

# Guidelines for Operating Private Equipment at Fires





## Acknowledgement

The Department of Fire and Emergency Services would like to acknowledge the assistance and contribution of its volunteers and staff; the Department of Biodiversity, Conservation and Attractions; Western Australian Local Government Association; and local government volunteer Bush Fire Brigades in the development of these guidelines. Similar guidelines from the Country Fire Authority of Victoria were used as a basis for this document and were contextualised for Western Australia.

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### Enquiries should be addressed to:

Bushfire Centre of Excellence  
Department of Fire and Emergency Services  
PO Box P1174  
Perth WA 6844

[dfes.wa.gov.au/bushfirecoe](https://dfes.wa.gov.au/bushfirecoe)

[bushfirecoe@dfes.wa.gov.au](mailto:bushfirecoe@dfes.wa.gov.au)



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# Section 1: Background

## 1.1 Background

There are three agencies with significant involvement in fire management in WA: the Department of Fire and Emergency Services (DFES), the Department of Biodiversity, Conservation and Attractions, and local government. These agencies are collectively referred to as Fire Services.

The responsibility for individuals to fight fire on their own land has always been a part of Western Australia's (WA) firefighting response. It has always been the custom and practice in WA that members of the community attend fires with their own equipment to protect their property and that of others. Bush Fire Brigades (BFB) often developed from such beginnings.

The guidelines have been developed to help you understand your responsibilities when fighting fires on or near your land. It provides some basic principles to help you fight fires safely and effectively, whether Fire Services are present or not.

## 1.2 Purpose of the guidelines

DFES recognises that, in many parts of WA, private equipment is an essential part of the community's response to fire. A key principle of this community response is that it be done with safety as the number one priority.

Your safety at fires is your responsibility. However, Fire Services are committed to working with residents operating private equipment to ensure safety is at the front of everyone's mind during bushfires.

The guidelines:

- promote the safe, efficient, effective and cooperative involvement of private equipment to control a fire in the shortest possible time;
- give private equipment operators information so that they can make informed decisions about their actions;
- identify the broad expectations held by Fire Services of private equipment operators in terms of their capabilities and that of their equipment, to ensure the tasks undertaken are appropriate and safely performed; and



- outline the expectation that private equipment operators will accept responsibility and accountability for their actions at fires.

You are encouraged to speak to your local fire brigade about the guidelines. This discussion will help in the development of a cooperative working relationship when you are at a fire.

### 1.3 Application of the guidelines

The guidelines should be applied to the response to bushfires as well as planned burning activities. They are not intended to provide guidance in the response to any other hazard.

**Private equipment** means equipment or machinery (including tankers) owned or operated by a private individual or body that

may be used to help contain, suppress or reduce the effects of a fire. It does not include:

- equipment or machinery used for the private defence of domestic dwellings in a bushfire; or
- equipment or machinery contracted by Fire Services.

Where possible, Fire Services will work cooperatively with private equipment operators to ensure safer and more effective operations. However, where private equipment operators impede operations or work unsafely, Fire Services' personnel may require that the equipment be deployed to another task or moved out of the area.

The guidelines do not apply to individuals defending their homes using fixed or portable firefighting equipment.



## 1.4 Content of this publication

The content of this publication is presented in four sections:

- Section 1 provides the context and background.
- Section 2 focuses on the guidelines themselves in terms of what is expected of private equipment operators engaged in firefighting.
- Section 3 is aimed at enhancing the awareness of private equipment operators in fire behaviour, suppression activities and fire hazards.
- Section 4 contains useful checklists.

## 1.5 Monitoring and review of the guidelines

The DFES Bushfire Centre of Excellence will monitor the effectiveness of the guidelines in consultation with the Western Australian Local Government Association and Department of Biodiversity, Conservation and Attractions. The guidelines will be reviewed within five years of their approval, or sooner if necessary, to consider any relevant field experience, technological change, legislative change, management policy or community expectation.

Private equipment operators and other stakeholders are encouraged to provide feedback via email to [bushfirecoe@dfes.wa.gov.au](mailto:bushfirecoe@dfes.wa.gov.au).



## Section 2: Guidelines

### 2.1 Principles

The guidelines are founded on the following principles:

- Everyone at the fire is responsible for safety.
- Accept responsibility for your decisions and actions.
- Ensure someone from the Incident Management Team (IMT) at the fire is aware of your presence and of what tasks you are undertaking.
- Work cooperatively with emergency services and others.
- Do not work alone – team up with others.
- Be aware of the situation around you and any hazards likely to cause you or others harm.
- Wear appropriate personal protective clothing (PPC) and safety gear for specialist equipment such as chainsaws.
- Know and work within your personal limits and ability.
- Ensure your equipment is well maintained and that you know and operate it within its limits and capability.
- Ensure the tasks you undertake match your capability and that of your equipment.
- Maintain communications.

It is essential for all private equipment operators to fully understand these principles and apply them at a fire.

They are based not only on sound common sense but also on the vast experience of private equipment involvement at fires across WA over many years.

The rest of this section discusses these principles in more detail.

### 2.2 Safety at fires

Safety at fires is the number one priority of Fire Services and must also be yours.

Take responsibility for your own safety at fires.

The decision to engage in firefighting should be well considered and planned for well before attending a fire. It is common practice for private equipment operators to be at a fire prior to a local brigade. DFES values this early intervention.

It is essential that, prior to deployment, private equipment operators adequately prepare themselves and their equipment.



Personal preparation can include:

- having the appropriate skills and knowledge;
- being mentally and physically prepared;
- understanding the risks involved;
- having suitable personal protective clothing and a first aid kit (see pages 46 and 47); and
- preparing drinking water, food and snacks.

Equipment preparation can include ensuring that:

- the vehicle is not overloaded;
- the load and fittings are properly secured;
- the vehicle and equipment are mechanically sound and reliable; and
- the vehicle is equipped with recommended safety equipment and communications.

DFES and BFB volunteers are trained and qualified in the roles they undertake. Private equipment operators who have undertaken formal training in bush firefighting will already have a good understanding of fire awareness.

Although this publication will assist you in developing your awareness, the best way you can become proficient in fighting fires is to be a DFES trained firefighter.

Private equipment operators are encouraged to discuss these matters with their local fire brigade and to share information and views as part of their preparation.

Use the checklists in Section 4 to make sure that you are adequately prepared.

## 2.3 Accept responsibility

When you elect to engage in firefighting as a private individual, you accept responsibility for your actions.

Fire Services have similar responsibilities to their members. Everyone at the fire has a shared responsibility for the safety of others.

The underpinning theme of the guidelines is one of mutual cooperation between Fire Services and private equipment operators.

As you perform your tasks at fires, you will be continually faced with circumstances requiring decisions and actions. In some cases, it may be best to refer a situation to someone from the IMT at the fire, while in others, you will choose to make the decision and take action.

Such decisions should be well considered and not taken lightly, but above all you are expected to take responsibility for that decision. Remember, you are not exempt or above the law when firefighting.

Make safety your priority.

## 2.4 Making your presence known

If you arrive on the scene before the fire brigade, team up with others and work within your capabilities. It may be your good work that saves the day.

When Fire Services are present, they have an obligation to their members, members of other Fire Services and other people who are at the fire, including private operators.

It is essential that you make yourself known to Fire Services so that you can operate in a coordinated and safe manner. As more resources arrive, the fire brigade may take on your tasks, allowing you to drop back to a less intense activity.

Understand that uncoordinated actions by individuals can be dangerous and are discouraged.

## 2.5 Working cooperatively

Successful firefighting relies on all personnel working cooperatively. As the fire grows in size and complexity, so does the number of personnel and equipment. While formal organisational structures are put in place to manage emergency services resources, a strong commitment to cooperation between agencies and individuals is critical.

Emergency services operate under predetermined procedures and protocols and will establish Incident Action Plans to define the tasks to be performed by their available resources. It is essential for private equipment operators to apply their efforts towards objectives.

Fire Services will keep you informed about operational and safety issues where possible so that you can make decisions about your actions at the fire. If asked to conduct particular tasks, Fire Services will give you a briefing about the incident situation and the tasks involved. This will ensure you are working safely, effectively and efficiently.

If you are unsure at any point, seek clarification.

## 2.6 Team up with others

The old saying ‘there is strength in numbers’ is true. By working cooperatively with others, the operation is safer and more effective. Members of the team watch out for one another, increasing safety. Communications are also more effective.

## 2.7 Look for hazards and assess the risk

Section 3 contains detailed information on the hazards related to bushfires.

Hazards you may encounter include:

- smoke;
- panicked community members;
- high levels of radiant heat and heat-related issues;
- heat-related illness (for example, dehydration, heat stress and heat stroke);
- danger from falling objects (especially trees and tree limbs), sharp objects, hot surfaces and flames;
- high noise levels for prolonged periods of time;
- mines and mine shafts;
- poor visibility due to smoke and dust;
- live powerlines being down;
- operating equipment in rough terrain or dense vegetation; and
- close proximity to firefighting vehicles, heavy machinery and emergency vehicle traffic.

Identifying and being aware of the hazards is the first step.

It is important to assess the risk that the hazard presents to you. Use your knowledge, life experience and your common sense to decide: “What is the likelihood of this hazard causing me or others harm?”

If the answer is extremely or highly likely, you should seriously consider withdrawing to a safer location.

## 2.8 Wear appropriate clothing

Radiant heat can kill. You need to cover up to protect yourself from radiant heat.

The correct level of protective clothing enables the release of increased metabolic heat generated through increased activity. At the same time, it provides the required protection from radiant heat and working in hostile and hazardous environments.

The design and fabric of clothing are particularly important because unsuitable or ill-fitting clothing can create heat stress. This can range from discomfort to reduced performance, illness, collapse or even death. It can also restrict performance by adding weight and limiting your movement.

It is important that all personnel, including private equipment operators, be suitably equipped and dressed for fires.

As a minimum, private equipment operators should wear the following at a fire:

- Cotton or natural fibre overalls with long sleeves, or a cotton or natural fibre work shirt with long sleeves and trousers (synthetic

materials that are not fire resistant are not acceptable)

- Sturdy leather boots, preferably lace-up types
- Leather work gloves
- Industrial type helmet with chin strap
- Industrial type goggles

For some tasks, you may also require:

- respiratory protection (P2 dust mask) and hearing protection (earmuffs or earplugs); and
- high visibility clothing (particularly for heavy machinery operators).

Protective clothing should cover the main part of the body while allowing reasonably good airflow to aid cooling. It should have closures at the wrists and ankles to prevent entry of heat and embers.

To minimise the build-up of body heat, protective clothing should be loose fitting. Sleeves should be rolled down and trouser legs should not be tucked into boots.

If other clothing is worn under the protective clothing, it should also be loose fitting and be made of natural fibres.

You should only unbutton your clothing or undo your overalls top when you are in a safe area.

## 2.9 Know your limits and capabilities

Firefighting is both physically and mentally arduous. A good level of fitness is required to cope with physical effort in a hostile and ever-changing environment.

Firefighting can exert enormous mental pressure, requiring decisions to be made for constantly varying circumstances. You should therefore work well within your limits and monitor yourself and others after firefighting as it may take hours to recover.

Much of this will be dependent on your levels of experience and knowledge.

Those who have previously been involved in firefighting will have a better understanding of fire behaviour, as well as a greater appreciation of how well they can cope with the situation.

To assist in developing your fire awareness, some basic information is included in Section 3 of this publication. Before participating in firefighting, you should ensure you are familiar with this material.

You are also encouraged to undertake the DFES Rural Fire Awareness training. Speak to your local fire brigade for details.



## 2.10 Your equipment

If you are planning to use your equipment to fight fires you should ensure the:

- operator's safety and the safety of others is not compromised;
- equipment is suitable and capable of performing the task;
- equipment is reliable; and
- equipment has the capability and robustness to operate in a hostile environment.

Private equipment operators are not exempt from the law when engaged in firefighting operations. Compliance with all legal obligations, including traffic regulations, is imperative for safe operations.

Private equipment should meet the following requirements to ensure its suitability for firefighting.

### 2.10.1 Vehicles equipped for wet firefighting

Vehicles must not be overloaded – the vehicle's Gross Vehicle Mass must not be exceeded. This is a critical safety issue.

An overloaded vehicle is less stable, harder to steer and has reduced braking capacity.

The load, including tank, pump and fittings, must be properly secured. Unsecured loads are illegal and may cause instability. Objects falling from a vehicle can be lethal.

The vehicle must be roadworthy and registered if operating on public roads. Participation in firefighting does not exempt private equipment operators from the law.

The vehicle and pump should be in sound mechanical condition, regularly serviced and easily started. Equipment maintenance is essential and should be undertaken prior to fire season to ensure reliable service at a fire.

Consult your local fire brigade about what form of communication you should use. Your vehicle should be equipped with a good quality UHF CB radio, which is crucial for good communication at a fire.

The vehicle should have a first aid kit and a woollen blanket for each person to use for personal protection at fires.

The vehicle should be equipped with an amber rotating beacon. At fires you have a responsibility to 'see and be seen'. You should have both your vehicle's headlights and amber rotating beacon turned on to make your vehicle more visible, particularly in smoky environments.

### 2.10.2 Tractor and utility drawn trailer units

The same criteria as detailed in 2.10.1 applies to this category. The safety of the tractor driver also needs consideration. Direct attack on a running fire with the unit moving is generally discouraged and should only be undertaken with the tractor driver in a fully enclosed cabin. Tasks performed by trailer units should be well considered due to trailer units' reduced manoeuvrability, mobility and stability. People should not ride on trailer units.

### 2.10.3 Farm machinery and implements

This category of equipment is primarily engaged in dry firefighting strategies, such as slashing, ploughing, ripping, harrowing and grading, with an implement being drawn by a tractor.

All criteria in 2.10.1 and 2.10.2 are applicable to varying degrees. It is essential that the task performed by this equipment is acknowledged by Fire Services at the fire, and that the machine is supported by a unit with wet firefighting capability and communications.

All-terrain vehicles (ATVs, quad bikes) fitted with spray units are not generally recommended for use in fire suppression. They

should not be operated near larger firefighting vehicles on running fire edges and should only be used for very low intensity fires or for mop up operations.

### 2.10.4 Heavy plant and equipment

This category includes machinery such as bulldozers, graders and scrapers. All criteria in 2.10.1, 2.10.2 and 2.10.3 are applicable to varying degrees.

In circumstances where this machinery is contracted directly at fires, both the equipment and operator are subject to rigorous conditions.

Where heavy plant or equipment is being operated independently by a private individual, it is essential that the task performed by the equipment is acknowledged by Fire Services at the fire, and that the machine is supported by a unit with wet firefighting capability and communications.

**NOTE:** If equipment is observed being used in an unsafe or inappropriate manner, Fire Services reserve the right to have the equipment withdrawn from that area of the fire or deployed to another task.



## 2.11 Your tasks

The tasks performed by private equipment operators vary, and may include initial attack, tactical support (supporting firefighting appliances), blacking out operations, and patrolling (ensuring incident safety).

Actual tasks performed will depend on your capabilities and experience, and the type, condition and capability of your equipment.

For example:

- It is not appropriate for someone dressed in shorts and a T-shirt to be active in any firefighting operations.
- It is not appropriate for a person on a quad bike fitted with a spray unit to directly suppress an intense fire. The quad bike sprayer may instead be an excellent tool for blacking out fence posts or tussocks in the burnt area.

## 2.12 Communications

Communications systems are crucial to ensure information and instructions about new strategies are rapidly disseminated.

A communications plan will be in place for every incident. Check with your local fire brigade to determine the communications arrangements and protocols that apply in your area. A combination of UHF or CB radio and mobile phones may be used.

Remember, communication at fires is not only confined to radio and mobile phone traffic. Direct contact and interaction between individuals and crews is essential.



## 2.13 Vehicle Control Points and private firefighting equipment access

Vehicle Control Points (VCP) regulate the flow of road traffic within the operational area.

Establishing a VCP is an important risk management tool that can be used while managing a fire.

To facilitate entry into an area, a VCP is assigned a particular access level (see Figure 1).

To gain access through an Emergency Services Only VCP, private firefighting equipment must have a Response Vehicle Identification sticker. These are only issued to vehicles that are part of the WA Government supported voluntary registration scheme for private fire appliances. The colour of the sticker changes every second year.

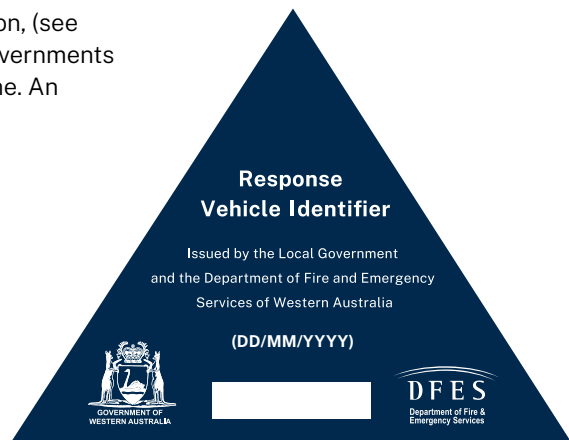
These stickers are issued to eligible vehicles that meet the criteria defined in this publication, (see page 45) where local governments have adopted the scheme. An

application form requesting the issue of a sticker must first be completed, submitted to the local government and approved.

Contact your local fire brigade to arrange a sticker for your vehicle.

**NOTE:** Having a Response Vehicle Identification sticker does not mean your vehicle has the on-road special privileges of an emergency vehicle. You must still obey all road rules, including leaving your beacon off until you arrive at the incident or enter the controlled area.

**Figure 1** Vehicle Identifier sticker





## 2.14 Restricted Access Permits

Restricted access permits are issued once the Incident Controller deems it safe for people to enter a restricted access area.

A restricted access permit may be granted for valid reasons, such as residents, business owners or utility companies inspecting vital assets and property inside a restricted access area.

Restricted access permits are issued with specific conditions, such as the address authorised to visit, how long the permit is valid for and whether the permit holder can re-enter the area. The permit can be a sticker to be placed on a vehicle's windscreen or a paper permit.

The permit must be shown at a VCP along with a current identity document. Once deemed safe, a restricted access permit issuing unit is established in a suitable location, generally in a local community area.

To find out the location of the issuing unit for a specific incident, you will need to monitor the alerts and warnings issued by Fire Services.

## 2.15 Equipment

If you bring private firefighting equipment to a fire, it is assumed you are knowledgeable enough to operate it and have the appropriate safety equipment.

## 2.16 Slip on units

In most cases, private units will be a 'slip on' unit. Where possible, slip on units should comply with the equipment specifications and guidelines (see page 49).

## Section 3: Fire Awareness

This section has been included to help you better understand the nature and behaviour of bushfire, together with suppression activities and bushfire hazards.

You may also wish to consider the benefits of joining your local fire brigade to increase your firefighting skills and knowledge even further. Not only will you raise your skill levels and knowledge, you will also provide a valuable service to your community.

To find out more about being a volunteer, contact your local fire brigade or visit the Volunteering page on the DFES website at [dfes.wa.gov.au](https://dfes.wa.gov.au).

### 3.1 Types of bushfire

Each type of fire creates its own particular hazards, which require constant monitoring.

Bushfires can generally be described in terms of the fuel they are burning – grass, scrub, forest or plantation.

The following pages explain some of the characteristics of different types of fire and define important parts of a bushfire's perimeter.

#### 3.1.1 Ground fire

This type of fire burns the organic material in the soil layer, as happens in a peat fire, and often also burns surface litter and small vegetation.

##### Characteristics

- Occurs in only a few parts of Australia, including Western Australia
- Smoulders with no flame and little smoke
- Can burn unnoticed and may later ignite surface fires (take care to avoid stepping into undetected hot spots in the ground)

#### 3.1.2 Surface fire

This type of fire travels just above ground surface in vegetation such as grass, low scrub and forest litter.

It presents a significant hazard to firefighters because conditions can change quickly. Strengthening winds or wind changes rapidly increase fire intensity and rate of spread.

##### Characteristics

- By far the most common type of fire
- Burns in fuels lying on the ground
- Consumes litter and low vegetation such as grass and scrub
- Does not extend into the crowns of trees



### 3.1.3 Crown fire

This is a fire that burns in the crowns of trees (treetops) above an intense surface fire and presents a significant hazard to firefighters. Radiant heat and direct flame contact resulting from the surface fire ignites treetops. Strong winds carry the fire along the upper storey vegetation.

#### Characteristics

- Fast-travelling, extremely destructive and often consumes all in its path
- Followed by an intense surface fire shortly afterwards
- Often accompanied by short or long-distance spotting (spotting up to 25km has been recorded)
- Can start further surface fires below due to falling material
- Can move faster than surface fires due to exposure to higher wind speeds

### 3.1.4 Parts of a bushfire

The shape of a bushfire is defined by its perimeter, which is the outside edge of the burnt area. Within this there may be burning areas, smouldering areas and blackened areas, as well as pockets of unburnt fuel. As illustrated in Figure 2, parts of a bushfire include:

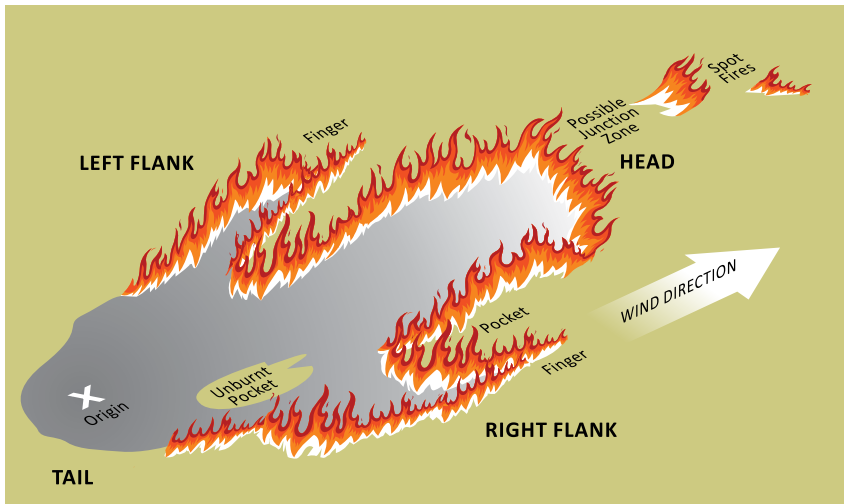
- The head
- The flanks or sides
- Fingers
- The tail (sometimes referred to as the rear, heel or back)
- Spot fires ahead of the main fire
- Unburnt pockets or islands
- The point of origin

#### The head of the fire

The head of a fire is where the fire is making its greatest progress (usually downwind or upslope), measured by its forward rate of spread. The head is also called the fire front. Flames are tallest and the intensity of the fire is greatest at this point. The head of the fire is influenced by wind direction, fuel factors and topography, and will change accordingly.

#### Flanks or sides of a fire

Both sides of the fire between the head and the rear are called the flanks. They are roughly parallel to the main direction of spread. The intensity of the fire at the flanks is less than at the head.



**Figure 2** Parts of a bushfire

They are often described by their geographic location (for example, the eastern or western flank of a fire) or by their orientation as viewed from the point of origin or rear of the fire (for example, the left or right flank of a fire).

### Fingers

These are long and narrow slivers of the advancing fire, which may extend beyond the head or flanks, and are caused by varying wind directions or variations in fuel or topography.

### Tail

This is the section of the perimeter opposite to, and usually upwind or downslope from, the head of a fire.

It is the least intense part of the fire's perimeter, with the lowest flames and slowest rate of spread.

### Point of origin

This is the area where the fire started. The likely point of origin should, if possible, be left undisturbed for fire investigation.

## 3.2 Factors that affect bushfire behaviour

There are three main factors that influence fire behaviour. Fire behaviour and spread can alter dramatically depending on changes in:

- fuel;
- weather; and
- topography.

An understanding of how these factors influence fire behaviour is crucial to predicting fire spread, and therefore planning and conducting fire suppression activities.

### 3.2.1 Fuel

Fuel is one of the most important factors that influences the way fire behaves and travels.

Variations in fuel also influence the risk to firefighter safety and firefighting suppression activities. Fuel varies in its:

- type;
- size;
- quantity;
- arrangement; and
- moisture content.

Common types of fuel involved in a bushfire include:

- grass;
- forest litter lying on the ground;
- small shrubs and scrub;

- trees and bark;
- decomposing humus and duff (fine ground litter);
- slash (material remaining after logging); and
- plantation prunings.

Given the right conditions, most of these fuels will readily ignite and burn at differing speeds and degrees of intensity.

For example, a grass fire is likely to spread more rapidly than a fire in a tall, dense forest –but the forest fire would generally burn more intensely than the grass fire due to greater quantities of fuel.

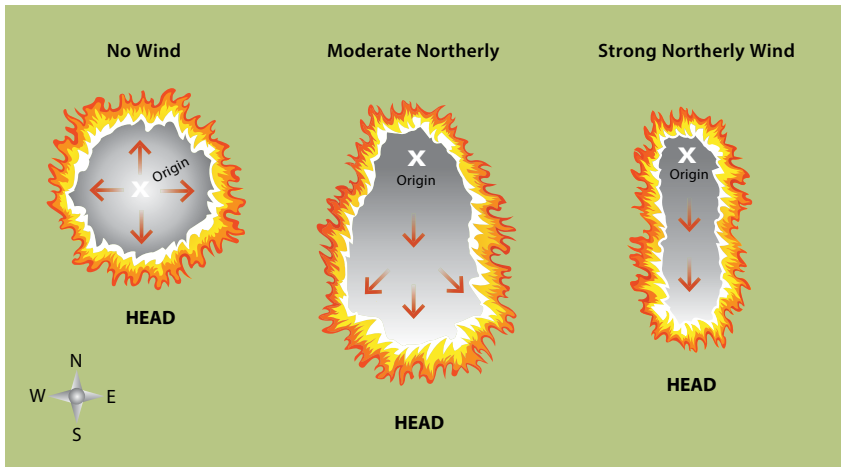
### 3.2.2 Weather

Weather is a major factor that impacts the spread of fire. The four key elements of weather are:

- air temperature;
- relative humidity;
- wind (speed and direction); and
- atmospheric stability.

In a bushfire situation, fire intensity increases as the temperature rises and relative humidity falls during the day. Fire intensity reduces as humidity increases and temperature drops at night.

Wind is the most critical factor affecting fire shape (Figure 3), forward rate of spread and behaviour. Changes in wind



**Figure 3** Effects of wind strength on fire shape

direction and increased strength present serious hazards.

A wind change can rapidly cause relatively quiet flanks to become active fire fronts. Always keep fuel between you and the fire to a minimum.

**NOTE:** The stronger the wind, the faster a fire will spread.

This change in direction will substantially increase the difficulty of fire suppression activities. More importantly, it presents an immediate threat to any firefighters working on what was the flank.

**NOTE:** Always be watchful of wind changes. If unpredicted changes occur in your area, warn the people around you and inform the Incident Controller or Fire Services.

#### Atmospheric stability

Atmospheric stability refers to the vertical (upward) movement of air masses that occurs when hot air rises and is replaced by cooler air.

In stable atmospheric conditions, fire behaviour will generally be predictable.



#### Visual indicators of stable conditions

- Stratus type clouds (clouds in layers) are present.
- Smoke columns drift apart after limited rise.
- Vertical movement of air is limited.
- Fog layers may be present.
- Winds are generally light and predictable.

In unstable atmospheric conditions, fire behaviour can be unpredictable.

#### Visual indicators of unstable conditions

- Cumulus (cotton wool) type clouds showing noticeable vertical growth are present.
- Smoke columns can rise to great heights.
- Winds are gusty and unpredictable.
- There is potential for thunderstorms and therefore lightning strikes.
- Dust whirls ('willy willies') may occur.



### 3.2.3 Topography

The third major factor that impacts the spread of fire is topography.

Topography is the surface features of an area or region, such as mountains and rivers.

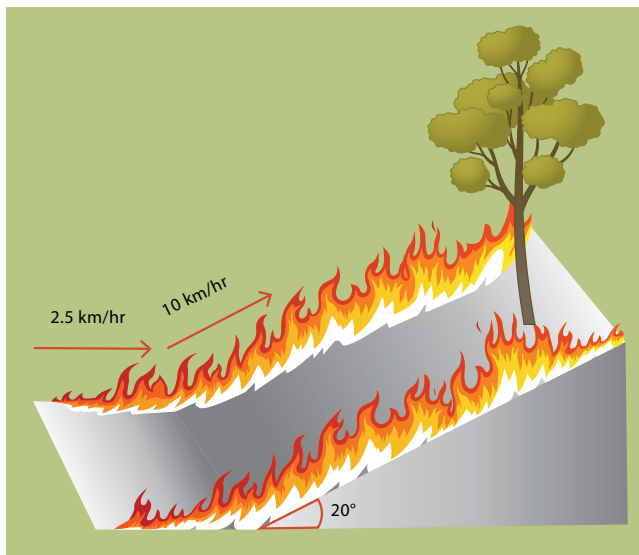
The topography of an area affects the direction and speed at which a fire will travel. The effects can be quite complex, as the topography will also affect the local wind speed and direction.

The three main concerns that arise in relation to topography are:

- slope;
- aspect; and
- the interaction between terrain and wind.

The following rules of thumb can help you calculate the effect of slope on the speed of a fire.

- For every 10 degrees of upslope, double the rate of spread (see the example in Figure 4).
- The rate of spread decreases downslope, but only to a maximum of around half of its rate of spread on level ground, regardless of the steepness of the slope.



**Figure 4** The effect of upslope

### 3.3 General health hazards

It is vitally important that you are aware of, and know how to avoid, illnesses and problems that may result from vigorous firefighting activity and exposure to smoke, dust and heat. First aid training and equipment is also important in the event someone is injured.

If you have a medical condition, such as asthma, diabetes, heart disease or epilepsy, that may be aggravated by the type of work undertaken on the fireground, you should seek medical advice to ensure you are able to carry out such work.

The following pages will cover:

- sunburn;
- smoke and dust hazards;
- fatigue;
- dehydration; and
- heat-related illness
  - heat cramps
  - heat stress
  - heat exhaustion
  - heat stroke.

#### 3.3.1 Sunburn

Prolonged exposure to the sun can lead to sunburn. Although not life-threatening, sunburn can impact your effectiveness.

Apply sunscreen liberally to any exposed skin. As you are likely to be perspiring freely

while working on the fireground, try to apply it more often.

Signs and symptoms of sunburn are:

- redness of the skin;
- tenderness in the affected area; and
- blistering, sometimes involving more than one layer of skin.

Treatment actions

- Apply cool, moist compresses to the burnt area.
- Rest in a cool place.
- Drink cool water and an electrolyte replacement drink.

#### 3.3.2 Smoke and dust hazards

Smoke and dust are ever-present irritants to your eyes and lungs at fires. Prolonged exposure to heavy smoke can be hazardous.

In addition to restricting visibility, heavy smoke contains carbon monoxide, which is a poisonous gas.

Inhalation of smoke and dust can:

- reduce your performance on the fireground;
- bring on fatigue more quickly;
- bring on illness;
- alter perception and judgement; and
- result in death due to carbon monoxide poisoning (in the event of severe inhalation).

Minimise the effects of smoke by:

- avoiding unnecessary exposure; and
- using approved personal protective equipment (P2 particulate filters, smoke masks and goggles) where provided –if necessary, use handkerchiefs or other cloth to cover your mouth and nose.

**NOTE:** P2 masks will not protect you against CO<sub>2</sub> gas.

**3.3.3 Fatigue**

The conditions and work you undertake at an incident can be physically stressful and demanding. Fatigue is a key factor affecting your performance at an incident.

**NOTE:** You should not drive vehicles or operate equipment if you are fatigued.

Signs and symptoms of fatigue are:

- tiredness and lack of energy;
- slowness to react and taking longer than usual to complete tasks;
- impaired judgement and inability to make decisions;
- inability to concentrate and lapses in attention; and
- erratic performance.

Treatment actions

To minimise the possibility of becoming fatigued at an incident, you should:

- take regular breaks to rest and allow your body to recover;
- pace yourself;
- drink regularly;
- where possible, avoid working in excessive dust, smoke and heat;
- cool off (unbutton clothing and remove helmet when away from the fireline, if safe to do so);
- drink water alternated with an electrolyte replacement drink;
- regularly eat snacks; and
- get ample sleep.

**3.3.4 Dehydration**

Water and electrolyte replacement drinks should be consumed regularly. You should always drink more than you need, in order to prevent dehydration. Failure to do this leads to the body overheating and the onset of heat illness.

On the fireground, you must replace fluids frequently. Drink at least 150-200 millilitres every 10-15 minutes. Water should be alternated with an electrolyte replacement drink. If in doubt, drink a litre per hour.

**NOTE:** Fluid and electrolyte replenishment is vital for your health and safety – especially so for less fit people.

Never drink water from vehicle tanks or knapsacks as it may be contaminated.

Milky drinks or drinks that contain fat should be avoided. Alcoholic drinks must not be consumed, as they increase dehydration and impair your ability to safely carry out tasks.

### 3.3.5 Heat-related illness

In addition to the health hazards outlined in the previous sections, firefighters also face the risk of heat-related illness, such as (in order of severity from lowest to highest):

- heat cramps;
- heat stress;
- heat exhaustion; and
- heat stroke.

The risk is increased due to working in hot, humid and dusty conditions, often within the range of radiant heat and while wearing personal protective clothing and equipment.

The body's natural cooling system may fail if:

- the environment is too hot;
- perspiration cannot evaporate freely;
- you are ill or unfit;
- your body's thermostat malfunctions due to disease, drugs or alcohol;
- you fail to maintain adequate fluid intake; and
- you overexert yourself, particularly in conditions of high humidity.

**NOTE:** Illnesses caused by exposure to extreme temperatures are progressive and can quickly become life-threatening if not treated immediately.

To minimise the risk, you should:

- take regular rest breaks, preferably in the shade, away from the work environment or heat source;
- loosen clothing to allow more air circulation and better evaporation of perspiration; and
- maintain adequate and appropriate fluid intake.

A person may not know they are becoming affected by a heat-related illness – you need to look out for each other. You must be able to recognise the symptoms and know the treatments, not only for your own wellbeing but also for others on the fireground.

If the heat-related illness is not too severe, and is recognised and treated early, it may be possible to continue working at a reduced rate. If the symptoms are not recognised,

or are ignored, the severity will escalate and may result in death. For a list of the signs and symptoms to look out for, and associated treatments, see pages 25 and 26.





Heat-related illness	Signs and Symptoms	Treatment
<b>Heat cramps</b>	<ul style="list-style-type: none"><li>• Muscular pain and spasms in the affected area</li><li>• Feeling tight in the affected muscles</li><li>• The inability to relax contracted muscles</li></ul>	<ul style="list-style-type: none"><li>• Tell the people you are working with</li><li>• Take a rest break</li><li>• Slowly drink an electrolyte replacement drink or, if unavailable, water</li><li>• Consume some food</li><li>• Gently stretch the muscles</li><li>• Massage the affected area or muscles gently</li></ul>
<b>Heat stress</b>	<ul style="list-style-type: none"><li>• Feeling very hot</li><li>• Flushed, red skin</li><li>• Vigorous perspiration</li><li>• Loss of energy</li><li>• Possibly a headache</li></ul>	<ul style="list-style-type: none"><li>• Tell the people you are working with</li><li>• Take a rest break</li><li>• Loosen clothing to allow more air circulation and better evaporation of perspiration</li><li>• Seek medical attention</li><li>• Take regular sips of water and occasional sips of a diluted electrolyte replacement drink</li></ul>
<b>Heat exhaustion</b>	<ul style="list-style-type: none"><li>• Feeling faint, light-headed and dizzy</li><li>• A pale face – this is the result of lowered blood pressure</li><li>• Clammy skin – an indication that there is some perspiration</li><li>• A loss of appetite</li><li>• Headaches</li><li>• Irritability and vagueness</li><li>• Muscular cramps and spasms</li></ul>	<ul style="list-style-type: none"><li>• Move them away from the work environment or heat source</li><li>• Lay them in the best available shade</li><li>• Give them frequent drinks of water (if they are conscious)</li><li>• Seek medical attention</li><li>• Do not give them salt tablets</li><li>• Remove or loosen their clothing</li><li>• Sponge or spray water on them, only if they are hot</li></ul>

Heat-related illness	Signs and Symptoms	Treatment
<b>Heat exhaustion (continued)</b>	<p>If more severe, symptoms are:</p> <ul style="list-style-type: none"> <li>• Vomiting</li> <li>• Confusion and drowsiness</li> <li>• Weak pulse</li> <li>• Shallow breathing</li> <li>• Unconsciousness</li> </ul> <p>In severe cases, death can result.</p>	
<b>Heat stroke</b>	<ul style="list-style-type: none"> <li>• High body temperature (often 40 degrees or more)</li> <li>• Red, hot and possibly dry skin</li> <li>• Weakness or collapse</li> <li>• Reduced conscious state or unconsciousness</li> <li>• Rapid pulse and breathing rates</li> <li>• Seizures (fits)</li> </ul> <p>Seizures may occur in cases of severe heat stroke as the brain becomes severely affected by raised temperature.</p>	<ul style="list-style-type: none"> <li>• This is a medical emergency. Immediate, effective cooling is essential</li> <li>• Remove the person from the work environment and heat source</li> <li>• Remove their clothing down to underwear</li> <li>• Sponge or spray them with water</li> <li>• Fan or expose them to a breeze</li> <li>• Call an ambulance and get onsite medical assistance while waiting for the ambulance</li> <li>• If the person is unconscious, position them on their side and ensure their airway remains open</li> </ul>

**NOTE:** It cannot be overstressed – if heat stroke is suspected, urgent medical attention is essential.

## 3.4 Bushfire suppression activities

### 3.4.1 Teamwork

Successful firefighting relies on individuals working together as part of a team. 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 firefighters around you;
- the person in charge of you knows where you are and what you are doing;
- you know where other firefighters are and what they are doing;
- you stay in regular contact with others;
- you know the escape plans; and
- in the event that you have to leave the area quickly, you can be contacted.

**NOTE:** 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.

### 3.4.2 Anchor points

While working in bushfire situations, it is important to work from an anchor point (Figure 5).

An anchor point is an advantageous location from which a fireline can be constructed. It is used to minimise the possibility of being outflanked by a fire while the line is being constructed.

Possible anchor points include:

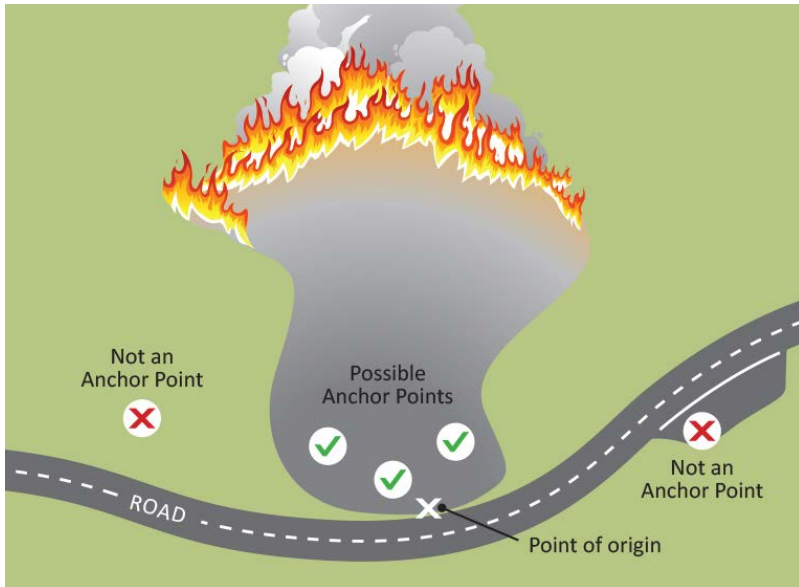
- the site of a recent bushfire (with little or no vegetation);
- bare ground;
- blacked out fire edges; and
- a non-flammable area, such as a lake or river.

**NOTE:** It is best practice to work either from, or directly on, the burnt edge of a fire known as 'keeping one foot in the black'.

### 3.4.3 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.





**Figure 5** Anchor points

Fire Services utilise an incident management system called the Australasian Inter-Service Incident Management System (AIIMS). It allows for scalability based on the complexity of the incident. Every incident has an Incident Controller appointed.

- Incident Controller – responsible for the overall management of the incident.
- Planning Section – responsible for the collation of incident resources and current information, predictions of any future development of the incident and preparing the incident action plan.

- Operations Section – responsible for management and supervision of combating forces. This is the function within which a bush firefighter operates.
- Logistics Section – responsible for the provision of facilities, services, materials and finance.

These positions are part of the IMT.

### Communications

Communications are vital to the successful outcome of bushfire suppression or any other incident.

A communications plan is developed to provide communications for the whole incident, as determined by its size and complexity.

### 3.4.4 Strategies and tactics

One of the principles of AIIMS is management by objectives, using strategies, tactics and tasks.

- Objective – a statement of what is to be achieved.
- Strategy – a statement of how the objective is to be achieved (for example, direct attack, indirect attack, parallel attack or a combination).
- Tactic – the tasking of allocated personnel and resources.
- Task – the job given to any firefighting force or unit (in other words, who is to do the job).

#### Fire intensity

Fire intensity is based on the amount of fuel burnt, the energy value of the fuel and the rate of spread of the fire. It is measured in kilowatts per metre (kW/m). In general terms, the indicators of intensity may be 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 metres (less than 500kW/m).
- Moderate intensity fires have a flame height of 1.5-7 metres (500-3000kW/m).
- High intensity fires have a flame height of 7-14 metres (greater than 3000kW/m).

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

The flames from an intense surface fire may eventually reach and ignite the crowns of trees.

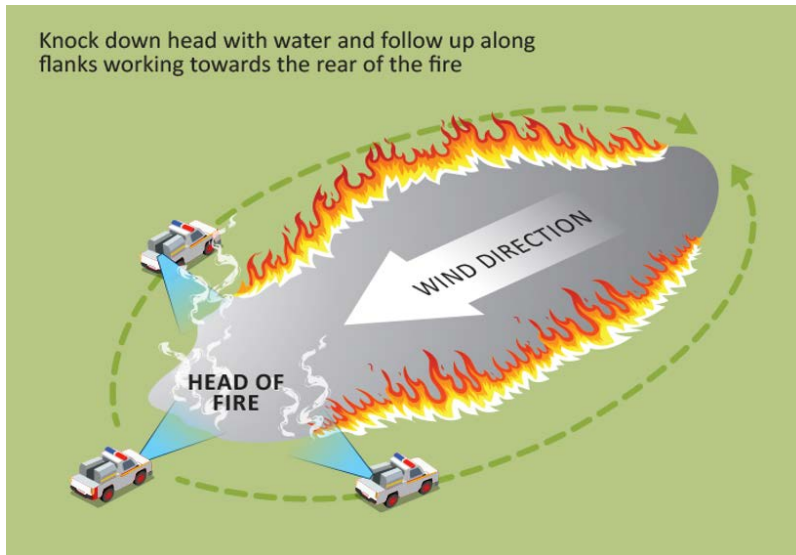
#### Methods of attack

The Incident Controller ensures 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 firefighters as a first priority.

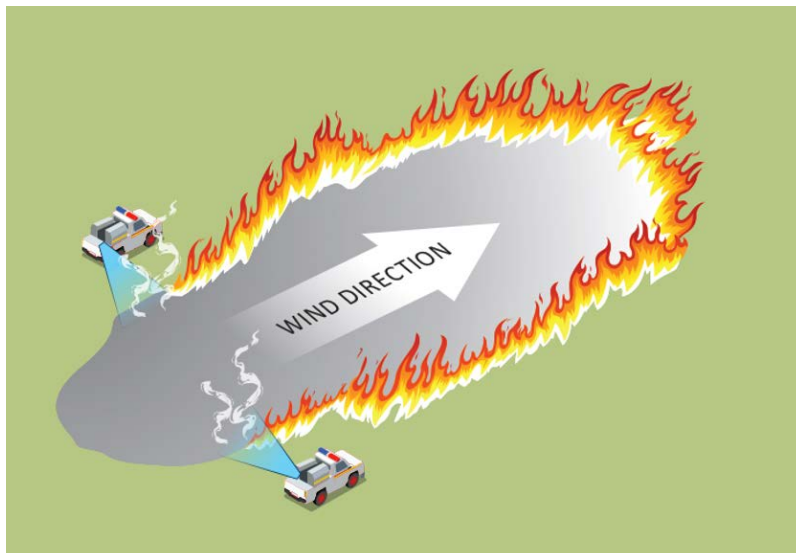
The strategy will identify the method to be used to attack the fire.

- Direct attack (Figures 6 and 7)
- Parallel attack (Figure 8)
- Indirect attack (Figure 9)

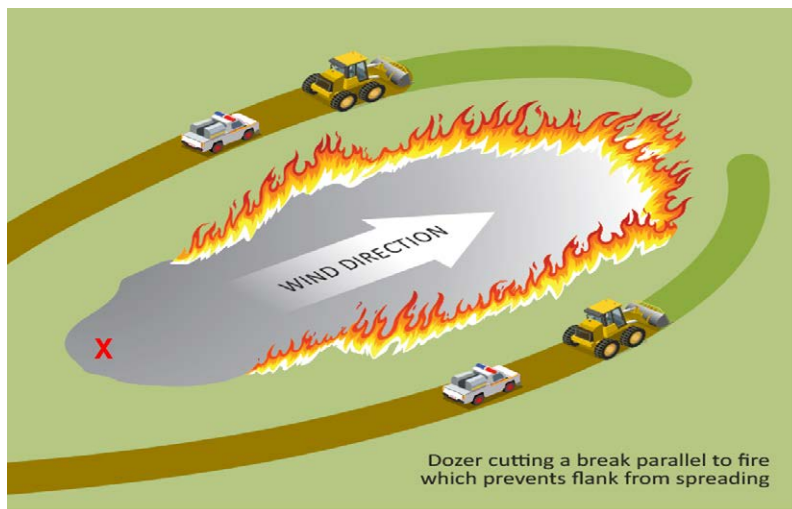
**NOTE:** A flank attack is the preferred option in any direct attack as it provides the greatest amount of safety for firefighters. It is used when it is impractical or unsafe to establish an anchor point at the head of a fire front, for example, at a high intensity grass fire.



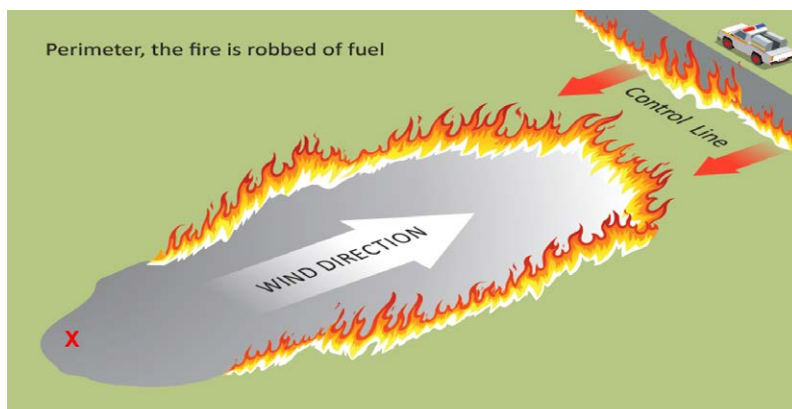
**Figure 6** Direct attack on the head



**Figure 7** Direct attack on the flanks (working from the tail towards the head)



**Figure 8** Parallel attack



**Figure 9** Indirect attack

### Asset and property protection

Many bushfires may pose a serious threat to life, livestock or property and asset protection. Isolated rural properties may also be placed under threat from an approaching bushfire.

The Incident Controller will take account of this when planning fire suppression strategies and tactics.

An option to minimise losses may be to apply tactics specifically for property and asset protection, alongside offensive strategies.

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

It is important to recognise that sometimes it is safer and more effective to pull back and defend assets rather than suppress the fire. In these situations, it is important that consideration is given to:

- preservation of human life;
- the availability of water;
- the mobility and capability of the equipment and firefighters; and
- escape routes.

### **3.4.5 Constructing a control line**

One form of control line is a man-made or natural fuel-free path, which prevents the spread of fire. In general, control lines are constructed as closely as possible to the flanks of the fire and must be trafficable for the vehicles that will use it.

For more information see DFES' [Guide to Constructing and Maintaining Fire-breaks](#).

You can use a range of equipment to construct control lines, including hand tools, slashers, ploughs, graders, bulldozers and chainsaws.

#### 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.
- Look into the burnt area to identify elevated, surface or ground fuel hot spots. Look out for fresh outbreaks in the unburnt areas caused by new or previous spotting activity.

### 3.4.6 Blacking out

Blacking out or mopping up operations make sure that a contained fire does not reignite or spread.

Thorough blacking out involves locating, breaking open, or exposing and extinguishing any smouldering fuel above or below ground.

**NOTE:** The importance of thorough blacking out cannot be overemphasised. Many fires considered contained have rekindled or started fresh outbreaks due to poor blacking out.

You should:

- extinguish elevated burning or 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.

Commencing at the edge and blacking out for 20 metres is the most common practice.

### Factors to consider when blacking out

#### *Depth of blacking out*

The depth of blacking out will depend on a number of factors:

- The size of the bushfire
- Nature and arrangement of the fuels
- Terrain or topography
- Current and forecast weather conditions

#### *Trees*

Burning stags (dead trees) near the fire edge should be extinguished to stop them from showering sparks and embers that ignite adjacent unburnt fuels. If this is not possible, post a patrol crew twice the tree height clear of the stag and upslope, or have a competent person fell the tree. Once felled, split it open and extinguish it.

**NOTE:** The use of chainsaws to assist firefighting operations must only be carried out by trained and competent people.

### Additional considerations

- 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 tree 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 to nearby personnel, the Incident Controller or Fire Services.
- You must exercise extreme care when applying water to hot beds of burning fuel, as the immediate 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 stag trees.
- Watch out for insects, reptiles and vermin that may have been disturbed because of the fire.

## 3.5 Taking refuge

Taking refuge is the last resort. Your highest priority is to avoid being placed in a life-threatening situation. You should ensure you take all necessary actions to avoid life-threatening situations where you may need to take refuge while on foot, in a structure or in a vehicle. Your chance of survival is significantly reduced if trapped in a grass fire and extremely low if trapped in a forest fire. You must know the actions to take to improve your chances of survival if, for reasons outside your control, you find yourself in a critical situation.

Remember, you must wear appropriate protective clothing, worn and fitted correctly, at all times on the fireground.

Refer to the checklists on pages 50 and 51 which cover:

- taking refuge on foot;
- taking refuge in a structure; and
- taking refuge in a vehicle.

It is worth reiterating that your priority should be to avoid being placed in a life-threatening situation.

## 3.6 Bushfire hazards

### 3.6.1 Safety first

Safety must be given priority over all other fire suppression considerations and activities.

**NOTE:** When working at an incident, you must avoid unnecessarily putting yourself at risk. By following safe work practices, you can minimise the risk of injury.

### 3.6.2 General hazards

There is a range of potential hazards that can arise from the use or misuse of vehicles and machinery during bushfire suppression operations. At night, these hazards pose an even greater risk.

#### 3.6.3 Vehicles and heavy machinery

- Take care when working on or around vehicles at an incident.
- Know the dimensions of your vehicle.
- Always wear a seatbelt where fitted.
- Ensure any items of equipment carried in the vehicle are stowed away and secured, including exterior equipment.
- Do not ride on the back of a vehicle unless it is designed for this purpose.

- When working on the rear of a vehicle, be aware that there is a potential for slipping, falling or being thrown, especially if the vehicle is moving over rough or steep terrain.
- Park safely and consider unstable trees.
- To avoid injury, mount and dismount the vehicle using the steps and rails provided to the crew area and cabin. Do not jump from any vehicle.
- Whenever possible, get someone to guide you when reversing.
- Do not stand behind a vehicle. If the vehicle is reversing, the driver may not see you and you could be injured.
- Always be alert for hazards created by other vehicles, such as vehicles being driven carelessly in conditions of poor visibility.

Machinery such as bulldozers, graders, farm machinery, tractors, ploughs and bobcats create their own unique set of hazards. Personnel working near any machinery, in a vehicle or on foot, risk being crushed if the machine operator is not aware of them.

All machine operators have restricted fields of vision to the front and rear due to the engine and rollover protection systems. Dust, smoke and darkness may further impede the operator's view.

Only approach when directed to by the operator.



Heavy machinery can rotate or turn quickly without warning. You should never attempt to hitch a ride as the moving tracks or wheels can be hazardous.

#### Dust and poor visibility

Vehicles and earthmoving equipment create intense dust. This is a hazard to personnel and traffic due to reduced visibility and the possibility of inhaling dust particles.

If dust is present or visibility is poor:

- try to work into the wind;
- make an exclusion zone around the machine;
- turn on vehicle or machinery lights; and
- maintain a safe working distance from machines.

#### **3.6.4 Trees and rocks**

Falling or rolling trees, logs, rocks and branches can cause serious injury or even death.

Trees, logs or rocks that are dislodged by heavy machinery working on slopes have the potential to roll downhill.

A tree or rock pushed by a machine may dislodge other trees or rocks. This combination causes a domino effect and creates the risk of a severe impact injury at some distance from the machine.

**NOTE:** Always stay more than two tree lengths from heavy machinery and never work downslope.

To reduce the likelihood of injury:

- always wear your safety helmet;
- do not park vehicles near or under burning trees or branches; and
- keep a lookout for hazards created by trees, branches and rocks.

#### **3.6.5 Chainsaws**

Chainsaws are used at bushfires to cut open burning logs, cut trees and branches that have fallen on roads and cut firebreaks. They are a useful but potentially dangerous tool.

If you have not been trained to use a chainsaw, do not operate one. A qualified chainsaw operator should always wear the correct protective clothing.

#### **3.6.6 Mine shafts and karst systems (caves)**

Some areas of WA are dotted with open and partially collapsed disused mine shafts and karst systems. These are a hazard to firefighters, as in many cases they will be concealed by surface fuel overgrowth. You must keep a constant watch out for these.

### 3.7 Safe work practices around aircraft

Aircraft are used for several activities in fire operations including:

- fire command and control;
- detecting fires;
- applying water or aerial retardants (firebombing);
- aerial ignition of unburnt areas within the fire perimeter;
- transporting crews and equipment; and
- observing and mapping fires.

#### 3.7.1 Safety precautions

There are general safety principles that apply when working around aircraft.

- Always follow the directions given by the pilot, flight crew or aircraft coordinator.
- Wear correct eye, ear and head protection. Do not wear loose headgear such as baseball caps.
- Stand clear of landing and take-off areas.
- Do not smoke within 30 metres of an aircraft or refuelling equipment.
- Be aware of propellers and rotors, particularly when engines are idling during warm-up and brief stops. Never lean on them, as this may cause the engine to turn over and cause injury.

- Do not handle moving parts, such as flaps, aerals, and airspeed sensing tubes, as these can be easily damaged.
- Only assist with loading and unloading under the supervision of the pilot.
- Stay in the pilot's field of vision at all times.
- Stand outside the main rotor disc area and await the pilot's signal before approaching the helicopter in a crouched position (Figure 10).
- Regardless of whether a helicopter is running or not, do not approach without the pilot's signal.
- If the helicopter is creating dust, cover your eyes and crouch down with your back to the helicopter until the dust clears.

#### 3.7.2 Aerial suppression

Aerial suppression (sometimes called waterbombing) is the term used to describe the dropping of water, foam or retardants in bushfire suppression activities. Helicopters or fixed wing, agricultural type aircraft can carry out waterbombing.

At times, waterbombing aircraft may be automatically dispatched and heard overhead before Fire Services' crews arrive. In these circumstances, ensure you remain well clear of the

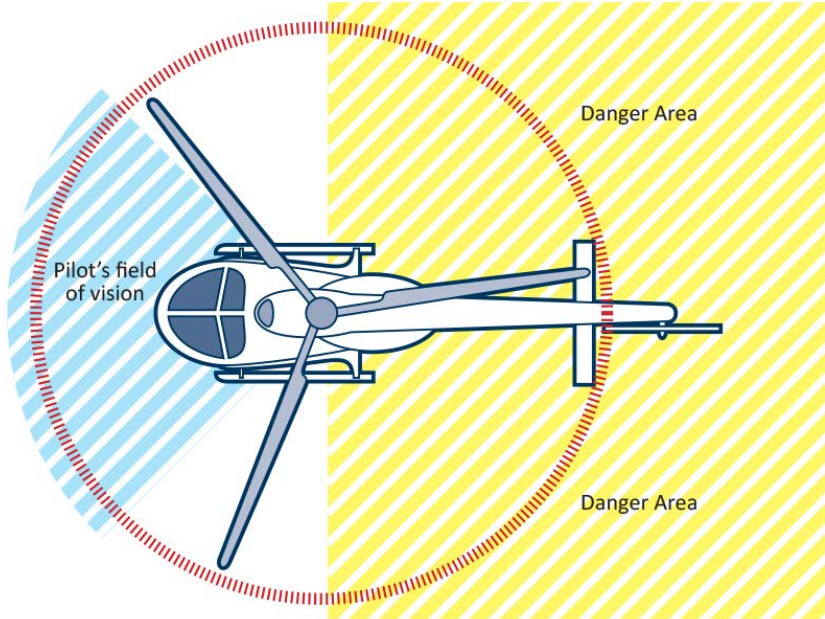
drop zone or the aircraft will be unable to drop on the fire.

To assist in warning ground personnel of incoming drops, some waterbombing aircraft are equipped with sirens. These aircraft will activate the siren prior to and during the release of any load.

**NOTE:** Not all waterbombing aircraft are siren equipped.

If caught in a drop zone:

- move away from the fireline;
- do not run or panic;
- watch out for dead or suspended branches;
- place hand tools well clear of you;
- hold your helmet on or protect your head with your arms;
- watch your footing; and
- wash with clean water if hit with foam or retardant.



**Figure 10** Working around helicopters

## 3.8 Working near powerlines

Electrical hazards may be encountered at bushfires or other incidents. These hazards may be caused by:

- high winds bringing down powerlines;
- falling trees or branches bringing down powerlines;
- burnt power poles falling and bringing down powerlines; and
- motor vehicle impact bringing down powerlines.

**NOTE:** You must always consider downed electrical wires as live until informed otherwise by a power authority.

### 3.8.1 Pole fires

- Remain at least three metres beside and below distribution lines (Figure 11).
- Remain at least eight metres beside and below transmission lines (Figure 12).
- Never work above any electrical conductor.
- Secure the area.
- Notify the power authority and request the electricity supply be shut off.

- Do not attempt to extinguish a pole fire until the electricity supply has been switched off.
- Be aware of falling wires.

### 3.8.2 Fallen conductors

- Remain eight metres from fallen distribution lines.
- Remain 20 metres from fallen transmission lines.
- Never work above any electrical conductor.
- Secure the area.
- When approaching the incident area, look for low hanging wires that may contact the appliance.
- If working at night, approach the incident area with caution.
- Use a torch or headlights to locate the ends of electrical wires.
- Notify the power authority.
- Keep the area clear of all personnel and wait for the power authority to arrive.
- Be aware of metal fences.
- Watch for coiling or springing of straight wire.
- If occupants of a car are trapped by fallen wires in a vehicle, instruct them to stay in the vehicle until the electricity supply is cut off.
- Downed electrical wires discharge an electrical current from the point of contact outwards for several metres on the ground.

### 3.8.3 No-go zones and spotter distances

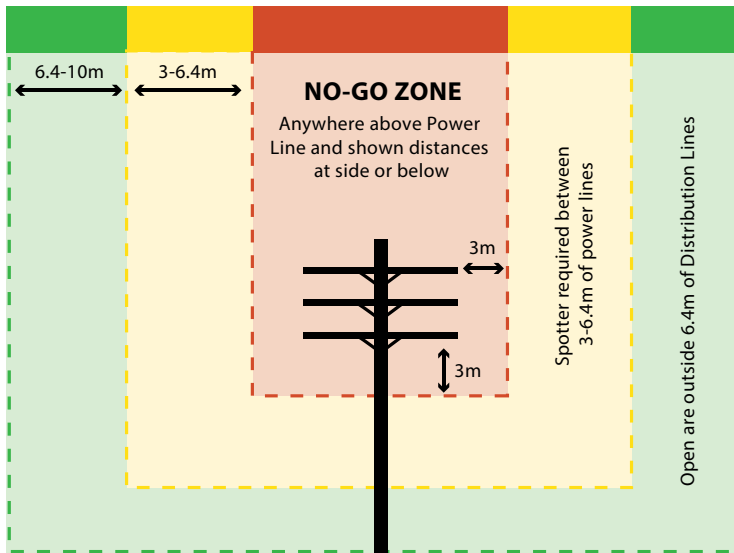


Figure 11 No-go zones and spotter distances for distribution lines

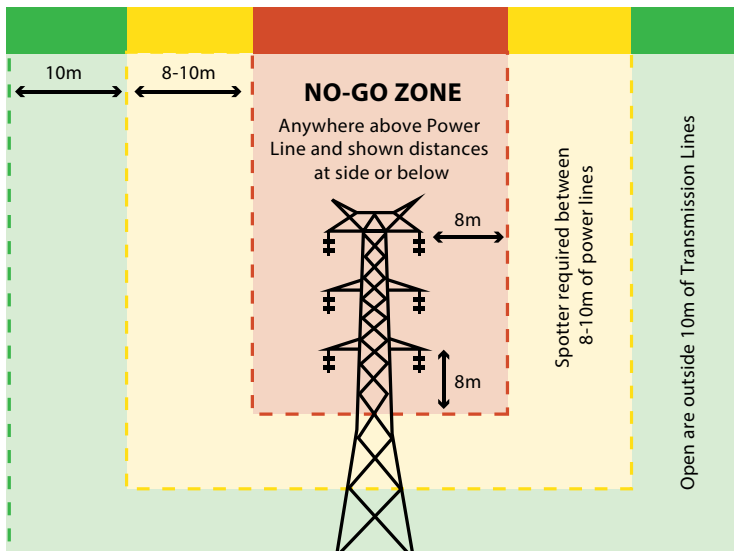


Figure 12 No-go zones and spotter distances for transmission lines



#### **3.8.4 Operating near transmission lines**

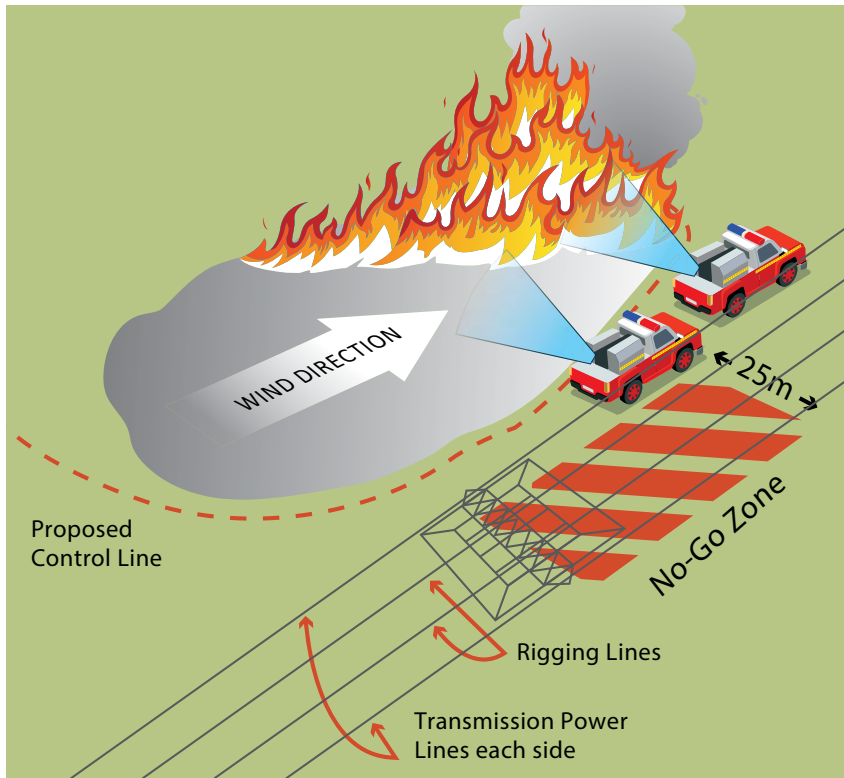
This is a no-go zone for vehicles and personnel if fire or smoke is within 25 metres of outer wire (Figure 13).

Flames and smoke may cause an electric arc from one wire to another, or to the ground.

Keep your hose stream below head height.

#### **3.8.5 Substations**

No person should enter an electrical substation unless accompanied by a representative from the power authority.



**Figure 13** Operating near transmission lines



# Section 4: Checklists

## 4.1 L.A.C.E.S.

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### LOOKOUTS

Lookouts and firefighters should have an uninterrupted view of the section of the fire for which they have responsibility. Regular patrols are necessary if the lookout cannot see the full length of the fireline.

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### AWARENESS

Remain aware of the fire situation including current and potential weather, terrain and aspect, fuel type and fuel loads, hazards and crew locations. All personnel have a responsibility to be alert and act decisively before situations become critical.

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### COMMUNICATIONS

Ensure you receive a briefing, stay in communication with others, communicate changes in situation and provide regular updates.

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### ESCAPE ROUTES

Know your escape routes at all times and ensure your fireline colleagues are also fully informed. Vehicles must be positioned to allow rapid escape.

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### SAFETY ZONE

Always have a safety zone (anchor point) to which you can retreat if fire behaviour escalates. Well burnt ground is a safe area. The safety zone must be large enough to offer protection.

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## 4.2 Dangerous situations

Dangerous situations on the fireground that require caution include:

<b>Fire downhill</b>	You are building a control line downhill towards the fire.
<b>On a slope</b>	You are working on a slope where rolling burning material can ignite fuels below you.
<b>Wind changes</b>	The wind changes speed or direction.
<b>Hot weather</b>	The weather gets hotter or drier.
<b>Unburnt fuels</b>	There are unburnt fuels in between you and the fire.
<b>Poor access</b>	The terrain or vegetation impedes travel or visibility.
<b>At night</b>	You are in country you have not seen in daylight.
<b>Unfamiliar</b>	You are not familiar with the weather or local fire behaviour.
<b>Spot fires</b>	Spot fires occur over your control line.
<b>Main fire</b>	You cannot see the main fire or communicate with anyone who can.
<b>Unclear</b>	Your instructions are not clear.
<b>Exhausted</b>	You feel exhausted.
<b>No anchor point</b>	You are attacking a fire or constructing a fire control line without a safe anchor point.
<b>Alone</b>	You are working alone with no communications link to crew members or supervisors.
<b>Uninformed</b>	You are not fully informed about strategy, tactics and hazards.
<b>No escape routes</b>	Safety zones and escape routes have not been identified.
<b>Fire potential</b>	The potential of the fire has not been assessed.
<b>Low water</b>	Water levels are getting low.



### 4.3 Is your vehicle ready?

		Y	/	N
1	When loaded, is the weight of your vehicle less than the rated Gross Vehicle Mass?	<input type="checkbox"/>		<input type="checkbox"/>
2	Is the load, including tank, pump and fittings properly secured?	<input type="checkbox"/>		<input type="checkbox"/>
3	Is your vehicle roadworthy, to Department of Transport standards?	<input type="checkbox"/>		<input type="checkbox"/>
4	Are the vehicle and pump mechanically sound?	<input type="checkbox"/>		<input type="checkbox"/>
5	Have the vehicle and pump been serviced regularly?	<input type="checkbox"/>		<input type="checkbox"/>
6	Is your vehicle fitted with a UHF Radio?	<input type="checkbox"/>		<input type="checkbox"/>
7	Is there a first aid kit in the vehicle?	<input type="checkbox"/>		<input type="checkbox"/>
8	Is there a woollen blanket for fire protection in the vehicle?	<input type="checkbox"/>		<input type="checkbox"/>
9	Is your vehicle fitted with an amber rotating beacon?	<input type="checkbox"/>		<input type="checkbox"/>

#### 4.4 Do you have the correct personal protective clothing and equipment?

		Y	/	N
<b>1</b>	Cotton or natural fibre overalls with long sleeves <b>or</b> Natural fibre work shirt and trousers <b>or</b> Level 1 bushfire personal protective clothing	<input type="checkbox"/>		<input type="checkbox"/>
<b>2</b>	Sturdy leather boots	<input type="checkbox"/>		<input type="checkbox"/>
<b>3</b>	Leather work gloves	<input type="checkbox"/>		<input type="checkbox"/>
<b>4</b>	Industrial type helmet with chin strap	<input type="checkbox"/>		<input type="checkbox"/>
<b>5</b>	Industrial type goggles	<input type="checkbox"/>		<input type="checkbox"/>
<b>6</b>	Respirator or dust mask	<input type="checkbox"/>		<input type="checkbox"/>
<b>7</b>	Hearing protection (if required)	<input type="checkbox"/>		<input type="checkbox"/>
<b>8</b>	High visibility clothing <b>or</b> vest (if required)	<input type="checkbox"/>		<input type="checkbox"/>
<b>9</b>	Drinking water, food and snacks	<input type="checkbox"/>		<input type="checkbox"/>



## 4.5 First aid kit

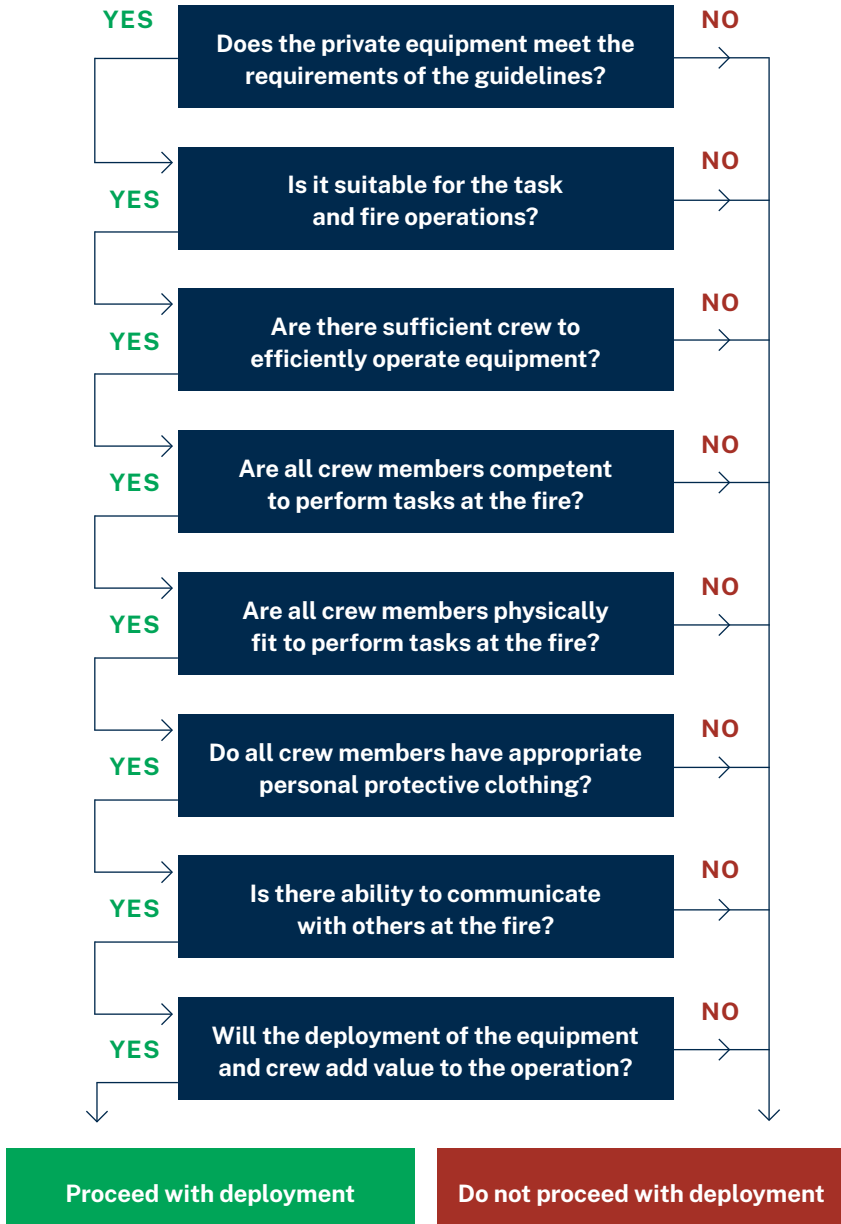
Check the contents of your kit regularly and ensure that:

- ☐ Items have been cleaned
- ☐ Packets are properly sealed
- ☐ Items have not exceeded expiry dates
- ☐ Previously used items have been replaced

### Basic first aid kit items

- |   |  |
|---|--|
| <input type="checkbox"/> Non-stick wound dressings    | <input type="checkbox"/> Saline solution           |
| <input type="checkbox"/> Adhesive strips (Band-aids)  | <input type="checkbox"/> Safety pins               |
| <input type="checkbox"/> Combine and eye pads         | <input type="checkbox"/> Plastic bags              |
| <input type="checkbox"/> Gauze swabs                  | <input type="checkbox"/> Stainless steel tweezers  |
| <input type="checkbox"/> Alcohol and antiseptic swabs | <input type="checkbox"/> Thermo/shock blanket      |
| <input type="checkbox"/> Triangular bandages          | <input type="checkbox"/> Notepad and pencil        |
| <input type="checkbox"/> Crepe bandages               | <input type="checkbox"/> Disposable nitrile gloves |
| <input type="checkbox"/> Disposable hand towels       | <input type="checkbox"/> Bite and itch relief gel  |
| <input type="checkbox"/> Stainless steel scissors     | <input type="checkbox"/> Cold pack (disposable)    |
| <input type="checkbox"/> Blunt-nosed shears           | <input type="checkbox"/> CPR protection mask       |

#### 4.6 Are you ready to deploy?





## 4.7 Equipment specifications and guidelines

Suggested slip on unit:

Item	Guideline
Water carrying capacity	300 litres minimum, 400 litres preferred
Pump	Internal combustion engine rated at 3.5kW (5hp), capable of a minimum pressure of 250kpa, and self-filling capability (via suction)
Safety	<ul style="list-style-type: none"><li>• Lap sash seatbelts for all crew when travelling</li><li>• 1 x woollen blanket per crew member</li><li>• 1 x portable first aid kit</li><li>• 1 x UHF radio</li><li>• Work lights</li></ul>
Delivery hose	30m of 19mm hose on a hose reel 2x 25mm layflat hose (if available)
Suction hose	Hard suction hose complete with strainer to match operations of the pump
Hand tools	<ul style="list-style-type: none"><li>• 2 x rakehoes</li><li>• 1 x shovel</li><li>• Tools and safety gear</li></ul>
Fuel	Ensure pump is fully fuelled  At least 10 litres of pump fuel should also be readily available at a safe location
Other	<ul style="list-style-type: none"><li>• Small amount of Class A foam (if available)</li><li>• Food, electrolyte replacement and drinking water sufficient for a shift (four hours minimum)</li></ul>

## 4.8 Taking refuge on foot

1. Remain calm and do not panic.
2. Send an 'emergency' message ('Emergency, emergency, emergency') to gain immediate radio attention.
3. Try to cut across a slope out of the path of the head of the fire.
4. Do not try to outrun the fire uphill unless you are certain a safe refuge is close by.
5. Try to reach bare or unburnt ground towards the back of the fire.
6. Do not run through flames unless you are able to see the ground on the other side, and the flames are low enough for you to safely cross. Breaks may occur where there is less fuel.
7. As a last resort, clear a survival area by removing fuel.
8. If possible, shelter behind a solid object or lie in a depression, stump hole or drain.
9. Lie face down, ensuring all exposed skin is covered.
10. If available, completely cover yourself with a woollen blanket.

## 4.9 Taking refuge in a structure

When forced to seek refuge indoors:

1. Send an 'emergency' message ('Emergency, emergency, emergency') to gain immediate radio attention.
2. Take in a hose and fittings if you know that the fitting can be coupled to an internal tap (such as the washing machine tap in a laundry).
3. Shut all windows and doors. Be aware that sparks and embers can also enter buildings through ventilation covers, subfloor spaces and under doors and eaves.
4. Soak towels and rags with water in case you need to extinguish small fires, and fill any available containers, buckets and baths.
5. Watch for and extinguish any outbreaks of fire, especially in the roof and ceiling and on windowsills, verandas, and timber decks.
6. If the main fire has passed and the building should catch fire, wrap yourself in a woollen blanket and leave.



## 5.0 Taking refuge in a vehicle

1. Send an 'emergency' message ('Emergency, emergency, emergency') to gain immediate radio attention if you are in grave and imminent danger.
2. Give continuous blasts on the horn as a warning signal. Ensure others are aware of the nature of the impending danger.
3. Park your vehicle in an area of least combustible fuel (preferably on burnt or bare ground, in a quarry pit, wet gully or cutting). Ensure you have parked away from surrounding or overhanging trees or other vegetation.
4. Ensure the cab of the vehicle is facing away from the fire to reduce the main impact of radiant heat.
5. Wind up all windows, close vents, turn on headlights and hazard lights, and keep the engine running.
6. Ensure all personal protective clothing is worn and properly adjusted, and that all areas of exposed skin are covered.
7. Get down as low as possible in the well of the cabin and cover yourself fully with a woollen blanket, keeping below the bottom of the windscreen.
8. When the fire front has passed, extinguish any fires on or around the vehicle that may be a threat to your safety.
9. When the danger has passed, advise Fire Services at the fire.



## Remember

- Everyone at a fire is responsible for safety.
- Accept responsibility for your decisions and actions.
- Ensure someone from the IMT at the fire is aware of your presence and of what tasks you are undertaking.
- Do not work alone – work cooperatively with emergency services and others.
- Be aware of the situation around you and any hazards likely to cause you harm.
- Wear appropriate personal protective clothing.
- Know and work within your personal limits and ability.
- Ensure your equipment is well maintained and operate it within its limits and capability.
- Ensure the tasks you undertake match your capability and that of your equipment.
- Maintain communications.







FOR A **SAFER STATE**