

# FIRE AND RESCUE INTERNATIONAL

Integrated fire, rescue, EMS and incident command technology

Volume 6 No 5



FROM CONCEPT DESIGN TO COMPLETION



## Even heroes.....

(H)e goes into a smoky cellar on his knees; crawls around.  
 (E)verything fine, he turns to go, then hears a sound.  
 (R)eaching behind the oil burner, he finds her there.  
 (O)verjoyed he rushes her outside to clean air.  
 (E)veryone asks him to relive the rescue; it's all they talk about.  
 (S)o he does, but that close call still fills him with doubt.

By Susan Moger

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#### Editor

Lee Raath-Brownie  
lee@fireandrescue.co  
Cell 082 371 0190

#### Advertising

advertising@fireandrescue.co

#### Design and layout

Marc Raath  
marc@fireandrescue.co

#### FRI Digital newsletter

Pierre du Plessis  
pierre@fireandrescue.co

#### Accounts and circulation

Kelebogile Chimaliro  
accounts@fireandrescue.co  
subs@fireandrescue.co

#### Secretary

Kelebogile Chimaliro  
pa@fireandrescue.co

#### Administration

Kelebogile Chimaliro

#### Contributions

##### Africa

Colin Deiner  
Etienne du Toit  
Oliver Wright  
Dr Neels de Ronde (In memoriam)  
Morné Mommsen  
Nadia Taljaard  
Joarez Myambo  
Charles Mabaso

##### USA

Tim Murphy  
Susan Moger

#### Publisher

Lee Raath-Brownie  
FIRE AND RESCUE INTERNATIONAL  
Tel 011 452 3135/6 Fax 086 671 6920  
Box 8299 Greenstone 1616  
www.fireandrescue.co

#### Subscriptions

Free of charge  
Contact: subs@fireandrescue.co

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# Comment

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We are proud to present our 58th edition of **Fire and Rescue International (FRI)**, providing our emergency services with thought-provoking technical and research articles, leadership guidance as well as practical know-how for daily use. Enjoy the read!



#### Cover profile: Emergency Vehicle Conversions (EVC)

Our cover profile features Emergency Vehicle Conversions (EVC), a 20-year-old, Johannesburg-based company specialising in the conversion of ambulances and specialised vehicles.

#### Training and courses

We feature the University of Johannesburg's Advanced Certificate in Medical Rescue, which focuses on equipping healthcare professionals with the required knowledge, skills and attributes to participate in a multi-disciplinary approach to rescue.

#### Interschutz 2022

We provide an overview and a gallery of the recently held Interschutz 2022 in Germany as well as a more detailed overview of the FireDos exhibit and product range.

#### Equipment

Equipment featured in this edition includes the Vortran GO2VENT®, the newest version of the Vortran Medical resuscitator available from SkillsTrain. Also featured is the Dependapower Otter, a composite ultra-lightweight floating submersible pumping system from Industrial Fire and Hazard Control.

#### Cancer awareness

The World Health Organisation's (WHO) International Agency for Research on Cancer (IARC) recently declared fire fighting a cancer-causing profession. Dräger South Africa provided us with an article on cancer awareness, focussing on the importance of training procedures and fitness.

#### Back to basics

Colin Deiner shares practical advice to learn to survive in a cut back environment, unpacking much needed issues surrounding fire fighters, training, maintenance, management and leadership.

#### Leadership

In this edition, Etienne du Toit provides useful know-how on building strong teams through strong leadership including how to establish leadership, encouraging teamwork, fostering relationships between your team members, developing relationships with each of your team members and setting and agreeing on ground rules for the team.

#### Emergency medical services

SAPAESA's Oliver Wright discusses emergency vehicle warning systems in South Africa and whether are we using them effectively.

#### Wildfires

We look at Kishugu Aviation's AT802 single engine air tanker (SEAT), which is specifically designed for fast and effective rapid initial and extended attack on wildfires, we continue with chapter seven from Dr Neels de Ronde's book, 'The Garden Route in flames', featuring an introduction to under tree canopy burning: controlled burning. US Forest Services' Chief Tim Murphy discusses common denominators with fire behaviour on tragic fires in his series, Command Corner.

#### Training

In our training section we feature the UL's Fire Safety Research Institute new hose stream prop and hands-on training toolkit.

#### Urban Search and Rescue (USAR)

We look at the recent participation of the Urban Search and Rescue South Africa Team (USAR-SA 01) in the BRICS countries virtual USAR simulation exercise.

#### Self-defence for first responders

Morné Mommsen shares how management can assist against attacks on emergency services members.

A special note of thanks to all our contributors, advertisers and readers for their valued support! Fire and Rescue International is your magazine. Read it, use it and share it!

**Lee Raath-Brownie**  
Publisher

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Images



**This month's FRI Images winner!**

## Congratulations to

Yolandé Pretorius for her photograph 'Cape Winelands Fire Service (Robertson)' taken with a Nikon D3000 with a 18 to 55mm lens on ISO 100, a shutter speed of 1/500 and F-stop F/5.6.

**Yolandé Pretorius wins this month's prize money of R2000!**

#### Photo description:

Cape Winelands Fire Service (Robertson)

## Well done!

# Best rescue, fire or EMS photo wins R2 000!



Fire and Rescue International's (FRI) bi monthly photographic competition is open to all its readers and offers you the opportunity of submitting your digital images of fires, fire fighters, disasters, incidents, emergencies and rescues.

#### Rules

- All photographs submitted must be high resolution (minimum 1meg) in jpeg format
- Allowed: cropping, curves, levels, colour saturation, contrast, brightness, sharpening but the faithful representation of a natural form, behaviour or phenomenon must be maintained
- Not allowed: cloning, merging/photo stitching, layering of two photos into one final frame, special effects digital filters
- Fire and Rescue International (FRI) reserves the right to publish (printed or digitally) submitted photographs with acknowledgement to the photographer
- Winners will be chosen on the merit of their photograph
- The judge's decision is final and no correspondence will be entered into afterwards

#### Entries must include:

- Name of photographer
- Contact details (not for publishing)
- Email (not for publishing)
- Name of photograph
- Brief description of photograph including type of incident
- Camera, lens and settings used

All entries must be emailed to:

**lee@fireandrescue.co**

**>> ENTER NOW!**



# 20 years of emergency vehicle conversions



The initial team started off in a small workshop in Jet Park in Boksburg, Gauteng, with five staff members working on predominantly Toyota Hi-Ace ambulances. “We then started expanding into the mobile clinic conversions, export as well as markets throughout Southern Africa”, said Rosenthal.

Rosenthal bought out all shares in 2017 and continues to manage and run the business. “We have grown to a workforce of 28 with a few outsourced services such as branding, upholstery and flooring. We have in-house fabricators/welders who have worked in the vehicle conversion sector for many years. We have a fully equipped workshop including heavy duty metal work machinery and a powder coating plant. This is truly invaluable when a client requires custom work”, he added.

Jonathan Greenhill returned after a two-year sabbatical to head up sales.

“We offer an in-house technical design and drawing service for new and custom concepts for our clients.

**E**mergency Vehicle Conversions (EVC) is a 20-year-old, Johannesburg-based company specialising in the conversion of specialised vehicles. Conversions include ambulances and emergency service vehicles, mobile clinics, forensic vehicles, camper vans, veterinary clinics, mobile laboratories, specialised and

security vehicles, mobile offices, blood donor vehicles police vehicles and custom tool vans.

The company was established in 2002 by Jonty Rosenthal and Jonathan Greenhill and the team has been involved in the manufacture of emergency vehicles since 1992.



Our in house technical designer is a red seal boilermaker who has, since joining us in 2018, taken over all the computer technical drawings. He supports with breakdown drawings in order for our engineers and fabricators to manufacture either custom furniture or new designs” said Greenhill.

“Our conversions are all customised to suit our client’s specific requirements and we draw on our team’s operational experience within the emergency services to assist in achieving the optimum solutions thereto. Over the last 20 years we have also relied on input from certain associations, paramedics and staff in the EMS industry”, added Rosenthal.

“This is particularly important when we design new layouts etc. We always appreciate input and will try our best to stay ahead of safety and convenience specification for our clients. Some of us have done many shifts as observers over the last 20 years in the EMS industry to gain insights into the EMS field and

to keep up to date with trends and changes”, continued Rosenthal.

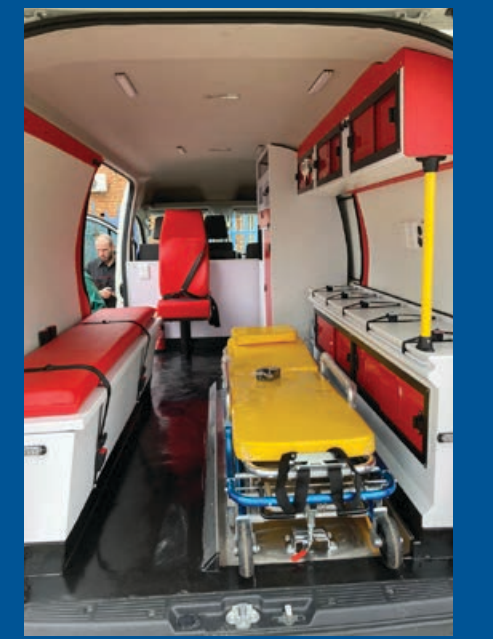
The business has grown over the years and moved premises in 2008 to larger premises and carried on hiring staff and growing the size of its workshops to a total of 1 500 square metres under roof and 700-square-metre yard space.

The company has a full camera surveillance system, two security companies that look after its premises including alarms and off-site monitoring by one of the security companies.

EVC complies with all legislative requirements and are proud to hold both BBBEE and ISO 9001 certification. The company is also a member of the Motor Industry Bargaining Council (MIBCO). EVC is registered as a body builder of motor vehicles with the South African Department of Transport and have National Regulator for Compulsory Specifications (NRCS) approved homologation on its converted ambulances, mobile clinics and camper vans.

Rosenthal added, “To date we have completed well in excess of 2 500 emergency service and related vehicles, with 2021 being our busiest year to date with 215 ambulance conversions alone.”

EVC was one of the first ambulance builders to incorporate LED lighting technology in their







► ambulance builds, which are far superior to the old style rotating lights. The superior light output combined with the increased reliability make the LED lights the only choice. "Soon after implementing LED emergency

lighting we started using LED interior and exterior scene lighting on all vehicle builds. We work very closely with our lighting suppliers and through good communications and feedback can keep up with the end users' needs and requests."

"Our ambulance furniture builds have evolved from basic steel frames covered with Formica clad aluminium to precision cut, bent and welded steel or aluminium cabinets. We have pride in the fact that most of our furniture can be removed from an old ambulance, refurbished and then re-used in a newer vehicle of the same make and model", said Rosenthal and Greenhill.

In 2017 they started utilising a PVC foam board product for walls, ceilings and bulkheads in the vehicles they build. The product is fire retardant, insect resistant and can be cleaned with most chemical solvents. This product is fully recyclable.

In 2014 an EMS act was put forward and accepted by the Minister of Health and went into practice in 2018. They studied the regulation over many months and started implementing the required changes. These changes included 2,5kg fire extinguishers, 2 000 watt inverters,



branding specifications and some internal adjustments to their conversions were necessary.

Ambulance operators were given a time period to comply with the EMS act and they assisted them with changes where necessary. All EVC ambulance builds are compliant with these regulations.

Rosenthal mentioned, "We had many conversations with South African Private Ambulance and Emergency Services Association (SAPAESA) regarding the interpretation of these rules and how it affects our builds and the end user's ability to comply with them. We have over the past few years consulted with many of our clients after ambulance inspections by their Provincial Departments of Health to confirm that we were, in fact, compliant. The implementation of the inspections took some time and we had to make sure our interpretations of the regulations met that of the inspectors in all provinces."

In 2018 the laws that are specific to oxygen storage, safety and delivery were also gazetted in South Africa and as soon as they were informed, they changed their securing and storage of cylinders in the vehicles as well as slowly changing over to supplying pin-index regulators.



"We are able to offer conversions in a variety of materials, layouts and options and each conversion is customised to suit the specific client and their application" concluded Rosenthal and Greenhill.

For a comprehensive overview of the EVC product range, visit their website. 🔥





# JOIFF Africa Summit 2022

14 and 15 November 2022 at Emperors' Palace, Johannesburg

**P**ine Pienaar, International Organisation for Industrial Emergency Services Management. (JOIFF) chairman and retired chief fire officer at Sasol Secunda Emergency Services, would like to extend an invitation for you and your colleagues to attend the JOIFF Africa Regional Meeting at the Emperors Palace, Johannesburg, South Africa.

With the world opening back up after the COVID pandemic, the JOIFF organisation felt that it is important to get back to face-to-face meetings as soon as possible, ensuring the safety of all that attend and for the first regional meeting post COVID, South Africa was the clear and obvious location.

Shared learning is a cornerstone of JOIFF and with the demand for access and the enthusiasm from attendees from previous JOIFF Africa Summits made it a no brainer to come back as soon as we could.

The one and a half day summit is designed to provide a unique shared learning opportunity and to join with high level international and regional industrial and municipal fire management specialists to listen, discuss and network with the world's and Sub Saharan Africa's foremost experts and specialists on fire hazard management.

## Speakers and topics

Disaster management during large scale incidents

- Dr Natalia Flores Quiroz, Stellenbosch University: Understanding evacuation modelling and human behaviour
- Colin Deiner, Western Cape Disaster Management: Flooding in Kwa-Zulu Natal - lessons to be learned
- Ian Scher, Rescue South Africa: Large scale disaster rescue

## Foam technology

- Niall Ramsden, Last Fire: NFPA 11 - Last Fire - update on test results of new generation foam concentrates
- Eric LaVergne, Williams Fire Introduction: Setting the scene for fixed fire reticulation systems versus mobile response systems - benefits and challenges of each application
- Ian Ross: Transition from older generation foam concentrates to new generation foam concentrates, not merely a matter of take out and replace

## Managing emergency responders - total wellness

- Dr Rina Steynberg: Total wellness of emergency responders
- Mike Perry: Africa Reptile and Venom Identification, safe handling and treatment in event of snake bite incidents by emergency responders

## General topics

- Nigel Blumire: Ammonium nitrate blast
- Dr Richard Walls, Stellenbosch University: Industrial structural designs
- Frank Preiss, Fire Dos
- Andre Tomlinson: EMS toolbox change out/adaption when converting from a refinery to a storage facility
- Mark Cummins: Application of Compressed air foam systems for extinguishing tank fires
- Chris Gilbert, Rural Metro: Public Private Partnership - Industry's role in strengthening municipal emergency response.

Come along to watch presentations and participate in panel Q&As from world leading international and regional speakers from organisations such as United Nations, oil majors, regional politics, academic and technical

specialists who will provide a unique opportunity for the attendees to learn, network and participate in the unique conference.

We are expecting 150+ senior fire hazard management specialists to attend this unique JOIFF Africa Summit 2022, including members of the South Africa Petrochemical Chiefs Committee making JOIFF Africa a unique networking and shared learning event.

## The delegate package includes:

- Pre conference drinks, evening reception networking event
- Delegate pass for one and a half day summit
- All refreshments and snacks during summit breaks including buffet lunches
- Discounted accommodation rates at venue hotel (whilst rooms still available)
- Individual annual JOIFF Membership (subject to approval)
- This JOIFF Africa 2022 Regional Summit entry is free for JOIFF members and specially invited VIP persons.
- Entry fee for Non-JOIFF members will be ZAR1 950.

Please note that available delegate places are limited and early registration is recommended.

To register and for further information please visit: [JOIFF Africa Summit 2022 Registration and Information](#)

If you would like further details on how you can sponsor or exhibit at this ground-breaking summit, please contact:

## Paul Budgen

Event director

Email: [pb@edicogroup.net](mailto:pb@edicogroup.net)

Tel: +(0) 44 77 88 281357 ▲



# JOIFF AFRICA SUMMIT 2022

Emperor's Palace,  
Johannesburg

14TH & 15TH NOVEMBER  
2022



**JOIFF in association with ADVANCED F.S.T are pleased to announce The JOIFF Africa Summit 2022 will take place on November 14th & 15th 2022 at the Emperor's Palace Resort - Johannesburg - South Africa.**

World Class Presentations, Unique Face To Face Networking  
Direct Contact With Suppliers & Industry Specialists  
Regional & International Speakers  
Latest Technical Advances  
Case Studies  
Technical Presentations  
Suppliers Presentations & Supplier Exhibition

## WHO SHOULD ATTEND

FIRE SERVICE MANAGERS - FIRE CHIEFS - SENIOR FIRE FIGHTERS - EMERGENCY RESPONSE PERSONNEL - FIRST RESPONDERS - FIRE ENGINEERS - FIRE SAFETY CONSULTANTS - FIRE RISK CONSULTANTS - OCCUPATIONAL SAFETY MANAGERS - PROCESS SAFETY MANAGERS - SAFETY & HSE MANAGERS - HSEQ MANAGERS - RISK MANAGERS - SECURITY MANAGERS - OPERATIONS MANAGERS - INDUSTRIAL SAFETY MANAGERS - INSPECTION & TRAINING MANAGERS

**FOR DELEGATE REGISTRATION PLEASE GO TO [WWW.JOIFFCONFERENCES.COM](http://WWW.JOIFFCONFERENCES.COM)**



Scan QR to Register now.

For Further Information On Sponsorship & Exhibition Packages at The JOIFF Africa Summit 2022

Please Contact Event Director Paul Budgen

Tel: +44 (0) 1305 831 768

Email: [pbudgen@edicogroup.net](mailto:pbudgen@edicogroup.net)

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**FIRE AND RESCUE INTERNATIONAL**



# 13<sup>th</sup> Fire Management Symposium: 23 to 25 November 2022

Nelson Mandela University George Campus, Southern Cape



Globally, effective wildfire management is impeded by a lack of integration between research results, technological development and efforts by fire managers. In the end all strive to prevent, suppress and protect the environment, human wellbeing and assets against wildfire.

This event aims to integrate the efforts of natural resource managers, engineers and scientists. Through an integrated approach, different role-players will be sensitised about each other's realities.

You are therefore invited to join fire managers and authorities from different disciplines and land uses such as nature conservation, agriculture, disaster management, forestry, local authorities, etc for a range of informative presentations and exciting networking opportunities.

**Focus**  
Following the worst fire experienced in the history of South Africa (Southern Cape) on 7 June 2017, as well as

numerous other urban interface fires in South Africa, it was decided to dedicate our biannual wildfire symposium to the topic: "Preparing for the next Mega fire event".

**Programme** (Download programme)  
The 2022 Fire Management Symposium promises to be a special event. Not only because of the unique setting of the venue in the heart of the Garden Route but because of the conglomeration of top rated fire management specialists whom will share their expertise in a very practical and applied manner. Internationally renowned fire scientist Prof Pete Fule will deliver the first keynote address and will be supported by local fire specialists such as Pieter van der Merwe. We will also proudly host other international fire specialists as well as specialists from leading forestry companies in South Africa. The second day of the event, hosted by The Southern Cape Fire Protection Association (SCFPA), will provide opportunities to visit the Southern Cape region to observe the unique vegetation and take note of fire related issues.

**In general**  
This event presents opportunities to people from different entities and parts of South Africa to network. In addition, the world of scientists who are engaged in research, will meet that of the hard-core fire manager who gets the smoke of wildfires in his/her eyes. Due to the capacity of the venue only 200 delegates can be accepted for the event. Final cost of the event has not been finalised but as in the past, will be very reasonable in order to provide the opportunity for everybody to afford attendance. The event dinner will take on the form of a spit braai with live music.

**For more information contact:**  
**Tiaan Pool**  
Email: [taian.pool@mandela.ac.za](mailto:taian.pool@mandela.ac.za)  
Cell: 072 374 2347

**Hannes van Zyl**  
Email: [Hannes.vanZyl@mandela.ac.za](mailto:Hannes.vanZyl@mandela.ac.za)  
Cell: 072 733 1692

**Sonia Roets**  
Email: [sonia.roets@mandela.ac.za](mailto:sonia.roets@mandela.ac.za)  
Tel: 044 801 5091

# Reimagine your future with University of Johannesburg's Advanced Certificate in Medical Rescue

This course focuses on equipping healthcare professionals with the required knowledge, skills and attributes to participate in a multi-disciplinary approach to the rescue of victims and patients in a range of urban, wilderness and aquatic rescue settings. Apply using the course token EMR2023 via [www.uj.ac.za/admission-aid/undergraduate](http://www.uj.ac.za/admission-aid/undergraduate).

**Admission requirements**  
Registered healthcare professionals with the Health Professions Council of South Africa or similar registering authority in the case of international applicants whom:

- Hold a recognised NQF level 5 or higher education qualification in Emergency Medical Care that facilitates articulation and access into the Advanced Certificate in Medical Rescue or
- Are registered as an Ambulance Emergency Assistants or Critical Care Assistants, who have obtained a Grade 12 with Diploma endorsement.

Applicants may enter the programme using UJ's RPL criteria. Applicants who meet the criteria, must also pass:

- A structured interview
- South African Civil Aviation Authority (SACAA) Class II Cabin

- Crew Medical Assessment (or equivalent)
- Physical fitness assessment including swimming proficiency
- Acrophobia and claustrophobia testing
- English proficiency assessment

**Selection criteria**

- Senior Certificate (prior to 2009) with University Exemption, or its equivalent (NQF Level 4), as determined with an M-Score of 10 with a minimum E symbol on Higher Grade or a D symbol on Standard Grade pass in English, Mathematics, Biology/Physiology or Physical Science. OR



Apply >>> Advanced Certificate in Medical Rescue

**Course Description:**

This course focuses on equipping healthcare professionals with the required knowledge, skills, and attributes to participate in a multi-disciplinary approach to the rescue of victims and patients in a range of urban, wilderness and aquatic rescue settings. **APPLY** using the course token **EMR2023** via: [www.uj.ac.za/admission-aid/undergraduate](http://www.uj.ac.za/admission-aid/undergraduate)

**Mode of Delivery:** Contact  
**Use Course Token:** EMR2023  
**NQF Level:** 6

**Course Code:** C9EMRQ  
**Application Deadline:** 31 October 2022  
**Credits:** 147

**Programme Duration:**  
Part-Time: Completed Over Two-Years

**Admission Requirements**

Registered healthcare professionals with the Health Professions Council of South Africa or similar registering authority in the case of international applicants whom:

- Hold a recognised NQF level 5 or higher education qualification in Emergency Medical Care that facilitates articulation and access into the Advanced Certificate in Medical Rescue **OR**
- Are registered as an Ambulance Emergency Assistants or Critical Care Assistants, who have obtained a Grade 12 with Diploma endorsement.

Applicants may enter the programme using UJ's RPL criteria.

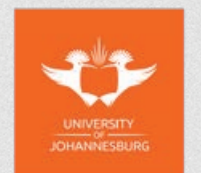
**Applicants who meet the criteria, must also pass:**

- A structured interview
- South African Civil Aviation Authority (SACAA) Class II Cabin Crew Medical Assessment (or equivalent)
- Physical fitness assessment including swimming proficiency
- Acrophobia and claustrophobia testing
- English proficiency assessment

**Selection Criteria**

- Senior Certificate (prior to 2009) with University Exemption, or its equivalent (NQF Level 4), as determined with an M-Score of 10 with a minimum E symbol on Higher Grade or a D symbol on Standard Grade pass in English, Mathematics, Biology/Physiology or Physical Science. **OR**
- National Senior Certificate with Diploma Endorsement must meet the Minimum APS: 21
- Language of Teaching and Learning (English): 4
- Mathematics: 4
- Physical Sciences: 4
- Life Sciences: 4

**Course Enquiries:** Faculty Officer, Gugulakhe Mahlangu  
**Telephone:** +27 11 559 9210 **E-mail:** [gugulakhen@uj.ac.za](mailto:gugulakhen@uj.ac.za)  
**Apply Online:** [www.uj.ac.za/admission-aid/undergraduate](http://www.uj.ac.za/admission-aid/undergraduate)



FACULTY OF HEALTH SCIENCES



# Exhibitors and visitors delighted with Interschutz 2022



After six intensive days, Interschutz 2022 wound down to a close on Saturday. Exhibitors, visitors, partners and organizers all had a consistently positive take on the event. In the face of increasing natural disasters and humanitarian crises, it was time – after a seven-year hiatus – to come together again as an industry to develop strategies for the future of civil protection. This was underlined by the high rate of attendance, with

85 000 visitors streaming onto the Hanover exhibition ground.

“Against a backdrop of increasing threat scenarios, it was high time after seven years for an Interschutz to take place again in a physical, on-site format,” reported Dr Jochen Köckler, Chairman of the Deutsche Messe Managing Board. “This trade fair was all about networking, developing ideas, discussing solutions and expanding international

networks. As a result, Interschutz is now more than just a product show, it is a shaper of sustainable security architecture on a national and global scale,” he continued.

85 000 visitors from 61 nations came to Hanover to keep abreast of the latest wave of industry topics. Apart from Germany, the leading visitor nations included Austria, Switzerland, the Netherlands, Belgium and France.

The Interschutz team had already announced its plans to donate one euro per visitor to Ukrainian fire service aid, a charity drive organised by the German Fire Service Association (DFV). “To make it a round sum, we are topping up the amount to 100 000 euros,” explained Köckler, as he handed over the donation check.

In addition to the high level of internationality, more than 1 300 exhibitors from over 50 nations praised the quality of the trade fair audience.

The partners at Interschutz were also highly satisfied. Dirk Aschenbrenner, President of the German Fire Protection Association (VFDB) summed it up succinctly: “At Interschutz 2022 we were treated to exactly the kind of things we wanted to see and experience. It was great to see the community come together again. There was an excellent product show and an incredibly large network. We also had many discussions about current problem situations and forward-looking ideas that have been forged here. This flagship fair definitely delivered what it promised.”

DFV President Karl-Heinz Banse came to a similar conclusion, “This was one of the best Interschutz fairs I have ever experienced. The developments, ideas and concepts on display were fantastic and helped us achieve a technical and active refresher for improved fire department performance. A high number of decision-makers from all over the world were present. We were able to greatly expand our networks and highlight the unique system of fire departments in Germany. Deutsche Messe was an excellent, responsible host.”

The 29th German Fire Service Day of the DFV took place parallel to Interschutz 2022, transporting the topic of the fire department from the trade fair to the city centre with numerous activities. Hannover’s fire chief Dieter Rohrberg explained, “We are thrilled by the great response both to the actions in the city centre and at Interschutz itself. It was also fascinating to see the technical

developments that have taken place since 2015 at Interschutz. We are proud that the state capital of Hannover was once again able to host the German Fire Service Day as well as Interschutz, making it the ‘blue light capital’ for an entire week. We are very much looking forward to the next Interschutz here in Hannover and can hardly wait until 2026.”

Dr Tobias Ehrhard, managing director of the VDMA Fire Fighting Equipment Association added, “Interschutz 2022 was an impressive live experience and innovations forum, the kind we fire service engineers have come to love and appreciate. Great encounters and fascinating technologies combined with exciting concepts for tomorrow’s connected as well as sustainable fire fighting, all underscored the value of Interschutz. See you again soon in Hanover!”

**Core topics at the fair: Digitisation, Civil Protection and Sustainability**

In addition to civil protection, the core topics of Interschutz 2022 included the increasing importance of digitisation and robotics in emergency response. Drones, rescue and fire fighting robots were just as present at the trade fair as were systems for the real-time transmission and evaluation of image, video and operational data. “Today, fire departments, rescue services and aid organisations can no longer do without digital solutions, which make operations faster, more efficient and, above all, safer,” Köckler explained.

In view of devastating forest fires in Germany and numerous other places, strategies for fighting forest fires were discussed and corresponding fire fighting vehicles were displayed. Experts expect that global climate change will increasingly lead to conditions in Central Europe mirroring those of more southern countries within the next few years. Natural disasters know no borders, which is precisely why it has become more important than ever to network across national borders, exchange experiences and develop new concepts for civil protection overall.

*“In addition to the high level of internationality, more than 1 300 exhibitors from over 50 nations praised the quality of the trade fair audience.”*

Sustainability was the third key topic at Interschutz. Here, it became apparent that electrically powered vehicles can play a greater role in fire departments and rescue services. Rosenbauer presented the world premiere of the Electric Panther, the world’s first electrically powered aircraft rescue and fire fighting (ARFF) vehicle.

Dr Dieter Siegel, CEO of Rosenbauer International, stated, “The feedback from visitors clearly confirmed how inspiring a face-to-face exchange between customers, partners and manufacturers can be. After all, creative approaches to solutions for mastering future challenges in fire departments often only emerge in direct conversation. As a companion to the fire departments, it was also a particular concern of ours to present the products needed for this in a way that can be concretely experienced and grasped. We were able to do this through our ‘Rosenbauer City’ showcase at Interschutz, which provided us with valuable inputs for our work.”

**Next Interschutz and a new interim format in 2023**

The next Interschutz will take place in Hanover, Germany, from 1 to 6 June 2026. To shorten the time until then, Deutsche Messe is planning a number of so-called interim formats for Interschutz. As a first step, a new event powered by Interschutz will be launched next year. “Einsatzort Zukunft” (Mission Future) is the name of the new format, which will be held from 14 to 17 May 2023, parallel to the vfdb conference, in Münster, Germany.

Source: Interschutz



Images: Simon McDonnell

- National Senior Certificate with Diploma Endorsement must meet the Minimum APS: 21
- Language of Teaching and Learning (English): 4
- Mathematics: 4
- Physical Sciences: 4
- Life Sciences: 4

**Programme information**

Part-time: (Completed over two years)  
NQF Level: 6  
Credits: 147

Mode of delivery: Contact  
Course code: C9EMRQ  
Application deadline: 31 October 2022

Course enquiries: Faculty officer  
Gugulakhe Mahlangu, Tel: +27 11 559 9210 or email: gugulakhen@uj.ac.za.







# The FireDos showcase at Interschutz 2022; Dosetech shares latest innovations



The FireDos M9 wireless remote control monitor with a flow rate of 40 000l/min

FireDos GmbH showcased its latest innovations at Interschutz 2022 with an array of new technology bolstering their already impressive existing product range. FireDos specialises in the development and production of innovative and reliable foam proportioning systems, extinguishing monitors and trailers for fire fighting. The latest developments included the foam proportioner FZ1000 for fire trucks, remote-controlled proportioners, infrared early fire detection with automated extinguishing and a lot more.

Interschutz visitors were able to see a number of extinguishing monitors in action including the FireDos M1 remote control monitor

at 2 000l/min, which extinguishes automatically coupled with an infrared early fire detection system. This was deployed with a 3D virtual reality presentation.

Also exhibited was the FireDos M9 remote controlled multi-purpose nozzle monitor with a flow rate of 40 000l/min and adjustable extinguishing agent flow rate during operation, including the option of wireless control. Its maximum flow at seven bar is adjustable from 5 000l/min to 40 000l/min whilst in operation with no need to shut water flow to adjust flow rate, another big advantage to optimise water and foam resources. The nozzles are also wide fog or stream. The M9's remote control functions were also demonstrated.

FZ1000 proportioner for fire trucks The new FZ1000 proportioner for fire trucks is features numerous improvements that make the generation of fire fighting pre-mix on the fire trucks more efficient, accurate and convenient. Due to the purely mechanical operating principle, the drive takes place without external energy and is independent of the on-board power supply. The water motor and proportioning pump ensure that the extinguishing water's pressure and delivery rate have no effect on the accuracy of the proportioning. The selected proportioning rate is precisely maintained under all operating conditions. The length and layout of the extinguishing water lines also have no effect. It

is also suitable for foam agents with medium viscosity, as the proportioning pump of the FireDos FZ1000 has been specially designed for this purpose. In addition, no flushing process is necessary. Foam or wetting agent remains in the sturdy proportioning pump.

DZ1000 portable proportioner The DZ1000 portable proportioner has been developed, especially for varying fire fighting scenarios like wildfire or forest fire suppression. The mobile FireDos proportioners offer maximum flexibility in mobile use and guarantee precise foam agent proportioning across the entire operating range. It takes only a few turns to switch between the proportioning rates during operation. The mobile proportioners are also suitable for producing wetting agent. Due to the reduced surface tension, the wetting agent deeply soaks into the substance on fire, notably increasing the extinguishing success, compared with water or foam and depending on the type of application.

### Smart FireDos proportioners

The addition of flow and pressure transmitters to the foam proportioners now allows for remote monitoring and testing.

On the stand was a smart foam proportioning demo rig, which demonstrated all the FireDos proportioner function with physically and electronically via the smart display panel, featuring proportional



FireDos GmbH showcased its latest innovations at Interschutz 2022



The latest developments included the foam proportioner FZ1000 for fire trucks, remote-controlled proportioners, infrared early fire detection with automated extinguishing and a lot more

flow at different end of line flow rate requirements, foam return system for dosing verification and system testing without foam concentrate consumption, effects of back pressure, pressure loss, water flow

rate measurement and manual preventative maintenance.

### Live presentation

Ingo Wosch of FireDos also gave a presentation on 'Transition from

**dosetech fire 30**  
special risk fire protection

Speak to the company that knows foam systems best

Future proof your fire protection system with **FireDos**

Efficient • Effective • Easy to use & test

ALL INDUSTRIAL, MOBILE, SPRINKLER REQUIREMENTS

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firedos@dosetech.co.za • www.dosetech.co.za

FireDos foam dosing proportioners and skids • Monitors and water cannons • Mobile dosing and monitor trailers • Bund, tank top and rim pourers





# New Vortran GO2VENT now available from SkillsTrain Distribution



The Vortran GO2VENT® (Gas Operated Ventilator) is the newest version of the Vortran Medical single-patient-use, disposable resuscitator (VAR). It provides “hands free” ventilator support via a secure airway using a continuous gas source. The GO2VENT® device can be operated on a compressor, oxygen or air with a minimum of 10 litres per minute flow rates. Since it does not require the use of electricity or batteries, it is an ideal backup ventilator for the management of difficult situations such as, mass casualties, natural disasters, disease outbreaks, major power outages and is the perfect



solution for transportation needs, whether in or out of the hospital.

**The gas-powered GO2VENT®:**

- Provides automatic ventilatory support for both breathing and non-breathing patients.
- Pressure-cycled on inhalation and exhalation (PIP and PEEP), which minimises the possibility of gas trapping.
- Delivers a more consistent tidal volume than using a bag-valve mask (BVM) technique.
- Is a constant flow pressure-cycled device and therefore any changes in patient lung compliance will result in changes in the respiratory rate (stiffer or smaller compliances produce faster rates). The advantage of this minimises the danger of barotrauma.
- A single-patient, disposable device and thus eliminates any cross-infectivity, cross-contamination and equipment sterilisation or decontamination issues.
- Provides emergent and short-



term, interim ventilatory support in both pre-hospital and hospital environments, while awaiting the transition to more optimal, sophisticated ventilatory support equipment.

- Provides optimal clinical options for a complex location (not all triage sites have A/C power) - portability, relative ease-of-use and the most cost-effective way of providing basic mechanical ventilation to a large number of patients.

“During inhalation, exhalation will not start until set PIP is reached. During exhalation, inhalation will not begin until pressure drops to the controlled PEEP. For the spontaneously breathing patient, the rate dial of the GO2VENT™ is set so that the baseline pressure is above the intrinsic PEEP allowing the patient to initiate inhalation by drawing the baseline pressure down to the set PEEP.” - Vortran® User Guide ▲



► fluorine containing to fluorine free foam concentrates, points to consider’, which discussed the subject areas to be considered for a successful transition of stationary extinguishing systems as well as fire

trucks from fluorine containing to fluorine free foam agents.

DoseTech’s Mike Feldon, said, “The FireDos GmbH display at Interschutz 2022 was by far the most impressive

with regards to our industry sector, the only company who had new technology and innovation, clearly very well received by the exhibition attendees, who kept the large FireDos team very busy for the six days of the show”. ▲

**GO2VENT™**  
a VORTRAN® Automatic Resuscitator (VAR™)

**SkillsTrain DISTRIBUTION**  
Tel: +27 467 2730  
Cell: + 82 7742  
linda@skillstrain.co.za  
www.Linkedin.com/Skillstrain  
www.skillstrain.co.za



# Dependapower Otter: Composite ultra-lightweight floating submersible pumping system



The Otter is a composite ultra-lightweight floating submersible pumping system



This portable floating hydrant provides reliable high-volume positive pressure water supply

The Otter™ is a hydraulically powered ultra-lightweight, high-volume, composite floating submersible pumping system used for remote water supply sourcing and emergency dewatering operations and is available from Industrial Fire and Hazard Control.

The power unit can be mounted on a vehicle or trailer with a minimum 1 633kg payload and a two metre or longer bed. With its standard 30m hydraulic umbilical, the Otter has considerable versatility to access open water sources that a typical fire pumper or draft pump cannot reach.

The Otter system's SP2 floating submersible pump uses the

latest advancements in structural composite technology to achieve an ultra-lightweight design that is physically manageable by one or two emergency responders. The Otter is well suited in supplying pressurised water to downstream apparatus, dewatering flooded infrastructure and pumping brine solutions and contaminated fluids such as chemical and oil spills.

#### 10 features and benefits of the Otter pump

1. Portable "floating hydrant" providing reliable high-volume positive pressure water supply
2. Superior corrosion-proof casing and impeller composite construction for

3. saltwater applications
4. No priming or drafting required
5. Increases access to more open water sources
6. Physically manageable by one or two emergency personnel
7. Deployment flexibility over a wide variety of terrain
8. Improved water shuttle operations by eliminating stationary draft engine, decreasing tanker/tender fill times
9. Easily refuelled while operating
10. Power unit skid air-liftable and can be located remotely away from water source
11. Uses non-toxic biodegradable hydraulic fluid

# Water Supply Issues?

**DEPENDAPOWER OTTER** helps you fight fire, not water!

The new **DEPENDAPOWER OTTER** is a hydraulically powered ultra-lightweight high-volume, composite floating submersible pumping system used for remote water supply sourcing and emergency de-watering operations.

The OTTER can operate at a head of 105m and offers volume performance of 2800 l/min to 11,356 l/min and is sufficiently light weight to be manhandled by 2 firefighters.

#### FEATURES

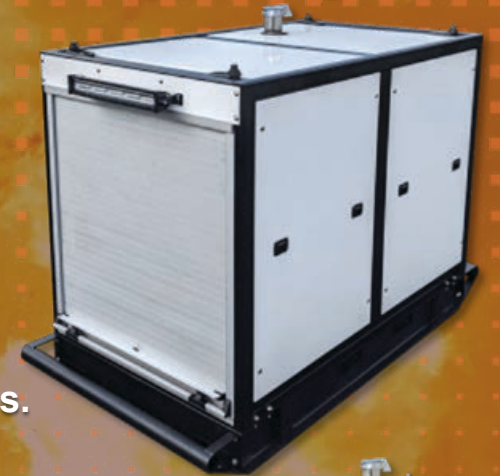
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- Superior corrosion-proof casing and impeller composite construction for saltwater applications
- No priming or drafting required
- Increases access to more open water sources
- Physically manageable by one or two emergency personnel
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- Improved water shuttle operations by eliminating stationary draft fire apparatus and decreases tanker/fire apparatus fill times
- Easily refueled while operating
- Power unit skid air-liftable and can be located remotely away from the water source
- Uses non-toxic biodegradable hydraulic fluid

For more information, contact us:

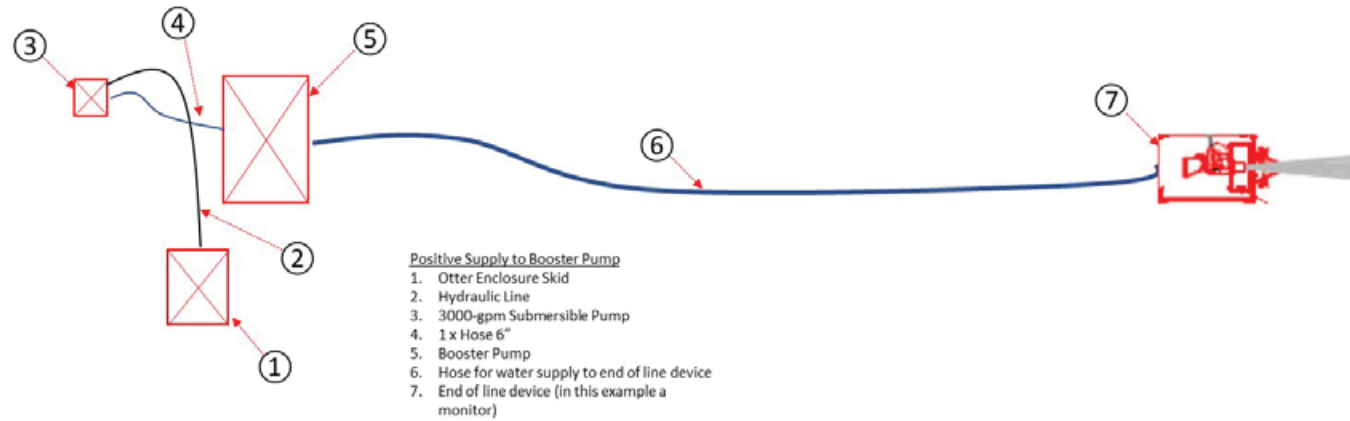
Trevor +27 82 651 2580 [trevor@industrialfire.co.za](mailto:trevor@industrialfire.co.za)  
Zarto +27 61 158 6941 [zarto@industrialfire.co.za](mailto:zarto@industrialfire.co.za)



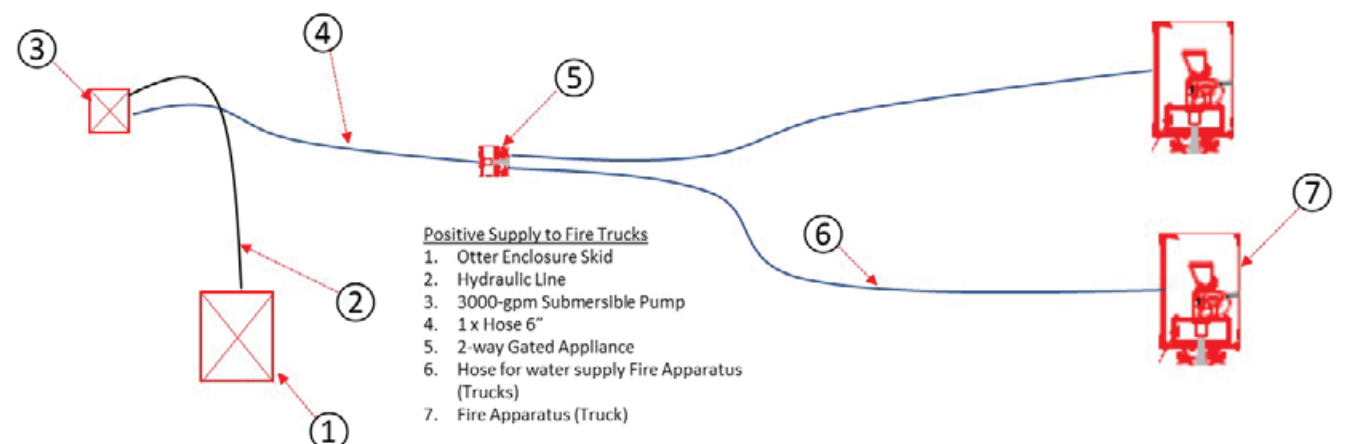
**INDUSTRIALFIRE**  
& HAZARD CONTROL



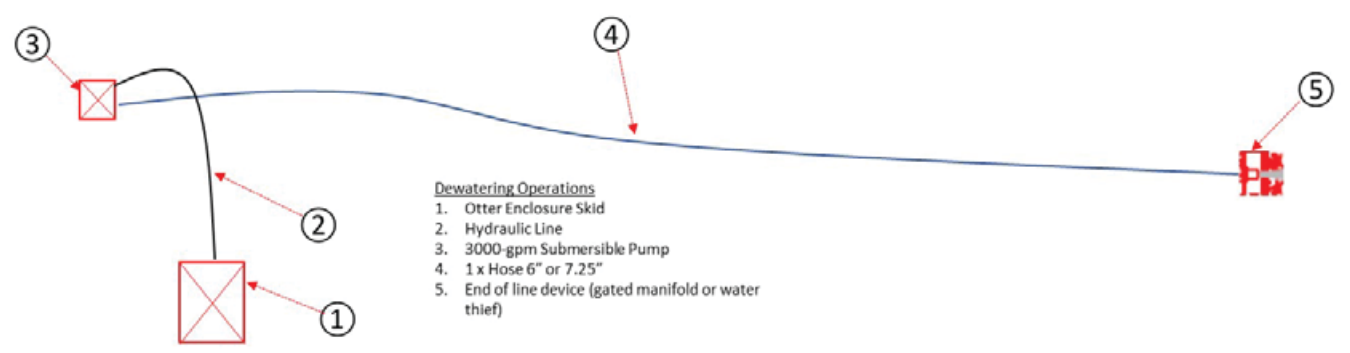




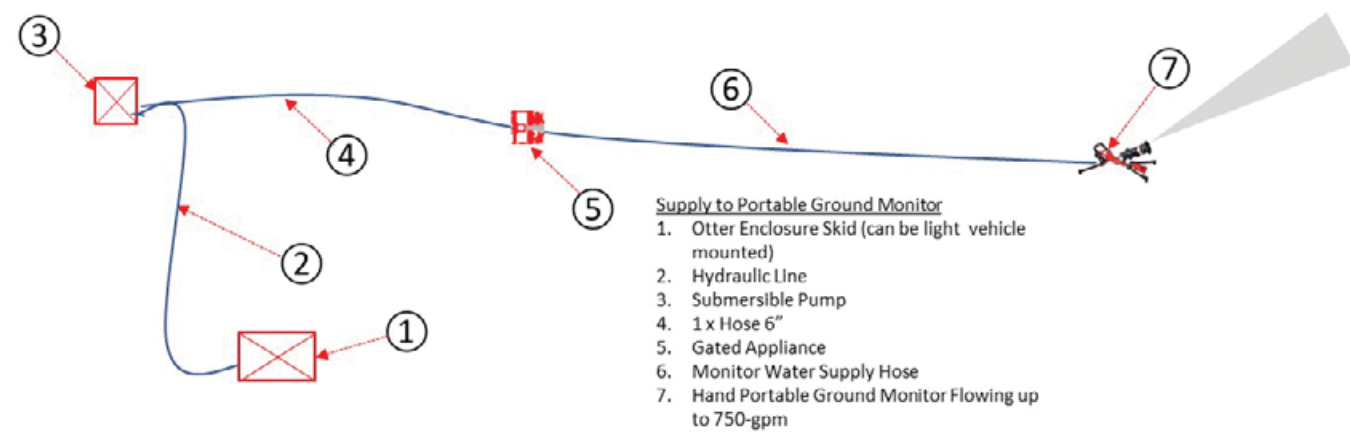
Positive supply to booster pump



Positive supply for fire trucks



Dewatering operations



Supply to hand portable ground monitor

# World Health Organisation agency declares fire fighting to be a carcinogenic occupation



The World Health Organisation's (WHO) International Agency for Research on Cancer (IARC) recently declared fire fighting as a cancer-causing profession.

In June 2022, 25 scientists from eight countries met at the International Agency for Research on Cancer (IARC) in Lyon, France, to finalise their evaluation of the carcinogenicity of occupational exposure as a fire fighter. This assessment will be published in Volume 132 of the IARC Monographs.

Occupational exposure as a fire fighter was classified as "carcinogenic to humans" (Group 1) based on "sufficient" evidence for cancer in humans. The Working Group concluded that there was

"sufficient" evidence in humans for mesothelioma and bladder cancer. There was "limited" evidence in humans for colon, prostate and melanoma and testicular cancers and for melanoma and non-Hodgkin lymphoma. There was also "strong" mechanistic evidence that occupational exposure as a fire fighter shows the following key characteristics of carcinogens in exposed humans: "is genotoxic", "induces epigenetic alterations", "induces oxidative stress", "induces chronic inflammation" and "modulates receptor-mediated effects". Evidence regarding cancer in experimental animal models was "inadequate" because no studies were available. The Group 1 evaluation for occupational exposure as a fire fighter should be presumed to apply to all fire fighters

(including volunteers) and to both men and women.

Occupational exposure as a fire fighter is complex and includes a variety of hazards resulting from fires and non-fire events. Fire fighters can have diverse roles, responsibilities and employment eg full-time, part-time or volunteer that vary widely across countries and change over their career. Fire fighters respond to various types of fires eg structure, wildland and vehicle fires and other events such as vehicle accidents, medical incidents, hazardous material releases and building collapses. Wildland fires are increasingly encroaching on urban areas. Changes in the types of fires, building materials, personal protective equipment (PPE) and roles and responsibilities among fire fighters



*Fire fighters can be exposed to combustion products from fires eg polycyclic aromatic hydrocarbons (PAHs) and particulates, building materials eg asbestos, chemicals in fire fighting foams such as perfluorinated and polyfluorinated substances (PFAS), flame retardants, diesel exhaust and other hazards eg, night shift work and ultraviolet or other radiation.*

- ▶ have resulted in substantial changes in fire fighter exposures over time.

Fire fighters can be exposed to combustion products from fires eg polycyclic aromatic hydrocarbons (PAHs) and particulates, building materials eg asbestos, chemicals in fire fighting foams such as perfluorinated and polyfluorinated substances (PFAS), flame retardants, diesel exhaust and other hazards eg, night shift work and ultraviolet or other radiation. Uptake of fire effluents or other chemicals can occur via inhalation and dermal absorption and possibly via ingestion.

Fire fighters rely on PPE to reduce their exposures. Self-contained breathing apparatus (SCBAs) are often worn during fire fighting activities involving structures or vehicles but less commonly during wildland fire fighting, where fire fighters can be deployed to wildfires multiple times a year and remain near the fire for several weeks. Dermal absorption of chemicals can occur even in fire fighters wearing PPE due to limitations of its design, fit, maintenance or decontamination. Furthermore, exposures can occur when fire fighters are not actively fighting fires and are not wearing PPE.

Since the previous classification of fire fighting (as “possibly carcinogenic to humans,” Group 2B) by the IARC Monographs in 2007, many new studies have investigated the association between occupational exposure as a fire fighter and cancer risk in humans. A total of 52 cohort and case-control studies, 12 case reports and seven meta-analyses were considered in

the present evaluation. The Working Group also did a meta-analysis that incorporated cohort studies of fire fighters published up to June 2022. More than 30 non-overlapping cohort studies following fire fighters for cancer over time were considered most informative for the evaluation and were conducted in Asia, Europe, North America and Oceania.

On the basis of the available epidemiological evidence, the Working Group concluded that a causal association exists between occupational exposure as a fire fighter and mesothelioma and bladder cancer. Seven studies examining mesothelioma incidence among fire fighters were included in the meta-analysis. For these combined studies, the Working Group meta-analysis estimated a 58 percent higher risk (95 percent CI 14–120 percent) for mesothelioma among fire fighters compared with mostly general populations. Heterogeneity in the estimate was low across the group of studies (I<sup>2</sup>=8 percent). Asbestos exposure in fire fighting is a plausible causal agent to support the observed associations. Confounding by sources of exposure outside of fire fighting and other biases, were considered unlikely to explain the magnitude and consistency of study results.

Positive associations for bladder cancer incidence were observed consistently in several cohort studies of fire fighters compared mostly with the general population. In the Working Group’s meta-analysis of ten studies, the increased risk estimate was small in magnitude (16 percent) but was statistically precise and had low heterogeneity (95 percent CI 8–26

percent, I<sup>2</sup>=0). This estimate was consistent with two additional higher-quality cohort studies of cancer incidence that used a slightly expanded definition of bladder cancer and with the results from studies of bladder cancer mortality.

Further, negative confounding by smoking was deemed probable because lower risks of lung cancer among fire fighters were observed in most studies and could have led to underestimated associations for bladder cancer in comparison with the general population. In one pooled US cohort study, a positive association in exposure-response analyses with adjustment for employment duration suggested that healthy-worker survivor bias might have attenuated associations in other studies that had no such adjustment. Fire fighters’ exposures to known and suspected human bladder carcinogens eg PAHs and soot, were considered plausible causal agents to support the observed associations for bladder cancer.

Credible positive associations were observed for colon, prostate and testicular cancers and for melanoma and non-Hodgkin lymphoma, based on estimates from the cohort studies included in the meta-analysis and consideration of the larger body of evidence. However, bias from greater medical surveillance and detection in fire fighters or confounding by physical and lifestyle characteristics could not be reasonably excluded as explanations for the positive findings. Concerns about surveillance bias were particularly salient for more commonly indolent or screened cancers such as prostate and colon, which were supported by the observation of attenuated or null associations in studies of mortality versus incidence.

For some of these cancer types, high heterogeneity in the meta-analysis estimates, inconsistent positive findings from informative studies or little evidence for fire fighting exposures known to be associated with these cancer types also reduced confidence



in a causal conclusion. For these reasons, a determination of “limited” evidence was reached for these five cancer types.

The human cancer evidence for all other cancer types was “inadequate”, including for lung and thyroid cancers. Lung cancer incidence and mortality rates were lower among fire fighters than in the general population in most studies and in the meta-analysis; negative confounding by smoking and healthy worker hire bias were presumed to be likely. Surveillance bias was considered a probable explanation for the higher incidence rate of thyroid cancer observed in fire fighters compared with the general population.

The evaluation of the mechanistic evidence was based on exposures associated with fighting structure and wildland fires and on employment as a fire fighter. Consistent and coherent evidence of genotoxic effects was observed in fire fighters: an increase in the frequency of PAH-DNA adducts was found in blood; increases in urinary mutagenicity, DNA damage in blood

and micronucleus frequency in buccal cells were associated with fire fighting-related exposures. Genotoxicity was also observed in relevant experimental systems: organic extracts of combustion emissions relevant to fire fighting exposure increased the frequency of micronuclei in a human cell line and of mutations in bacteria. Evidence of epigenetic effects was observed in fire fighters, based on changes in blood DNA methylation at loci in cancer-related genes. Epigenome-wide association studies among fire fighters showed persistent changes in DNA methylation associated with proxies for cumulative exposure and DNA methylation alterations associated either with years of service or with blood PFAS concentrations.

Exposure-related alterations in the expression of microRNAs associated with cancer were also observed in the blood of fire fighters. Occupational exposure as a fire fighter induced exposure-related oxidative DNA damage in blood and oxidative stress markers in urine. Acute and persistent inflammation was observed in

fire fighters. Airway and systemic inflammatory markers, such as IL-6 and IL-8, were associated with fire fighting-related exposures. Moreover, declines in lung function associated with changes in inflammatory markers and exposure-associated bronchial hyperreactivity were reported in fire fighters.

A minority of the Working Group considered the evidence for chronic inflammation to be only suggestive; however, the majority considered the evidence consistent and coherent for this key characteristic. Consistent and coherent evidence was found that occupational exposure as a fire fighter modulates receptor-mediated effects, as shown by the activation of the aryl hydrocarbon receptor.

“The removal of PFAS from fire fighters’ bodies via therapeutic blood donation (venesection) will also assist in reducing the incidence of cancer and is already supported by Medicare in cases of haemochromatosis,” said McConville.

**Source: The Lancet** 



# Cancer awareness: Training: The importance of training procedures and fitness



Those who achieve extraordinary work every day, need more than an ordinary workout routine. One important building stone for efficient cancer prevention is the physical health and fitness of fire fighters.

Another major part in minimising the cancer risk lies in the enhancement of routines and workflows. New standard operating procedures, that incorporate comprehensive trainings, must be established.

One of the most effective remedies against diseases? Prevention!

### Encouraging awareness and actualise changes

The goal must be to improve routines and workflows in the working environment of fire fighters: mitigate exposures, expedite implementation and

adjust standard operating procedures (SOPs). Consequently, encouraging awareness and to actualise changes, which would lead to commitment.

As a manufacturer of safety equipment, we take this commitment to heart and the responsibility that goes with it. How do we help? First and foremost, by supporting the awareness of cancer-prevention campaign in fire services across the globe.

Additionally, we believe that before any firefighter begins to answer

*“By regular medical examination, serious diseases can be recognised in good time”*

## Protecting you every step of the way Trust data like you trust your instincts

Learn more about solutions that enhance your situational awareness

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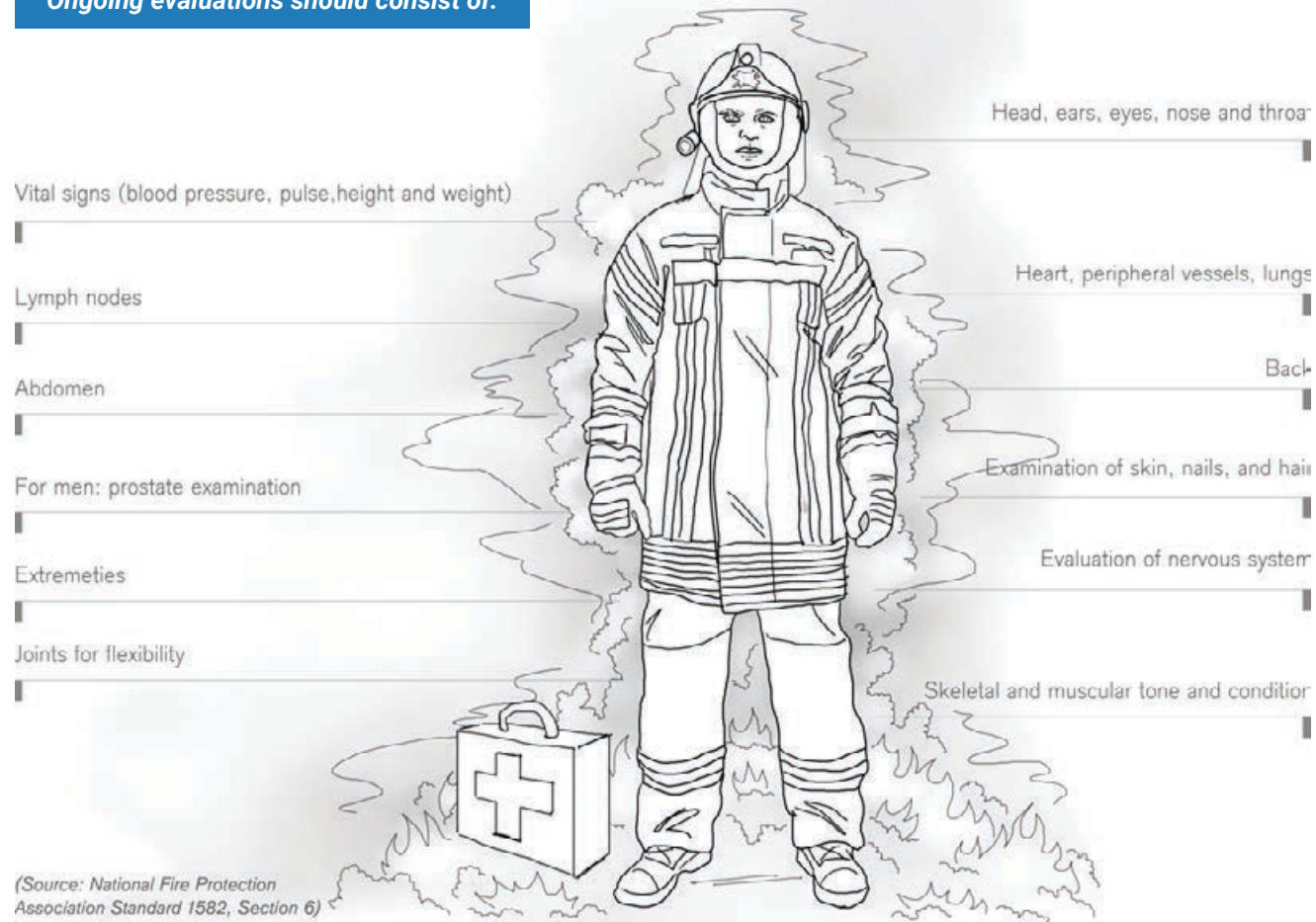
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Ongoing evaluations should consist of:



► their first call, fitness should play a key role.

**Checking health and fitness on a regular base**

Fire fighters have normally long careers and emphasizing physical fitness alongside regular medical check-ups can be a positive way to reinforce the importance of

staying fit. A comprehensive physical evaluation performed by a qualified health care practitioner can consist of the items as seen in our infographic.

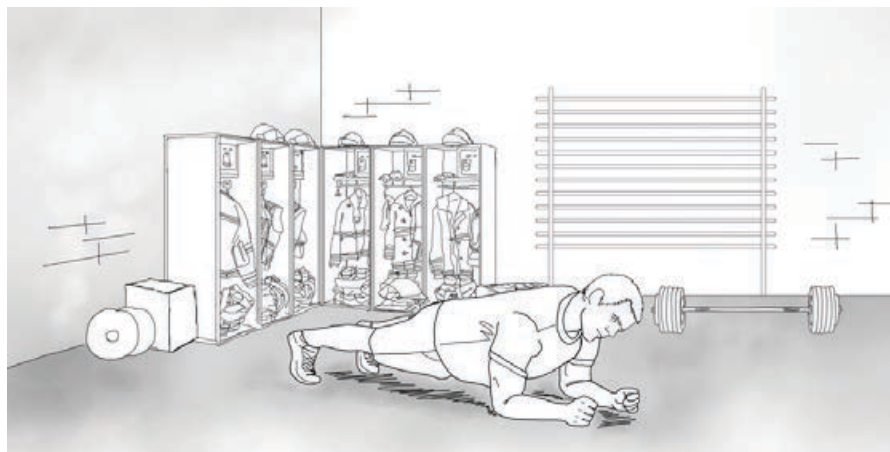
With the help of these evaluations early cancers, heart disease, hypertension and high cholesterol can be detected timely in many cases.

**Physical fitness plays a key role in prevention**

Fitness cannot and should not be under-valued as a preventive solution in the fight against cancer. Therefore it is crucial to keep the body in shape so it can handle all the demanding requirements of the job. Integrating workouts into the daily routine can help with that. We put together exercises that are especially designed for fire fighters; find them at a glance on our workout poster.

**Establish proper training procedures**

Furthermore, the significant value of proper training procedures cannot be overlooked. A healthy fire fighter is someone who understands and is trained on how to identify and measure hazards, select and use the protective equipment, understands and deploy fire fighting tactics, doff after fire incidents, treat contaminated materials after



Physical fitness plays a key role in prevention

overhauls and perform personal hygiene routines. Fire fighters today are pushing for new standard operating procedures, which incorporate comprehensive trainings, enhancing their routines and workflows. ▲

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**DEVELOPING TRAINING PROCEDURES ON:**

- ✓ HOW TO IDENTIFY AND MEASURE HAZARDS
- ✓ SELECTING AND USING PROTECTIVE EQUIPMENT
- ✓ UNDERSTANDING AND DEPLOYING FIREFIGHTING TACTICS
- ✓ DOFF AFTER FIRE INCIDENTS
- ✓ TREAT CONTAMINATED MATERIAL AFTER OVERHAULS
- ✓ HOW TO PREVENT EXPOSURES AND DECONTAMINATE YOURSELF

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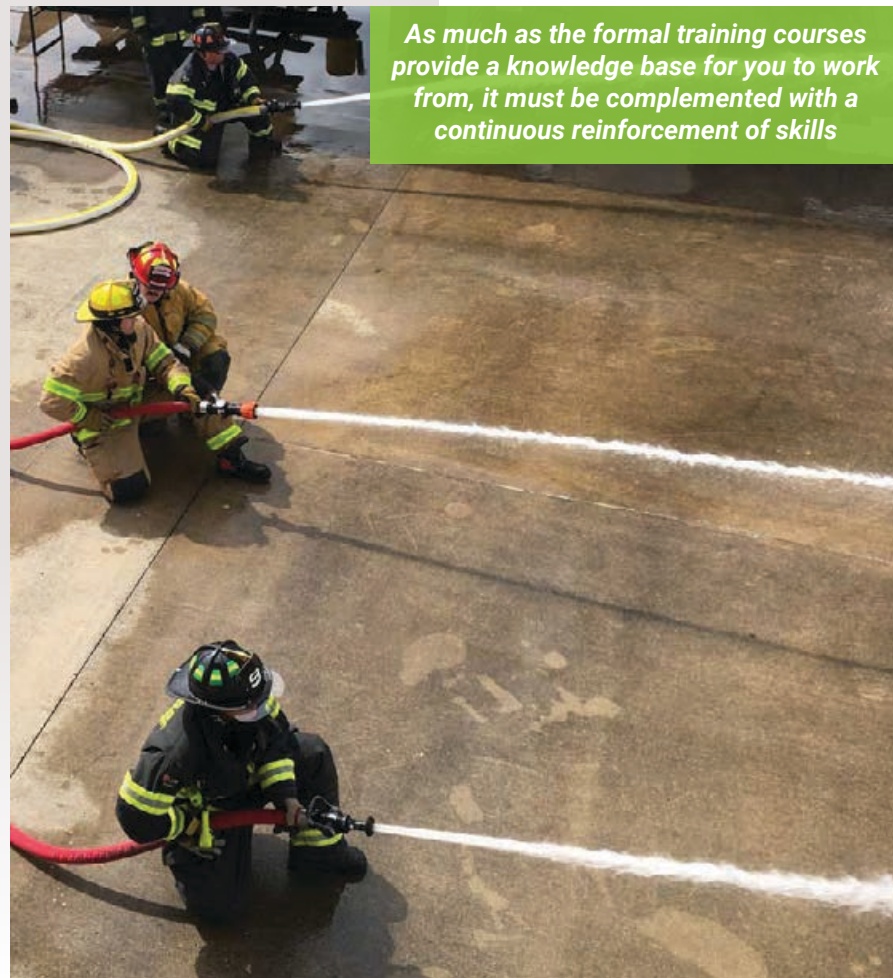
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# Back to basics: Learning to survive in a cut back environment

By Colin Deiner, chief director, disaster management and fire brigade services, Western Cape Government



As much as the formal training courses provide a knowledge base for you to work from, it must be complemented with a continuous reinforcement of skills

**A**threatening worldwide economic recession, record fuel prices and an extremely high currency exchange rate has placed tremendous pressure many aspects of the South African economy and indeed influenced the way of life for many citizens. Unfortunately, emergency services have also had to bear the burden of significant cutbacks in budgets and funding.

All too often we are confronted by news reports of fire services arriving very late at incidents or fire appliances breaking down at fire incidents or while responding. Sadly, this is not entirely due to the grim economic situation

currently prevailing but also due to neglect and a lack of maintenance of vehicles and equipment.

Of the many challenges facing modern day fire services, how to survive in an environment of cutbacks and ever decreasing budgets is probably the most urgent. Paradoxically, the incidents we are called upon to respond have increased in number and complexity with our emergency services having to respond to more frequent and larger devastating fires.

So, what to do? This problem will (a) not go away and (b) not sort itself out

magically. It is therefore us, as fire fighters, managers and our political leaders, to take this head on, for every day we delay only puts us further behind and if left unchecked to a point that the target is no longer visible.

Let's take a look at each part of the chain and discuss some thoughts. Just a point here: These are entirely my own thoughts. They are not based on a particular emergency service or individual. I also don't intend offending anyone but am merely attempting to make some suggestions on how to improve services that have found themselves in serious trouble or have an urgent need to improve. But, then again, if you are offended by what I have to say here, then you might be part of the problem!

## Fire fighters

I recall a story I heard several years ago about an airport fire fighter somewhere in Europe who had served at a particular airport for more than twenty years without respond to a single emergency incident. He did many standby activities and drilled for many hours but never actually attended to an emergency. There is a lot to admire about the safety record of that particular airport but in hindsight, I'm not sure if the fire fighter in question really signed up for twenty plus years of inactivity.

The point is that fire fighters sign up for the challenges provided by the incidents they will be confronted with. The satisfaction does not come from just responding to an incident. Most incidents you will respond to generally have terrible impacts on people's lives.

Remember that the call out you are responding to, is probably the

worst day of someone's life and you are there to help them through that. The true satisfaction comes from attending to an incident for which you have been trained, have planned for, you have the right equipment to manage the incident and you were able to have a positive impact. That, unfortunately, doesn't happen by itself.

I once heard someone say, "You can't run your outfit like a three-ring circus and expect it to operate like the US Marines when things go south".

The answer is preparation, lots of it and often! Preparation has a number of components. Let's have look at them.

## Training

As a fire fighter you are expected to undergo a certain amount of mandated training before you can be accepted into the service. These are mainly related to your basic Fire Fighter (I and II) courses and your Hazmat Awareness and Operations level formal courses.

You will also need to do a level of rescue training, which should include light-motor vehicle rescue and basic rope rescue training. As you move on in your career and depending on the area you wish to specialise in, you might do more advanced rescue training or pursue the Hazmat Technician level qualification. Also included in all this will be proficiency training in the various vehicles you might have to operate in the course of your duties.

It doesn't end there. As much as the formal training courses provide a knowledge base for you to work from, it must be complemented with a continuous reinforcement of skills. Formal training sessions organised by your station manager and shift commander, will reinforce those skills acquired during your foundation training but also establish the teamwork needed operationally. It also creates the 'muscle memory' needed for fire fighters at task level when certain tasks must be done almost automatically as a component of an overall effort to achieve the desired outcomes.

Fireground bread and butter operations like hose-laying, laddering, ventilation, forcible-entry and search-and-rescue must come naturally to any crew member who must be able to do it under all conditions and at any time of day. These activities form part of the bigger picture during fire fighting operations at a structural fire and must all work in unison for there to be any chance of success.

I have always been rather critical of teach "Fire Search and Rescue" as a basic competency to rookie fire fighters. Although I have no argument with fire fighters being trained to move in a low visibility area and find their way out of a burning or smoke-filled structure, I don't believe that any decision to commit crews to an active search-and-rescue mission should include junior level fire fighters. Search-and-rescue in a structural fire requires a thorough knowledge of fire behaviour (including backdraft and flashover indicators), building-construction, ventilation and forcible entry.

A newbie with limited experience and not enough training to work as a team, will be placing himself/herself and the team at risk if used in such a role. I know many fire officers who would only commit experienced fire fighters to this activity and so it should be.

The late great former fire chief of the Phoenix, Arizona Fire Department in the USA and author of much of what we know about incident command, Alan Brunacini, once said to be careful of people who say, "Well, we fight fires differently out here" because they usually do! It makes a simple point.

Fires are fought generally the same way and has been done so for many years. We have been provided with new equipment and certainly our strategies and tactics have improved. Essentially, we have just found more and (sometimes) better ways of putting the wet stuff on the red stuff.

Most of the 'better ways' we have found have been learned during actual incidents. If you are faced with a particular challenge with iron burglar bars on a residential structural fire



Jim Gargan wrote the first training manual on Trench Rescue and, together with the late Harvey Grant, authored the first ever book on vehicle rescue

and realise that this will become a challenge for other crews from your service in future, you should find a way to deal with it, implement it and have all your fire fighters trained up on how to handle it.

In the years I was fortunate enough to be involved in fire service operations (and even thereafter) there have been many improvements in hydraulic rescue equipment. It is easier to stabilise vehicle wrecks in all possible positions, access to the patient can now also be achieved quicker and the spreading and cutting capacity of rescue tools has increased. Despite all this, vehicles have become more hazardous, airbags in various locations, reinforcing inside vehicle doors and other systems, which were developed to protect the occupant during the collision but become a major hazard afterwards all add to the risk. Add to this the millions of cars being produced by the likes of Mr Elon Musk and his friends and it stands to reason that ongoing training on new car technology and how it will present in a vehicle wreck is crucial.

## Maintenance

It is no longer abnormal for us to read in the media or watch a





**Back to basics: A focused investment in the bread-and-butter capacity of services**

► news report of a fire service falling far below the required number of vehicles for their particular jurisdiction. It's also not unusual to hear or read about vehicles not having sufficient equipment such as fire hoses or foam etc. We also, unfortunately, have too often endure visuals of fire fighting vehicles and equipment standing at junkyards and in repair facilities for an inordinate period of time. It hurts us all to see this and even more so when, at closer examination, it's clear that many of those vehicles were the victims of negligence and poor maintenance.

The life span of a fire fighting apparatus varies for a number of reasons. Its specific application, frequency of use, service record and in-station maintenance schedule will have a large impact on how long it stays in service. Although some larger services might have a solid replacement programme that sees units replaced periodically and others might be following a lease contract. Most services acquire their vehicles through the standard government tender and procurement processes and the vehicle becomes part of the inventory of that service. In many of the smaller towns these vehicles are expected to provide a service for a fairly extended period and, due to their relatively low utilisation, are quite easily able to do so. The most important determination on the expected

lifespan of any fire apparatus is the frequency and level of maintenance to which it is subjected.

After being appointed as a Learner Fireman in 1984, one of the first tasks I had to learn was the morning vehicle check. Every vehicle on the station, fire and EMS, had a checklist of all its systems and equipment and we carefully and painfully had to check each piece of equipment carried on that unit. If it carried breathing apparatus (BA), the pressure had to be checked, ladders, nozzles, fire extinguishers, everything. Not anyone's favourite task!

I remember us asking one of our officers once as to why we had to do this so thoroughly every day. His reply, "When you check an SCBA on a particular engine every day, you not only learn where it is mounted on the vehicle but you practice lifting it out checking the pressure and fitting the mask. It's a small training session every day". I have always treasured that wisdom and it remains true in so many other areas as well.

Another maintenance control we had was a register, which required us to do comprehensive testing of all our ladders, winches, hooks, breathing apparatus, high-pressure lifting bags, wire cables etc. These records had to be meticulously kept. It was tedious and time-consuming work although it did

have a range of benefits of which one stands out: No equipment failures during missions!

Several years later we had the benefit of having another legend of American rescue services spend some time working and teaching at the department I was working. Jim Gargan wrote the first training manual on Trench Rescue and, together with the late Harvey Grant, authored the first ever book on vehicle rescue. Jim had a philosophy that you could gauge the quality of a fire service on the sharpness of the blades of the cutting tools kept on their rigs. "If your people are keeping the blades sharp, they are paying attention to the other equipment as well."

I don't believe I'm saying anything here that you don't know already. This is bread and butter for fire services and should, quite frankly, not even form part of this article. As much as I appreciate that, I often look at the pictures and footage of all those wasted vehicles in the junkyards and wonder what their checklists looked like.

#### Management

The responsibility of turning a fire service around and ensuring effective service delivery is reliant on the entire chain of command. As much as I have focussed on the critical role of the fire fighter in keeping him/her current and prepared and maintaining the vehicles and equipment, it is as important for managers at all levels to provide the necessary guidance and leadership to the operational staff.

The world has admittedly changed significantly in recent years with people having more access to information and technology. As a manager you are also dealing with a generation that is more comfortable challenging certain structures and systems. Although this is not something that can necessarily be easily managed, it does present the opportunity to grow the quality of a service through innovation.

Youngsters coming with fresh perspectives should be



**The responsibility of turning a fire service around and ensuring effective service delivery is reliant on the entire chain of command**

encouraged. Where would we be without innovation.

It must, however, always be appreciated that the fire service is a high maintenance industry and that every component that makes up the service, must be carefully maintained.

First and foremost a fire service consists of its people. The vehicles and equipment (and buildings) are there to support the people who will do the thinking, understanding, rescuing, fire fighting and maintaining and they must be the top priority.

A number of years ago I had the honour of spending some time with the United States Air Force. During one of the exercises I attended, the instructor was stressing the point of equipment care when he used the phrase, "The Air Force looks after you and you look after the Air Force". Pretty much what I'm trying to say here.

The reason for the existence of a fire and rescue service is simple: fighting fires and rescuing people (and sometimes animals). It's

really as simple as that. The people living in the city you serve primarily expect only that. It's important for your service to win the regional services volleyball tournament or participate in various charity events or achieve high marks in academic endeavours, however, when the house of a family living in the suburbs is on fire, they want the fire department to arrive quickly and work as fast and efficiently as possible to limit the damage as much as possible. As much the person trapped in a vehicle wreck just outside town is expecting a well-resourced rescue team to arrive within a few minutes and get him out of the entrapment and on the way to hospital with a good chance of survival. I call this 'Operational Focus' and it should be the cornerstone of every fire services.

#### Leadership

Leadership, be it political or officialdom, need to understand what their emergency services can do and, probably more importantly, what they can't do. The understanding of the capacity of

your fire service and their mission will firstly help at budget time and secondly provide accurate media communication. It is more important to tell the media how effective the resources are at a particular incident than how many vehicles are present.

Understanding the mission also allows for a better strategic focus and therefore a more focused investment in the bread-and-butter capacity of services rather than projects which, although important, should not be the priority.

#### In conclusion

The catch phrases "Back to Basics" or "Build Back Better" have nowadays become part of our common vernacular. I think few people will argue that in many local governments, fire and rescue services need to form part of this process. Only through focusing on those components that form the basis of a good service and have done so since fire services were first established, will we reach our goal. Saving lives and fighting fires. ▲



# Fire service leadership: Tools for effective team building

By Etienne du Toit: AIFireE, PrDM, B Tech: Fire Technology (Pretoria Technicon)



Building a successful team can be challenging since it combines a diversity of opinions, values, past work experiences, cultures, prior team experiences, work goals and skills in communication and team building.

I have, for the purpose of this article, decided to focus on five elements to build a productive and effective team:

## Establish leadership

The common denominator in a great team is a great leader. This leader should be someone who doesn't just issue instructions and micromanages activities. If your team members trust your judgement, they will work effectively and with great confidence even in your absence. Before you can start team building, you need to develop the right kind of leadership skills. This doesn't mean asserting authority, instead try to foster trust through honesty and transparency. Especially in larger organisations, managers can't be everywhere at once, but if your employees trust your judgements they will work effectively even when you're not around. However, sometimes it is helpful to take a step back to recognise when a team is working effectively. I have been fortunate to have worked with some excellent leaders in my career. Some of those leaders were senior managers and officers, while others only held the rank of Fire fighter. It is amongst the latter that I experienced some of the strongest leadership traits, the one's that left a life-long impression.

## Encourage teamwork

As the old saying goes, "There is no 'I' in team." The sooner this is realised, the easier teams will develop.

select their own team. Fire fighters will generally be assigned to a shift or a station irrespective of the supervisor or manager.

Without team building skills, a fire service leader risks limiting the potential of their employees to what each member can achieve on their own. The concept of team building can unite your team around a common goal, which will raise efficiency as a result.

The workings of a highly effective team are not always obvious to everyone. Using a simple example of the combined four-person ladder and hose drills of pitching a 464 (13,5m) ladder and getting a line of hose to work on the third floor of a building may seem easy enough. Without effective teamwork, a simple evolution such as this has the possibility of turning into a comedy of errors.

Teamwork and synergy are synonymous; working together enables people to apply a variety of skills that go beyond the scope of one individual, helping to coordinate activities towards a greater common goal. This article examines the dynamics of leadership and relationships in teamwork.

Leaders consistently measure the performance of their teams and monitor relationships in their teams. Rightly so, performance management is one of the responsibilities of line function managers. Performance measures demonstrate that effective teams will almost always outperform individuals working alone, more so in the fire service where high-pressure situations may require multiple skillsets. Most managers in a uniformed environment, such as the Fire Service, will in most cases not have the opportunity so

Once you have established relations with and between your employees, it's time to help them work together effectively. Encourage your team to share information, both amongst themselves and within the wider organisation. Also, try to communicate more with your team. This goes beyond simply holding meetings and includes things like being open to suggestions and concerns, asking about each team member's work and helping where necessary and doing everything you can to communicate clearly and honestly with your team. Transparency is another way to think of this concept.

## Foster relationships between your team members

As your team starts to cooperate more, examine the way they work together and take steps to improve communication, cooperation and trust amongst the team. If there are any conflicts, try to resolve them amicably. Listen to both sides of the argument and act as a mediator. One way to do this is to brainstorm solutions, which helps to empower your employees and may lead to new solutions to the problem. If the trust level is low, the team will argue and debate negatively. Each of these steps to creating a highly effective team is progressive.

Effective teams operate in an environment where they look out for each other. They take risks and share successes and praise but more importantly, they are also there when things do not go as planned by providing encouragement. Teams with low trust see failures as an embarrassment. They want to hide these missteps and lay blame on others.

Operating in a trust-filled environment breaks down barriers and allows people to be less vulnerable and far more confident in their own abilities.

## Develop relationships with each of your team members

Try to learn more about each member of your team, their skill sets, how they are motivated

and their likes and dislikes. This knowledge is invaluable to leaders, as it allows them to match each employee's expertise and competencies to specific problems, which will help increase their productivity and job satisfaction.

Where possible always try to include your team in the decision-making process. Instead of delegating tasks, give your team's open-ended projects and allow them to determine the best solution. This will encourage them to cooperate and develop problem solving skills. Team members freely discuss challenges and opportunities with each other and with the leader. Transparency is another way to think of this concept. The leader openly discusses opportunities and challenges with the team. Praise your team members for their accomplishments. Tell them often how important they are to the overall success of the organisation.

## Set and agree on ground rules for the team

Finally, you can begin officially establishing your team through creating team values and goals, as well as evaluating team performance alongside individual performance. Ensure that your team participates in this process; they must know what is required and ultimately agree with it.



One of the fundamental needs in an environment that fosters teamwork and collaboration are empowered employees. They act independently and require minimal direction. Managers in organisations say they want employee empowerment, but they act in ways that undermine the ability of employees to act.

Team building is one of the most important responsibilities a manager has. It isn't something that can be achieved in a short time and then forgotten. It is an ongoing organic process that you will have to facilitate and guide. As this process unfolds, however, your team members will begin to trust and support one another and share their skill sets and effort to complete your organisation's goals more effectively.

## Conclusion

Inarguably, developing effective teams is considered critical to the future of the fire service. It has been asserted through research that team work directly affects organisational performance levels. I have personally observed multi-agency incident management teams during major incidents as well as structured exercises and have witnessed the effect of teamwork on the outcome of the latter. ▲



# Emergency vehicle warning systems in South Africa – are we using them effectively?

By Oliver Wright, chief executive officer, South African Private Ambulance and Emergency Services Association (SAPAESA)



Roof-mounted emergency lights with 360 degree visibility remain most effective

Is South Africa behind the curve in terms of the application of emergency warning systems within the country?

When it comes to the installation of a new, emergency warning system for your vehicle, there are a number of factors that every emergency vehicle owner or operator should be considering and applying. Unfortunately, when it becomes time to choose a new emergency warning system, a number of these factors are often neglected in the South African environment.

The result is that not only do a large number of emergency vehicle warning light and siren systems in South Africa not achieve the best possible warning effect; some systems may even contribute towards making the scene of an emergency even more unsafe than it was before.

So what are these factors? Some of these key factors include:

- Emergency lighting colour
- Placement of emergency lights
- Emergency light patterns
- Intensity of emergency lights
- Siren output
- Siren speaker placement
- Use of low frequency sirens

### What does the international literature say about these factors?

In terms of lighting colour, we know the following: When considering the following three colours, red, blue and amber, we know that red lights are more conspicuous than blue lights during the day, in the evening we know that blue lights are more conspicuous than red. The conspicuity of yellow lights falls between that of red and blue lights during both the day and the night.

In South Africa, emergency medical vehicles are limited to the use of

red emergency lights only. The inclusion of yellow emergency lights in combination with red emergency lights has often been suggested for the South African environment in order to increase the visibility of emergency medical vehicles but until legislation is amended, this remains a concern within the South African environment.

Another colour to consider for use on emergency medical vehicles is white. Unfortunately, with the use of modern emergency lighting products such as LED and strobe based products, the output of a white emergency light has increased to such a degree that white emergency lights are often more of a danger than a benefit. High intensity, white emergency lights are generally accepted to be extremely dangerous in the majority of instances. With the exception of alternating headlight flashers and a limited amount of forward-facing emergency lights,

white emergency lights should never be fitted to a rear of any emergency vehicle and the incorporation of white emergency strobe type lights into the rear taillights of any vehicles should be strictly prohibited.

Once an emergency vehicle is parked and is stationary on the scene of an emergency, the use of white emergency lights should be immediately terminated. White, flashing emergency lights have been shown to be extremely distracting and disorienting to passing motorists, with these same white emergency lights being blinding at night.

The distracting, disorienting and blinding effects of white, emergency lights puts both assets and personnel at extremely high risk. Passing motorists have been known to collide with both emergency vehicles, as well as emergency services personnel on the scene of an emergency after being blinded or disoriented by flashing white lights.

As a result it is clear that the use of white, emergency lights should be avoided wherever possible and, aside from the traffic clearing effects of an alternating headlight flasher, there is essentially no argument that the inclusion of white, flashing lights on any emergency vehicle adds any practical benefit or element of safety.

With it then being understood that the emergency medical services must make the best use of red



Emergency light patterns are a concern that is often overlooked in South Africa

emergency lights only within South Africa, the question then becomes, how do we do this?

The answer includes the correct placement of emergency lights, the use of appropriate flash patterns and the use application of the correct amount of power output per light unit.

In terms of lighting placement, a number of considerations are important to remember. These include the following:

### Mounting locations

Utilising mounting locations on the vehicle that maximises the visibility and effectiveness of each lighting product. Emergency lights should not be obstructed by other vehicle features such as window tinting, windscreen wipers, bull bars other

pieces of body work. Emergency lights should be mounted at different levels on the vehicle, with the focus being on higher mounting locations, while also using mid-level mounting locations such as dash mounted lights that align with the line of sight of other motorists as well as the side mirrors and rear view mirrors of other vehicles.

Roof-mounted emergency lights with 360 degree visibility remain some of the most effective emergency lighting products available to the emergency medical services.

Additional LED modules that serve to emphasise the dimensions of any emergency vehicles along the front, side and rear of the vehicle remain effective. These modules serve to indicate the outer edges of the vehicle, which assists to warn



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▶ passing motorists of the size of the emergency vehicle, as well as the location of the emergency vehicle at the scene of an emergency.

### Emergency light patterns

Emergency light patterns are a concern that is often overlooked in South Africa. Historically, a longer flash exposure was considered to be most effective as a visual warning. The older, halogen rotator products were the most effective at this sort of warning. Newer LED and strobe patterns typically use a much quicker flash and a shorter exposure to the emergency light. The result is that it is often difficult for approaching motorists to determine the distance to a parked emergency vehicle when flash patterns are too quick. In order to counter this, it is suggested that a number of different surfaces areas of an LED light bar are illuminated at different times and in different locations in order to ensure that at least half of the light bar is illuminated at any given time.

While responding to an emergency, a faster emergency light flash pattern may be more effective at grabbing the attention of passing motorists but these same, faster light patterns can also be distracting to passing motorists if left on after the vehicle arrives on the scene of an emergency. It is believed that a slow, well synchronised flash pattern is the best option for use once an emergency vehicle is parked and remains stationary at the scene of any emergency.

It is thus clear that emergency medical services should consider

the use of two lighting pattern setups, one for use during response and the other for use once a vehicle is parked stationary on scene

During the day, full intensity lighting is suggested, however when the emergency vehicle is parked on the scene of an emergency at night, the operator of the emergency vehicle should consider stepping the intensity of emergency lighting to 50 percent of regular lighting output in order to avoid distracting vehicle, and in order to increase the visibility of emergency services staff members who may be working around the emergency vehicle and who may be in positions of risk and exposure.

### Sirens

While emergency lights serve to provide an effective visual warning effect, these visual warning systems should also be paired with an effective audible warning system such as an emergency vehicle siren.

Historically, a 100 Watt siren system was considered to be adequate, however, with the development of motor vehicle technology and the associated, increased amount of vehicle insulation, the old 100 watt siren system is often no longer sufficient to offer adequate audible warning for the modern emergency medical vehicle. The solution to this challenge involves a combination of solutions.

Siren speaker placement is an important factor that is often overlooked. Siren speakers should be mounted as far toward the front

of the vehicle's engine compartment as possible. Siren speakers should not be obstructed by other sections of the emergency vehicle's body or mechanical parts and siren speakers should always be forward facing.

Wherever possible, the use of a 200 Watt siren system should be installed, the increased decibel output of the 200 Watt siren system, as well as the ability to operate a dual tone warning system, serves to start to overcome the increased insulation and sound deadening that we see in the majority of modern motor vehicles.

Lastly, the use of a low frequency siren system should be included in your emergency vehicle warning system if possible.

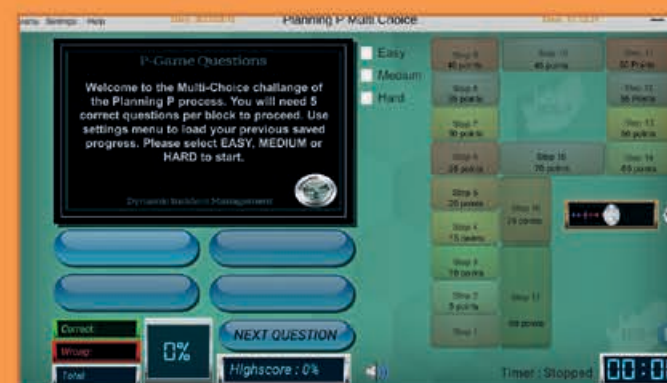
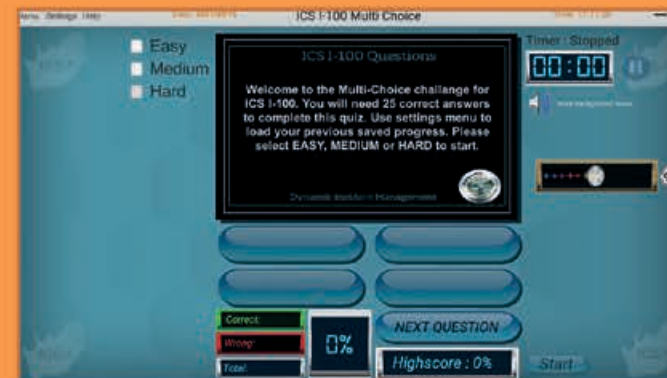
These low frequency siren systems are now becoming commonly available from the majority of emergency device suppliers in South Africa and are available at a price point that is now much more affordable than they have been in recent years. Low frequency siren systems use vibrations to penetrate the insulated interiors of modern vehicles and add an extra level of pre-warning to approaching motorists that serves to safely increase the effectiveness of your emergency vehicle's siren system.

Sadly, a number of suppliers of warning systems in emergency vehicles in South Africa are still installing these same warning systems in a manner that is as fast and as cheap for the installer as possible. The result is that these same emergency warning systems often result in lighting patterns that are distracting and uncoordinated and that do not take full advantage of the features of the technology being used, while siren systems are installed in locations that do not maximise speaker output.

It is up to the owners and operators of emergency vehicles to educate themselves on the various factors to consider and to demand that suppliers install warning systems in emergency vehicles in a manner that maximises the features of the products used and that is setup in order to be as safe and as effective as possible.

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# The AT802 single engine air tanker (SEAT): A force to be reckoned with

**K**ishugu Aviation aims to provide the optimum mix of aerial resources available on the market that suits our client requirements.

According to Emile Grobbelaar, CEO of Kishugu Aviation, the Air Tractor (AT) 802, single-engine aerial tanker (SEAT) is a very important part of Kishugu's offering as a highly effective and sought-after aerial fire fighting resource. Also referred to as the "bomber aircraft", it is specifically designed for fast and effective rapid initial and extended attack on wildfires.

The AT802 has served with distinction on the front lines of wildfires around the world and for close to 10 years in South Africa. Kishugu Aviation owns and operates the only four AT-802s in

South Africa, which they supply to the forestry industry and the South African Government's Working on Fire (WoF) Expanded Public Works Programme (EPWP).

Grobbelaar says the bomber is a fast, manoeuvrable aircraft that is operationally effective and economical. "This remarkable aircraft carries up to 3 104 litres of water, mixed with fire suppressants, reaching a cruising speed of 250km/h for rapid response to a fire line."

He explained that what makes the bomber aircraft so unique and fit-for-purpose is that it is fitted with a computerised Fire Retardant Disposal System (FRDS) that can be programmed to discharge its load in pre-set volumes and intervals. "This enables the pilot

to optimise water and retardant dispersal and makes precision drops on several critical points on fire. But it can also drop a high volume once-off load of more than 3 000 litres."

"Once it completes delivery of its load, it returns to the airfield at speeds up to 350 km/h to refill. The refill operation takes about two minutes, after which it returns to the fire line", he said.

The AT 802 has an endurance of about four hours and, depending on the proximity of the runway, it is capable of delivering roughly 18 000 litres of water and retardant per hour onto a fire. Today, this fleet of fixed-wing water bombers fly an average of 350 hours during active fire fighting operations annually.



*The AT 802 carries up to 3 104 litres of water, mixed with fire suppressants, reaching a cruising speed of 250km/h for rapid response to a fire line*

Kishugu introduced AT 802's to the South African market in 2013. Prior to that, they made use of PZL-Mielec M-18 Dromader and Ayres Thrush aircraft, essentially previous generation crop sprayers, adapted for aerial fire fighting.

Grobbelaar says Kishugu Aviation imported its fleet of AT 802's from Spain and deployed all SEAT pilots to acquire type specific ratings in either Spain or Brazil. Pilots also received specialised air and ground training in wildland fire fighting, which includes fire behaviour, communication skills and techniques and maintaining situational awareness. Kishugu's minimum requirement for entry-level SEAT pilots is a Commercial Pilot's License (CPL), a total of 1 000 flying hours as the Pilot in Command (PIC); at least 500 hours turbine and 300 hours taildragger experience.

Our bomber pilots all sing from the same hymn book, "Being a bomber pilot is the most rewarding job. It combines action and adrenaline with precision, teamwork and a real sense of purpose." 🚀



*Its computerised Fire Retardant Disposal System (FRDS) can be programmed to discharge its load in pre-set volumes and intervals*



*The Air Tractor (AT) 802 is specifically designed for fast and effective rapid initial and extended attack on wildfires*



# The Garden Route in flames:

## Introduction to under tree canopy burning: Controlled burning

Chapter VII

### A book by Dr Neels de Ronde

The following article is the seventh in the series of excerpts from a book written by Dr Neels de Ronde, *The Garden Route in flames*. Dr De Ronde lived in the Southern Cape in South Africa and had done extensive research in the field of land management and wildfire prevention. Dr De Ronde gave permission to Fire and Rescue International to publish his book in the magazine in separate sections for the benefit of all forestry and wildfire managers, fire protection associations and land owners in order to gain insight and an understanding of the intricacies that form the basis of such extreme fires and how it can be prevented, highlighting effective fuel management and fire prevention measures.

#### 7.1 Comparing prescribed burning application under Pine tree canopies with prescribed burning inside other fuel/vegetation types in the region

This comparison is mainly discussing fire application inside Pine stands, vs prescribed burning inside fynbos shrubland. Where the latter is mainly prescribed burning of a fynbos area within buffer zones or in the form of block burning, the first is about fire application within Pine stands, mainly within forest floor fuel under the crown canopy of trees, with a certain degree of crown canopy closure (de Ronde, 1988; de Ronde et al, 2004).

Fynbos burning is normally well-known by fire managers in the Cape regions, with the technique normally being applied in the form of a combination of circle burning, with some within-area spot ignition where some sections of the burn are only patchy burning. However, the circle firing technique is the one normally avoided when prescribed burning is applied inside Pine stands, with the exception of burning of slash, after tree felling and timber exploitation. I will not discuss the issue of prescribed burning of fynbos in this chapter, as I assume the fire managers/fire bosses do have experience with this type of burning.

In most Pine stands, the most dominant “fuel drying manipulator” is the dominant tree crown canopy degree of closure of the crowns, which reduces the (normally) living fuels growing in abundance on the forest floor at

early stand age, suppressed when crown canopies close, to form eventually a prominent compact, dead, fuel needle mat.

#### 7.2 Assessment of Pine tree stands and selecting the correct treatment

Here I will concentrate on the managed Pine stands found on the Garden Route regions’ plateau but also on the southerly aspects of the foothills of the Outeniqua Mountain range. The main criteria to be considered will be (i) Pine species, (ii) stand age, (iii) degree of crown canopy closure, (iv) fuel characteristics on the forest floor and (v) occurrence of pruning, thinning and/or previous tree rotation slash leftovers. I will provide the main restrictions/advantages in each case, with type of prescribed burning treatments recommended and when the technique(s) should be applied.

##### a. *P. radiata* stands planted on the mountain foothills < 15 years stand age

Normally no crown canopy closure present and another characteristic is that the tree species is vulnerable for cambium damage when exposed to fire temperatures. No fire application is recommended in these stands.

##### b. *P. radiata* stands planted on the mountain foothills > 15 years stand age

Crown form normally too thin to form a high degree of crown canopy closure, although some partly crown closure is possible where no P-deficiencies are present. As a precaution against cambium damage, rake available fuel away from stems and spread between tree rows. Only fire allowed between trees (at least one metre away from tree stems) and then only burning by means of backfire application or in the form of spot ignition.

##### c. Natural regeneration of *P. radiata* stands on the plateau < 15 years stand age

NR will provide patchy stems per hectare, which will be spaced at least once, providing some thinning slash. No prescribed burning will be recommended at this early tree stem age.

##### d. Natural regeneration of *P. radiata* stands on the plateau with 15 to 20 years stand age

Stands should only be incorporated with prescribed

burning if falling within main buffer zone areas and then only if all slash is spread thinly between trees and then patchy burned only once before clear felling.

##### e. Natural regeneration of *P. radiata* stands on the plateau > 20 years stand age

All slash to be raked away from tree stems and then spread between tree rows between prescribed burning application combinations of application methods allowed to be applied according to best requirements on sub-sites.

##### f. *P. elliottii* planted (all sites) < 10 years stand age

Only allowed prescribed burning (backfire method only) if situated within key buffer zone sites with acceptance some degree of crown scorch.

##### g. *P. elliottii* planted (all sites) 10 to 15 years stand age

Can be prescribed-burned but only backfire method applied where crown canopy not completely closed, where crown scorch can be expected.

##### h. *P. elliottii* planted (all sites) > 15 years stand age

Prescribed burning can be applied normally at a two-year rotation or as and when required, using any burning method, provided tree crown canopies are closed.

#### 7.3 Prescribed burning - stand assessment before application

The following procedures should be attended to within approximately one week before prescribed burning is planned to be applied:

- Determine boundaries of stand to be burned and determine fire protection cleaning required along these lines, before burning is applied.
- From mature stands: Forest floor inspection for moisture gradient humus (H) layer and in absence top soil moisture should be present before burning is applied at all.
- Determine estimated height of living crown foliage from forest floor.
- Estimate percentage crown canopy closure.
- Determine and sketch major patches of living vegetation, where backfire only has to be used as burning technique.
- Make notes of any significant fuel in suspension from eg pruning and/or thinning slash leftovers.
- Make notes of significant changes in slopes and where to apply strip-head firing, and where only backfires should be applied.
- Identify where fire ignition should start (with test burn applied) and where backfire lines should be created as starting line, also considering wind direction expected at time of burning and an alternative backfire line if wind direction is different (edge burning).
- Calculate maximum flame height allowed from prescribed burn, from lowest living crown height and 1 : 7 flame height/scorch height ratio.
- Determine if preliminary edge burning is required, if difficult fuels are encountered.
- Draw up a prescribed burning plan, with burning

techniques to be applied, indicated on a sketch map from the stand to be burned.

- Brief the fire boss who will be in charge of the burning operation or, alternatively, take him along when assessing the stand to be prescribed burned.

#### 7.4 The following prescribed burning techniques can be applied inside even-aged Pine stands:

##### (i) Edge burning

This is basically the set of burning procedures when starting to prescribed burn a Pine stand. It always starts with a test burn at the stands’ corner where to first ignite the backing fire for a safe start against wind and/or slope. When starting burning early during the morning, this provides an idea what type of fire behaviour can be expected on the tree compartments’ edge, to see if burning along this line is safe against the wind (photograph 16).

Because of the above “test and see” burning procedure, this will also normally be the time when to estimate what fire behaviour will be like inside the stand, when the edge burning exercise has been completed. Most of time, the early morning fire behaviour could be restricted to burning the edge and it will only be when conditions warm up during the morning, if the rest of the stand can be burned at all or many times has to be postponed with one day. If to be postponed, then at least the safe edge burning phase has been completed, and the burning team can start straight away inside the stand with strip-head firing. ▶



Photograph 16: Edge burning in progress in a mature *P. elliottii* stand in the Tsitsikamma. This fire line is producing a maximum flame height of approximately 0,8m. As the fire line progressed to burn from left to right in the picture, this was reduced to an estimated flame height of approximately 0.1m when progressing about 2m inside this stand because of the higher moisture of the fuel there protected by the crown canopy. This burning technique is normally applied first before burning is applied inside the stand. The technique can also be used as a stand-alone method within certain stands as a safety measure, where difficult fuels are found. Photograph taken by Dr Neels de Ronde.



► **(ii) Striphead burning**

This method of prescribed burning application, is best illustrated in sketch 1 below, and then shown in spreading progress on Photographs 17 and 18. This method is particular useful because the strip width can vary when flame height has to be increased or reduced, depending on scorch height requirements, to keep scorch height out of the tree crowns.

The burning method is then also mostly applied with two fire igniters, to speed up the burning process, and not only one as is illustrated on sketch one. However, to keep proper control over the burning process, the first person igniting the line may not be too far ahead of the second person igniting, and always check if the distance between the two remains constant. The fire boss can also slow down the "ignition speed" when walking into fuel structure variations needing strip width reductions.



Photograph 17: Striphead burning in progress in mature *P. pinaster* stand in the Tsitsikamma. The fire line in the centre of the stand has just been ignited with a drip torch. Note controlled flame height and the backfire line (created first) visible in the background. Photograph taken by Dr Neels de Ronde.



Photograph 18: Another striphead burning operation in progress inside a mature *P. elliottii* stand in the Tsitsikamma. This compartment was broken up in sub-blocks with cleared lines to act as block boundaries; see cleared guideline between the two burners. Photograph taken by Dr Neels de Ronde.

**(iii) Backing fire**

In difficult fuels, the backing fire should be the only burning method to be applied. Here a six-year old *P. patula* stand with highly aerated pruning slash is being subjected to a high intensity backing fire as an experimental burn. Although the backing fire keeps the flames as low as possible, crown scorch was common in the lower crown branches, and up to two-year tree height increment was lost as a result (for examples of backing fires, see photographs 3 and 19).



Photograph 19: Back fire in progress in 6-year old *Pinus patula* stand in NE Cape. This experimental fire was applied in heavy pruning slash. The stand suffered from a common, high, scorch percentage in the tree crowns but, contrary to expectations, the trees survived the fire, although they lost about two years of tree height growth as a result of the high percentage of crown scorch. Photograph taken by Dr Neels de Ronde.



Photograph 20: A high intensity back burn (backing fire) in progress inside a mature *P. elliottii* stand to burn-out patches of the *Gleichenia polypodioides* indigenous fern weed spreading in this stand. Photograph taken by Dr Neels de Ronde.



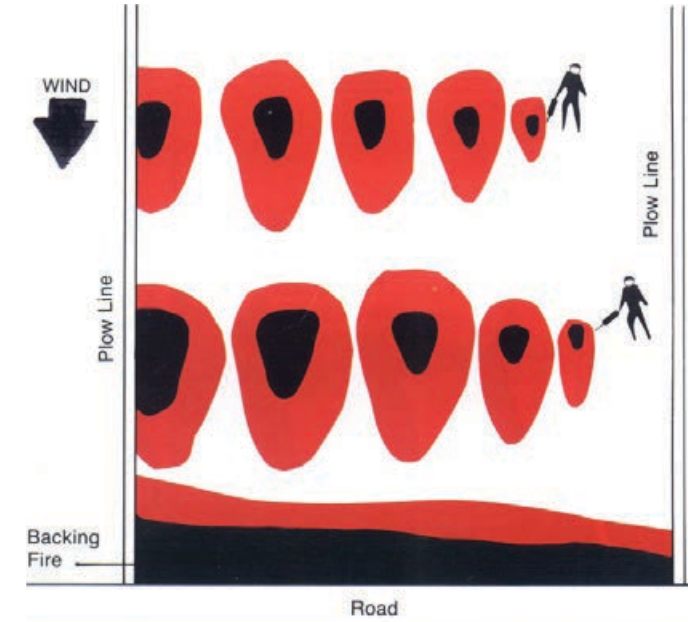
Photograph 21: A test ignition as part of grid burning exercise inside a 50-year old *Pinus halepensis* stand, between two very light surface fires, with gaps left unburned. Photograph taken by Prof Vittorio Leone.



Photograph 22: Spot burning of pruning slash stacked in low profile heaps or short rows inside a mature *P. elliottii* stand in the Tsitsikamma forest region. Photograph taken by Dr Neels de Ronde.



Photograph 23: Grid burning inside a mature *P. pinaster* stand in the Tsitsikamma forest region. Note low profile (but continuous) flame lines. Photographs taken by Dr Neels de Ronde.



Sketch 1: Illustration of grid burning in progress. Note wide backing fire at the bottom of the sketch. Distances between ignition point to be set at allowing surface fires to be continuous, while flame height should not scorch crown needles from lower pine tree crowns (unknown artist).

**(iv) Grid burning**

Grid burning is a technique which can only be applied in easy fuel types to speed up the burning progress. Use of this method is best illustrated in Sketch 1 and on Photograph 19, 20 and 21. Note on sketch 2 that the backing fire is still used when starting the burning operation, before starting with the grid.

The most important issue will be to test which optimum grid point width to use to ensure (i) no high intensity fires and in contrast (ii) to get complete fire cover over the whole area to be burned. For this reason, the first grid must be observed carefully when applied in a restricted area, and thereafter adjusted and "tuned-up" until satisfied that optimum widths have been achieved.

**(v) Circle burning**

This burning technique should only be applied in broadcasted clear felling slash after the logs have been cut out and removed by means of road transport. This technique should never be applied when burning stands under crown canopies. The other provision that should also be made before circle burning is applied is that all slash should be properly broadcasted by hand, to ensure that no flaring potential exists when burning is applied (Sketch 2).

**(vi) Chevron burning**

This burning technique should only be applied in broken, mountainous terrain with varying aspects (such as in typical "koppies" landscape). Starting with ►



- ▶ three to six drip torches from the top, these “igniters” should descend from the top of each “koppie” in star formation simultaneously, thus basically the technique is similar than strip head firing, adjusted for slope/ aspect variation.

**(vii) Concluding notes par. 7.4**

When applying prescribed burning inside Pine stands, combinations of the above burning techniques should be applied as and when required, thus where fuel loading variation varies significantly. Before such stands are burned, the fire managers should make a note of such requirements before such burning is initiated.

**7.5 Post-prescribed burning results assessment**

The post-prescribed burning results assessment should be applied within Pine tree stands exposed to prescribed fire:

- Inspect for any smouldering spots which should be attended to. If deep smouldering is detected, the stand should be guarded and watered regularly on these spots until adequate rain has been recorded on this site.
- Inspect of boundary breaks are all safe and “out”.
- Inspect the stand for any patches or areas, which were left unburned and should be re-ignited to complete the burning operation.
- Inspect the forest floor to estimate percentage of profile consumed by the fire applied.
- Inspect (and map if necessary) crown scorch occurrence/pattern/height into the crowns.
- Ensure the results were achieved and write a concise report for the record.

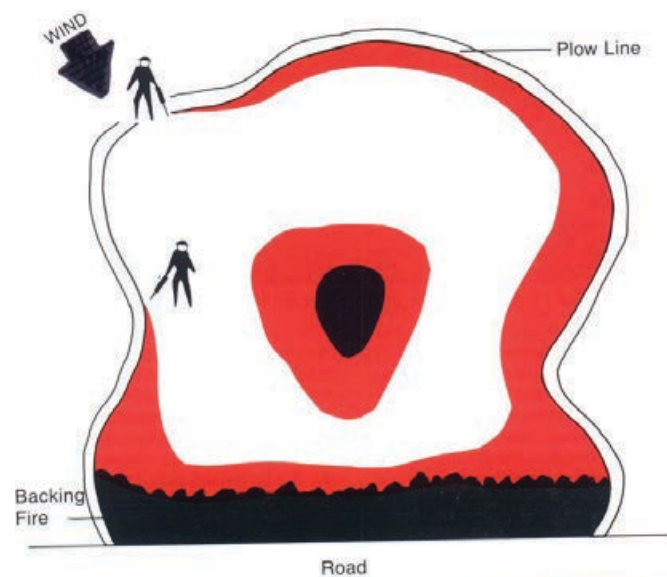


*Photograph 24: Burning of slash heaps stacked within a clear felled Pine stand in the Mpumalanga Province. Stacking slash in heaps and then burn this, doubles tree establishment costs, because of costs of heap stacking and slow burning procedures with higher costs of safety measures required for dangerous flaring potential of fuel heaps. Photograph courtesy of Working on Fire.*

**7.6 Special burning operations for specific goals**

To avoid scorch height where tree crown canopies are low, prescribed fire can successfully be applied when pruned branches are still green (photographs 26 and 27). The time of burning application is crucial here, as the pruned branch needles need to be green so these can have a smouldering effect on the dead fuel underneath it, on top of the forest floor. Once these needles have been dead and cured, such stands cannot be prescribed burned as the added dry fuel in suspension will increase fire intensity to kill trees in the process.

It is thus necessary that the fire manager keeps track of the pruning programme and, when such a stand has been put on the prescribed burning list, will have to be burned when (i) the needles on the pruned branches are still green and (ii) weather conditions are suitable for such burning to be applied successfully.



*Sketch 2: Circle burning in progress. Note wide backing fire burn at bottom of picture, required for safety reasons. Spot ignition in centre of area burned is optional (unknown artist).*



# Command Corner: Common denominators with fire behaviour on tragic fires

By Chief Tim Murphy, US Forest Service Africa  
Disaster Management Technical Advisor

**F**ive common denominators that contribute to accidents/incidents have been identified through studies of tragedy fires. It is important for fire fighters to readily recognize the following common denominators so that future tragedies can be prevented:



- Most incidents happen on smaller fires or on isolated portions of larger fires.
- Most fires are innocent in appearance before unexpected shifts in wind direction and/or speed results in flare-ups or extreme fire behaviour.
- In some cases, tragedies occur in the mop-up stage.
- Flare-ups generally occur in deceptively light fuels, such as grass and light brush.
- Fires run uphill surprisingly fast in chimneys, saddles, gullies and on steep slopes.
- Some suppression tools, such as helicopters or bombers, can adversely affect fire behaviour. The blasts of air from low-flying helicopters and bomber have been known to cause flare-ups.
- Wind is the most important weather factor. Know what the wind direction and speed is and what it is predicted to do.



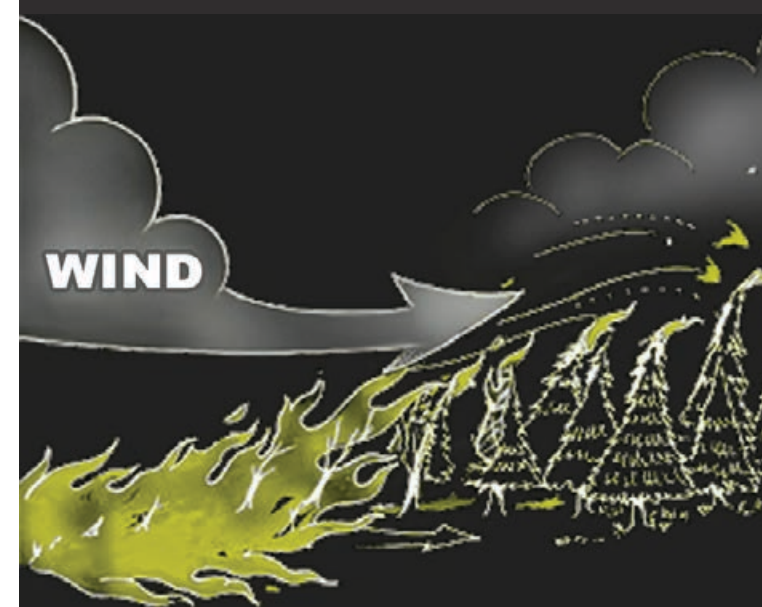
*Photograph 25: Picture of a 10-year old P. elliottii stand hours after prescribed burning application. The pale green to light brownish crown canopy needle colour indicated when crowns were scorched by the heat from the fire, which was in this case only in a few patches of the stand where crowns were only partly closed. Subsequently the light intensity/ patchy scorch did no harm to the trees. Photograph taken by Dr Neels de Ronde.*



*Photograph 26: Under canopy burning in progress in “green” pruning material in seven-year old Pinus patula in the North-Eastern Cape region . Photograph taken by Dr Neels de Ronde.*



*Photograph 27: Same stand as for Photograph 5, after the fire was applied. Note the needle on the branches still being “green” in colour, indicating the light degree of fire intensity. Photograph taken by Dr Neels de Ronde.*





# UL's Fire Safety Research Institute releases new hose stream prop and hands-on training toolkit



- Strategies for utilising different stream types, application patterns, stream angles and methods of deflection to assist in game-time decision-making during exterior suppression operations.
- How coordinating ventilation post-suppression can quickly return the environment to tenable conditions and provide better visibility when conducting interior operations.
- How to properly place a stream into the eave line to quickly coat the attic while limiting the ventilation into the space.

"This Hose Stream Prop is a gift to the fire service born out of field experience and research. My hope is that this prop becomes part of every fire fighter academy curriculum. The importance of stream placement and its effect on the fire is a 'must learn' for fire fighters," said Ray McCormack, fire lieutenant (ret), Fire Department of New York.

"This innovative, hands-on training prop can be incorporated into fireground suppression training at any level, from the newest of recruits to the most experienced of company officers. It provides a great visual aid to demonstrate how varying suppression tactics move air about a structure and how the water coats the building surfaces and burning materials," said Keith Stakes, research engineer, FSRI.

To learn more and download the toolkit, visit: [fsri.org/hose-stream-mechanics](https://fsri.org/hose-stream-mechanics).

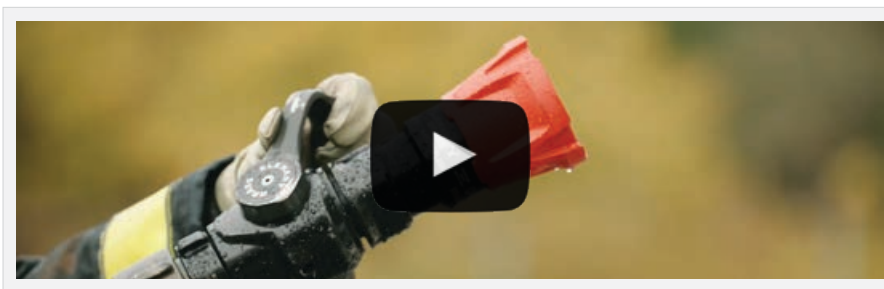
UL's Fire Safety Research Institute (FSRI) announced the release of an all-new hands-on training toolkit focused on hose stream mechanics, giving fire departments an innovative new way to put research into practice. This toolkit is designed to facilitate realistic training and includes all the information needed to construct and utilise FSRI's Hose Stream Prop, everything from prop designs, video demos and training lesson plans covering air entrainment principles in hose streams and water distribution tactics in structures.

With the help of trusted fire service partners and live training demonstrations throughout the country, FSRI designed several enhancements to optimise usability and increase the suppression concepts able to be visualised with the prop, leading up to the final version and current construction plans. FSRI is proud to share these plans along with instructional videos and lesson plans for fire departments to incorporate into their training protocols.

By leveraging this hands-on toolkit, fire departments will enable their members to learn:

- How to manage air entrainment and effectively distribute water and map the surfaces of a structure on the approach to and into various interior fire compartments.

The idea for this innovative Hose Stream Prop was sparked when FSRI research studies began to yield thought-provoking findings around the fundamentals of hose stream mechanics, specifically air entrainment and water mapping. These concepts are the ground-level building blocks needed to understand the impact of varying suppression tactics on the fireground. From these findings, FSRI research engineers began by building a prototype training prop to visualize and interactively demonstrate these concepts.



# Urban Search and Rescue South Africa Team (USAR-SA 01) participates in BRICS countries virtual USAR simulation exercise

By Nadia Taljaard, volunteer USAR technician; Joarez Myambo, fire fighter EMT, City of Johannesburg and Charles Mabaso, USAR-SA team leader, Deputy Chief, City of Tshwane



With the increase of natural and man-made disasters in recent decades, disaster response preparation has been a priority for governments and humanitarian organisations worldwide.

South Africa, as a member of the United Nations committed itself to international disaster response as part of its Disaster Management Framework. This undertaking includes the External Classification of an Urban Search and Rescue team (USAR SA-01) according to International Search and Rescue Advisory Group (INSARAG) guidelines.

INSARAG is a network of 90 countries and organisations who respond to disasters world-wide. The organisation is dedicated to urban search and rescue as well as operational field coordination in disaster situations. Its goal is to establish classification

standards and methodology for international response.

USAR SA-01 received its INSARAG classification as an international medium search and rescue

team during 2017 and is due for reclassification in 2024. This team was part of a major rescue and recovery operation in the aftermath of the KwaZulu-Natal floods (April 2022).







▶ USAR SA-01 team members are selected from the disaster and emergency departments of City of Johannesburg, City of Tshwane, City of Ekurhuleni, Gauteng Provincial EMS and the Midvaal, Lesedi, Emfuleni and the West Rand municipalities.


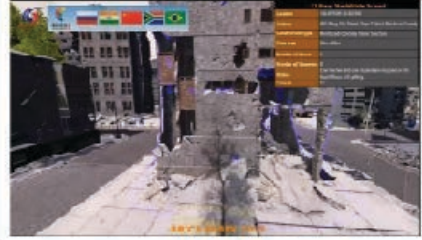

To establish a world class urban search and rescue task force, USAR SA-01 members are qualified as rope, structural collapse, confined space, vehicle/machine, trench, wilderness and swift water rescue technicians.

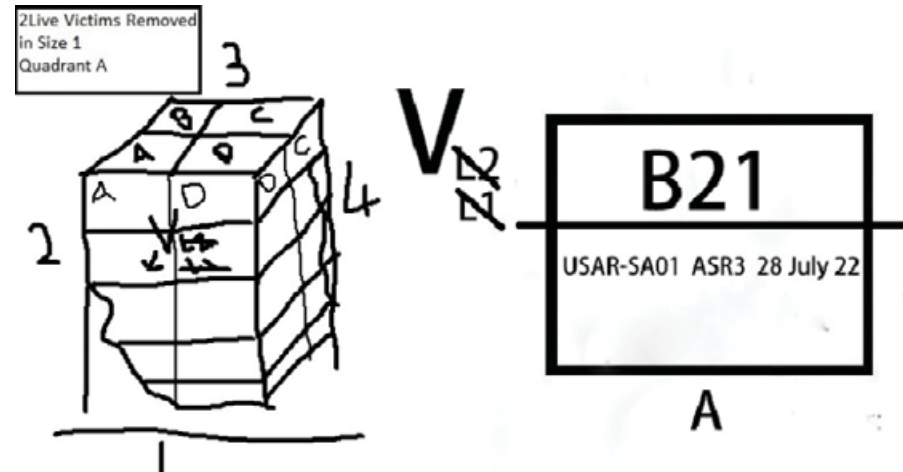
Additionally, members are encouraged to train in disciplines such as K9 search and rescue, commercial diver, hazardous materials and information technology (IT).

As part of its ongoing response preparedness training, USARSA-01 was invited to participate in the BRICS Urban Search And Rescue Simulation Exercise from 27 to 29 July 2022. BRICS (Brazil, Russia, India, China and South Africa) is a gathering of five significant arising economies-Brazil, Russia, India, China, and South Africa which was established to promote common objectives as developing countries.

The virtual table top exercise was hosted by China International

Search and Rescue (CISAR) team, represented by two heavy rescue teams (Chin-01 and China-02), three Russian teams (Russia-01,

21 Rong Sha Middle School																	
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Russia-02 and Russia-03) and a team from India and South Africa.

The virtual event was held at the Tshwane Disaster Centre and was attended by eight USAR SA-01 technicians under the guidance of team leader, Deputy Chief Charles Mabaso and squad leader, Company Commander Mervyn van Ginkel. Representatives from national and provincial disaster management were also in attendance as external observers, support, and sponsors of USAR SA-01.

The virtual scenario was based on a 6,1 magnitude earthquake in the Beichuan County of China. The country included six sectors, with a total of 14 400 injured persons, 4 472 missing persons and 5 105 deaths. The simulation had additional impacts such as mud slides and secondary collapses for the teams to contend

with. Information gathering and situational awareness was facilitated by high quality 3D video and pictorial information about each scene. USAR SA-01 was deployed to Sector B – Dayu District, focusing on Wang Tang Street and Rong Shu Street.

Each team received tasks to complete in a predetermined timeframe on the Global Disaster Alert and Coordination system (GDACS)'s Virtual On-Site Operations Coordination Centre (VOSOCC), the ArcGIS Survey 123, ArcGIS Explorer applications, which are real-time online coordination platforms that allow for information exchange in the management of an emergency/disaster.

The tasks included deployment, base of operations (BoO) organisation, reconnaissance/ area assessment, building triage and markings, operational period handover, victim extrication/ treatment and demobilisation. Sketches and updated INSARAG markings based on video information were a requirement in various tasks.

The USAR SA-01 team found the exercise to be an excellent learning experience, with a great emphasis on the application of technology and adherence to INSARAG guidelines and methodologies. As stated by Deputy Chief Mabaso, "If we think USAR is about breaking and breaching concrete only, we will fall far behind and the world is not going to wait for us."

With this statement in mind, USAR SA-01 has committed itself to intensive training on the various virtual coordination systems in addition its weekly rescue training schedule.

The BRICS SIMEX 2022 as experienced by USAR SA-01 was surrounded with an atmosphere of guidance, synergy and sometimes humour with the singular goal of saving lives, which made SIMEX a tremendous success! ▲





# How can management assist against attacks on emergency services members?



*Maybe it is time to issue each emergency worker with a body cam that is linked to a control room system?*

Management receive complaints daily from their staff of the dangerous conditions that members need to work in. Fire fighters and medical staff (government, municipalities or private entities) are all afraid of being part of crime related incident.

This results in member refusing to work in certain areas, which will hold back service delivery to the community in need of assistance.

On many occasions I have asked the question, "When will South Africa's different emergency management members start to realise that South

Africa is becoming the capital world for crime?"

I have also indicated that police officials, traffic officials, security officials, ambulance services and fire departments are all being targeted by the very same industry we try to serve and protect.

I personally think that no training will be able to protect you against these types of attacks because we are narrow minded, meaning that we focus purely on the patient or victim we assist and we do not focus on the overall environment. These types of attacks are fast and

are performed at a maximum force and most of the time a member will 'freeze up' or 'overreact' involving being a victim.

Do we have a solution for this and the answer will always be 'yes'? If you follow a long-term training programme that promote a good fighting fitness programme (not gym), basic fighting methods, understanding how to defuse and stay calm in a hostile environment resulting in reaching a level of fitness and understanding the basic fighting principles. This will allow for you to advance to a more forceful level of self-defence. Let me explain...

What to do? Will always be the question and everyone is looking for a quick solution towards this problem, meaning that some will attend a self-defence seminar or attend one- or two-day self-defence classes or start searching for answers on YouTube and 'think' they are now fighting experts. It takes a lifetime of hard work every day to achieve a grading belt in martial arts and just to be told by your Sensei that you not ready yet, what makes you think you can do it in a day or two. Out of a 1 000 people starting with a self-defence/martial arts course, only one percent will completed or grade on the end of the day.

Will we be able to make a difference in the way people think, by making posters and marketing "do not harm our members"? And the answer is no. We are fighting against a society that has the 'love for power on social media', 'people that are under the influence of substance abuse' and 'gang-related crimes.

If you are not willing to learn self-defence and we cannot make a difference? What is left?

Maybe it is time to issue each emergency worker with a body cam that is linked to a control room system, allowing for live view, live audio feed and allowing qualified control room operator to advice and, if an emergency is evolving, they can activate mitigating procedures on behalf of the person in distress.

The body cam record evidence that can be used in a court of law, you will be able to point out the criminals involved, evidence can be used for training purposes but evidence can also be used against any member of a service committing an offence. Will this stop an attack? No but can we get justice? Yes!

If we do not try, we will fail our members and if we fail our members, we fail our community.

You are welcome to contact **Morne Mommsen** via email: [dnaemergency@gmail.com](mailto:dnaemergency@gmail.com). ▲



*Maybe it is time to issue each emergency worker with a body cam that is linked to a control room system?*



*The body cam record evidence that can be used in a court of law*





# History and origin of the 911 emergency number in the US

The three-digit telephone number 911 has been designated as the “Universal Emergency Number,” for citizens throughout the United States to request emergency assistance. It is intended as a nationwide telephone number and gives the public fast and easy access to a Public Safety Answering Point (PSAP).

The first known use of a national emergency telephone number began in the United Kingdom in 1937 - 1938 using the number 999, which continues to this day. In the United States, the first 911 call was made in Haleyville, Alabama, in 1968 by Alabama Speaker of the House Rankin Fite and answered by US Rep Tom Bevill. In Canada, 911 service was adopted in 1972 and the first 911 call occurred after 1974 roll-out in London, Ontario.

## Emergency services before 911

Before 911, how did people respond to emergencies? Time is critical during an emergency, so early emergency alert systems prioritized speed. In the 18th and 19th centuries, American cities relied on watchmen, who alerted the city by shaking wooden rattles and shouting. The sound not only alerted residents, it also called up volunteer fire fighters, who would show up with buckets and axes.

In the 19th Century, Philadelphia experimented with a fire alert system at the top of the Pennsylvania State House. The watchman would ring the bell once for a fire to the north, twice for a fire to the south and so on, warning people about the fire and providing information on its location.



*First 911 call on 18 February 1968 by Alabama Speaker of the House, Rankin Fite and answered by US Rep Tom Bevill*

Advances in technology offered a breakthrough in emergency services. In 1857, William F Channing and Moses Farmer patented the “Electric telegraph to signalise alarms of fire.” In Boston, Channing and Farmer created a dense network of telegraph lines and alarm boxes, where citizens could send signals using electric currents. The alarm would set off bell clappers at the emergency scene and central station. Early tests failed, however, because eager citizens cranked the alarm too fast, resulting in a garbled signal.

John Nelson Gamewell led the next advance in emergency systems, creating fire alarm boxes that were found in nearly 500 cities by 1890. Rather than placing alarms on streets, a new technology, the telephone, let people report emergencies from within their own homes.

## Local emergency response meant memorising phone numbers

The first telephone systems, in some ways, had a built-in emergency service. Before rotary dial phones, all phone calls went to an operator, who directed the call. Anyone calling with an emergency

could be quickly connected to their local police station or fire department. But rotary phones introduced a new wrinkle. People had to place direct calls to emergency providers, which meant memorising a lot of phone numbers.

In Los Angeles, for instance, residents were served by 50 different police departments, all with different phone numbers. If callers weren't sure what number to ring, they could always hit 0 to speak with an operator but that step could easily add delays.

The system was extremely confusing for users. In 1946, the Washington Post reported on a woman who tried to call for help when her apartment caught fire, writing, “[S]he tried vainly to reach an operator by dealing the emergency number ‘311.’ In her excitement, she forgot the fire control centre’s number, Union 1122.”

Even when people did get the right number, sometimes the police or fire department didn't pick up. In 1921, Public Service Magazine reported that Bellevue Hospital in New York City received up to 2 500 emergency phone calls every day.

In 1958, Rosamund Reinhardt wrote a letter to The New York Times complaining about the system. She tried calling the operator to report a fire but the line kept dropping. The delay nearly cost Reinhardt her life: “I discovered the time I had wasted to prevent my getting out of the apartment, as the hall was impassable due to smoke.” The close call left Reinhardt wondering, “Would it not be possible to cut out the operator stage by dialling directly some prearranged emergency number?”

## The UK created the first emergency number in the 1930s

The United Kingdom created its first three-digit emergency number in 1937. Londoners could call 999 to reach emergency services. The successful system was run by the post office.

For years, US fire fighters promoted the idea. In 1920, an article in the Quarterly of the National Fire Protection Association recommended switching from the older telegraph alarms to a telephone alarm. By the 1950s, some US cities installed telephone alarms on the street so people could phone the fire department directly in case of emergencies. Yet people were still stuck memorizing local police and fire department phone numbers or hoping the operator would pick up.

## The beginning of 911 in the US

By 1957, the International Association of Fire Chiefs recommended creating a single national emergency number, but it would still take more than 10 years for the first 911 system.

The first city in North America to use a central emergency number was the Canadian city of Winnipeg, Manitoba, in 1959, which instituted the change at the urging of Stephen Juba, mayor of Winnipeg at the time. Winnipeg initially used 999 as the emergency number but switched numbers when 911 was proposed by the United States.

In 1964, an attack on a woman in New York City, Kitty Genovese, helped to greatly increase the urgency to create a central emergency number. The New York Times falsely reported that nobody had called the police in response to Genovese's cries for help. Some experts theorised that one source of reluctance to call police was due to the complexity of doing so; any calls to the police would go to a local precinct and any response might depend on which individual



*A fire/police call box New York City, US*

sergeant or other ranking personnel might handle the call.

In 1967, the President's Commission on Law Enforcement and Administration of Justice recommended the creation of a single number that could be used nationwide for reporting emergencies. The Federal Communications Commission then met with AT&T, an American multinational telecommunications holding company headquartered at Whitacre Tower in Downtown Dallas, Texas, in November 1967 in order to choose the number. It is the world's largest telecommunications company by revenue and the third largest provider of mobile telephone services in the US.

In 1968, the number was agreed upon. AT&T chose the number 911, which was simple, easy to remember, dialled easily, which, with the rotary dial phones in place at the time, 999 would not and because of the middle 1, which indicating a special number (also 4-1-1 and 6-1-1), worked well with the phone systems at the time. At the time, this announcement only affected the Bell System telephone companies; independent phone companies were not included in

the emergency telephone plan. Alabama Telephone Company decided to implement it ahead of AT&T, choosing Haleyville, Alabama, as the location.

AT&T made its first implementation in Huntington, Indiana on 1 March 1968. However, the rollout of 911 service took many years. For example, although the City of Chicago, Illinois, had access to 911 service as early as 1976, the Illinois Commerce Commission did not authorise telephone service provider Illinois Bell to offer 911 to the Chicago suburbs until 1981. Implementation was not immediate even then; by 1984, only eight Chicago suburbs in Cook County had 911 service. As late as 1989, at least 28 Chicago suburbs still lacked 911 service; some of those towns had previously elected to decline 911 service due to costs and, according to emergency response personnel, failure to recognise the benefits of the 911 system.

Regarding national US coverage, by 1979, 26 percent of the US population could dial the number. This increased to 50 percent by 1987 and 93 percent by 2000. As of March 2022, 98,9 percent of the US population has access.





- Conversion to 911 in Canada began in 1972 and as of 2018 virtually all areas, except for some rural areas, such as Nunavut, are using 911. As of 2008, each year Canadians make twelve million calls to 911. On 4 November 2019, the Northwest Territories launched the 911 service across the territory with the ability to receive service in the territory's 11 Official languages.

On 15 September 2010, AT&T announced that the State of Tennessee had approved a service to support a Text-to-911 trial state wide, where AT&T would be able to allow its users to send text messages to 911 PSAPs.

Most British Overseas Territories in the Caribbean use the North American Numbering Plan; Anguilla, Bermuda, the British Virgin Islands and the Cayman Islands use 911.

Mexico switched its emergency phone number from 066 to 911 in 2016 and 2017.

#### Enhanced 911

Enhanced 911 (E-911 or E911) automatically gives the dispatcher the caller's location, if available. Enhanced 911 is available in most areas, including approximately 96 percent of the US.

In all North American jurisdictions, special legislation permits emergency operators to obtain a 911 caller's telephone number and location information. This information is gathered by mapping the calling phone number to an address in a database. This database function is known as Automatic Location Identification (ALI). The database is generally maintained by the local telephone company, under a contract with the PSAP. Each telephone company has its standards for the formatting of the database. Most ALI databases have a companion database known as the MSAG, Master Street Address Guide. The MSAG describes address



The phone that received the first 911 call

elements including the exact spellings of street names and street number ranges.

To locate a mobile telephone geographically, there are two general approaches: some form of radiolocation from the cellular network or to use a Global Positioning System receiver built into the phone itself. Both approaches are described by the radio resource location services protocol (LCS protocol). Depending on the mobile phone hardware, one of two types of location information can be provided to the operator. The first is Wireless Phase One (WPH1), which is the tower location and the direction the call came from and the second is Wireless Phase Two (WPH2), which provides an estimated GPS location.

As Voice over Internet Protocol (VoIP) technology matured, service providers began to interconnect VoIP with the public switched telephone network and marketed the VoIP service as a cheap replacement phone service. However, E-911 regulations and legal penalties have severely hampered the more widespread adoption of VoIP: VoIP is much

more flexible than landline phone service and there is no easy way to verify the physical location of a caller on a nomadic VoIP network at any given time (especially in the case of wireless networks) and so many providers offered services which specifically excluded 911 service to avoid the severe E-911 non-compliance penalties. VoIP services tried to improvise, such as routing 911 calls to the administrative phone number of the Public Safety Answering Point, adding on software to track phone locations, etc.

In response to the E-911 challenges inherent to IP phone systems, specialised technology has been developed to locate callers in the event of an emergency. Some of these new technologies allow the caller to be located down to the specific office on a particular floor of a building. These solutions support a wide range of organizations with IP telephony networks. The solutions are available for service providers offering hosted IP PBX and residential VoIP services. This increasingly important segment in IP phone technology includes E-911 call routing services and automated phone tracking appliances. Many of these solutions have been established according to FCC, CRTC and NENA i2 standards, to help enterprises and service providers reduce liability concerns and meet E-911 regulations.

The intense interest in the concept of 911 can be attributed primarily to the recognition of characteristics of modern society, ie increased incidences of crimes, accidents and medical emergencies, inadequacy of existing emergency reporting methods and the continued growth and mobility of the population.

Sources: NENA, Ranker Weird History, Santa Clara County, Wikipedia ▲

# What's On?

## 2022

### October

#### 26 to 28 October 2022 Africa Health Exhibition 2022

Africa Health is the most influential healthcare exhibition on the African continent. For over 10 years Africa Health has been bridging the gap between the business of healthcare, knowledge, and skills development through meaningful connections. At Africa Health we bring the continent and the world the most advanced medical devices, sophisticated solutions, high-level professional conferences and invaluable networking opportunities.

**Venue:** Gallagher Convention Centre, Johannesburg, South Africa

**For more information visit:**

<https://www.africahealthexhibition.com/en/home.html>

#### 26 to 28 October 2022 Africa Health Congress

Africa's largest healthcare conference. The 11th edition of Africa Health will offer you the option to learn and network live in-person with your industry peers after a two-year break from live shows. The conferences will offer content that is unique and delivered by top speakers. With the aim of bridging the gap in medical knowledge, the carefully designed conferences at Africa Health provide the very latest updates and insights into cutting-edge procedures, techniques and skills. This year will once again see the coming together of healthcare professionals re-connect and engage with industry thought leaders and influencers under one roof over three days.

**Venue:** Gallagher Convention Centre, Johannesburg, South Africa

**For more information visit:**

<https://www.africahealthexhibition.com/en/conferences/overview.html>

### November

#### 10 and 11 November 2022 The Disaster Management Institute of Southern Africa Conference and AGM 2022

**Venue:** On line

**For more information visit:** [www.disaster.co.za](http://www.disaster.co.za)

#### 14 and 15 November 2022 JOIFF Africa Summit 2022

The JOIFF Africa 2022 one-and-a-half day summit is designed to provide a unique shared learning and networking opportunity and to join with high level international and regional industrial and municipal fire management specialists to listen, discuss and network

with the world's and Sub Saharan Africa's foremost experts and specialists on fire hazard management. Please note that available delegate places are limited and early registration is recommended.

**Venue:** Emperors Palace Convention Centre, Johannesburg, South Africa

**For more information visit:**

[www.joiffconferences.com/conferences/joiff-africa-summit-2022](http://www.joiffconferences.com/conferences/joiff-africa-summit-2022)

#### 23 to 25 November 2022 13th Fire Management Symposium

The 2022 Fire Management Symposium promises to be a special event. Not only because of the unique setting of the venue in the heart of the Garden Route but because of the conglomeration of top rated fire management specialists whom will share their expertise in a very practical and applied manner. Internationally renowned fire scientist Prof Pete Fule will deliver the first keynote address and will be supported by local fire specialists such as Pieter van der Merwe. We will also proudly host other international fire specialists as well as specialists from leading forestry companies in South Africa. The second day of the event, hosted by The Southern Cape Fire Protection Association (SCFPA) will provide opportunities to visit the Southern Cape region to observe the unique vegetation and take note of fire related issues.

**Venue:** Nelson Mandela University George Campus, Southern Cape

**For more information contact:**

Tiaan Pool

Email: [tiaan.pool@mandela.ac.za](mailto:tiaan.pool@mandela.ac.za) or Cell: 072 374 2347

Hannes van Zyl

Email: [Hannes.vanZyl@mandela.ac.za](mailto:Hannes.vanZyl@mandela.ac.za) or Cell: 072 733 1692

Sonia Roets

Email: [sonia.roets@mandela.ac.za](mailto:sonia.roets@mandela.ac.za) or Tel: 044 801 5091.

### December

#### 7 and 8 December 2022 Natural Disasters Expo Asia

This show is an opportunity to raise environmental awareness as environmental issues have become the greatest concern for the whole world. Environmental awareness has become a very important term as it not only implies having knowledge about the environment, but also our moral values and necessary education to solve environmental related problems. The Natural Disaster Expo Asia is about raising environmental awareness and disaster risk reduction policies and strategies, reducing existing disaster risks and managing residual risks, contributing to the strengthening of resilience and reduction of losses.

**Venue:** Singapore

**For more information visit:**

[www.naturaldisastersshowasia.com](http://www.naturaldisastersshowasia.com)