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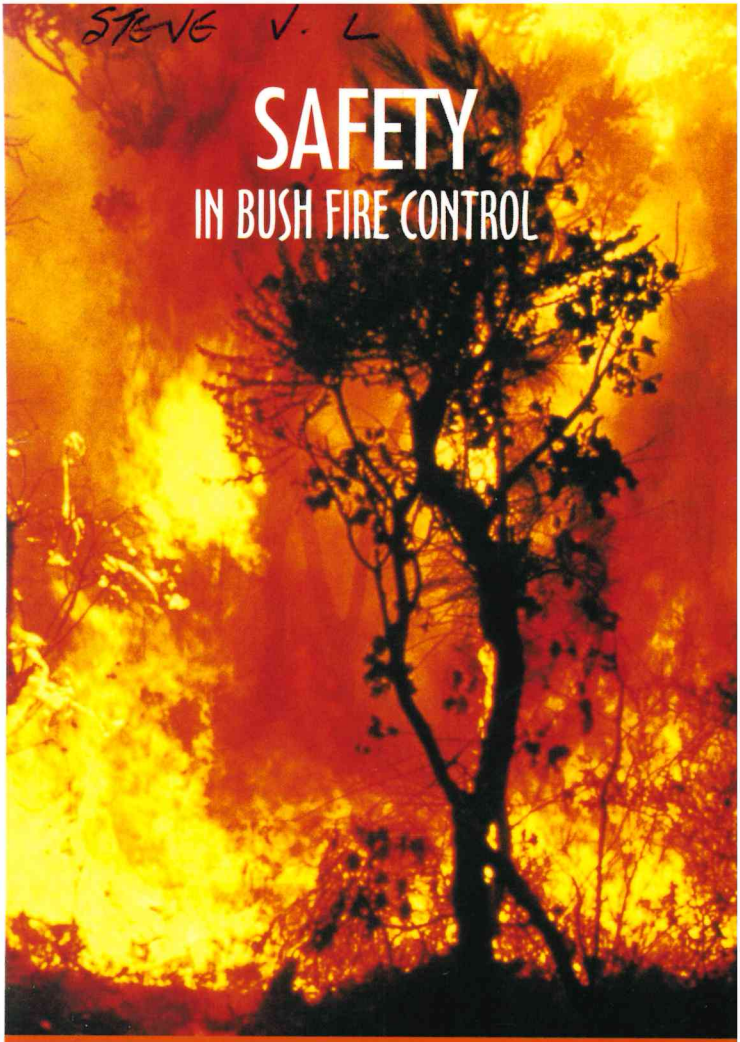
SAFETY
IN BUSH FIRE CONTROL



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SAFETY
IN BUSHFIRE CONTROL

by
CALM*FIRE*

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

SAFETY IN BUSHFIRE CONTROL 1998

Safety on the fireline and during burning operations is everyone's responsibility. Be mindful at all times for your own safety and the safety of others.

The major threats to fire fighters are radiant heat, physical exhaustion, smoke inhalation, dehydration and work stresses associated with working in hazardous situations. Hazards can include erratic fire behaviour, burning trees and falling limbs, steep slopes and dense vegetation.

You should be constantly aware of the situation you and your colleagues are in, and try to anticipate changes in fire behaviour. Think ahead and be observant.

Know and follow the safety rules in this booklet, read it carefully, retain it, and re-read it from time to time. It could save your life.

This booklet contains some basic safety information regarding working in and surviving bushfire. It does not substitute for proper training, or having experienced supervision.

For further information contact your local CALM office, Bush Fire Brigade or FESA office.

Photo – Lachlan McCaw

Teamwork is vital—firecrews should ensure they are briefed on all fire suppression and burning tasks.

PERSONAL PROTECTION

PROTECTIVE CLOTHING AND EQUIPMENT

All personnel working on the fireline and on prescribed burns must wear suitable standards of protective clothing.

- Safety Helmet—wear an approved safety helmet adjusted to fit properly to protect against falling objects.
- Overalls Or Long Sleeved Shirts And Long Trousers—overalls or long sleeved shirts and long trousers protect the body. against radiated heat. Use wool, cotton drill, or probane treated cotton. Don't wear synthetics. The task for fire fighters' clothing is not just to keep radiant heat out, but also to let body heat escape.
- Safety Boots—Protect feet with safety boots in good condition, preferably calf length.
- Safety Goggles Or Glasses—Wear safety goggles or glasses to prevent eye injury from smoke irritation, wind blown debris, or chainsaw debris.
- Gloves—Protect hands from blisters when unaccustomed to hand tool work
- DO NOT WEAR shorts, singlets, T-shirts, thongs, or sandshoes in the fire area.
- DO NOT WEAR plastic watch bands as they can melt into the skin and cause infection.
- All Fire Fighting Vehicles must carry a complete, standard first aid kit. Crewleaders and truck operators must check their kits regularly to ensure that the kit isproperly stocked with medical supplies. Each crew should contain at least one qualified first-aider.

Photo – Lachlan McCaw

When driving around a fire, make it your business to know the country you are travelling into.

HEAT AND FIREFIGHTERS

Fire fighting is hot work, but not just because of the fire. The main source of heat is that generated by the body doing the steady physical work involved in fire fighting. This is combined with the environmental conditions: hot weather, hot winds, sunlight and radiant heat from the fire. Overheating and heat illness is a major hazard to all firefighters. Firefighters who are not prepared for the heat or ignore early warnings will have a reduced physical and mental capacity leading to poor decision making, mistakes and accidents. They risk unconsciousness, permanent injury and death.

COPING WITH HEAT

Fire fighters can lose more than one litre of fluid per hour through sweating. This fluid must be replaced to prevent heat related illnesses. Sweat, as it evaporates, is the body's main line of defence against heat. If sweat is not replaced, the body's cooling system breaks down and body temperature climbs dangerously, subjecting the body to heat stress.

People often confuse heat discomfort with heat stress. In fact they are completely different from each other.

HEAT DISCOMFORT

When evaporation is restricted—by clothing, high humidity, or low air movement—the sweat accumulates and causes a feeling of discomfort. If we can't make the sweat evaporate better—by loosening clothing and seeking a breeze—we may feel oppressed and irritated. But we are not necessarily suffering from heat stress, nor at risk of developing heat illness.

People differ greatly in their capacity to cope with heat. In particular heat tolerance is reduced in people who are overweight, unfit, unacclimatised, dehydrated or ill.

HEAT STRESS—SYMPTOMS & TREATMENT

In contrast to heat discomfort, heat stress occurs when the body's temperature rises beyond safe limits. Factors such as high air temperature and humidity, radiant heat and lack of air movement combined with heavy work and protective clothing can cause the body's temperature to rise. Normally the evaporation of sweat cools the body and keeps the body temperature within safe limits. When the body cannot cool itself through sweating its temperature can climb dangerously. Heat stress disorders may then be experienced, such as heat cramps, heat exhaustion and heat stroke.

For all heat disorders the casualty should be placed in a cool shaded area and restrictive clothing loosened.

Heat Cramps

- These are experienced by workers who sweat profusely in the heat. They may be less likely when fluid intake is adequate and diet includes fruit and vegetables with essential minerals. Treatment involves replacing fluids and stretching to relieve the cramps. People who suffer frequently from heat cramps should seek medical advice.

Heat Exhaustion

- Symptoms include weakness or extreme fatigue, unstable gait, wet clammy skin, headache, nausea and collapse.
- Treatment includes rest in a cool place and replacement of fluids. Seek medical assistance if recovery is not rapid. Heat Stroke
- THIS IS A MEDICAL EMERGENCY. Send for medical help at once and begin treatment immediately. Brain damage and death may result if treatment is delayed.
- Symptoms include
- hot (often dry) skin
- high body temperature (41^0 or higher)
- mental confusion, incoherent speech and delirium
- loss of consciousness, convulsions and coma.
- Treatment
- Rapidly cool the victim by soaking with cold water and ice, and by fanning vigorously to promote evaporative cooling.
- Continue until victim's temperature drops.
- Treat for shock in necessary once the temperature has lowered.
- Transfer to a medical facility as soon as possible.

PREVENTING HEAT STRESS

Bushfire fighting is hot, hard and sweaty work. However, it is safe to fight bushfires in hot weather, so long as crew members are healthy, fit, wear the right loose-fitting clothing, drink frequently, work at their own pace, avoid excessive radiant heat, look after each other, and deal promptly with any adverse symptoms and signs of heat stress. Large losses of sweat without fluid replacement results in dehydration characterised by thirst, fatigue, giddiness and anxiety. Hard working crews must try and drink 150-200 ml every 10 to 15 minutes.

The key to survival is sweat, which needs to evaporate. Sweat provides no cooling whatever if it simply drips off or soaks into clothing.

Whilst it is important to recognise and treat heat disorders, the best approach is prevention. Each person can minimise the chance of suffering from heat stress by the following means.

Be Fit: Achieving and maintaining a high level of aerobic fitness is one of the best ways to protect against heat stress. Keep to a healthy weight as excess weight reduces the effectiveness of the body's cooling system. Discuss the stresses of firefighting with your doctor.

Acclimatise: The worker who is acclimatised to work in the heat runs less risk of heat stress. It takes 4 to 8 days for the body to adjust to hot work. About 11/2 hours per day is enough to acclimatise workers to a specific combination of work and heat. Don't expect full production for the first several days.

Check the Conditions: Know when the conditions are such that heat stress may be a problem. High temperatures, high humidity, the sweat is dripping off your body instead of evaporating.

Replace Fluids: Drink lots of fluids before, during and after hot work. It is common to lose 1 litre of sweat per hour working in the heat. In a hot humid environment the loss may be as much as 3 litres per hour.

Pace Yourself: Different people have different capacities. If you push too hard to keep up you may end up slowing down the team by becoming ill.

Rest Periods: Frequent short (30 seconds) breaks can provide an opportunity for you to have a drink and to cool down a little. The longer you work the more frequent the breaks will need to be. Rest in cool shaded areas whenever possible.

Look After Your Mates: Make sure your work mates are drinking plenty of water, and check if they are showing signs of heat stress. Share the workload and encourage them to pace themselves.

FIRST AID FOR BURNS

- As soon as possible gently pour clean, cold water on to the injured area to cool it
- Do not touch the injured area
- Do not apply lotions of any kind
- Do not remove burned clothing and do not break blisters
- Remove the casualty for medical aid as quickly as possible, except where the burn is very small and only superficial
- Place the casualty in a lying position, dependent on injuries
- Loosen any tight clothing
- Cover the injured area with a clean, non-stick dressing and, if necessary, bandage lightly to protect from infection and to minimise fluid loss.
- If thirsty, the casualty should be given sips of tea, water etc., but NOT alcohol.

SURVIVAL MEASURES

Radiated Heat can kill you if your are unprotected from intense fire burning in heavy fuels or caught in front of a fast moving fire. Fire intensity is affected by the amount and type of fuel available to the fire. Fire intensity is greatest at the headfire.

- Radiant heat travels in straight lines. You can protect yourself by having a barrier between you and the fire.
- Use any and every means that will shield you from radiant heat. Some of the best ways are:
- cover all expose skin with a natural fibre materials (eg: wool, drill cotton) such as the protective clothing provided by all fire authorities;
- find refuge in a vehicle which is parked away from heavy fuels, in a house, behind logs or rocks, in holes made by fallen trees, or in deep wheel ruts.
- Woollen blankets must be carried in pumpers, fire trucks and all other vehicles attending fires. These are to be used to cover the vehicle occupants in the event of a fire entrapment. Synthetic material can easily burn on to skin and should be avoided except as a last resort.

SURVIVAL IN A VEHICLES

Should you be in a vehicle and trapped in a bushfire, the vehicle offers you the best chance of survival, provided you follow these basic rules:

- Radio your situation to control.
- Park the vehicle on the area that has the least amount of flash fuels. Where possible use road cuttings, large logs or similar objects to protect the vehicle from the oncoming fire. This will also provide you with extra protection against radiant heat.
- Use any time available to remove flash fuels immediately near the vehicle. Do not completely exhaust yourself in doing so.

Photo – Lachlan McCaw

Following the correct survival procedures enabled the fire crew of this light duty to escape without injury.

- Do not attempt to backburn.
- Leave hazard lights on. Leave motor and pump running to avoid vapour lock.
- Ensure all windows, doors and vents are shut to keep out smoke, heat and burning embers. Set air conditioning to recycle.
- Wait outside, using the vehicle as protection for as long as possible.
- When it becomes impossible to remain outside, enter your vehicle quickly on the lee side and shelter yourself from radiant heat by remaining on the floor and covering the body with a blanket or rugs, floor carpets, etc.

- Remain in the vehicle for as long as possible. The flaming or flash period rarely exceeds 5 to 10 minutes in a forest fire or 2 minutes in a grass fire.
- Exit the vehicle on the lee side and take care not to touch the vehicle.
- Contrary to popular belief fuel tanks do not "just explode". Even in the worst situation it will be some minutes before the vehicle catches fire and becomes intolerable. Remember those "few minutes" will probably save your life.

Heat Shields—Trucks:

New trucks have been fitted with heat shields to protect firefighters working on the back of the truck. These will only protect against brief exposures. The cabin is still the safest place to be if trapped by fire.

SURVIVAL ON FOOT

Escape Routes on Foot

If caught on foot in a wildfire follow these guidelines:

- Remain calm, do not try to outrun a fire anywhere.
- Crew members must be encouraged not to break away from the team.
- Don't run, but walk briskly if there is a clearly indicated way of escape with a crew.
- Stay on bare or burnt ground, eg: gravel pits, clearings, roads.
- Move across slope and out of the path of the fire.
- Move across the slope and out of the path of the fire, then work your way downslope towards the back of the fire; do not run uphill or away from the fire unless you are certain a safe refuge is nearby.
- Work your way downslope towards the back of the fire.

Photo – Lachlan McCaw

Turn headlights on when driving around the fire.

- Select a path that is least obstructed by logs, dense growth or uneven ground.
- Use clothing to best advantage as a shield.
- Breathe air close to the ground, away from combustion gases.
- Do not attempt to run through flames more than about one metre high and you can see clearly behind them.
- Beware of the danger from burning limbs and trees in forest country.
- Avoid dense vegetation in gullies as these areas are often impenetrable and can be subject to intense fire behaviour. If conditions become severe, use every possible means to protect yourself from radiant heat.

Refuge on Foot:

If you get caught on foot in a bushfire, follow these guidelines:

- Excavate a depression.
- Clear debris away from depression.
- Mound dirt on side of depression from which fire is approaching.
- Lay in depression and cover yourself with earth or sand.
- Make use of wheel ruts, depressions, large rocks, culverts or logs to give protection.
- Take refuge in ponds or running streams.
- Clear as much fine fuel from the area of shelter as possible and cover yourself with a blanket, or earth if possible, for protection from radiant heat.
- DO NOT take refuge in elevated water tanks or tanks on fire appliances.

SURVIVAL IN A BUILDING

Even though a building may burn down later, it will generally provide protection for the occupants while the main intensity of the fire passes. It is advisable to:

- stay outside for as long as possible
- extinguish small outbreaks.

When you are no longer able to stay outside:

- move into the building
- look for and extinguish internal outbreaks
- pay particular attention to roof spaces

When conditions permit:

- move outside
- extinguish outbreaks

Wait for qualified help before fighting an established internal structural fire.

RESPONSIBILITIES

Responsibilities of Management

Fire Managers must:

- Ensure fire fighters wear suitable protective clothing; and are provided with sharp tools; well maintained pumps, chainsaws, vehicles and other equipment.
- Establish regular training in safe work practices and develop effective self pacing; efficiency in hand tools; aerobic and muscular fitness; and heat acclimatisation.
- Develop well-trained and confident crew leaders and sector commanders that ensure sound work practices and avoid work emergencies (eg: entrapment).
- Train crews to drink enough to replace sweat losses, and to recognise and treat adverse reactions to the heat. Provide adequate supplies of water bottles and refills.
- Ensure that crews are provided with appropriate crew replacement, shift lengths, meal breaks, drinking water, transport and sleeping arrangements.
- Provide high-carbohydrate meals and snacks, and cool drinking waters.
- Minimise smoke exposure by crew rotation and appropriate work practices, rather than by using respirators, which cause discomfort and restrict breathing and vision.
- Rotate crews on the fire to ensure that the work load is shared. The work that has been down on previous shifts should be considered when making crew allocations.

RESPONSIBILITIES OF CREW LEADERS

Crew Leaders must:

- Take primary responsibility for the welfare and safety of their crew.
- Have the full confidence of the crew.

- Ensure that people under their control conform to safe standards of protective clothing and behaviour.
- Not be involved in hard physical work, or any other activity that reduces the ability to monitor the weather, the fire behaviour, and the crew's performance.
- Watch the crew members closely and help any who are tired or unwell.
- Encourage self-pacing and rotate crews to lighter work (eg: patrolling) as required.
- Call for short breaks whenever necessary and feasible.
- Make sure cool water is readily available and that crew members drink frequently.
- Obtain information on fire behaviour, fire location, weather changes, fire maps and fire fighting instruction. If unclear about your instruction, say so!
- Brief the crew on the overall fire situation, and the Sector Commander's expectations of them.
- Maintain the Chain Of Command. Inform your supervisor of your deployment. Do not "self" deploy and neglect to tell someone.
- Make sure your crew has at least one escape route.
- Use the "buddy" system—never let anyone work alone. Maintain frequent communications between crew members and with machine operators working on your sector.
- Make regular situation reports in order to give and receive important information about the fire and crew safety.
- Watch for any signs of panic amongst crew members. They must be encouraged not to break away from the team. Panic in one crew member can cause others to panic.

Photo – Lachlan McCaw

Crew leaders should make regular situation reports to give and receive information about the fire and crew safety.

RESPONSIBILITIES OF CREW MEMBERS

Individual crew members must:

- Follow instructions given by your crew member. If unclear on instructions, ask questions.
- Insist on prior briefing on all fire suppression/burning jobs.* Observe and keep in mind local topography, landmarks, road location, clearings and likely safe spots.
- Select escape routes before entering the fire zone.
- Avoid steep slopes above a fire.
- Avoid thickets, swamps and dense vegetation near the fire zone, as these can become traps.
- Stay on the edge of the fire, don't wander off into unburnt country, and don't become isolated from your companions.
- Beware of burning limbs and trees, and fallen powerlines — particularly near wire fences.
- Avoid fatigue and control body heat load by self-pacing and keeping a comfortable distance from the flames. This will also reduce smoke exposure.
- Drink water frequently. You can improve cooling through evaporation by opening up clothing whenever it is safe to do so.
- Ask the crew leader for a rest or a spell on a lighter job if feeling tired or unwell.
- DO NOT attempt any fire suppression on gas or electrical installations.

HAZARDS AT FIRES

Hazardous Situations to Watch Out For

1. **Building a control line downhill towards a fire.** Fires race up hills, look at where the fire is going and don't get into this situation. It can be particularly unsafe at the head of a gully where the wind may funnel the fire.

Photo – Lachlan McCaw

When using hand tools, pace yourself. Keep rake hoes sharp, sandpaper rough handles to avoid splinters.

2. **On a slope, rolling material can ignite fuel below you.** There is the possibility of being caught between the fire you are working on and a new one burning uphill toward you.
3. **The wind changes speed or direction.** A change in wind direction will mean a change in how the fire burns, how it needs to be controlled and how much it threatens your safety. A wind change could change the direction of fire spread or it could turn at the flank of a fire into the fire head. An increase in wind speed will lead to an increase in fire spread and intensity. A drop in wind speed may be the forerunner of a dramatic weather change.
4. **The weather gets hotter or drier.** This leads to a decrease in fuel moisture and more intense fire behaviour. Therefore a fire that was mild and easy to control at the start of the day can become a major threat as the fuel dries out.
5. **In heavy vegetation, with unburnt fuel between you and the fire.** Heavy loads of fuel mean very intense fires and rapid rate of spread when they burn.
6. **Terrain or vegetation impedes travel or visibility.** If you cannot move across the ground easily you will need extra time to escape from any problems, or you will need to look for good refuges not far away. If visibility is impaired you cannot be sure of the whereabouts of the fire how it is behaving. You may not be able to see your workmates or people operating mechanical equipment and they may not be able to see you.
7. **In country you have not seen in daylight.** You may not be aware of potential fire hazards in the area. You will need good briefing information, good maps and good lights, torches etc.
8. **Unfamiliar with local conditions and fire behaviour.** Different parts of the State have very different topography and fuel types. In these circumstances fire behaviour can be very different to what an "outsider" might predict from looking at a map but should be familiar to local people. Steep terrain and gullies can cause unexpected wind channelling and unpredictable wind

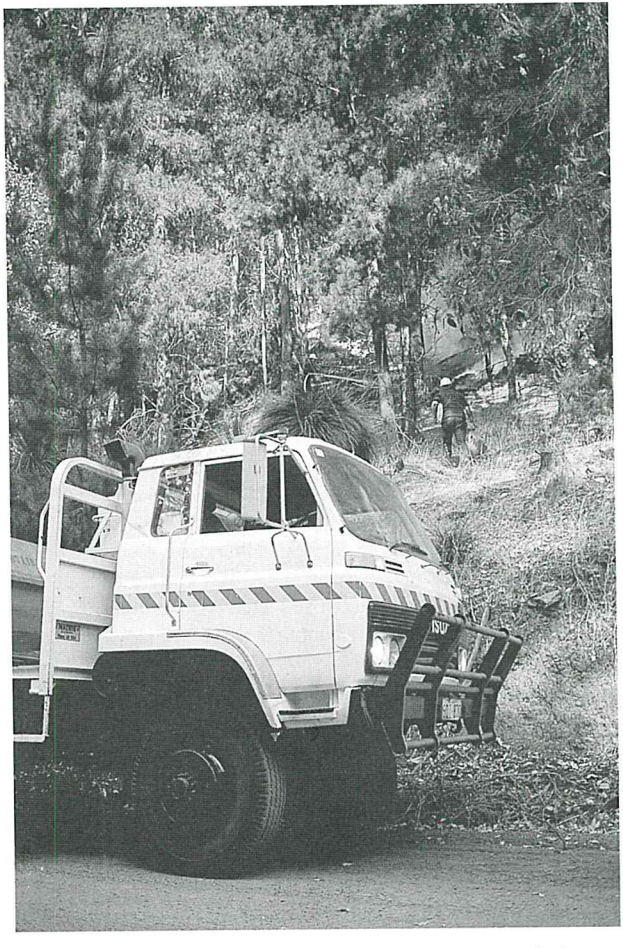

Photo – Lachlan McCaw

Take care when working on slopes; ensure vehicles are parked so others can pass.

changes, not necessarily the same as the prevailing winds on the "main fire".

9. **Frequent spot fires occur over your control line.** Spot fires present fire control problems as well as safety problems.

10. **You cannot see the main fire or communicate with anyone who can.** If you cannot see the main fire you cannot be sure* how it is behaving.

- ❖ how effective the work you are doing will be
- ❖ how far away the fire is or
- ❖ how much time you have until it is near you

11. **No communications link to crew members or supervisor, and working alone.** Communication between crew members and their supervisor is the key to keeping all members of the crew informed of what is happening.

12. **Unclear instructions or tasks are given.** Unclear instructions can lead to confusion and misunderstandings about where people are and what they are meant to be doing.

13. **Uninformed on strategy, tactics and hazards.** A crew needs to have a clear understanding of what they will be doing, what standard of work is expected and what hazards they are likely to encounter to be able to complete their own tasks effectively and safely.

14. **You feel exhausted or want to take a nap near the fire.** If you feel exhausted or sleepy as a result of fatigue or illness then it is not safe for you to remain working at a fire and you should let your supervisor know.

15. **Frontal attack on a fire or constructing a fire control line without a safe anchor point.** When building a fireline, be sure it starts at a safe anchor point like a rock or clearing.

16. **Safety zones and escape routes not identified.** It is no use waiting until an emergency arises to start thinking of a way out of it.

17. **Fire not scouted or potential assessed.** Until a fire has been properly assessed on the ground the full range of possible fire behaviour and possible safety threats will not be understood.

18. **No reserve of water in the tanker for protection and safety of the crew.** Never completely empty the tank before refilling.

BURNING TREES AND LIMBS

Burning trees and limbs can pose a serious threat to fire fighters lives and to machinery and vehicles working on firelines. Fire fighters and support staff working on or near firelines must

- wear helmets at all times
- keep looking up and around for dead tree (stags), or trees with burning limbs
- observe hollow burning chimney/hollow butt trunks which may fall
- be wary on steep down slopes where trees may fall downhill
- be especially cautious in strong, gusty winds
- be aware that many branches fall long after the main fire has passed through
- listen for the sound of wood cracking in and react quickly
- as the fire burns through the ground fuel be aware of unstable logs or rocks that may roll downhill and pose a danger to people working down slope
- mark hazardous trees with tape and advise crew members

FELLING OF BURNING TREES

Burning trees located on the perimeter of a firebreak can start new outbreaks. However, before the decision to fell a burning tree is made, the sector boss or crew leader should first consider other options for dealing with this problem. These include:

- Allow limb(s) to burn out, and contain and patrol any outbreaks.

- Burn out small area surrounding the burning tree(s).
- Push tree over with dozer. If it is decided to fell a burning tree, the following precautions must be taken:
- Chainsaw and associated tools must be appropriate for the task and maintained in top condition.
- Ensure safety equipment is in good condition and is worn at all times.
- Sector boss or crew leader to inspect and mark each tree before felling commences.
- Only experienced fallers should be used when felling burning trees. The faller reserves the right to refuse to fell any tree.
- Inspect nearby trees (within 21/2 times height of tree) for dangerous conditions, eg: burning hollow butts and burning crowns.
- Prepare a suitable escape path and clear it of obstructions into a safe area. Do not leave equipment on the path.
- Felling not to be attempted after dark.
- When felling is being done near road or track, prominent signs must be displayed each side of danger zone. Lookout personnel should be posted on track.
- Roads or tracks in the area of the felling must be closed during felling.

THE SWAMPER

- Must be experienced and have a good knowledge of felling techniques.
- Must be in reasonable proximity to the feller at all times during falling operations.
- Must be on the lookout for any overhead dangers that may occur during felling operations.
- Give audible warning to any people entering the danger area.

- Arrange with the faller a method of communication in the case of an emergency during felling operations.
- Must liaise with lookout personnel when felling is being done near roads or tracks.
- If the faller needs to leave the tree to refuel or maintain the saw, the swamper must remain at the tree. The faller must confirm with the swamper that it is safe before returning to the tree.

WORKING AT NIGHT

Daytime hazards on the fireground will present new problems in the dark. It is easy to come disoriented and lost at night.

- Carry a small, lightweight torch to help you avoid walking into holes, branches at eye level, burning stump holes, and objects that can cause trips and falls.
- Increase your visibility at night (especially near busy roads) by wearing bright green (or yellow) overalls with reflective tape, and by using the hazard lights on the fire truck.
- Take a warm woollen jumper in case temperatures drop after the main fire is out.

VEHICLE SAFETY

- Ensure the vehicle you drive is in good working condition and unlikely to break down in the middle of a fire.
- Clear all material from the back of truck/tray that may catch alight from burning embers.
- When driving to or around a fire, make it your business to know the country you are travelling into. Only use qualified, experienced drivers in difficult terrain.
- Some areas are too dangerous to enter, and tracks are either too steep, or even blocked by fallen trees.
- Do not travel up dead end tracks. Identify turnaround points as you proceed. Check on foot if there is any doubt.

- Observe clear areas with low fuels along tracks where you could take refuge if necessary.

DRIVING THROUGH FIRE AND SMOKE

Should it become necessary to drive through a burning area or one heavily covered with smoke, the following procedure should be observed:

- Keep cab windows closed.
- Switch on headlights and sound horn occasionally.
- Remove exposed flammable material from truck.
- People travelling on truck tray should have water available, through a powered pumper, tank or knapsack sprays and must wear all suitable items of protective equipment.
- At all times drive at a speed consistent with visibility.
- If smoke is heavy, don't keep driving. Park vehicle off the track to avoid collision with other vehicles.

PARKED VEHICLES

Vehicles will often be parked for a great part of the time, and so should be:

- Parked so that they can move directly out of the area on a known, safe route.
- Left with the ignition key in the lock.
- Parked on a cleared or previously burnt area.
- Parked so that other vehicles may pass.
- Left with cab windows closed and all flammable material stowed away. If a person is left with the vehicle they should know the outline of the whole operation, what other members of the crew are doing, any rendezvous with the others and communication schedules.

Photo – Lachlan McCaw

Driving through smoke requires particular care – if smoke is heavy, stop and park off the track to avoid collision with other vehicles.

HAND TOOL MAINTENANCE AND SAFETY

These hints will allow you to get safe and effective work out of equipment.

Rake hoe and axe:
Keep sharp and keep edges covered (when storing). Sandpaper rough handles to avoid splinters. Leave handles unpainted to avoid blisters. Do not carry over your shoulder.

Drip torch:
Keep spout unblocked. Make sure all valves work. Use kerosene only. Do not use a petrol/distillate mix.

Knapsack:
Lubricate taps/pump withwaterproof grease/vaseline.

Photo – Lachlan McCaw

Important! Only use kerosene in 'fire bugs'.

FIREBOMBING

Aerial fire fighting is used regularly for bushfires, particularly in the metropolitan area. Fire crews should familiarise themselves with the correct procedures to be followed when the aircraft are operating. If you are on the fireline and may be caught in the drop zone, then follow these simple steps:

- Move away from the fireline
- Don't run or panic
- Watch out for dead branches or widow makers etc.
- Place hand tools well clear of you
- Hold hard hat on or protect your head with your arms
- Watch your footing
- If you are hit with foam or retardant, wash it off with cold water

Photo – Lachlan McCaw

PRESCRIBED BURNING AND BACK BURNING

Prescribed burning is normally done under mild weather conditions when fire behaviour is characterised by slow spreading, low flames that result in a patch-burn mosaic. Despite these moderate conditions, fire behaviour can increase rapidly as a result of sudden change in wind speed and direction, changes in fuel loads, vegetation types and slopes. Hazards that are likely to be encountered at prescribed burns, including silvicultural/slash burns are:

- smoke and ash in eyes
- radiant heat
- falling limbs and burning trees
- fire induced whirlwinds carrying burning debris and ash
- uneven ground, deep ash and burning stump holes that can trip up and burn unwary fire fighters
- high levels of radiant heat and convective heatSigns warning the public that prescribed burning is in progress must be erected on all roads and walk tracks entering the burn area. These signs must be removed once the patrol work ceases.

INSPECTION BEFORE LIGHTING

The officer-in-charge of the burn must carry out a full inspection before the burn. A burn prescription must be completed on the area to be burnt. Among other things, the prescription must include a plan highlighting those features that may affect personnel safety, such as:

- Burn boundaries.
- Roads-trafficable and non-trafficable.
- Water Points, turnarounds, Control Points.
- Swamps, creeks and other dangerous areas.

- Private property within and adjoining the burn. The prescription must be given to the crew leader on the morning of the burn. An officer will discuss the burn with them, explaining aspects of the prescription that will help do the job effectively, such as:
- Burn objectives
- Fuel age and tonnes of fuel per hectare.
- Forest and scrub types.
- Fire danger index prescribed for the burn.
- Likely fire behaviour and rate of spread.
- Preferred wind strength and direction.
- Likely pattern to be used.
- Remarks on any dangerous areas or special conditions.
- Departments, organisations or people it may be necessary to contact on the day of the burn.

Wherever possible the Burn Controller should provide crews with the opportunity to inspect the burn (boundaries, water points etc.) prior to the commencement of lighting.

INSTRUCTIONS FOR LIGHTING CREWS

Spot fire lighting is normally done by two or more lighting crews moving in an echelon formation. Crew members must maintain contact with each other at all times. If necessary, a compass should be used to maintain direction, particularly in dense scrub which precludes visual or verbal contact between lighters. The strip length should not exceed 2000 metres in order to avoid fatigue and disorientation. In dense forest understorey, such as the karri forest, it may be necessary to prepare bulldozed walking lanes to ensure the safety of lighting crew. In dense forest areas, lighting crews should work in pairs. The crew leader or officer directly in charge of lighting must brief all members of the crew before starting each strip line. He must ensure that each person knows exactly what is to be done. All personnel must be familiar with:

- The area to be burnt which should be shown on the plan and on the ground by way of signs or paint marks.
- The roads and tracks in the vicinity and their point of outlet.
- Features on the plan such as swamps, creeks, and steep slopes.
- Wind direction and the likelihood of changes.
- Direction of strip lines and whether echelon or line-abreast formation is to be used.
- Spacing and placing of crew in the formation.
- Action to be taken by individuals if they lose contact with workmates. The crew leader should place their most experienced competent crew at each end of the formation. It is important that each crew member ensures they understand the crew leader's instructions to the lighting crew. If uncertain, they should ask for clearer instructions.

COMMUNICATIONS

- **Give clear instructions.** Write them down if necessary.
- **Make sure instructions are understood. Get feedback.**
- **If you don't understand instructions given to you, check.**
- **Radios.** Follow established procedures for the use of radios, using standard radio pro-words and, when necessary, the phonetic alphabet.
- If you are in a situation where you are in danger, call the forward control and give a situation report. Problems can occur in contacting control because of other users on the channel. It this case, an **EMERGENCY** call should clear the airwaves. Break into the pause between transmissions using the word **EMERGENCY**. All other radio users must immediately stop using the radio if they hear an **EMERGENCY** call. When the situation has returned to normal, remember to give a further situation report.
- Keep the crew regularly informed of what is happening elsewhere, and keep them informed of the fire situation, the weather and the country they are working in. Remember, weather dominates fire behaviour.
- If you cannot see the main firefront and you cannot communicate with anyone who can—you could be in trouble.

SUMMARY

Teach yourself to observe. Observe fire and the environment around you. Understand how fire may behave, and what the hazards and threats are. Think about how you will react to life threatening situations. Remember

- Wear the correct protective clothing and equipment
- Look after yourself, keep drinking fluids
- Look after your mates
- Maintain your handtools, vehicles and equipment
- Know what to do in an emergency situation

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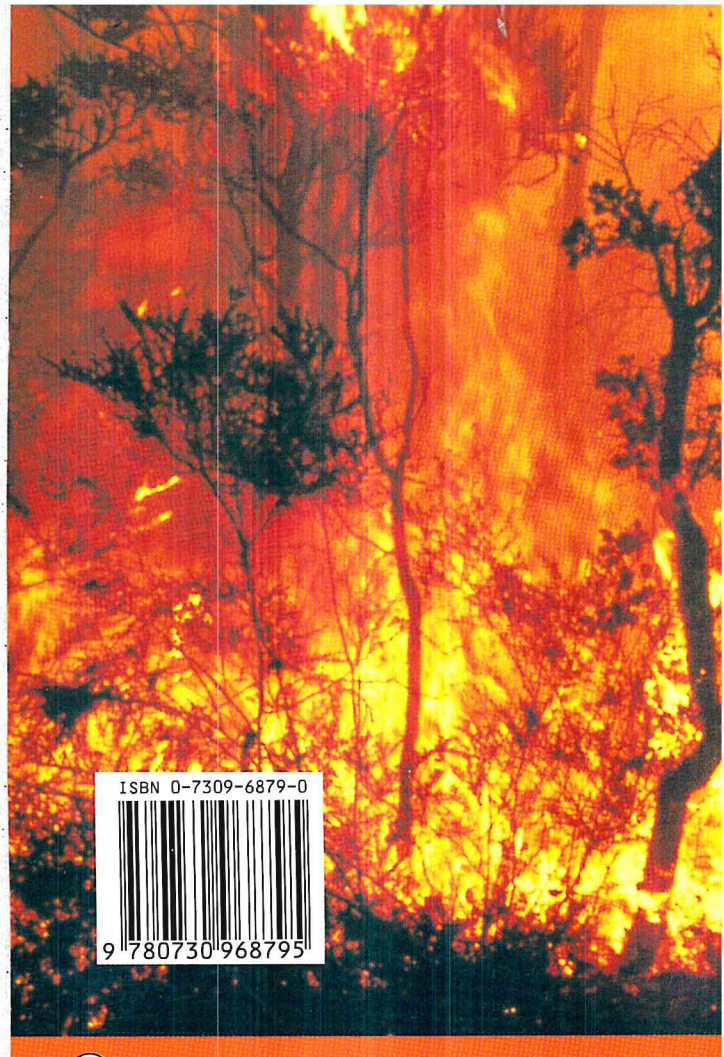

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