



**Lions River Fire Protection Association**  
By Landowners - For Landowners

## **FIRE FIGHTING TACTICS**

Compiled by Bobby Hoole

### **Fire Suppression Activities**

#### **Teamwork**

Successful fire fighting relies on individuals working together as part of a team in a co-ordinated manner. As a member of a team, you must stay in contact with your colleagues at all times, either by sight or radio.

You must make sure that:

- you understand your task and how it fits in with the work of other fire fighters around you;
- the person in charge of you knows where you are and what you are doing;
- you know where other fire fighters are and what they are doing;
- you stay in regular contact with others; and
- you know the escape plans and, in the event that you have to leave the area quickly, you can be contacted.

Never let anyone work alone – don't allow people around you to "get out of sight" – look after your mates and work together. Frequent communication is important – make regular reports so that you give and receive important information about the fire and your safety – keep an eye on the people around you.

#### **Remember your ten Standard Fire Orders**

- Stay in contact
- Watch the fire
- Know the country
- Escape route
- Park in a safe place
- Check instructions
- Use an anchor point
- Wear safety gear
- Keep calm
- Take care

#### **Anchor Points**

While working in fire situations it is important to work from an anchor point. An anchor point is an advantageous location from which a fire line can be constructed. It is used to minimise the possibility of being out flanked by a fire while the line is being constructed.

Possible anchor points include:

- site of a recent fire (i.e. little or no vegetation);
- bare ground;
- blacked out fire edge; and
- non flammable area such as a lake or river.

## WATCHOUT

**WATCHOUT** is an acronym used to remind fire fighters of potential dangers to their safety and to give advice on safe work practices. Understanding the meaning of the acronym will help you perform a more comprehensive risk assessment.

**W**eather dominates fire behaviour, so keep informed.

**A**ctions must be based on current and expected fire behaviour.

**T**ry out at least two safe escape routes.

**C**ommunicate with your FPO, your crew and adjoining crews.

**H**azards - beware of variations in fuels and steep slopes.

**O**bserve changes in wind speed and direction, temperature, humidity and cloud.

**U**nderstand your instructions, make sure that you are understood.

**T**hink clearly, be alert and act decisively before your situation becomes critical.

## Managing the Fire

The safety and success of fire suppression hinges on the command, control and communications systems that are set up to control the incident.

### *Communications*

Communications are vital to the successful outcome of fire suppression or any other incident. A communications plan is developed to provide communications for the whole of the incident, as determined by its size and complexity.

### *Strategies and Tactics*

One of the principles is management by objectives using strategies, tactics and tasks. Never rush into a wildfire, step back and assess and put a plan together:

- objective – a statement of what is to be achieved;
- strategy – a statement of how the objective is to be achieved (e.g. direct attack, indirect attack, parallel attack or a combination);
- tactic – the tasking of allocated personnel and resources; and
- task – the job given to any fire fighting force or unit (i.e. who is to do the job).

### *Fire intensity*

Fire intensity is a function of the amount of fuel burnt, the energy value of the fuel and the rate of spread of the fire. In general terms the indicators of intensity may be flame length depending on how far they are leaning over and flame height. It is useful to know the indicators of intensity as the intensity of the fire may dictate the method of attack used.

- Low intensity fires have a flame height of less than 1.5 m (less than 500 kw/m).
- Moderate intensity fires have a flame height of 1.5–7 m (500–3000 kw/m).
- High intensity fires have a flame height of 7–14 m (greater than 3000 kw/m).

- Very high intensity fires have a flame height greater than 14 m (greater than 7000 kw/m).

The flames from an intense surface fire may progressively consume elevated shrub and bark fuels, and may eventually reach and ignite the crowns of trees.

### *Methods of attack*

The Incident Commander / Fire Boss will ensure that a risk assessment is conducted in order to determine and approve an appropriate strategy. The strategy selected for use at a fire whether in grassland, forest or at any other incident will depend on this risk assessment, taking into account the safety of fire fighters as a first priority.

The strategy will identify the method to be used to attack the fire:

- direct attack;
- parallel attack; or
- indirect attack.

### *Direct attack (low intensity fires)*

A direct attack is used mainly on low intensity fires that can be easily and safely reached by fire fighters. Fire fighters work from an anchor point directly on the edge of the fire and this edge then becomes the established control line. In grass fire situations, water is commonly used to extinguish the burning edge of the fire in which case a mineral earth control line may not be required. Fire fighters may also use foam and fire retardants to extinguish the fire.

In forest fire situations, a mineral earth control line may be constructed using hand tools or mechanical equipment such as bulldozers, along the fire's perimeter. Care must be taken not to drag burning material across the control line into unburnt fuels and to work as close to the fire edge as possible. Water, Class A foam or retardants may not effectively extinguish a forest fire but will assist in establishing a temporary control line.

To perform a direct attack you can use:

- water contained in knapsacks, tankers, aircraft or in hose lines from a static water source e.g. a hose lay;
- bulldozers and other earth moving equipment; and
- hand tools such as rake hoes, slashers, axes and chainsaws.

The terms *head attack* and *flank attack* are used in fire suppression to describe two variations of direct attack techniques for suppressing a fire. You should be aware of how these two methods of attack differ.

A **head attack** involves directly knocking down the head of the fire and then working towards the point of origin. The anchor point is the blacked out fire edge at the head of the fire. This type of attack is used only for low intensity fires and in moderate weather conditions where you can get close enough to attack the burning edge and can be sure that there will be no unexpected flare ups or spotting activity.

A **flank attack** involves approaching the fire on the flanks and working directly on them. One version of a flank attack is to work from the rear using the blacked out edge as an anchor point to work progressively towards the head of the fire in an attempt to "pinch" it out. This technique is used when it is impractical or unsafe to establish an anchor point at the head of a fire front, for example, high intensity grass fire.

### Advantages

- Provides maximum safety for fire fighters e.g. the ability to move into the black if required;
- generally, the least area is burnt of all methods;
- fuel is removed from the immediate path of the fire, allowing the earliest possible control; and
- parts of the fire edge that have self extinguished may be quickly incorporated into the control line.

### Disadvantages

- Fire fighters working at the fire's edge can be exposed to heat and smoke;
- fences and natural barriers may present obstacles; and
- an irregular control line may be produced which can be difficult to patrol.

### *Parallel attack (low and moderate intensity fires)*

The parallel method of attack commonly involves the construction of a control line parallel to the fire, or just a short distance away from the fire's edge. You should be able to see the fire edge to observe changes in fire behaviour.

The distance from the fire edge will depend on:

- the intensity of the fire edge and spotting;
- the type of fuel;
- weather conditions;
- topography; and
- equipment used.

In general, control lines are constructed as close as possible to the flanks of the fire. Irregularities in the fire's perimeter can be bypassed using this technique. You can use a range of equipment to construct control lines e.g. hand tools, ploughs, graders, bulldozers and chain saws.

The fuel between the main fire and the control line may be burnt out by other fire fighters under close supervision. This generally occurs from the point of origin using the blacked out edge as an anchor point as the work on the control line proceeds.

Control line construction must stay ahead of any burning out activities. If this is not possible, you must patrol the control line to ensure that it is not crossed when the main fire reaches it.

*Note: when using this technique, you must always remember that the fire is constantly changing due to factors such as fuel and topography. The distance that you can work from the fire edge is dependent on fire intensity – the further away you work from the fire edge, the greater the personal risk if the fire changes direction or intensity increases.*

When using the parallel method, you must:

- commence control line construction from an anchor point;
- monitor the progress of the fire and note any weather changes; and
- ensure you have two escape routes.

Advantages

- Control line may be shorter and straighter than in direct attack; and
- crews may be less exposed to heat and smoke.

Disadvantages

- There will be an increased risk of the fire escaping; and
- the total fire area will be greater than that in a direct attack.

### *Indirect attack (high/very high intensity and inaccessible fires)*

The indirect method requires the use of either a natural fire barrier, or the construction of a control line some distance from the fire's existing perimeter, or a combination of both. The fuel between the control line and the main fire is back burned when conditions are safe to do so.

By back burning some distance from the fire 's existing perimeter, the fire is robbed of fuel. This technique is generally used when access is not available to the fire edge, the fire is too intense or is spotting, or for environmental reasons. The fire is allowed to burn to predetermined control lines. Back burning is potentially hazardous and needs experience, knowledge and skill to ensure a successful outcome. This activity is only to be carried out when identified as part of the overall control objective strategy in the Incident Action Plan and following authorisation by the Incident Controller. You will only carry out this task under direction and supervision.

#### Advantages

- Generally the only means to control fires with long distance spotting;
- controls more intense fire ;
- reduces the exposure of fire fighters to fire hazards;
- allows more time for planning and assembling resources appropriate to the incident;
- allows the location of a control line to be chosen with greater regard to crew safety and environmental considerations;
- allows more time for the construction of a control line; and
- control line may be shorter and straighter than in a direct attack.

#### Disadvantages

- Requires considerable resources and planning;
- the total fire area will be greater than that in either of the previous methods;
- greater area to be controlled and patrolled, therefore an increased risk of the fire breaking through the control lines;
- the fuel between the fire and the control line may have to be back burned or burnt out – the two fires joining may result in intense fire activity at the junction zone (where the fires meet) and an increased chance of spotting;
- the back burn may fail or escape, creating the difficulty of controlling the main fire and the back burn.

### *Asset and property protection*

Many fire s occur close to, or enter, urban-rural interface areas and may pose a serious threat to life, livestock and/or property. Isolated rural properties may also be placed under threat from an approaching fire.

The Incident Controller will take account of this when planning fire suppression strategies and tactics. One option to minimise losses may be to apply tactics specifically for property and asset protection. For example, using pumpers or tankers to protect homes and other property using local, static or reticulated water supplies.

Local pre-plans may have already been developed to determine the safe, effective and efficient use of resources for asset protection.

### **Bare earth fire control line**

As you can see from the previous section, a control line is an important part of fire suppression activities. One form of control line is a man-made or natural fuel-free path. It prevents the spread of fire. When constructing control lines, the term mineral earth (or bare earth) is sometimes used. This term refers to ground where all vegetation cover has been removed and only rocks and soil are exposed. The mineral earth should be exposed for the length and width of the control line. The control line may vary in width and length, depending on the incident.

A control line can be constructed by using:

- hand tools (e.g. axes, slashers, rake hoes and chain saws) to remove unburnt surface fuels from the fire; and
- machinery, such as bulldozers, graders, bobcats and farm tract ors fitted with a plough or a blade.

### **Constructing a fire control line using hand tools**

Constructing a control line using hand tools requires a team effort. It is necessary to work in a planned manner if the team is to work safely, effectively and efficiently. Rake hoes and axes have sharp edges – failure to observe safe handling and work procedures can result in severe injury.

### *Key points to remember*

Make the most of natural fire breaks such as:

- exposed rock shelves;
- open ground; and
- creek beds.
- Keep the control line as straight as possible to provide fire fighters with a clear view and enable them to move along the control line easily.
- Keep the length of the control line to a minimum.
- Corners should be widened, as fires are more intense in this area and can often spot over at these points.
- Avoid heavy concentrations of fuel as the fire's intensity will increase close to the control line.
- Cut saplings and small trees at ground level to minimise the potential for the sharp stumps to cause accidents.
- Keep the control lines clear of dead trees or stumps.
- Rake and scrape unburnt surface fuels away from the fire.
- Remove rough bark and ladder fuels from trees adjacent to the control line as these can cause spotting across the control line or rake around these, if it is not possible to avoid them.
- Be sure that the fuel is removed down to the mineral earth.

### *Patrol the perimeter*

- As soon as a control line is established, patrol it regularly to ensure there is no risk of the fire rekindling.
- Create a mineral earth control line around stumps, trees and fence posts to avoid breakaways.
- Use the rake end of your rake hoe to rake away any remaining fuel, such as leaf litter, from the burnt area, being careful to not take any hot embers into the unburnt fuel, then use the sharp edge to scrape or chip down to the bare earth.
- Look into the burnt area to identify elevated, surface or ground fuel hot spots, and look out for fresh outbreaks in the unburnt areas caused by new or previous spotting activity.

### **Mopping Up**

Mopping up operations involve making sure that a contained fire does not reignite or spread. Poor blacking out may also increase the risk to your crew or other crews working round you if the fire rekindles.

Thorough blacking out involves locating, breaking open, or exposing and extinguishing any smouldering fuel above or below ground. This is done manually with hand tools, by wetting the fuel, or both. In a grass fire situation, wetting the fuel may be sufficient.

*Note: The importance of thorough blacking out cannot be over emphasised. Many fires considered contained have rekindled or started fresh outbreaks due to poor or insufficient blacking out being undertaken.*

The first stage of mopping up should concentrate on making the fire perimeter safe. Most successful blacking out is carried out on foot to allow close inspection of potential hot spots. When they are found you must deal with them and be sure they are completely extinguished.

You should:

- extinguish elevated burning/smouldering fuels first;
- extinguish any smouldering and hot materials;
- place any smouldering fuel found outside the control line into the burnt out area;
- break up fuel concentrations to release the heat; and
- turn smouldering logs into a position where they will not roll into an unburnt area.

When the edge is controlled, any patches of unburnt fuel can be burnt out or contained within the control line. A strip inside the perimeter must then be blacked out to extinguish all burning or smouldering material. Commencing at the edge and blacking out for 20–30 m is the most common practice.

As with other fire fighting activities, consider your hose line as your lifeline. Whether moving up or adding an additional hose length to prevent hose damage, be sure to wet down ahead of your hose to create a cool damp area free of hot embers and threat from naked flame.

### *Factors to consider when mopping up*

#### *Depth of mop up*

The depth of mop up will depend on a number of factors:

- the size of the fire – it may be possible to mop-up the entire area of small or spot fires, in large fires the depth of blacking out will depend on fuel, weather and topography;
- nature of the fuels – heavy, smouldering fuels like stumps and logs, or tall burning hollow trees showering sparks across the control line from inside the mopped up perimeter increase the risk of re-ignition, therefore, depth of blacking out needs to take account of this; and
- terrain or topography – control lines on slopes with burnt ground above unburnt ground pose a risk of smouldering material tumbling down hill into unburnt fuel across the control line, mopping up must be extended further upslope to reduce this risk.

#### *Weather conditions*

The likelihood of severe weather approaching may make a greater depth or area of the mop up and additional patrols necessary, particularly on the eastern flank, as a wind change from the west/southwest would blow towards this direction carrying embers on to unburnt fuel.

#### *Different fuels*

##### *Logs and stumps:*

- you may have to roll a log over to extinguish the underside. To avoid it rolling down hill or into an unburnt area, use a rock or earth mound as a chock or dig a trench to roll the log into;
- you may have to split a log open to extinguish any burning material inside. If you have insufficient water, use your rake hoe to create a suitable bare earth break around it; and
- when blacking out stumps, firstly cool down the stump and surrounding area. You may need to use a shovel to access hot root holes or an axe to open the stump up.

##### *Trees:*

- be sure to black out all smouldering bark and elevated fuels to prevent it blowing into unburnt fuel;
- burning stag trees near the fire edge should be extinguished to stop showering sparks and embers igniting adjacent unburnt fuels. If this is not possible, post a patrol crew twice the tree height clear of the stag and up slope, or have a competent person fell the tree. Then split it open and extinguish it.

*Note: the use of chainsaws to assist fire fighting operations must only be carried out by trained, competent and endorsed people.*

- When blacking out in grassland or bush, take care not to spread burning embers back into the unburnt area.
- Animal manure needs to be broken apart and thoroughly wet down.
- Be sure to black out fence posts, as they are a valuable asset.

## *Safety*

- Falling trees and limbs can kill. These can continue to fall for many days after the main fire has passed. Look up and maintain a close watch while working under canopies. Report any dangers.
- You need to exercise extreme care when applying water to hot beds of burning fuel, as instantaneous production of steam may cause a violent reaction, throwing dust, smoke and steam back into your face.
- Watch out for rolling logs and material burning underground in stump holes.
- Stay at least two tree heights clear and upslope of any burning snag trees.
- Watch out for insects, reptiles and vermin that may have been disturbed as a result of the fire.