FIRE AND RESCUE INTERNATIONAL

Integrated fire prevention, detection, management and rescue technology Volume 1 No 4

New European agency / partnership announced

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Rural Fire Rescue

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Comment

Lee Raath-Brownie

Welcome to the fourth edition of **Fire and Rescue International.**

Cover profile
Our cover profile this month features fire equipment specialists, Rural Fire Rescue (RFR). RFR has been awarded the Mettis International fire fighting vehicle agency. Mettis is based in Slovenia and specialises in compact, highly manoeuvrable, fire trucks that are equipped with high-pressure fire fighting technology, capable of containing a fire with minimum water usage.

FRI Images photographic competition
Our second winner of the FRI Images competition is announced this month and won R2 000 cash! See page 3 for details. **CONGRATULATIONS!**

You too could be a winner. Just send in your photographs!

Your news and views
The rescue, emergency services and fire fighting fraternity provide such a dedicated service and selfless service to the public.

Fire and Rescue International is your magazine. We publish your experiences, ideas and suggestions. So keep the emails, photographs and phone calls coming!

We enjoy hearing from you!

Lee Raath-Brownie
Publisher

What is a fireman?

He's the guy next door - a man's man,
with the memory of a little boy.
He has never gotten over the excitement of
engines and sirens and danger.
He's a guy like you and me,
with warts and worries and unfulfilled dreams.
Yet he stands taller than most of us.
He's a fireman.
He puts it all on the line when the bell rings.
A fireman is at once the most fortunate and
the least fortunate of men.
He's a man who saves lives because
he has seen too much death.

He's a gentle man because he has seen the awesome power
of violence out of control.
He's responsive to a child's laughter because his arms
have held too many small bodies that will never laugh again.

He's a man who appreciates the simple pleasures of life -
hot coffee held in numb, unbending fingers - a warm bed for
bone and muscle compelled beyond feeling - the camaraderie
of brave men -the divine peace and selfless service of a job
well done in the name of all men.

He doesn't wear buttons or wave flags or shout obscenities.
When he marches, it is to honour a fallen comrade.

He doesn't preach the brotherhood of man.

He lives it.

-Unknown author-

This month's FRI images winner!

Congratulations to

Photographer
Bernardine Altenroxel

Name of photograph
Heat haze

Photo description:
This photo was taken at the site of a fire at a timber plant. The photo was not enhanced in any way, but merely taken through the heat haze to give a rippled effect.

Camera:
Canon PowerShot S3 IS compact camera

Settings:
Used on shutter priority mode with an F-stop of 5.6 and a shutter speed of 1/800 second

Bernardine Altenroxel wins this month's prize money of R 2 000!

Well done!

Calling all budding photographers!

We want your photographs!

Fire and Rescue International (FRI) has introduced a monthly photographic competition to all its readers. This exciting competition offers you the opportunity of submitting your digital images of fires, fire fighters, disasters, emergencies and rescues.

The rules are simple:

- All photographs submitted must be in jpeg format and not bigger than 4 megabytes.
- Photographs must be in high resolution (minimum 1500 pixels on the longest edge @ 300dpi) for publishing purposes
- **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.
- Brief description should accompany photo.

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 fire
Camera, lens and settings used

All entries must be emailed to **lee@fireandrescue.co.za.**

>>ENTER NOW!

Rural Fire Rescue

secures sole SA agency for Mettis International

Newly established Rural Fire Rescue (RFR), a member of the FFA Group of Companies, specialises in fire fighting vehicles and equipment to the industry and has been appointed sole South African agent for Mettis International fire fighting trucks.

RFR MD Marius Koekemoer says: "Mettis is a Slovenian company with an established presence in the European market. We believe European manufactured trucks are more appropriate to South African urban conditions, being lightweight and able to manoeuvre in smaller spaces.

"Mettis has perfected the art of utilising space on a fire truck. Every available area is optimally utilised, while the trucks are equipped with high pressure fire fighting technology capable of containing a fire with minimum water usage. Mettis is ISO-accredited to comply with EU quality requirements and we believe these trucks are going to attract a lot of interest in South Africa and other African countries." ▶

RFR has also been appointed as the official Southern African agent for Canadian company Wildfire Environmental Inc (previously Wildfire Equipment). Wildfire Invents are manufacturers of premium water handling equipment for wildland fire fighters, agencies and governments worldwide.

The company is rapidly filling its order book, currently expediting orders for five fire trucks for the Nkangala District Municipality in Middelburg and two trucks for the Amathole District Municipality in East London, while building 21 trucks for another project. RFR has already completed orders of 11 fire trucks for Sappi and six trucks for Eskom contracts this year.

Comprehensive spectrum of products and services

"We're not just another company offering products already being sold by other companies. If we're unable to manufacture a specific product in-house, we will source it at the best value for the best price," says Koekemoer.

RFR offers a spectrum of products and services which include portable pumps, fire fighting equipment, disaster management equipment, skid and trailer units, fire fighting foam concentrates and application equipment, as well as floating pumps. A full range of fire trucks meets local requirements, including leasing of vehicles and financial solutions, maintenance contracts and refurbishing of fire trucks.

Koekemoer says the company is geared up to provide our customers with tailor-made solutions to their specific fire risks. RFR's 900 m^2 manufacturing facility is based in Potchefstroom, North West Province, where the company is currently able to manufacture fire trucks at a rate of one per week. In-house equipment is able to carry out cutting, bending, welding, shot blasting and powder coating.

"These premises are already proving too small and we're poised to expand to a brand new purpose-designed 3 000 m^2 factory in Potchefstroom," he says. "However, at RFR we believe that a product is only as good as the after sales service provided. Guided by this philosophy, we're building long term relationships and partnerships with our clients and business partners."

RFR's technical division and workshop is based in Nelspruit, Mpumalanga, providing technical back-up and field services to customers. The company is in the process of establishing several more workshops, starting in Potchefstroom and, over the next two years, in Cape Town, Bloemfontein and Durban.

Sales to the local market and beyond South Africa's borders are handled from RFR's Johannesburg offices.

"Africa is fraught with stories of 'hit and run' transactions carried out by ruthless suppliers. As a grass-roots company, we understand the unique challenges associated with doing business here, as well as the operational limitations, and we've designed our products with this in mind." ▲

Letters to the editor

The recent fires in Arizona has been declared the largest wildfire in US history

I have been reading this article in your magazine (Vol 1 No 3) with interest. The 210 445 ha burned over by this massive fire was indeed an enormous tragedy (largest in the history of that US state) and as far as I can recall from recent wildfire history in South Africa, compares well with the 2001 Kruger fire when about 250 000 ha was burned over, and, more than 20 people died. The causes for the Arizona wildfire were given as "forest management practices", the drought and also an insinuation that "modest climate warming" could have contributed to this fire's size.

With regard to the first reason provided, I assume that this points a finger at the unrestricted creation of exploitation slash. The second reason I buy (obviously contributing), while the last reason can be regarded as "debatable" but "difficult to prove at this point in time".

We should also take note that during the first half of 2011 the US already had lost about as much hectares in fires as during the whole of 2010: Indeed a frightening situation, and as similar situations could happen at any one stage in South Africa, it is important that we take note!

We should also take note that – reading between the lines – that "fuel management" will be stepped up throughout the US to reduce damage from future wildfires to come, which will be applied by means of "thinning forests" and "clearing out biomass".

Such terms may appear strange to the SA forester at first as thinning application in SA will *increase* fuel levels and not *decrease* it. However, I think the writer is referring to the application of prescribed burning inside natural forests to reduce stocking by means of killing a certain percentage of the trees. "Clearing of biomass" probably refers to slash burning in most cases, or in grassland, to prescribed burning application.

Furthermore, the writer also insinuates (reading between the lines again) that the US government is now seriously (i) acknowledging that there is a negative correlation between fuels in terms of area "treated" and areas damaged by wildfires: Increasing the first decreases the second.

Subsequently, they are now *increasing* the rate of prescribed burning, probably to levels where it has been some decades ago. Unfortunately this policy-change is still not materialising in some other US states, as I can only note that in California wildfires are still raging every year, and properties are burned-over by the hundreds yearly*, with no decrease of damage-levels in sight. I will not comment on "fire exclusion policies" to have been applied there for "ecological reasons" according to reports. I can recall that such policies were still in place as recent as during the period around 2005, but maybe some of my US colleagues can provide some answers here for the readers!

** = Also take note of this serious "Urban Interface problem".*

This reminds me very much of what we are experiencing in South Africa. Take fynbos as an example. Some four to five decades ago, foresters used to apply block burns and maintain fuel levels. This practice was reduced to "almost no application of fire whatsoever", until the managers realised that this reduction in prescribe burning applied just leads to the (very negative) impact of extreme wildfires, with whole mountain ranges burned out. Now I can see the wheel is turning, and serious attempts are made to start with prescribed burning again. Similar tendencies can be found in other fire-related biomes in South Africa, including in our industrial timber plantations!

Off course there are still problems everywhere with prescribed burning programmes sometimes not being applied in the right places and at incorrect priorities, but this can be corrected in the future. It is important that the application of fire in principle is now being applied and stepped up in hectares burned yearly, as this cannot be negotiated: In the light of climate change and global warming looming, *prescribed burning programmes should be stepped up, not decreased*.

Dr Neels de Ronde

Fire engulfed
historic Arkansas hospital complex

A massive fire claimed a historic World War Two-era hospital in Arkansas and more than 100 other buildings near Fort Smith, Arkansas, USA.

The Fort Chaffee fire broke out on a 36,5 hectare former medical complex late on Wednesday, 3 August 2011, the hottest day recorded in Fort Smith history, according to its National Weather Service. Fire officials said the fire's cause was under investigation.

A recent bout of fires has plagued Arkansas as drought and heat worsened, and temperatures hit the 46 degree Celsius mark in Fort Smith. Ray Gosack, Fort Smith's city administrator, said fire fighters suffered dire conditions controlling the Chaffee blaze due to the heat and dangerous lead and asbestos in the wooden, dilapidated structures at Fort Chaffee, which served as an Army training centre in World War Two.

"With the recent weather conditions of heat, wind and no rain, it was the perfect storm for something like this," he commented.

Fort Chaffee has a rich history with many movies, including "Biloxi Blues," filmed on the property. It is best known in popular culture as the site where Elvis Presley entered the Army in 1958 and had his hair shaved in a crew cut.

An aerial view of Fort Chaffee

The US government initiated Camp Chaffee in 1941, paying US$1,35 million to acquire the land. The first soldiers arrived on 7 December 1941 - Pearl Harbour Day. It served as a training camp as well as a German prisoner-of-war camp.

Fort Chaffee was a processing centre for refugees from the Vietnam War in the mid-1970s. It also housed Cuban refugees and Hurricane Katrina evacuees. However, many of the buildings that housed them, burned in 2008. *Source: Reuters.* ▲

A number of buildings were lost in the 2008 fire that swept through Fort Chaffee

Fire damaged mill in Sabie

Sabie residents recently woke up to a glow of a raging fire at a sawmill east of the town.

Reports in local newspapers stated that two timber kilns were destroyed in the blaze and that the cost of the damage was yet to be estimated. The fire started at approximately 04h30 in the morning and a thick cloud of smoke and mist enveloped the road leading to the mill.

The Lowvelder reported that a resident of a nearby village described that he heard the warning siren being sounded at the mill. When he went outside he saw the glow of a fire in the sky above the mill. "The fire was huge and the flames were sky-high," he said.

Employees, fire fighting contractors and firemen contained the fire and prevented it from spreading to other parts of the mill. ▲

Photographs courtesy of Highlands Herald

Various fire departments, farmers and a Working on Fire team assisted the staff in fighting the fire

Photographs courtesy of Highlands Herald

The Working on Fire helicopter scooped water from the nearby trout dam

Well-known Millys restaurant gutted

The well-known Millys restaurant next to the N4 highway between Belfast and Machadodorp, Mpumalanga, South Africa, was destroyed in a recent fire.

The restaurant and adjacent shopping centre caught fire on around 09h00 on the morning of 17 June 2011when sparks from the chimney fell onto the thatched roof. The fire was fuelled by a strong wind. The strong wind blew ambers from the thatched roof's fibreglass top plate and thus spread the fire to the adjacent veld.

Although the buildings were gutted, nobody was injured in the incident.

A Working on Fire helicopter helped prevent the fire from spreading to a nearby petrol station by scooping water out of the trout dam next to the restaurant. Various fire departments, local farmers and a Working on Fire team assisted in putting out the fire.

According to the restaurant owner and manager, the fire spread rapidly and gutted the building. Patrons and employees were safely evacuated. While some nearby shops were also gutted, Caltex Star Stop Millys was not affected.

"A sad day indeed... for both the owners (the Cilliers family) of this landmark restaurant and its employees; the restaurant employed many folk from the local Machadodorp (Entokozweni) community," quoted the Highlands Herald on the Facebook page. ▲

Photographs courtesy of Highlands Herald

The fire caused extensive damage to the restaurant and surrounding buildings

Photographs courtesy of Highlands Herald

Although the buildings were gutted, no one was injured

Photographs courtesy of Highlands Herald

The Working on Fire helicopter scooping water

A Working on Fire Huey based in Vryheid

Busy fire season for KwaZulu-Natal fire fighters

A spokesperson for Working on Fire, Zanele Nxumalo, told East Coast Radio's Tamlyn Canham that KwaZulu-Natal was experiencing a busy fire season to date.

Nxumalo said that most of the fires were reported in the northern parts of the province.

Vryheid has recorded the most incidents with 19 wildfires so far. Emergency officials also responded to three blazes in the Eshowe area. Strong winds and dry winter conditions had been a contributing factor.

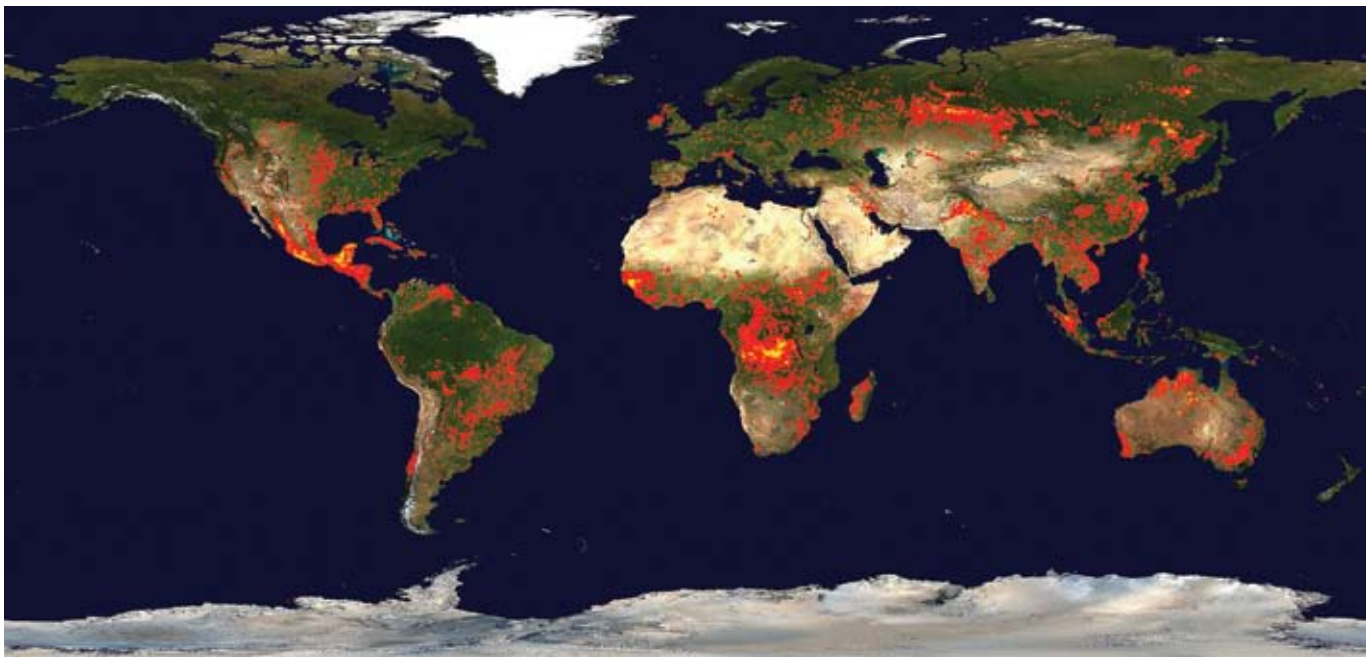
Nxumalo further more detailed that 400 fire fighters had been deployed across the province to deal with the 2011 fire season, which ends in October.

She also stated that while fire fighters had their hands full, there had been fewer incidents compared to the same time last year.

"You find that people in communities don't know whom to contact when fires start and then wait until the fire gets big before they get help," she added.

The WoF ops room in Vryheid

The Working on Fire base in Ugie experienced very low temperatures



The International Strategy for Disaster Reduction's global fire map for June 2011

Russian crews
still battling wildfires

Fire crews faced difficult circumstances in the Siberian republic of Yakutia

Fire fighters put out eight wildfires in the Russian Far East but still dealt with numerous other fires in the region, officials said. Forty one forest fires covering an area of 1 334 hectares were registered in the Far East in a 24 hours period recently, a representative of the Russian Emergencies Ministry reported.

Vladimir Stepanov, head of the national crisis management centre of the ministry, said fire fighting crews were gaining the upper hand in the fires.

"The number of wildfires and their overall area has been reduced considerably in the past 24 hours," Stepanov said.

Stepanov said fire crews faced a difficult fire fighting situation in the Siberian republic of Yakutia in the Far East Khabarovsk territory and in the Arkhangelsk region.

"The number of fire fighting personnel will be increased. Emergencies Ministry's aircraft will bring 600 additional men to fight wildfires in the Arkhangelsk region," Stepanov stated.

"In total, the personnel involved in fire fighting operations there will be increased by 1 000 to stabilise the situation in that region, which leads in terms of the number of wildfires and their area," Stepanov detailed.

Stepanov also confirmed that one person had died in a fire fighting operation in Russia's southern Rostov region.

In 2010, wildfires during a Russian heat wave killed 62 people and left thousands homeless. ▲

Death toll in China
warehouse fire rises to 14

The death toll from a warehouse fire in central China in July 2011 has risen to 14, including three children.

The official Xinhua News Agency said y that fire fighters found two bodies in the two-story building. The Agency also stated that a short circuit in an electrical outlet downstairs was believed to have caused the fire. Most people in the warehouse managed to escape, but at least a dozen were trapped on the second floor.

The warehouse is located in an industrial park in Wuhan in Hubei province, China, and was rented by a latex firm.

Xinhua News Agency also reported that the building contained temporary dorms for workers and some of the victims were their family members. ▲

Biomass burning

in southern Africa seen from space

The NASA photograph showing a large number of fires on the African plateau

NASA (National Aeronautics and Space Administration, USA) detected a number of fires in southern Africa in July 2011.

This astronaut photograph was taken on 23 July 23 2011 with a Nikon D3S digital camera using a 28 mm lens, and was provided by the ISS Crew Earth Observations experiment and Image Science and Analysis Laboratory, Johnson Space Centre. The image was taken by the Expedition 28 crew. A smoke pall dominates this view of tropical southern Africa, one of the most fire-prone regions of the world. Numerous fires give rise to regional smoke palls every dry season. Fires are both natural (started by lightning) and set by local people to clear woodlands for agricultural fields.

This oblique, northwest-looking view from July 2011, at the end of the dry season, shows the extent of the smoke on the African plateau—from central Zimbabwe (image lower left) to northern Malawi more than 1 000 kilometres away (image top right), and in the wide coastal plains of the lower Zambezi River valley of Mozambique (image lower right). Here smoke can be seen blowing inland, channelled up the Zambezi River valley and contributing to the pall on the plateau. The light grey smoke plumes contrast with higher altitude, brighter patchy cloud cover at image lower right.

The smoke palls obscure the details on the land surface so that Lake Malawi, one of Africa's Great Lakes, is barely visible. The same goes for Lake Cahora Bassa, Africa's fourth largest reservoir, in the Zambezi valley. The sun's reflection off the surface of Lake Kariba makes it prominent in the view at image left. Kariba is 220 kilometres long and is the world's largest artificial reservoir by volume. The steep, shadowed, mid-afternoon faces of the Inyanga Mountains on the Mozambique-Zimbabwe border protrude above the smoke layer at image lower left. Solar panels extending from Russian spacecraft docked at the International Space Station are visible at image left. ▲

Source: M Justin Wilkinson, Jacobs/ESCG at NASA-JSC

Baby dies

in shack fire

A 15-month-old baby boy recently died and three families were left homeless after a fire razed four shacks in Khayelitsha's LP Block informal settlement in the Western Cape, South Africa.

Residents of the informal settlement said the fire started at about 14h00 after the boy's mother, Ntombifuthi Mrwetyana, left her baby, Hlelo, sleeping on the bed while she went to visit a friend, three doors down.

Eyewitness Amanda Seti said within minutes after Mrwetyana left her home neighbours saw flames in the shack and shouted for help.

Hearing their cries, Mrwetyana rushed back and tried to save Hlelo, but was driven back by the flames. She was badly burned in the attempt and rushed to the Khayelitsha day hospital. Three shacks in front and downwind of her home also caught alight, leaving about 15 people homeless and with all their belongings destroyed.

"Everything happened so fast. When the fire started resident shouted 'fire' and Mrwetyana came rushing. She was not far from her house. She tried to open the door and grab her child with no success," said Seti.

Seti said Mrwetyana was distraught and said she couldn't get to Hlelo as the bed was on fire.

Police on the scene said an electric two-plate stove was found in the bed in which the baby boy was sleeping, which was believed to have been the cause of the fire.

A neighbour whose home was razed, but who didn't want to be named, lost everything. She said she was at work when the fire started and when she returned in the evening her shack was gone.

Ward Councillor Monde Mabandla confirmed that the city was providing building material for the affected families.

Western Cape Police spokesperson Warrant Officer November Filander said it was "alleged that the mother left her sleeping baby on the bed at home and went to the neighbour's home." He said she returned when she heard people screaming that her house was on fire and tried to grab her baby but the heat was too great.

Filander confirmed that three other homes were destroyed in the blaze and "the 32-year-old mother" was taken to the Khayelitsha day hospital after sustaining burn wounds to her arms and hands. He also confirmed that an inquest docket had been opened, AllAfrica.com reported. ▲

The Vassilikos power station which was extensively damaged by a massive blast at a neighbouring military base near Mari in Cyprus

Cyprus blast kills 12,
injures 62, reduces power by 50%

A fire and explosion at a Cyprus naval base damaged an adjacent power plant and killed 12 people, injured 62 others and knocked out 50 percent of the island's electricity supply, the Cyprus government stated.

A bush fire spread to explosives stored at the Evangelos Florakis naval base in Mari on the southern coast and set off munitions seized from a ship in 2009, state broadcaster CyBC said.

"Of the 62 injured, two are in a serious condition," government spokesman Stefanos Stefanou detailed. "The exact cause of the fire has yet to be determined, but we are ruling out sabotage based on current information."

Both the Cypriot Defence Minister, Costas Papacostas, and Army Chief, Petros Tsalikides, resigned and both resignations were accepted, he said. Cyprus has declared three days of national mourning.

Among those killed were four soldiers, two sailors and five fire fighters and an unknown number are missing, CyBC reported. Many of those injured were driving past the plant and base and were hit by flying metal, Health Minister Christos Patsalides stated.

Damage to the Vassilikos plant, the country's largest, knocked out about half the island's power-producing capacity, the energy regulator said. Generation island-wide, which fell to 140 megawatts at the time of the incident from about 700 megawatts, rose to 560 megawatts, according to the Cyprus Transmission System Operator.

Fifty fire fighters and 10 fire trucks fought the blaze, said a fire official who declined to be identified. Leonidas Leonidou, spokesman for the fire department, said the fire at the base was under partial control and some fires still burning at the power station didn't threaten the fuel depots.

Huge disaster

"The blast caused a huge disaster at the power station," Giorgos Siammas, chairman of the Cyprus Energy Regulatory Authority, told Cyprus state radio. "Owners of reserve generators must put them into operation."

The government spokesman confirmed that the munitions that exploded came from the Russian-owned, Cypriot-flagged vessel Monchegorsk that was intercepted by Cyprus in 2009.

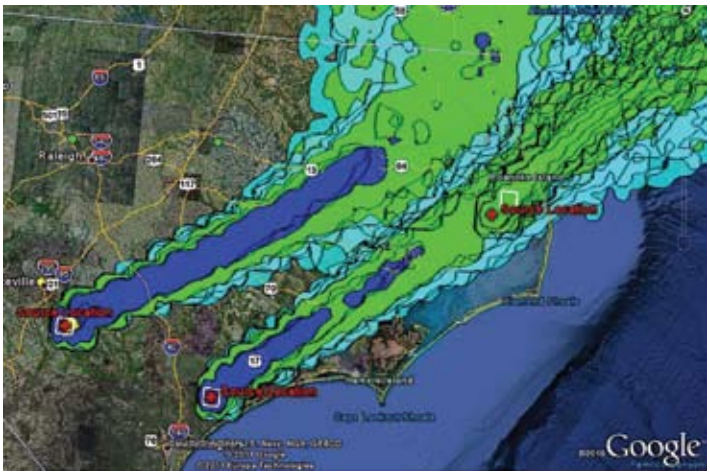
The US, Britain and France said at the time that the Islamic Republic of Iran Shipping Lines chartered the vessel to send weapons-related material, including what they described as "bullet shells" and anti-tank munitions, to Syria. Iran said the seizure of the arms shipment was illegal.

Three staff members at the power plant were injured and there were no fatal casualties, the EAC's Gavrielides said. ▲

Forestry crews battle North Carolina wildfire

while plagued by extreme heat

North Carolina Forestry Services, USA, has been fighting the wildfire, believed to have been caused by a lightning strike on 19 June 2011. The wildfire has burned 12 603 hectares and was, at the time of going to print, 85 percent contained. The total cost of the fire was estimated to be US$3 474 258 to date.



A map indicating the spread of smoke from the North Carolina fires

Heat may be part of a fire fighters job, but the prevailing extreme heat conditions are taking its toll on forestry personnel battling the Juniper Road wildfire in Holly Shelter game lands, forestry officials said.

Pender and Onslow County emergency services assisted with structural protection when needed but forestry services handled all the off-the-road containment, said Brian Elam, a forestry division supervisor. Fortunately personnel have had only a few minor injuries like blisters, small burns and bug bites, he said. No structures have burned.

Since the fire started, line personnel changes have been made every two weeks for the protection of the fire fighters, Elam said.

"We have 14 day line assignments and then we let the folks go home," he said. "After 14 days, the wear and tear, the fatigue with the long days and being away from home … we find there is a lack of focus and injuries cost us more than keeping them here longer."

Fire crews have been called in from all over the country. Currently there are 52 fire fighting and fire management personnel from Kentucky, Tennessee and Florida fighting the fire.

"It takes a unique person to go into forestry," said Elam, who has been in the forestry field for 25 years. "It is all just fascinating to us. We get to learn and understand the process. We study fire, the atmosphere … To the lay person it is like playing a game. When you follow the rules nobody gets hurt. We learn to judge and make decisions about what is going to happen. If all I think about is what is happening now I am behind in the ball game — behind the curve. I have to look at what I have to work with, where is (the fire going), how long is it going to take to get there and how can I stop that."

Though the Juniper Road fire is in static mode at the moment, Forestry Services has to make sure it has enough personnel and equipment should escape issues prevail, said Elam.

"Usually at this point we give the fires back to the district but because it is so dry they don't have enough manpower to cover it," he said. "We don't want to keep more folks than we need, but we're kind of walking a fine line — we have to justify being here, without wasting the state's money, but we have to have enough to keep eyes on it and detect hot spots so we can pick them up. The fire still has the potential for moving, and the last thing we want is to see it get outside those (containment) lines and start over."

Winds from thunderstorms have caused flare ups and there is still ground fire and hot spots, particularly on the south-eastern portion of the fire which has seen very little rain, Elam said.

"With 60 to 80 kilometre per hour downdrafts from these isolated cells there have been embers that spread the fire across (containment) lines, but so far we have been able to monitor it and take care of it," he said.

The heat and sun dries out the well-established containment lines and once that happens they will burn too, so crews are constantly "churning" it up and keeping it as wet as possible with water being hauled in, Elam stated.

Getting the water to the lines has been the biggest problem. "Not having a nearby water source has been a big issue," Elam confirmed. "All the interior creeks are virtually dry with this drought and it is a long way to haul water from the Cape Fear River." Forestry established three water tanks at the south end which hold approximately 11 360 litres of water. "We have trucks that all they do all day long is haul water to keep those tanks full so our guys don't have to go so far to fill up," Elam stated.

Elam said the crews generally start at 6 am and do not arrive back at their hotels until 8 or 9 pm. "They eat, shower and go to bed," he concluded. ▲

Israel forest fire

forces Holocaust memorial evacuation

A wildfire tore through a forest on the outskirts of Jerusalem recently, moving within several hundred meters of Israel's Holocaust memorial Yad Vashem and sending a huge plume of smoke billowing over parts of the holy city.

Fire service spokesman Boaz Rakia said the fire was under control and that Yad Vashem was not in danger. He said investigators were considering the possibility of arson because of reports that the blaze erupted in several places at once.

Police spokesman Micky Rosenfeld said a number of fire engines, equipment and aircraft were deployed and had largely brought the blaze under control.

Estee Yaari, a spokeswoman for Yad Vashem, said the 18 hectare campus was evacuated as the blaze approached. Police said the fire was a few hundred meters from the memorial. "Everybody was evacuated calmly," Yaari said. "There was a lot of smoke on campus." Two people required medical treatment, she added.

Yad Vashem is one of Israel's national treasures, home to a museum and memorials for the victims of the Holocaust. Foreign dignitaries routinely stop at Yad Vashem when visiting the country.

The memorial holds some 140 million pages of Holocaust documentation, the world's largest such collection. It also exhibits artefacts, such as shoes, photographs, suitcases and recorded testimonies of Holocaust victims and survivors.

Yad Vashem also has an eternal flame in its "Hall of Remembrance," as well as the "Hall of Names," where it is collecting the identities of the 6 million Jews who perished at the hands of the Nazis and their sympathisers during World War II.

The fire broke out in the Jerusalem Forest, a patch of hilly terrain covered by pine trees on the western edge of the city. ▲

European parliament

adopts a resolution on the EU emergency number 112

The European Parliament adopted a resolution on Universal Service and 112 on 5 July 2011, in Brussels, Belgium.

After several months of debate, MEPs agreed on a set of actions to raise citizens' awareness of 112 and improve its functioning.

Created in 1991, the European emergency number functions in all EU Members States. Unfortunately, it is still unknown to 74% of Europeans and a lot remains to be done to ensure a high-quality 112 service all over the EU.

In its resolution, the Parliament called on the Commission and the Member States to improve the use of information and communication technologies by emergency services. To this end, MEPs proposed a set of initiatives to improve the regulation, foster sharing of best practices and effectively allocate EU funds. The Commission was also requested to propose performance indicators in view of measuring the quality of service. In addition, MEPs invited Members States to deploy an effective "reverse-112" service to inform citizens in case of upcoming emergencies and disasters.

"The message of the European Parliament is strong and clear: European citizens expect more from the 112 service", commented Olivier Paul-Morandini, president and founder of the European Emergency Number Association. "This resolution is a major step towards ensuring a high-quality 112 service all over the EU; we now count on the Commission and the Member States to take the necessary measures", concluded MEP Bernadette Vergnaud, who initiated the report. ▲

The official logo for the EU emergency number 112

WORKING ON FIRE

SCHOLARSHIP FUND

To enhance the sustainability and protection of life, livelihoods, ecosystem services and natural processes through integrated fire management in order to contribute to economic empowerment, skills development, social equity and accelerated service delivery.

WORKING ON FIRE

The **WORKING ON FIRE** (WOF) Programme is one of the most successful components of the South African governments Expanded Public Works Programmes designed to alleviate poverty through skills training and the creation of job opportunities. The WOF Programme draws beneficiaries from impoverished communities and transform formerly unemployed and in some cases unemployable youth into fit, disciplined and trained veld and forest firefighters, which are deployed at over 100 bases in fire prone areas across South Africa. South Africa has created a world record proportion of women in the ranks of these firefighters, where some 30% are young women.

The impact of this programme has been widely recognized through the accolades which it has been awarded over the years. Not only has the WOF Programme made a huge contribution to South Africa's veld and forest fire fighting capabilities, but the modest remuneration which the WOF Programme beneficiaries receive is a critical relief measure from the depths of poverty experienced by so many in South Africa. Their income represents a real contribution to the lives of the beneficiaries, their families and communities where they live.

WOF beneficiaries not only receive specialized training in various fields related to their veld and forest fire fighting work but are afforded to progress in the ranks of the WOF structure to become Type II then Type I crew leaders as well as branching out into the management and administration functions in the programme. Some 84 former fire fighters have already progressed into such positions such as instructors, regional managers, media and community liaison officers, financial clerks, stores and procurement administrators, etc.

The WOF Scholarship Fund is intended to provide resources to aspirant current and former wildland fire fighters still engaged by WOF to pursue further formal training to improve their skills and knowledge. The fund will be managed by a committee consisting of former fire fighters and programme managers, chaired by the executive chairman of FFA Operations, the company implementing the WOF programme.

Contributions will be solicited from the general public, both domestically and abroad, corporate social investment resources and public and private institutions both in the form of general contributions and targeted funding initiatives. Individuals or institutions may also choose to sponsor a WOF beneficiary pursue their further studies or training. The intention would be to register the WOF Scholarship Fund as a public benefit entity to allow for tax deductible contributions from the corporate sector. All contributors to the WOF Scholarship Fund will receive annual statements on the utilization of funds and beneficiary progress.

You are urged to make a contribution to this fund which will greatly enhance the ability of the WOF Fund beneficiaries to improve their skills and knowledge and in so doing improve their employment opportunities and contribution they can make to their communities. Contributions can be made via the enclosed pledge form.

For further information, please contact:
The Executive Chairman,
FFA Operations T/A WORKING ON FIRE,
Email: Abrahams@iafrica.com
Tel: +27 (0) 82 557 5069.
Also see the WOF website at **www.workingonfire.org**

Or deposit your donation in the following Bank Account:

Account Name:	FFA Section 21
Account Nr:	405 953 7280
Branch code:	632005
Bank:	ABSA Nelspruit
Ref:	Scholarship Fund

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Ventilation gives you the benefit of maximum fire fighter protection and minimising property loss

Five basic rules for interior structural fire fighting

By Colin Deiner

One of my favourite sayings in the fire fighting business comes from the famous retired fire chief of the Phoenix, Arizona Fire Department, Alan Brunacini: be careful of people who say "We fight fires differently out here", because they usually do!"

The point is that the art of structural fire fighting has changed very little over the years. Some of the science has most definitely changed but essentially it is still all about finding the most effective way to put the wet stuff on the red stuff. I recently found an interesting PowerPoint presentation on the internet which was entitled "10 Rules for Fighting Fires". This got me thinking about the way we fight fires "out here" and how our rules would look. Here then follows my own rules for fighting structural fires in South African conditions (I have kept it down to five to make it easy to remember).

You may agree with me, you may not. Either way, it will be interesting to hear your input on this subject.

Bring everything you need and bring it early

Due to budget constraints and a number of other more archaic factors many South African fire services still persist in responding a single fire fighting unit to a structural fire call and then calling back-up when they arrive at the scene and realise the fire is too big and complex to manage with just that single unit or when they start getting their collective butts kicked by a fire which has got out of hand due to no effective early control.

Why you shouldn't do this:

- Doing this leads to the practice of placing every conceivable piece of equipment you think you may need on the vehicle and in so doing cluttering the storage space up so badly that even the most experienced fire fighter has a hard time finding the specific piece of kit he may need for a particular job

- You only have one pump on scene and that cuts down your options should things start going pear shaped with your water supply

- Your fire truck is designed to carry a specific load. Packing "everything anywhere" does not help when you have a long lag on your vehicle replacement policy like most fire departments do

The American "truck and engine company" system is often misunderstood as a convoluted system requiring large numbers of fire fighters and vehicles making it prohibitively expensive. It may be worthwhile to take another look. The system is merely a way of organising ▶

your resources into the specific tactical priorities you will activate during a structural fire. Simply put, the engine company carries all your water application kit while the truck company looks after your forcible entry, laddering, search and rescue and ventilation needs. Your engine is generally a medium pumper while your truck would be an aerial device of some description (either a hydraulic platform or turntable ladder). Now before I hear the howls of protest telling me how expensive it is to run an aerial device on every structural fire, I do want to mention that approximately fifteen years back the city of Phoenix, Arizona, Fire Department grappled with the same issue and addressed it by designing what they called a "ladder tender". This was merely a medium size truck with nothing else but a capacity to carry all the equipment needed to support a sustained structural fire attack. Sure they don't have aerial capacity on these vehicles but that can be called in when needed. The running costs were brought down dramatically.

The ideal response to a structural fire? Two engines and a truck company. Total staff: 10 people. Not that impossible but highly effective. You wouldn't play a rugby match against fifteen players if you were only ten but yet we respond to fires badly understaffed and believe we will win here as well.

Size up and decide your strategy

A really bad decision made by some fire services over the last number of years has been to remove junior line officers from shift work and move them to office hours positions which generally only requires them to respond to incidents on the request of the junior first responder or to respond from their homes (sometimes in their private, subsidised vehicles). This practice, which is aimed at saving money, has not only severely compromised the safety and effectiveness of the service but has bombed the science of fire fighting back to the stone ages and should seriously be relooked at. I would love to know if any municipality who has implemented this system has actually done a cost-benefit analysis and, if so, what the results have been.

The reason I mention this here is because of the importance of a good early size up of the prevailing conditions at the incident and the need to make the correct early decision as to the best strategy to deal with it. I make no claim to coining the following phrase but we all know that the first ten minutes of a fire call are the most important and will dictate the direction for the next few hours.

The effect of the fire on each of the six sides of the building must be considered

When the first officer arrives on the scene of a structural fire, he/she must try to get as much information as possible and use that to formulate the plan. Remember that a building has six sides (including the top and bottom) and the effect of the fire on each of these sides must be considered.

Ideally the officer in command of the first-in engine company should do a drive past of the involved structure and get a three-sided view of prevailing conditions before placing the engine to the furthest front corner of the building but leaving the front of the building to the truck company, thereby enabling them to access any entrance they need to and perform whatever ventilation activities they need to.

The second arriving engine should have the sole purpose of supplying water to the first engine and, if needed, stretch any further hose lines that may be needed. The basic rule should be to always be prepared to deploy three lines: frontal attack, rear attack and roof attack.

Before I get too carried away with the many tactics that could be deployed we need to go back to the most important decision that must be made after the size up…

Offensive or defensive? That is the question!

The condition of the structure, fire column, possibility of rescue and life risk will all play a central role in determining the answer to this question. The golden rule will always be that the risk should match the benefit. If we can save a life we take the chance of committing fire fighters into a structure however if there is no chance of saving any lives and the risk is too great we don't commit our valuable resources.

Fire service training manuals have in recent years, strongly advocated aggressive interior fire fighting as the most effective way of saving life and property and much of the equipment available nowadays is specifically developed for this purpose. The decision to go offensive and to commit all your resources to

an aggressive interior attack must be communicated to all sectors and no person must be in any doubt as to the objectives that need to be reached.

It might occasionally be necessary to switch from offensive to defensive mode. This could happen due to an increase in fire volume or a change in the integrity of the structure. When this happens it's once again critical to communicate this to all sectors within the command structure. In the organised chaos that accompanies a large structural fire, the biggest mistake a commander can make is to combine an offensive and defensive strategy. This "mode confusion" can lead to an extremely dangerous situation, particularly for the crews on the inside and can severely compromise ventilation and possible escape routes. Remember, mode confusion is the first sign that you are losing your head.

In the organised chaos that accompanies a large structural fire, the biggest mistake a commander can make is to combine an offensive and defensive strategy

Do it in 3D

In most services fire fighters are trained to break down doors and attack flames with water pumped through large diameter hoses. Fire fighters are taught to never spray water into smoke as it forms steam and comes back at them, causing burns. This was fine a number of years ago. Building materials have since changed dramatically and are now made from synthetic materials rather than wood or metal. This means that today's fires produce two to three times as much energy as a typical fire did in 1980, and most of that energy is released as flammable gases. These invisible gases can be much more dangerous than the flames, especially in enclosed spaces. The types of insulation used in some newer buildings cause gasses to become superheated, flammable and highly mobile in a fire situation. The result is extreme fire behaviour, marked by life-threatening backdrafts, flashovers and gas explosions.

3D fire fighting is a relatively new term in fire fighting although many services in Sweden and the United Kingdom have been using the strategies and tactics related to it for a number of years. Simply put, 3D fire fighting refers to the techniques and tactics used to gain control over deteriorating fire conditions inside fire-involved structures. This objective of taking control of interior conditions at the outset of fire operations is based upon an immediate risk-based approach, evaluating risk versus gain and is applied at the earliest opportunity, ie; on fire arrival at the fire scene.

3D fire fighting entails hose teams entering a structure and using small bursts of fog to cool the gasses and create a thermal balance inside the structure. By deploying the water in very short bursts it is broken into tiny droplets and instead of turning into steam the moisture's expanded surface area will cool the gases in the smoke. Then fire fighters can move closer to the blaze - instead of ducking for cover - and once they are close enough, revert to the old method of smothering the blaze with a solid application of water.

The main advantage of 3D fire fighting is fire fighter safety. Which is achieved by cooling the smoke, thus the smoke is less likely to start a fire when it moves away; dropping the pressure of the gas drops when it cools (thereby also reducing the mobility of the smoke and avoiding a "backfire" of water vapour). Finally it prevents roll-over (flames rolling off the ceiling which gets created by the burning of hot gases).

Ventilate

Once the decision is made to commit hose crews to an aggressive interior attack those crews need to be supported. The three main areas of support are forcible entry, ventilation and laddering. And it is here, boys and girls, where truck companies come in.

A former colleague of mine once made the statement "a good fire department is one which can move smoke as effectively as water". Unfortunately many incident commanders still see ventilation as an activity to be performed sometime during the fire fighting operation, usually when smoke becomes a problem. Ventilation should be a first attack option during an aggressive interior attack and must be implemented together with the initial hose deployment. The two things you are trying to achieve here are:

- Improve sight and working conditions for interior hose teams, and
- Improve the survivability chances of any possible trapped victims.

Without going into a lesson on ventilation at this point I think the most important thing would be for an incident commander to designate a "ventilation" officer

who should make the call as to the method to use and the direction in which the smoke should be moved. With very few exceptions, positive pressure ventilation will be the tool of choice during a rapidly moving interior attack. It is for this reason that the officer commanding the interior attack must have a very close communications net with the hose teams and the ventilation crew and that both groups must know exactly what the other group's intentions are.

Deciding which direction to move your smoke will also dictate where you will be placing ventilation crews. Putting them on a roof of a structure carries with it a certain amount of risk which can be planned for by ensuring that fire fighters with the right experience and the correct equipment are deployed in these positions. The amount of research done on ventilation saws and Class A foam for protection of unburned areas, to mention a few, provides a platform for us to really make a big effort to improve our ventilation practices and give them a priority position in our standard operating procedures.

When not to ventilate

When commencing an aggressive interior attack the officer's mind-set must be tempered in certain conditions and he/she must be able to recognise conditions when ventilation could be a safety risk. Ventilation should not be attempted when:

- A fire is demonstrating 'backdraft' conditions
- A charged primary hose-line is not in position to attack the fire
- Ventilation openings may spread the fire into roof spaces
- A ventilation-controlled fire might advance towards flashover and;
- The flow-rate at the nozzle is unlikely to deal with such escalation
- A clear objective or reason to create an opening has yet to be identified

Ventilation gives you the benefit of maximum fire fighter protection and minimising property loss. It's about at the time that the living room sofa is floating out of the front door and your fire fighters are walking into walls on their way out of the building that you will realise that you have to relook your ventilation practices.

Controlling the movement of smoke may serve as a life-saving tactic on its own.

Support your attack

In rule four we already mentioned ventilation as a support tool for interior fire fighting. Another major support tool (especially in South Africa) is forcible entry.

It will only be through solid and job focused training that fire fighters will gain the kind of skills needed to perform an effective aggressive interior attack

Forcible entry should not be seen as a function that creates access for rescue and hose teams in the first stages of a fire and then ceases to exist. In South Africa our unfortunately high crime rate places a huge reliance on intruder proof (burglar) bars and security doors. Generally teams move into a structure through a normal opening and then proceed into rooms that are heavily burglar proofed and allow virtually no egress. A good practice would be to have a forcible entry team move in tandem with the interior team on the outside the structure and be prepared to remove any obstructions should it be needed to remove a rescued victim or as an escape route for the hose teams. Communications here are again vital and in the event of a fire in an above ground floor structure your requirement for extra laddering must be factored into your total support considerations. Removing security bars as you go along will not only be time consuming but also very costly and will definitely not endear the fire department to the building owner in the long run.

The last support tool I would like to discuss is laddering. Another highly negative spin off from a single vehicle response is the limited number of ladders that can be carried by that vehicle to a structural fire. There is a reason NFPA specifies twelve ladders on a truck company. Committing rescue and hose crews into the most advantageous areas of a structural fire requires that those crews must be provided with an egress route at all times. The correct placement of sufficient ladders will save the lives of your roof crews.

In closing

A well-known hazmat instructor from the USA, Mike Callan, once said: "hazardous materials don't respect colour, sex or religion. It respects smart". You can relate this phrase to fire fighting just as easily. A fire will provide different challenges to people on different levels. An incident commander needs to size up the situation, get the big picture and ensure correct placement of his/her units and deployment of resources into the best positions. The ventilation officer needs to read the smoke behaviour decide what would be the best procedure and safely deploy roof teams. A hose team leader needs to enter a building safely, balance the thermal layers in the structure, consider hydro ventilating and attack the fire with minimum water damage.

It will only be through solid and job focused training that fire fighters will gain the kind of skills needed to perform an effective aggressive interior attack. This must be firmly ensconced in the character of a fire department. Staff must train regularly and it must be implemented whenever it is required.

Only if this approach becomes a culture within your fire service will it show its real benefit: safer fire fighting, less smoke and water damage and maximum effect. ▲

Pyrolance –
introducing a new technology

Pyrolance can punch through almost any structure

By Cas Seyffert

Every now and then a new technology comes along that can be considered disruptive! It changes the way we think, live and do things! Just think about cellular phones, email, and the jet engine, to name just a few. Never will the world be the same again because of the influence these inventions have had on our daily lives. I believe Pyrolance is such a technology for the fire service. It is the first tool in the world that allows a fire fighter to make an interior aggressive attack on the fire without ever having to enter the fire area. Pyrolance is a true stand-off attack tool that will change the way we approach those enclosed, confined fires which lead to deadly flashover and back draught conditions that claim the life's of so many unwary fire fighters daily across the world.

Background

For many of us older hands in the fire service, the chapter on flashover and back draught or rapid fire growth, was not even part of our text books. Or if it was, it maybe was contained in one small chapter. As fire fighters, we were traditionally taught to go for the base of the fire and all our training and efforts concentrated on interior aggressive attack. Protective clothing in the last few years have made huge advances and so did SCBA (self-contained breathing apparatus) and all the other equipment and so we started going in deeper and longer into potentially dangerous atmospheres on a daily basis without even thinking twice about it. Remember when most of us started our careers PPV (positive pressure ventilation), CAFS (compressed air foam system) and cell phones were not even on the planet.

The problem

We were taught to attack the "fuel" phase of the fire (put the wet stuff on the red stuff) and the job is done. It was only in the last couple of years that the Swedish started playing around with "flashover simulators" to teach the "gaseous phase" of fire behaviour in so dramatic fashion that we older fire fighters started paying attention to this critical part of fire behaviour. Nowadays many a training academy across the world boasts the by now familiar "modified shipping container" which is used to teach the guys "hot" training. It is a cheap and easy way for most of us to re-produce these serious fire conditions in our backyard so to speak.

One of the intentions of this "flashover training" is to teach us that fire is three dimensional and that the products of combustion (smoke) burns. How much of this information is retained when we work at actual fires is debatable. There seems to be this approach to go in and get it at whatever the cost! "Aggressive interior attack" is the correct terminology. Most of the time that works and we walk out proud and have that feel good feeling. After 24 years in the fire service I wear the T-Shirt, been there done that! But some days, just some days, this familiar tactic goes awry and bites us. It is on days like that when today's heroes become tomorrow's funeral procession. Question is, is this necessary!

Paradigm shift

Progressive fire departments and training academies teach their fire fighters and officers about these dangerous fire conditions. How to recognise them and to be mindful of the dangers that lurk in those billowing smoke pumping from the enclosed, confined fire structures. Right up to this point we have not had a serious tool in our arsenal that could assist us to rapidly and efficiently deal with these dangerous conditions and it is only due to the ingenuity, skill and a protective hand that is ever present that we have not lost more of our brothers.

Pyrolance is a disruptive technology that gives us a never-before-heard-of option. To punch through almost any structure, brick, re-enforced concrete, steel and the rest in an incredibly quick time and then flow high-pressure water fog straight into the thermal layer (gaseous phase) inerting the fire gases without ever introducing oxygen into the fire area and dropping interior heat conditions in seconds to effectively contain the fire and allow for save and rapid entry into the fire building whilst maintaining "control" over the fire conditions from an save exterior stand-off position.

Pyrolance achieves this by flowing water at 160,5 l/m with a pressure of 30 337 kpa at a speed of 644 km/h through a specially designed lance that enables it to add a granite abrasive into the stream allowing it to pierce or cut most materials at a phenomenal rate. The droplet size of Pyrolance is around 0,015 cm (150 microns) giving it enough muscle to attack even the most formidable thermal layer. Typical "reach" into the thermal layer is around 9 to 14 m with a heat absorbsion capacity of around 9 800 BTU (British thermal units) per second (10 MW).

The lance is supplied via a 1,27 cm high pressure hose with a maximum length of up to 91,5 m from the main pump. The hose is typically stored ▸

Fire management symposium held

The Nelson Mandela Metropolitan University (NMMU) together with The Southern African Institute of Forestry (SAIF) recently hosted a symposium on fire management in Pietermaritzburg, South Africa.

More than 120 foresters, fire protection personnel and other industry stakeholders attended the event. Delegates were treated to a variety of thought-provoking presentations by fire managers, land users and authoritative speakers from industry and different disciplines.

Evelyn Holtzhauzen

Dealing with the media

Evelyn Holtzhauzen of HWB Communications delivered the keynote address which encompassed a number of useful tips on dealing with the media during crisis situations including major fires. Holtzhausen also explained how newspapers work, its driving forces and reporting methods.

His practical advice included:

- To create and build friendships in the media through developing relationships with the local newspapers throughout the year. This will be beneficial when there is a crisis
- Never give a "no comment" to a journalist requesting information. Rather turn the focus on a positive aspect and supply them with information for an article so they don't have to go back empty handed or find another source who might supply incorrect information
- Appoint an incident commander within you organisation to handle all media so there is a focused message coming from your company
- Have alternative information readily available in the time of a crisis so that you can supply a positive message with ease when journalists come calling
- New technology has sped up media rate of spread ie social media like Facebook, Twitter, Utube etc so be prepared so that you can react to disaster incidents fast to counter possible damaging articles

Luke Radebe

Strategies to improve integrated fire management through FPA's

Luke Radebe, manager for the fire protection associations section at DAFF presented delegates with an overview of the legislative framework of the FPA's and DAFF. He also highlighted the national fire risk classification map and stated that the majority of FPA's are situated in the high fire risk areas of the country. He furthermore summed up what are FPA's, the reasons why we need FPA's, the duties of the FPA's, the benefits to land users of joining an FPA, the role of the government in the FPA's and the key challenges for the FPA's.

Simon Thomas of the KZN FPA chaired the morning session

Wiseman Rozani of DAFF chaired the afternoon session

According to Radebe, 30,6% of South Africa falls in an extreme wildfire risk area, 31,3% in high risk, 11,7% in medium risk areas and 26,4% in the low risk areas. He also confirmed that government is focusing on promoting the establishment of effective FPA's in the extreme and high-risk areas. There are 227 FPA's registered in South Africa and we need FPA's to assist with the cooperation between various land users and stakeholders to reduce and prevent the spread of fire.

Membership of FPA's is voluntary for private land owners but required by organisations that are managing state land. Radebe furthermore stated that the key benefit of being a member of an FPA is the presumption of not being "negligent until proven otherwise". He also highlighted the cost savings of combining efforts and resources by being a member. ▸

from page 22

Pyrolance –

introducing a new technology

▸on an electrically operated hose reel allowing rapid deployment. Fitment can be on any pumper or ladder truck working off the main transmission via a PTO (power take-off). Alternatively, a stand-alone diesel power pack allows for "plug and play" applications found on ships, oil rigs or industrial sites.

Solution

We fondly refer to the Pyrolance as the "smart bomb of the fire service" because used in conjunction with a thermal imager it allows us to pinpoint and strike at the heart of the fire with uncanny accuracy and efficiency. Is this the silver bullet of the fire service? Absolutely not, but for the first time we have something in our arsenal that allows us another angle on the fire ground that we never had before.

Cas Seyffert is a retired Assistant Chief of Sandton Fire Department South Africa and is current VP Operations of Pyrolance North America and resides in California, USA. ▲

- FPA's should also send annual reports to his department so that government will have a better understanding of the fire and risk situation to enable them to provide suitable support.

Malcolm Proctor

Hazard and risk mapping in the Freestate

Malcolm Proctor of DAFF in the Freestate presented their recent research in compiling a comprehensive hazard and fire risk map of the province enabling the FPA's to make more informed strategic decisions regarding prescribe burning practices and areas. Their exercise also included historic information on fire hotspots, frequency of fire incidences, the intensity of the fires, current fuel loads and the impact of fuel loads on fire intensity and spread and the social and economic risk factors within the province and its border areas. The map also overlays the location of the FPA's and the fire fighting abilities of the regions stakeholders and land users.

FRI will feature this research in-depth in a future edition.

Ruth Bezuidenhout

Fire insurance

Safire's Ruth Bezuidenhout described how the relationship between a client and a re-insurer is crucial to the provision of sustainable fire/risk insurance. Insurers should add value to the process and need to understand the industry and markets to be able to adapt to landowners' and stakeholders' internal changes and fluctuations in the external environment. Willingness and commitment to this partnership is essential to the sustainability of long-term relationships. Bezuidenhout also detailed that the majority of the members on the SA Fire board are timber growers and as such provide them with an in-depth understanding of their clients risk analysis and business.

She concluded in advising delegates to never admit negligence for the spread of a fire from your property to a neighbour's. She also described the obligations of a land owner when the fire spreads through their property and recommended that all land owners should be a member of an FPA.

The effect of altitude on the FDI

Ezemvelo KZN Wildlife's Charl Brummer presented a study he did on the effect altitude has on the FDI. Through his research Brummer could conclude that the Little Berg with an average height above sea level of 1 500 meters burned more intensely than the lowlands at 1 000 metres above sea level while the high escarpment

Charl Brummer

at 3 000 meters above sea level burned at a lesser intensity than the lowlands. Brummer also noted that the temperatures in the low, middle and high Berg are generally lowest at eight am in the morning, highest at midday and then dropped down again towards the evening and stayed low during the night. The humidity was quite high in the mornings, the lowest at midday and then started rising again towards the evening. The results proved that it was the most dangerous to burn at midday.

His researched also showed that the air cooled two degrees per 300 metres rise in altitude and that this had a direct impact on the humidity and fuel moisture.

Wind speeds indicated the same pattern and were highest at midday. Brummer concluded in saying the higher the altitude, the high the wind speed.

Bobby Hoole

The role of the FPA's

The fire protection officer (FPO) for Lions River FPA, Bobby Hoole, informed delegates of the role of the FPA's and the importance of the relationship between landowners and FPA's in the prevention and suppression of wildfires. Hoole confirmed that should a landowner's property fall within a registered FPA's area, they have to adhere to the rules and regulations of that FPA, whether a member or not. A 'no burning' announcement applies to both members and non-members according to the National Veld and Forest Fire Act of 1998.

Hoole also elaborated on the duties of an FPA and its FPO. FRI will be focusing on this in detail in upcoming editions.

Ben Potgieter

Disaster fires

Ben Potgieter, a well-known fire consultant, said in his presentation that the continued occurrence of mega fires can be contributed to the following factors:

- Climate change
- Lack of cooperation amongst stakeholders
- Poor fuel load management
- Lack of training
- Lack of resources ▸

He furthermore added "we in the industry are good at launching the initial attack, but we need to convert that to an extended attack when faced with big or mega fires". Potgieter also said that the industry needs to have a better understanding of weather behaviour. Readiness actions should be based on local weather conditions and changes should be monitored during fire fighting operations. Changes in weather can turn a small fire into a big fire in a flash.

Potgieter also reiterated that the relationship and cooperation between landowners and FPA's is critical in the development of an overall risk reduction programme. He added that there is currently not enough focus on managing fuel loads. The development of strategic buffer zones on a regional level is imperative as normal firebreaks cannot stop major fires in adverse weather conditions.

He concluded that pre-suppression planning must include detailed response plans for high FDI periods, a well-structured communication plan and the roles and that the responsibilities of relevant staff and the line of command be worked out to the finest detail in order to cope with future mega fires. The importance of training staff in order to cope with major catastrophic fires was once again highlighted as was the necessity of the capacity to turn an initial attack into an extended suppression action.

Dave Everard

Grasslands requirements for fire

Dave Everard, Sappi's divisional environment manager, presented the case for burning of grasslands on forestry estates. Forest growers converted grasslands into plantations which resulted in the remaining grasslands' need for careful management to conserve its biodiversity. Fire is a natural behaviour in grasslands and is required by most grasses. Everard stated that the frequency should be varied in order to promote its natural biodiversity and that fires should ideally be frequent and late in the fire season ie spring.

This sentiment clashes with the prerequisites of forestry managers who would prefer fires in the early part of the fire season and less frequent.

Everard detailed the key principles of grassland fires which he aptly named "The Goldilogs" principles:

1. Fire is a natural occurrence in grasslands and an important ecosystem driver. Grasslands that don't get burnt lose its productivity
2. Flora and fauna have different levels of fire tolerance and therefore shouldn't all be burnt at the same time each year
3. Species need habitat to survive. Fire must support and maintain ecosystem processes. Good basal cover is generally a sign of a healthy grassland
4. Don't burn too frequently as annual burning of the same areas will kill off fire-intolerant species and could cause grasslands to become homogenous
5. Don't burn too infrequently as this could result in a woody species invasion and less productive grasslands with less basal cover
6. Don't burn too early as burning in autumn could result in reduction of grassland productivity due to exposed soil and an increase in erosion
7. Don't burn too late as this will reduce the sward productivity and impact on many plants that flower after the onset of growth. The preferable time to burn is in late winter or early spring
8. Not all habitats and species can tolerate fire meaning certain areas should be excluded from burning ie kloofs, natural forests etc.

Everard added that in general, variation in burning patterns is best for overall biodiversity and that the impact that climate change has on biodiversity, would make effective fire management even more important in the future. He concluded "through good burning practices, we in forestry can maintain good plantations and good grasslands."

NMMU Saasveld lecturer, Tiaan Pool, presented delegates with a recent study into the effects of mulching on fire behaviour. *Fire and Rescue International* features this study on page 33 in this edition.

Johan Heine

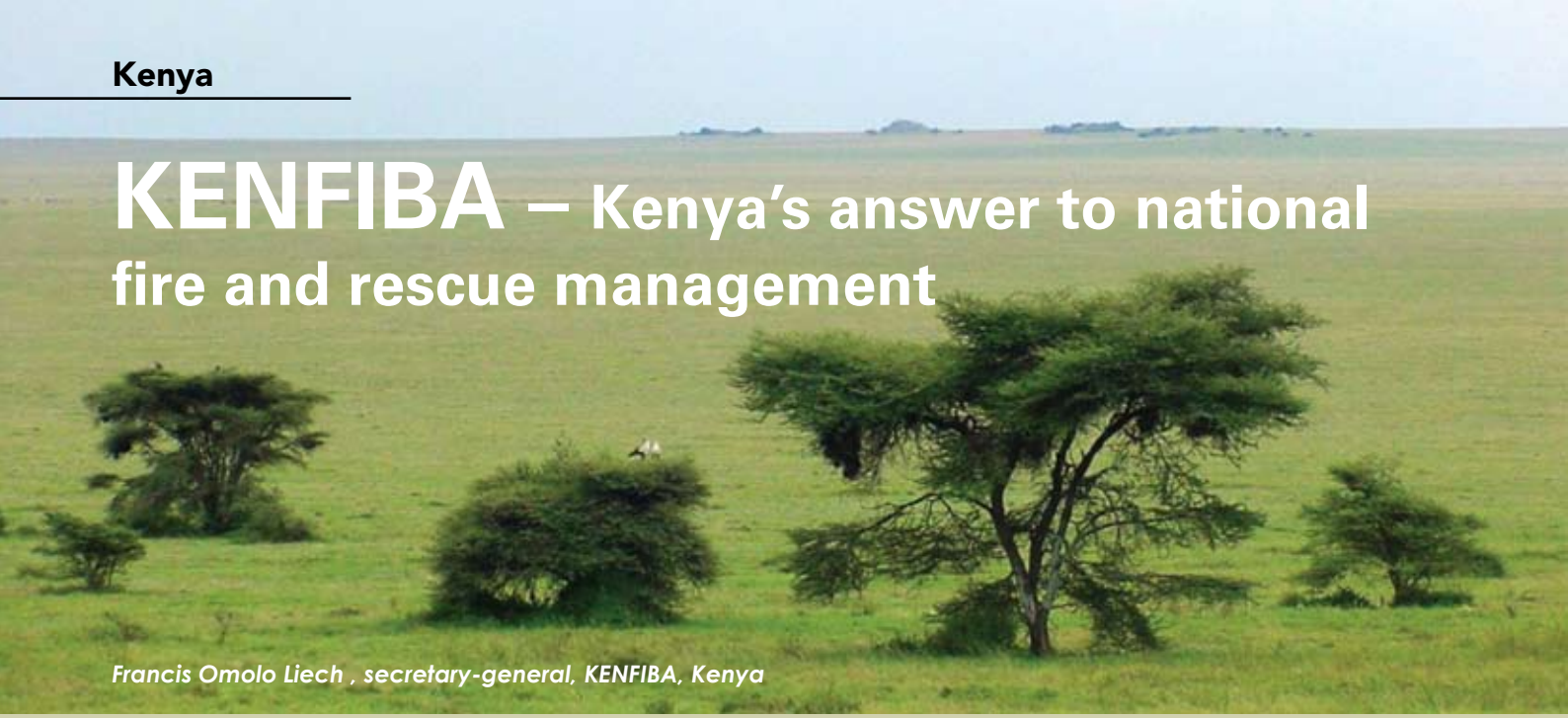
Wildfire 2011

Johan Heine, managing director of the FFA Group of Companies, presented delegates with an overview of the International Wildfire conference which was held in May 2011 at Sun City in South Africa. The conference was attended by more than 540 delegates from 73 countries.

Tiaan Pool

"The symposium made it clear that everybody in South Africa can contribute to curtailing damaging veld and forest fires by working together and truly adhering to the basic principles of fire management," said Tiaan Pool of NMMU's George Campus at Saasveld – one of the guest speakers; as well as a member of the organising committee of the fire symposium.

The event was co-sponsored by Masonite, Sappi, KZN FPA, SA Fire and DAFF. ▲



KENFIBA – Kenya's answer to national fire and rescue management

Francis Omolo Liech , secretary-general, KENFIBA, Kenya

The Kenya National Fire Brigades Association (KENFIBA) was formed to enhance Kenya's fire fighting and rescue ability, standardise and empower fire departments.

Back ground

Fires in Kenya, as in most other countries, are a major risk especially in industries, forests, poorly planned buildings, informal settlements and overcrowded areas where most houses are of temporary structures.

Indeed these fire incidences call for prevention and management and therefore both private and government must develop strategy to combat fire and its effects. These should include establishing, investing and committing the necessary systems.

In 2001, Kenya witnessed a lot of challenges in fire attack, mostly in local schools and industries. The country could not find proper solution on how to deal with these issues due to the lack of proper equipment and skill. Realising the problems facing the fire fighters and industry in general, the municipal council fire brigade officers called a meeting to find a solution to the problem, which was common to all fire stations in the country. The meeting resolved to form an association called Kenya National Fire Brigades Association (KENFIBA) which called on stake holders assist in solving the problem. KENFIBA was registered in July 2002 under the Society Act, Section 10 of the laws of Kenya.

Objectives

1. To unite the fire brigades in the country and achieve a common goal as far as fire fighting and related duties are concerned
2. To promote, encourage and improve the science and practice of fire extinction, fire prevention, fire engineering and all related expedients
3. The association will serve as an advisory body to both central and local government
4. To promote concepts of use to the association and to the community at large
5. To standardise and unite the different brigades and identify a property title and designations for members of fire brigade
6. The committee will set up a minimum scale of fire services supplied to its members
7. To establish a national training school of firemen and officers
8. To formulate training as a pre-requisite for membership of the association through the study and engagement in fire engineering
9. The association is a disciplined body and non-political
10. To empower individual fire brigades to execute its power to prosecute those who interfere with fire services procedures as stipulated in the Fire Regulation Act 1947
11. To organise national fire service and brigade events eg sports drills, football and national parade
12. To ensure unity and uniformity of treatment in recruitment and career development for suitable and qualified officers
13. Foster collaboration networks and partnerships locally and internationally in disaster management
14. To determine the safety of firemen or members of any deformity on duty by providing them with insurance cover
15. To give a token to retired members of the association
16. To establish branches within the fire brigade across the Republic

Mission

KENFIBA's mission is to secure a safer community achieved by reducing incidences of fire through partnerships, education, advice, and when necessary enforce and sustain a highly effective, efficient and economic fire/ambulance service with paramount value at its heart.

Vision

To be the best advisory service provider on fire matters within the eastern Africa Region

History

Fire prevention involves community training on fire safety techniques. This includes reaching out to rural/urban communities with a view to train and equip them to become voluntary fire fighters.

The rising spates of arsonist fires in schools were of concern to KENFIBA, which led a meeting with the permanent secretary for education, Prof Karega Mutahi in 2005. Both parties underscored the importance of training teachers and students to become voluntary fire fighters and the government committed to equip ▶

schools with light/portable fire fighting equipment. KENFIBA was invited to give lectures and demonstrations at schools and other educational institutions. Although this was a great step forward, there was still a need for government to provide schools with adequate training on the proper use of the equipment.

In 2008, the Ministry of Local Government (MOLG) purchased 10 rapid intervention vehicles increasing the number of fire engines in its local authorities. These were distributed to fire stations in Homabay, Garissa, Kakamega and Mtito Andei. However, the Homa Bay's fire engine crashed, leaving the station without a fire engine. The Garissa and Mtito Andei brigades fire engines were never used as the staff received no training.

In Germany, only big cities maintain a fully equipped fire brigade while smaller towns depend on volunteer fire fighters. KENFIBA strongly felt that the same principle should apply in Kenya. Volunteer fire fighters therefore should be fully trained and kitted with the necessary equipment.

KENFIBA officials requested government to purchase Isuzu vehicle tankers fitted with water pumps and send it to areas without fire engines.

As fire prevention also involves commercial and domestic building inspections, KENFIBA incorporated these services by implementing council notices to building owners for periodic inspection, thereby boosting the council's finances. Inspections are undertaken on portable fire extinguishers, fire alarms, fire detectors, fire escape routes, fire hydrants and water pumps mounted in buildings. In Nairobi, this service is periodically conducted at a fee while Mombasa recently included it in its by-laws.

In the United Kingdom, the fire prevention and protection service is categorised as an emergency, which is offered at fee while services like fire fighting and ambulance services are conducted free of charge.

The impact of climate change on urban fires

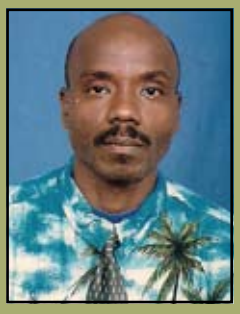
Climate change and global warming cannot be wished away and of all countries in Africa (and the world at large) Kenya is potentially the worst pre-disposed to the negative impacts of climate change. Kenya's informal settlement areas are a particular high risk area during the dry season.

In general, the fires in Kenya will increase in frequency and intensity and will become a more prevalent and destructive "urban ring of fire", especially during droughts.

The impact of climate change on rural fire especially in the game parks and forest reserves

One of Kenya's greatest assets and resources are the large number of game reserves, national parks, and forest reserves in the water catchment areas, mainly in the semi –arid savanna woodland and mountain ranges. Apart from the unusual 1961 drought, when Nairobi National Park burnt for days, fire in the parks and forest reserves has not been a major problem. However, with the rapid warming and forthcoming droughts, fire has become a real threat to Kenya's forests, wild scenic landscapes and wildlife conservancies - the

Athman Bacha, national chairman

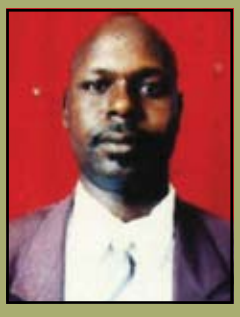


Suleiman M Abdalla, assistant national chairman

Francis Omolo Liech , secretary-general

Benedict M Khamasi, assistant national secretary-general

Nelson Kikame, national treasurer



Kennedy Kiboi, assistant national treasurer

Dan Obala, organising secretary

Johnson Kiobo, assistant organising secretary

foundation of the tourism which is the driving engine for Kenya's economic growth to a vision 2030 and beyond. Besides forests reserves scenic landscapes and wildlife conservancies, dry conditions in rural areas could raze down whole villages due to wildfires.

The escalating fire hazard in Kenya: essential proactive approach

Due to urban revolution the greatest fire hazard is in the "urban ring of fires". The rural countryside's climate change poses a grave fire hazard to forests and game reserves let alone the hundreds of villages. The possibility of a fire disaster is real, widespread and includes urban and rural interface. Because of this, a national policy should exist which recognises municipal, city and corporate responsibilities ensuring precaution and provision of a safe working environment. Steps must be taken to prevent or minimise cause of fires in compliance with relevant statutes and the codes of the land. All municipalities, corporate entities and responsible persons should ensure the prevention of fire and adequate evacuation measures and procedures.

Yet, in the light of an escalating fire hazard, KENFIBA has observed:

- That there is need for new approach to effective bulk instructions, information and training in the basic measures in fire prevention, evacuation and the management of fire fighting equipment
- That there is need to review conditions which promote compliance with fire hazard management
- That similar reviews be made and effected in fire risk assessment and audits
- In the light this, the fast-evolving states and the complexity of the fire hazard in Kenya, KENFIBA decided on a new management's strategy.
- New strategy objectives
- To effectively contribute to fire disaster risk reduction, urban and rural
- To provide opportunity for critical awareness, public education and functional ability on fire hazard management
- Prevention
- Effective response through community-based fire hazard management, urban and rural
- Training of trainers (TOT's) and provision of community fire response officer's
- systematic monitoring assessment and evaluation of performance of the new approach with a view to improvement

New strategy goals

- To evolve a wakeful society capable of functional, community-based literacy and capable of the management of fire hazards
- To enable urban slum dwellers to play effective frontline role in fire prevention and effective response, before the arrival of the fire brigade
- To enable villagers to effectively manage fire hazards
- To contribute to effective management of fire hazards
- To contribute to effective management of fire hazards in forests and game reserves

How will KENFIBA achieve this?

KENFIBA will concentrate on improving awareness, public education and functional capability in managing fire hazard through the targeted activities and especially in the peri-urban "ring of fire", cities and municipalities, rural locations and divisions close to national parks and reserves such as:-

- Training volunteers (TOTs) in the communities
- Liaising with local authorities to organise workshops, public education etc
- Open KENFIBA branches in municipalities, cities and districts
- Let the people appoint community emergency response officers
- Use appropriate electronic media for education and campaigning
- Arranging annual fire hazard jamborees
- Information brochures

Resource mobilisation

Resource mobilisation is an essential element in the fire safety management. The government, development partners and other stakeholders will avail human, financial and material resources for the prevention, preparedness and mitigation of the effect of fire incidences.

KENFIBA will be mainstream into the relevant sectorial policies and development initiative for effective and targeted resource mobilisation through a medium term expenditure framework (MTEF).

Funding

Financial mobilisation for the purpose of fire safety management will be subject to the provisions of the local government act and development partners such as Working on Fire.

Sources of funding to the safety management activities will include:

- Fees levied on registration and other professional services
- Direct allocation from the local authorities through the ministry
- Support from development partners, multi-lateral agencies, civil society organisations and the community
- Any other source of funding that management may deem fit

Development partners

KENFIBA is appreciative of the role the development partners, especially Working on Fire (WoF), played in support of fire safety management. Working on fire (WoF) is a supplier of integrated fire management and climate change services to the international market. WoF supports the UN - ISDR Regional Sub-Sahara Wildfire Network.

The cooperation between KENFIBA and WoF has enhanced the culture of fire prevention, detection and protection through training and awareness creation in the eastern Africa region to achieve its broad objectives.

KENFIBA is changing with the times and has adopted a new strategy to ensure that Kenya's biggest assets, its people, forest reserves and game parks will endure the threat of disastrous fires that climate change brought through increased public awareness, functional literacy of fire in urban and rural communities providing front line defence against fire hazard.

KENFIBA is sure the new strategy is justified, otherwise what alternative is there? These are revolutionary times for revolutionary approaches. ▲

Training

Working on Fire will be presenting two training courses in September 2011.

Incident Command System Training – Planning Section Chief

Obtain an international incident management qualification. Hosted by the Working on Fire Programme, an international team of highly qualified incident managers will present this new and unique training opportunity.

Planning plays a vital role in managing large, complex incidents. This course will provide consistent knowledge and a skill base for members of an Incident management Team that are responsible for performing the planning function.

The course contents include

- Resource tracking, summaries and displays
- Situation summaries and displays
- Operation planning
- Incident action plans
- Incident meetings, briefings and information gathering

Venue: Working on Fire Academy, Nelspruit Mpumalanga, South Africa
Date: 19 to 23 September 2011
Course duration: Five days
Course fees: R 9 063 excluding VAT

Veld and forest fire cause and origin determination course

Obtain an international qualification in fire investigation. This course is hosted by the Working on Fire Programme and is presented by highly qualified fire investigators.

Designed to provide consistent knowledge and skill base for the veld and forest fire origin and cause determination investigator, this course has been specifically adapted for South African conditions.

The course content include

- Professional standards for investigations
- Burn pattern indicators and fire behaviour
- Fire science evidence
- Investigation methodology
- Ignition patterns and source
- Arson recognition
- Witness interviews
- Court preparation and testimony

Venue: Working on Fire Academy, Nelspruit Mpumalanga, South Africa
Date: 26 to 30 September 2011
Course duration: Five days
Course fees: R 9 200 excluding VAT

Contact Fred Favard at Tel 013 744 9689 or email fred@wofire.co.za

Fuel dynamics

of industrial timber plantations

By Dr Neels de Ronde

***Acacia* (Wattle), *Eucalyptus* (Gum) and *Pinus* (Pine) plantations in South Africa were established within a natural fuel/vegetation base, changing not only the landscape, but also its fire-related characteristics, forever.**

Foresters normally take this for granted, but sometimes forget that the natural vegetation and fuel continues to change significantly by tree species and by age (even annually) and so does the fire hazard pattern on the ground. Most of times, these dynamic changes have no relation to vegetation and fuel changes in the natural vegetation (such as grassland and fynbos). However, it is only when we understand the relationship between plantation fuel dynamics and the fire hazard status within plantations and on a region as a whole, that we will understand subsequent fire behaviour variation within plantation stands in the case of prescribed fire application, as well during wildfire conditions.

To complicate matters, the role of the natural vegetation base is only systematically reduced with increase in plantation stand age, until complete crown canopy closure of the trees is reached, when natural vegetation is basically removed from

Edge burning applied in a mature P. Elliottii *stand, in preparation of a prescribed burning experiment in the Tsitsikamma region (photograph taken by Neels de Ronde).*

the system, as a contributing factor to the fire hazard status. When this stage is reached, depends greatly on species, tree growth rates (MAI) and crown form (thin or widespread crown forms). The results of these influencing variables on the stage when crown canopy closure is reached, is further affected by the addition of thinning and pruning slash, which is again affected by the major timber product regimes, such as the production of sawlogs for structural timber vs pulp production. In the case of the first, regular thinnings result in more fuel being added to the forest floor, while in trees grown for pulpwood, only some light pruning slash is added (if pruning is applied at all). Clearfelling also adds another dimension to this dynamic - mostly man-made - problem.

Fortunately researchers have not only studied - but also quantified - all these affecting variables over the past few decades, and existing fuel model databases have been developed over time, so that each parameters' affect is not only known with regard to changes in biomass loading, distribution and, height and density, but also how these dynamic and man-made changes influence fire behaviour parameters. Unfortunately this information is seldom understood by the fire managers and neither is it used in practice (with the exception of a few tree-growing companies in South Africa who now use it as part of their fuel management policies).

With this article I just want to illustrate/summarise the fuel-dynamic changes taking place inside our plantations, and how such changes affect related fire behaviour in general. With this writing, I just want to point out how these changes can have a dramatic influence on the regional fire hazard status from one season to the next. Finally, I will table some proposals for fuel dynamic training, for fire managers in general, in regions where plantations form a significant part of the regional landscape.

Main vegetation and fuel comparisons between species

It is important that we differentiate between the three main species used for plantation forestry (Wattle, Gum and Pine) with regard to a number of important parameter affects over time, as this will make fuel dynamic assessment more meaningful (see Table 1 below):

Parameter affects	Wattle	Gum	Pine
Tree stand age	Crown canopy closure within 4-5 years	Crown canopy closure within 2-3 years	Crown canopy closure within 4 – 7 years
Silvicultural regimes (thinnings, prunings)	Mostly none applied: No affect	Mostly none applied in pulp rotations	Pruning mostly applied, with thinnings applied regularly in sawlog rotations
Decomposition dynamics	Low leaf-fall rate, decompositing very fast.	High leaf-fall rate, litter accumulating fast	Decomposition normally matching leaf-fall*
Clearfelling	No serious slash loading problem	Very serious slash problems, with high loading	Clearfelling slash a problem in *P. Patula* stands

Table 1 *Summary of the effect of stand age, tree growth rates, silvicultural regimes, decomposition dynamics and clearfelling slash levels on fire hazard in general, for the three main tree species used for afforestation.*

Critical issues now to understand from the above table are the following:

- The periods when tree crown canopies are not closed. In the case of Pine stands (four to seven years unclosed crowns) this means that e.g. a five to six year old Pine stand has a cover of a five/six-year old grassland, and thus presents an extreme fire hazard in a stand of this age. ▸

Striphead burning in progress in a P. Radiata *stand in the Tsitsikamma region (photograph taken by Neels de Ronde).*

- When thinnings are applied in Pine stands, this adds aerated fuel heaps to the forest floor and opens-up crown canopies partly, allowing some return of forest floor vegetation regeneration.
- Pruning slash normally has very little effect on litter loading, but as these branches are well aerated, prescribed burning inside stands should either be applied within weeks after pruning, or only when the fuel on the branches is all "down", and part of the forest floor.
- When Wattle has a closed crown canopy, decomposition is so fast that very little is left on the ground (forest floor is almost absent), providing an excellent natural firebreak, mostly fuel-free. Such stands are ideal to incorporate into firebreaks and buffer zones.
- Gum tree litter is normally highly aerated and dries out relatively fast. This makes prescribed burning inside Gum stands somewhat problematic, requiring special measures before it can be applied (but this has recently been proved as being viable).
- In Pine stands prescribed burning can best be applied once crown canopies are closed and litter is "down". However, in *P. Patula* the top needle layer may sometimes be too compact to carry even a light intensity fire, requiring extra drying days before burning can be applied.
- Slash burning after clearfelling should always be applied as and when required for fuel reduction before a new rotation of trees is started. Take note that this is particularly the case in *P. Patula* stands at high altitude, as well as in most Gum stands.
- In case of a wildfire, take note that mature Wattle stands can provide the best area from where a fire can be brought under control. Secondly, mature Pine stands (with closed crown canopies) can be used to advantage to control wildfires, while only young Gum stands can be used for this purpose, once having been established after a slash burn operation.
- Extreme fire hazards can be expected in four to seven year old Pine stands as well as in Gum and Pine stands after clearfelling. The highest fuel loads can be found in *P. Patula* stands at high altitude, after clearfelling. These stands also require the most drastic fuel reduction measures before the next tree generation is established.

To quantify the fuel status of the above stands for predicting fire behaviour purposes, for prescribed burning inside these compartments, slash burning after clear felling or during wildfire situations, the above general knowledge-base is not regarded as being sufficient, and the assistance of (i) photoseries, (ii) fire behaviour simulation with BehavePlus with existing fuel model input for fire behaviour prediction and (iii) on-site fuel assessment, as fire management tools, are strongly recommended. Understanding the basics of fuel dynamics inside plantations is always forming the cornerstone for such actions.

Fuel dynamic assessment before prescribed burning inside pine stands is applied

Only a few forestry companies make use of prescribed burning inside Pine stands for fuel management purposes and for selected use as part of firebreak and buffer zone preparation, for fire protection purposes. This is very unfortunate for the rest of the forestry industry, because the advantages of selective use of this technique are not always well understood in other regions, while in other areas staff is just resisting the burning-idea without really understanding the benefits.

Fortunately, more and more forestry companies today incorporate prescribed burning under tree canopies as part of a fuel management regime. To assist foresters and fire managers in assessing the viability for such burning application, the fuel status of tree stands has to be evaluated properly, and then used as input in fire simulation programs, such as BehavePlus, to predict fire behaviour. With the use of an existing fuel model base - based on photoseries - such predictions can be calculated with ease, using expected weather conditions as further input.

Assessing slash fuel loading before slash burning is applied

Before such measures are considered, it has to be assessed which slash preparation measures are to be applied in which stands. For some unexplainable reason, most foresters are still under the impression that stacking slash in heaps or rows will make it easier to apply fire with an added measure of safety, which (knowing from experience what this does to fire behaviour!) is wrong, because such stacks/heaps can be extremely hazardous to control and are very susceptible to any slight increase in wind speed, which can make spotting a real problem.

Well-advanced progress of fire spread after a point-grid ignition exercise in a mature P. Pinaster *stand in the Tsitsikamma region (photograph taken by Neels de Ronde).*

- Spreading of slash is not only providing a safer fuel base for burning, but has also been found to be most cost-effective, and is thus recommended before burning is applied. Why carry slash from point A to point B for no reason whatsoever?

Of course if slash loading in stands is low and not hindering tree establishment after clear felling and timber exploitation, no slash reduction measures (such as slash burning) should be necessary. However, once re-establishment of trees has been identified as being problematic and even not feasible because of heavy slash loading, do not hesitate, but see to it that such burning is applied. There is no alternative option! If such unburned slash is carried forward to the next tree rotation, fire hazard is automatically increased, with possible disastrous consequences.

Once the fuel status in stands where slash has to be burned has been assessed properly, and slash has been spread, fire behaviour in such stands can be predicted more meaningful at the hand of fire behaviour prediction programs (BehavePlus), making it possible for the forest/fire manager to apply such fire effectively and with confidence.

Using fire danger rating

Forest fire managers and regional FPO's have determined that the "Fire-calc" program works best for them for daily FDI predictions in forestry regions (where timber plantations form the main cover in the landscape). Some also use the MacArthur FDI calculation program as well (particularly where a significant percentage of the land is under natural grassland) but until such time that a much improved FDR prediction system has been determined and put into operation at forest regional scale, the situation is not likely to change.

Generally speaking I do not have a problem with that under the present circumstances, but I still feel that the lack of fuel loading and/or curing input is a shortcoming, which should seriously be considered for more accurate regional FDI's. Until such time that another (region-specific) FDR system is available with fuel input, the present methodology is the best to use. The existing methods are then also used to advantage and should be used as is in the near future.

Understanding fuel dynamics in a wildfire situation

Wildfires in plantations are a frightening experience. They can under extreme weather conditions not only give rise to crowning of fires and multiple spotting, but in some cases real fire storms can develop, endangering men and property and testing fire fighters to the limit. Cool-headed fire bosses are then required to take control of such disaster situations and such fire managers can then greatly be assisted if they know the region well, including where effective protection lines exist and where these can assist in restricting fire spread (such as applying counter fires parallel to fire flanks.

In well-planned regional fire protection plans, provision is normally made for main buffer zones placed strategically in the landscape, from where major wildfire spread can be restricted. In forestry regions, these will most probably include mature Pine "compartment chains", sometimes with prescribed burning applied prior to a wildfire occurring. Where such man-made lines do not occur, knowledge of wildfire behaviour in plantation stands where particular species, stand age and crown canopy status are present in the landscape (pre-determined by means of fire behaviour prediction of typical regional examples, and maybe mapped on a fire protection map). Such information can assist fire managers in determining potential lines from which such fires can affectively be contained or maybe restricted in spreading.

Likewise, tree stands with an extreme fire hazard can also be identified (and are maybe also mapped in integrated fire management plans) so that the worst fire behaviour potential can be pre-determined providing the fire boss with the tools to make specific disaster management decisions and to give such instructions in advance. It will also be useful if typical examples of such situations in specific plantation fuels can be simulated by fire managers (with the use of BehavePlus) so they are even better equipped to predict fire behaviour, even under extreme wildfire conditions,

Conclusions

I am of the opinion that improved understanding of region-specific fuel dynamics – in plantation and in natural fuels – can only improve the understanding of fire behaviour in general, in all aspects of fire application, as well as during wildfires, in forestry regions. The use of fire behaviour prediction programs such as BehavePlus (with an available fuel model database) can greatly assist in all aspects of fire management and is strongly recommended. Training at advanced fire manager and FPO level in such subjects will then be required and is recommended. Such training can be provided by the writer of this article by means of presenting a three-day course.

"Fuel dynamics" is still a dirty word in many forest fire management quarters and knowledge thereof is still a serious shortcoming, also in the forestry industry. It is never too late to improve this knowledge-base to the levels required and can indeed be regarded as a vital necessity and not a luxury. Lives can depend on this! ▲

Tiaan Pool and his team with the AHWI mulcher

The effect of different harvesting slash treatments on fire behaviour

By Tiaan Pool, C F Nelson Mandela Metropolitan University (NMMU), South Africa

Despite technical advancements in fire management within the forestry sector, fire losses within the commercial forestry sector of South Africa still escalate. Figures released by Forestry South Africa (FSA) indicated that the average fire damage incurred by the forestry industry more than doubled during the last decade with an average area of 32 418ha destroyed annually compared to 14 441ha/year the previous decade (Godsmark, 2009).

During these periods, the afforested area in South Africa did not change significant in size. Factors contributing to increased fire damage include global climate change, which causes adverse weather conditions conducive to wildfire development, poor silvicultural practices on plantations leading to fuel accumulation, economical constraints preventing maintenance and replacement of infrastructure necessary to manage wildfire, a lack of competent staff responsible for fire management, and an unfavourable political climate in some rural areas due to delayed land restitution, social unrest and unemployment.

Forestry companies are increasing their efforts to resolve this situation by focusing their fire management activities on fuel load management. Prescribed burning activities in some of the major forestry companies such as Komatiland Forests (KLF) have more than doubled since 2008 (Bothma, Pers. Com., 2009). Decision making regarding controlled burning, is however, becoming increasingly complex due to an increased risk linked to this activity. Broader ecosystem values such as substantial soil quality is becoming increasingly important, and need to be considered when decisions are being made regarding employing appropriate fuel load management methods in commercial plantations. Due to wildfires during 2007, the forestry industry suffered losses amounting to nearly R9 billion. This loss was calculated in terms of loss of planted forests, equipment, jobs as well as future income and had a potential reduction to the provincial GDP of 50% (Godsmark, 2008). Events like these are threatening the sustainability of forestry in South Africa.

Burning of post-harvesting slash provides a means of managing hazardous fuel and remains a popular and affordable solution to the fire threat in commercial plantations, but may at the same time have negative effect on the nutrient budget and soil characteristics on forestry growing sites. Many factors need to be considered when doing fuel load management and an integrated fire management approach is necessary. The South African forestry industry has shown its commitment to sustained forest management through the adoption of forest certification schemes such as the Forest Stewardship Council (FSC) system. More than 95% of all commercial plantations in South Africa are currently FSC certified (Godsmark, 2009). In order to retain FSC certification it is important that all the management activities of forest companies are ▸

FSC compliant. It's expected that pressure from the European market will mount for greater compliancy with rules and regulations that will regulate fuel management activities threatening sustainability of forest areas. One of the fuel load management activities under scrutiny is prescribed burning.

Prescribed burning, being the preferred slash and fuel loads treatment amongst foresters, is continuously criticised, and silviculturists like Da Costa (2008) argues that removal of organic material through fire application leads to losses of nutrients and enhances the chances of soil erosion on sensitive growing sites. A lack of scientific results regarding fuel load management strategies, led to renewed interest to investigate different fuel load management practices in the forestry industry. However, the affordability, effectiveness and ecological implications of these methods with regards to fire management and sustainable tree growth are inconclusive and need to be investigated.

Different post-harvesting slash management methods are employed in the forestry industry. These include prescribed burning, broadcasting, mulching, windrows, chopper roll and in some cases removal of slash for utilisation as bio-fuel. The desirable outcomes of a post-harvesting slash treatment will include the retention and accelerated decomposition of organic material, ease of silvicultural activities in the compartment, improved weed control, site sustainability and reduced fire hazard. In many cases the slash treatment method preferred by managers are subjective choices and often disregard long term ecological and financial outcomes. It is therefore common to find different post-harvest slash management methods used in the same area where homogenous environmental conditions prevail. Mulching of post-harvesting slash is a seemingly effective but expensive method dealing with slash management and is becoming increasingly popular amongst foresters. Mulching entails the mechanical chipping of harvesting debris to break down and compact fuel loads. The effects of broadcasting, chopper rolling, windrowing, prescribed burning and removal of slash have been studied in the past and fire managers are more familiar with the results of these treatments on silvicultural activities and fire behaviour. Literature studies indicated that although mulching is widely applied to dispose of organic slash and to prepare fire brakes, no scientific measurements have been done that could explain and compare fire behaviour in post-harvesting mulched slash with other post-harvesting slash treatments.

It is important that the direct financial cost is not the primary factor for decision making regarding treatment of post-harvesting slash as managers may miss out on the "value of opportunity costs" and the benefits it can generate.

Because it is difficult to quantify value of opportunity costs and its benefits, the effect of mulching, broadcasting, chopper rolling, removal of slash and windrowing was compared in a study that could identify the most desirable fuel load treatment change fire behaviour. Broadcasting of post-harvesting slash is generally seen as the preferred slash treatment and will be regarded as control in this study.

The results of this study can contribute to decision support systems for integrated slash treatment and fire management strategies in plantation ecosystems.

Methodology

Two trials with three repetitions of five slash treatments (windrows, chopper rolling, mulching, broadcasting and removal of slash) were laid out. The species selected for the study was *Pinus patula* and *Eucalyptus macarthurii.* The trials were laid out in two homogenous compartments with regards to site quality as well as the weather experienced in the previous season. Fuel load, forest floor mass and fuel moisture were measured prior to a fire treatment within the trials. The trial areas were burned under similar environmental conditions and in the case of the *E. macarthurii* trial took place nine months after treatment and in the case of *P. patula* trial, eight months after treatment were completed. Fire temperature, flame length and rate of spread (ROS) were measured during the burning process and the results compared.

Results

Figures 1 and 2 give an indication of the available fuel left in the treated *P. patula* areas. Note that fuel measurement in *E. macarthurii* took place nine months after treatment and in the case of *P. patula* eight months after treatments were completed. It can be seen that the fuel lad in the mulching treatment is significantly lower that fuel load in other treatments. Even the inter-windrow (where all post-harvesting slash has been removed to stack in windrows) contained a higher fuel load than the mulching treatment.

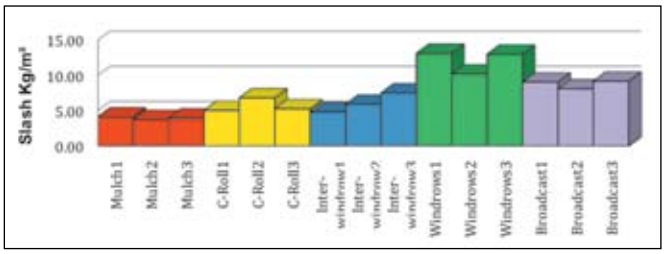


Figure 1a: *Fuel load of* P. patula *post-harvesting slash (Kg/m²)*

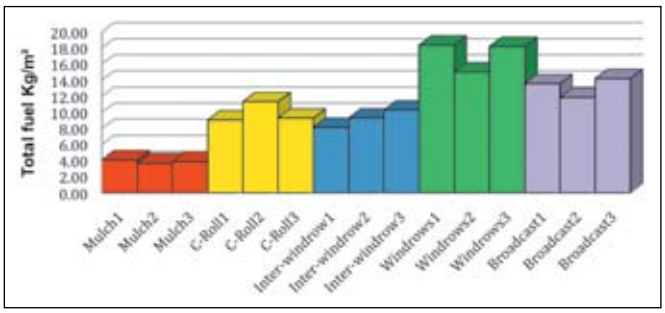


Figure 1b: *Fuel load of* P. patula *post-harvesting slash as well as litter layer (Kg/m²)*

In the *E. macarthurii* areas the fuel load situation looked different but mulched areas still contained less fuel than the chopper roll and windrow areas. I must be mentioned that the fuel load in the broadcast treatment in this trial

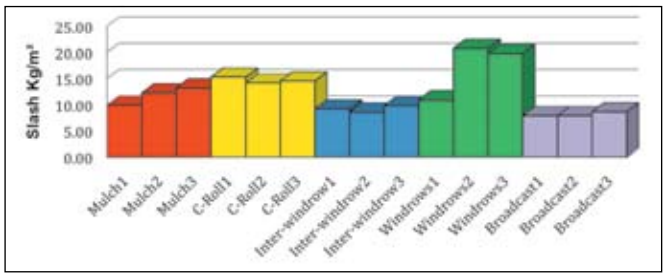


Figure 2a: *Fuel load of* E. macarthurii *post-harvesting slash (Kg/m²)*

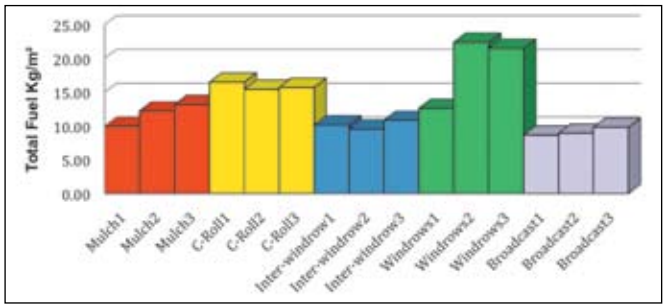


Figure 2b: *Fuel load of* E. macarthurii *post-harvesting slash as well as litter layer (Kg/m²)*

might have been influenced by the harvesting method in the compartment and is suspected that the area selected to do broadcasting contained less post-harvesting slash to start off with. It is interesting to note that chopper rolling was not very effective as fuel load reduction treatment. In Table 1 some of the results reflected in Figures 1 and 2 are compared for the same treatments in the two trials.

The only explanation for the significant lower fuel loads within mulching treatments is accelerated mineralisation of organic material within these areas. Factors that support this conclusion is a higher moisture content of these fuels, bigger surface area of more fine fuels as well as the compactness and close proximity of these fuel layers to the soil.

Table 1: *A comparison between fuel loads of different treatments*

Treatment	*P. patula* (kg/m²)	*E. macarthurii* (kg/m²)
Mulching	5,18	4,14
Chopper roll	9,87	15,86
Broadcast	13,18	9, 12

Interesting to note was the distribution of the fuel classes within the different treatments where more fine fuels (one hour fuels) were present in the *E. macarthurii* trial if compared to the *P. patula* trial after treatment. Figures 3 and 4 indicates that fuel moisture content in both trials was significantly higher than in other treatments, possibly because these treatments contained more compacted fine fuels that retained moisture better than fuels in other treatments. The effect of the different treatment on fuel bed depth is indicated in Figure 5. The fuel bed depth also indicates the proximity of fuel towards the soil. The closer and more compact the fuel to the soil the bigger its influence on soil moisture and temperature.

Table 2: *Distribution of fuel classes (%)*

	1h fuels (< 6mm)	10h fuels (6-25mm)	100h fuels (26-75mm)	1000 h fuels (>75mm)
E. macarthurii	32%	39%	20%	9%
P. patula	9%	34%	21%	36%

The flame heights of *P. patula* and *E. macarthurii* were measured during the burning of the different post-harvesting treatments in the two trials. In both cases the flame heights measured in the windrow treatments were the highest and the lowest in the mulched areas. The flame heights in the broadcast and mulch areas are summarised in table 3.

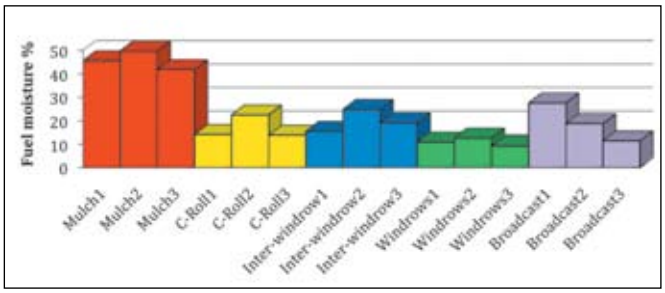


Figure 3: *Fuel moisture* P. patula

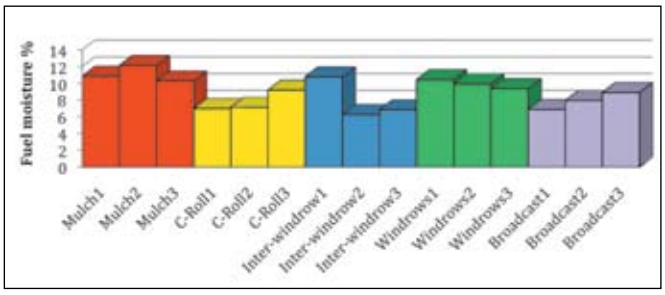


Figure 4: *Fuel moisture* E. macarthurii

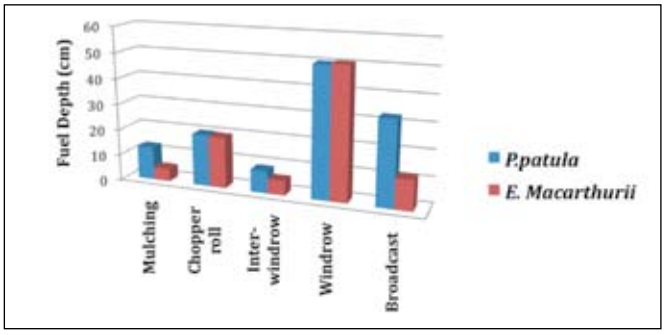


Figure 5: *Fuel bed depth for different treatments*

Table 3: *Comparison between average flame heights of broadcast and mulch treatments*

	Mulch	Broadcast
P. patula	0.20 m	1.73 m
E. Macarthurii	0.44 m	1.47 m

The rate of spread (ROS) of the fire in the two trials was also measured within the different post-harvesting slash treatments. The ROS in the mulched treatments of both trials was significantly lower if compared to that within the other treatments. This is possibly because of the higher moisture present in the fuels of the treatments as well as

Burning in pine mulch

the compacted arrangement thereof. The results of flame heights within all treatments are summarised in table 4.

Table 4: *ROS within all treatments for both trials*

	P. patula ROS (m/h)	*E. macarthurii* ROS (m/h)
Mulch	5	30
Chopper roll	23	51.5
Inter-windrows	11	22
Windrows	39	36
Broadcast	30	46

The average fire temperatures were measured within the different post-harvesting treatments. These temperatures with the exception of the inter-windrow treatment in the *E. macarthurii* trial are much lower than those measured in the other treatments.

Conclusion

Different post-harvesting slash treatments had an influence on fuel characteristics, fire behaviour within treatments as well as organic mineralisation. In comparison with all the other slash treatments, the average flame height, ROS and average fire temperature measured in the mulched areas were always lower except in the case of the inter-row treatment of the *E. macarthurii* trial. Mulching can therefore be recommended as the preferred slash management treatment to reduce fire behaviour parameters of post-harvesting slash in both *P. patula* and *E. macarthurii* compartments.

Fuels in mulched plots were also finer and more compact compared to fuels in other treatments. Mulched fuels in the *P. patula* trial contained 26% more, and in the *E. macarthurii* trial 4% more moisture than in broadcast plots.

After eight and nine months respectively, total fuel load in the *P. patula* mulched area was 61% less and in the *E. macarthurii* mulched area 55% less than in the broadcast areas. This indicates an accelerated mineralisation rate within mulched areas.

The fire consumed far less fuel within the mulched areas if compared to other post-harvesting slash treatments in the trials. Fire behaviour also became worse with an increase in the fire danger index (FDI)/weather variables, higher fuel load and elevation in fuel bed dept. Fire behaviour calmed down with an increase in fuel moisture content.

70% of the fuel load in the *E. macarthurii* trial was one and ten hour fuels and fuel lost/gained moisture faster than in the *P. patula* trial where only 43% of the total fuel load was one and and ten hour fuels. Fuel moisture retention in the *P. patula* trial was thus better than in the *E. macarthurii* trial.

In the *P. patula* trial, the chopper roll treatment resulted in a smaller fuel load, lower flame height and slower rate of spread than in the broadcast and windrow treatments, Chopper rolling is therefore a more effective treatment to reduce fire behaviour in *P. patula* post-harvest slash and should also be considered as alternative slash treatment as it is a much cheaper treatment than mulching.

When landowners aim to select the most suitable post-harvest slash management method, consideration must be given to the following aspects:

- Fire risk in the area (vulnerability of environment, people and assets as well as the presence of hazards),
- Sensitivity and sustainability of the growing site,
- Environmental factors that determine fire behaviour (fuel, weather and topography),
- Cost effectiveness of the operation,
- Externalities of the method such as weed suppression, decomposition of organic material, fire behaviour, and
- Ease of silviculture

The effects of mulching on post-harvesting slash should not only be measured in terms of its direct influence on fire behaviour, but also in terms of its indirect influences on fire behaviour through its positive effect on fuel and soil moisture retention as well as the accelerated tempo of mineralisation of the organic litter layer. It must further be acknowledge that cost effectiveness of post-harvesting slash treatments should be measured in terms of the direct cost of the treatment, but also consider negative environmental impacts of forest fires in areas where post-harvest slash was treated differently. ▲

Fuel load reduction
for forests, veld and wildland

By Ben Potgieter

It is widely known that the most important driver for wildfires is forest fuels. Fires need fuel to burn and fuels are responsible for the spread of fires. If land owners can manage the current fuel loads, fires will not burn so intense and the rate of spread (ROS) will be reduced. This will enable fire fighters to get control of wildfires during high fire danger periods when fires are dangerous and causes extended damage.

It is not always affordable or practical to have only low fuel loads in commercial plantations and it is therefore important to create strategic low fuel load zones in the landscape to slow down the rate of spread of wildfires and thereby reducing the intensity of fires.

Low fuel load zones are strategically placed and run parallel with the predominant wind direction and are placed in the landscape to reduce the lateral spread of wildfires and to slow down the head. These zones are permanent and should be managed on an annual basis to ensure a low fuel load status.

The most effective buffer zone is a zone planted with *Acacia mearnsii. Acacia mearnsii* have a naturally low fuel load due to the fine leave structure and rapid break down of the litter. Well managed wattle stands stop the rate of spread of wildfires. It is not always possible to plant wattle and alternative methods must be used to create these zones.

Any harvesting slash in these strategic zones must be burned after harvesting and followed up with an annual weed control program to ensure a low fuel load status. The establishment of *Pinus* species or re-establishment with coppice regrowth must be avoided in these buffer zones. The silvicultural practices of pruning or coppice reductions add additional fuel during the critical age class of the species. To avoid the build-up of the fuel hazards, land owners must use alternative methods of fuel reduction under the canopy.

These alternative methods of fuel reduction include mulching, under canopy burning of certain species, disking, and gyro mowing and even grazing.

Fires burning in stand as illustrated above is very intense have high rates of spread and are very difficult to contain. Strategic buffer zones must always have a very low fuel load status to be effective.

Under canopy burning

Under canopy burning is a very effective method when executed under the right weather conditions and done by a well-informed forester. This method is very effective in sawtimber rotations. Pulp markets do not accept scorched or carbon contaminated timber which limits the use of this practice.

Mulching

Mulching of the strategic zones is then the alternative slash management tool that doesn't affect the final product to the markets. Mulching under the canopy require a machine that can fit between the planting rows, mulching all the fuel between the rows. Mulching is ▸

Mulching is not a cheap operation but must be seen as an investment or insurance to protect the crowing crop

Mulched areas have proved to be effective barriers to stop the spread of wild fires

normally used in the initial treatment followed by weeding operations afterwards to ensure a low fuel load status. Other mechanised methods like disking or gyro mowing can also be used as a follow up treatment if the terrain allows access.

These mulched zones are normally 60 to 100 meters wide. Initially mulching is not a fuel reduction activity but a fuel modification as mulching change the arrangement of the fuels and can mix it with the soil. The new fuel arrangement slows down the rate of spread and the intensity of fires. This allows fire fighters to control wild fires. Mulched areas can also be used as escapes routes or safe areas for fire fighting personnel during wild fire scenarios.

Mulching is not a cheap operation but must be seen as an investment or insurance to protect the crowing crop. Mulched areas have proved to be effective barriers to stop the spread of wild fires. The biggest obstacle to use other methods like disking is old stumps in the inter row. Mulching is necessary to remove the old stumps before other cheaper alternative methods can be used.

Mulching is also very effective to clear natural areas from invader species to create effective firebreak systems.

Strategic buffer zones designed on a regional basis and across boundaries, are a necessity to ensure the sustainability of the forest industry.

Strategic zones must be designed to limit the potential loss during high fire danger periods and to serve as areas from which fire fighters can contain fires.

Fuel load management is the cheapest insurance against fires and more focus is needed to reduce the overall fuel load status in commercial plantations. It must be integrated in all forestry operations and treated as an investment in the future sustainability of commercial plantations in southern Africa.

As land owners will have fires, reducing the fuel load will ensure low intensity fires and less damage to the growing crop.

Prescribed burning
under pine plantations

Ben Bothma, Komatiland Forests

Ben Bothma of KLF

Prescribed under canopy burning in progress

This is what the forest floor underneath the burned fuel layers should look like directly after a prescribed burn

Fuel loads under the pine trees accumulated to unacceptable levels which made fire fighting hazardous and almost impossible to extinguish with current fire fighting methods. KLF realised to protect the valuable timber asset and surrounding communities, prescribed burning appeared to be the most effective method in reducing the fuel loads.
Komatiland's fire risk manager, Ben Bothma, visited Australia to gather information on prescribed burning. In 2008, an Australian fire manager, Mike Cantelo, was invited by KLF to visit, investigate and then train plantation managers on fuel load reduction under pine canopy.

History

From 1994 to 2004, the volume of sawn timber sold in South Africa has almost doubled, while the volume of other fibre products increased six-fold. During the same period the total planted area in South Africa decreased from 1 432 000 hectare to 1 340 000 hectare. Simultaneously, the frequency and size of disastrous fires increased drastically since 1993. KLF realised that this was a sure indication that current fire prevention strategies of the industry did not keep up with the demands of the ever-increasing fuel load under its trees. Foresters and fire fighters also faced the fact that traditional firebreaks were not always effective enough to stop high intensity fires and it became clear that a complete overhaul of fire management strategies was needed.

Dr Kevin Tolhurst of Melbourne, Australia, stated during1999: "People need to come to terms with the fact that fires had been part of our environment for millions of years and need to continue to be part of the environment. If they do so, then they should be able to realise that the use of fire as a land management tool is essential and not an option."

The use of fire in plantations as management tool is NOT something new. It is widely used in various countries all over the world. In South Africa (SA), comprehensive plantation fire-related research on prescribed burning started as early as during 1978. Aspects such as effects of fire on soil and the forest floor, the impact of fire on decomposition dynamics and the effects of fire on nutrients and physical soil properties – covering short, medium and long-term studies, have been addressed in the process by SA forest fire researchers. ▸

Under canopy aerial ignition

The aerial ignition team with KLF and Working on Fire staff

Mike Cantello of Western Australia, sharing his practical knowledge with KLF

Dr Neels de Ronde explaining ignition methods to KLF foresters

Guidelines

Although there is not a single set of "scientific rules" which will provide 100% successful burning under all circumstances, properly trained foresters can now apply this management tool safely if the following is applied:

- *Pinus patula* and *Pinus taeda* younger than 12 years should not to be prescribed-burned without accepting that crown damage in the form of some degree of crown scorch can occur
- *Pinus elliottii* can be burned safely from 11 years of age onwards (without crown damage). In some instances compartments from approximately seven years of age onwards may be burnt by experienced fire practitioners if special measures had been taken and if some degree of crown scorch is accepted
- Clearfelling compartments should be prescribed-burned two years before felling, as this enhances decomposition processes, particularly in *Pinus patula*. This should make it possible to avoid slash-burning after felling and exploitation
- Knowing that there is a 1:6 ratio of flame height to scorch height , it is important not to slash weeds before prescribed burning is applied, as this may lead to fuel addition and subsequent higher fire intensities (and a higher crown scorch height)
- Stands growing on steep slopes or broken terrain should be prescribed-burned early in the morning or late in the afternoon
- Prescribed burning should not be applied if the air temperature is > 22 degrees celcius, unless a specific high fire intensity is required to eradicate weeds such as Gleichenia polypodioides (Kystervaring), where high intensity back-burning only will be effective (and then only applied by experienced burners)
- Smouldering spots (normally not a problem except where decaying tree stumps occur) should be treated with lots of water as soon as the fire front has gone past such areas, to prevent them from burning into humus layers and root channels
- Pruning branches should not be left against tree stems during pruning operations
- Compartment edges of stands with difficult fuels - exposed to prevailing winds - should preferably be prescribed-burned approximately two days after adequate rain was recorded. The remainder of the compartment can then be burned one to three days later (depending on the fuel moisture status of the remaining fuel)
- No prescribed fire should be applied on sandy soils

Training in prescribed burning application, pre-planning and results assessment, plays a very important

A forester at Belfast plantation inspecting a compartment after prescribed burning

One of the advantages of prescribed burning

role in the entire process. No burning should be applied by untrained foresters. KLF provided comprehensive "in house" training for their staff and various external training courses were also incorporated. Dr Neels de Ronde presented an integrated fire management course in Sabie during 2007 for KLF personnel only and two Australian trainers also spent time on KLF plantations, sharing their practical knowledge and expertise during burning operations.

A complete set of photoseries was also developed in conjunction with Dr de Ronde, to make it not only possible to assess plantation fuels, but also assist in fire behaviour prediction. The person is charge of a planned prescribe burn, can now just page through all the photos in this bundle until he/she identifies a photograph that is representative of a particular compartment to be burned and then read-off this useful information, applicable for typical burning conditions.

Advantages to the forester (and ecological effects) have been identified since KLF started with prescribe burning application:

- Cost of fire protection can be reduced significantly
- The incidences of destructive, crowning wildfires are reduced, due to the wider, strategically-burnt firebreaks with only marginal forest floor fuel layers
- Narrow fires breaks can now be replaced by wide buffer zones
- Burning can now be applied under pre-determined optimum conditions, making it a much safer burn
- Fuel loads are reduced, thus reducing risk of high-intensity wild fires
- Weed control is improved and the amount of chemicals used in the plantation habitat is thus reduced
- Removal of weeds encourage regeneration of indigenous plants (including palatable grass)
- Fires with light intensities generally increase litter breakdown processes, reduces the risk of forest floor accumulation and make nutrients better available to trees: In this way optimising timber yields
- Access to plantations can be improved dramatically
- Opportunities for agro forestry may become a reality (eg improved grazing inside plantations, increased mushroom growth, etc)

New technology and methods

In an interview with FRI, Bothma stated that under canopy burning in pine plantations is no longer a hit or miss situation, but a science. He emphasised the importance of training and keeping up with technology.

KLF has been using aerial ignition to assist with the vast areas that need to be burned in a short period. "The window of opportunity is only 22 days annually that are ideal for prescribed under canopy burning, due to weather patterns," Bothma detailed. "The only way to manage such a task is to use aerial ignition. We are able to burn approximately 700 hectare a day with aerial ignition as opposed to 50 to 70 hectare per day manually which adds a cost saving aspect to the time saving facet."

The number of pellets dropped in aerial ignition varies according to the fuel load density. Under normal fuel load conditions, 12 pellets per hectare are dropped. The intensity (number of pellets per hectare) is increased as the fuel load increases.

Prescribed burning has introduced fire at low intensity under controlled conditions, reducing fuel loads up to 50% during the wet season. KLF have burnt more than 30 000 hectare and is the industry leaders in this field. An estimated area of 11 000ha is forecasted to be burnt annually on areas of high risk in the future. Prescribed burning will not prevent fires, but will reduce the intensity of the fire, protecting the trees and thus giving the fire fighters a better chance to control and extinguish the fire.

Bothma concluded that under canopy burning has proven to be a very effective fuel load management tool in KLF's integrated fire management strategy. ▲

Precision Husky

grinders and shredders

Precision 900-T

Precision 900

Precision Husky, well-known manufacturers of stationary and mobile chippers and accessories, also produce a wide range of grinders and shredders.

The ProGrind 900 tub grinder is an affordable, compact grinding solution for community based solid waste programs, smaller municipalities, golf courses, landscape operations and cemeteries. This tub grinder will grind up all the fire break and slash waste as appose to burning it. The product can be left in situ to decompose or be used for compost production for use in other sectors.

The ProGrind 900 is available in 74,5kW to 112kW Cummins diesel engines and three different hammer options for grinding versatility. Two 305mm discharge augers easily move material from mill area.

The tub tilts forward at 38 degrees for easy access to the hammer mill, screens and lower auger area. The units are available with an optional stacking conveyor and magnetic head roller.

The control panel is easy to use and comes complete with operating switches, hydraulic controls and gauges. The ProGrind 900 is equipped with state-of-the-art, electronic control system, providing reliable operation and easy maintenance. Strategically placed access panels allows for quick and efficient maintenance of the engine and other components. It comes standard with a ball hitch for towing.

Maintenance

Maintenance is simple and safe. The tub tilts forward 38 degrees, providing easy access to the hammer mill and screens. Screen replacement can be done in a matter of minutes, and hammers can be replaced in as little as 30 minutes. During grinding operations, the tub table locks screens in place without the use of bolts or latches. Innovative safety features includes an interlock system and automatic machine shutdown during jams, provide protection to operators and mechanics while running or servicing the machine. ▲

Performance and versatility

The ProGrind 900's hammer mill provides the power needed for small to medium-sized grinding applications. Three different hammer type options are available - 2,3kg, 5,7kg and replaceable tip - allowing the overall versatility needed to grind several different types of material, including slash, bark, yard waste, brush and more. Eight different screen sizes are also available.

Easy-flow auger design

Equipped with dual 305mm augers in an easy-flow design, the ProGrind 900 smoothly removes processed material from the hammer mill to discharge area.

Clutch

The exclusive fluid coupling provides maximum clutch protection. This added protection also dramatically reduces clutch wear and virtually eliminates the possibility of clutch failure.

The Precision Husky grinders are available in various models

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Several Protea and other Fynbos species require fire for regeneration

Dense sulphurus smoke containing ethylene from burning Grass Tree

Fire: friend or foe?

By Lynne Trollope

Is fire good or bad?

In his book "The Story Behind the Scenery", Jack de Golia, an American ecologist, sums up fire in a most succinct manner.

De Golia said, "fire has been mankind's companion and foe since the dawn of time. It's a fundamental element of the planet, like air, shaping the patterns of life. Our opinion of fire has changed often, but fire itself, is the same. The real challenge from fire is to understand it and the earth we live on. Fire represents opportunities for new life that don't exist until a burn. Each place responds in its own way and in its own time. While forests and grasslands of today are products of earlier fires, they're also setting the stage for fires to come. The essential point is - fire is neither good nor bad. The real question is what does fire do to the soil, plants and animals in a given place?"

Wildfire is among the oldest of natural phenomena. As a product of lightning, wildland fires trace their ancestry to the early development of terrestrial vegetation and the evolution of the atmosphere. Fossil evidence of fires are buried in the coal beds of the Carboniferous period, and although there is no reason to suppose these mark the origin of natural fire as an ecological force, there is little doubt that such fires have continued unabated into contemporary times.

Archaeologists estimate that pre-Stone Age man was the first to develop the controlled use of fire about a million years ago. It is not clear if this was captured or manufactured fire, but most feel that it probably represents the first evidence of the ability to steal fire from natural bush fires started by lightning strikes in the area and to transport the flames into caves for warmth, protection from predators, and possibly the cooking of food. The controlled use of fire marked a pivotal change in human behaviour as it signalled their ability to adapt the environment to suit their requirements. As humans spread throughout the world they created new fire regimes that shaped the landscape and impacted on living conditions leading to the realisation that fire has two faces – beneficial and detrimental.

Fire can be a good servant but a bad master!

Today, most people world-wide view fire as just fire, and their impression is that, in the main, fire is destructive. This stems from the fact that in recent times, opinions changed and fire was, and still is, viewed mainly ▸

Grass Tree Burning

Sampling Smoke from burning Grass Tree to test for ethylene

as a threat to life, infrastructure and ecosystems, thus the modus operandi has become prevention or suppression. The result is that society lost the notion of fire as a useful tool and important process in shaping landscapes. However fire is a vibrant, tangible entity in the ecosystem, influenced by many factors.

The beginning of an insight into the role of fire is to try and understand the bigger picture. Appreciation that plant survival depends on a response to what we normally term a major disturbance or "disaster" - fire, is a starting point. Plants across the globe have different response mechanisms to fire and can be classified into three groups according to their response - fire dependent, fire tolerant or fire sensitive.

Many plant communities have adapted themselves to fire, in fact it has become a symbiosis, such an integral part of some ecosystems that not only do they tolerate fire, but they actually require it for survival. For example, certain Protea species do not germinate without fire and have become listed as threatened or red data species because fire has been virtually eliminated from the areas in the western Cape of South Africa where they were fairly common. Pine trees have scerotinous cones which need fire to open and release the seeds. According to Professor Coert Geldenhuis, an authority on forest management, Kiaat (*Pterocarpus angolensis*), a sought after African timber species, sometimes suffer from die-off of the crowns of the trees. Research on the problem indicated that fungal attack on the trees was responsible. Lack of fire caused an imbalance in ecosystem health which triggered stress on the trees and facilitated the fungal infection. Even *Themeda triandra* or Red Grass, a nutritious natural fodder species, germinates more prolifically once an area has been burnt.

Several plants, notably the Grass Trees (*Xanthorea australis*) of Australia, depend on the chemical ethylene, generated in the smoke of a fire, to stimulate flowering. In many environments fire is the most effective form of decomposition, the dominant selective force for determining the relative distribution of certain species, and the means for effective nutrient recycling and even the recycling of whole communities.

Fire sensitive plants, on the other hand have no defences against fire – trees in this group have thin bark and succumb to any form of fire as do many other plants in this category. For them fire is destructive! Their genetics are not programmed for survival of one of the major disturbance factors on the planet. For these sensitive environments and their associated fauna, it is essential to be ecologically aware and prevent or minimise the impact of wildfires.

Fire is regarded as a natural ecological factor of the environment that has been occurring since time immemorial, particularly in the savanna and grassland areas of the African continent. Its use in Africa has extended the grasslands and the savannas at the expense of tropical forest. Africa has the most extensive area of tropical savanna on earth which is highly prone to lightning storms and has an ideal fire climate. The majority of the earth's surface burnt every year is within the tropics and subtropics. This is due to the fact that these zones have a hot, wet growing season, resulting in high biomass (vegetation) production, and a dry winter season, causing a substantial quantity of this biomass to dry out considerably, increasing the available fuel load. These areas are characterised by grasslands that become extremely flammable during the dry season.

A significant number of the plant species in savannas are fire tolerant. Savannas occur where fire intensity generally limits the development of tree seedlings into mature trees. Savanna trees have the ability to re-sprout from the underground rootstock when the aboveground stem is killed by fire. Such trees may be several years old but are kept in a juvenile state by repeated fires. Not all fires though are high intensity fires and fortunately many trees manage to escape the "fire trap" and mature into large specimens. Escape from the grass layer where the intensity of the fire is normally higher depends on the fire frequency, the lower the fire frequency the more trees grow into mature trees. By managing fire behaviour and fire frequency land managers can turn fire into a good servant.

The use of fire in the management of vegetation for both domestic livestock systems and in wildlife management is widely recognised.

So, fire is not just fire – it is neither good nor bad but it is a complex beast that can so easily be a good servant but a bad master! ▲

Goscor's fire fighter 'semis' in demand

Leading engine and engine-products distributor, Goscor Power Products (GPP) reports that there is substantial demand for its fire fighter 'semis' ie stand-alone units mounted in a protective role-over frame for those who have their own water tanks.

"Many of our customers already own their own supply tanks and prefer to purchase our 'semi' fire fighting units, especially those units that can power two hose-reels simultaneously," says GPP managing director, Mark Bester.

He adds that these units are purpose-built with Goscor's TR60 pumps and are powered by the renowned Subaru Overhead Cam (OHC), 4,5 kW, EX17 engines. The units are fitted with two reels of 20m hoses and two spray guns - one to combat the fire and the other to 'mop up' any part of the fire that is still burning. "Usually the one operator sprays while driving the bakkie, while the second operator sprays while walking beside it," he says.

Subaru is the world leader in OHC design. "These engines have fewer parts, which means less wear and tear and less that can go wrong. Also, an OHC engine runs quieter meaning less noise and vibration, plus more torque and more horse power," says Bester.

"The fire fighter range is very versatile as it need not stand idle during the low fire risk months," continues Bester. "It provides an efficient and capable all-round service to a wide number of users as it is designed to handle a range of chemical products, including fertilisers, dips and crop protection sprays. These chemicals will not harm any part of our pumps as the seals are especially selected to handle this while the piston is made from stainless steel.

"Subaru engines, because of their unique construction and superior performance, are fast becoming the preferred brand of engine in a wide range of applications and they have certainly stood the test of time in harsher applications like construction, agriculture and forestry," he says.

GPP's fire fighting units have managed to balance the three most important ingredients: usability, quality and price. "We offer a product that is easy to operate, powered by the best engines in the world and is very reasonably priced.

GPP's fire fighter range is backed by Goscor's nationwide dealer network and in Namibia, Botswana and Swaziland. "Having been in the business for 25 years, Goscor has built up an enviable reputation for supplying reliable and dependable world-class products with service and parts back-up to match," concludes Bester.

Township firefighting volunteers recieve fire extinguishers from SafeQuip

Initiative to curb fires in townships

A leading South African fire equipment supplier and subsidiary of the Rovic group of companies, SafeQuip, is spearheading an initiative to try and prevent the disastrous consequences of wildfires occurring next to informal settlements.

Safequip has donated 20 fire extinguishers to volunteer fire fighting groups in Masiphumelele and Kayalitsha in order for them to fight fires as it starts.

One thousand five hundred informal dwellings were destroyed by fire in Masiphumelele in May this year. Should the programme proof to be successful in reducing township fires, moves afoot are to roll out the solution throughout the country.
In the May 2011 Masiphumelele disaster, fire fighters were unable to get their fire trucks between the buildings due to the narrow streets and alleys, and therefore could not gain access to the heart of the fire.

Residents of the informal settlements are unable to fight the fires themselves as the water pressure in these areas is too low to have any effect on the fire. Some municipalities do not clear or enforce the clearing of overgrown bush on vacant land next to residential and informal settlement areas which increases the risk of fire to homes significantly. A solution to this problem could be that municipalities and farmers buy smaller portable fire fighting units, which can be mounted on the back of a bakkie allowing access through narrow streets or open veld. The water transfer units can also be used to irrigate, deliver pesticide, and fertiliser.

SafeQuip recently sold 27 of its new FireKing economy units at the NAMPO show, held in May 2011 in Bothaville, Freestate, South Africa, to farmers. SafeQuip fire readiness advice is that every residence, processing facility and vehicle should be equipped with a fire extinguisher. The company also supplies a home fire safety kit which contains a battery powered smoke alarm, a fire blanket and a mini fire extinguisher, all in a box. ▲

Two new Deputy CEOs

reinforce MAN's strategy for SA

Forming an integral part of MAN Truck & Bus AG's global expansion programme is MVS, a marketing and sales strategy implemented in 2008 to shift operational and entrepreneurial responsibility to the interface with the customer, enabling swift, customer oriented decision-making at the point-of-sale in all MAN sales regions and MAN centres around the world.

According to Markus Geyer, CEO, MAN Truck & Bus SA, "the marketing and sales strategy has proved highly effective in creating uniformity and effectiveness throughout the group's managerial structure as well as to improve customer proximity, one of MAN's core values. In line to the MVS global rollout schedule is the appointment of two Deputy CEOs at MAN Truck & Bus SA to ensure that commitments made to all MAN customers in the southern African region are effectively met."

As of July 1st 2011, MAN Truck & Bus SA's Management Board will report to its new Executive Committee (ExCo), headed by Markus Geyer as CEO. Bruce Dickson has been appointed Deputy CEO, responsible for truck business. Ray Karshagen has been appointed Deputy CEO, responsible for the bus business. The ExCo includes additional members; Maarten Roode (CFO), Godfrey Hani (Centre 4) and Marc Michel (Production).

"The two Deputy CEOs and CFO will manage and lead the local business in South Africa," explains Geyer. "The Management Board includes Wayne Powdrell (Service Business/ After-Sales), Mike Macdonald (Centre North) and Frans de Wet (Centre South)."

A Management Board member for Centre East will be announced in the future, but in the interim, Bruce Dickson will continue to care-take this role. Maarten Roode will continue with all his existing responsibilities as CFO (ie Finance, HR, Procurement, IT, SHEQ, VMS and Internal Audit).

Bruce Dickson, in addition to heading up the Retail Business throughout South Africa, will also be responsible for Marketing and Communications.

Ray Karshagen will continue his responsibility for Bus Sales and Product Management, Bus Production and direct the After-Sales Business for MAN Truck & Bus SA.

Bruce Dickson

Ray Karshagen

"We wish the new appointees success and ensure them of our full support," Geyer concludes.

What's on?

October 2011

4 – 6 October 2011
International Conference on Fire Behaviour and Risk Modelling
Where: Alghero, Sardinia, Italy
Details: www.iafss.org

9 October 2011
The Science of Suppression - a FIRESEAT Symposium
Where: University of Edinburgh, UK
Details: www.eng.ed.ac.uk/fireseat/

12 – 14 October 2011
Safety and Security Asia 2011
Where: Suntec Singapore International Convention and Exhibition Centre, Singapore
Details: www.safetysecurityasia.com.sg

14 – 17 October 2011
Exploring the Mega-fire Reality 2011, A Forest Ecology and Management Conference
Where: Florida State University Conference Centre, Florida, USA
Details: www.megafirereality.com

November 2011

23 – 24 November 2011
The Emergency Services Show 2011
Where: Stoneleigh Park, UK
Details: www.ess2010.com

30 November – 1 December 2011
IFSS Expo 2011
Where: Henry B. Gonzalaz Convention Centre, San Antonio, Texas, USA
Details: www.ifssevent.com

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