

FIRE AND RESCUE INTERNATIONAL

Integrated fire, rescue, EMS and incident command technology

Volume 5 No 5



CELEBRATING
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YEARS
OF PARTNERSHIP
FOR SUCCESS

WORKING
ON FIRE

BETWEEN WORKING ON FIRE,
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Comment

Fire and Rescue International (FRI) proudly presents its 53rd edition. We trust that our readers will find the articles and information published in this edition of use and beneficial. Enjoy the read!



Lee Raath-Brownie

National Disaster Management Centre (NDMC)

South Africa's White Paper on Fire Services was gazetted on 25 September 2020. The Fire Brigade Services Act, 1987 (Act No. 99 of 1987) (FBSA) is one of the pieces of legislation administered by the Department of Cooperative Governance (DCoG) through the National Disaster Management Centre (NDMC). Dr Musiwalo Moses Khangale of the NDMC highlights the key policy proposals underscoring the White Paper.

Wildfires

The wildfire focus in this edition features dispatch and coordination systems, Chapter 3 of Dr Neels de Ronde's book, 'The Garden Route in flames', which focusses on developing the basic regional fire prevention plan and an Australian contribution that shares their indigenous ancient burning traditions with Botswana. Technical expert, Colin Deiner, writes about commanding the wildland/urban interface, highlighting the impact of the large scale densification of cities, the key priorities, staging and managing resources and the importance of mutual aid agreements. Michelle Kleinhans shares 'Lessons learnt in ICS to be implemented', a reminder that we do not make the same mistakes again and again.

Mobile fire fighting technology for high hazard applications

Stuart Phythian of Firedos details the technology and challenges faced in fire protection systems stating that fixed fire protection systems are increasingly being supplemented by versatile mobile equipment. He adds that Industry changes in foam fire fighting techniques present some special challenges for equipment manufacturers for a response combining both fixed and mobile equipment for high hazard applications.

Rescue Roundup

SAMRO's Julius Fleischman and Neville van Rensburg share their views on proper education and training for emergency medical services (EMS) and rescuers responding to motor vehicle accidents, highlighting the importance of the fact that when confusion and conflict occur between medical and rescue priorities, it's the patient who suffers.

Self-defence strategies for first responders

Morné Mommsen of Midvaal Fire and Rescue and Warrior Combative, shares the reasoning why self-defence for emergency workers is so important, especially in today's world.

We thank 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
Publisher

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This month's FRI Images winner!

Congratulations to

Michael Combrink for his photograph 'Rosenbauer tanker' taken with a Samsung A7 on auto settings.

Well done!

Michael Combrink wins this months prize money of R2000!

Photo description:

Rosenbauer tanker at OR Tambo International Airport ARFF with 41 400 litres of water and 5 000 litres of foam.

Best rescue, fire or EMS photo wins R2 000!

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!

Working on Fire celebrates 17 years of successful partnerships



The award winning Working on Fire programme, funded by the Department of Environment, Forestry and Fisheries, reached a milestone of having been in existence for 17 years during the month of September.

Over the past 17 years, Working on Fire, implemented by the Kishugu Group of Companies, has grown exponentially from its humble beginnings, with just 850 veld and forest fire fighters, to a globally

renowned programme, employing over 5 000 people, encompassing Working on Fire, the High Altitude Team (HAT), the Drought Relief Project (DRP), the Value-Added Industries (VAI) project and its recent addition, the Forestry Support Team programme.

Celebrations of this milestone, with the theme, '17 Years of Successful Partnerships', were held at national and provincial level, with various activities and events in all eight

of the provinces whilst adhering to COVID-19 regulations. These partnerships include Working on Fire's longstanding partnerships with the Department of Environment, Forestry and Fisheries, national and local government entities, public and private landowners and fire protection associations.

There are many highlights along Working on Fire's 17-year growth path, with the many critical interventions in major disaster fires, such as the Knysna Fires in 2017, the George fires in 2018 and the Cape Town Table Mountain fire in 2015, showcasing Working on Fire's sought-after integrated fire management services.

The 10-year celebration at ThabaNchu in the Free State, the participation in various international wildfire conferences and a showing at the 22nd African Forestry and Wildlife Commission highlight Working on Fire's global footprint.

In addition, Working on Fire has had successful deployments of fire fighters and management to Canada, Indonesia and Chile.



Working on Fire's contribution to saving lives and protecting the environment is self-evident in the number of fires attended, disaster relief as in the case of the Lowveld floods in Mpumalanga, the tornados in the Free State and the rescuing of children from shack fires.

Equally important has been the impact of restoring dignity to the unemployed youth, who are recruited from disadvantaged communities, into the programme and have gone through the ranks and now occupy management positions.

Currently, Working on Fire employs just over 30 percent of women and this are the highest level of women employment in the fire services globally. Moreover, 51 percent of Working on Fire's management are women, many of them former fire fighters.

In addition, we have developed a dedicated Women's Forum over the past few years, which provides our women employees an opportunity and platform to engage on a wide range of issues affecting them in the workplace.

In 2007, Forestry SA CEO, Mike Edwards, stated after a devastating fire season, that "Forestry South Africa has sustained losses of R3,6 billion and that if it was not for Working on Fire, that losses would have been double."

Working on Fire has created a development path for the up skilling of former participants and current fire fighters to become functional managers within the programme. Today Working on Fire participants occupy 60 percent of the management positions in the programme. The crew leaders in the programme are also former participants who have been trained and skilled to lead the Fire Fighting Teams at bases across the country.

Striding the global stage - international deployment

This has been one of the remarkable facets of the development of Working on Fire programme, both in terms of how it projected our abilities on the international stage but the impact of these deployments had for our fire fighters. Indeed, the



threats of climate change point to this becoming a potential area of growth in the future.

There are many former fire fighters who are now serving in Working on Fire management and many other alumni are now engaged in full time employment in state structures such as the South African Police Service (SAPS), the South African National Defence Force (SANDF), Correctional Services, municipal fire services, other local government structures, conservation agencies, the private sector and those who pursued entrepreneurial careers on the foundation of their experience in Working on Fire.

Working on Fire has an extensive collection of letters of recognition and appreciation from various communities where Working on Fire teams assisted in saving their lives and property from fires.

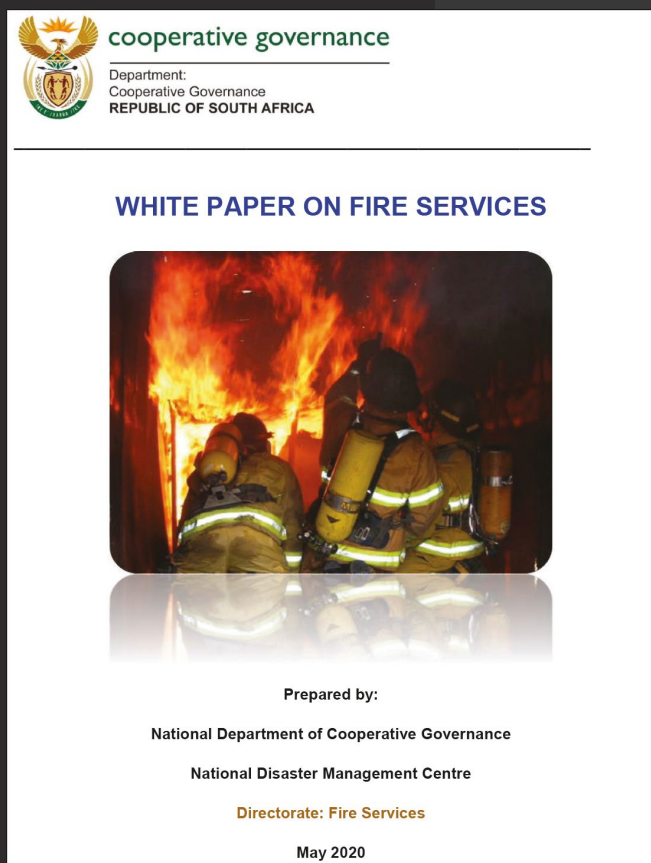
In 2012, the late Minister of Water and Environmental Affairs, Edna Molewa, during her visit to the Working on Fire Training Academy on 23 November, officially handed over the Kamoso Award for the best performing Expanded Public Works Programme (EPWP), under the sector Environment and Culture, to Working on Fire.

The late Minister Molewa said, "Working on Fire has once again excelled in their commitment to create jobs, to alleviate poverty, to skill previously unemployed youth and successfully having contributed to South Africa's integrated fire management capacity."

In October 2012 Working on Fire received a certificate of excellence in the Centrum Guardian Awards. Crew Leader, Jonas Zandamela and the Nkomazi Team in Mpumalanga represented Working on Fire with their rescue efforts during the floods in the Lowveld earlier in 2012. ▶

White Paper on Fire Services gazetted on 25 September 2020

By Dr Musiwalo Moses Khangale, director: Fire Services, Department of Cooperative Governance,
National Disaster Management Centre



South Africa's White Paper on Fire Services was gazetted on 25 September 2020. The Fire Brigade Services Act, 1987 (Act No. 99 of 1987) (FBSA) is one of the pieces of legislation administered by the Department of Cooperative Governance (DCoG) through the National Disaster Management Centre (NDMC). The Department has identified the FBSA as an old order legislation that must be reviewed to closely align and harmonise it with other applicable legislation especially the post 1994 local government legislation. Initially, DCoG attempted to achieve the objectives of reviewing the FBSA through amendments and accordingly commenced with the process. Whilst this process was underway, it became evident that this approach will not enable the Department to achieve the desired objectives due to the nature of aspects that must be introduced in the revised fire services piece of legislation. In view of this and consistent with Government's approach to policy development, a Discussion Paper on the review of Fire Services legislation was published for public comments in March 2013. The Discussion Paper was followed by the White Paper on Fire Services which will form the policy basis for the revised legislation.

The department is confident that this approach will ensure that prior to the promulgation of the revised fire services piece of legislation, a clear policy framework



In March 2010, Working on Fire was awarded a Certificate of Merit by the Impumelelo Awards Trust for its KwaMemela Firewise Community project, which has successfully pioneered community-based fire management concepts in rural KwaZulu-Natal.

In 2009, the remarkable work done by Working on Fire in reducing the impact of unwanted fires on people and the environment was acknowledged when the programme received the Kamoso Award for Best Environmental Programme.

In 2005 Working on Fire was awarded a Platinum Award, the highest accolade, by the Impumelelo

Innovations Trust, which recognises exceptional achievement by government-initiated projects that are sustainable and can be replicated.

And in October 2019, Deputy Minister of Public Works and Infrastructure, Noxolo Kiviet, singled out the Working on Fire programme, as one of the South African Government's most successful programmes. She made these remarks whilst accepting on behalf of the EPWP programme, an International Bronze award at the Future Policy Awards in Belgrade, Serbia, which seeks to give global recognition for the successful implementation of youth empowerment policies. ▲

for the function is in place for all role players to grasp the fundamental principles and policy direction underpinning the legislation. The fundamentals of this White Paper are derived from the Constitution and the relevant post 1994 local government legislation. While fire fighting services are provided at both local government level and by designated services, the 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 in line with Chapters 3, 6 and 7 of the Constitution.

The White Paper also introduces a vision for the Fire Services function as outlined below:

Vision of Fire Services

A fire service that is proactive in preventing fires and other risks rather than simply reacting to fires through:

- a. Acting in support of the wider developmental agenda as outlined in the NDP
- b. Establishing sound institutional and administrative capabilities that support its roles and purpose
- c. Demonstrating good governance and administration
- d. Adopting community based approaches
- e. Putting people and their concerns first and
- f. Professionalisation of the function.

Key policy proposals underscoring the White Paper

There are 20 key policy proposals set out in the White Paper: These are:

- a. Reform legislation to reposition the fire services into the 21st Century
- b. Clear definition of roles and responsibilities of all spheres of government
- c. Introduction of a national fire services advisory structure
- d. Locating fire services within the broader development agenda of the country
- e. Development of a National Fire Services Framework
- f. Professionalisation of the fire services
- g. Alignment of applicable regulatory/legislative frameworks to provide a comprehensive and unified legislation for fire services
- h. Establishment of a national fire research and data centre
- i. Development of a uniform risk assessment model
- j. Development of various categories of designated services
- k. Development of a national education and training strategy
- l. Introduction of a risk-based approach in the provision of fire services
- m. Entrenching fire safety and prevention as core deliverables of the fire services
- n. Introduction of a funding strategy for fire services
- o. Make provision to adopt applicable South African National Standards (SANS) to provide benchmarks for the provision of fire services
- p. Make it mandatory for all municipalities to develop and adopt fire services bylaws;

“The Head of the National Disaster Management Centre, Dr Mmaphaka Tau, has noted that the finalisation of this White Paper marks an important milestone in the process of introducing a comprehensive and harmonised piece of legislation for the Fire Services in the country.”

- q. Introduction of a National Fire Code that will deal with fire safety elements that are not addressed adequately in the National Building Regulations
- r. Introduction of a national uniform Incident Management System (IMS) to improve response to fire incidents
- s. Establishment of Fire Services Directorate at both provincial and national government spheres and
- t. The introduction and implementation of a new Fire Services Act.

The review of the FBSA is fundamental to re-position fire services to respond to changing and growing needs of society and to contribute meaningfully in the achievement of National Development Plan (NDP). The White Paper therefore represents the first major step in the reform and overhaul of the legislative framework governing the provision of Fire Services to communities. The NDMC will commence with the process of drafting the Fire Services Bill based on the policy framework provided by the White Paper and would create platforms for consultation across the country with all role players. Finally, the NDMC wishes to convey its gratitude to all role players who participated in the process of developing this White Paper on Fire Services.

The Head of the National Disaster Management Centre, Dr Mmaphaka Tau, has noted that the finalisation of this White Paper marks an important milestone in the process of introducing a comprehensive and harmonised piece of legislation for the Fire Services in the country. He further observes that, by enjoining all role players to prioritise fire risk reduction measures especially at community level, this White Paper is in line with global contemporary disaster management philosophy and practice.

The gazetted White Paper is available for download on the NDMC website www.ndmc.gov.za. Enquiries on the White Paper can be directed to:

Dr Musiwalo Moses Khangale

Email: Mosesk@ndmc.gov.za

Tel: 012 848 4601. 🔥

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With the corona virus pandemic sweeping through the world, a world-wide hazmat incident of note, effective sanitation has become critical and even lifesaving, especially for our first responders. Our eyes, mouth and nose have proved to be primary entry and infection points for this virus. Scientists and the World Health Organisation (WHO) have discovered lately that an alarmingly large proportion of the COVID-19 infections are also caused by minute micron size droplets that have been aerosolised by infected persons either sneezing, coughing or merely exhaling the virus into the air where these floating viruses have been measured to remain afloat for excessive periods of time, greatly enhancing the vulnerability to infection of our first responders.

It is obviously clear that we must keep the face and infection points well sanitised and clear of the virus. To improve our own biosecurity and to

reduce the risk of infection, we must keep our faces and these points of infection ie eyes, mouth, and nasal passage, as well as throat sanitised and free of the virus. It is critically clear that we must kill the virus in these infection points before it migrates down to the lungs. If we can keep these infection points sanitised and free of the virus; then obviously we greatly reduce the risk of infection. This is critically important, especially for first responders who are bravely battling this virus and who are at greatest risk.

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- prions as well as also rapidly killing the highly contagious COVID-19
3. Vita has a superior safety level, with no adverse effects on fibroblasts and keratinocytes, is free of any oral or nasal toxicities, skin sensitisations or irritations and offers anti-inflammatory and immunomodulatory properties. It is 100 percent safe. No risk of poisoning or causing necrosis (damage) of human cells and tissue. It is a highly effective biocide and sanitiser and yet it is so gentle to human and human tissue and cells
6. Vita can be applied in situ in any working environment eg hospital wards, fire stations, etc without having to vacate the premises for risk of poisoning, as is the case with most chemical sanitisers. Vita can be sprayed in a work area without the staff having to vacate the building
7. Vita leaves no chemical residue and there is no need to rinse with water after application
8. Vita is not a risk to the environment and dissipates in high organic soil loading and reverts to H₂O and NaCl
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10. Vita can be safely and effectively applied by means of a mist or fog or by humidifier to decontaminate the air and all the surfaces in a room. Because of its electrostatic nature, the Vita droplets will be far reaching and penetrate cracks and hard to reach places and provide for an overall and full surface decontamination.
11. Importantly, Vita can be applied into ventilation and air conditioning systems eg hospitals, fire stations, office blocks, etc to provide for the decontamination of circulated air to kill airborne pathogens as well as viruses and to prevent aerial cross contamination. 🔥



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FireWeb in Working on Fire Dispatch and Coordination

By Tracey Carter, HOD: Dispatch and Coordination, Working on Fire



Kishugu Aviation is included in the solution, allowing their pilots to complete the captain's logs digitally

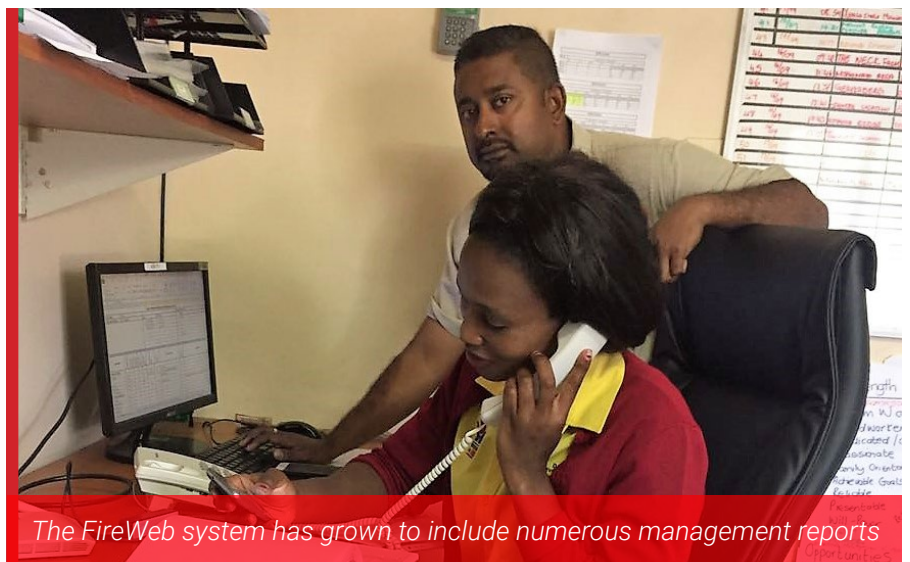
available products that could meet the Working on Fire Dispatch and Coordination requirements. Through a selection process, the FireWeb incident management system was selected as the preferred operational solution for the Dispatch and Coordination Department. The FireWeb Incident Management solution, developed by SYW.io, has been deployed throughout South Africa, including to a number of our customers and partners such as local, district and provincial Government as well as to a number of fire protection associations and their larger members.

In the initial phases of this investigation, it was clear that the team at FireWeb understood our operations and what was involved with the management and dispatching of different vehicle types, the team types and different aircraft over a wide variety of movement types, categories and subcategories as well as the management structure applied in the verification of this information. ▶

Working on Fire is a national organisation, managing 333 fleet resources, 31 aircraft and 246 teams with approximately 5 500 participants. Within the organisation, Dispatch and Coordination plays a vital role in the dispatching, monitoring and reporting on of over 34 000 activities per annum ranging from integrated fire management activities such as prescribed burning, fuel load reduction and fire break preparation, drought relief activities such as fuel load reduction, high altitude team activities such as alien invasive clearing, through to fire suppression activities with our partners and landowners through to every internal movement such as relocation of teams and taking vehicles in for a services.

The responsibility to issue movement numbers, call takes and route forms as well as to complete the administrative sign-off and financial submissions of the above falls directly within the portfolio of Dispatch and Coordination.

Over the years, as the Working on Fire programme grew, it became clear that there was need for a centralised reporting system to track and collate all of these activities from our 24 dispatch centres located throughout the country. An evaluation process was started to investigate the



The FireWeb system has grown to include numerous management reports



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“FireWeb has been instrumental in Dispatch and Coordination in being able to capture all our different movements in one place”

- ▶ The 75 staff of Dispatch and Coordination found the programme very user-friendly and can integrate many of their functions, from capturing to checking to reporting.

In mid 2018, the team at FireWeb began the process of implementing a number of Working on Fire specific customisations enabling our organisation to effectively report on movements involving both aerial and ground based resources, often running over multiple days with a collection of different authorisers. After intensive testing and training in a smooth transition, FireWeb went live at Working on Fire on 1 April 2019.

Since 2019, we have observed the system improve, evolve and grow and as an organisation, we have provided numerous valuable inputs into the solution, which has enabled us to report

more effectively, both internally as well as to our funders at the Department of Environment, Forestry and Fisheries (DEFF).

The FireWeb system has grown to include numerous management reports, ranging from our critical dispatch summary reports, which tracks team movements, hours and kilometres driven, aerial dispatches, accumulative hours flown, trend analysis reports from each of our regions to assess the activities dispatched by season, response time tracking, assisting us in analysing our commitments to our partners. In addition to this, we have included Kishugu Aviation into the solution, allowing their pilots to complete the captain's logs digitally and to upload any evidence required for the incident report. This information provides detailed reporting to the management of the different business units within the organisation and allows for dispatch to provide accurate logs of fleet and aircraft utilisation.

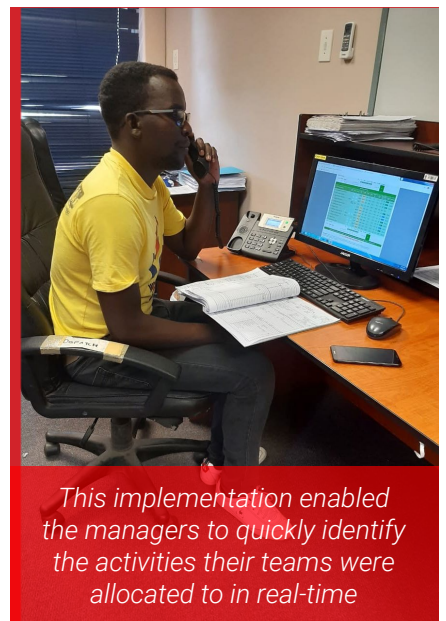
The information captured into FireWeb has also helped our finance department in ensuring the timeous and accurate invoicing of movements.

This October, Working on Fire made the decision to implement the FireWeb solution within operations. Whilst the information has been and will continue to be populated by Dispatch and Coordination,

the aim was to provide access to information to the regional managers, ground operations managers, general managers as well as the admin controllers within each of the provinces giving them a detailed operational overview of the teams they are responsible for.

This implementation included indepth user training but also enabled the managers to quickly identify the activities their teams were allocated to in real-time, which resource, how many hours performed, as well as the number of hectares of production completed. In addition, the regional managers now have the ability to plot the area worked by their teams, verify the production hectares and to access the evidence provided by their crew leaders in a digital format. The general manager now has access to the status of movements invoiced as well as to verify the output provided by their province.

FireWeb has been instrumental in Dispatch and Coordination in being able to capture all our different movements in one place as well as being able to upload all the supporting documents. It is a one stop shop for all our activities. We have thoroughly enjoyed our use of the FireWeb product to date and are looking forward to a continued long relationship with their team and further developing functionality of use to us as a department. 📍



Commanding the wildland/urban interface

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

Recent major wildland fires across the world, particularly in Australia, Portugal and California, have stressed the increasing threat that major wildfires pose to inhabited areas



Recent major wildland fires across the world, particularly in Australia, Portugal and California, have stressed the increasing threat that major wildfires pose to inhabited areas. More and more people are moving into the wildland urban interface (WUI) for different reasons. This places an extra responsibility on both urban fire services and specialised wildfire services to realise the added risk posed by this situation and to develop strategies and tactics to support each other during such operations.

What is the WUI?

The term 'wildland' refers to an area in which development is essentially

non-existent, except for roads, railroads, powerlines, etc and any structures are widely scattered. The wildland/urban interface is defined by the US National Wildfire Coordinating Group as the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. This is the area where a wildland fire can potentially ignite structures. Due to the area of fire spread caused by a wildfire the risk is clear that several structures could be affected if the conditions are right.

There are broadly two types of people that live within the WUI. The first group is comprised of low income and

poverty stricken communities who have mostly settled in cities to find work and escape the deprivations of the rural areas. They live in shacks in informal settlements on the urban edge, which are constructed of mainly flammable materials with no fire protection whatsoever. These people are not only at risk from wildfires that have started outside their occupied spaces but are also capable of starting fires which could spread into the wildland environment.

The second group is those who fall in a much higher income bracket and occupy dwellings that bring them 'closer to nature'. Due to their intention to live as close to the

Extreme fire conditions could precede a fire in a WUI area and rapidly spread into the inhabited space causing ignitions of structures through fire and ember exposures from the wildfire



- ▶ natural environment as possible, they will fully avoid creating a safe barrier between their homes and the wildland environment.

In both cases it becomes increasingly difficult to manage the WUI due to the risk of pre-burns destroying people's properties. The natural fire-reliant environments are compromised to the point that despite recent emphasis on 'fire use'; many more wildland fires are suppressed compared to those allowed to burn. 'Fire exclusion' still seems to be our default approach and this has resulted in changes in vegetation fuel structures and fuel accumulation, leading to more high-intensity fires.

Structural fire fighters vs wildland fire fighters

The urban fire service environment is normally organised around the placement of multiple fire stations within a city area according to the risk in that particular suburb or industrial area. Response is based on standard operating procedures (SOPs) specific to the incident. Units based on a pre-determined attendance (PDA) will respond to a structural fire and commence fire-fighting operations in the room of origin, floor of origin or building of origin, depending on the magnitude of the fire.

Protection of surrounding exposures may also be prioritised. Responding to a structural fire in an urban area should, due to the standard PDA, not take longer than a few minutes (or seconds) and control of the fire

should also be fairly rapidly achieved in several minutes to a few hours. The fireground is generally well delineated and the incident commander should be aware of most of the risks he/she is dealing with. Additional resources will firstly come from the service's own jurisdiction and additional resources from other services might only be called in the event of the primary service being overwhelmed. In most cases, however, there is only one structure to focus on.

A wildland fire, on the other hand, does not conform to the parameters encountered in a structural fire scenario. Firstly, the first response could comprise land owners with wildland fire services arriving as a secondary response. Multiple jurisdictions could be involved from the start and the fire area could range from a small area to several thousand hectares. Seldom would a wildfire response be of a short duration. Often fire crews would be deployed for several hours to several days, even weeks.

WUI and WUI disasters

When a major fire starts burning within the wildland/urban interface, most of the above rules go out of the window. The fire spread will not be dependent on its geographic location but due to a set of circumstances such as fuels, topography and local weather. The initial response should include multiple agencies from several jurisdictions and could impact structures on the interface boundary,

whole neighbourhoods and even parts of towns or cities.

Wildland/urban interface fire disasters are frequently preceded by extreme weather conditions such as high wind speed and low humidity. This is the first element of a disastrous situation. The Fire Danger Rating System is quite effective at predicting when such disastrous wildfires are likely to occur and are effectively utilised by wildfire authorities during their high-risk seasons. The situation is not necessarily the same for WUI fires. The Southern Cape fire in 2017, which destroyed more than 900 formal dwellings in the coastal town of Knysna, occurred outside of the region's wildfire season and therefore provided little warning of the major fire, which followed a province-wide storm blowing in from the western parts of the province. The region was, at that stage, experiencing a major drought disaster, which increased the risk exponentially.

So how does a WUI fire disaster happen? Extreme fire conditions could precede a fire in a WUI area and rapidly spread into the inhabited space causing ignitions of structures through fire and ember exposures from the wildfire. These structures are exposed to the same fire conditions and embers from exposed combustible elements spread to other structures leading to multiple ignitions. This could quickly overwhelm the first responding agencies. The time it will take assisting services to respond, will be critical. It is here where a fire could take hold of the urban area and grow to the extent that it rapidly compromises the effectiveness of all fire-fighting services. You are now dealing with a disastrous situation, which will destroy multiple structures before control can be achieved.

WUI response

Incident commanders will quickly be confronted with multiple priorities. The following three priorities should be key:

1. Life
2. Incident stabilisation
3. Property and environment preservation

Your objectives will be informed by these priorities and should outline what must be done to ultimately control the fire. Always ensure that the objectives are focused, measurable and achievable within the time allocated to them. They must also all be aimed in the same direction. The one that leads to the fire being controlled. Crucially these objectives and the expectation of how they will be achieved must be communicated to all forces clearly.

Forecasting fire behaviour happens at all levels and should be a prime component of the incident commander's planning. Command should consider all inputs from the various sectors and if necessary include them into the incident objectives.

In a fast moving WUI fire, the incident commander can delegate objectives down to branch level and allow them to best manage their individual area by implementing the appropriate tactics based on fire behaviour. Communications could become difficult at this stage and it will then be important that all branches within the command system are able to operate with a clear set of instructions.

Decisions on the evacuation of people, road closures, animal control, etc will be informed by the anticipation of fire behaviour in the next few hours. Early deployment of the units that will be responsible for these activities will ensure



The time it will take assisting services to respond, will be critical

rapid execution when it becomes necessary and will also enable these resources to reach the areas they are assigned to without being prevented to get there due to the spread of the fire.

Staging of resources in the WUI environment will differ from a purely rural wildfire due to some of them having to be located in urban areas. It might be difficult to locate areas able to accommodate large numbers of resources and the consideration should be for a number of secondary staging areas in relatively close proximity to one another.

Aerial support becomes a highly focused activity in this environment. Coordinating water drops within the wildland environment will have to be focused on controlling the fire in that space and preventing its migration into the urban spaces. An early response

of aerial resources will greatly enhance the chances of achieving just this. Careful coordination between the air operations manager and the ground crews working on the urban edge must be achieved through clear communication. Water drops need to be done with almost surgical precision.

Evacuation of the public will have a number of challenges and might also require the deployment of a large medical group. The medical group supervisor should be embedded at the incident command post where he/she can direct resources in coordination with the respective geographic branch and/or division. The staging of emergency medical staff and ambulances should be away from the command post and staging area and allow for rapid and safe response to and from triage areas.

In closing

With the large scale densification of cities, we are seeing more and more of these fires and it is seldom that any major wildfire does not interface with habituated areas. Equally, there are very few large-scale WUI incidents that won't require mutual aid and multiple agencies and disciplines working together as a team.

Agencies responsible for dealing with wildfire must, together with their urban fire services brothers and sisters, plan for the types of scenarios that will test them all in an unnatural situation that could eventually become the norm. ▲



Decisions on the evacuation of people, road closures, animal control, etc will be informed by the anticipation of fire behaviour

Lessons learnt in ICS to be implemented

By Michelle Kleinhans, managing director, Dynamic Incident Management



they know ie friends, instead of using people that are more qualified to fill the positions. It is important to not change IC's per shift. It is confusing and contributes to regular change of tasking to 'suit' the new IC's view of the situation, instead of continuing with the current plan. Unified command is seldom used and can make a major difference during an incident.

The incident command post (ICP)

The incident command post is not the same as an emergency operations centre (EOC). The incident command post is where the incident commander and his/her incident management team (IMT) manage the incident from. Also, it is not a place for gatherings or where people walk in and out from. The incident command post should allow for each section activated, to have their own room for operations. The incident commander should have his/her own space and meetings need to be held in a separate room and not within the sections, so that people can continue to work. Briefings should preferably be held on the outside of the incident command post or at a camp, as to avoid cramping into one small room.

ICS structure

The ICS structure complements the incident needs and requirements. It is important to fill the required ICS positions using skilled personnel. A section chief, who does not understand his/her role and responsibilities, should not be appointed. An incident is no place to do in-house training; activate a trainee position without the responsibility of the actual position for training purposes. Activate unit leaders; one person cannot do all the work.

ICS positions

ICS positions should never be combined. Only the incident commander can fill all positions at once if he/she does not activate

Memory is good but short.

A lesson learnt, needs to be a change in personal or operational behaviour as a result of the experience that should be considered in future operations or response. Yes, collecting and disseminating lessons learned helps but:

- What about applying them?
- Important enough to be communicated and re-applied?

The only way to avoid problems happening again, is to carefully consider what went wrong at the time and why; then decide what can be done differently next time to avoid the problems/issues. It is important to understand that lessons learnt should be implemented not only upon responding or during incidents but before responding or deploying resources. It is called preparedness.

Let's look at some lessons learnt in implementing the incident command system (ICS) before during and after incidents.

Activate the ICS structure from the start of an incident!! No matter how small the incident, there must always be an incident commander (IC), this is the start of forming the ICS structure. Remember an incident commander cannot do all the work on his/her own. One cannot just do one training course and think you know how the system operates and implement the structure the way you think it should be. It is important to understand the situation and know when to activate ICS positions as the incident escalates. Take notice of when the incident is escalating into an extended attack and plan the structure needs to grow with the incident.

The incident commander (IC)

The incident commander (IC) must have full authority (delegation of authority) to make decisions and has full accountability at the incident. A lack of understanding of this concept during incidents is evident in our country. The IC must draw on trained, qualified and experienced people to build the ICS structure. People tend to use people



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Wildfires

- ▶ the specific position. The section chief can fill the unit positions if not activated by them. Critical positions such as logistics cannot be used to check in resources, which is part of the planning section's responsibility. There is a reason for each position with a specific role and responsibility; to combine or cross the role and responsibility is asking for unclear instructions and communications.

Incident management teams (IMT)

It is all about span of control!

An incident management team (IMT) means trained, qualified and experienced people that support the operations during an incident, not vice versa. One does not just put people in positions to form a team. ICS is about position, not rank. IMT members do not necessarily need to be from one organisation, if they understand the incident command system and the roles and responsibilities, the person can work within any IMT. The use of local experts can strengthen the incident management team's work and outcomes. Regular incident management team training will ensure that each member is still current within the position. There is a need in South Africa for a national IMT database.

Use of the planning process

Without following the planning process the only thing that continues is chaos management. Implement the process should not be as we like it to be but rather it needs to follow the ICS formal planning process. Meetings and briefings during the process is not a time for 'catching up' with friends. Operational period briefings are formal briefings where tactical supervisory personnel receive operational instructions and should be formal and timely.

Standard terminology and forms

The use of standard incident action plan forms and other relevant incident forms is critical on all incidents. Refrain from using your company forms or what you feel is relevant. Resource typing is critical on any incident and need implementation.

Incident action plans (IAP)

Incident action plans (IAPs) are done before the start of the operational



period, not after. There should be an incident action plan per operational period and each supervisory personnel must receive an IAP during the operational period briefing. The IAP becomes a legal document at the end of the incident and should be filed and kept. Proper completion of each form of the IAP is critical and the incident commander should ensure that IAPs all are completed and signed off. The IC on final signing off the IAP confirms that all is correct and ready for implementation. The accountability lies with the incident commander.

Checking in and tracking of resources

One cannot put enough emphasis on checking-in and tracking of resources. The incident command system uses a T-card system, which is visible and easy to read. Electronic resources tracking should be used for record purposes not as the only tracking system. All resources, tactically and functionally, must check in; this will help with volunteers just arriving to check on qualifications before tasking.

Communication

Integrated communications are critical for successful communications. WhatsApp cannot be the main communications method tactically but it is a good back-up system. Each division or group must have their own channel and not everybody should have a radio. Air communications should be done through a licensed person and not used by everybody. Public information during the incident is critical. The more information provided, the less calls will be received; not only via radio, television or newspapers but regular updates

on community billboards will give calming information to the public. Social media must be controlled; difficult but possible for all incident personnel and resources.

Incident identification

Resources arriving at an incident must go through check in and should receive an incident call sign and not use their own call sign for the incident. Vehicles, crews and single resources should receive a colour tag to confirm official check-in and tasking were received. IMT members should wear the same PPE ie shirt with position identification; different uniforms should be avoided.

Incident resources, camps and staging areas

Check-in is a must when arriving at incidents, camps or staging areas. Activate proper camps for resources to allow for relieve resources to be housed and rested to continue working. This will also allow for more control of resources. A camp should not be used a staging area. Allow for enough relieve resources during larger incidents; don't wait until needed.

Transfer of command

Formal transfer of command should take place and everybody should be informed of the transfer of command. Stick to the current plan; do not just change it to suit your needs as new incoming supervisory personnel.

Demobilisation

Demobilisation is not an on-the-spur-of-the-moment task. Allow enough time for demobilisation orders. Proper check-out and tracking need to happen. Implement demobilisation plans and debrief resources before demobilisation.

Formal debrief

The formal debrief not is not an opportunity for a finger-pointing session. The formal debrief is critical for lessons learnt and must be attended by all IMT members and supervisory personnel, not just decision makers and political leaders; it is not about the who but the what. The incident commander should not chair the debrief; it should be chaired by a person who was not

The Garden Route in flames: Chapter III - Developing the basic regional fire prevention plan

A book by Dr Neels de Ronde

The following article is the third 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.

3.1 Developing the basic regional fire prevention plan: The top-down approach

At this early stage of creating the regional fire prevention plan, it is important that we identify the natural as well as artificial fire protective lines and structures in the landscape, which can be used to advantage for this purpose and to determine where these lines can be incorporated into the fire prevention plan. This requires a holistic outlook for solving effective reduction of extreme fire hazard situations in the regional landscape, without even considering fixed lines, such as property boundaries. This is important because these lines (property boundaries) are all man-made and for fire protection purposes, many will be the worst to use for

such goals because of wrong (ineffective) routes being selected for fire protection purposes!

Effective fire protection can only be achieved if the terrain (general topography, aspect and slope steepness) is properly assessed, together with the direction from where "hazardous fire approach" is most probable, such as from the general northerly direction along the Garden Route.

Then the fire history (and mapping thereof) is also totally neglected and in particular the related changes in vegetation age of some areas and this includes in particular the consideration of the 2017 and 2018 wildfires into future regional planning. I fail to see such plans. Where is the regional plan for the Garden Route, as affected by the recent wildfires? I will, with this writing, provide some guidelines for such a future plan. However, my attempts will here only be to provide some ideas and by no means are any of these "units" or "buffer zones" fixed. This depends on the actual vegetation cover and classification of the sub-regional areas. Remember that all this planning will have to be flexible, so that these can be adjusted in the case of future significant wildfires taking place.

3.2 Basic after fire decision-making

The most useful topographical features along the Garden Route, which can be used for fire prevention purposes, are the rivers carving through the plateau, from the mountains in the north to the Indian Ocean in the south. Then the national

involved in the incident. Emotions have no place in a debrief.

Training

The use of qualified, experienced incident command system facilitators is vital. A one or two course coaching opportunity does not make a person an ICS facilitator. ICS is not just about reading from a slide or a book; it is to provide an understanding of implementation to each student in front of you. As an ICS facilitator, if you do not understand the process and each step's role, responsibility,

forms, inputs and outcomes, you are not ready to train ICS. Use registered training service providers and ask for qualifications in ICS training skills.

Lessons learnt outcomes must be shared and implemented! It is of no use if it is only on paper and not shared with all. Ask yourself, why are we not sharing lessons learnt from incidents?

- Is it because it is about people or organisations and not what happened?
- Is it because egos are too big?
- Is it because we do not care?

- Is it because we think we do not make mistakes?
- Is it because we think it will not happen again?
- Is it because we do not want to share new ideas because then it is not yours?
- Is it because someone in a lesser rank/position can't have better ideas?

Share, share, share then we will all learn from mistakes. Do not keep your lessons learnt a secret. It might just save a life. ▲



Photograph 9: The Garden Route region, excluding the Tsitsikamma, with the “study area” demarcated with a red line. The white lines are the national roads to be incorporated, while Photograph 6 can be used to planning the routes of these buffer zones to be created through the 2018 wildfire area (unknown image origin, while the author has drawn in the added lines).

▶ roads can many times also provide perfect baselines for buffer zones, simply because these lines through the landscape provide permanently-cleared (tarred) surfaces, mostly with fuel reduction measures applied on road shoulders, added to create a substantial firebreak-base for buffer zones. Some road shoulders offer mostly “green” vegetation which can also not carry a continuous fire in such a low profile fuel bed, and are normally maintained as such by the authorities responsible for these tasks.

Then major wildfire areas have to be incorporated to make provision for future inclusion of sections of buffer zones, making provision for the time when such additions are possibly burnable. This has to be planned accordingly, to ensure that an effective regional fire prevention plan is maintained as such at all times, with the correct burning and other clearing methods applied at set times in a regional fire prevention plan. The buffer zones through the mountain catchments have to make provision for at least two continuous sub-zones to be burned in rotation, about four to five years apart.

3.3 Placing the main (regional) buffer zones
The strategic-correct placement of the regional (or main) buffer zones will then also be the most important basis for effective regional protection against wildfires. For this reason, the structuring and maintenance of the main regional buffer zones will always be top priority and should be in the form of continuous lines, with most-effective widths where feasible, to enable the reduction of wildfire size into smaller (more manageable) areas from a fire fighting point of view (Calvin et al., 2004).

3.4 Main buffer zone notes (western study area)
B1: This buffer will be running west of the main tarred road between Hartenbos and Oudtshoorn, as indicated

on Photograph 10. This buffer runs east of this road system at first, missing the Urban-Interface area west of this road (new sub-Urban area), which is situated closer to the Indian Ocean (Photograph 10).

The top northern portion of this buffer was mainly burned over by the 2018 Outeniqua wildfire, which will have to be incorporated when the burned over fynbos is ready to carry a prescribed fire. However, any Pine plantations at present established on the foot slopes where this buffer will run through should be prescribed burned under tree canopies as and when required.

The centre of this buffer consists mainly of agricultural land, which is ploughed regularly and can thus be incorporated as such, with patches of Renosterveld, which have to be incorporated into the buffer by means of rotation burning, to form combined continuous fire prevention lines. The bottom (southerly) portion of this buffer has to be treated as such, as and where land-use makes this feasible.

B2: The northern section of this buffer will run through the 2018 wildfire area, only to be incorporated when ready to be prescribed-burned in rotation when available for this in the future. The rest of this buffer zone runs through the landscape, as yet untouched by the recent wildfires. It will run along the Great Brak River gorge forming a base for future fire prevention, running from north (linking it to the Outeniqua wildfire area) to the south (as far as the Indian Ocean beach near the Great Brak River mouth (Photograph 10).

Where industrial Pine plantations have been established on the foot slopes of the Outeniquas where the buffer will run through, landowners will have to prescribed-

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Photograph 6: View of the Knysna fire area after the fire, from its origin, through Knysna, to the Harkerville plantation on the far right of the image (Courtesy CSIR/AFIS).

- ▶ burn the land falling within the buffer area, when crown canopy closure will make this possible, by means of under-canopy prescribed burning application.

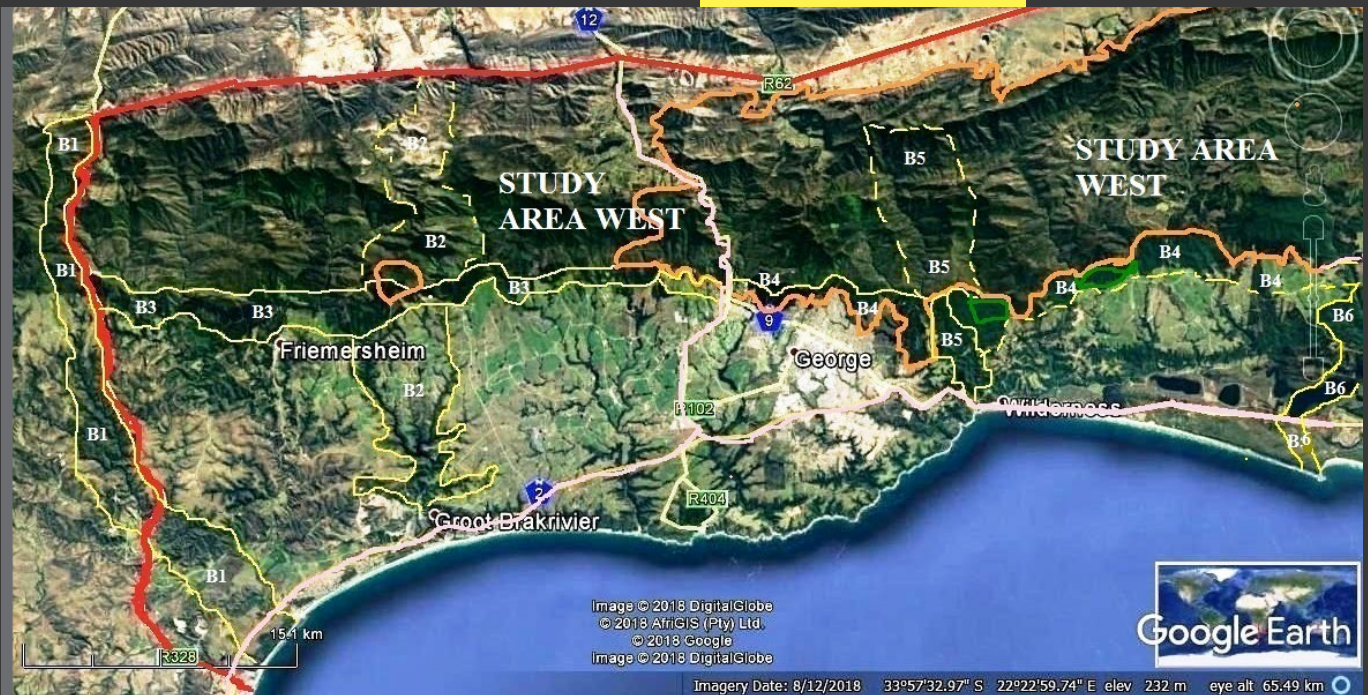
The fynbos within this central portion of the buffer consists mainly of patches Renosterveld within agricultural land. The Renosterveld will have to be incorporated into the prescribed burning plan to aim at

establishment of continuous fire prevention lines in the landscape, preferably on a rotational basis, whenever the veld is ready to carry such a continuous fire.

B3: This buffer will run from the west to the east all along the Outeniqua foot slopes, connecting the Robinson Pass with the Outeniqua Pass (Photograph 10). This will in some places include the outliers of the Outeniqua



Photograph 7 is illustrating in particular how the national roads through the Garden Route region are placed in relation to the formation of the regional buffer zones.



Photograph 10: Zooming in on the western study area section, with the main buffer zones now also added, using not only the road systems but also the topography linked to consider the routes for the main buffers and existing vegetation and the 2018 wildfire area (main buffers B1 to B6). Source: Image from Google.Earth, while the author has drawn in the added lines

wildfire but in others industrial Pine plantations, which were either burned over by the Outeniqua wildfire or were not burned then (Photograph 10).

Where the plantations mainly consisted of *Pinus radiata* plantings these can mostly only refer to off-site establishments, which should rather be converted to *Pinus elliottii* in future rotations. The latter species are also fire resistant and can subsequently be incorporated with ease in rotational burning under their tree crown canopies.

B4: This is basically just a continuation of the B3 main buffer zone and the same applies here as described under the B5 buffer zone. As more of the *P. radiata* here was burned over by the Outeniqua wildfire and these stands were neither thinned nor pruned it will be up to managers to decide how these sites will be treated in the future. However, the fact that these stands (when left unburned) also present a high fire hazard threat, should be considered, whether to be converted to fynbos or to stands maintained in plantation-form (Photographs 10 and 11)

B5: This north-south buffer zone does run through some vital fynbos, which has been exposed to wildfire three times during my career and should be regarded as “hazardous”. The northern section was again burned over during the Outeniqua wildfire and, as soon as burnable, should be prescribed-burned as soon as possible in rotation. The portion south of the B4 buffer zone should be incorporating the Kaaimans River gorge, with added fynbos burning on its sides, for maximum protection, burned in rotation west and east of this gorge as and when fynbos is available for such treatment (Photograph 10).

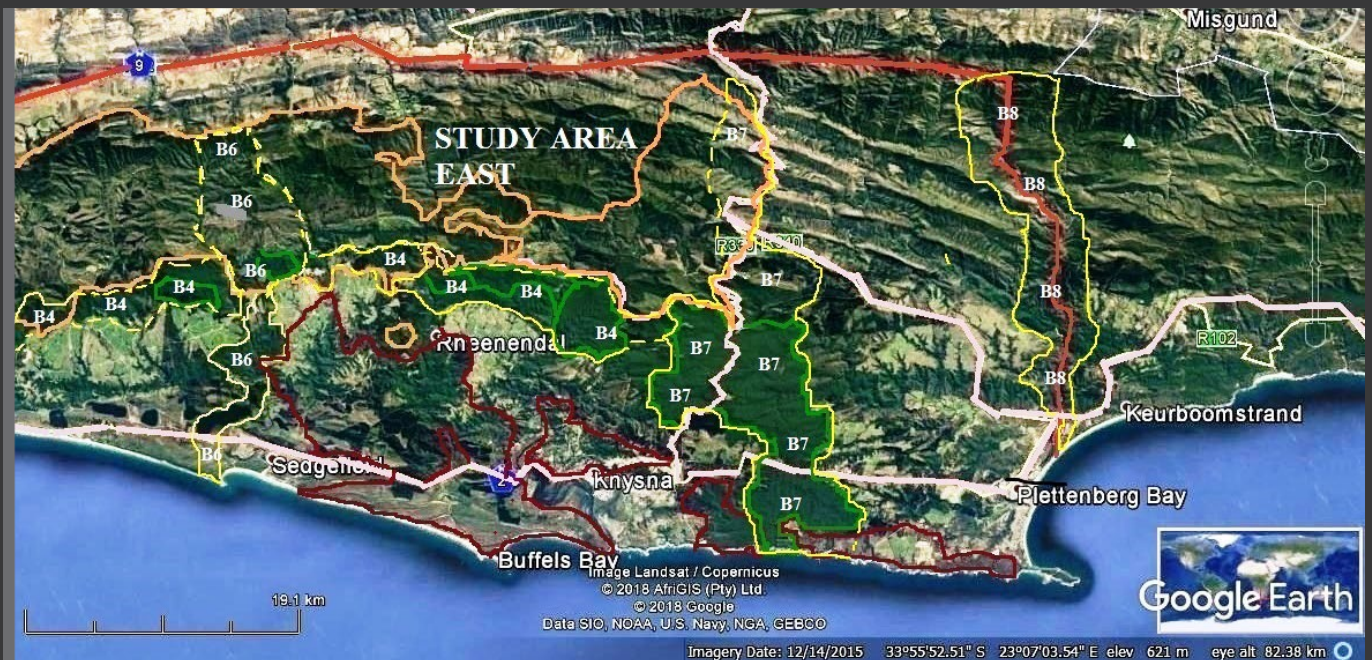
3.5 Main buffer zone notes (eastern study area)

B6: This buffer is situated with the Goukamma River and valley as its base, from a general northerly to southerly direction. Most of this valley is covered by ever-green pastures apart from the wide river itself, while also presenting some unburned and burned over indigenous shrubs covered by the 2017 Knysna fire (Photographs 10 and 11).

B7: This buffer is an automatic choice as (a) the central section of this buffer is mostly formed by the Knysna forests, which is a perfect natural protection buffer and (b) the buffer north of this was mainly burned out by the Outeniqua wildfire (both the old fynbos as well as the Industrial plantations). The latter will have to be treated with fire whatever its vegetation base may be; Fynbos when reaching prescribed burning age and the plantations (most probably *P. elliottii*) when crown canopies are closed and then in two year rotation (Photograph 11).

The buffer-part in the far south of the land has mostly been covered by informal settlements but these townships need to be isolated from the original Knysna town by means of effectively-cleared firebreaks, as will be the urban interface between the townships and the Kruisfontein plantation in the east. Here whole compartments have to be treated with fire at least on a two-yearly rotation and the areas there burned over by the 2017 Knysna fire, preferably re-established with fire-resistant *P. elliottii* stands.

B8: This buffer runs from north to south as indicated, with the Keurbooms River and its surrounding indigenous forest (or scrub forest) as a natural fire prevention buffer, with no additional treatment required. The northern section of this buffer, however, may have some old fynbos



Photograph 11: Zooming in on the eastern study area section, with the main buffer zones now also added, using not only the road systems but the topography linked to consider the routes for the main buffers, also accounting for existing vegetation and the 2018 wildfire area (main buffers B4 to B8). Source: Google.earth image, while the author has drawn in the added lines.

- ▶ which needs to be burned to form a continuous firebreak with the rest of this line. However, if too old, such senescent fynbos might have to be isolated in the form of cut-off hazardous islands (Photograph 11).

Photographs 9, 10 and 11 are by no means final because of the “top down approach” used to remain flexible and I am sure there is room for improvement. Also note from Photograph 10 that the area burned over by the 2017 Knysna wildfire area has been demarcated on the picture with a dark-red line.

3.6 Within-buffer zone policies

The objectives for within-buffer zones policies will always be to prescribed-burn the available vegetation fuel strictly according to schedule, which has been developed to provide the least fuel loading for sub-zones and also to create within-zone rotations, to have always effective sub-zones being non-burnable at any one time in the form of continuously-cleared line strips.

The objectives will here be not to create buffer zones that are completely fuel-free all the time because this will not be feasible. However, areas within buffer zones should always be creating lines from where a wildfire can be fought or within which spotting can be brought under control in time when extinguished by fire fighters, before becoming uncontrolled.

Another important issue to be considered will be the legislation required with regard to the different properties; private and Government land, where portions of this land will now be covered by the main buffer zones (see Photographs 10 and 11). Most important will be to streamline legislation at first to make “emergency fire prevention measures” possible under disaster management legislation.

Central Government will have to be consulted regarding the control over buffer zones where national roads are situated. Also to be considered should be where Provincial Government is the controlling body, where eg the overall control over the fire prevention plan is required. The local Government (municipalities) will have to be consulted regarding control over the land falling under their control, particularly in connection with the routing and maintenance of the main buffer zones through the land they are responsible for.

The overall control over the creation and maintenance of the buffer zones for the region involved, should be a shared responsibility between Central and Provincial Government and the Garden Route region (study area) should be used as a unique example to counteract the impact of the recent 2017 and 2018 wildfire disasters and to ensure no repetition of these crippling events.

This “master plan” will thus act as a “White Paper” for extrapolation to other regions within the Western Cape Province, and also to other SA Provinces. Of course the Western Cape Provincial Government should feel free to extrapolate the “Garden Route plan” to other regions within the province as and when required, with the required adjustments as and when needed, as their staff will also have to be trained to apply this further without guidance.

Subsequently, the Western Cape Provincial Government should seriously consider appointing and training a few “champions” for control over the new planning approach. For this purpose, we can discuss my personal involvement to make this possible, including the use and development of fuel model sets for specific regions. I also hope that this handbook can lead to the use of the methodology at national level within South Africa. 🔥

Fighting fire with fire: Botswana adopts Indigenous Australians' ancient burning tradition

By Sam Johnston, senior fellow, The University of Melbourne

Interest in Aboriginal fire knowledge has been high since last summer's terrible bushfires. One initiative shows the huge potential benefits of this ancient practice, not just in Australia but globally.

The International Savanna Fire Management Initiative (ISFMI) is taking the fire management techniques of indigenous northern Australians to the world. Recently, it's reinvigorated traditional fire management in Botswana, in southern Africa.

Results so far show the Botswana project is likely to prevent significant amounts of greenhouse gases from entering the atmosphere, reduce destructive fires, promote a productive landscape, increase biodiversity and revive traditional culture.

Australia's bushfire royal commission is currently looking at how Aboriginal knowledge can be incorporated into mainstream fire management. So let's take a closer look at how it's already working in Australia and abroad.

Reviving an ancient practice

Intense bushfires devastate ecosystems, biodiversity, human health, livelihoods and economies. Climate change will increase the severity, incidence and intensity of bushfires in many regions.

Over thousands of years, Aboriginal people in Australia have used fire to manage natural resources and as an integral expression of culture.

Burning was often undertaken in the early dry season, when fires

Cultural fire leader Otto Champion from Arafura Swamp Rangers, and Bayo Taylor from Karajarri Rangers, demonstrating cultural burning in Botswana



can develop gently and be easily controlled. Such burning removed fuels such as grass and leaf litter that might otherwise cause bigger fires. It also retains the canopy and other plant matter, and so preserves habitat for animals.

Over time, following the colonisation of Australia, indigenous land managers were forced off or left their traditional lands. Their absence has allowed large and intense bushfires in the late dry season to increase.

Traditional fire management techniques were first reintroduced at scale in Western Arnhem, in the Northern Territory, in 2007. Now there are 76 such projects, more than half either owned by or significantly involving, an Aboriginal community.

Since the projects began, the total area affected by destructive wildfires has fallen. This reduces emissions because fires caused by cultural burning are less intense and extensive than large wildfires. This reduction is recognised by the federal government as carbon

credits, generating more than A\$90 million for communities so far.

Exporting Indigenous know-how

The initiative focuses on fire-prone savanna landscapes which globally account for more than 60 percent of carbon emissions from fire each year. Principally funded by the Department of Foreign Affairs and Trade, it comprises an active network of indigenous organisations, traditional owners and experts.

Botswana was the first site to prove that transferring this knowledge is possible. Among the reasons it was chosen were its savanna landscapes and a tradition of fire management by its own indigenous people.

The first ranger exchange took place in May 2019, when Indigenous rangers from Northern Australia travelled to Botswana at the invitation of the Botswanan Government.

In savannas outside the town of Maun, Botswanan firefighters pitted their controlled burning skills against Australia's indigenous rangers. ▶



Ranger Ray Nadjamerrek demonstrates early dry season burning techniques in West Arnhem



An example of traditional indigenous Australian burning

- ▶ The Botswanans applied European-style fire suppression techniques they've adopted over the years. This involved fire trucks and 30 people. They ignited the windward side of their area, let the fire race through and then extinguished the flames.

It was 38 degrees Celsius, the wind was strong and the bush was dry. It was no surprise the fire was intense and all that remained was a charred landscape.

In contrast, two Australian indigenous rangers used hand-held devices called drip torches to weave a path of fire through their area. Their block was gently burnt using the wind, the bush and their skill, clearing out undergrowth and leaving green-topped trees.

The demonstration emphatically convinced the 300 spectators, who comprised most of Botswana's fire fighting community, that the skills of Australia's indigenous rangers were effective in Botswana's savannas.

Indeed, the techniques used by the visitors are not dissimilar to traditional Botswanan fire methods. The common ground was reflected when the two groups exchanged almost identical fire sticks when the rangers visited a nearby community.

Last year, Botswana sent a delegation to Northern Australia to learn more about the techniques. At pilot sites in Botswana, the communities, indigenous rangers and local fire managers are now experimenting with reinvigorating traditional fire techniques.

Lessons learnt

The degradation of savanna landscapes in Australia following colonisation is replicated around the world.

Globally, bushfire management is dominated by the concept of fire suppression rather than prevention. Fighting fire with fire seems counter-

intuitive to many people. But the Botswana experience shows these attitudes can be changed quickly.

Another key lesson is that convincing people and communities to use traditional fire techniques requires real-life demonstrations. Trying to make the point through lectures, simulations and written material has limited impact.

And creating networks is essential to connect the few experts and limited resources. Knowledge of traditional fire management around the world is scarce, and experience even more so. In Botswana for example, only a few community elders still have this knowledge.

The experiences also show scale is key. A couple of small sites, with a few local people involved, is not enough to manage wildfires effectively.

Beyond Botswana

The initiative has demonstrated how Northern Australia-style traditional fire management will be useful in other savanna environments around the world. We are now working on expanding this Australian technology to other promising sites in Angola, Namibia, Zambia, Zimbabwe, Mozambique, Brazil and Timor Leste.

Many other countries are interested in adopting these techniques. New funding, including from the private sector, is needed to scale up traditional fire management internationally.

The following people made important contributions to this article: Nolan Hunter, CEO, Kimberley Land Council; Dean Munuggullumurr Yibarbuk, Warddeken Land Management; Rowan Foley, CEO, the Aboriginal Carbon Foundation; Cissy Gore-Birch, Executive Manager Aboriginal Engagement, Bush Heritage Australia; Professor Jeremy Russell-Smith, Charles Darwin University; Professor José M.C. Pereira, University of Lisbon and Professor Guido van der Werf, Vrije Universiteit. This article was originally published on The Conversation. ▲

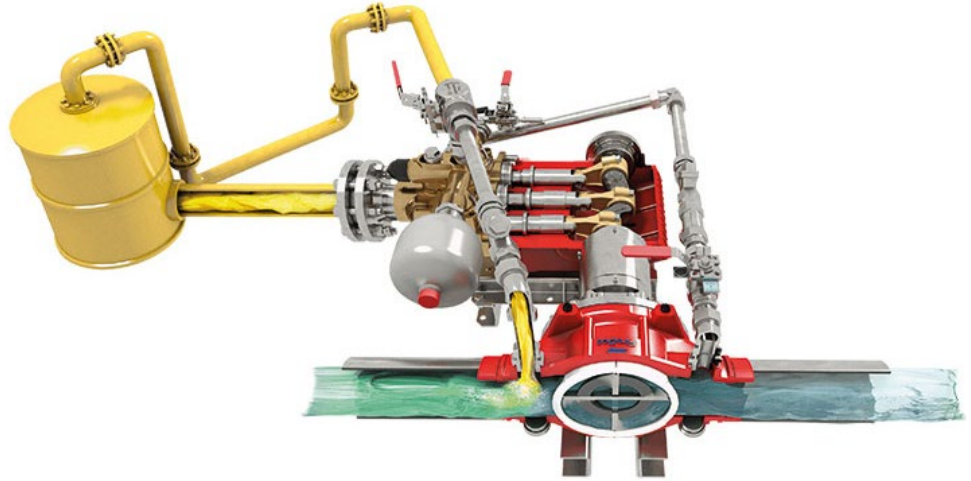
Mobile fire fighting technology for high hazard applications

By Stuart Pythian, FireDos

Fighting high hazard and storage tank fires is one of the most challenging scenarios firefighters and crisis management teams must plan for and manage. Fixed fire protection systems are increasingly being supplemented by versatile mobile equipment. Industry changes in foam fire fighting techniques present some special challenges for equipment manufacturers for a response combining both fixed and mobile equipment.

The occurrence of high hazard fires has reduced in the last few years suggesting training and testing standards have generally improved, supported by testing from industry bodies such as JOIFF and LASTFIRE by sharing best practice amongst the end-user community members. This is an achievement in that global storage capacity is expected to double in the 20 years from 2005 to 2025 from approximately 600 million cubic metres (cbm) to over a billion cbm.

However, the industry faces increasing challenges and opportunities. These include the legislative and enforced change from environmentally harmful PFAS type foams to fluorine-free foams (FFF). The increased use of very-large tanks, more than 100 metres diameter becoming more challenging to extinguish. The oil and gas industry adoption of Industry 4.0 and digital solutions for remote monitoring, control and testing, meaning a reduction in site manpower requirements. Some unknown factors and a reduced level of well-trained manpower mean a higher risk.



FireDos GENIII method of operation including test function recirculating foam concentrate to the foam concentrate tank

The use of mobile fire fighting equipment which is easy-to-deploy and use will become more important as an integral method to fight large fires as the cost and complexity of fixed systems increases. Fixed systems will always remain a central hub of any fire protection system but fires break out often due to unknown and uncontrollable events and fixed systems may get damaged by the fire incident itself, calling for some level of flexible response.

Fixed systems

Fixed systems typically consist of a fire water main pump feeding a hydrant or ring line with fixed monitors, foam pourers for tanks and sprinkler systems for storage areas. The foam concentrate is stored in a fixed atmospheric or pressurised storage tank, with a proportioner to deliver the recommended mix of foam concentrate into the extinguishing water stream.

Modern fire protection systems have introduced a degree of remote and automated operation such as flame and heat detection, as well as remote control, ensuring personnel are kept out of harm's way as much as possible.

The selection of equipment varies, often with a trade-off in terms of operating cost, performance, reliability, testing and size.

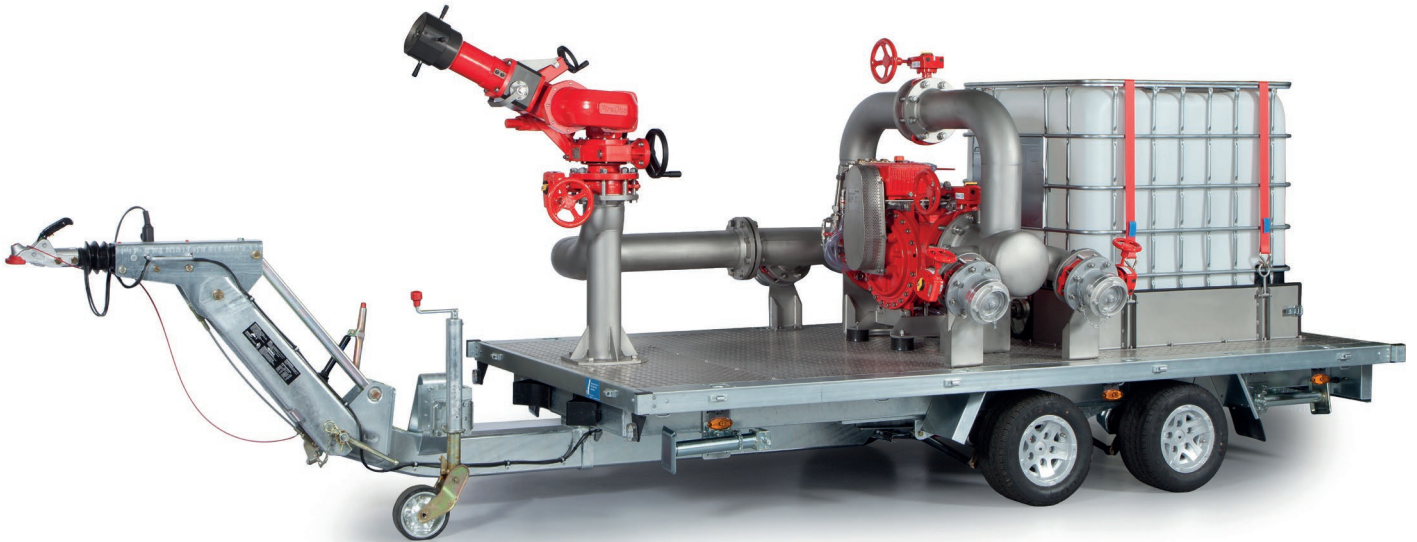
Due to the large size, complexity and cost of fixed fire fighting equipment, operators and end-users are increasingly looking to provide hybrid solutions. The ideal being a fire protection system using a fixed system aided by a team with versatile mobile equipment, which can be rapidly deployed, depending on the hazard.

Mobile fire fighting equipment

Mobile fire fighting equipment primarily includes the use of high capacity monitors and associated equipment, such as hoses and hose laying equipment and where necessary foam tankers and proportioning equipment.

The challenges for many mobile applications are the potentially long hose lengths, restricted diameters and the pressure drop associated with many pieces of equipment.

Bladder tanks and balanced pressure proportioner systems combined with venturi-based



Integrated foam storage tank, foam proportioner and monitor trailer for small applications: FireDos M3 up to 4 000lpm

- ▶ proportioners (eductors/inductors) or wide range proportioners are designed for fixed installations with a fixed range of pressures and flows. Typically, they are easy to design and install but like all engineered systems, there is a trade-off. One of these is their lack of suitability for mobile applications and varying fire fighting approaches.

Venturi type proportioners, including jet ratio controllers are not suited to modern mobile applications when faced with non-Newtonian high shear-rate and high-viscosity foam concentrates. Foam proportioning rates become more important, especially with FFF foam concentrates, as Venturi's cannot guarantee a specific proportioning rate at varying water flows.

Foam pumps are also only suited for fixed installations due to their need for external power, such as electronic control units and an electric motor or diesel engine. The ideal design for mobile equipment is components that are external power independent with a low pressure-loss, consistent proportioning rates irrespective of foam concentrate viscosity at varying water flows and back pressures that are easily and rapidly deployed.

Mobile proportioner design

The two main criteria of any foam proportioner is proximity to the foam concentrate source and its pressure loss. If foam proportioners can deliver the required foam rates without large pressure losses to monitors, mobile systems become more attractive to system designers and fire fighters alike. FireDos GENIII hydraulically driven foam proportioners present significant advantages:

Accurate proportioning rates

The water from a hydrant or ring main is used to drive the positive displacement water motor, which in turn drives the plunger pump of the foam proportioner. As each revolution of both the water motor and proportioning pump have a fixed volume, we can easily determine the fixed proportioning rate. As the water flow increases through the water motor, this in turn increases the volume of foam concentrate pumped into the outlet of the water motor and into any mobile foam outlet devices such as monitors and hoses. Unlike other proportioners, the FireDos GENIII is entirely independent of the system pressure and will generate the required proportioning rates independent of any system pressure and flow fluctuations.

Testing

The cost of operation of any foam extinguishing system must consider the ongoing foam proportioner testing costs, including any clean-up and disposal costs. Having the ability to circulate the foam concentrate back to the foam concentrate tank is a major saving provided by FireDos GENIII proportioners. This eliminates any short- or long-term environmental impact, such as associated disposal and even mobile foam testing can comply with NFPA11 testing requirements.

Capacity limitations

It is common to locate the foam concentrate tank, proportioner and monitor together on the trailer. The size of an intermediate bulk container (IBC) tank typically contains 1 000 litres of foam concentrate, providing a limited fire fighting capability. For small applications up to 1 000 to 2 000 litres extinguishing water per minute (lpm) with a three percent nominal foam proportioning rate, an integrated trailer could provide up to 17min at full flow. At a one percent nominal proportioning rate this is triple the time (up to 50min). The use of an integrated trailer solution offers the advantage of rapid deployment, as additional

foam concentrate supply can be organised separately.

For medium water flows above 2 000 to 4 000lpm, separate mobile proportioners fed by foam concentrate tankers are recommended. This aids in the rapid deployment and setup as the position of a monitor is not dictated by the location of the bulk foam concentrate supplies or the accessibility of a foam concentrate tanker.

The versatility of FireDos foam proportioners means they are not susceptible to changes in back pressure or flow restrictions, guaranteeing foam quality at the specified percentage regardless of flow rate.

Foam concentrate viscosity

Depending on the type of foam concentrate, the foam concentrate viscosity, proximity to the proportioner and foam concentrate suction piping diameter and design can all have an adverse effect on the performance of any foam proportioning system.

At FireDos, as manufacturers of foam proportioning equipment, we see many applications regardless of proportioner type, where the foam concentrate suction line to the proportioner is designed without adequate consideration of the above-mentioned aspects, resulting in ineffective foam systems.

Unlike low viscosity foam concentrates such as AFFF, many new FFF are non-Newtonian, pseudoplastic and highly viscous. The FireDos GENIII is designed to overcome the challenges in the handling of high-viscosity foam concentrates.

Pressure loss

The pressure loss of an extinguishing system can be the difference between a system working or not. This means careful consideration must be taken for the firewater-main pressure, the maximum hose lengths and equipment such as the monitors and proportioners.

“Depending on the type of foam concentrate, the foam concentrate viscosity, proximity to the proportioner and foam concentrate suction piping diameter and design can all have an adverse effect on the performance of any foam proportioning system.”

The GENIII is designed with a maximum pressure drop of up to 1,5 to 1,9 bar, dependent on operating conditions. A low-pressure drop across the proportioner, combined with an ideally designed monitor, mobile mounted equipment becomes a more attractive option.

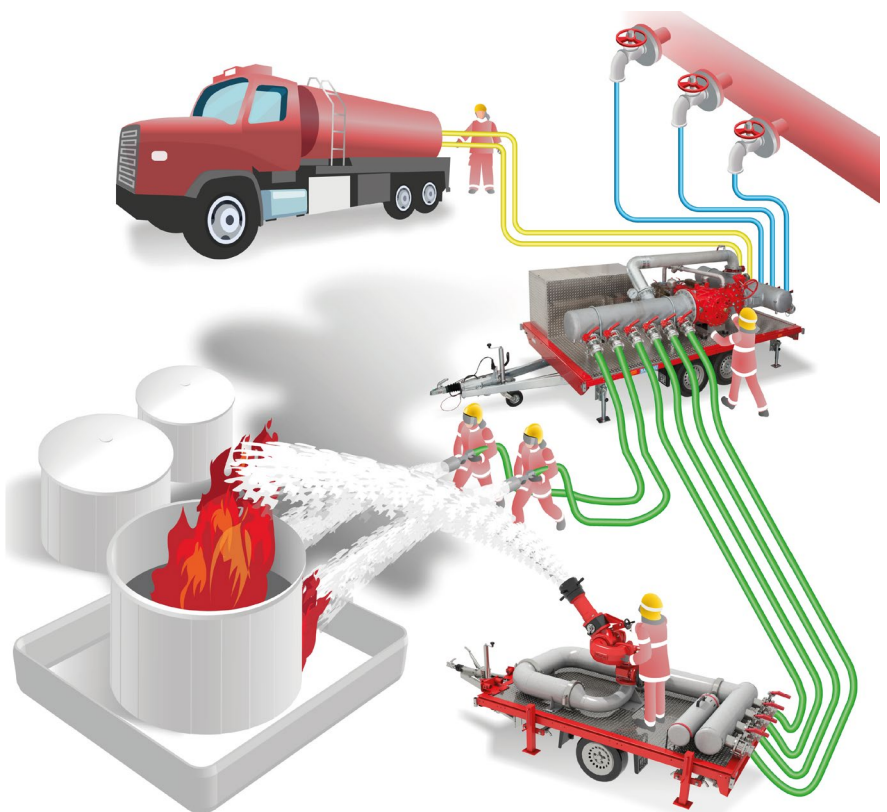
Ideal monitor design

Fire fighting monitors for mobile use should be easily transportable, rapidly deployed, easy to operate with a low-pressure drop from inlet to the nozzle.

FireDos introduced their range of F- approved fire fighting monitors for water and foam with flows ranging from 500lpm at six bar to 60 000lpm at 16 bar. Each model is designed using the following characteristics for trailer mounting:

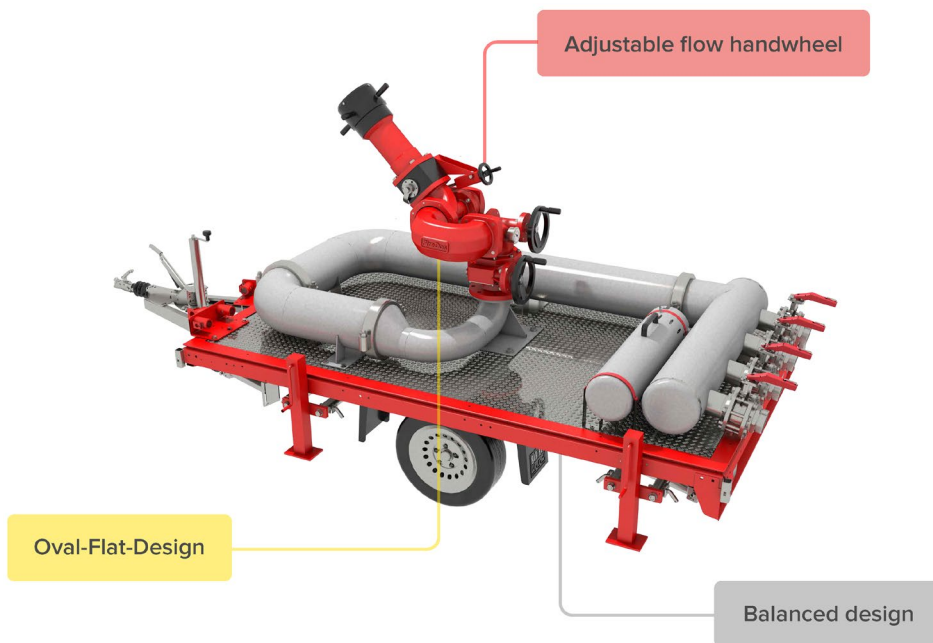
Low-pressure drop, balanced design

Long lengths of hose and associated equipment such as foam proportioners, ‘rob’ much-needed pressure to deliver monitors and nozzles the pressure ▶



Typical FireDos water driven foam proportioner fed by a foam concentrate tank feeding a trailer mounted monitor and two hand nozzles fighting a tank fire and bund protection

Mobile fire fighting technology for high hazard applications



Trailer-mounted monitor design

► required to develop a reasonable throw and reach wanted to keep personnel out of harm's way and to reach the intended target. This is especially important on large storage tanks. FireDos redesigned the internal monitor pipework using a computational fluid dynamics programme to minimise flow restrictions and came up with the "oval-flat" design, which led to a class-leading pressure drop of less than one bar at full flow and therefore a longer throw and reach.

No ballast tank required

The design of many other monitors necessitates the requirement for a big ballast tank to stabilise the trailer. A big ballast tank takes time to fill, empty and adds a 'dead-weight' making trailer movement and re-deployment difficult. The balanced design works to counteract these forces by acting upon itself to balance the pressures out, thereby minimising the reaction forces. The reduced ballast needed is created within the optimised monitor inlet piping. By sizing the piping on the trailer accordingly no additional ballast tank is necessary, aiding in rapid deployment and accessibility to more varied terrain.

Adjustable flow during operation

When fighting different classes of fire with newer foams (FFF) with varying drainage times, changing flow during operation means more rapid control of a fire hazard situation. Many monitor designs must be switched off and isolated to change the flow, delaying the fire fighting effort. Enabling the flow to be changed by means of a handwheel mid-flow, as with the FireDos AMPN nozzle, without stopping and isolating during continued operation of the monitor also means the fire fighting operation is not interrupted.

If a "banking or raindrop" type of fire fighting attack is required, as is sometimes recommended for type III methods ie when using AR-AFFF, adjusting the flow midstream provides an added advantage. A more accurate flow-stream footprint can be obtained by modifying the angle of attack, combined with altering the flow based on weather conditions.

Conclusion

The reputational damage associated with large fires is often worse than the tangible costs as the PR costs often outweigh the physical costs. Modern operators now

must consider the costs of foam discharges and any short- or long-term damage to the environment.

Utilising equipment designed for mobile use, rather than modifying equipment initially designed for fixed extinguishing systems is one such method to achieve better outcomes.

Mobile fire fighting equipment, ideally designed for rapid deployment and ease of use means less manpower is required to operate and with longer throws and reaches, keeps fire fighters further out of harm's way.

Ultimately, modern approaches to designing hardware using CFD and FEA techniques making them easier to operate and faster to deploy, with features such as integral testing without discharging foam to the environment or changing flow rates during operation, means the industry is safer and more responsive than ever before.

Local units supplied by DoseTech to date include three custom-built trailer systems:

1. 22 000l/min three percent foam dosing with FireDos proportioner and FireDos monitor with a reach of 120 metre
2. 2. 18 000l/min three percent foam dosing with FireDos proportioner, used for accurate, easy to use foam and water dosing for use on existing portable monitors, rim seal and bund pourers
3. 20 000l/min one percent, three percent and six percent dosing with FireDos proportioner, use for dosing all types of foam concentrate available on the facility, on existing high flow monitors, rim seal and bund pourers, said Mike Feldon, managing director of DoseTech Fire in South Africa.

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Rapid intervention with ultra-high pressure, reducing potential flash overs

By Chief Wynand Engelbrecht, CEO, Fire Ops South Africa

This is not a technical paper; it is a general discussion regarding our approach in defining fire fighting operations.

Fire fighting, like anything else in life, ought to be based on philosophy, which then further determines what strategy one would pursue to be successful. Haphazardly turning out to a scene, whether it be done using very modern apparatus or not, is in and of itself of little value, if the responders are not thoroughly schooled in tactics, under-pinned by a well-defined strategy.

After careful consideration over many months, we, at Fire Ops SA, decided to implement an approach based on the research work done by Underwriters Laboratory (UL) in the United States and Eddie Buchanan of Hanover Fire Department (USA). The research resulted in the fire attack principle “size-up, locate the fire, isolate the flow path, cool from a safe distance, extinguish” abbreviated to SLICE-RS. We needed to make some adjustments, based on the following reasoning: the research done by UL was still based on flowing 125gpm to 250gpm through 65mm and 38mm lines at low volumes (500kPa to 800 kPa). In our opinion, even that theory may already be outdated, although it was concluded just over a decade ago.

The National Institute of Standards and Technology USA (NIST), in cooperation with the Fire Department New York (FDNY) and the Chicago Fire Department, has completed immensely important research on ventilation of fires as an operational tactic, during the eighties and nineties. For at least two decades ventilation was considered to be one of the more crucial elements of the fire fighting operation. Size-up, followed by rescue, exposures, containment, extinguish, overhaul - ventilation and salvage (RECEO-VS), was an approach followed



Rapid intervention is a base element in our tactical approach, enhanced by the use of the Pyrolance/UHP system

from the late forties already. There are still major fire departments in North America where ventilation is favoured by individual officers. The dilemma is that one cannot simply dismiss ventilation, as it still remains a major factor for consideration but is a context different from the beaten path.

The work done by UL is mostly an extension of the theories of the late Chief Lloyd Layman of Parkersburg, West Virginia, who in 1950 presented a paper titled “Little drops of Water” at the Fire Department Instructors Conference (FDIC) in Memphis, Tennessee. It was a turn-around theory which purported in-direct fire attack as its basis, where the tremendous heat-absorbing properties of water mist and steam was lauded as the solution for the future.

Well, the future has arrived.

Our philosophy

We opt for an approach that is well-defined in international texts

as ‘transitional fire fighting’. Much has been said about this topic, even in our country but little has in fact been done about implementing true transitional operations.

Under RECEO-VS, rescue was considered the most important element following on the size-up. Under SLICE-RS rescue is considered to be ‘an activity of opportunity’ and we agree with this position.

Our strategy

The subject is immensely complicated, as there may be transitions between external fire attack tactics and external exposure defense tactics, external direct attack and external indirect attack, internal direct and internal in-direct attack, flowing minute amounts of water at ultra-high pressures (UHP) and ultra-high velocity (UHV) and, on the other hand, the conventional methods of flowing higher volumes at lower pressures, using 38mm attack lines and akromatic nozzles.

Ultra-high pressure fire fighting technology

- ▶ Attacking a fire using diminished diameter reinforced attack lines and specialised nozzles requires that the nozzle operators (we refer to them as UHP technicians), need to be absolutely au fait with fire spread potential and the potential for flash-over. By 'neutralising' the thermal layer directly and subjecting the flame to secondary attack, this potential is mitigated. It is of utmost importance that the crews must have access to thermal imaging cameras as well. This type of operation cannot possibly be left in the hands of fire fighters who are not very specifically trained with the equipment later discussed herein.

The applied tactics

The term 'rapid intervention' is loosely thrown around as if every second pick-up bakkie simply qualifies as a 'rapid intervention vehicle' (RIV) by virtue of it carrying two fire extinguishers. UHP operations differ massively from convention. The equipment we utilise is fitted on a Hyundai H-1 2,5 diesel panel van with automatic transmission. The vehicle lends itself perfectly to the principle of an RIV.

Rapid intervention is a base element in our tactical approach, enhanced by the use of the Pyrolance/UHP system. It comprises a pump system,

water reservoir and two delivery lines. One line feeds the lance, which is used to gain access to the fire compartment through an external wall or window frame. It affords the fire fighter safety in that he is not exposed to the fire at all. Once the 3mm hole has been 'drilled' through the wall (it takes a few seconds only), a relatively small amount of water is released into the chamber at a working angle of approximately 20 degrees, directing the mist under force, into the smoke column or thermal layer. This action decreases the chamber temperature from say 800 degrees Celsius to around 120 degrees Celsius in moments, depending on the compartment size. The flash-over potential in the thermal layer is fully mitigated by this.

The second line feeds the Blitz nozzle, delivering 40lpm at 100 bar. The Blitz crew stands ready to enter the compartment once communication is received from the lance technician that temperature reduction has been successful. The lance operation is terminated. The Blitz operator is already inside the house, waiting in the passage (in the event of a house fire). The Blitz crew sprays the door frame with the door still shut; this also effects internal cooling of the roof and further diminishes flash-over potential.

They now open the door, enter the room and extinguish the fire under more bearable conditions.

Ventilation: the operation requires complete control over the thermal layer and the fire flow path. Fire fighters trained in 'cold zone operations' staple down the fire room externally. This means they use our fire sheet and Hilti gun and staple the sheet over the window of the fire room. If more windows need to be stapled down this is also done. Vertical and horizontal ventilation is only effected as an activity of opportunity, and only under strict supervision of the incident commander. The fire sheet can also be used internally in the event where doors have burnt away and the fire flow path control is compromised.

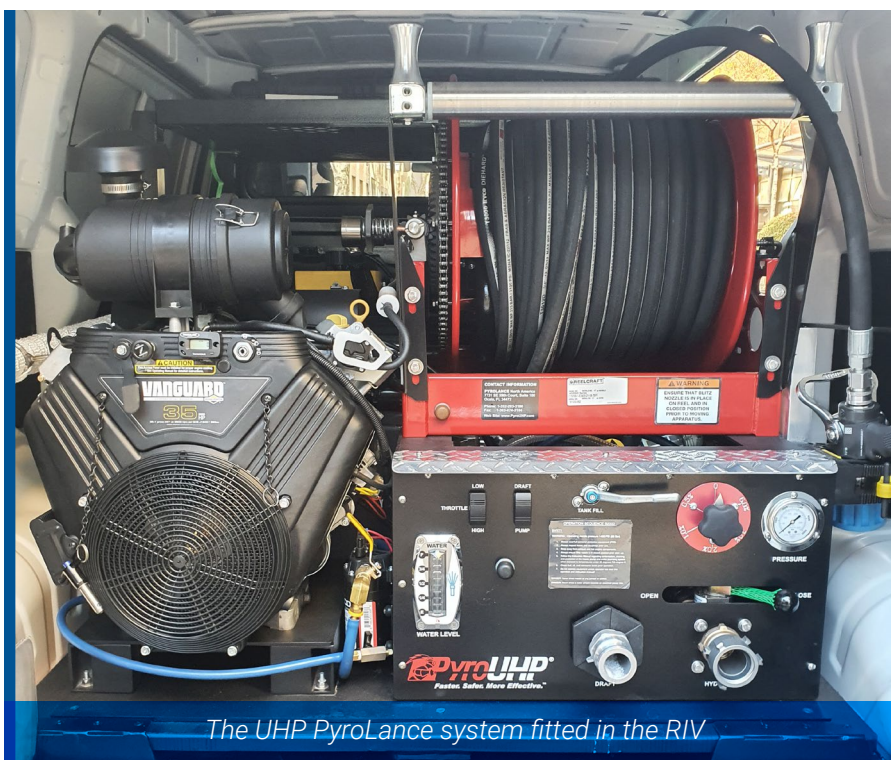
Communication: reporting the fire

There is no point in dispatching an RIV team if the caller's call has not been processed in good time and if the dispatch team is not absolutely 'on top of it'. The process should take no longer than one minute as dispatching and response will also take up valuable time. We have developed a smart phone app comprising a reporting button and back-office incident management, over a period of many years. Our (paying) clients have access to the app. We pride ourselves in the time-line when reporting a fire: 60 seconds from the caller to the crew, complete with address and coordinates for response.

The challenge is that in order for the crew to successfully mitigate flash-over potential, they have to enter the fire structure within ten minutes of the fire having started.

In conclusion

Our corporate client, Anglo American, financed the UHP/Pyrolance unit for us; it also stands in on the rental contract on the H-1 on which the unit is mounted. It would take up far too much space to lay out the entire operation and how support staff and support vehicles are used in the operation, in this article. Suffice it to say the officers' corps of Fire Ops SA takes its responsibility seriously; they commit themselves to being 'better-than-what-we-were-yesterday'. ▲



The UHP PyroLance system fitted in the RIV

The future of firefighting in Africa has arrived!



The PyroBlitz Ultra High Pressure (UHP) Fire Suppression System for Wildland, Fast Attack and First Response Vehicles

MORE EFFECTIVE

- The PyroBlitz breaks down a standard water droplet to 64 microns using a pressure of 96 bar
- This creates 12 times the surface area to capture more heat
- 90% of the water is used efficiently
- Conventional droplets are too large to be effective
- In conventional firefighting, 85-90% of the water used ends up as run off
- PyroBlitz takes out more fire with less water

SAFER

- Smaller, lighter droplets have better “hang-time”
- These drop suspend longer in the upper thermal layers, reducing heat in the most dangerous part of the fire
- These droplets are light enough to be drawn into the flow path of the fire sending suppression to where it is needed most
- These droplets access every point of the fire helping to extinguish fires that are not immediately visible

FASTER

- More efficient use of the water allows the fire department to be effective with far less water enabling them to reduce the size of the vehicle needed thereby saving on cost and response
- A smaller vehicle is more mobile and can get to the fire faster
- The PyroBlitz has 60m of charged line which reduces the deployment time needed at a fire scene
- With fires burning 8 times faster, it is critical to get to the scene and flow water faster than ever before



For more information on
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Fire fighting flowrate - critical flow rate



The PyroLance system gives you the ability to penetrate any structure within seconds and flow ultra-high pressure water fog straight into the thermal column

How often do you stop and think about this? What size line do you need to pull? The correct answer is.....every time you roll-up to a fire! So often

though, this decision happens 'automatically' and you pull a line as if you instinctively know what flowrate will be required to suppress the fire. Some regard this as "job

knowledge" or "experience". But how many actually sit down to discuss if the water you flowed on the fire was adequate; too little, too much or just enough?



PyroLance system and PyroBLitz is now available in South Africa

So many factors and variables come into play into making that conscious or 'automatic' decision. It could be size and volume of structure, type of structure, type of contents, building design and construction, visible flame showing or lack off, water supply available standard operating procedures (SOPs) and many more.

Question: How often do you look how much run-off water is leaving the fireground or how deep are you standing in the fire fighting water? Most probably not that often. This begs the question...do you really understand why you are flowing the amount of water you do?

The fact of the matter is that, as a water scare country (and it is getting worse) the future of turn-out protocol,

Proper education and training

By Julius Fleischman and Neville van Rensburg, World Rescue Organisation (WRO) assessors and members

Motor vehicle crashes (MVCs) continue to be a source of severe injury and death in the South Africa. However, changes in personal behaviour, overall health of citizens and vehicle design changes are making the rescue and treatment of survivors of MVCs more difficult for emergency medical services (EMS) and rescuers.

Emergency crews must work together to balance the priorities of rescuer and patient safety, utilisation of resources, tactical decision-making and patient care in the continued race to bring a patient to a trauma team as quickly as possible.

Crews are encouraged to get patients to critical trauma care within the 'Golden hour', which is the first 60 minutes after their injury. The 'Golden hour' will likely



Understanding injury profiles is the first step in adding value to the extrication process

never see a randomised trial but rescue teams across the country continue to work to shorten the time patients experience the progressive decline toward death

brought on by haemorrhagic injuries and shock.

Despite awareness of the time sensitivity of the severely injured

fire pumps and hose line diameters and nozzles will be very finely tuned around this requirement. In fact, the entire set-up will revolve around flow-rates. This is going to happen sooner than later as we no longer have the luxury of throwing endless volumes of water at the fire incident. Making water work more effectively is what we want to create for the future. The dynamic of understanding critical flow rates and the technology behind transitional fire fighting is what is going to change how we approach fires, how we design our fire fighting vehicles and how we select our pumps and nozzles and, ultimately, how much water we use to extinguish a structural fire.

There are basically two types of combustion that we face:

- Fuel-phase fire: Two dimensional fuel bed or surface fire
- Gaseous-phase fire: Three dimensional gaseous phase fire

When having to extinguish a fuel-

phase fire, copious amount of water is usually required, especially if the fire is well developed and ventilated. When faced with a gaseous-phase fire that is fully enclosed and non-ventilated, the water requirement can look very different. It can look a whole lot different if you were to have the ability to flow water in a 'ready state' in the form of ultra-high pressure fog straight into the thermal layer and inert the products of combustion prior to it being ventilated. It will look even more different if you could flow that water fog into the thermal layer penetrating through from the outside of the structure involved straight into the heart of the fire.

For the first time you have a tool in your arsenal that allows you this option were you can, in a matter of seconds, breach any type of construction without any physical exertion and using only one fire fighter! The PyroLance system gives you the ability the penetrate

any structure within seconds and flow ultra-high pressure water fog ie 37l/min at 100 bar, straight into the thermal column and interrupt the combustion process enabling quick and safe overhaul of the fire. Imagine using the PyroLance system to halt the lateral spread of fire within the attic space using one fire fighter thereby checking fire spread and allowing for far safer roof operations.

For internal attack, you will have the PyroBlitz that operates on the principle of generating very fine droplets of water and delivering them to the fire zone. The PyroBlitz provides the three primary mechanisms for extinguishing the fire, namely heat extraction, oxygen depletion and radiation blocking, with secondary mechanisms involving air dilution and kinetic effects such as reduced flame velocity.

The PyroLance system and PyroBlitz is now available in South Africa. ▲



The transition from disentanglement to extrication should be seamless

“With proper education and training, EMS and rescuers can improve outcomes for critically injured trauma patients.”

occupants are frequently trapped in vehicles whose structure has been damaged to a devastating extent.

Passenger vehicle disentanglement and extrication

Extrication is the process of physically removing the disentangled patient from the wreckage. Whether the casualty has full spinal immobilisation or not, this is an extremely difficult phase in the rescue.

As nouns the difference between extrication and disentanglement is that extrication is the act or process of extricating or disentangling; a freeing from perplexities; disentanglement while disentanglement is removal of or extrication from twists, tangles, complications or confusion.

Many disentanglement procedures can be ineffective if there aren't proper relief gaps or if the material is displaced against the suspension system of the vehicle. Another

- ▶ trauma patient, barriers can still occur that add time to the clock. Rescue teams with inadequate resources and training, delays in extrication because of safety concerns, lengthening the extrication time because of needing to modify a rescue plan, lack of preparation to quickly transition from treatment to transport and underuse of air medical resources or poor communication from rescue to transport crews can all prolong the time it takes for a patient to reach definitive surgical care and negatively impact the patient's outcome.

To participate in vehicle extrication, rescuers and paramedics should have more than the obligatory extrication demonstration. To integrate into the rescue team, a provider must understand the following:

- Crash mechanics, force and velocity
- Injury profiles
- Restraint systems benefits and limitations
- Their defined role in the rescue and medical team
- The appropriate personal protective equipment (PPE) to wear and
- The process to communicate with the rescue officer and the medical team.

When confusion and conflict occur between medical and rescue priorities, it's the patient who suffers.

Understanding injury profiles is the first step in adding value to the extrication process. The crashworthiness of vehicles is based on a detailed assessment of many factors. Translating this information into the initial and ongoing size-up for rescue teams can be intimidating. Begin by considering what the typical crashworthiness test is and make a determination if the impact the survivor compartment sustained, was beyond that.

One of the responsibilities of fire fighters is to rescue injured occupants from crushed vehicles. Such



With proper education and training, EMS and rescuers can improve outcomes for critically injured trauma patients

barrier to effective disentanglement is tunnel vision, which prevents teams from seeing the strong points from which material can be pushed.

Teams can lose valuable time trying to make small efforts to get “just enough room,” when what may seem like a larger manoeuvre can displace a lot of material more quickly and provide the team greater access to extricate the survivor.

In complex or extended extrications, rescue group leaders should request enough resources to operate several plans simultaneously. For example, the damaged side may seem like a direct path to a patient in a side impact collision but a full sidewall, seat and centre console removal can create a faster extrication path because crews aren’t working against the impact of the collision.

For rescue groups with limited equipment or manpower, knowing when to stop a plan that’s struggling, is a difficult challenge. Even if resources for simultaneous operations aren’t available, a leader can be identified who will be working on a backup plan, monitoring the primary plan for progress and be empowered to discuss changing plans with the rescue group supervisor. The crews working on the primary plan will often continue without consideration for a change in direction.

We believe that the rescue time of vehicle occupants injured in traffic accidents can be reduced by improving rescue method, and therefore save lives.

Conclusion

The transition from disentanglement to extrication should be seamless. The decisions to remove a survivor horizontally or vertically will depend on the manpower available, access to the patient, suspected injuries and resources for lifting. Extrication of patients with severe limb injuries can be a painful experience for the patient and uncomfortable for the rescuer or paramedic.

Angulated limbs can be returned to a neutral position when the patient



The rescue, treatment and transport groups must all understand they share the same precious field time allotted to the prehospital team

is extricated. Delaying extrication for a limb that’s free but requires manipulation puts the patient at further risk of hypothermia, bleeding, limb ischemia and injury.

The rescue, treatment and transport groups must all understand they share the same precious field time allotted to the prehospital team. Opportunities to reduce on-scene time include the outside medic keeping transport teams updated on the progress of the rescue, transport teams being available and ready to transport the patient after extrication and reducing repetition in patient assessments.

An effective means of producing a seamless, accurate and timely transition to transport is to keep

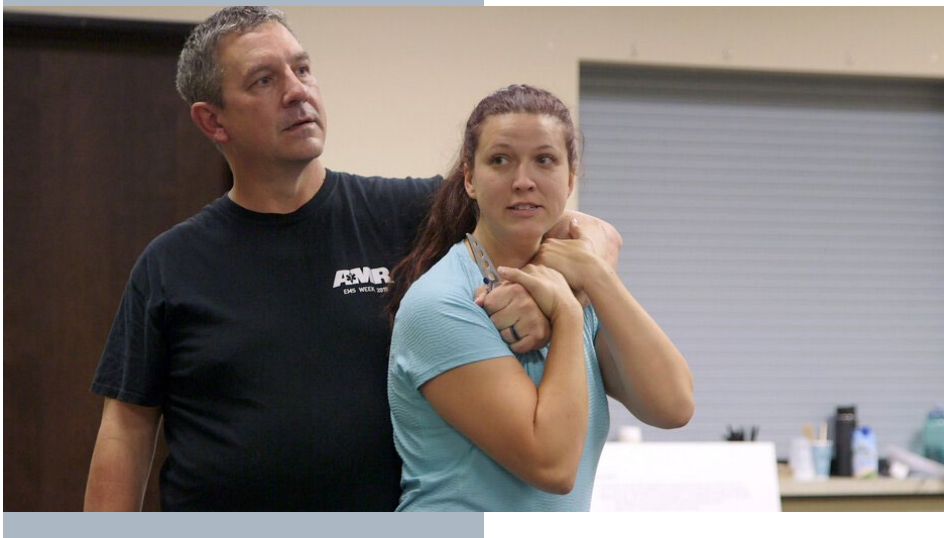
the inside medic with the patient until handoff to the trauma team at the hospital. During handoff, accurate facts are often lost that would paint an important picture for the members of the trauma team. Transporting medical crews must be ready to receive the patient after extrication.

With proper education and training, EMS and rescuers can improve outcomes for critically injured trauma patients. The integration of high-quality medical care, quick and efficient rescue plans and timely transport can give trauma teams the time to provide definitive care.

This article contains references, which are available from both the writers and the publisher. ▲

Why self-defence for emergency workers?

By Morné Mommsen, Midvaal Fire and Rescue and Warrior Combative



South Africa and other countries promote visual aids trying to stop violence against emergency services but the reality is actually that no one is doing anything about this problem and it really does not make sense, a person with this type of outlook (existentialists believe) in life only objective are to hurt, steal and kill or whatever and it will never change. People will rather take a video of a medic being assaulted or killed because of his/her social craving before attempting to help the emergency worker.

Existentialism in the broader sense is a 20th Century philosophy that is centred upon the analysis of existence and of the way humans find themselves existing in the world. The notion is that humans exist first and then each individual spends a lifetime changing their essence or nature.

In simpler terms, existentialism is a philosophy concerned with finding self 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 being 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.

Some organisation states that emergency service member needs to carry firearms. As a firearm expert and instructor, the following question comes to mind, "How will you be able to protect your firearm if you busy with a patient or standing with a spreader in your hand?" Sorry, you can't protect your firearm and how many of you that do have a firearm, can really use it in a combat situation, meaning physically be able to use it?

Many will become an expert with regards to YouTube videos or as experts we call them 'YouTube Warriors'. As an instructor who has been in the martial arts long enough to understand this and who has more than 28 years service in the fire department, I feel I should share this.

Emergency members need to get regular training in some kind of self-defence system. I represent Warrior Combative and Mile High Kickboxing - Shidokan who specialised in Krav Maga System, Kickboxing and the US National Fire Protection Association (NFPA) Self-Defence Course designed for the purpose of defending yourself against the reality on the street. It takes hard work and dedication to be able to defend yourself and I can promise you, nothing comes easy. But in today's world of mixed martial arts, civilian self-defence courses, military combatives and an overall 'new' approach to self-defence by people who "think outside the box," I can tell you, there is much confusion by people new to the martial arts world as to what exactly is the best approach for them. Many seek different things in martial arts, however, one thing they seem to have in common, is self-defence.

You need to concentrate on awareness programmes, 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 sent and introduced to various departments, entities and everyone always state "Wow" or "What a good idea" or "We must make this a priority". For how long do you want to make it a priority and don't act or must we wait till the first one is killed or raped or missing. If interested in any form of assistance please contact us via email:

Gauteng: dnaemergency@gmail.com
Meyerton: davidkies.dk74@gmail.com
Cape Town: pvogts1@gmail.com ▲

Why leaders should keep learning

By Tom Wood, RWA Insight (Edited)



Successful leaders never stop learning. Whether they read books, learn new skills, study academic or business journals, learn from their employees or peers, or strive for change through innovation, they all share a passion for wanting to learn new skills and ideas.

Life itself is one long learning experience and to get to the positions that they have reached, leaders need to have learned skills and knowledge along the way.

The modern business world is evolving and changing at a very fast pace. Change is driven through innovation, good business strategy and creativity. Companies that stand still and don't embrace change run the risk of being overtaken either by a competitor or someone who is more willing to learn to do things better.

Learning does not just have to be about skills. A good leader will network with peers, management and other leaders, listen to issues arising and consider what is happening in other industries and with technology advancements that they can use. They will listen to their teams,

monitor social media channels and learn through communication.

Five tips to help

- Be curious and inquisitive about your work environment and your industry
- Identify fire departments that are doing well and try and understand what sets them apart
- Have a playful mind and think creatively about learning new skills and changing how you manage your teams
- Involve your colleagues. Quite

often they will have hands-on experience that you can learn from to improve your leadership skills

- Focus on self-development. If your crews, colleagues and peers see that you take personal development seriously, then they are likely to as well.

Consider this: If you, as the leader, take personal development seriously then in theory you should find ways to improve your leadership skills and find ways to make your teams grow.

Now apply this personal development to all of your staff and colleagues. If they see you doing it and championing personal development, then they are more likely to take personal development seriously for themselves. They will become more motivated, more educated and they, too, will find ways to improve your department and find ways to make it grow.

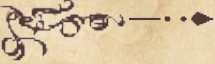
The more motivated and developed individuals and teams that you have in your department, the greater success rate you will have in terms of growth, innovation and change management.

Ask yourself, what will you learn today? 

“
If you want
to lead you
need to grow.
Good Leaders are
always good
learners.

John C. Maxwell

Leadership First



Fire hooks: One of fire fighting's oldest tools



This image was scanned from Adrian Tinniswood, By Permission of Heaven: The Story of the Great Fire of London (London: Jonathan Cape, 2003)



The use of fire hooks can be traced back to Rome in 6AD

A fire hook is a tool that is designed to be used by fire fighters who need to be able to gain access to a space or clear debris. Fire hooks are used in urban as well as rural areas and are commonly stocked in the equipment carried on fire apparatus. There are a number of different designs available, with various heads for the hook that have been engineered for specific operations. In the Merriam-Webster dictionary, fire hooks are defined by "a stout pole having a hooked metal head and used especially in fire fighting for tearing down walls or ceilings".

The fire hook is a very versatile tool and can be used as a probe or prying tool to get around doors, windows and other openings. It can also be used to quickly tear through walls and other obstacles and for tasks such as cutting into ceilings and floors, tearing into ventilation systems etc. The head

of a fire hook may include blades or serrations for the purpose of cutting quickly and efficiently, and to reduce the risk that the hook will become trapped.

In addition to being used during a fire to gain access, a fire hook can also be useful for probing as a fire settles. The hook can be used to move and push debris to confirm that there are no hidden embers and to spread debris for the purpose of allowing it to cool. Fires can restart minutes or hours later if embers or hot spots remain and these may not be visible with a quick visual examination, making a fire hook a useful tool for checking to see that a site is safe before pronouncing it clear.

History

The use of fire hooks can be traced back to Rome in 6AD to the first fire brigade, which was formed in Rome in 6AD. The Roman firemen were called *vigeles*. They used buckets of

water passed from man to man and had axes and long fire hooks to pull down buildings and make firebreaks.

In researching fire hooks, we tracked that fire hooks were also used to help tear down buildings to stop fires from spreading as seen during a fire at Tiverton in Devon, England, 1612.

During the Great Fire of London in 1666, Samuel Pepys kept a diary that has been well preserved. He was a clerk to the Royal Navy who observed the fire. He recommended to the King that buildings were pulled down; many thought it was the only way to stop the fire. The mayor was then ordered to use fire hooks to pull-down burning buildings but the fire continued to spread.

These days, some fire departments have developed custom fire hooks to meet their specific needs. Sometimes these designs catch on and enter mass production. ▲

In the life of a child a fire fighter came

A child was sleeping in his room alone,
When suddenly a fire was consuming his home.

Alone and afraid to run from the smoke,
He moved not a muscle 'til the fire fighter spoke.

"Son, I'll take you away from all harm."
And wrapped the child in a reassuring arm.

Through dense smoke and heat, both fire fighter and child fought.
"I must protect this child," was the fire fighter's thought.

Child clinging to the fire fighter as they crawled on the floor.
Oh where, oh where, is the opening of the door?

"Son, we made it." "Mom and Dad are here too."
"You were so brave." "We're all so proud of you."

The child was the fire fighter's own, if only for a minute or two,
But the love and concern was genuine and true.

In the life of a child a fire fighter came,
And life to this child will never be the same.

Author: Patty Temple - From the International Fire Services Network



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