FIRE AND RESCUE INTERNATIONAL

Integrated fire, rescue, EMS and incident command technology

Volume 6 No 1

Hollard.

Hello… an exciting new opportunity has just become available at a local leading Insurer. We are looking to recruit a **Risk Consultant for the Western Cape,** working out of the local Insurer's office situated in the **Cape Town CBD.**

Role Objectives:

- Responsible for the protection of the company with respect to over exposure from a risk management perspective by conducting accurate fire, security, and insurance peril risk assessments as well as the submission of accurate MPL (maximum probable loss) scenarios and risk reports. The risk reporting system is an electronic tool which generates reports automatically.

Key Responsibilities:

- Evaluate buildings and structures (physically or based on plans) to establish the level of compliance with regards to insurance requirements, legislation, regulations, and codes of practice and provide an informed opinion of the possible impact of non-compliance and propose alternatives to mitigate such non-compliance.
- Evaluate risk, evaluate loss potential, make requirements / recommendations for risk improvements where necessary and advise the company on whether to participate or come off risk on properties.
- Carry out physical surveys timeously and professionally (within agreed times).
- Provide complete and professional reports in order for Underwriters to have a clear picture of all the risks involved.
- Stakeholder management: Take ownership of queries and offer possible solutions to the various stakeholders / clients and ensure all are resolved and feedback given to relevant parties.
- Continuously build and manage the relationship between Risk consultants & Branch and broker network.

Required Knowledge, Experience and Skills:

- We are seeking a senior candidate with qualifications and experience in fire technology and or fire engineering with a strong solid fire prevention / fire safety background, preferably with a fire prevention/safety fire department background.
- 3 years' experience in building fire prevention / fire safety and or fire codes approvals.
- Experience within surveying Insurance risks is advantageous but not essential.
- We will teach you the insurance aspects related to the risk evaluations - we need your fire expertise.

Educational Requirements:

- Matric.
- Graduate member (or higher) of the Institution of Fire Engineers (IFE) or Diploma (or higher) in Fire Technology or Fire Engineering or National Diploma in Safety or CFPA Advanced Diploma in Fire Prevention / Safety or a suitable equivalent qualification.

Additional Requirement/s:

- Valid driver's license.

Salary & Benefits:

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- Limited personal fuel and travel costs.
- Study assistance and further role related learning interventions.
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- Performance related bonus.

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"Applications for this role will be prioritised in line with our transformation objectives as per our Employment Equity Plan"

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Lee Raath-Brownie

Fire and Rescue International (FRI) is proud to present its 54th edition of the magazine. Our contributors have spent a lot of time and effort in researching and writing the articles in this edition and we trust that you find the information of use. Enjoy the read!

Industrial fires
The industrial fire focus features a technical article by Frank Preiss of FireDos GmbH on automatic extinguishing solutions in recycling facilities and incineration plants utilising heat detection.

Equipment news and technology
The equipment news and technology articles in this issue include the recent handover of 10 new apparatus enhancing the City of Tshwane's EMS fleet by FleetAfrica. We also feature the Double Assassin by Industrial Fire and Hazard Control and the new search and rescue X3 Finder, a portable human heartbeat and respiration detection system, available from Fremtac.

Training
The ETS Emergency Training Solutions' new industrial fire fighting training section, Jurassic Park, offers a simulated industrial environment that realistically represents various parts of an industrial plant.

Wildfires
Our wildfire feature includes articles on the recently founded National Veld and Forest Fire Protection Advisory Forum, the new FireWeb Incident Management software system implemented by the KwaZulu-Natal Fire Protection Association, new locally-manufactured CAFS systems as well as rugged terrain fire fighting technology. We also look at effective incident management teams during wildfires.

New to the magazine is US Forest Services' Chief Tim Murphy with Command Corner, this issue focussing on 'Leader's intent'. We are also featuring a new series of articles on firebreaks by Tiaan Pool and we continue with Chapter 4 from Dr Neels de Ronde's book, 'The Garden Route in flames'.

Structural fires: Incident command post positioning
Our technical expert, Colin Deiner, discusses the placement and positioning of incident commanders during structural fireground operations, ensuring incident commander safety.

Fire service leadership, planning and standards
Etienne du Toit shares the importance of developing leadership and standards within the fire and emergency services, highlighting the impact of strong systemic and deliberate leadership development and discussing some of the challenges faced by fire and emergency service leadership.

Self-defence for first responders
Morné Mommsen of Midvaal Fire and Rescue and Warrior Combative reiterates the importance of self-defence for first responders.

A very big thank you to all our contributors, advertisers and readers for their continued support! Fire and Rescue International is your magazine. Read it, use it and share it!

Lee Raath-Brownie
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This month's FRI Images winner!

Congratulations to

Simon McDonnell for his photograph 'Cape Point rescue' taken with a Canon EOS 5D mk III with a Canon 28-300mm f/3.5-5.6L IS USM lens on the following settings: ISO100, focal length 50mm, shutter speed 1/40th second, aperture f/7.1.

Well done!

Simon McDonnell wins this months prize money of R2000!

Photo description:
QThe Red Cross Air Mercy Service helicopter departs Cape Point after airlifting an injured tourist in the reserve. Western Cape Fire and Rescue, Cape Medical Response and NSRI Station 10 were also involved in the operation.

Best rescue, fire or EMS photo wins R2 000!

WIN R2 000 every month!

Fire and Rescue International's (FRI) 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!

You need to upgrade your equipment to keep up with the changing world: Stihl BR 800 for real blowing power

In controlled burning, where the fuel load is light, blowers are effective in blowing the fire back on itself

"Climate change is expected to increase temperatures over parts of the interior of South Africa by as much as three degrees to five degrees Celsius by the end of the century. Longer dry spells may also occur more frequently during all seasons. Increasing temperatures and increased drought frequencies combine to exacerbate the incidence of fire risk."
~ Working On Fire

"I have been a fire fighter for many years and from experience I know that you need equipment that you can trust in a tricky situation. There's no point in having a blower that isn't up to the job, for example, which is why I have always relied on Stihl blowers, upgrading through various models over the years.

A powerful blower is a must-have. It's great as part of a fire management programme, even though any blower, even the BR 800, cannot be expected to manage a fire on its own but it is very useful for clearing areas of organic material like leaves and grass etc. I also use it for blowing machinery clean.

A powerful blower is a must-have as part of a fire management programme

I prefer a backpack blower as Stihl's design and focus on user comfort means that it can be used for extended periods with less fatigue and reduced tiredness from aching back and shoulders. The BR 800 has an excellent power-to-weight ratio and an anti-vibration system as well.

The BR 800 is the most powerful Stihl backpack blower so, naturally, it has plenty of power. It delivers more than 1 700m3/h of air volume and has a wind velocity of over 230kph. This model is a completely transformed machine, not just an upgrade of the BR 700. It features a new blower housing and impeller in addition to the 80cc engine.

An enhancement that's really useful is that the BR 800 has side-start technology so that the operator no longer has the hassle of removing the backpack to

restart. Thanks Stihl, this is much easier when in a hurry! Plus, the telescopic tube is easily adjustable for various user heights without any tools for extra convenience.

I trust in the BR 800 for the following reasons:

- It quickly clears areas that would otherwise have to be cleared manually, which is time-consuming and labour-intensive and sometimes, in the field, there simply isn't time to do it by hand.
- Also, a blower like the BR 800 uses less water when constructing firelines. Please remember that a blower, no matter what model, cannot replace water on a fire line!
- In controlled burning, where the fuel load is light, blowers are effective in blowing the fire back on itself.
- If you've ever worked with a beater or other hand-held tools, you'll be grateful to have a powerful blower like the BR 800 on your back. Backpack blowers are more comfortable and effective than hand-held tools, no argument!
- High-powered models are incredibly useful when managing fires: use the blower air to cool down flammable gasses so they are less likely to ignite and also dilutes the gases. The high speed of air from the blower forces other gasses away from the area.

The Stihl BR 800 is a high performance blowing tool that is ideal for use as a fire management tool. But please, as when using any power tool - you need expert guidance, as you'd get from your Stihl dealer when buying any Stihl product. If you plan on using a blower for fire management purposes, you need to get in touch with your local fire protection agency for correct procedures as well as what personal protective equipment should be worn. And please ensure that any operator is properly trained when using any equipment.

I hope that this will assist with what could be a challenging fire season in 2021!"

The BR 800 has an excellent power-to-weight ratio and an anti-vibration system as well

City of Tshwane Emergency Services receives new apparatus; Mayor hands over bravery medals

City of Tshwane honoured 17 of its fire fighters with bravery medals

On Thursday, 3 June 2021, South Africa's City of Tshwane honoured 17 of its fire fighters with bravery medals for selfless service and commitment to protecting residents by responding swiftly to emergencies. The special event was held to commend the noble deeds by Tshwane fire fighters who helped to extinguish the Bank of Lisbon Building fire after answering a call to assist their colleagues in Johannesburg in 2018.

City of Tshwane showcased the new additions to the EMS fleet

The City of Tshwane also used the occasion to showcase the newly received fleet of vehicles by the Emergency Services Department. A total of 10 efficient and modern vehicles joined their fleet and include a multi-patient major incident unit built on an Iveco 26.28 Afriway 6x2 bus chassis, an E-One industrial pumper with a compressed air foam system (CAFS), an E-One Water Master (tanker), an E-One foam tender and an E-One foam tanker/pumper, all three built on International IH chassis were built on International (IH) chassis'. The E-One airport rescue and fire fighting apparatus (ARFF) and E-One industrial pumper was built on a custom E-One chassis by FleetAfrica, the official E-One Dealer Partner in Sub Saharan Africa.

All the above was supplied on a full maintenance lease-to-own basis while the WP1800 armoured fire engine, WP1800 armoured ambulance and special infection ambulance built by TFM Industries and supplied by FleetAfrica, is owned outright.

City of Tshwane Mayor Randall Williams said at the official handover ceremony, "Together with the MMC for Community Safety Councillor Karen Meyer, we had the honour of bestowing the bravery medals to the 17 fire fighters who were part of the Bank of Lisbon Building operation. An 18th medal was also awarded in absentia. As executive mayor of Tshwane, I would like to thank our fire fighters for being true professionals and for flying the Tshwane flag high. They have earned these bravery medals. It is important that we show our appreciation to the men

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The E-One CAFS industrial pumper

The E-One tanker/pumper

The E-One Airport Rescue Fire Fighting (ARFF)

and women in uniform from various disciplines. They play a critical role in keeping our communities safe, be it through crime fighting, responding to emergencies, assisting the ill or putting out fires."

Of the 18 crew members who responded to the Bank of Lisbon fire, leading fire fighter Onica Monchonyane was the only female fire fighter.

"Recently our teams answered the call to assist our colleagues in the province again when they were deployed to the fire incident at the Charlotte Maxeke Hospital. For our Emergency Services to do their job effectively, they require reliable equipment and vehicles so they can improve in their response times to emergencies, accidents and disasters. I have absolute confidence in stating that I believe we have one of the best capacitated Emergency Services departments in the country," added Mayor Williams.

EMS fleet additions

"The newly received vehicles by the City of Tshwane Emergency Services Department will assist with the urbanisation of the city. All the fire engines were purpose-built on specialised chassis for fire engines and in accordance to the National Fire Protection Association (NFPA) codes and standards. Most of these engines are first of its kind in Africa or even in the Southern Hemisphere", said Charles Mabaso, deputy chief: public information and liaison officer at the City of Tshwane Emergency Services.

E-One industrial pumper

The E-One compressed air foam system (CAFS) industrial pumper boasts a 1 893-litre water tank, a 2 000-litre foam tank and a dry 159kg chemical system. The two-stage centrifugal Hale pump can deliver 11 358 litres per minute, through six pump outlets and a 203mm deck monitor that can deliver up to 11 358 litres per minute over a distance of 60 metres. The rear monitor has a 7 572 litres per minute capacity. The unit will be stationed at Station 4 (Silverton) to assist with the refineries and new vehicle hub of the City of Tshwane.

E-One foam tender/pumper

The E-One foam tanker/pumper is built on an International (IH) chassis and has a 2 000-litre water and 2 000-litres foam capacity. The mid-ship mounted Hale high-performance centrifugal single-stage fire pump can deliver 6 000 litres per minute and the top monitor 7 600 litres per minute at an effective 45 metre reach in still wind. The vehicle will be stationed at Station 2 (Rosslyn) to assist with response to the heavy industrial area.

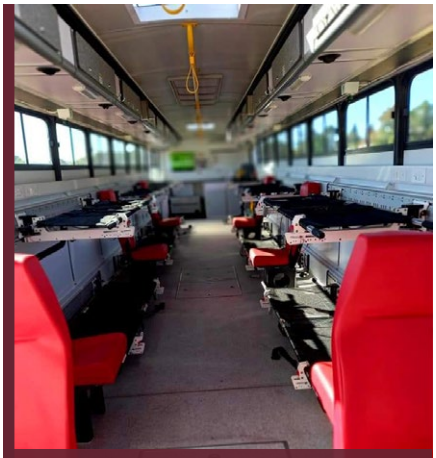
E-One tanker/pumper

The E-One tanker/pumper is built on an International (IH) chassis and has an 11 358-litre water capacity. Its mid-mounted, single-stage centrifugal pump with split-shaft transfer case has a 4 733 litres per minute capacity that makes the vehicle a heavy pumper with a quick dump valve at the back to dump all water into a portable dam. The top monitor has a delivery capacity of 4 700 litres per minute at an effective range of 45 metres in still wind. The vehicle will also be stationed at Station 4 (Silverton) to assist with the water supply to the major pumper for the refineries and new vehicle hub of the City of Tshwane.

E-One Water Master (tanker)

The E-One Water Master (tanker) is also built on an International (IH) chassis and has a 13 000-litre water capacity. The Water Master is fitted with a 1250 Hale vacuum fire pump that can deliver 4 733 litres per minute and a deck monitor with the same flow rate. The vehicle also has a portable removable 11 000-litre dam. The vacuum pump can fill the tank of 13 000 litres under three minutes and dump the water under two minutes. The Water Master will be based at Station 2 (Rosslyn) to assist the Foam tender/pumper with water supply in the heavy industrial area.

The Multi-patient major incident unit



cap The unit is designed for multi patient transport of P2 and P3 patients tion

The hydraulic gurney lift for the on and off-loading of patients

The E-One Water Master

E-One Airport Rescue Fire Fighting (ARFF)

The Wonderboom Airport received an Airport Rescue Fire Fighting (ARFF) unit is built on a custom E-One chassis by FleetAfrica with a 6 000-litre water capacity, 825-litre foam tank and a 225kg dry chemical powder (DCP) capacity. The acceleration of the ARFF unit is 0 to 80km/h in 25 seconds for response to airport incidents and is according to International Civil Aviation Organisation (ICAO) standards. The vehicle will be based at Station 8 (Wonderboom Airport).

WP1800 armoured fire engine

The armoured fire engine built on an Iveco Trakker 4x4 chassis is the first of its kind and offers a seating capacity of driver plus two in the cab and was manufactured by TFM Industries. The unit is to be used

during public unrest situations and offer level B4+ ballistic protection to the fire personnel within the fire engine and has a 2 500-litre polypropylene water tank. It is fitted with a Darley HE48K diesel-driven fire pump with dual Digitrol pump control panels (at pump and in cab) with a flow rate of up to 2 300 litres per minute, 1 900lpm at five Bar. The TFT EF1 RC bumper turret with automatic nozzle has a flow rate of 40 to 500lpm and the TFT Tornado RC deck monitor with automatic nozzle has a flow rate of 400 to 1 900lpm). Both monitors are operated through joystick controls from within the cab. There is also one normal pressure discharge for mop-up operations. Additional features include hydraulically operated front dozer, four roof-mounted R/C spot-lights, air-conditioner and engine bay fire suppression system. The vehicle will be based at Station 1 (Central) to be deployed at any stage to any area of the City.

The E-One foam tender/pumper

The WP1800 armoured fire engine and special infection control ambulance unit

The WP1800 armoured ambulance

WP1800 armoured ambulance

The armoured Evac ambulance built on an Iveco Trakker 4x4 chassis by TFM Industries is the first of its kind and offers a seating capacity of driver plus one in the cab. The unit is to be used during public unrest situations and offer level B4+ ballistic protection to the fire personnel within the fire engine. The ambulance saloon has a four-patient carrying capacity through Ferno Intraxx carrier system with Ferno disaster stretchers. It has two practitioner seats each with an Intraxx Safepack medical equipment box to facilitate easy access to patient treatment consumables, four wall mounted oxygen connection points and two equipment storage racks. It is fitted with a 5 000 Watt inverter power pack with two 100Ah 12V deep cycle batteries with a double power outlet at each stretcher position. Additional features include a hydraulically operated front dozer, four roof-mounted remote control spot-lights, air conditioner and engine bay fire suppression system. The idea is to rapidly load patients into the back of the vehicle during a hostile situation and treat them inside the vehicle where it is safe for crew and the patients. The armoured ambulance will also be based at Station 1 (Central) to be deployed at any stage to any area of the City.

Special infection control ambulance unit

The special infection control ambulance unit was manufactured by TFM Industries for FleetAfrica, using a European style box-body ambulance built onto an Iveco Daily 35S17 freight carrier chassis cab. It features aviation technology polyurethane, hermetically sealed box body mounted onto an all-aluminium sub frame with suitable

mounting point onto chassis with double rear doors and side access door. A fibreglass Luton fuel saver is incorporated into the box body for improved aerodynamics and houses a separate air-conditioning unit. It has ergonomically designed storage cabinets against the side walls manufactured from WPC board and the floor is a seamless anti-static medical grade floor covering. All interior cabinets are completely waterproof.

There is a centre positioned stainless steel stretcher base to accommodate Ferno F2 Monobloc self-loader ambulance cot and two high-back practitioner seats. The isolation chamber is equipped with a negative pressure filtration system that fits on the ambulance cot. The unit also has a 3 000-Watt pure sinewave inverter with four power points. Oxygen layout with two wall outlets and four power points are installed as well as two ultraviolet anti-microbial lights and filters.

This ambulance is the first of its kind in South Africa and fulfils the key requirement for hazmat level B incidents, viral haemorrhagic fever, multidrug-resistant (MDR)/ extensively drug-resistant (XDR) tuberculosis (TB) and COVID-19 patient treatment and transportation. Additional features include a 50-litre fridge/freezer for refrigerated medications, reverse camera system and six 6 000 lumen flush-mounted scene lights.

The special infection ambulance will be based at Station 9 (Hatfield) to be deployed at any stage to any area of the City.

Intensive care ambulance unit

The Intensive care ambulance unit built by TFM Industries for FleetAfrica is a European style box-body ambulance built onto an Iveco Daily 35S17 freight carrier chassis cab. Aviation technology polyurethane, hermetically sealed box body was mounted onto an all-aluminium sub frame with suitable mounting point onto chassis featuring double rear doors and side access door. A fibreglass Luton fuel saver is incorporated into the box body for improved aerodynamics and houses a separate air-conditioning unit. Ergonomically designed storage cabinets against the side walls were manufactured from inert waterproof construction board. The floor is seamless anti-static medical grade floor covering and all interior cabinets are completely waterproof. The centre positioned stainless steel stretcher base accommodates a Ferno F2 Monobloc self-loader ambulance cot and there are two high back practitioner seats. The unit has a 3 000-watt pure sinewave inverter with four power points and oxygen layout with two wall outlets and four power points. Two ultraviolet anti-microbial lights and filters are installed.

The Intensive care ambulance unit

Additional features include a 50-litre fridge/freezer for refrigerated medications, a reverse camera system and six 6 000 lumen flush-mounted scene lights.

The special infection ambulance will be based at Station 9 (Hatfield) to be deployed at any stage to any area of the City. “We are in the process to purchase a transport incubator for the critical neonates or infants”, said Mabaso. The vehicle will be based at Station 9 (Hatfield).

Multi-patient major incident unit

The multi-patient major incident unit was built by TFM Industries for FleetAfrica into an Iveco Afriway 6x2 bus body and is designed for multi patient transport of P2 and P3 patients from emergency incidents and standby during public events. It has four wheel base luggage lockers, a roof-mounted air-conditioning system driven from the bus engine for when the unit is on scene/traveling and two 12500BTU split unit air-conditioners when in standby mode. A secondary door is fitted with a Skyjacks SGL350 hydraulic gurney lift for the on and off-loading of patients. The Ferno Intraxx litter arm system can accommodate 12 lying patience on Ferno disaster stretchers. There are four sitting patient high back chairs with seat belts, six practitioner seats and 16 high level storage cabinets. A wash basin cabinet with a 200-litre fresh water tank and 200-litre grey water tank is fitted. The bus includes a full electrical layout with power supply from 6,5kVA silent running diesel generator, two 5 000 Watt pure sinewave inverters with eight 100Ah deep cycle battery bank and shore power connection with 30m extension lead. A wall-mounted oxygen connection points to all patient positions from four F-size cylinder banks. Additional features include an air-curtain at gurney lift entrance, 120m³ air purifier, two Snowmaster 67-litre 12.220V fridge/freezers, Teklite pneumatic light mast, six all round flush mounted 6 000 lumen scene lights, electric awning and reverse camera system.

The vehicle will be based at Station 1 (Central) to be deployed at any stage to any area of the City.

Automatic extinguishing solutions in recycling facilities and incineration plants utilising heat detection

By Frank Preiss, managing director, FireDos GmbH

With a growing awareness towards the environment and resources, the amount of recycling and incineration facilities worldwide has increased significantly. The risk of fires in these industries is a rising concern. Solutions to extinguish these fires in the early stages of development are imperative, especially considering that the materials being processed are unpredictable. There is certainly no simple answer to this challenge but it is an issue that needs addressing. In this article, suitable fire protection systems are discussed, with a focus on automatic extinguishing solutions utilising heat detection and remote-controlled fire monitors.

Development of the fire hazard situation

Over the last few years, the trend towards recycling materials has grown in many parts of the world. This has led to the division of organic wastes and recyclables and the installation of waste management companies operating incineration plants, composting plants and recycling facilities instead of landfills. Vast amounts of materials are now temporarily stored. The fire hazards associated with this are growing as relatively dry materials with high energy contents are stored together with potential ignition sources such as Lithium-Ion batteries, household aerosol bottles, paint cans and propane tanks. In composting facilities, decomposition can lead to temperatures high enough to cause auto-ignition of the stored material. These types of fire can be difficult to detect and often demand great effort to extinguish when detected too late. This can have serious effects on the environment and public health and jeopardise the safety of fire fighters and local communities.

Potential for fire hazards

Recycling facilities are generally set up in three sections.

- Delivery and primary storage area of unsorted recycling goods (tipping floor)
- Sorting and separation facility
- Storage of separated goods such as plastic, paper, metal, glass and compost

This article will focus on the first section of delivery and primary storage, the tipping floor. Here the complete variety of mixed waste, as it comes from our households, is tipped from collection trucks onto concrete floors or into waste bunkers. In this conglomerate of waste, both ignition sources and combustible materials are present. Damaged batteries that have developed heat are exposed to oxygen and sparks can ignite gases and vapours leaked from household aerosol bottles, paint cans and propane tanks or formed due to decomposition of waste. Before being transported into the recycling facility via conveyor belts, workers or machines sort out as much problematic garbage as possible. Unfortunately, these components often end up inside the facilities where they may ignite and start a fire. Fortunately, most of the waste is in constant movement. Hot-spots or a fire can be monitored and quickly dealt with if the proper detection and extinguishing equipment is installed.

In incineration plants, the untreated waste is often delivered and burnt without any separation, apart from the removal of metal. The material is stored in bunkers, partially several metres high, where it may be stored for longer durations of time before being transferred to the incinerator. Here a fire may smoulder below the surface without being detected and break out over a wider area.

Fire protection systems

The main extinguishing systems used in recycling and incineration plants are sprinkler or deluge systems and fire fighting monitors. Dependent on the goods that

must be extinguished, water or foam can be used as an extinguishing agent.
Sprinkler systems are mainly used indoors and are generally water-filled. A fire's heat will activate individual sprinkler heads that will release extinguishing water onto the area below it. If the fire spreads, additional sprinkler heads are activated to extend the extinguishing capability. Each sprinkler head is designed to protect an area of several square meters. Large areas are exposed to the extinguishing water when several sprinkler heads are activated and the system usually must be manually deactivated. Depending on the distance between the fire and the sprinkler heads, they may be triggered too late to successfully extinguish the fire. They are mainly used in areas with low ceilings.

Sprinkler systems can alternatively be filled with a foam premix that generates extinguishing foam once released. The premix is made using specially designed proportioning systems, such as the GEN III water motor-driven proportioning pumps made by FireDos.

Deluge systems are sprinkler systems with open nozzles. They can be manually operated or may be equipped with remote-controlled valves that are triggered by heat detections systems. On activation extinguishing will occur in the complete section of a larger area.

Fire fighting monitors, like the distinctive octagonal 'Oval Flat Design' from FireDos, are designed for indoor or outdoor use. When a fire is detected, they are either manually operated or can be remotely controlled. Fire monitors allow precise positioning of fire extinguishing media from a safe distance. See the following link for a FireDos M2 in action in a recycling plant:
https://www.linkedin.com/feed/update/urn:li:activity:6709360327227654144

Dependent on the fire extinguishing system setup, it is possible to switch between water and foam. Fire fighting monitors are optimally suited to be combined with detection systems to form an automatic fire extinguishing system.

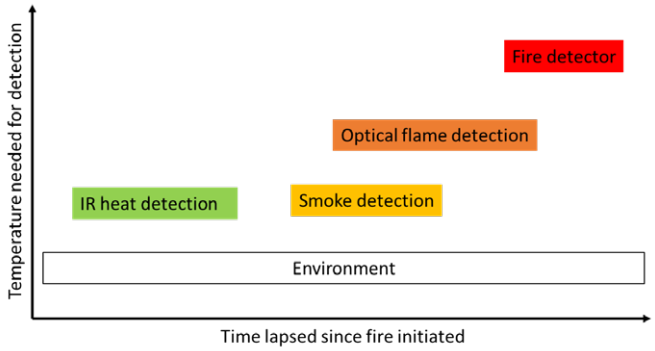


Figure 2 - Sensitivity of fire detection systems

Fire detection systems

We can differentiate between three common detection scenarios:

- Smoke detection
- Fire detection
- Heat detection

Smoke detectors are mainly installed under the ceiling to monitor complete halls or sections of a big area. They generally require a large amount of smoke to trigger an alarm. They are mainly used together with manual fire fighting equipment utilising hoses or fire fighting monitors as the exact location of a fire must be visually confirmed. They are not well suited as components for modern automatic fire fighting solutions.

Another possibility for smoke detection is the use of video smoke detection. It is recommended to use these systems only if combined with another type of detection to avoid false alarms triggered by steam, exhaust fumes or fog. These systems also require ideal lighting conditions and only work in areas with low levels of dust.

Sprinkler systems are classic fire detectors. They are not suited as components for modern automatic fire fighting solutions.

- Linear heat or fire detectors are sensor cables. They are mainly used to monitor tunnels or garages but may also be installed in big halls. They are generally not suited for use in incineration plants and recycling facilities but may be a suitable option for monitoring covered conveyor belts.

Most common heat detection is achieved through thermal imaging by using infrared (IR) detection technology. In contrast to detecting smoke or a fire, the environment is monitored for radiated heat. By continuously monitoring a specific point or area and measuring the actual radiated heat or analysing the increase in temperature, fires can be detected, even if they have not yet reached the surface of a pile. The rise of hot gases may be sufficient to detect a sub-surface fire. Usually, temperatures of 80 degrees Celsius are considered strong indicators of a fire. Heat monitoring of an object with an infrared early fire detection system means a fire is identified in its formation phase.

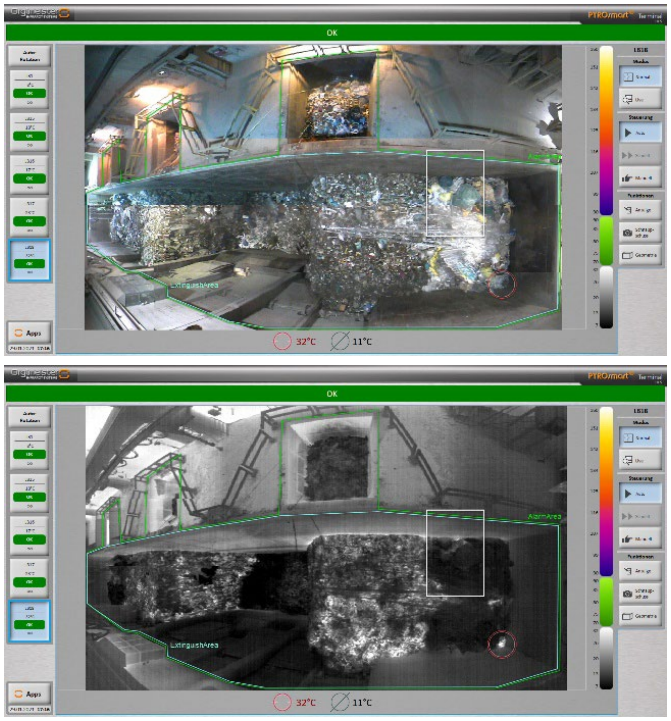


Figure 3 – Video and high-resolution radiometric panorama from a PYROsmart heat detection system

For fire detection, continuous monitoring of the hazardous area is mandatory to detect any changes in the environment. Intentional and known heat sources such as motors from belt drives or vehicles, exhaust pipes, sun and reflections should be automatically identified and ruled out as potential fires to reduce false alarms to a minimum.

One stationary, relatively inexpensive camera can cover a large area when using a lower resolution but this will prevent the early detection of fires while they are still small. With more sophisticated technology, such as the Orglmeister PYROsmart system, areas can alternatively be surveyed using a single pan/tilt head camera. It continuously scans a large area and builds a high-resolution radiometric panorama image. Combined with intelligent analysis software, detection and exact locating of a hot spot allows positioning of water or foam using a precise, remote-controlled monitor such as the FireDos M2 or M3. On demand, a combination of IR and live video pictures will provide an effective analysis of the situation, especially when the resolution is high enough to allow the user to zoom into the video image.

Through self-learning and artificial intelligence (AI), the software analyses the environment and differentiates between hot motors, exhaust pipes and hot spots that indicate potential or actual fires.

Automatic extinguishing solutions

When planning a fire extinguishing system, the most effective fire fighting strategy to extinguish the wide range of possible fires must be found.

One of the steps is the decision to use water, foam or have the alternative to use either.

Assuming a plan to use a detection system, it must be decided between manual or automatic intervention. Considering that incineration plants may be operational 24/7, recycling facilities often only run one or two shifts a day, making around the clock monitoring and fire fighting by staff members difficult.

In the case of manual intervention, the detection system will raise the alarm. Dependent on the system used, this may be a critical hot spot, a flame or smoke. In each case, visual confirmation of the fire threat and manual intervention of the extinguishing process is required by ie activating a deluge system or utilising a manual or remote-controlled fire monitor.

If the fire extinguishing system is automated, triggered by smoke or fire detection, a deluge system may be activated, flooding the complete area. Alternatively, a fire monitor could automatically direct the extinguishing agent using a pre-programmed spray pattern in a pre-defined area. Deactivation of the extinguishing system is mainly done manually.

Suppose the fire detection system uses IR heat detection. In that case, a remote-controlled monitor is activated to accurately direct water or foam to the exact location of the hot-spot or fire. A pre-programmed spray pattern may be used. Deactivation may be manual or the fire monitor can be automatically turned off after a defined extinguishing time. IR heat detection will continue and restart the extinguishing process when and where necessary.

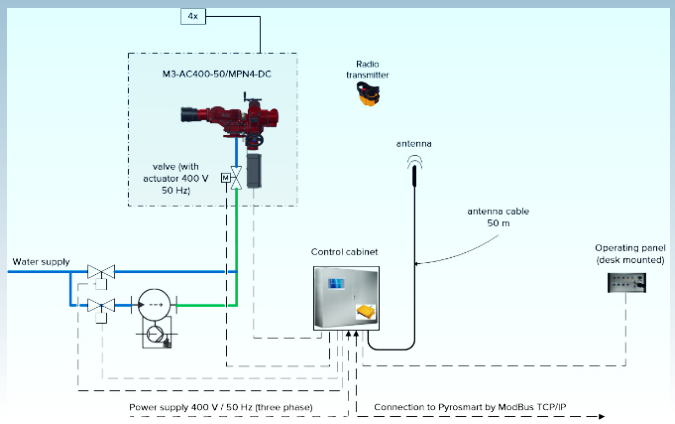


Figure 4 - Schematic of remote-controlled monitors with optional water or foam output and connection to a heat detection system.

An automatically controlled process with a multi-stage approach is also efficient when a hot spot has been detected:

1. Precise delivery of a limited volume of water to an identified area.
2. Monitoring and the additional delivery of water if the temperature has not decreased to a non-hazardous level.
3. Monitoring and the delivery of foam may be activated automatically if water does not give the required result after one or two extinguishing attempts – or the extinguishing area is enlarged.

With automatic detection and extinguishing systems, the fire fighting approach can be customised to the facility, the goods to be extinguished and the threat a fire may pose to the environment. A first step and a significant part of the process, is to determine the best approach for fire fighting with an analysis of the premises to assess detectors and fire monitors' best positioning. Optimum placement of these devices minimises the quantity and the cost of a system.

Conclusions

When it comes to fire fighting, the three steps for any facility are: Prevention, internal response and professional response.

In the event of a fire, integrated processes and systems, consisting of state-of-the-art heat detection and automated extinguishing solutions, are essential to assure that a fire has been extinguished before a professional response is necessary.

Advanced, state of the art fire hazard detection and automatic suppression systems provide great potential to reduce damage and property loss. Although the initial investment cost is higher than for traditional methods, by focusing on early detection and smart, precise extinguishing, rather than extended fire fighting, plant owners and operators can reduce reoccurring costs and facility shutdowns can be reduced and the total cost of operation optimised.

Figure 5 – PYROsmart heat detection system and remote-controlled monitor in recycling plant

Industrial Fire and Hazard Control's Double Assassin

Every now and then, we can design equipment and apparatus with leading technology that blows conventional systems out of the water with the added advantage of drastically reducing the price for the system when compared to the conventional and yet offering three to four times the efficacy. This is the case with the Double Assassin.

Convectional units are often offered on a Land Cruiser or similar type chassis cab with 680 litres of premix and a mere 50kg of dry chemical powder (DCP). On application, it is the monitor and a handline that delivers the foam solution and the DCP is delivered through a wheeled trolley. In other words, each extinguishing media is delivered individually with the corresponding limitations.

The Double Assassin in turn delivers the foam solution through a monitor, a handline (38/44/65mm) and a hose reel. The DCP is delivered through the hose reel at 3,2kg a second. However, the secret weapon of the Double Assassin is the unit's ability to discharge water/foam/DCP simultaneously.

The power of DCP at a fire incident can never be underestimated nor neglected. The challenge that the conventional units have is the fact that the distance that the DCP can be applied is so limited that it becomes a risk for the responding firefighters. The Double Assassin mitigates this through the use of Hydro-Chem technology that allows the DCP to effectively reach distances four to five times further than the conventional methods.

The advantages of the Double Assassin:

- Carries 680 litre premix (Hydral 3C AFFF); 135kg DCP (Purple K)
- Discharges: Monitor, attack line, hose reel (electric rewind)
- Williams Hydro-Chem technology: water/foam/DCP simultaneously if so selected, through the same nozzle
- Heavy-duty trailer (double axle for stability and high-speed manoeuvring)
- Up to half the purchase price of conventional apparatus
- Stand-alone operation when supplied from a hydrant or relay pumper

The Double Assassin is ideal for operation at:

- Airports (up to CAT III)
- Game Farms
- Mines
- Municipal (industrial/urban interface)
- Light and heavy industry
- Military
- Ports Authority
- POG facilities

The Double Assassin unit is available through Industrial Fire and Hazard Control.

INDUSTRIAL FIRE AND HAZARD CONTROL.

DOUBLE ASSASSIN

- Carries 680 litre premix (Hydral 3C AFFF); 135kg DCP (Purple K)
- Discharges: Monitor, attack line, hose reel (electric rewind)
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Industrial Fire & Hazard Control

ADVANCED
FIRE SUPPRESSION TECHNOLOGIES

Human detection system optimises rescue and surveillance: X3 Finder is now available in South Africa

X3 Finder can also be mounted and configured to enable see-through-wall surveillance, enabling users to detect individuals within buildings, caves or tunnels

The X3 Finder is a portable human heartbeat and respiration detection system

Fremtac Fire and Rescue cc has been awarded the exclusive distribution rights for South Africa for the SpecOps Group Inc. the manufacturer of the X3 Finder for first responders, fire fighters, law enforcement and military applications.

X3 Finder (Finding Individuals for Disaster and Emergency Response) was originally developed at NASA's Jet Propulsion Laboratory and SpecOps Group Inc to help rescue crews find survivors quickly in a major disaster, where seconds make the critical difference between life and death.

The X3 Finder is a portable human heartbeat and respiration detection system that uses radar to identify signs of life beneath rubble and debris, through walls and underground. Now first responders can find living human victims through piles of rubble at the click of a button. Finder allows first responders to bypass the physical search phase and to focus on the rescue portion of the mission providing life-saving medical attention only precisely where it's needed. Finder can also be mounted and configured to enable see-through-wall surveillance, allowing users to detect individuals within buildings, caves and tunnels.

X3 Finder uses a low power radio signal to detect the motion signature of human heartbeats and respiration. After a disaster, there is a limited window of time to save trapped and injured survivors. Finder makes the process more efficient by removing the guess-work out of search efforts, providing rescuers with precise detection of all living victims at a disaster site.

"The unit is portable, easy and safe to use and can be operated by a single person. With the push of a button the X3 Finder detects heartbeat and respiration within one minute. That's why the X3 Finder has become the gold standard in search and rescue technology providing first responders, fire fighters, military and law enforcement with the capability to save many lives quickly," said Adrian Garulay, co-founder, president and CEO of SpecOps Group Inc.

The X3 Finder manufactured by SpecOps Group Inc is the new standard for search and rescue. In addition to the portable unit, the X3 Finder's see-through-wall heartbeat detection system can be configured and mounted on robots, drones and SWAT vehicles to enable covert human surveillance and law enforcement missions. Finder provides users with the ability to detect human targets inside buildings, tunnels, containers and in caves providing valuable situational awareness. Human heartbeat detection results are captured and displayed on the ground in real-time.

Specifications

- Easy to use, only minutes of training required
- Ultra-portable
- Fits in an airline overhead compartment
- Weatherproof
- Single operator
- Detect heartbeats/respiration through walls, caves, tunnels, rubble and more
- Quick setup, detect heartbeats on site in less than 1 minute
- Detects multiple heartbeats 20 metres away vertically and horizontally
- Graphical user interface
- Built-in GPS
- Statistical reporting
- Wi-Fi enabled

X3 FINDER LIFE DETECTION SYSTEM

The X3 Life Detection System is a heart rate and respiration detection system. With the ability to detect life signs through up to 45cm of concrete cumulatively and up to 91 metres in the open air. More importantly it does this in minutes. The X3 is used by search and rescue, emergency services and military around the world.

Applications and specifications

- Easy to use, only minutes of training required
- Ultra-portable
- Detect heartbeats/respiration through walls, mines, caves, tunnels, vehicles, rubble and more
- Quick setup, detect heartbeats on site in less than 1 minute
- Detects multiple heartbeats 20 metres away vertically and horizontally
- Fits in an airline overhead compartment
- Weatherproof
- Graphical user interface
- Built-in GPS
- Statistical reporting
- Wi-Fi enabled

Contact Jimmy Croucamp

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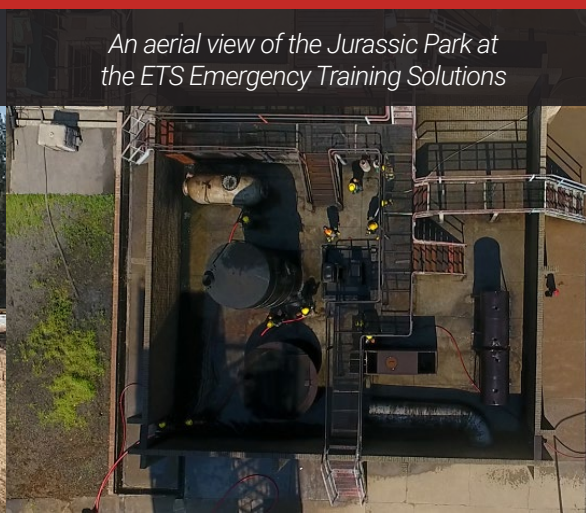
FREMTAC
FIRE AND RESCUE CC

Industrial fire fighting for on-site responders at ETS Emergency Training Solutions

Jurassic Park is a simulated industrial environment that realistically represents various parts of an industrial plant



An aerial view of the Jurassic Park at the ETS Emergency Training Solutions

Industrial fire fighting refers to the reactive measures and actions taken to contain, control and extinguish fires within the premises of manufacturing, engineering and fabrication, collecting, processing, storing, refining and mining organisations. Industry includes any organisation where a group of people come together and utilise machines and equipment to do work, eg port terminals, airport, freight rail, warehouse or printing press. Premises may include occupancies within industrial parks, factories, utilities, collection points and plants that generate electricity or process minerals or chemicals and installations which store, process or refine combustible and flammable materials.

The variety, types and size of the fire incidents that occur within industry are as varied and complex as the array of industries in existence. Fire suppression actions are more often than not performed by employees who volunteer to be trained to a suitable level and are appointed by the employer to fulfil certain expectations in terms of responding to those fires.

Fire fighting in these workplaces is part and parcel of managing fire risk. The risk of fire and explosions is common to almost all industries. There are few incidents that pose a risk to life and the workplace and impact on business continuity as profoundly as fires and explosions do. The risk of fire demands both pro-active and re-active measures to be planned and executed by trained personnel.

So where does one begin when putting together a fire fighting response strategy within an industrial setting? It is important to understand that emergency response and more specifically fire fighting, fits into a larger strategy of emergency management namely:

- Risk assessment and vulnerability studies
- Prevention measures
- Emergency planning and preparedness
- Emergency response
- Recovery and business continuity

It is incumbent on employers to assess risk and put control measures in place to prevent and mitigate the effects of those risks. Fire risk assessment is crucial in high-hazard industries and where there is extensive risk of fire and explosion. Based upon these risk assessments, a process of prevention measures and activities must be established. Emergency planning and preparedness is key and the size of the organisation as well as the hazards found within the organisation, will determine the complexity of the emergency planning and preparedness strategies.

SANS 1514:2018 Ed 1, Major hazard installation: Emergency Response planning addresses emergency planning for major hazard installations but may also be seen as a useful guideline for ordinary installations. Response strategies contained in the emergency plan should provide guidance on how fires are tackled safely by containing fire response plans. Response plans may be as uncomplicated as having trained and appointed fire fighters to extinguish small fires when it is safe to do so. An emergency plan organogram is used to identify the role players in emergency preparedness and response and would, for example, indicate the number of employees trained and appointed as basic fire fighters (incipient stage fire fighters).

Typically, the capabilities of personnel trained in basic fire fighting, extend to extinguishing small fires with portable fire extinguishers, small hand lines for water (hose reels) without ▶

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- the need to wear special personal protective equipment (PPE) other than workplace PPE. Fire fighters trained to a basic level, would not be expected to venture into smoke filled areas or to crawl in the process of approaching or extinguishing fires.

More advanced and more formalised fire fighting teams are sometimes created to fight larger fires with larger amounts of water, large diameter hose lines and possibly fire fighting foam. It is important for risk managers to impose limitations on what on-site fire fighters will respond to and how they will respond. The limits to the response of some fire fighting teams may be confined to defensive fire fighting and the cooling of exposed structures or exterior-only attacks. Specialised PPE may be required to perform these fire fighting duties safely.

An organisation that is largely independent of the services of municipal fire brigades, is most likely to follow a path of advanced training and providing advanced equipment for its fire fighting teams to perform interventions. These may include interior interventions with recognised fire fighting PPE and self-contained breathing apparatus (SCBA). Such advanced levels of response require well-established and well-planned methods of incident management, including incident action plans, procedures and operational guidelines.

Multi-disciplined on-site responders referred to as emergency response teams (ERTs) may be developed as a specialist part of the emergency plan structure to provide the organisation not only with fire fighting capabilities but also rescue, hazardous materials and medical capabilities, at least until off-site responders such as a municipal service or specialised hazmat clean up teams are able to assist.

In large organisations, with highly developed strategies, fire risk management standards and directives are often written. These seek to provide more organisation specific policies, structures and procedures. These standards and directives help to ensure the safety of fire fighting personnel and efficiency and effectiveness of emergency response management. In larger, higher risk industries, response plans may become far more complex, involving more stringent selection of fire fighting personnel, more specialised training regimes, greater numbers of specialised equipment and a documented administration system holding all of these components together.

More examples of elements of a good administration system include a written commitment by management in the form of policies or a fire fighting organisational statement. Furthermore, identification of high-risk fire 'hot spots' as identified in fire risk assessments, pre-incident plans containing strategies and tactics, identification of hazards, action plans, standard operating procedures (SOPs), suggested operating guidelines (SOGs) and site maps, serve both on-site and off-site responders well, both in terms of preparation and in the course of fire fighting operations.

NFPA 600 Standard for Facility Fire Brigades and NFPA 1600 Standard for Crisis and Emergency Management, serve as valuable guidelines in these instances.

Training and education

It is advisable that a training programme for fire team members be developed and maintained as part of the organisations administrative systems. Fire team members should receive training to establish minimum levels of proficiency as well as to safely deal with site hazards specifically encountered during fire fighting operations.

Most industrial fire teams are well equipped, possess very good plant and premises knowledge and very often have abundant access to adequate water supplies. These aspects count towards a successful response by fire teams while their biggest challenge may be that, as volunteers, they seldom respond to any emergencies, let alone fires. The potential thus for inefficiency and hazardous conditions arising at an incident due to a lack of experience is real and therefore realistic training repeated periodically is essential.

Drills

The test of an organisation's response to incidents, of which fire fighting response is often a factor, is its ability to protect its patrons and employees, its assets, the environment and in some cases, the ever-encroaching communities surrounding industries. Full and rapid recovery in terms of business continuity is directly related to the organisation's effectiveness of response. Naturally, an organisation cannot wait for a fire incident to take place in order to test the effectiveness of its response and therefore realistic, simulated incident scenarios are posed in order to assess an organisations emergency preparedness and response. Fire team drills should be conducted periodically to measure the teams' abilities against performance standards. These drill simulations should be representative of the conditions encountered at an actual fire. NFPA 600 recommends that drills be reviewed at least annually in order to establish training needs, equipment needs and the general effectiveness of the fire fighting team.

Pictured in this article is Jurassic Park at the premises of ETS Emergency Training Solutions. Jurassic Park, affectionately so named because of the fire fighting props (dinosaurs) within its walls, is a simulated industrial environment that realistically represents various parts of an industrial plant. These include transformer fires, bulk fuel storage fires and boilers and pressure vessels involved in fire. The principles of "surround and drown" fire attack, flame bending and valve isolation attack groups and fire fighting with foam can all be handled in Jurassic Park.

The training is intense and realistic and seeks to maximise the exposure that students get while wearing full PPE in a simulated industrial fire fighting interior attack. At the same time, the training aims to minimise the period of time that students are away from their workplace. Jurassic Park drills form part of the outcomes of the one-week Industrial Fire Fighting Advanced Level where students must work in teams to suppress various fires. We utilise Jurassic Park to meet the outcomes in NFPA 1001 Fire Fighter 1 and 2 successfully.

National Veld and Forest Fire Protection Advisory Forum established for South Africa

By Dale Nortje, chairperson, National Veld and Forest Fire Protection Advisory Forum

Provincial umbrella fire protection associations (UFPAs) have been established and recognised in terms of the National Veld and Forest Fire Act 101 of 1998 (NVFFA), Chapter 2 sections 9 and 10, to facilitate and coordinate fire prevention, control and suppression measures and related risks, within the respective provinces as well as within South Africa.

In order to realise this facilitation and coordination function, an advisory forum, the National Veld and Forest Fire Protection Advisory Forum (NVFFPAF), was established to ensure a coordinated approach to fire risk management in respect of integrated fire management practice throughout South Africa, in turn ensuring provincial UFPAs achieve common standards with regard to overall suppression operations, awareness, training, prevention and control. The forum will work closely with national and provincial Government structures, as well as other fire related service providers and stakeholders.

The National Veld and Forest Fire Protection Advisory Forum will also assist the Department of Forestry, Fisheries and the Environment (DFFE), the custodians of the National Veld and Forest Fire Act (NVFFA) No 101 of 1998, in the implementation and fulfilment of the Act, to enable effective implementation of integrated fire management through the formal structures of registered fire protection associations (FPAs) for the benefit of landowner members.

The forum is made up of two nominated representatives from each of the recognised provincial UFPAs, preferably the chair and vice chairpersons, as well as two representatives from the DFFE national office, as they are custodians of the Act 101. The forum elects from its members a chairperson and vice-chairperson and co-opt a secretary to become office bearers of the forum.

Main purpose and aims

The main purpose of the forum is to provide a platform for UFPA discussion and participation in integrated fire management issues that pertain to FPAs within South Africa. Some of the typical points are:

- To evaluate and monitor impacts of fire on land use and facilitate the development of appropriate measures to reduce such impacts
- Assist in the compilation of documents that provide proposals and strategic plans in respective of integrated fire management
- Share ideas and innovations that could benefit UFPAs and their member FPAs, such as evaluating and guiding implementation of veld and forest fire information and management systems and operating procedures, relative to their duties and obligation.
- Facilitate the overall strategic direction and planning in respect of UFPAs.

Some of the aims of the forum are to:

- To facilitate guiding principles with common FPA stakeholders at provincial and national levels
- To align advocacy and awareness programmes nationally
- To support and contribute to continuous development of national competencies and training
- To take a leading role in influencing all public and private entities, whose decision making processes affect the risk to life and property, as a result of veld and forest fires
- To develop trust amongst all UFPAs, FPAs and all the role players and stakeholders and to promote cooperative governance by stakeholders and relevant authorities
- To lobby for funding for the implementation of integrated fire management by UFPAs and their affiliated FPAs.

Some members of the recently formed NVFFPAF in Stellenbosch in 2020

Members of the forum also serve on the National Fire Workgroup of DFFE, where common issues relating to integrated fire management are discussed and actions implemented to try resolve such issues.

The forum's chairperson is Dale Nortje, manager at Winelands FPA and vice chair of the Western Cape UFPA and the vice chair is Simon Thomas, operations manager at the KwaZulu-Natal Umbrella FPA. Both serve on the Working on Fire (WoF) Oversight Committee. Secretary of the forum is Maritza Swanepoel of Letaba FPA.

FireWeb Incident Management software system implemented at KwaZulu-Natal Fire Protection Association

The KZNFPA currently has 24 affiliated FPAs in the province covering just over 6,5 million hectares and incorporating in excess of 3 500 members in total

The KwaZulu-Natal Fire Protection Association (KZNFPA) is based at the Shafton Airstrip in the Karkloof, outside Howick in KwaZulu-Natal, South Africa and has recently installed the FireWeb information, incident and communications system in order to coordinate, manage and synchronise incident information, resources and reports.

The KZNFPA currently has 24 affiliated FPAs in the province covering just over 6,5 million hectares and incorporating in excess of 3 500 members (landowners) in total. The primary airbases where the KZNFPA is operationally involved are Shafton in the Karkloof, Riverdale in Richmond, Weza in Harding, Kwambonambi and Melmoth. The above airbases support on average eight single engine air tankers (SEATs), five spotter aircraft and two helicopters. The Shafton airstrip also hosts the provincial Working on Fire (WoF) helicopter and spotter.

FireWeb is a mature web-based information, incident and communications tool, tailor made for fire and rescue services with users on the ground throughout South Africa and more recently within the United States of America and has utilised successfully in national, provincial, district and local government as well as in the private sector. Their product team consists of individuals from within the fire services and technical members with well over a decade of experience working with fire services and has spent over 10 000 hours gaining insight and performing user research into the challenges faced by our end-users in field and on the ground on a daily basis.

The KwaZulu-Natal Fire Protection Association (FPA), as the umbrella FPA for the KwaZulu-Natal Province in South Africa, is mandated to produce statistics for the National Department of Forestry, Fisheries and the Environment (DFFE). Various platforms such as the Fire Information Management System (FIMS), which was designed by the KZNFPA in conjunction with Alan Richert, a private IT consultant, have been used over the past few years to gather statistics. Unfortunately, the programmes were not web-based and as such, manual reports had to be

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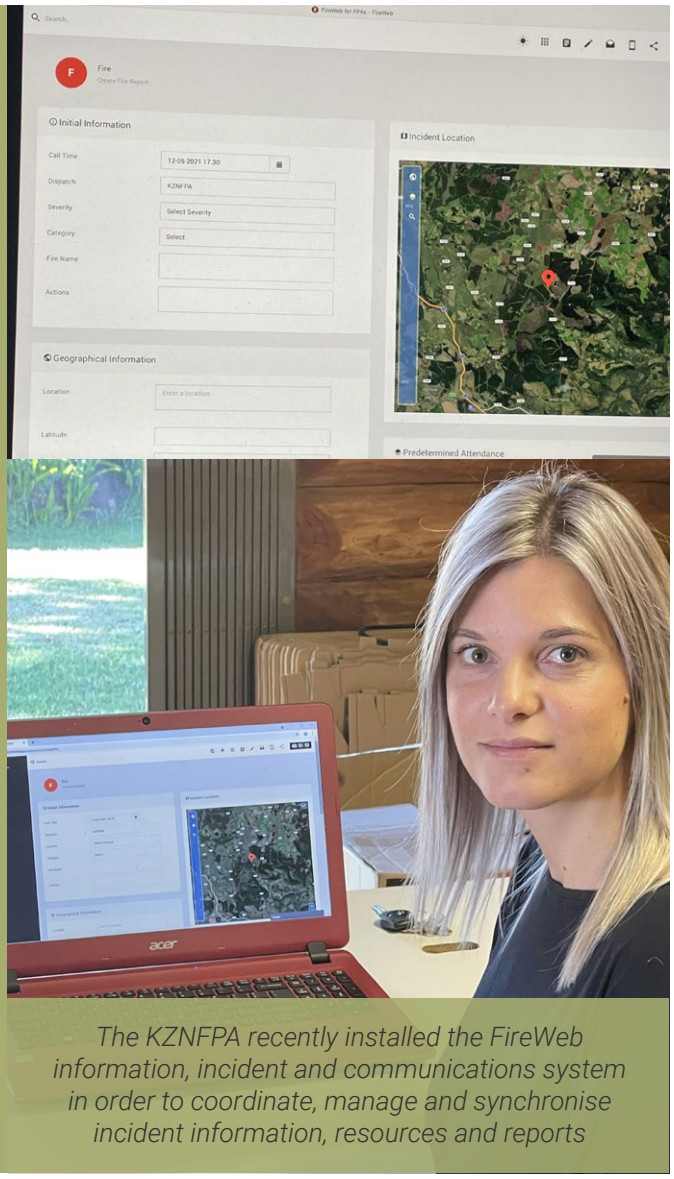


The KZNFPA recently installed the FireWeb information, incident and communications system in order to coordinate, manage and synchronise incident information, resources and reports

- generated by the three FPAs in the Province currently using FIMS in order for the umbrella FPA to combine and create a report. A very simple Excel spreadsheet was also used to generate a weekly report by all FPAs in the Province to enable the KwaZulu-Natal Umbrella FPA to manually create the weekly report, which is then submitted to DFFE, Cooperative Governance and Traditional Affairs (CoGTA), etc. "All in all a very cumbersome exercise," said Simon Thomas, operations manager and fire protection officer at the KwaZulu-Natal Fire Protection Association.

For many years, there have been attempts to create one standard reporting web-based programme for fire statistics but this has never really taken momentum.

"When I first had insight into FireWeb, I immediately saw this as the solution to the above requirement and we started investigating the programme to see whether it would fulfil our needs, at least in the KZN FPA. As such, FireWeb was approached to present what was achievable and what they would be able to do to fulfil our requirements remembering that in KZN we have aviation, detection and then our other FPAs not involved in the aforementioned", added Thomas. He continued, "They were able to present solutions to our requirements and as such the KZN FPA was mandated to go ahead and implement the FireWeb system for the corporate growers to start with. Two major timber growers in the region are now on board with others soon to follow. KZN FPA holds the parent license with the corporates and at present we have child licenses with Zululand FPA and Zululand Inland FPA with the aim of the other FPAs eventually coming on board holding the additional child licences for the application."

We asked Thomas what features of FireWeb made him choose it for the KZN FPA, to which he replied, "We chose FireWeb because of its ability to generate comprehensive fire reports for all fire incidents. Added to that, it's able to interface at a company level with the GIS database and FireWeb's ability to create a movement of resources thus enabling us to include aircraft movement for the relevant member to see. Strict security settings will only allow certain tiers of members within a particular organisation to view information. It also integrates fire reporting from detection centres and integrates with Vital Fire Weather to keep current FDIs during events as live as possible."

"For administration, historic data of incidents in excess of 18 000 plus fire data from FIMS has been incorporated into FireWeb allowing for some really comprehensive reports and trends to be generated. For dispatch, aerial support and reporting, the immediate capturing of aircraft movement for all to see on the incident is now possible. Added to this, for resource management, the incident commander is able to see either on his laptop or on the phone app what resources are at the incident. Vehicle movement of other available resources can be monitored in a single place."

The FPAs in the province are now able to report all of their members and smaller members' incidents on the system. Using the App, small growers and other members can record their incidents for uploading onto the system once in data cover."

"Risk management, such as vulnerable areas risk maps, can be integrated with the system. Post fire debriefs and investigation reports are uploaded to the incident and as such trends can be plotted for future risk mapping. Burn scars etc pictures can be uploaded to an incident using your smartphone camera. Any voice notes can be uploaded and using the mobile application, burn scars can be plotted and uploaded," said Thomas.

Benefits to FPAs

Incident reporting

- FireWeb has an integrated mapping solution, bringing the power of own GIS systems into the dispatch and reporting function. This allows for the grouping of all incident information on a single record, multi-day fires included.
- Occurrence book entries, media such as photos, videos and voice notes as well as polygons and attachments

all archived with the incident for audit purpose.
- When populated correctly, FireWeb serves as a powerful statistics database allowing for a wide variety of reports ranging from incident hotspot reports through to trend analysis reports.

Resource logs
- As the FPA, you are now able to manage all your different resources (either owned, or contracted) from an aerial and ground resource perspective
- Generate performance reports on your resources and associated drivers and/or pilots
- Export log book entries for a period or resource (or further based on criteria entered)
- Analyse per incident, per region, per dispatcher, per dispatch centre, per season etc
- Allocate tariffs and perform real-time cost estimates for incidents from a manpower, aviation and vehicle perspective.
- Link FPA responses to a member fire, saving time in populating that data a second time (for the member)

Service providers
All service providers either use FireWeb via their FPA or have their own installation allowing for free flow sharing of incident resource information from a ground and aerial perspective. This prevents duplicate capturing of information and has major time saving benefits for all involved parties relying on the accurate capturing of the various service providers.

Collation of data
If integrated with others such as other FPAs, umbrella FPA etc, FireWeb automatically serves as a data submission tool, no more need for email or upload into another system and collates the information across the board into automated statistics reports for all of the above areas ie incidents, resources, logs etc. Member report submission can be automated, no longer needing to collate additional fire reports as submitted on interval based submissions.

Ease of access
Use advanced search tools for find information/incident reports by a variety of criteria ranging from area, dispatcher, dispatch centre, vehicles, aircraft, personnel etc.

Live chat
Live chat with service providers, other dispatch centres, other services using the same product as well as members.

Benefits to members

Mobile application
FireWeb has a mobile reporting application which enables foresters and other members to capture their incidents / fire (emergency and controlled) with information such as: description, location, time, photos, videos, voice notes, polygons with estimated hectares/ metres and additional reporting meta required.

FireWeb has successfully and will integrate with FireHawk with detections feeding through into the mobile application and online. It converts a detection event into an incident and later link FPA movement reports if needed.

Compile national fire statistics reports
FireWeb has included the national fire statistics report that each member is required to complete. This can be completed after initiated either online or via the mobile application. Integrations with GIS tools make completing the report easier as there is access to fuel load information (if shared confidentially), age, species etc. Now there is a single point of entry for all information (as opposed to word documents or spreadsheets), then re-calculated to generate a fire register and re-calculated for costing etc. The system includes tracking of incident costing based on own tariffs ie per km for vehicles by type, by hour per role; personnel and by aircraft per hour.

The FireWeb system offers major time saving in collecting captain's logs, route forms and other FPA supporting documentation as the incident is simply linked and allows for the uploading of all supporting evidence for inclusion in reporting or for audit queries ie insurance etc.

Generate standard reports from source
The standard reports are branded in PDF format and are generated on request as needed.

FireWeb has been implemented in preparation for the upcoming fire season and will assist the KZNFPA with its management.

Locally produced compressed foam system (CAFS) offers huge advantage to fire fighting efforts

The Anco CAFS300 compressed air foam system (CAFS)

Locally designed and produced by Anco Manufacturing, the Anco CAFS300 compressed air foam system (CAFS) offers the South African fire fighting fraternity an ideal fire fighting tool in their arsenal to fight forest and wild fires. The team at Anco Manufacturing, a specialist manufacturer and supplier of fire fighting equipment since 2001, adapted existing technology into an easy to use but very effective, 100 percent South African mini CAFS system.

Although the Anco CAFS300 is one of the most recent developments from Anco, the company continues to design, develop and produce a wide range of fire fighting vehicles and equipment based on technology that has been tried, tested and working in harsh African conditions.

CAFS is a system used in fire fighting to deliver fire retardant foam onto a fire. A CAF system uses a Class A or B foam concentrate combined with water and compressed air to create a continuous supply of fire extinguishing foam that has greater fire fighting ability than the sum of its parts and has proven to be a superior fire fighting medium compared to water only.

When used as a fire fighting agent, a steady stream of compressed air foam has a very high heat absorption quality, almost ten times that of water that will suppress a fire in a fraction of the time when compared to conventional water.

This is due to the fact that CAFS attack and work on all three elements of the fire-triangle by penetrating carbon based fuel loads, depriving the fire of oxygen and absorbing heat. CAFS is one of the most effective methods to suppress fires and has been in use for many years in fighting virtually all types of fires and is considered an excellent force multiplier in fire fighting situations. Similar systems are currently used by US, European and Australian fire fighting agencies with great success.

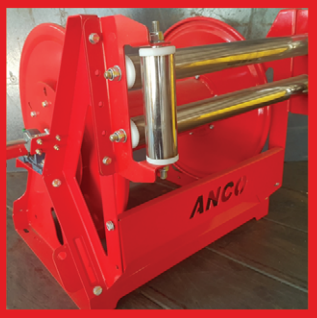
"Traditional CAFS units have been available from the USA and Europe for many years but in our typical South African way we had to respond to continued demands from the local industry to come up with an effective, locally produced and more affordable system. Producing the unit locally not only allows for a reduction in cost compared to imported units but also allows us to offer better after-sales support" says André Scheepers, managing director of Anco Manufacturing and chief designer on the Anco CAFS300 project.

The Anco CAFS300 is a self-contained CAFS generator that can be installed onto almost any fire fighting vehicle platform, even onto a standard LWB bakkie. According to Scheepers, "The benefits of the system lies in the fact that traditional water carrying vehicles can be retro fitted with the system or installed as part of the design and will effectively multiply the usable water load by up to ten times."

Many hours of development, pre-production experimentation, burn testing and real-life deployments have enabled the Anco team to offer another tried and tested product that will assist the South African fire fighter in dealing with the huge challenges they face every day.

Anco are also suppliers of traditional fire fighting vehicles such as their 10-seater, 4 500-litre, forestry fire fighting vehicle with a wet-end body, bakkie sakkies ranging from high pressure/medium to low volume as well as low pressure/high volume units, fire pumps, fire fighting trailers and fire fighting equipment including hoses, reels, nozzles, couplers, fittings etc.

Specialist manufacturer and supplier of fire fighting equipment since 2001



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ANCO has been established as a leader in quality innovative products in the forestry and agricultural industries offering products and services specifically designed for harsh African conditions.

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Ponsse introduces fire fighting equipment for forwarders with a 47-metre reach in rugged terrain

The Ponsse forwarder-mounted fire suppression system for rugged terrain

Finnish-based Ponsse has designed and manufactured a forwarder-mounted fire suppression device that utilises the excellent terrain travel ability and powerful hydraulics of a Ponsse forwarder. Design has been done in close cooperation with the local department of emergency services. The idea is to use a very capable forwarder to fight the challenging forest fires in difficult terrain where other normal fire fighting equipment can't reach.

A water reservoir and pump unit are lifted on the load space with forwarder's own loader and fastened securely. Electric and hydraulic quick-couplings are connected and the machine is ready to work.

A fire fighter can use the equipment with a remote control while the forwarder operator focuses only in driving the machine, communicating with the fire staff with a radiophone. The equipment allows simultaneous use of monitor and free hand held fire fighting hose. The equipment is connected to the base machine with electric and hydraulic connectors and can be done in 15 minutes.

Ponsse has an option to order new forwarders as fire fighting ready so the actual equipment can be ordered at a later stage. An Installation kit can also be acquired for existing machines through Ponsse spare parts.

The tank has a capacity of 10 000 litres and it's built lightweight so that it's possible to lift into the load space with the loader crane of the forwarder. The tank is made out of aluminium for large capacity in light weight but still strong enough. There are reinforcement/ baffle plates inside the tank to support the structure and prevent water from moving around when driving in uneven terrain. The aluminium structure withstands well the different chemicals mixed in the water for fire extinguishing purposes. The water refill hose is lead into an opening in the right side of tank top which has a steel mesh for screening out thrash and keeping the water clean that enters the tank.

A powerful monitor is fitted that is fed by a powerful Reini centrifugal spray pump with a maximum flow of 950L/min with a maximum pressure of 14bar.

The spray pump is corrosion resistant and would withstand corrosion even when using sea water. Directing the monitor's direction, spray height and the spray nozzle is all adjusted hydraulically by the hand held remote control. The powerful monitor can spray up to 47 metres depending on the nozzle setting of the spray monitor.

Filling the water reservoir takes approximately seven minutes with a flow rate of 3 000L/min for refilling. The pump is powered by the base machine working hydraulic and the filling pump has a lifting bar so the loader grapple can lift and lower it into the water. The refill pump is also insensitive for impurities so that mud, sand or other matters will not damage the pump internals. It can replenish itself from a pond, river, tanker or another fire truck.

"Forest machines are the most natural and effective way to access a forest fire area. Operations in difficult terrain come as second nature to them and they have more than enough capacity in their hydraulic system for demanding conditions", says Juha Haverinen, Ponsse´s product manager of forwarders. " When the rescue authorities asked us if we were willing to develop this product together, we were ready right from the beginning because rescue professionals and our customers had a clear demand for fire fighting equipment", Juha added.

Ponsse forwarders and fire fighting systems are available locally in South Africa from MTS Parts.

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FOR RUGGED TERRAIN

Dimensions: length 5 150mm,
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The effective incident management team during wildfires

By Michelle Kleinhans, Dynamic Incident Management

Effective incident management teams (IMTs) are the foundation of every successful management of any wildland fire or other related incidents or events

Heard the phrase, "Do you have an effective team?" Does your jurisdiction have an effective and efficient incident management team? Are they trained and qualified incident command system team members? Does your jurisdiction follow the incident command system standardisation or follow their own?

Effective incident management teams (IMTs) are the foundation of every successful management of any wildland fire or other related incidents or events. An effective IMT is a team in which each member brings his or her knowledge and skills to the table, which contribute to the overall success of the management of the incident and the resources as one team with one plan.

An incident management team is deployed to manage the logistical, fiscal, planning, operational, safety and community issues related to the wildfires and provides the command and control infrastructure that is required to safely, effectively, efficiently and with an integrated coordinated effort manage the wildfire incident from beginning to end.

It is important to understand that an incident management team will require delegation of authority that includes scope of authority to manage the wildfire on behalf of an agency, organisation or landowner. The incident is not the incident management team's incident; no, they work for the relevant landowner due to their skills, knowledge and experience in managing of wildfires or other related incidents.

What is an effective and efficient incident management team (IMT)?

An incident management team (IMT) is described as "A team of functional personnel that provides on-scene incident management support during wildfires that exceed a jurisdiction's or agency's capability or capacity, thus integrating the incident management system.

A well-developed team comprise of at least three functional levels deep in; the incident commander, command and general staff positions and the important unit level positions within the incident command system structure required to management the incident.

The idea is to put together a trained, qualified and skilled group of people in a specific position,

A well-developed team comprise of at least three functional levels deep in; the incident commander, command and general staff positions and the important unit level positions within the ICS structure

BEYOND FIRST RESPONSE

Dynamic Incident Management is a LG SETA accredited Training Service Provider and specialise in Integrated Incident/Event Management.

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- that can respond to any incident or emergency anywhere in the country to help manage the incident that continue throughout multiple days on behalf of an organisation, province or country. These teams typically have 10 to 20 trained, qualified and skilled personnel available for deployment.

Developing an incident management team is not an easy task. It requires a lot of work, commitment and passion, standard operating procedures, alerting and deployment protocols and constant recruitment and training of members is but the beginning of setting up an effective IMT for the country or jurisdiction.

Standardisation is the key concept for an effective incident management team, instead of each team doing it because "they want to do it". We will certainly not be able to adopt a national standard until we all agree where we want the standard to take us in developing, maintaining and deploying Incident management teams within South Africa.

Team members should complete certain fundamental and functional ICS courses; take a position specific course of one or more of the various positions within the ICS structure to form a team or to be considered for recruitment within an IMT. Jurisdictions and agencies should avoid forming IMTs that are not qualified or not working according to National Standards and protocols including the use of national and possibly international ICS documentation to develop the incident action plans during incidents.

Incident management team members should:

- Understand that accountability comes with each position, especially the incident commander or unified commanders
- Provide a strategic, well developed plan of action
- Provide clear objectives
- Have a defined integrated structure, use common terminology and ICS standardisation
- Follow a proper planning process and tracking of resources
- Proper briefing sessions to all resources
- Complete incident action plans per operational period in the incident documentation pack for handover to owner of incident
- Regularly be part of refresher training and simulated exercises

Not all agencies/organisations feel comfortable asking for an IMT to manage an incident on their behalf, especially if they are not used or familiar with an incident management team and their operations.

To ease this feeling, they should remember that the jurisdiction always remains in charge and that the IMT works for the agency administrator that provides the IMT with a delegation of authority outlining the expectations, clear mission and assignment and outcomes to the incident management team incident commander and staff and all incident documentation stays the property of the relevant jurisdiction.

Think of this when building an effective team!

- Must have a qualified incident commander and staff members
- Must have clear objectives
- Requires balanced skills, roles and responsibilities to achieve overall objectives
- Implement effective ICS processes, effective information systems and coordination of resources
- Provide good communication across the team and for the community
- Follow appropriate trusted leadership
- Pledge support and trust by listening and giving support
- Conduct openness and conflict management professionally
- Always insist on mutual cooperation
- Ensure individual development
- Work towards sound inter-group relations and respect for each other
- Seek regular performance and goals review as a team member

Now ask the question again, "Do you have an effective team?" If you do not have an effective team, we do! Contact us for our team assistance or for training your own team.

Do you have an effective team?

Standardisation is the key concept for an effective incident management team

Command Corner: Leader's intent

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

Leader's intent is a crucial element of effective operations and is a clear, concise statement about what people must do to succeed in their assignments

Tim Murphy

In fast-moving, dynamic situations, top-level decision-makers cannot always incorporate new information into a formal planning process and redirect people to action within a reasonable timeframe. Incident commanders provide leader's intent so people closest to the scene of action can adapt plans and exercise initiative to accomplish the objective when unanticipated opportunities arise or when the original plan no longer suffices. Leader's intent is a crucial element of effective operations because it reduces internal friction and empowers subordinates, even when chaotic conditions prevent the chain of command from communicating effectively.

Leader's intent is a clear, concise statement about what people must do to succeed in their assignments. It delineates three essential components:

1. Task: the objective or goal of the assignment.
2. Purpose: why the assignment needs to be done.
3. End state: how the situation should look when the assignment is successfully completed.

Within the framework of the defined end state, leaders can develop plans that include incident objectives, priorities, strategies, trigger points and contingency plans.

Food for thought, discussion points:
Think about how you were most recently provided leader's intent.

Describe a situation where leader's intent was utilised to adapt and achieve the desired end state.

Describe a situation where leader's intent was not clear. Discuss how to gain leader's intent if it is not initially provided.

Firebreaks: A matter of terminology?

By Tiaan Pool, lecturer, Wildfire Management, School of Natural Resource Science and Management, Faculty of Science, Nelson Mandela University George Campus

Figure 1: Boundary fire belts

Chapter four of the National Veld and Forest Fire Act (Act 101 of 1998) places a duty on landowners to prepare and maintain firebreaks. Firebreak terminology can, however, sometimes become a bit murky. Part of this confusion is not knowing how to refer to the different types of firebreaks. Terms like internal and external fire belts, trace belts, control lines and buffer zones are often used loosely. This often leads to misinterpretations about which of these structures are referred to if the term firebreak is generally used as a descriptor. This article will therefore make effort to distinguish and describe different firebreak infrastructure.

It should be kept in mind that when the legislator uses the term "firebreak", the intention is clearly to inform and regulate the construction of firebreaks on the boundaries between different properties and does not make reference to any other firebreak infrastructure that might exist on a property. The following requirements for these boundary firebreaks are further stipulated as follows:

- It must be wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land
- It does not cause soil erosion
- It is reasonably free of inflammable material capable of carrying a veldfire across.

From this requirement set it is clear that a firebreak refers to infrastructure that will cause a break or gap in fuels that can carry fire from one property into the neighbouring property. It can therefore further be concluded that every time such a gap is encountered in vegetation, be it a planned or unplanned, natural or man-made, one can refer to it as a firebreak. Examples of different firebreaks are therefore fire belts, trace belts, control lines and buffer zones, roads, water bodies, ploughed fields, footpaths, indigenous forests and more.

It is thus justifiable to ask the question, "What are the differences, purposes and requirements for different types firebreaks?" Following this question, different firebreaks will therefore be discussed.

External (boundary) fire belts

Boundary firebreaks are fire belts constructed on the boundary of a property. These belts are required by law and if they are not constructed or constructed in a way that does not meet the requirements stipulated in the Act, the landowner can face civil charges. A civil charge can lead to a fine or jail sentence and is issued by the local authority that has jurisdiction in the area. If a fire crosses from the property of such an owner (without a legal boundary fire belt) and causes damage to a neighbouring property, the guilty landowner will be liable for the damages on his/her neighbours property and can face criminal charges.

The purposes of a boundary fire belt should be to:

- Prevent the spread of fires across property boundaries
- Serve as point to attack an approaching fire by starting a counter fire or back-burn
- Defend a property from an approaching fire by extinguishing it at the belt
- Provide vehicles and staff easy access to a fire.

Boundary belts from adjoining neighbours are shown in Figure 1. Width of boundary fire belts are often debated as the requirements in the Act don't specify a precise width. The width of a boundary belt is therefore left to the judgement of the "reasonable person".

A reasonable person should take the following factors into account before deciding on the width of a fire belt:

Figure 2: Road made more effective to serve as internal fire belt

Topography: The steeper the slope, the wider the belt should be, as fires spread faster upslope. On northerly and westerly aspects, belts should also be wider as these aspects are dryer and warmer and will support more intense fire behaviour.

Vegetation type: Vegetation characteristics such as flammability, height of vegetation and fuel load (tons of fuel per hectare) should be considered, as different types of fuel can cause more intense fires with taller flames that can cause spot fires.

Weather patterns: The boundaries of the properties facing the dominant wind direction in the region should have a wider belt, as fires will approach the property from that side. In South Africa, the dominant fire-wind direction is usually north-west.

Environmental considerations: Where fire belts can cause negative environmental impacts like erosion and wetland destruction, it might be necessary to limit the width of belts and strengthen the belts by making use of alternative preparation methods.

Proximity of barriers: If a natural or man-made barrier like a water body or a road borders the boundary of a property, it can be included into the width of the boundary fire belt.

High risk areas: If a property is bordering on an area with a known history of regular unplanned fires, landowners should increase the width of boundary belts facing the risk.

Fire protection associations (FPAs) in a region represent the "reasonable person" of the region and often provide guidelines regarding minimum fire belt widths. By-laws of local authorities pertaining fire belt widths and the guidelines of the local FPA should conform.

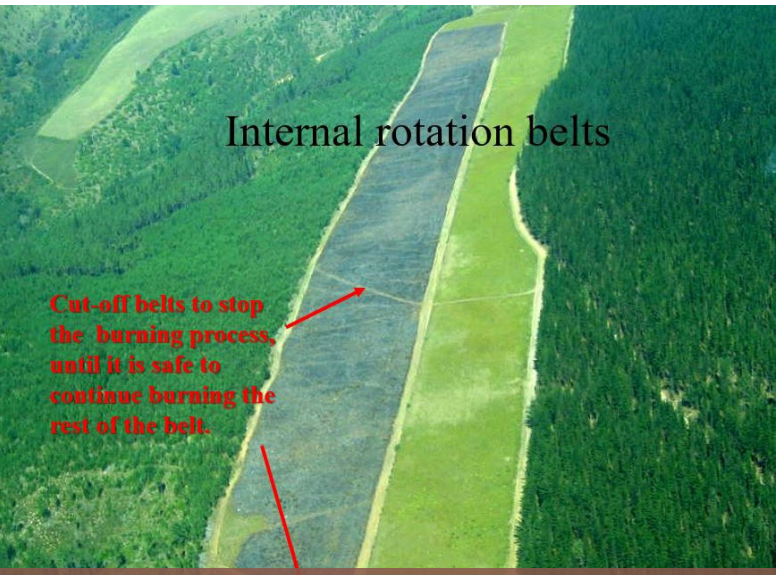


Figure 3: Rotation internal fire belt

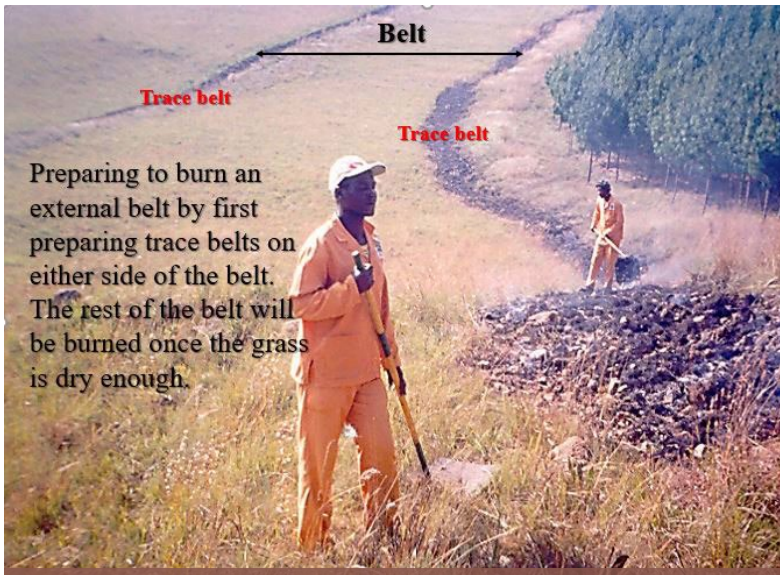


Figure 4: Trace belts prepared through burning

Internal fire belts

Internal fire belts are not required by law. They, however, serve same general purposes as external fire belts. In addition, internal fire belts should be designed to divide a property into smaller units. These units are typically between 250ha to 400ha in size and aim to restrict unwanted fires on the property. This practice will limit the losses caused by unwanted fires to a smaller area of the property. A stock farmer with internal fire belts should therefore not lose all his/her grazing in a single fire.

Areas on properties that are typically maintained as internal belts include conservation areas, riparian zones, main roads, unproductive portions of the estate, power/telephone lines as well as railway lines. Infrastructure like roads are often made more effective by cleaning the shoulders of roads (Figure 2).

In cases of sensitive vegetation, rotation belts are constructed and alternative parts of the belt prepared in different years (Figure 3). A negative aspect of rotational belts is that a lot of area is sacrificed to make provision for more than one belt.

Trace belt

Trace belts are prepared to facilitate the safe burning of fire belts or burning of blocks of vegetation. Trace belts are narrow belts prepared all along the perimeter of an area that needs to be burned at a later stage. Once favourable conditions for the planned burn exist, the trace burns are used as a starting point for ignitions. As general rule, trace belts are the same width as the height of vegetation. Against slopes, the top trace belt should be two to four times wider that the vegetation height to prevent the planned fire from jumping over the trace. In Figure 4 trace belts are prepared by burning. In Figure 5 a block burn is executed by igniting the fire against a trace belt prepared by mowing/slashing some grass.

Control line

Control lines are firebreaks constructed at fires. These lines are usually constructed while the fire might still be actively burning. While some fire fighters are busy knocking down the flames of the burning fire, others start to construct a control line around the perimeter of the fire. Construction of the control line usually takes place in the areas where the flames have been extinguished. The purpose of these lines are to separate the burnt from the unburnt area. Once a control line has been completed, it should cover the whole perimeter of the burnt area. It is only then that it can be reported that the fire has been 'controlled'. The area where the fire was burning/is still burning, is now contained by the control line. Control line construction is considered as part of the mop-up operation and should be carefully supervised. Where practical, existing firebreaks like fire belts, roads, streams etc, can be used as a control line. This will cut down on the time it takes to construct a control line. If an existing firebreak is close to the perimeter of the fire, it might be necessary to allow the area between the firebreak and the fire perimeter to burn out in order to use it as a control line. The unburnt fuel between a firebreak and the perimeter of a fire is often burned out as part of the control line construction process.

The following important guidelines should be considered when constructing a control line:

- Care should be taken that fire fighters constructing the control line don't deposit smouldering material from the burned area in the unburnt area
- Areas in the burning area that are close to the perimeter of the fire that are still burning or contain very hot smouldering fuels (hot spots in the burned area), justify a wider control line
- If there are unburned hazardous fuels outside of the burned area, it justifies a wider control line
- If the fire in the burned area is still 'hot', fire fighters should patrol the control line (Figure 6)

- As soon as more manpower becomes available, the control line should be strengthened by making it wider
- A control line should be cleared to mineral soil
- Control lines should not be constructed in sensitive areas where damage to the environment is caused
- Control lines should be rehabilitated if it lead to damage in the environment (like erosion)
- If bad weather is predicted the day/days following the fire, the control line should be strengthened
- One of the most basic errors made by fire managers are to depart from a burned fire scene once the flames have been extinguished but before control line construction has been completed. Many cases of fires that have re-ignited in the absence of a control line have been recorded. These fires often cause more damage than the initial fire.

Figure 5: Trace belts prepared through mowing of grass

The same guidelines to determine the width of trace belts should be followed when constructing a control line. A control line should, however, always be wider at the head (down-wind) of the fire than at the rear of the fire.

Buffer zone

A buffer zone is not a long narrow strip like a fire belt but rather a big area or block of vegetation where fuels have been managed. The aim in creating a buffer zone is not to create an area that is devoid of all burnable vegetation but rather an area where high-intensity fuel management is practiced. This will create an area that, should a fire burn in the area, vegetation in the area will not support intensive burning. A fire burning in a buffer zone will therefore not spread so fast or burn as so intense and will have shorter flames. Under these altered fuel conditions, it should be possible for fire managers to fight a fire in this zone regardless the weather conditions.

Examples of buffer zones can be a natural feature like an indigenous forest or waterbodies or a manmade zone like an area where the fuels are slashed, burned or ▸

Figure 6: Hot control line (control line where the fire is still actively burning).

Figure 7: Block burn of mountain serving as a buffer zone

- ploughed. In Figure 7, a block burn has been completed that will serve as buffer between a commercial plantation and its northern boundary.

  Buffer zones are often located next to fire belts to strengthen a fire belt that might not be wide enough to stop an intense fire from crossing (Figure 8). In addition, a buffer zone can be created by allowing intensive grazing in certain areas by cattle or to practice under-burning, a practice where foresters select suitable weather conditions to apply a low intensity fire under their trees that will consume all the fine surface fuels but not kill the trees.

  There are no specific requirements for buffer zones other than the judgement of the landowner. As guidelines, the following can be considered:
  - Cost benefit of spending extra money to prepare a buffer zone
  - Suitable location (topography and fuel conditions) that will make a buffer zone effective
  - Historic risk of an area (high risk justifies the construction of a buffer zone)
  - Ease and cost of maintenance of buffer zone
  - Environmental impact caused by creating a buffer zone.

  In follow-up articles, effective placement and preparation methods of firebreaks will be discussed.

  In conclusion, it is safe to say that a firebreak is not just a firebreak but serves a specific purpose. Fire managers should therefore first consider the purpose of a break and then construct the appropriate infrastructure to satisfy the purpose. It is also important to use the correct terminology to refer to different types of firebreaks to prevent confusion. Identifying and referring to specific firebreaks will assist managers to formulate better guideline criteria when constructing them.

Figure 8: Buffer zone created by brush cutting next to a fire belt protecting a homestead

The Garden Route in flames:
Chapter IV - Assessing the fuel status of the region after the 2017 and 2018 wildfires

A book by Dr Neels de Ronde

The following article is the forth in the series of excerpts from a book written by Dr Neels de Ronde, The Garden Route in flames. Dr de Ronde lives in Sedgefield in the Southern Cape, South Africa and has done extensive research in the field of land management and wildfire prevention. Dr de Ronde gave permission to Fire and Rescue International to publish the 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.

Photograph 12: Picture taken of pine plantations, only hours after a wildfire spread through the area (somewhere in Mpumalanga, South Africa). Note damage categories: 1 = Crown fire with complete crown needle consumption, 2 = Complete crown scorch and 3 = Partly-scorched needle from the tree crowns, top crown still alive (courtesy Working on Fire).

4.1 Introduction to fuel dynamics

For optimum understanding of fuel dynamics, I will be using the list of fuel parameters used for the Input required for the BehavePlus 2-D fire simulation program (Andrews, 1986; Andres and Chase, 1986 and Burgan and Rothermel, 1984), which can be summarised as follows:

Description of fuel
1 hour fuel load (tons/ha)
10 hour fuel load (tons/ha)
100 hour fuel load (tons/ha)
Live herb fuel load (tons/ha)
Live woody fuel load (tons/ha)

1 hour (SAV)*
Live herb (SAV)*
Live woody (SAV)*
*SAV=Surface-to-volume ratio (square metre per cubic metre)

Fuel depth (m)
Fuel moisture extinction (percentage)
Dead fuel heat content (kilojoules per kilogram)
Live fuel heat content (kilojoules per kilogram)

The vegetation and/or fuel classification selected to be the optimum representative for a specific regions' individual fuel models, have to be developed and tested using a site-specific input for BehavePlus runs, to arrive at a representative fuel model set for a region. More about the fuel modelling development and testing processes later in this handbook.

There are two main fuel classes:
- Fine fuels (or 1 hour fuels, see above): Grass, small branches, pine needles and leaves with a diameter of up to 6mm. They dry very fast and need little heat to ignite. They are well aerated, they will burn rapidly but if they are compacted, they can burn very slowly.
- Coarse fuel (>1 hour fuels, see above): Thicker branches, logs and stumps. The fuels dry slowly and require more heat to ignite but once burning, will continue to burn (or glow) for extended periods of time.

4.2 Considering fire dynamics

Rate of spread of a fire

This is normally expressed in metres per minute or km/hr (in fast fire spread studies, such as fast-moving head fires in grasslands). Fast rates of spread can many times lead up to spotting, particularly if a fire is spreading uphill.

Flame length and flame height

In the absence of wind and slope, flame length and flame height are equal but wind and/or slope have the effect of tilting the flame towards the unburned fuel and thereby reducing flame height, while flame length remains unaffected. Flame height is another one of the four main fire parameters to be considered (Andrews, 1986) and is an important parameter for predicting the height of crown scorch in the canopy of trees. ▸

Fire intensity parameters

The two most important ways to express fire intensity (kW/m or kJ/s/m) and heat per unit area (kJ/m2). Fire line intensity can be regarded as the heat released per second from a metre-wide section of the fuel extending from the front to the rear of the flaming zone (Byram, 1959) and is equal to the rate of spread of the fire front (Trollope, 1983; Trollope, et al., 2004)

Torching, scorching and spotting

Torching occurs when individual trees are ignited but there is insufficient wind to sustain a crown fire. A torching tree may give rise to burning embers being lifted straight up and then carried away by the prevailing wind to start spotting fires elsewhere.

Scorching: This is when tree needles or leaves in tree crowns die as a result of heat radiated from the flames of a surface fire. Scorch height is the height to which scorching (not fuel consumption) occurs in tree crowns, vertically measured from the soil or forest floor surface.

Spotting: This is one of the most dangerous characteristics of major wildfires in terms of fire suppression. In the case of long distance spotting, burning embers are carried several kilometres from the main fire front, to ignite new fires far ahead from the main burning fires.

4.3 Introducing the assessment procedures

This process consists of two phases, namely:

1. Assessing the present fuel/ vegetation status after the two wildfires
2. Extrapolating the results from the above to predicted 'first burnable' status.

The present status, during say 2020, can be best assessed from photographs taken from the representative fuel/vegetation status of the region, which can best be subdivided in the Garden Route region under the following sub-headings:

A. Burned over by the 2017 and 2018 wildfires:
a. Old fynbos
b. Pine plantations
c. Coastal sand dunes, mostly covered by fynbos with dominantly infested Acacia.

B. Not burned over by the 2017 and 2018 wildfires:
a. Old fynbos (mountains and foothills)
b. Mature pine plantations
c. Younger pine plantations, with prominent forest floor vegetation cover
d. Coastal sand dunes, mostly covered by fynbos infested with Acaci.
e. Sand dunes, covered by mature, natural (coastal) fynbos.

4.4 The fuel model base to be developed

The fuel/vegetation assessment phase only has to be applied at this stage (2020) to the regional areas NOT burned over by the 2017 and 2018 wildfires, thus not in the three categories provided above under (A), namely old fynbos, pine plantations and coastal sand dune vegetation. To avoid the regional plan-users/developers having to go through a comprehensive learning curve of fuel model development and testing at this point in time, as well as to avoid the use of the BehavePlus fire behaviour

Fuel model parameter	Old (senescent) fynbos S. Asp (tons/ha)	Mature pine spp (mostly P. rad.)	Younger pine spp. 11 – 15yrs	Coastal fynbos infested with Ac.	Coastal fynbos un-infested
1hr fuel load	10.4	6.0	6.0	13.0	12.0
10h fuel load	13.2	1.0	3.5	15.0	2.4
100h fuel load	13.2	0.2	0.7	20.0	1.2
Live herb f.l.	0.5	0	0.4	1.7	0.1
Live woody f.l.	8.8	0	0	5.0	3.7
1h SAV	6200	6700	6700	4200	5000
Live herb SAV	5000	4900	4900	3000	4000
Live woody SAV	4000	4900	4900	3000	4000
Fuel depth (m)	1.5	0	0.4	1.5	0.9
Moist (%)	20	20	25	20	19
Dead fuel heat c.	20485	20485	17989	20485	19500
Live fuel heat c.	20485	20485	17989	20485	19500
Crown canopy closure (%)	50	30	50	50	40

Table 1: Summary of representative fuel models developed for the Garden Route region (using the C de Ronde fuel model database to provide closest developed fuel models for the region).

Fire behaviour parameters	Senescent (Old) Fynbos	Mature P. rad. natural regeneration	Young pine 11–15 yrs old	Coastal fynbos Infested with Acacia	Old coastal fynbos uninfested
Rate of fire spread (m/min)	18.6 (4)	5.5 (1)	8.0 (2)	12.1 (3)	23.1 (5)
Heat per unit area (kj/m2)	34808 (4)	9659 (1)	10252 (2)	56401 (5)	34460 (3)
Fireline intensity (kW/m)	10810 (3)	858 (1)	1365 (2)	11396 (4)	13241 (5)
Flame length (m)	5.6 (3)	1.8 (1)	2.1 (2)	5.7 (4)	6.1 (5)
Spotting distance (km)	1.2 (5)	0.4 (1)	0.5 (2)	1.0 (3)	1.1 (4)
Ranking totals	19	5	10	19	22
Fire hazard class	Extremely high	Medium	High	Extremely high	Extremely high

Table 2: BehavePlus outputs from five runs conducted to arrive at regional ranking for each of the five representative regional fuel models for the Garden Route (rankings provided in brackets).

simulation programme at this stage for this purpose, I will develop and use the basic fuel models for the Garden Route region, arrived at from my developed and completed South African fuel model database eg de Ronde, 2004 and de Ronde and Goldammer, 2016.

For the above purpose, I will thus only use five fuel models to represent the main fuel categories provided under section B above, by using my personal fuel model database for South Africa (de Ronde et al., 2004; de Ronde and Goldammer, 2016) as basis and to provide the necessary adjustments to create new models for this purpose. The above basic (five) fuel models (see Ba – Be above) will then be run under typical fire hazard conditions experienced in the Garden Route region when the two wildfires occurred, with the BehavePlus BP6 fire behaviour prediction simulation programme. See Appendix (a) for the results.

4.5 Calculating the basic fire hazard classes for the region, with fire risk adjustments omitted at regional level

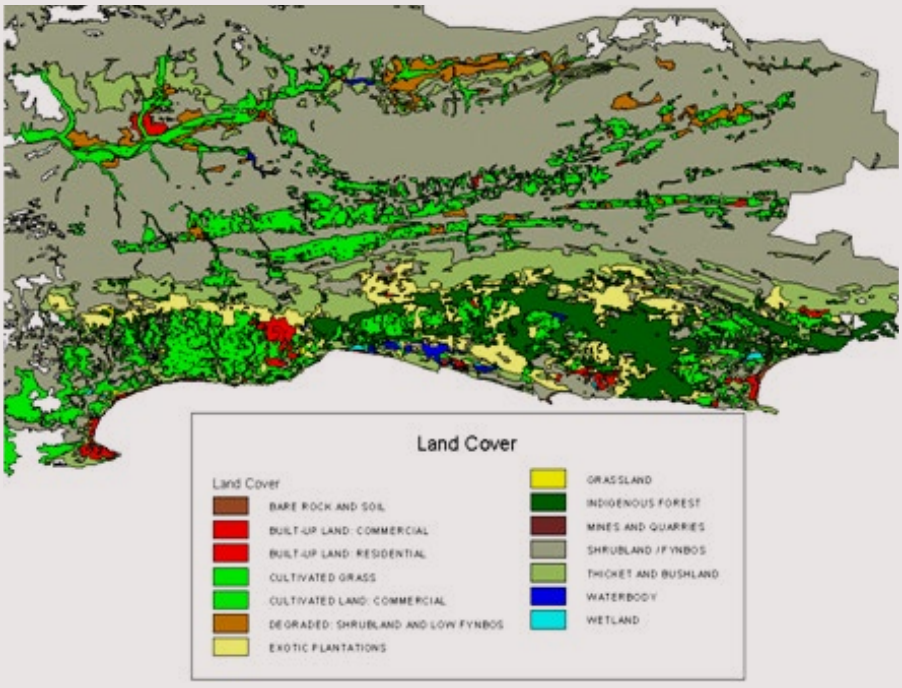
The outcome for the BehavePlus runs for the above five fuel models will be used as a basis for these calculations, when the Output for the following five parameters will be used to arrive at fire hazard classes (Trollope, et al., 2004; Calvin et al., 2004):

Flame height (m)	FL
Rate of fire spread (m/min)	ROS
Fireline intensity (kW/m)	FLI
Heat per unit area (kJ/m2)	HEAT
Max spotting distance (km)	SPOT

The BehavePlus output results can be summarised as follows (Table 1):

Contrary to popular believe, mature pine stands are not nearly as hazardous as the fynbos classes in general and sometimes offer counter fire opportunities where this is not possible in other vegetation bases where the fire burns through (see Table 2 and also see Photograph 13 below).

The fire hazard rating classification arrived at (Table 2) will have to be mapped for the region, as adjustments for fire risks cannot be performed at this ▸



Map 2: Land cover map of the Southern Cape region (unknown source of origin).

"Where's the command post?": Placement and positioning of incident commanders during structural fireground operations

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

A lesson learned

At approximately 23h00 on Thursday, 20 February 2003, sparks from a pyrotechnic display ignited the ceiling of the Station Club in West Warwick, Rhode Island in the US. The fire spread rapidly throughout the building and within minutes flames engulfed the entire structure. A police officer who was working a security detail at the Station Club that night made the first emergency notification at 23h07. The intensity of the blaze, combined with the number of victims who needed to be treated and evacuated from the scene, required a huge response. Approximately 575 fire, police and emergency medical personnel from over 35 agencies responded to the incident.

Early on in the response, the chief of the West Warwick Fire Department arrived on. He assumed overall (incident command IC) and established an incident command post (ICP) near the front entrance of the building, converting the trunk of his vehicle into a makeshift worktable. The IC chose to establish the command post at this location because the proximity to the incident allowed him to observe both fire suppression and rescue operations.

The incident command post's location, however, presented certain problems at the site. The IC's proximity to the scene allowed responders to bypass the normal chain of command and to communicate directly with him. This created confusion because many responders were unaware of the decisions and orders coming from the IC. Here was some concern that the location of the command post unnecessarily placed the leadership in harm's way because of the potential for the wall to collapse on the ICP.

The incident after-action report recommended that ICPs should be located close enough to allow the IC to observe operations but far enough away to provide safety and shelter from the noise and

Photograph 13: Picture taken of the Knysna fire in progress in Kruisfontein plantation. Note how the backfire spreading down slope presents an opportunity to control this fire line by means of a counter fire, down slope of this fire line (Picture taken by unknown photographer).

(regional) level for the Garden Route region.

I did not perform a fuel model spread survey for the region because this survey still has to be conducted by the future fire management staff. However, a basic regional fire hazard map for say the year 2020, will have to be used to assess and check regional buffer zone specifications (see photographs 9 and 10) and then to adjust these buffers accordingly.

Remember that the Garden Route regional buffer zones will have to be mapped first, before thefive5-year (detailed) fire prevention plan is considered and drawn up. The regional fire prevention plan will likewise have to be drawn up before detailed year plans are developed and produced for the region.

confusion that accompanies normal operations. A command vehicle is often ideally suited for this purpose

The placement of the incident commander (IC) and incident command post (ICP) on any incident is one of the crucial first steps in determining the direction that the incident will follow for its duration. Although incident command may have taken longer in this country to establish itself and for fire fighters to get comfortable with its principles and procedures, I think we have reached a level of maturity in our services that the concept of having a single person 'in charge' of the incident and directing the flow of activities, is well ingrained. The entire incident command system as we know it, is a highly structured system that allows for proper command and control, from the smallest incident all the way to a major disaster. The utilisation of work sheets, support staff and related tools are meant to guide the incident commander from the very early stages of an incident all the way to its (hopefully successful) conclusion. Another aim of the ICS is to prevent commanders from 'freelancing' and making decisions outside of the incident action plan. This succeeds most of the time, however, there will always be the possibility that events on a fireground could change and cause the IC to make decisions outside of the original plan.

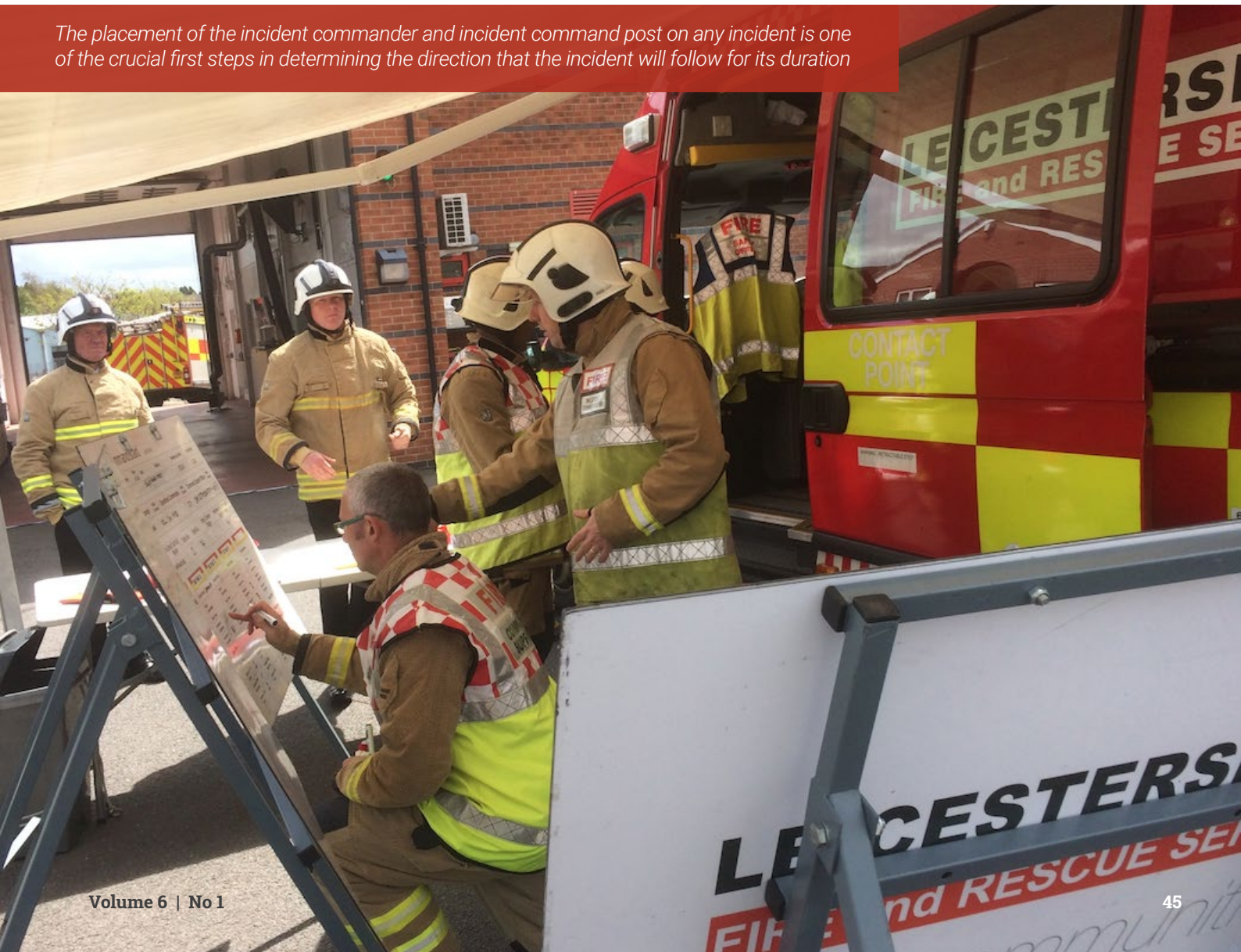
It is not my intention to provide a lesson in incident command here. I also don't intend to rehash many of the things that have already been written and said in this publication regarding incident command. I merely intend to share some thoughts on the placement of the command post in various scenarios. I can quite simply sum up everything I want to say in the following few sentences: Incident command posts should be located close enough to allow the incident commander (IC) to observe operations but far enough away to provide safety and shelter from the noise and confusion that accompanies normal operations.

Let's break up the above statement a bit and examine its main points. The statement speaks to 'observation', 'safety' and, although it is not mentioned, 'communication'.

Safety

As always, the first thing we start with is safety. The incident commander must be placed in such a position that he/she can observe command from a safe position. A number of factors must be taken into account when the decision to place the ICP is made. This will include the type of incident eg if it is a hazmat incident gradient and wind direction might be your most ▸

The placement of the incident commander and incident command post on any incident is one of the crucial first steps in determining the direction that the incident will follow for its duration



The Station Club Fire in 2003 in West Warwick, Rhode Island in the US

important consideration. Depending on the product involved the blast radius might be vital.

Often ICPs are placed as close to the incident as possible. Although this might give the IC a 'feel' for the events taking place, it could easily lead to the command staff becoming fixated on events in their immediate vicinity and could lead to other important events being ignored or missed.

It is very important for the ICP to be in a fixed location and for that location to be made known to all arriving units. These units will be required to report in to the ICP and this becomes hugely problematic if the IC is continuously moving from one area to another. It is for this reason that the incident is divided into sectors that will be responsible for keeping command informed of events as they happen.

I am a firm believer in developing an Incident Action Plan (IAP) and benchmarking your objectives as you proceed through the incident. The benchmarking should be set and made known to all sector commanders. "How far have we progressed in the last ten minutes?" is the question you should be asking often. This will provide an indication of how effectively you are moving to the successful completion of the operation. This does not require the command team to be observing every event but rather good feedback from sector commanders who are better positioned and are aware of the specific objectives in their designated sectors.

It might be required of the incident commander to escalate the level of command or to hand over command to another arriving officer. It might not be necessary to change the position of the ICP in the second instance, however, the escalation of command usually means that the incident has escalated and the command system must adapt accordingly. This may very well require a change of position to accommodate a larger command staff and to manage larger numbers of resources.

During the initial response to a structural fire, the departmental standard operating procedures (SOPs) should include the pre-determined attendance (PDA) to the type of incident you are responding to. I have frequently advocated the 2+1 philosophy (two engines and one ladder truck). The ladder truck must have the priority of the front of the structure while the first-in engine should be placed in such a position as to be able to deploy the attack lines optimally. The first-in incident commander will usually be on that unit. The second engine must be placed in such a position as to be able to provide a sustained water supply to the first engine and to provide whatever back-up is required. It is understandable that in the cut-back environment we work in it is very difficult, if not impossible, for many departments to deploy three fire fighting units to one structural incident. This unfortunately leads to a situation where the engine responding is limited to the number of personnel as well as the equipment it can carries and therefore it is not able

to perform the range of activities that are required to enable the fire fighters to operate in a safe manner.

Communication

The first-in IC, assuming he/she was on the first responding engine or responded in a command vehicle, should, after the initial placement of the resources, identify the ICP and communicate it to all responding units. Command should designate a geographic title to the command post eg "Command is located on the corner of East Street and 24th Avenue". The ICP should, if they anticipate an escalation of the incident, identify and designate a secondary staging area for units following on from other stations or districts. The location of the secondary staging areas should be made clear to these units and they should proceed to that location before reporting to the ICP. The last thing the IC needs is to be overwhelmed by emergency vehicles of all descriptions at the ICP. This would be akin to General Custer calling for more Sioux and Cheyenne warriors at the battle of Little Big Horn.

Ideally a staging officer should be designated by command who will then record the types and capacities of all incoming units and deploy them as required.

It goes without saying how important the communication of the IAP and alerting sectors to any changes in fire conditions will be. Sector commanders will adjust their own strategies to these reports and it is equally important then for them to report back to command if they have changed their location or if they have had to tweak their tactics. You don't want the IC to be thinking that a specific sector is doing one thing while they are doing something different, which might have a different impact on the fire.

Placement guidelines

Clearly there are so many different situations that could require different approaches to locating an ICP. It would not be possible to cover them all in this article. Certain high-risk facilities in your area of jurisdiction may already have a pre-determined location in their emergency plan. This is advisable as it will in all probability also guide the specialist advisors at the site on where to go to make contact with the fire department. Allowance should, however, always be made for the relocation of the ICP should the identified one be compromised.

The incident commander must be placed in such a position that he/she can observe command from a safe position

Below are a few pointers to guide incident commanders in determining the ideal location for their ICPs:

- Adequate space for all command staff and specialised advisors
- Ease of accessibility
- Ensure personal hygiene facilities (especially under current COVID-19 conditions)
- Adequate shelter from natural elements
- Ensure suitability of existing communications resources (phone, radio and/or internet connectivity)
- Ensure suitability of briefing facilities
- Identify command post security requirements, safe location
- Notify other units of command post location; provide maps/ driving directions
- Determine staging areas and incident base locations
- Identify future need to relocate, upgrade facilities

Conclusion

In this article I have attempted to provide some advice on the location of incident command posts (ICPs) at structural fires. The most important consideration in all of the above is the importance of the first-in IC arriving at the same time as the initial units.

It is in these first critical minutes that the direction of the incident is determined. It has unfortunately become a culture in many fire departments in this country that officers employed to take the role of ICs, are forced to work office hours and therefore respond (often in their private vehicle) from their homes to the incident. This is an unacceptable practice.

An IC arriving at an incident already in progress will have to catch up on an already rapidly moving incident, where his/her resources have most probably already started working the fire. The establishment of command is well-nigh impossible at this point. Surely he/she can't expect the fire fighters to stand around and wait for his/her arrival before committing to the incident.

A few years ago I was speaking to a fire chief, who shall remain nameless for the purposes of this story, who told me that his department was placing all their officers on day shift. When I inquired as to the reason for this I was told that headquarters was concerned that the administration at the stations was suffering as a result of the station commanders not being available during office hours. My reply to him, "That's interesting. I thought they were employed to fight fires".

Until next time, stay safe.

Importance of developing leadership and standards within the fire and emergency services

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

This article presents a discussion on some of the challenges facing fire and emergency service leadership. Most challenges are neither new nor unique to South Africa. In fact, in the United States of America, the 1966 Wingspread Conference on Fire Service administration, education and research highlighted twelve critical areas that impact on fire service leadership and planning. This article presents a discussion on these identified areas and will therefore attempts to achieve alignment through local reference and example.

The author concludes that the White Paper on Fire Service seeks to address certain shortcomings in current Fire Service legislation.

The author also identifies that legislative change may not necessarily ensure leadership in this sector, it may, however, assist with the development of a framework and ultimately the professionalisation thereof.

Introduction

The direct material fire and life losses in South Africa continue to rise each year. Available records indicate that in 2017 alone, 5 283 fires occurred in informal settlements. The financial losses incurred during the Knysna fires of June 2017 alone exceeded R2 billion. This excludes the R180 million other household fire losses reported to the Fire Protection Association of Southern Africa.

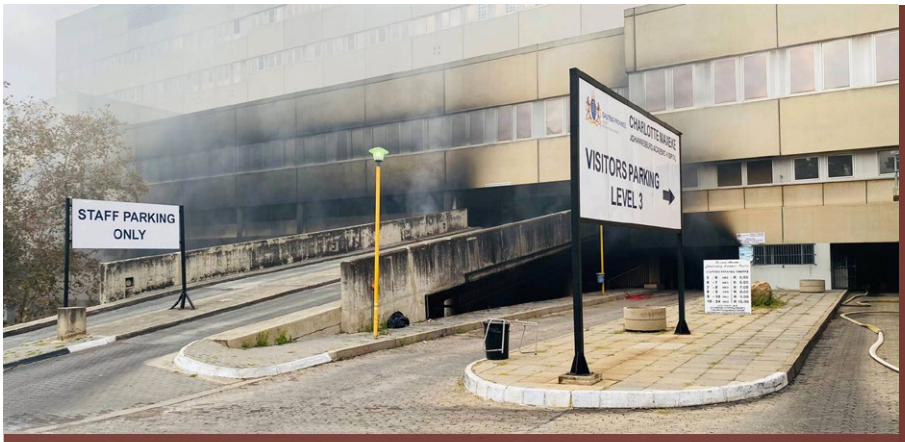
Whilst writing this article, nine people perished in a fire in the Johannesburg CBD on Wednesday, 14 April 2021. The Charlotte Maxeke Hospital in the same city suffered a particularly devastating fire on Friday, 16 April 2021. Apart from severe structural damage, the hospital was closed for seven days and resulted in the transfer of nearly than 700 patients to other facilities. This was followed by a wildfire on Sunday, 18 April 2021 in Cape Town, which decimated large areas of Table Mountain National Park and raised, amongst others, the Jagger Library at the University of Cape Town (UCT), which housed priceless African studies, collections, museum pieces and personal papers. Several other buildings, including the Rhodes Memorial Restaurant as well as the Mosterd's Mill dating from 1796, were also destroyed. Losses of this magnitude would indicate, then, that unfriendly fire is a major social and economic problem. Basically, the suppression effort is organised and financed as a local Government function.

The guarding of local Government mandates by Schedules 4 and 5 of the Constitution of South Africa makes it extremely difficult to bring into being any organised method for general improvement in any large segment of the fire service. The fire service, as a whole, lacks uniform standards of performance, educational achievement of skill. Many individual fire services have made excellent progress in technology, tactics and strategy, administration and organisation. However, this progress have been largely dependent on the calibre of leadership of individual fire chiefs and there is no assurance that this progress will continue or the standards be maintained when there is a change of leadership in a given fire service.

Often this struggle for progress is made under adverse conditions. The

economic base of the community may place such heavy demands on the service delivery funding available for all local Government functions that the financing of the fire function simply cannot be afforded at local level. Management systems enhancing the coordination of the fire function above local level must be considered. Without this coordination at a national or provincial level, it is difficult to maintain open lines of communication within the service itself so that improved methods, techniques and the systematic exchange of information and ideas can be facilitated. This deficiency in the service has been pointed out in the White Paper on Fire Services. Hence, we seem to have in the fire service nearly three hundred individual municipal fire service organisations at local, district and metro level, each trying to cope with the fire problem, uncertain of its responsibility, its jurisdiction and its level of competency to cope with the day-to-day problems that are related to the total fire picture. This has been recognised by a legion of studies and associated reports by many individuals, educational institutions and service associations. Some of the individuals who recognised the need for a comprehensive study in the area of fire service administration, education and research, participated in the drafting of the White Paper on Fire Services, which was approved by Cabinet on 27 May 2020, as a first hopeful step in trying to isolate and define some of the major problems, so that additional research and study could be given to problems with a high priority. It is hoped that once these problems are more clearly defined and understood, foundations, Government agencies and educational institutions will bring their resources to bear on the issue.

Some of the issues identified by David B Gratz in his book, 'Fire Department Management: Scope and method' refers to the 1966 Wingspread conference and remains relevant six decades later.



The devastating Charlotte Maxeke Hospital fire on Friday, 16 April 2021

1. Unprecedented demands are being imposed on the fire service by rapid social and technological change

I would go a step further and include environmental change under this heading. The proliferation of the wildland urban interface (WUI) exacerbated by climate change, resulted in the single biggest fire loss in South African history.

The scale of business and Government operations today, the complexity of modern technology and organisation brought about by the Fourth Industrial Revolution (4IR) and the rapid increase in new knowledge, the population explosion, rapid growth of urban communities, need for efficiency and economy on the part of the commercial and industrial community to compete in our private enterprise system, particularly under the pressure of imports of our foreign trade commitments, require that fire executives and administrators be better educated than their predecessors and better prepared to understand and facilitate change. The mobility of individuals and whole segments of our society brings about societal change and behavioural patterns, which pose tremendous problems for the fire service.

The current lack of formal housing has resulted in an explosion of informal settlements never seen before. The erection of high-rise structures, large undivided commercial and industrial buildings and solid-wall structures in outlying areas, brings to many small, undermanned and ill-equipped fire service problems of a magnitude never faced. The deterioration of central business sections and the transition of older residential areas help to create informal settlements. Technological changes in manufacturing processes, science, use of chemistry, alternative energy, etc, are confronting fire service with problems far greater than they can handle.

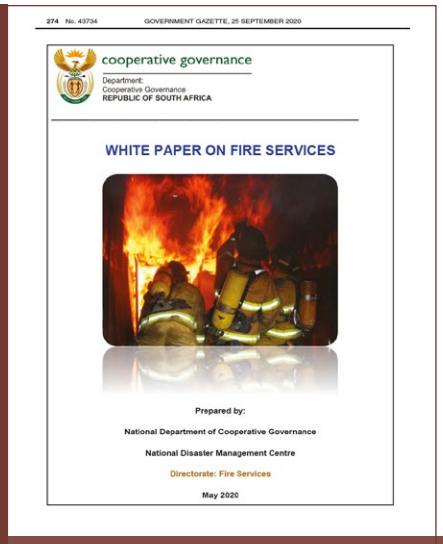
This societal, environmental and technological change should be thoroughly researched to determine causes and possible relationship to fire service planning needs.

2. The public is complacent toward the rising trend of life and property loss by fire

What are acceptable limits? Certainly, we have reached the limit insofar as crime is concerned and we are rapidly approaching the limit for traffic deaths. Society in general in South Africa seems to establish tolerable fire loss limits, which we are willing to accept.

The overall cost of property loss (structural and environmental) due to fire is estimated to cost the South African economy more than R3 billion every year.

The Burn Mortality rate in South Africa during 2012 was 8,5 per 100 000, greater than the world average of five per 100 000 and the African region average of six per 100 000.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cooperative governance

Department:
Cooperative Governance
REPUBLIC OF SOUTH AFRICA

WHITE PAPER ON FIRE SERVICES

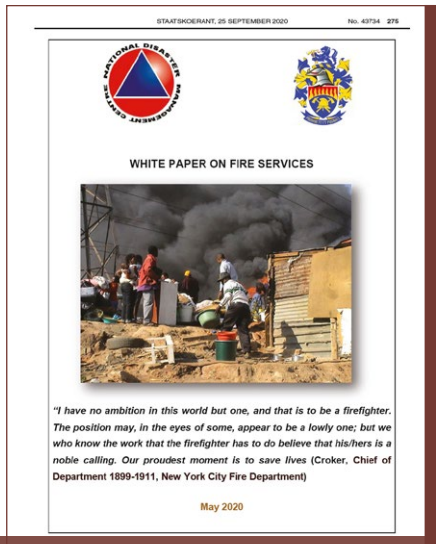
Prepared by:

National Department of Cooperative Governance

National Disaster Management Centre

Directorate: Fire Services

May 2020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WHITE PAPER ON FIRE SERVICES

"I have no ambition in this world but one, and that is to be a firefighter. The position may, in the eyes of some, appear to be a lowly one; but we who know the work that the firefighter has to do believe that his/hers is a noble calling. Our proudest moment is to save lives (Croker, Chief of Department 1899-1911, New York City Fire Department)

May 2020

The White Paper on Fire Services was approved by Cabinet on 27 May 2020

3. There is a serious lack of communication between the public and the fire service

The average citizen's understanding of what constitutes fire protection seems to be very limited. This lack of understanding is also shared by those persons primarily responsible for protecting the public welfare, the elected and appointed Governmental administrators.

4. Behaviour patterns of the public have a direct influence on the fire problem

Fire frequency has been directly related to human activity. This is reflected in timetables as to when the highest frequency rate occurs during each 24-hour period.

The 2012 Western Cape Strategic Framework for fire and burn injury prevention provides an excellent overview of causal factors as well as the consequential frequency rates of fires in the Western Cape. Strategic_Framework_fire_and_burn_injury_prevention_web_13-01-2016.pdf (westerncape.gov.za)

5. The insurance interest has exerted a strong influence on the organisation of the fire service. This dominance seems to be waning. The fire service must provide the leadership in establishing realistic criteria for determining proper levels of fire protection.

The original concept of organising public fire protection in this country was to minimise the conflagration hazard. This was originally initiated by the mutual assistance concept where all would hare in any individual's loss. Public officials must become willing to accept criteria that are realistic and based on life and property protection without depending upon insurance rates as the primary guide. This whole area of evaluating today's fire protection requirements needs to be studied considering the many changes that are taking place in our society.

Following the Knysna Fire in 2017, Santam commissioned the report from the Council for Scientific and Industrial Research (CSIR), the Research Alliance for Disaster and Risk Reduction (RADAR) and the Fire Engineering Research Unit (FireSUN) at Stellenbosch University.

The report urged the insurance industry to help build the capacity of municipal fire services to deal with wildfire prevention and response. "Insurers can help by requiring policy-holders to undertake measures to reduce risk; for example reducing flammable materials and creating defensible spaces around homes."

Another key recommendation was that insurers develop more affordable insurance products for the so called 'missing middle', the households that are not sufficiently impoverished to be supported by Government welfare but who are unfortunately not able to afford insurance.

The total cost of fire is difficult to measure in terms of economic losses because of the direct and indirect effects borne by the public, private sectors and individuals. Insurance financial data often refer to the tangible damage to property that refers to losses to which a monetary value can be assigned and direct effects of a fire ie damage of assets that occur at the time of the fire or fire-related disaster. The main items in this category include the total or partial destruction of physical infrastructure, buildings, appliances, furniture, equipment, means of transportation and documents. The intangible effects and indirect losses are not reported on due to lack of consistent and available data.

6. Professional status begins with education

The Gordon-Howell report suggests four criteria for defining a "profession".

- A profession should rest on a systematic body of knowledge of substantial intellectual content and on the development of personal skill in the application of this knowledge to specific cases.
- It must set up standards of professional conduct that take precedence over the goal of personal gain.
- It should have an association of members, among whose functions are the enforcement of standards and the advancement and dissemination of knowledge.
- It should prescribe ways, controlled in some degree by the members of the professional association, of entering the profession by meeting certain minimum standards of training and competence.

A systematic and deliberate educational programme leading to a broad knowledge base that is acceptable to the academic

The major wildfire on Sunday, 18 April 2021 in Cape Town, which decimated large areas of Table Mountain National Park and damaged several historic buildings

community is the surest approach to professionalisation. It is unrealistic to assume that every member of a fire service has a formal education (NQF 6 and higher). Therefore, levels need to be established within the profession.

A clear distinction must be made between fire service professional development on the one side and factors affecting fire service labour issues. A professional body should not and cannot become involved in labour issues.

7. The scope, degree and depth of the educational requirements for efficient functioning of the fire service must be examined
Many individual fire services do have specific educational and skill requirements, which must be met by existing fire service personnel. Virtually all trades, vocations, technical areas and professions have established minimum in-service training requirements. Continued Professional Development (CPD) programmes are sadly lacking at this stage.

8. Increased mobility at the executive level of the fire service will be important to the achievement of professional status
Mobility is present within virtually all professions. In the fire service, many restrictions have been established that limit mobility. Some of these archaic restrictions are individual conditions of employment and individual residential requirements. Others have been devised by local groups that limit mobility in any level in the fire service. If uniform knowledge and skill criteria were established on a nationwide basis, there should be no reason why mobility at the various levels in the fire service could not be facilitated. However, a comprehensive study needs to be made to determine specific ways in which increased mobility can be attained within the fire service.

9. The career development of the fire executive must be systematic and deliberate
As in any other professional field or quasi-professional field, the requirements for the fire executive must be identified. Once this is accomplished, ways and means of individuals to meet the needs and requirements should be established. This gives rise to the thought of direct entry into the executive level of the fire service as well as coming up through the ranks of the service. Traditionally, in the fire service in this country, we have promoted men and women into higher ranks or higher levels and then attempted to train and educate the individual to meet requirements of the level to which he has been promoted. This is contrary to the practice in virtually all other professions and technical areas.

10. Governing bodies and municipal administrators generally do not recognise the need for executive development of the fire officer
The fiscally hard-pressed governing bodies and municipal administrators find it difficult to justify sending their fire executive to educational courses for long periods of time. This, it is felt, it partly due to recognition of the fact that there are no specific achievement levels established

The current lack of formal housing has resulted in an explosion of informal settlements never seen before

- in many of these courses and activities. It is felt that if various achievement levels or acceptable ends could be shown to governing bodies and municipal administrators, these groups would be more receptive to allowing fire executives to participate. The full scope and extent of the fire problem often is not understood by governing councils and municipal administrators because membership in governing bodies is generally transitory. The office holder generally is not in the same office for a long enough period for him to understand the full depth and scope of fire service organisation, operation, etc. Therefore, he must rely primarily upon his fire executives to justify their participation in educational and improvement activities. The fire executive then finds himself in a position without standards, without specific acceptable development programmes, hard pressed to justify to governing bodies and municipal administrators why his fire service people need to participate in extended educational activities. Executive development programmes will not be possible until the people responsible for policy and decisions recognise and support the development process.

11. Fire service labour and management, municipal officers and administrators must join together if professionalism is to become a reality

If professionalism within the fire service is to be achieved, then professionalisation must be made a common goal toward which all fire service organisations, local Government associations and professional management associations can work. All must recognise that professional status begins with education. There is growing evidence of the emergence of a systematic body of a knowledge that can be applied to fire science and administration. Without this close cooperation and coordination in the development of such a body of knowledge, acceptance of the fire service as a profession will be slow and difficult. If professionalisation is to be achieved, studies need to be made as to ways and means for coordination and communication channels need to be devised and kept open, so that all organisations that have an interest in the fire problem, can work toward a common goal of professionalisation of the fire service.

12. The traditional concept that fire protection is strictly a responsibility of local government must be re-examined

A principle of fire protection that many fire service and governmental jurisdictions have had to learn the hard way is stated as follows, "It is economically unfeasible for any single governmental jurisdiction to equip and man itself with sufficient forces to cope with the maximum situation with which it may be faced." The lack of understanding of this principle has caused many communities to be caught short of fire suppression resources. As a result, catastrophes have not been minimised as fully as possible. Many local governmental jurisdictions find themselves, in too many cases, too small to be large and too large to be small.

CONCLUSION

The author concludes that there are numerous challenges impacting upon fire service planning and leadership. The review of Fire Service legislation currently at the White Paper stage advocates a paradigm shift from response and operations-oriented approaches towards a fire risk management approach that prioritise fire prevention and safety.

This approach will ensure that prior to the promulgation of the revised fire services legislation, a clear policy framework for the function is in place for all role players to grasp the fundamental principles and policy direction underpinning the legislation.

While fire fighting services are provided at both local Government level and by designated services, this White Paper also clearly outlines the roles and responsibilities that both national and provincial Governments must execute in support of municipalities and other stakeholders involved in fire services across the country.

Strong systemic and deliberate leadership development is vitally important to ensure that the policy proposals in the White Paper are institutionalised. Failure to professionalise will force us to remain satisfied with incompetence and ineptocracy or mediocrity at best.

A list of references is available from the Publisher.

Why self-defence for emergency workers?

By Morné Mommsen, BED HRD (NWU), Midvaal Fire and Rescue and Warrior Combative

Since the last article was published, a steep increase in attacks occurred all over South Africa and even internationally. Different entities in South Africa promote visual aids on social media trying to stop violence against emergency services but the reality is that no one (you as an emergency worker) is actually doing anything about this problem because the person (attacker) with this type of outlook (existentialist's belief) in life only objective will be to hurt, steal and kill or whatever feed the need and this will never chance.

As previously postulated, people (bystanders) will rather take a video of an emergency/law enforcement member being assaulted or killed because of his/her social media craving before attempting to help the emergency/law enforcement member.

Existentialism is a philosophy concerned finding oneself and the meaning of life through free will, choice and personal responsibility. The belief is that people are searching to find out whom and what they are throughout life as they make choices based on their experiences, beliefs and outlook. And personal choices become unique without the necessity of an objective form of truth. An existentialist believes that a person should be forced to choose and be responsible without the help of laws, ethnic rules or traditions.

Most importantly, it is the arbitrary act that existentialism finds most objectionable, that is, when someone or society tries to impose or demand that their beliefs, values or rules be faithfully accepted and obeyed. Existentialists believe this destroys individualism and makes a person become whatever the people in power desire thus they are dehumanised and reduced to be an object. Existentialism then stresses that a person's judgment is the determining factor for what is to be believed rather than by arbitrary religious or secular world values. "The will to survive sometimes blind the act to commit a crime" (Mommsen,2018).

Start asking yourself the following questions:

- Can I really protect myself and my love ones?
- If you carry a firearm, can you really use it? (In documented proof, the ability for a trained person to take the firearm away from the one pointing it is easy and can be accomplish in less than two seconds; chew on this proven fact).
- If you are surrounded by more than one assailant do you really know what to do?
- Do you know how to protect yourself against any type of edge weapons?

If the answer in no to even one of the above, then you are not even close to be able to protect yourself or in fact anyone.

As an instructor who has been in the martial arts long enough to understand this and who has 30 years' service experience in the fire and rescue department, I feel I should share the following with you. ▶

- Emergency members need to get regular training in some-kind of self-defence system. I signify myself with Warrior Combative International and Mile High Kickboxing - Shidokan who specialises in the Krav Maga System, Kickboxing and have written consent on a National Fire Prevention Association (NFPA) Self-Defence Course designed for the purpose of defending oneself against the reality of the street.

  It really takes hard work and dedication to be able to defend yourself and I can promise you, nothing comes easy in today's world of mixed martial arts. A question before we continue, if someone in the martial art world who is a good fighter in the cage, battle to defend him/herself in the street, what will you that don't have or think you have the skills, do in a real one-on-one or multiple attacker fight?

  You need to start with a programme that will assist you to concentrated on awareness, communication skills, basic stances, target areas, how to plan escape routes, how to control the fight and flight effects and if all fails one-on-one fighting skills, multiple attacker fighting skills, knife fighting skills, firearm skills and so much more and remember, nothing in life is for free or come easy.

  On so many occasions training programmes and skills development with regards to self-defence for emergency members was send and introduced to various departments, entities and everyone always reply with a "Wow" or "What a good idea" or "We must make this a priority", for how long do you as management want to make it a non-priority skill or do we first need to wait till the first emergency member pass away or get raped or go missing. In fact, you all take note of the medic that was killed.

  No pamphlet, YouTube video, standard operating procedures (SOPs) or a member from your management environment will be able to protect you; but preparing yourself with physical and mental skill will provide you with the ability to avoid a situation and, if needed, protecting yourself, partner, family or even patient(s) against a physical attacks.

  This is not only for emergency workers but include law enforcement, hospital staff, clinic staff, office environment people, general workers, school children, university students or whoever need that personal confident to act.

  Get yourselves enrolled in a self-defence system and keep on training. It does not matter how difficult it becomes, "Bleed in training, victory in battle".

  "Curriculum is only the blueprint, how to implement and survive it, is Self-defence"

  Basic recommended needs for a person? (To be implemented and supplied as personal PPE).
  - Proper planned long-term self-defence training programme, which include a daily fitness programme
  - Bullet proof (no reflective on it), including training how to use a bulletproof to your advantage in a fight
  - Strong and durable waterproof flashlight (high lumens with strobe) fitted on bullet proof for easy use
  - Proper multi-purpose axe with belt (Titan crash axe for emergency services only, if properly trained)
  - Pepper spray fitted on bullet proof for easy use
  - Proper expandable baton fitted on belt or bullet proof for easy use
  - Duke pepper and sonic grenade that is fitted on bullet proof to be use as needed
  - Body cam fitted on bullet proof.

  If interested in any form of assistance please contact us via email:
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  Cape Town: pvogts1@gmail.com

The evolution of face masks

In times of a pandemic, common sense dictates that each person must protect themselves by all available means, especially when those pandemics are generated by infectious agents that are transmitted by air such as the current COVID-19 pandemic and the Spanish Flu of 1918. The common method generally approved and tested to bring some kind of protection to our lives is the use of face masks.

There is an ongoing debate both in scientific community and on a personal level about the effectiveness of wearing face masks to avoid the exposure to infectious agents like Coronavirus or influenza virus just to mention some examples. The truth is that face masks with medical and health purposes have been used for a long time, mostly to prevent infections transmitted by air.

While most people debate about the effectiveness or not of wearing a face mask in these pandemic times, history has shown us that face masks have undergone an important evolution trying to provide a better degree of protection to our lives.

The earliest recorded face mask-like objects in history date to the 6th Century BC. Some images of people wearing cloth over their mouths were found on the doors of Persian tombs.

In China, a kind of scarf woven with silk and gold threads from the Yuan Dynasty (1279-1368) is believed to be the earliest item in China that is similar to today's face mask.

According to the record of The Travels of Marco Polo, the 13th-Century travelogue of the famous Italian who once travelled in China in Yuan Dynasty (1279-1368), servants who served the emperor during meals needed to wear silk scarves to cover their mouths and noses. It was believed that the silk scarves would keep the servants' breath from impacting the smell and taste of the food.

16th Century plague doctor masks, worn during a Black Death outbreak

In the 14th Century, the Black Death spread to Europe. This also greatly promoted the emergence of functional face mask-like objects.

In the 16th Century, French doctor Charles de Lorme invented the beak mask. He installed glass in the eye sockets to ensure visibility and perfume, scented spices or medicines including mint leaves, camphor could be placed in the beak section to filter out disease. In addition to the mask, a top hat, shawl, robe, trousers, gloves, shoes and walking sticks made up a complete 'beak suit'. It eventually evolved into a terrifying symbol of death due to the rampant extent of the plague.

That same century, famous painter Leonardo da Vinci proposed soaking cloth in water and placing it on his face in order to filter out toxic chemicals coming from people's respiratory systems. This effective method is still widely used in fire escape guides today.

Modern exploration

The design of the mask took a big step forward in the 19th Century. In 1827, Scottish scientist Robert Brown discovered "Brownian motion," which theoretically proved the protective effect of masks on dust.

In 1848, the mask made by American Lewis Hassley for miners obtained the first patent for a protective mask, which was a milestone in the history of face masks. Masks at this stage were closer to gas masks. Hassley applied for the patent in 1849 with the patent number 6529, which is still available in the archives in the US.

In 1861, French biologist, microbiologist and chemist Louis Pasteur proved the presence of bacteria in the air, which made more people pay attention to the design of modern masks.

For example, a French doctor created a mask made of six layers of gauze and sewed it on the collar of a surgical gown in 1899. The doctor ▸

A plague doctor in full costume. They use to wear a wide-brimmed leather hat to indicate their profession

Gauze face mask following Berkeley George Andrew Moynihan (1865–1936)

Mask-wearing during the 1918 Spanish Flu Pandemic

only needed to flip the collar up when using it. It gradually evolved into a form that could be freely tied and hung on the ears with a looped strap, thus giving birth to the modern mask.

In 1890 William Stewart Halsted pioneered the use of rubber gloves and surgical face masks, although some European surgeons such as Paul Berger and Jan Mikulicz-Radecki had worn cotton gloves and masks earlier. These masks became commonplace after World War I and the Spanish Flu Epidemic of 1918.

During the late Qing Dynasty (1644-1911), Chinese-Malaysian epidemiologist Dr Wu Lien-teh invented the surgical face mask, considered the precursor to the N95 mask in response to the Manchurian Plague, which spread in northwestern China in 1910. The Chinese government appointed Wu to investigate the disease, which he identified as the highly contagious pneumonic plague that spread from human to human through respiratory transmission. Wu designed and produced a special surgical mask with cotton and gauze, adding several layers of cloth to filter inhalations. The mask was called "Wu's mask" and was highly complimented by experts in different countries as it is simple to manufacture, has a low production cost and the materials are easy to obtain. Wu also worked with Government officials to establish quarantine stations and hospitals and apply progressive sterilisation techniques.

The influenza pandemic of 1918 and 1919 was the most deadly flu outbreak in history, killing up to 50 million people worldwide. In 1918, advanced masks like the N95s that healthcare workers use today were a long way off. Surgical masks were made of gauze and many people's flu masks were made of gauze too. Red Cross volunteers made and distributed many of these and newspapers carried instructions for those who may want to make a mask for themselves or donate some to the troops. Still, not everyone used the standard surgical design or material.

New design

With several outbreaks of infectious diseases and flu and the rise of smog from modern industry, the materials in masks have continued to evolve to better filter viruses and pollution.

In addition to the SARS epidemic in 2003, the last large-scale use of masks in China was due to smog in 2012. That year, the term "PM2.5" began to enter public awareness and mask models such as N95 and KN90, which can filter out this fine particulate matter, became highly popular.

The 3M mask is short for Minnesota Mining and Manufacturing Co, the company that has produced these masks since 1967. Interestingly, the idea of 3M came from women's disposable bras. An employee proposed the inspiration that a disposable mask could protect workers' noses and lungs in harsh operating environments such as mining and smelting.

The evolution of face masks has been exponential since its first days back in ancient times. While there is an open and heated debate about their effectiveness in preventing some kind of diseases, common sense dictates that, in the worst case scenario, wearing a face mask can´t do any harm, and some people think it is even 'cool' to wear it, while at best they can help you stay alive and healthy in times of pandemic.

Sources: Global Times, Deyner´s Notes, US Today, European Journal of Medical Research, History.com

Chinese-Malaysian epidemiologist Dr Wu Lien-teh invented the surgical face mask

UMaqopholwana, The red armoured fire engine

'Maqopholwana' is our red, armoured fire engine.
He roams the streets in the City of Tshwane
He reminds me of a red-and-black bull that I used to like.
He was a strong bull but a cheeky one - that oke.

Maqopholwana was not from our kraal.
He had many scars on his skin; his horns were like a hook.
We had our own big black bull, very tall.
Granddad used to call him "Hlehlani"
Meaning "Retreat or Stand back"

He walked tall but did not attack anyone.
Hlehlani never liked Maqopholwana, not even a bit.
These two bulls used to fight until sunset.
The red and black bull was the younger.
The sound of their horns was like thunder.

"Maqopholwana" the red armoured fire engine,
Like the red-and-black bull from my hometown,
Has great strength, is powerful and has speed.
No one knows exactly what goes on in his head.
He is called only when there is a need,
As he is the only one of his breed,
He is surely special, one of a kind.
What goes on exactly in his mind?

"Maqopholwana" the red armoured fire engine
Never likes disruptive fires in the City.
He uses his skill, his prowess and his agility
With his bevel bar he sweeps the city clean.
Engine 764 is his official given callout name.

Goes around driving on any ground, any terrain
He has endurance like a diesel train
Nobody knows what really goes on in his brain.
Anywhere else in the world,
I am certain about it and
Thus, I give you my word
A similar one, you will never find.

By Lindsay Z Mnguni, Poem#27

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