety of exhibitors and review what new technology and equipment is in the market. The event will also give them a chance to win prizes kindly donated by Hilti tools. Hilti will have a stand which will allow attendees to try out the latest gear on offer and test it for performance.

Firetech and Competenz will present an overview on fire industry training, what is changing in the education space with the formal review of qualifications and how the industry can improve its completion rates.

PLENARY SESSIONS DAY 1

We have now provided a total of four streams to cover the wide topics of interest we have in Fire protection.

This allows delegates and others to attend a session that allows them to make the best value out of these specific workshops and gain a valuable opportunity to attend a networking event at the conclusion of the day 1 sessions.

EXHIBITION

Entry to the Fire NZ 2014 Exhibition is FREE to anyone with an interest in the fire industry. Registration is not required to visit the Exhibition. A visitor sign in book will be available at the entrance for visitors to sign in. Catering is for Delegates and Exhibition Representatives only. If you are not able to attend the full Conference, you may still be able to take this opportunity to see the latest in fire industry products and services all assembled together on one place.

PROGRAMME

Wednesday 15th October 2014				
8.00am – 8:30am	Registration - All Delegates & Speakers			
8.30am – 8:45am	Guest Speaker: Penny Webster , <i>Auckland City Council</i>			
8.45am – 9:30am	Keynote Speaker: Bruce Ross Presentation - Switch Thinking: How to Engage Untapped Capability			
9.30am – 10:15am	Speaker: Brett Warwick Presentation - NZFS Vision 2020			
10:15am – 10:45am	Morning Tea – Newmarket Room, Level 1			
10.45am – 11:15am	Speaker: Frank Mendham , <i>IFE</i> Presentation: Engineered solutions to reduce the fire and explosion risk in mines.			
11.15am – 11:45 am	Speaker: Aaron Nicholson Presentation: C/VM2 Design vs Non C/VM2 performance based design. Is the Fire Engineer putting the occupants at risk, and who is responsible?			
11.45am – 12:15pm	Speaker: Brian Davey Presentation: Risk from Fire in Complex Building - a case study of Lakanal House.			
12.15pm – 12:30pm	Winstone Wallboards Speaker: – Kevin Sceats Presentation: Penetrations in Fire Rated Systems.			
12.30pm – 1:30pm	Lunch – Newmarket Room, Level 1			
1:30pm – 5:00pm	WORKSHOP SESSIONS <i>please refer to page 8 for more detail on the workshops</i>			
1:30pm – 2:30pm	Workshop 1 - FPAZ Session One: Chris Mak <i>Aon</i>	Workshop 2 – IFE Session One: Reducing Risk using ICT	Workshop 3 - SFPE Session One: EvacuationNZ Workshop	Workshop 4: The Passive Workshop for Architects 3pm: Speaker Introduction
2:30pm – 3:15pm	Session Two: Tony Jenner <i>Hawkins Construction</i>	Session Two: Reducing Risk using ICT	Session Two: EvacuationNZ Workshop	3:20pm - 4pm Session One
3:15pm - 3 :45pm	Afternoon Tea – Newmarket Room Level 1			
	WORKSHOP SESSIONS <i>please refer to page 8 for more detail on the workshops</i>			
3:45pm – 4:30pm	Workshop 1 - FPAZ Session Three: David Boyack <i>Tyco</i>	Workshop 2 – IFE Session Three: Reducing Risk using ICT	Workshop 3 - SFPE Session Three: EvacuationNZ Workshop	Workshop 4: The Passive Workshop for Architects 4:00pm - 4:40pm: Session Two
4:30pm – 5:00pm	Session Four: <i>Ampac – Speaker to be confirmed</i>	Session Four: Reducing Risk using ICT	Session Four: EvacuationNZ Workshop	4.40pm - 5.15pm: Session Three
5:15pm – 6:15pm	Drinks and Canapés – Newmarket Room Level 1			
6:15pm – 7:30pm	Conference Dinner and Interactive Quiz – Guineas Room Level 3			



GIB FireNZ CONFERENCE DINNER

The FIRE NZ Conference Dinner is sponsored by Winstones Wallboards and will be held on Wednesday the 15th of October.

This year's Conference Dinner will begin at 6:15pm followed by the some entertainment which will involve a variety of interesting

activities such as an interactive quiz and team challenges with prizes to be won.

Since interest in attending this event is high, we urge you to make your reservation as soon as possible. Please complete and return the registration form to Jenna@fireprotection.org.nz

Thursday 16th October 2014

8.00am – 8:30am	Registration - All Delegates & Speakers	
8.30am - 9:00am	Keynote Speaker: Paul Grimshaw Presentation: Litigation - Every engineer's worst nightmare.	
9.00am – 9:45am	IAG Insurance Speaker to be confirmed. Topic: Insurance	
9.45am - 10:15am	Speaker: Jason Dyer <i>Norman Disney & Young</i> Presentation: The Risk of Complying	
10.15am - 10:30am	Morning Tea – Newmarket Room Level 1	
10.30am – 11:00am	Speakers: Andrew Campbell and Ken Collins Presentation: The Cutting Edge – Addressing Risk in Modern Research Facilities.	
11.00am - 12:00pm	FireNZ Trade Displays – Newmarket Room Level 1 – General Attendance	
11.00am - 12:00pm	FireNZ 2014 AGMS – Invitation only – All Delegates	1 AGM – FPANZ 2 AGM – IFE 3 AGM – SFPE
12.30pm – 1:30pm	Lunch – Newmarket Room Level 1	
1.00pm – 1:30pm	Speaker: Dave Hipkins, Wormald Presentation: Fire Protection Water Supplies – Is this the greatest challenge the industry is facing?	
1.30pm 2:00pm	Speaker: Trent Fearnley Presentation: Reliability of Sprinkler Systems.	
2.00pm – 2:30pm	Pertronics Speaker: Stephen Lederer Presentation: In what way can the Aerospace Industry assist with innovation for the Fire Industry?	
2.30pm - 3:00pm	Afternoon Tea – Newmarket Room Level 1	
3.00pm - 3:30pm	Tyco Speaker: David Boyack Presentation: Protecting Your Critical Assets – Risk Mitigation Using Modern Fire Suppression and Detection Solutions	
3.30pm - 4.00pm	Speaker: Ron Green Presentation: Passive Fire Protection – Be part the solution, not the problem!	
4.00pm - 4:30pm	Speakers: Kevin Weller and Gareth Richards – BECA Presentation: Passive Fire Swiss Cheese – Validating the holes by Risk Assessment.	
4.30pm	Wrap up of the Conference	



WORKSHOPS



FPA Workshop Stream

Wednesday 15th October, 1.30pm – 5.00pm

Session One 1.30–2.30pm **Chris Mak Aon** – Aon inspectorate agencies with a theme of “**What is stopping industry practitioners from achieving certification at 100% completion**”

Session Two 2.30–3.15pm **Tony Jenner** *Hawkins Construction*. **Integrated testing of services within the building envelope.**
What are the common issues facing the industry in achieving design compliance and practical completion?

Session Three 3.45–4.30pm **David Boyack** *Tyco*. David is the Special Hazards Manager of Tyco Fire Protection Products based in Melbourne, Australia. David has 20 years of experience in the fire and security industry including System Design, Product Management, Research & Development, Channel Development, Codes and Standards across Africa, Asia, Australia and New Zealand. As a subject matter expert in fire protection, David was often invited by conference organisers where he conducted numerous fire safety and equipment presentations to government agencies, industry representatives, and the fire engineering community. David is a VESDA Accredited trainer, was a member of TC2 Australian Standards committee and SANS SC3 fire standards committee.

Protecting Your Critical Assets – Risk Mitigation Using Modern Fire Suppression and Detection Solutions.

The workshop will discuss critical aspects of fire risk mitigation in today's modern data centre environment. Presentation will discuss in-depth fire suppression systems, its performance, environmental and safety aspects. Protection of critical information systems is paramount to ensuring business continuity and keeping your business, data and intellectual property secure.

Session Four 4.30–5.00pm **AMPAC Speaker**
Speaker to be confirmed.



SFPE Workshop Stream – Speaker: Mike Spearpoint

Wednesday 15th October, 1.30pm – 5.00pm

Mike is an Associate Professor at the University of Canterbury and is the Director of the Fire Engineering programme at the University. When time and energy allows, he has been developing the EvacuationNZ simulation software on and off in his 'spare' time for a number of years.

Topic Content: EvacuationNZ

EvacuationNZ is a coarse network, agent-based egress simulation model that has been under development at the University of Canterbury. The simulation model is a risk-based model that incorporates the Monte Carlo approach in producing probability distributions of evacuation times collected from repeated simulations of a specified scenario.

The workshop will demonstrate the mechanics of the simulation model by introducing a series of hands-on examples. The examples will show participants how to create building geometries, specify agent characteristics, populate spaces and obtain model results. Some of the more advanced features of the software will be discussed but there will not be time during the workshop to cover everything in detail.

Participants will be expected to bring their own PC which must have Windows 7 installed. A version of the simulation model will be released to participants ahead of the workshop so they can install the software and check it is working. Participants will also need to install the freely available yEd graph tool, have access to text editor (Notepad is fine but Notepad++ is recommended) and also a standard web browser. Participants are encouraged to look at the EvacuationNZ website for more details and also do a bit of background reading on how to create simple XML format data structures although the workshop will quickly cover enough on the basics of both for what will be required during the workshop.

WORKSHOPS



IFE Workshop Stream

Wednesday 15th October, 1.30pm – 5.00pm

Topic Content: Reducing risk through the use of Information, Communication and Technology

The IFE Workshop will focus on “Reducing risk through the use of Information, Communication and Technology” and will demonstrate this using a variety of systems and applications which will be on display throughout the duration of the workshop. There will also be the opportunity to showcase the latest development with each of the systems throughout the afternoon. Among the applications available throughout the workshop will be:

- Emergency Service Control Rooms are not normally open to view, however NZFS will demonstrate its state-of-the-art system using a mobile control room terminal.
- NZFS ICT team will be showing the latest communication tools, vital to any organisation’s success.
- Incident Management training through simulation has come a long way in recent years, and we are fortunate that several applications will be available to try at the workshop:
 - Martjin Boosman is bringing XVR from the Netherlands to display the latest in their highly flexible suite of tools.
 - NZFS Training will be displaying both tactical and management team simulation tools from Vector, as well as a newly-developed concept using Fire Studio.

This workshop will be of interest to everyone, so come in have a look and have a go.

The Passive Workshop for Architects

Wednesday 15th October, 3.00pm – 5.15pm



The spread of fire in a building is probably the worst scenario owners or occupants can imagine. When it comes to effectively minimizing the effects of fire, the interplay of a variety of systems and elements is required.

The GIB® Fire Rated Systems technical literature has been a regular item in specialist trades’, architects’ and builders toolboxes since 2006. Providing clear instructions on building in protection from fire. However, changes to the New Zealand Building Code (NZBC) related to fire protection have meant the need to refresh, update and release the new GIB® Fire Rated Systems 2012 technical literature.

The GIB® Fire Rated Systems 2012 technical literature is compliant with the new requirements. When building or designing, it will be important to check which versions of NZBC Clause C and F7 you should be using and ensure that you’re using the right supporting documents.

Hilti Firststop Systems create effective barriers against the passage of fire, smoke and toxic gases through openings in walls or floors. As passive fire protection forms an integral part of the design of the structure of a building it must be taken into account in the planning phase of a construction project. Total passive fire protection cannot be achieved by a single product. Firestop is a system of various components, designed to seal openings and joints in walls or floors, acting in concert to build an effective barrier against the passage of flames, smoke and deadly gases. Hilti firestop products are designed to restore the integrity of fire-rated assemblies. Passive fire protection is designed into the structure of the building. The materials used to form the seals must not only fill all gaps at the time of construction, but also, in the event of fire, expand to close further gaps formed by melted components. Hilti offers wide-ranging and innovative firestop systems which allow simple and reliable specification, installation and maintenance and are fully compliant to the NZBC requirements.



SPEAKERS & PRESENTATIONS



Guest Speaker: Penny Webster *Auckland City Council*

Wednesday 15th October, 8.30am – 8.45am

Penny Webster is a Councillor on the Auckland Council and former Mayor of Rodney District, Auckland, New Zealand. As mayor of Rodney, she headed one of the six main local government entities generally considered as making up the Auckland metropolitan area (Auckland City, Manukau City, Waitakere City, North Shore City, Papakura District, Rodney District), with her district being the northernmost entity. All of these entities were merged into the new Auckland Council in 2010. She was also a former New Zealand politician: an MP from 1999 to 2002, representing the ACT New Zealand party.



Key Note Speaker: Bruce Ross

Wednesday 15th October, 8.45am – 9.30am

Bruce is an experienced facilitator, coach, and workshop leader. He understands leadership from a:

- Commercial perspective – having directly helped develop the leadership capacity of literally hundreds of business leaders / owners throughout Australasia.
- Academic perspective – delivering an MBA-level 'Leadership Development' course plus other leadership-related courses through EMA [Employers and Manufacturers Association] and the Auckland University Short Courses.

He is able to simplify the challenges of running an organisation as well as sustaining high performance teams. Bruce brings a pragmatic and energetic approach to his work. He applies a 'strengths-based' approach to performance improvement. This generates the needed shifts in energy / motivation to drive through high-performance initiatives that achieve stand-out results.

Topic Content: Switch Thinking: How to Engage Untapped Capability

Given the commercial forecast: insistence on continual high performance; increasing pressure from perpetual change; a shifting economic backdrop; the challenge of finding your work / health balance, what's the solution? What's the essential ingredient that satisfies these demands and grows your internal capacity?

Energise – revitalised mental energy levels. With high energy levels we're more productive, relaxed, confident, agile and resilient. We're more intact. Strategy is what you have the energy for. Leadership is about harnessing your people's energy, not your people.

This workshop combines the tough-mindedness of practicality, with an understanding of how to tap inherent potential. Already impacting organisations on both sides of the Tasman, Bruce's insights and tools have the power to immediately revolutionise your approach to life and work. *It all starts with Switch Thinking.*



Speaker: Brett Warwick

Wednesday 15th October, 9.30am – 10.15am

Following completion of a Bachelor of Commerce degree, Canterbury University, Brett commenced a career in auditing at Audit New Zealand before moving into chartered accountancy with Deloitte, and then into banking with ANZ and Westpac. He worked in Australia and London before joining the New Zealand Fire Service. Brett has been with the Fire Service for over 15 years in the role of Chief Financial Officer. He has seen the Service evolve off the back of community expectations, and is now committed to the rollout of Vision2020.

Topic Content: NZFS Vision 2020

The one certainty around evolution, is that one must adapt to survive. The underlying assumption that the status quo is sufficient and your previous credentials will be sufficient to ensure long term survival is not enough.

Vision2020 "*Leading Integrated Fire and Emergency Services for a Safer New Zealand*" is all about adapting to changing expectations and listening and working with our people to deliver what communities are now expecting of the Fire Service.



Speaker: Frank Mendham *IFE*

Wednesday 15th October, 10.45am – 11.15am

Frank Mendham is the Technical Director of 'Mining and Industrial Fire and Risk Engineering' for WSP Asia Pacific, a Fellow of the IFE and the current IFE Australia Branch President Elect. He is a part-time research scholar at the University of Queensland's Minerals Industry Safety and Health Centre (MISHC), currently finalising his PhD research into the development of improved fire detection and evacuation analysis methods for underground coal mines.

He holds undergraduate and post-graduate fire engineering qualifications to Master level, with some of his previous research addressing potentially explosive atmosphere management.

Topic Content: Engineered solutions to reduce the fire and explosion risk in mines

Significant fires and explosions continue to occur in underground mines. Recent incidents in Turkey, China, the USA and New Zealand highlight the significant fire life safety and asset losses that can eventuate from dust explosions or large conveyor belt fires. Recent research has found that Video Based Fire Detection (VBFD) offers considerably faster response to visible smoke plumes than other forms of fire detection currently used in underground coalmines. The results of this research have provided a better understanding of how an increased amount of time can be achieved for mine workers to evacuate mines prior to the onset of untenable conditions. Additionally, improved asset loss control for underground mining is achievable.

SPEAKERS & PRESENTATIONS



Speaker: Aaron Nicholson

Wednesday 15th October, 11.15am – 11.45am

Aaron is an Associate at Beca in the Fire Engineering field. With a career entirely within the fire protection and fire engineering industries, Aaron has over 12 years fire engineering design and fire protection design experience, over a wide range of sectors in the United Kingdom, New Zealand and Australia. Aaron has been the lead fire engineer for a number of fire specific and multi-discipline projects nationwide. He holds a Bachelor of Science with honours in Fire Science from the University of Leeds and is a Chartered Professional Engineer.

Topic Content: C/VM2 Design vs Non C/VM2 performance based design

The C/VM2 the Verification Method Framework for fire safety design introduced “prescriptive” performance based fire engineering design. Whereas before it was left to the experience of the fire engineer to propose and agree methodology, inputs and acceptance criteria, these are now prescribed in C/VM2. While a Non-C/VM2 performance based design is still available as a route to demonstrate compliance with the New Zealand Building Code, the view is that a Non-C/VM2 performance based design should be the rare exception. When a Non-C/VM2 performance based design for a building identifies that the building requires significantly different fire safety systems from a C/VM2 design, have we as fire engineers been over-designing buildings for many years pre-C/VM2? Or is the Fire Engineer putting occupants at risk by not including the fire safety systems required by the Non-C/VM2 performance based design? And who is responsible?



Speaker: Brian Davey

Wednesday 15th October, 11.15am – 11.45am

Brian retired from the NZFS in October 2012 following 42 years as a career firefighter, the last 28 as a senior operational officer (including 14 based at the New Zealand Fire Service (NZFS) NHQ, and retiring as Area Commander for East Otago). While at NZFS NHQ his role involved the development and review of operational policies and procedures reflecting national approach to firefighting operations. He is a Member of the Board of Directors and a Trustee for the Institution of Fire Engineers (IFE UK), and Past President of the New Zealand Branch of the IFE. Following retirement, he was approached by the Assistant Deputy Coroner for the Inner Southern District of Greater London to act as an expert witness for the Lakanal House fire inquest. This role resulted in attending the inquest hearing and appearing as a witness to address a number of specific matters relating to actions undertaken by the London Fire Brigade.

Topic Content: Risk from Fire in Complex Building - a case study of Lakanal House

The Coroner to the Lakanal House Enquiry in London identified a number of areas that the London Fire Brigade should address to improve its method of operation, especially relating to familiarisation visits, command and control and interaction between fire brigade operations and Brigade Control. This presentation will look at similarities between the NZFS operational procedures and methods of operation and those of the London Fire Brigade.



Winstone Wallboards Speaker:

Kevin Sceats *Winstone Wallboards Ltd - Senior Technical Executive*

Wednesday 15th October, 12.15pm – 12.30pm

Kevin is a member of the Winstone Wallboards Ltd strategic management group, responsible for Research & Development and Industry Liaison. He has a building materials and science background but has held a variety of roles including General Management of manufacturing and contracting operations both here in NZ and Australia. He's been involved with development of building materials and systems for the construction industry for over 35 years. He's passionately involved with leading activities to lift skill levels across the construction industry with one of his key roles to achieve this being a Director (and Chair) of the BCITO since 2007.

Topic Content: Penetrations in Fire Rated Systems

In 2008 the Fire Protection Association of New Zealand (FPANZ) issued a research report (funded by the Building Research Levy) which identified areas for improvement to the design, installation, inspection and maintenance of passive fire protection in New Zealand buildings. This followed reports out of the UK and Australia which identified issues similar to those outlined in the FPANZ report. Not much has changed since then so what needs to happen to protect the good name of our industry and ultimately our building owners and users?

Registration or Licensing of installers and underpinned by an NZQA Qualification is vital!



Speaker: Paul Grimshaw

Thursday 16th October, 8.30am – 9.00am

Paul has developed significant expertise in construction disputes which require careful analysis of the Building Act, the Building Code and Environmental & Resource Management. Construction disputes tend to be complex and he has specialized in the Leaky Building area. However, his considerable expertise extends across councils, including contract enforcement, caveat hearings, injunction hearings, and disputes over land, rating sales and debt recovery. Paul has also acted on behalf of various professionals including solicitors, accountants, liquidators, receivers and values. Paul has wide experience in arbitration hearings and alternative forms of dispute resolution.

Topic Content: Litigation - Every Engineer's worst nightmare

Litigation of leaky buildings is starting to extend beyond the building fabric into areas of fire rated construction and fire safety. Paul will speak on the litigation process in general and how fire safety is starting to become a part of leaky building claims. He will also discuss common mistakes engineers make that exposes them up to more liability than is necessary.

IAG Insurance Speaker – to be confirmed

Thursday 16th October, 9.00am – 9.45am

Topic Content: Insurance

SPEAKERS & PRESENTATIONS



Speaker: Jason Dyer *Norman Disney & Young*

Thursday 16th October, 9.45am – 10.15am

Jason is the Fire Protection Manager for Norman Disney & Young. Jason has a Bachelor's degree in Mechanical Engineering and Master's Degree in Fire Engineering, and has worked in the fire protection industry in management and engineering roles for over 18 years. He has also served on a number of Standards NZ Committees for fire protection standards.

Topic Content: The Risk of Complying

Fire protection is often driven by compliance with Code minimums, but what are the Code minimums and what do they offer?

The New Zealand Building Code Clause C1 does not expressly set out to provide protection to the owners building, content, processes or business from the effects of fire. It is the job of the fire engineers and fire protection engineers to consult with the owner to ensure their needs are met. In some instances the systems required by the Code minimum, while cheaper in isolation, may actually result in a higher overall building cost and less flexibility of use than a superior system exceeding the Code minimum. Effectively it is sometimes possible to save money by upgrading.



Speaker: Andrew Campbell

Thursday 16th October, 10.30am – 11.00am

Andrew is based in Holmes Fire's Auckland office and is an experienced fire engineer who has developed fire strategies for a number of high profile projects over a range of sectors, and has a proven track record of securing regulatory approval for complex fire safety engineering solutions. He enjoys the creativity and lateral thinking required to develop a harmonised fire safety design in synergy with the architectural intentions and other engineering disciplines and which can be effectively implemented and managed by the end user.



Speaker: Ken Collins

Ken is based in the Wellington office and is a founding director of Lab-works and has over 20 years' experience in the design of laboratory facilities. He is a leader in laboratory design and construction, educational campus design facilitation and laboratory health and safety standards. He was a part of the Australia and New Zealand standards committee writing AS/NZS 2982.2:2010. He frequently attends and presents seminars at international laboratory design conferences.

Topic Content: The Cutting Edge – Addressing Risk in Modern Research Facilities

Modern research facilities are highly specialised environments with specific processes and procedures that require a high degree of flexibility and procedural controls to facilitate efficient, safe and secure working and learning environments. Many modern research facilities contain research of value to society that utilise a wide range of harmful media, hazardous and dangerous substances and internal atmospheres that present risks to occupants and contents where the impact of fire could result in severe consequences to people and the environment and loss of valuable research output. The mitigation of risk is an underpinning principle to the design and operation of modern research facilities. This typically demands bespoke solutions for a given facility that balances the need for flexible working environments for specific research activities with protective features to remove and reduce the risk of fire, protect people, valuable research work and the environment. Design solutions generally must exceed the minimum requirements of regulatory regimes and prescriptive codes of practice to achieve an efficient and successful outcome. This presentation discusses the approach to managing risk in the design and operations of modern research facilities, and how a holistic approach that has risk mitigation at its core can offer the best result.



Speaker: Dave Hipkins *Wormald*

Thursday 16th October, 1.00pm – 1.30pm

Dave is National Technical and Product Manager with Wormald. Dave is responsible for the day to day operations of the technical and engineering group, which ensures compliance of Wormald's fire protection products, systems and servicing operations. Dave joined Wormald in 1987 and has over 25 years' engineering experience in the fire protection industry. Dave holds a Bachelor of Engineering (Mechanical) and a Masters of Engineering (Fire). He is also a Chartered Professional Engineer and a member of the Institute of Professional Engineers New Zealand (IPENZ).

Topic Content: Fire Protection Water Supplies – Is this the greatest challenge the industry is facing?

Having an adequate water supply available is critical for a fixed fire protection system to function. If the fixed fire suppression system is solely dependent on the "Town's Mains" for its source, there are a number of risk factors associated with this configuration for the building owner. The fire protection industry is experiencing an increasing number of water supply defects arise due to the likes of; deterioration due to the age of the network array, the installation of pressure reducing valves, population grown and associated increased demand and poor maintenance regimes and practices.



Speaker: Trent Fearnley

Thursday 16th October, 1.30pm – 2.00pm

Trent is a Station Officer and a Fire Engineer who has over 18 years' experience in the fire industry, ranging from fire-fighting to trainer to fire safety management to fire engineering design. Just over 2 years of his career was spent in a consultancy role in the Middle East. He was involved in many major projects but his highlight was working on the Dubai Metro and Al Sowwah Island – the new Abu Dhabi Financial Centre. He is currently a station officer in Gisborne and the secretary for the Institution of Fire Engineers. In amongst this he is also completing his Masters.

Topic Content: Reliability of Sprinkler Systems

A comprehensive survey of sprinkler systems in high rise office buildings was carried out to determine the reliability of various components of such systems in Australia. In that study a fault tree analysis (FTA) was used to estimate the overall reliability of these sprinkler systems based on the survey data from 26 buildings. A similar one conducted for shopping centres showed the average values of reliability can be adopted; Sprinkler zones associated with specialty shops 98.5%; Sprinkler zones associated with major stores 99.5%. Trent has conducted a similar study in New Zealand and has compiled survey data from office buildings which was verified against NZFS Incident Data. The data has been used to determine the reliability of the sprinklers in office buildings.

SPEAKERS & PRESENTATIONS



Speaker: Stephen Lederer *System Sensor*

Thursday 16th October, 2.00pm – 2.30pm

Steve Lederer is Senior Product Manager in the System Sensor Aspiration Business Unit. Since joining System Sensor in 2012, Steve has provided worldwide marketing and training support for our FAAST aspirating smoke detection system and the PipeIQ software. Currently, Steve is working to develop next generation aspirating smoke detection technologies.

Topic Content: In What Ways can the Aerospace Industry Assist with Innovation for the Fire Industry?

In what ways can the Aerospace industry assist with innovation for the Fire Industry? What are the latest innovations in the advancement and take up of very early smoke detection systems? How do these innovations add to the integrity, reliability and commercial justification for adopting very early warning detection systems? How do these innovations communicate with existing and future Fire Protection and Building Management systems? Steve Lederer will present views on these and many more interesting discussion points around very early warning detection technology.



Tyco Speaker: David Boyack

Thursday 16th October, 3.00pm – 3.30pm

David Boyack is the Special Hazards Manager of Tyco Fire Protection Products based in Melbourne, Australia. David has 20 years of experience in the fire and security industry including System Design, Product Management, Research & Development, Channel Development, Codes and Standards across Africa, Asia, Australia and New Zealand. As a subject matter expert in fire protection, David was often invited by conference organisers where he conducted numerous fire safety and equipment presentations to government agencies, industry representatives, and the fire engineering community. David is a VESDA Accredited trainer, was a member of TC2 Australian Standards committee and SANS SC3 fire standards committee.

Topic Content: Protecting Your Critical Assets – Risk Mitigation Using Modern Fire Suppression and Detection Solutions

Discuss critical aspects of fire risk mitigation in today's modern data centre environment. Presentation will discuss in-depth fire suppression systems, its performance, environmental and safety aspects. Protection of critical information systems is paramount to ensuring business continuity and keeping your business, data and intellectual property secure.



Speaker: Ron Green

Thursday 16th October, 3.30pm – 4.00pm

With 35 years in the Fire Protection and Building Compliance Industry, Ron Green is recognised as a National Leader in Passive Fire Protection (PFP). He holds NZQA Level 4 Qualification in Passive Fire Protection (Building Consent Inspections) is an IQP and has PS1, PS2, PS4 authorisation. Ron is SIG Chair - Passive Fire Protection - FPA and Chairman of the Association of Building Compliance. Ron undertakes various PFP roles including, training, peer review for Councils, expert witness, design, building assessments for Fire eEngineers, PS4 sign-off and IQP inspections. As Passive Specialists and Director of Fire Group Consulting he is involved in projects from Whangarei to Dunedin, working alongside Fire Engineers ensuring fire stopping is correctly designed and installed.

Topic Content: Passive Fire Protection – be part of the solution, not the problem!

Fire and Smoke Separations (PFP) form part of a buildings Fire Safety Design and are strategically important for Means of Escape from Fire, Progressive Evacuation, New Zealand Fire Service and Property Protection. In spite of their importance they are the most incorrectly installed, inspected, and maintained aspect of fire safety systems in New Zealand. Many PS3, PS4 and Form 12A documents for PFP are either ignorantly or fraudulently signed. If you are a Builder, Fire Engineer, Tradesperson, IQP or supplier of PFP Systems are you being responsible to your clients and those who use the buildings? What is your and Councils RESPONSIBILITY and RISK and how can it be significantly reduced but more importantly how can we GET IT RIGHT?



Speaker: Kevin Weller *BECA*

Thursday 16th October, 4.00pm – 4.30pm

Kevin Weller is a fire engineer with Beca, located in their Bay of Plenty office. He has been involved in the specific fire engineering design of numerous hospitals, retail and commercial buildings, including fire modelling of existing buildings with poorly maintained fire separations. He holds a Bachelors of Engineering (Mechanical) from the University of Waikato, and is currently studying fire engineering at the University of Canterbury.



Speaker: Gareth Richards *BECA*

Having worked in the UK fire engineering community for the last 12 years, Gareth has recently relocated to Beca's Bay of Plenty office, joining the fire engineering team. He has significant experience in preparing fire risk assessment across a wide range of sectors including sports grounds, shopping complexes, offices, industrial, sleeping and construction site fire safety. This has given him a good understanding of existing buildings, identifying their fire safety shortcomings and recommending practical cost effective solutions. Gareth has a Bachelor of Science with Honours in Fire Safety Engineering from the University of Wales, Newport and is a Member of the Institute of Fire Engineers.

Topic Content: Passive Fire Swiss Cheese – Validating the holes by Risk Assessment

In recent months media attention has turned to industry-wide failings in fire stopping, with some believing it to be the next leaky-home saga. Those involved in construction monitoring will be aware of a rapid drive for the building industry to up skill in fire stopping. All of this points to a possible historic systemic failure in the construction, construction monitoring, council code, compliance checks and IQP Building Warrant of Fitness checks of our buildings.

But does this make our building stock dangerous, or is there an acceptable level of risk associated with un-stopped fire and smoke separations? Is it possible to design a building with the assumption that firewalls will not be maintained? This presentation will pose answers to these questions, drawings on existing literature and smoke modelling to see if compliance with the New Zealand Building Code is possible with limited fire stopping.

Risk and Responsibility

WE ALL PLAY A PART!

Mitchell Brown

Area Manager, Manawatu
New Zealand Fire Service

Past President
Institution of Fire Engineers
New Zealand Branch

Past President
Fire Protection Association
New Zealand

This year's Fire NZ Conference and Exhibition is themed around the notion of "Risk and Responsibility". Whilst there will be presentations by leaders in the fire industry on key aspects of managing risk and the responsibilities that engineering, design, installation, maintenance and upkeep hold for all in the fire industry – I thought I would look at the issue from a holistic whole of building life perspective.

So before the first notion of concept is brought to bear by the developer and property owner, a number of key considerations must first be considered. Surely the primary consideration before commencement is the cost and final cost benefit outcome sort by the developer or property owner. To initiate the project consideration on location, zoning, resource consent requirements, local territorial authority requirements, build requirements, building use, potential changes in use and future development opportunities to ensure fullest cost benefit from the life of the building – must be all considered and weighed up.

So without delving into the many drivers that a building owner and developer must consider, perhaps if we go back to basics and look at the premise of risk and the various responsibilities that are in play for the fire industry in performing its role to engage with a building owner and the development of a building right from its inception, through its entire building life to deconstruction and replacement.

Risk

We live in the modern era where risk is an identified and manageable component to all aspects of our lives, business and work requirements. The basis of the discussion on risk is to identify the risk in a prioritised way, treat and manage the risk so that an acceptable outcome is achieved to allow the process or practice to occur. Our standard hazard risk assessment practice for the workplace is based around the matrix defined with Consequence (could result in) and Likelihood (probability of it occurring). A similar practice is applied for projects and business management practice.

Using this table we can look at issues to determine the possible consequences of the hazard, and the likelihood of that occurring:

HAZARD RISK ASSESSMENT			
CONSEQUENCE (could result in)		LIKELIHOOD (probability of occurring)	
Catastrophic	Fatality(one or more) to staff; catastrophic loss of operational capability	Almost certain	Is expected to occur (greater than a 90% chance of occurring)
Major	Multiple serious injuries (e.g. permanent disability); major loss of operational capability	Likely	Will probably occur (between a 70% to 90% chance of occurring)
Moderate	Serious injury (e.g. hospital, off work); moderate damage to equipment	Possible	Might occur (between a 30% to 70% chance of occurring)
Minor	Minor injury; minor loss/damage to equipment	Unlikely	Could occur (between a 10% to 30% chance of occurring)
Insignificant	Insignificant injury or damage/loss to equipment	Rare	May occur in exceptional circumstances (less than a 10% chance of occurring)

Having identified the issues around possible harm in the workplace with the risk of an event occurring and the resulting outcome, the example can now be used in this table to find the risk level for the hazard:

CONSEQUENCE LIKELIHOOD					
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	High	Very high	Very high	Very high
Likely	Medium	High	High	Very high	Very high
Possible	Low	Medium	High	Very high	Very high
Unlikely	Low	Low	Medium	High	Very high
Rare	Low	Low	Medium	High	High

And finally, we can use this table to determine what action is required, based on the risk:

Risk	Action required
Very high	Take immediate action to eliminate or isolate the hazard, and to implement medium and long-term controls. Consider alternatives.
High	Eliminate or isolate the hazard within 24 hours.
Medium	Eliminate, isolate or minimise the hazard within a month, or sooner, unless there is the potential for serious harm to occur, in which case the hazard should be controlled as soon as practicable.
Low	Eliminate, isolate or minimise the hazard within two months, or sooner, unless there is the potential for serious harm to occur, in which case the hazard should be controlled as soon as practicable.

So we have a tool that can be applied in a logical and practical way to determine risk and the probability and consequence of our action or inaction. Whilst in some instances and circumstances, this is required in a workplace or as part of industry practice; the question to be asked is who has the responsibility to support the needs of risk and responsibility for a building and its use? Who has the responsibility for the various practices and requirements to deliver a building in a safe and useable state for its whole of life?

Responsibility

The responsibilities for a building from start to end of life on behalf of the building owner are wide and varied and include:

- The architect, property developer, fire engineer, building consultant are key to the initial information and planning for the building owners design and build expectations against cost and benefit for its use.
- The electrical engineer, HVAC specialist, lift engineer, eco designer, water supply authority, fire service - fire risk management officer, design review unit, fire information unit all have a responsibility at the earliest stages of the concept and drawings stage to provide key information that will cause the building to perform as expected. Not only as a structure and space for occupation, but how the components interact and meet the building design and use requirements. The responsibility for supplying the correct information to support the expectations of the building owner for meeting the building act, building code, compliance issues, insurance provisions for the design of the building from fire, energy use, safety and design provisions for electrical and building management needs helps ensure the life of the building.
- Water supplies, water pressure provision, fire protection systems including sprinkler systems, manual systems, heat and smoke detection, air sampling, visual detection, gas flood, cold and hot process building environments, crowd size and building use and purpose group provisions - must all knit together collectively in balance with responsibilities for efficient and correct provision offered and applied to the building for the suitable outcome for its safe use.
- During the construction phase of the building the key components of building access provision, water supply and access, fire protection system location including sprinkler house, fire alarm panel, mimic panel, security systems, passive fire protection installation, electrical and data services, structural construction with all designed components for occupancy and building use.
- Installation of hand operated fire fighting equipment, Code of Compliance Certificate sign off, occupancy maintenance of the evacuation scheme or procedure with initial acceptance and regular trial evacuation and reporting, building warrant of fitness inspections and management of the building features and engineering aspects.

Conclusion

The responsibility for a building and its life relies on the professional delivery of built environment practice and service. The responsibility of each building component adviser, consultant, installer, sign off manager for the maintenance of the systems and practices in the building supports the owners requirements. The risks are present throughout the entire process of a buildings life and are managed with due care and the responsibility by all to support their function in support of the building owners ultimate responsibility - to provide a safe building for use throughout its life.



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Preventing Fire and Protecting Assets with OXYGEN-REDUCTION FIRE PREVENTION



Martin McGettrick
General Manager
Special Hazards
ARA Fire
E: info@arafirepass.com.au

A few months after an oxygen reduction fire prevention system was installed at Sydney Adventist Hospital, one of the power factor correction units failed. This could have led to a fire but there was no fire possible because of the oxygen-reduction system.

- Can your business risk a fire?
- Oxygen-reduction fire prevention creates an environment of breathable, controlled oxygen-reduced air that prevents fire ignition and is safe for people and safe for the environment
- Oxygen-reduction systems prevent fire proactively instead of suppressing a fire after it has started and damage and business interruption has occurred

Australia's first oxygen-reduction fire prevention system was installed in June 2013 at the Sydney Adventist Hospital (SAH), NSW's largest single campus private hospital.

An oxygen-reduction fire prevention system protects several rooms at the SAH, including the power factor correction room and the hospital's main switch room that feeds the operating theatres; a volume of approximately 500m³. A fault occurred in one of the power factor correction units a few months after the installation of the oxygen-reduction system. The fault was detected by the VESDA system and the oxygen-reduction system prevented a fire starting.

Bernard Jakovac, Director of Engineering Services at SAH, said "the hospital is very pleased with the oxygen-reduction system and we think it is a great solution for the environment it is protecting. Our insurers are also very keen on the system and we are considering this for other high-risk areas across the large campus. We believe the oxygen-reduction fire prevention system is a wonderful product and a great innovation in fire prevention".

How does oxygen-reduction fire prevention work?

Oxygen-reduction fire prevention uses a technology that produces oxygen-reduced (hypoxic) air by partly filtering out oxygen from ambient atmospheric air. Normal atmosphere contains 21% oxygen. The hypoxic air injected into a protected space is 15% oxygen and 84% nitrogen (1% is made up of argon, carbon dioxide and other gases). A fire cannot start in this environment. Common flammable solid materials and liquids cannot be ignited with an oxygen level below 16%.

Oxygen reduction fire prevention works by taking oxygen out of the air as opposed to other systems that inject pure nitrogen into the area to be protected.

How does Oxygen-reduction technology differ from conventional fire protection?

Oxygen-reduction technology provides a continuous level of prevention rather than discharging an extinguishing agent once a fire starts, as is the case with traditional fire suppression systems. Oxygen-reduction fire systems also have a straightforward installation process, minimal maintenance costs and a smaller footprint than a sprinkler system or a fire suppression system.

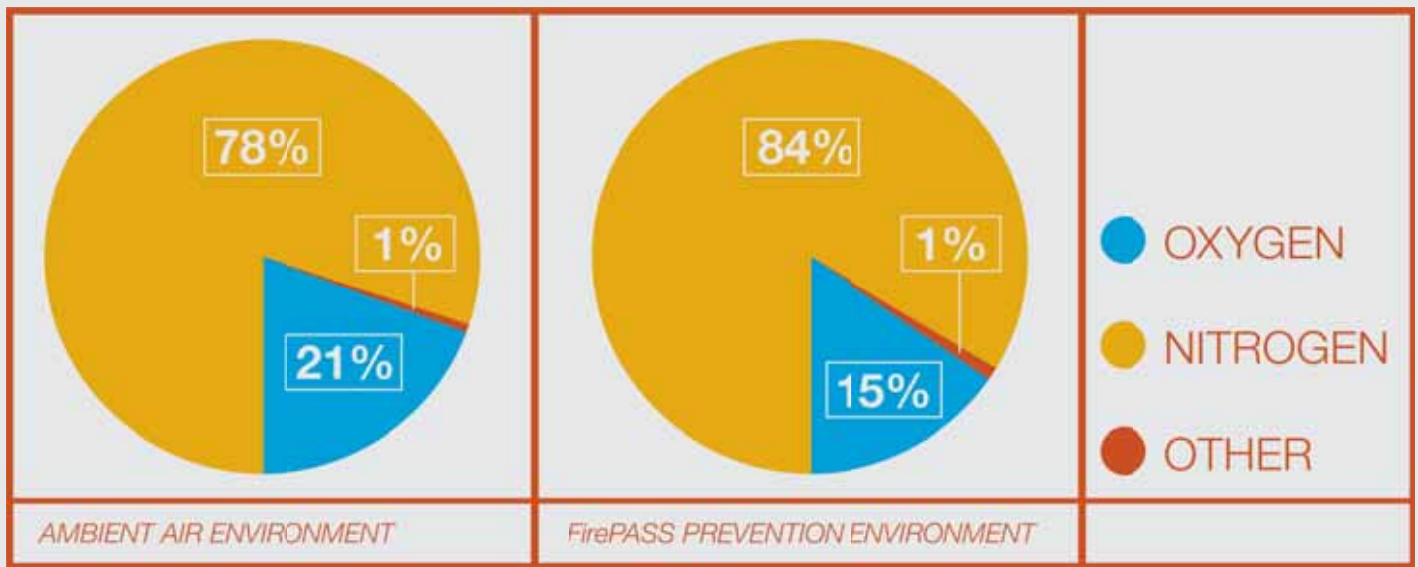
Cost comparisons indicate the installation and set-up of an oxygen reduction system is more than a conventional fire protection system on volumes less than approximately 800m³. However, on protected areas greater than 800m³, the return on investment and long-term benefits of an oxygen reduction system easily outweigh the installation and set-up cost. Factors to be considered include:

- A traditional fire protection system is only activated once a fire has broken out, resulting in some form of heat, smoke or water damage to equipment, building, materials and fittings
- Items being protected may be irreplaceable and the cost incalculable
- Installing an oxygen reduction system ensures:
 - No flame - a fire will never start
 - No damage to property and goods
 - No shutdown of business operation due to fire damage
 - No annual integrity testing – the system self-tests
 - No ten year hydrostatic testing of suppression cylinders
 - No false discharges

How is oxygen-reduction fire prevention safe for people and safe for the environment?

Oxygen-reduction fire prevention systems are clean-air systems. The system uses ambient air to produce breathable air for fire prevention, no chemicals or gases are involved. The oxygen-reduction fire prevention agent is simply oxygen-reduced (hypoxic) air.

Hypoxic environments created for the purpose of fire prevention are precisely controlled and



monitored reduced-oxygen environments. They should not be confused with other environments where hypoxic conditions can occur in an uncontrolled, unwanted or unexpected way.

There has been extensive medical research in the UK, Europe and Australia to support the safety of working in a hypoxic environment of oxygen at 16% and below.

At sea level, 15% oxygen content is equivalent, in terms of human physiology, to normal atmospheric air at an elevation of around 2,700 metres (9,000 feet) above sea level or being on a commercial flight. Millions of people around the world live at altitudes equivalent to exposure at or below 15% oxygen concentration at sea level.

Hypoxic air environments are currently used in medical research and for physical training and rehabilitation of athletes.

What are the suitable environments for an oxygen-reduction fire prevention system?

Environments that are best suited to oxygen-reduction fire prevention include any areas that require the highest levels of fire prevention and where uninterrupted operation is essential:

- Data centres
- Server rooms
- Archive rooms
- Libraries
- Museums
- Electrical switch rooms
- Power factor correction rooms
- Telecommunication rooms
- Laboratories
- Warehouses
- Hazardous materials storage
- Food storage areas / deep freeze / cold storage rooms

Oxygen-reduction fire prevention systems can be implemented as an alternative, but also as a complementary or supplementary option that enhances conventional fire-safety means without interfering with their performance.

How does oxygen reduction protect irreplaceable goods?

Documents, rare archives, historic artefacts, museum exhibits etc. are all irreplaceable items, usually of high value. They are destroyed or damaged by fire, water, smoke and chemicals. Oxygen-reduction not only prevents the outbreak of fire, avoiding any collateral damage by extinguishing agents, it also slows oxidation and reduces deterioration of irreplaceable items due to the reduced oxygen content of the hypoxic air produced.

How does the system monitor oxygen levels?

The oxygen-reduction system is designed to enable the oxygen concentration levels to be monitored on a continual basis by a minimum of two independent oxygen sensors, in different locations, in each protected space. The monitoring units are typically placed at eye level, at an appropriate distance from the door of the room. This is to provide for monitoring of oxygen conditions and alert if doors are wedged open or not closed properly, whilst minimising the amount of false, high oxygen alarms. The oxygen sensors transmit to monitoring and control points (e.g. the fire alarm panel and the building management system), as required.

Performance indicators show, as a minimum, for each protected space:

- Oxygen concentration level as indicated by each oxygen sensor
- High and low oxygen alarm conditions
- An output indicating the operation of any other system alarms

Health and Safety

The design aim of any oxygen-reduction fire prevention system is to create and maintain an atmosphere in an enclosure that is capable of preventing ignition of combustibles found within the protected area, whilst simultaneously remaining a safe environment for the occupants.

A risk assessment, in accordance with AS/NZS ISO 31000-2009, Risk management – Principles and guidelines, shall be carried out prior to any installation of an oxygen-reduction fire prevention system to ensure safety of both people within the protected area and those outside the protected area that may be exposed to output air from the oxygen-reduction fire prevention system. Such an assessment shall detail:

- I. The safeguards employed for persons having access to the protected space and oxygen-reduction fire prevention system equipment
- II. Limitations to the number of people allowed in the protected enclosure and the level and duration of physical activity permitted to be undertaken

An independent review on working in hypoxic conditions was carried out by thoracic specialist Professor Matthew Peters, President of the Thoracic Society of Australia and New Zealand.

Professor Peters produced a report and a checklist of considerations for anyone working in or visiting a hypoxic environment. A copy of Professor Peters' report can be found at www.arafirepass.com.au.

Installing an oxygen reduction fire prevention system

Oxygen-reduction fire prevention systems come readily mounted and tested. Once on site, the system is connected to the room sensors and to the power supply. The system is then connected to the rooms via the installed tubing. The by-product oxygen-enriched air is vented outside.

Oxygen-reduction fire prevention systems do not require rigid piping within the protected spaces. The only requirement is simple, minimal pressure piping to each protected area and to the ambient air, along with wiring of the oxygen monitoring units in the protected areas.

It is recommended that protected areas be equipped with highly sensitive smoke detectors such as VESDA or equivalent to ensure any smouldering combustion from cable faults, for example, is reported in its incipient stages.

A comfortable, breathable atmosphere is created inside the protected space by the ongoing ventilation with fresh, hypoxic air.

Sealing the rooms

It is essential the protected area is well sealed in order to minimize the permanent leakage of air in and out of the room. The key factor relating to running costs (energy consumption and maintenance) of an oxygen-reduction fire prevention installation is the leakage. This is the sum of permanent leakage of the protected area and the temporary leakage created by door openings. Investing in improving the sealing of the protected areas will have a direct impact on running costs, as they are directly proportional to the leakage rate achieved. Typically, the payback for such improvements is less than one year.

All spaces in the protected area must have split-type air cooling or closed, dedicated air recirculation systems.

To evaluate the current leakage of the area to be protected, it is recommended to perform an integrity fan test (accurately predicts the room's pressurisation and identifies any leaks in the room), prior to any works being commenced.

Venting / Cooling

The area where the compressors and filtration units are housed is required to be well-vented in order to allow a permanent supply of fresh, ambient air to the compressors. Alternatively, the room can be cooled with chillers. There is a requirement for a small drain in the machine room for the wastewater of the condensate cleaner.

Maintenance

The highly reliable hypoxic air generators require very little upkeep and can operate for decades with proper maintenance. A maintenance cycle of six months is typical. Regular inspections are recommended

to ensure a fire preventative atmosphere is maintained. This cycle applies if the supplied fresh air is compliant with the required quality. If the air quality is lower (in the event of dust, humidity, temperature etc.) the cycle of filter changes needs to be reduced.

Limitations on installation

Oxygen-reduction fire prevention systems shall not be installed for use in areas where:

- Sufficient infiltration control cannot be achieved
- An alternative source of oxygen is present
- Oxidizing agents exist that have the potential to reduce oxygen concentration by chemical reaction (e.g. chlorine)
- Substances or processes exist that evolve gases capable of modifying the atmosphere such that the oxygen concentration is reduced (e.g. toxic displacement)

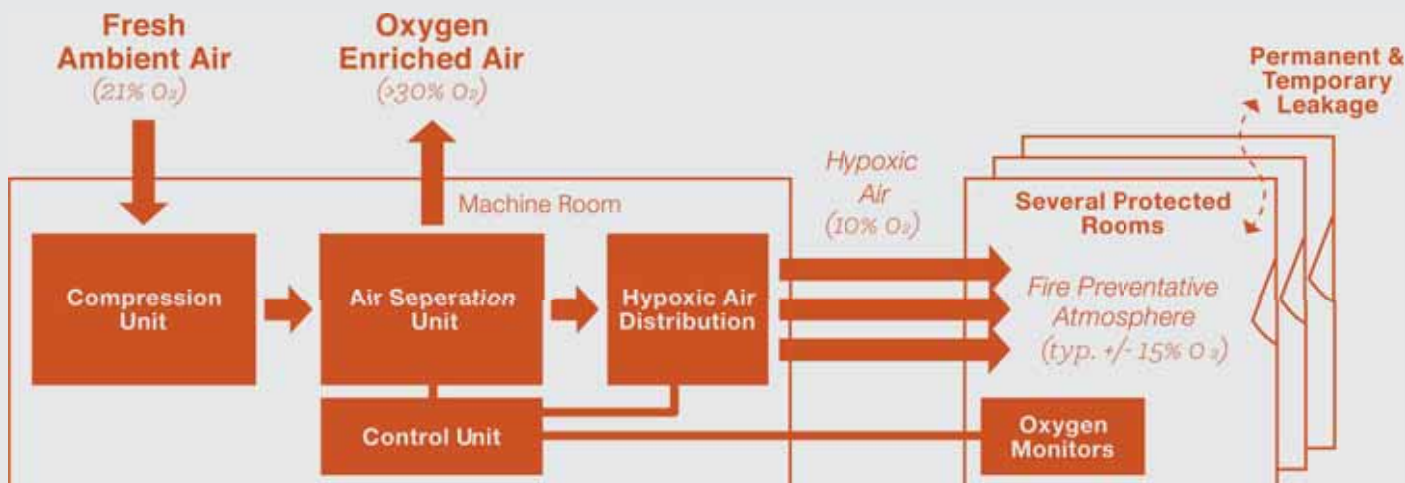
Benefits of oxygen-reduction fire prevention

- Certainty of avoiding the outbreak and spread of fire
- Continuous fire prevention without any interruption; no refilling or replacement required
- Environmentally friendly – no chemicals used
- Designed, engineered and manufactured to customer requirements and specifications
- Very small footprint and little building space required
- Simple to install
- Easily installed into existing premises as well as newly built spaces.
- Minimal maintenance
- Retaining access to protected areas at any time
- Scalable to fit any sized area, large or small
- Slows oxidation and reduces deterioration of documents, materials, equipment and artefacts.

Countries where oxygen reduction fire prevention systems are installed:

- | | |
|-------------|---------------|
| • Australia | • Russia |
| • Brazil | • Singapore |
| • Dubai | • Sweden |
| • Norway | • Switzerland |
| • Oman | • USA |
| • Portugal | |

Oxygen-reduction fire prevention systems provide unmatched fire safety and achieve the ultimate goal in fire protection - fire prevention.





TUNNEL EMERGENCY EXERCISES

Ed Claridge

MIFireE

Fire Engineer, Beca

Roger Callister

GIFireE

Assistant Area Manager
(Operations),
New Zealand Fire Service

Introduction

Emergency Exercises form a crucial part of the construction, commissioning and on-going operations of all major infrastructure tunnels. During construction activities they are essential to test the resilience and preparedness of construction site personnel and coordination with the responding emergency services to determine the most appropriate response should an incident occur. Once construction is nearing completion, exercises become necessary to ensure familiarisation of the tunnel and its systems for both the emergency services and also any tunnel operators that may be involved in the day to day operations of the facility. Such exercises provide all parties with the opportunity for familiarisation, practice and to experience the tunnel environment under simulated incident conditions.

New Zealand Tunnels

Prior to 2009 New Zealand had not built any major road tunnels for 30 years and emergency exercises within road tunnels were not common practice. Auckland has seen a dramatic increase in the number of road and infrastructure tunnels being constructed in recent years. The construction of the 2.5 km twin bore Waterview tunnels, which includes the largest ever Tunnel Boring Machine (TBM) used in the southern hemisphere and on-going design of the 3.4km City Rail Link has increased public awareness of the development of significant tunnelling projects. Wellington has also seen recent fire safety upgrades implemented as part of the refurbished Terrace motorway and Mount Victoria tunnels and a number of other historic road and rail tunnels are constantly under review given the changes to the way in which fire safety in tunnels has developed over the last few decades.

A number of incidents within tunnels such as last year's Onehunga water main explosion, a major response to missing persons within the 9.2km Vector tunnel, the 2002 tourist bus fire within Homer tunnel and the deaths of three workers within the Auckland CBD sewer on Waitangi Day in 1999 have identified the difficulties associated with responding to tunnels.

Emergency Preparedness and Response Planning During Construction

Major construction projects will undertake emergency preparedness and response planning during construction. These plans will need to be tested and put into practice regularly by scenario testing to demonstrate that the workforce are familiar with the plans, procedures and to improve the plans and allow them to evolve as the site conditions change. The emergency services will typically become involved in major exercises to allow them to become familiar with the specifics of the project, construction site and ensure that their procedures are compatible with site constraints. This type of planning and these exercises are essential for tunnelling projects due to the unique challenges that they present to first responders. Figure 1 shows an exercise undertaken in 2009 approximately 750m into the Rosedale wastewater tunnel. This exercise involved the New Zealand Fire Service (NZFS) and St John and was based around a trapped worker caught under a concrete tunnel segment. In confined spaces such as this 2.8m diameter tunnel, the coordination between site workers and emergency services, communications and practicalities of effecting rescue in such circumstances become extremely difficult.

A number of exercises have been held within the Waterview tunnels involving various external agencies. Recently a large scale emergency exercise involving various agencies including NZFS, St John, Police, Mines rescue was held within the Waterview tunnels to test the underground mines emergency protocols developed in response to recommendations of the Royal Commission on the Pike River Coal Mine tragedy.

Tunnel Emergency Exercises

During the construction of the Johnstone's Hill road tunnels north of Auckland, it was recognized that there would be the need to be a significant involvement of the emergency services in their design and on-going operations. This was partly due to the tunnel being located within the first response area of a rural fire district which includes

a first response by a Rural Volunteer Fire Force and being located very close to a well-supported composite fire station comprising a mix of volunteers and career fire fighters. In contrast, the Victoria Park Tunnel located in the heart of Auckland City which opened in 2011 is surrounded by numerous career staffed fire stations and benefits from far faster emergency response. This variability in response times and resourcing between the two tunnels however is not unique to New Zealand's tunnels and reinforces the need for regular exercises. The Auckland Motorway Alliance (AMA) now runs regular exercises in both its new road tunnels which has provided significant benefit not only to the emergency services and tunnel operators, but has also been used to provide continuous learning and has identified a number of design and operational response improvements.

To date these have included approximately eight field exercises as well as commissioning and desktop exercises. The exercises are undertaken during annual maintenance closures of the tunnels, they are normally held at night and typically alternate between major and minor exercises.

Where available resources allow, minor exercises include responses from all three of New Zealand's major emergency services including the Fire Service, Police and St John ambulance. Minor exercises typically include a number of actors, static vehicles and where relevant to the exercise the generation of smoke and operation of the tunnels safety systems which includes the deluge systems. A scene from the latest minor exercise undertaken within the Johnstone's Hill tunnels and from systems commissioning is shown in Figure 2.

For major exercises the scenarios are developed further to include many more actors and vehicles, greater use of the infrastructure, such as both tubes and approach roads. Where possible, major exercises try to involve additional parties such as Civil Defence and other parties as relevant.

Other recent multi agency exercises have been held within the AMETI road tunnel as part of the commissioning of the tunnel. Auckland's latest road Tunnel is situated adjacent to the recently built Panmure Train station and sits below a new bus interchange which is part of the wider AMETI project. The Auckland Manukau Eastern Transport Initiative (AMETI) is a group of projects for the southeast of Auckland (Panmure, Mt Wellington, Sylvia Park, Pakuranga and Botany). Phase 1 of the project includes a 1.5km new road linking Morrin Rd to Mt Wellington Highway including the 225m long AMETI Tunnel.

Exercise Variation

The Victoria Park tunnel allows the passage of dangerous vehicles which informed and drove the basis of the 2013 emergency exercise involving a chemical tanker incident requiring a hazardous substance response from the emergency services. As part of the exercise, a tanker carrying 3000 litres of water was used to simulate a spillage of hydrochloric acid within the tunnel. A dry ice smoke machine was used to simulate gas being given off from the spill and actors were used to simulate casualties within vehicles, including the first responding Police officers who became overcome by fumes. Orica, one of New Zealand's largest transporters of hazardous goods took part in the exercise and provided a tanker and driver to assist and also to test and inform their own internal procedures to spillages.

Recent exercises have also been held in the rail tunnel environment including one within the Britomart tunnels that was undertaken prior to electrification of the rail network.

Outcomes of Emergency Exercises

A major benefit of undertaking the exercises has been to educate all involved in the unique environment that tunnel incidents pose. For example, the use, operation and nature of emergency smoke management and deluge systems in tunnels is very different to that experienced within buildings. The environment inside a tunnel that responders will face when jet fans and deluge systems are operating will typically be loud and for the case of a deluge system may completely obscure the incident scene. Understanding how these systems operate, the implications of operation and how they can help or hinder incident response is crucial. For fire fighters responding to an incident inside a tunnel, different procedures need to be adopted than that are typically put in place for response to buildings and a greater understanding of systems operation is essential. For the Police responding to tunnel incidents may also conflict with their standard approach to incident response especially when first on the scene and responding directly into the tunnel.

Debriefing of exercises is important to understand what occurred during the exercise and why, and to establish outcomes and record the lessons learned. A hot debrief will typically be held straight after the exercise for the onsite players. These can be particularly important to those directly involved and who may not be available for separate more formal sessions at later stages. Additional debriefs will be held separately for the observers and for representatives of the emergency services to gain a greater insight into the exercise and to start establishing outcomes useful at an organizational level.



FIGURE 1 – NZFS and St John practicing the rescue of a trapped worker caught under a concrete tunnel segment 750m into the Rosedale sewage tunnel in 2009.



FIGURE 2 – Johnstone's Hill tunnels undergoing
a) Minor exercise simulating a crashed vehicle requiring patient extrication and
b) systems commissioning both involving the emergency services.



FIGURE 3 – Scenes from major exercises within the Victoria Park tunnel
a) prior to opening, the first exercise involved a crashed vehicle scenario requiring deluge operation and
b) the second major exercise simulating a crash between a car and heavy goods vehicle causing a fire. This exercise involved over 60 actors and a coach full of occupants.

Conclusion

Emergency exercises are critical to ensuring the safe on-going operation of tunnels. It is vital that both the tunnel operators and emergency services are not only familiar with the assets and the systems present, but are also provided with the opportunity to use the systems under simulated conditions and to experience the tunnel environment with the tunnels systems operating. This is particularly essential for tunnels with suppression and forced ventilation systems. For new tunnels, full scale emergency exercises complement desktop exercises and are a necessary part of the wider systems integration and demonstration that the tunnel and the operator's ability to oversee its safe operation are ready to open.

Exercises provide a valuable way of keeping in touch with the various emergency services personnel and bringing together tunnel operators who would otherwise have no other forum to be in contact. Through exercises and exposure to emergency responders and their organizations can often provide a good source of advice to assist on-going operations. Emergency exercises also provide a means to assist with large scale training providing a mutually beneficial relationship. Ultimately exercises allow the formation of relationships between tunnel operators, managers and the emergency services, which is essential in building trust and ensuring the best possible outcomes to real incidents.

- Tunnels vary greatly in many respects and a standard frequency of exercises may not suit all tunnels over their lifetime. Typically it will be necessary to conduct emergency exercises on a more frequent basis during the start-up and initial operation of a new tunnel and then reduce the frequency as the tunnel beds in. Other factors such as the complexity of the tunnel, presence of fire fighting systems and distance to responders home bases will also affect

the need and frequency of exercises that should be undertaken.

- For an adequate emergency response to an incident of any kind within a tunnel, communications between the emergency services and between the tunnel operators is essential. Good communications can only occur if a degree of trust and confidence exists between parties. Emergency exercises are the best means to establish knowledge of the tunnel, an understanding of how all of the parties that would likely respond and be involved in an incident and provides a basis for establishing confidence and trust between those parties.
- Familiarization of the tunnel and its facilities, including back of house areas should be undertaken for as many of the likely incident responders as is possible. Familiarity should also include visits to the tunnel operations centres to build up an understanding of each other's roles, responsibilities and capabilities.
- Tunnel operators should also be familiar with the tunnel infrastructure including back of house areas and how systems are operated both locally and remotely.
- Emergency exercises are essential to the on-going improvement of the tunnel, their management and operation.
- They have provided outcomes that have and are continuing to be fed into the design of new tunnel infrastructure throughout New Zealand.
- With every exercise that has been undertaken, all of the organizations involved have steadily improved their knowledge of tunnels and have fed this back into their own organizations operational plans.
- Emergency exercises allow tunnel operators to manage incidents more effectively and efficiently.



FIGURE 7 – Scenes from a Major exercise within the Victoria Park tunnel.
a) Fire fighters liaising with Police prior to making entry into the tunnel and
b) Fire fighter stands at edge of deluge zone with a charged hose.



FIGURE 8 – Post Exercise Debrief involving all of the emergency services following a major exercise within the Victoria Park tunnel.



FIGURE 4 – AMETI exercise simulating a motor vehicle collision inside the tunnel with trapped occupants and a fire breaking out within a vehicle



FIGURE 5 – Scenes from a major exercise within the Victoria Park tunnel
a) fire fighters washing acid (simulated) into drainage sump and
b) using a decontamination shower.



FIGURE 6 – Emergency exercise within the Britomart Tunnel including smoke generation from a stopped train. The scenario was held in conjunction with the NZFS prior to electrification of the network.

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