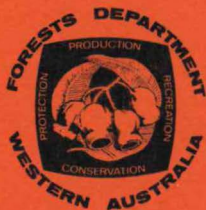


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SAFETY IN PRESCRIBED BURNING



SAFETY IN PRESCRIBED BURNING

To
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of
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Safety is the responsibility of each and every employee. It is the responsibility of the overseer, the employee, the forester, the Divisional Forest Officer. Everybody must be mindful at all times of his own safety and the safety of others about him.

All employees on any job must be alert. If one employee fails to be alert, he may cause harm to himself or others.

It is essential for each employee to know and observe the drill and safety measures set out in this booklet.

The booklet should be carefully retained and re-read from time to time.

I hereby acknowledge receipt of this safety code and I agree to comply with the rules and regulations contained in this book.

Name

Date

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INTRODUCTION

This booklet deals with aspects of prescribed burning of forest areas as practised by the Forests Department. These include:

- Line drill and discipline when doing hand burning.
- Technical aspects of aerial prescribed burning.
- Special features of karri regeneration burning.
- Safety and survival in dangerous fire situations.

The basic safety rules are listed, and must be fully understood and observed by all staff and employees. It is stressed that the fundamental theme is one of discipline—team discipline in formation, and personal discipline.

In fire control work, responsibility for individual thought and action does not cease with acceptance of an order from a senior officer. Responsibility for his own safety, and the safety of workmates, must be accepted by every man on the job.

PRESCRIBED BURNING HAND METHOD

Most methods of prescribed burning involve strip lighting. Strip lighting refers to the lighting of roughly parallel lines of fire at varying distances and set spacings. Distance between lines of spots is determined by an officer or overseer on the day of the burn, by using the forecast for the day and the "Forest Fire Behaviour Tables".

Strip lines are normally lines of spots. Continuous lines of fire will only be used under certain circumstances or conditions that will be decided by the overseer.

Lighting is normally done by two or more men moving in echelon formation, as shown in Figure 1. Where strip width or dense scrub precludes visual or verbal contact between lighters, a compass or other direction finder shall be used to maintain direction, and the lighter will be accompanied by a compass-man. On no account shall the strip length exceed 2000 metres.

In karri forest or other areas of very dense understorey, it may be necessary for parallel walking lanes to be constructed by a bulldozer or other machine, before burning commences. This will be decided by the officer who prepares the prescription.

Signs warning the public that prescribed burning is in progress, must be erected on all roads associated with the burn.

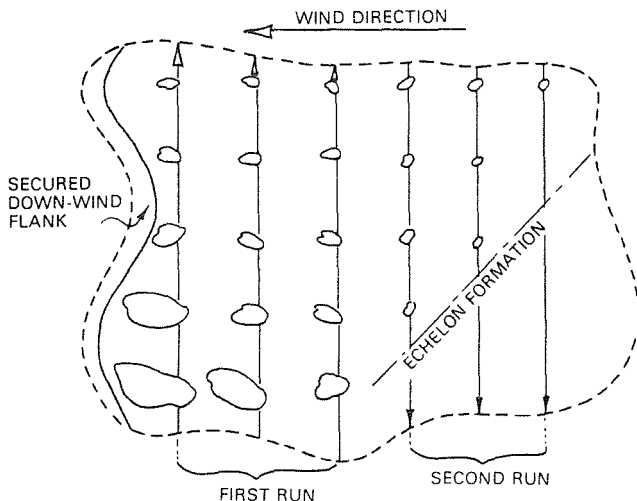


Fig. 1. Spotfire lines and echelon formation.

Inspection Before Burning

An officer must complete a **PRESCRIPTION** for each area to be burnt. The prescription will include an **A.P.I.** plan of the area, showing:

- Boundaries of the burn
- Swamps, creeks and other dangerous areas
- Dieback areas
- Roads, trafficable and non-trafficable
- Private property on the boundary, inside the burn or nearby

- Scale of the plan
- Experimental plots and plantations
- Permits, apiary sites, etc.
- Areas of milling, and pole slash
- P.M.G. and S.E.C. lines

The prescription will be handed to the overseer on the morning of the burn. An officer will discuss the burn with him, explaining information on the prescription which will help to do the job effectively:

- Litter age and tonnes of fuel per hectare
- Forest and scrub types
- Fire danger index, metres per hour prescribed for the burn
- Preferred wind strength and direction
- Remarks on any dangerous areas or special conditions
- Departments, organisations or persons it may be necessary to contact on the day of the burn—the P.A.F.S.O.U. form.

Instructions to Lighters

The overseer or officer directly in charge of lighting must brief all members of the gang before starting each strip line. He must ensure that each man knows exactly what is to be done.

All personnel must be familiar with:

- The area to be burnt, which should be shown on plan and on the ground, preferably by driving round the perimeter while dragging a chain or other marking device. If this method is likely to spread dieback, then

the boundary must be marked by another method such as paint marks.

- The roads and tracks in the vicinity and their point of outlet.
- Features on 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 men in the formation.
- Action to be taken by individuals if they lose contact with workmates.

The overseer should place his most experienced and competent men at each end of the formation. It is the responsibility of the employee to ensure that he understands the overseer's instructions. He must never give the impression that instructions have been understood, if in fact, they have not.

Formation and Direction—Maintenance

The overseer is responsible for seeing that each man starts his strip lines correctly.

After starting the men on their respective lines, he will:

- Check fire behaviour, particularly flame height and rate of spread.
- Contact each lighter on completion of his line.
- Alter spacing for next strips, if necessary.

If a lighter comes upon a dense thicket, swamp, or other obstruction on his line, which he cannot penetrate with safety, he must immediately:

- Stop lighting and extinguish his torch.
- Move around the obstruction and contact a workmate.
- Regain position and recommence lighting if it is considered safe to do so.
- Report the incident to the overseer on completion of the line.

General provisions to help maintain direction and contact are as follows:

- A maximum of five men is allowed in any one formation. This implies that only two, three or four may be used in some situations.
- Brightly coloured protective helmets such as the standard yellow or white types should be worn.

PRESCRIBED BURNING AERIAL IGNITION

The overseer will brief each gang member on the sector to be patrolled and measures that will be needed to control the edge of the burn, e.g. burning-out of unburnt pockets, suppression of hopovers, mopping up; and of additional assistance required for aircraft navigation, such as marker fires.

Gang members are not to enter tracks within the burn after lighting has commenced except with specific advice from the fire boss. A patrol within the burn area may be required prior to lighting, to ensure that no member of the public is unwittingly in the area.

General Provisions

- Observe safe driving procedures—see *Vehicle Safety* section.
- On all roads forming burn perimeter, erect signs warning the public that prescribed burning is in progress.
- Wear clothing as described in *Survival* section.

Verey Pistols

Marker vehicle crews must be conversant with the safety rules for firing of verey pistols:

- Verey pistols must be handled only by personnel who have been fully briefed and authorised to use them.
- They must be fired only when standing on the ground and at an elevation and direction which projects the flare above the canopy of the forest to be burnt.
- The arm should be slightly bent to absorb recoil.
- Pistols must not be loaded until the operator is in a position to fire. Loaded pistols must not be carried in vehicles.
- The muzzle must be pointed down until ready to fire, and must never be pointed at another person. Do not cock the pistol until ready to fire.
- If there is a misfire, cock the pistol and fire again. If another misfire occurs, wait fifteen seconds to avoid flashback, then “break” the pistol with the breech-opening away from the body, and eject the cartridge.
- Verey pistols must be cleaned and oiled after each burn.

- Flares must be kept in the box provided, and not loose in the vehicle. They must not be jarred or bumped, especially near the detonator cap.

Transmission Wires

The aerials on marker vehicles, sometimes called "Beacon aerials" reach some 9.5 metres above ground level, and may make contact with P.M.G. or S.E.C. transmission lines.

- These aerials must not be erected within 60 metres of any power or telephone line.
- Any accident or incident concerning power lines is to be reported to the S.E.C. and the Forests Department Safety Officer immediately.
- On no account should any attempt be made to extinguish a burning pole or cross-arm until notified that the line is electrically dead.

KARRI REGENERATION BURNS

These are usually very intense fires, lit in mid-summer or autumn to promote regeneration in cut-over forests of karri or karri-marri.

There are a number of different techniques used in lighting these fires, but hazards common to all include:

- Smoke and ash in eyes
- Falling limbs and burning debris.
- Uneven ground where it is easy to slip or fall.
- High level of radiant heat.

Safety Measures to be Adopted

- Always wear full protective clothing, particularly anti-smoke eye protection and helmet flaps.
- When stripping-out across logging tops and debris, lighters must always work in pairs, and each pair must maintain visual contact with those on either side.
- Protect exposed skin from radiant heat, with shirt sleeves rolled down, light-weight gloves, and Barrier cream on face and neck.
- Wherever possible, move along snig or dozer tracks in preference to heavy tops. Note the position of open areas such as landings, where temporary refuge can be taken.

SAFETY AND SURVIVAL

Personal Safety

The following clothing will be worn by all officers, overseers and employees engaged on prescribed burning or fire suppression:

- Approved safety helmet
 - Eye protection in the form of spectacles, goggles or face shield
 - Long trousers, preferably of wool
 - Long sleeved shirt, preferably of wool
- Note.* Inflammable synthetic materials, such as NYLON must not be worn.
- Working boots in good condition, preferably approved safety boots.

Avoid recognisable danger areas such as:

- Steep slopes above the fire.
- Dense thickets, swamps or creeks which could become a trap.
- Burning trees.

Develop observation to aid a sense of direction. Note landmarks such as roads, tracks, creeks, ridges, gravel pits, burnt country, etc.

Insist on prior instruction, whether engaged on prescribed burning or fire suppression.

Learn recommended individual survival measures.

Keep physically fit, do not eat or drink more than you require.

Individual Safety Measures

Conserve Energy. Don't panic; panic drains physical and nervous energy and clouds judgement. Don't run unless absolutely necessary.

Shield Body From Radiant Heat. Wear protective clothing as described.

Take Refuge. Light a back-burn and use the burnt country as a refuge. Do this only if there is time for the back-burn to spread sufficiently before the main fire reaches the area. Use gravel pits, clearings in the forest and roads, for this purpose. Lie down on the ground—air is freshest and coolest at ground level.

Move Through the Flames. If it is necessary to do this, and it must be as a LAST RESORT:

- Do not linger in front of the flames.
- Use clothing to the best advantage as a shield.
- Select an opening where flame height is lowest.
- Move through the flames on to burnt ground as quickly as possible.
- Beware always of the danger from burning limbs and trees in burnt country which the fire has just passed.

Finally, to quote from the C.S.I.R.O. publication *Bushfire Sense*:

“In most bushfire tragedies the people are usually dead or nearly dead before the flames actually touch them. By laboratory and field measurements and from the study of case histories of people who have either lost their lives or saved them when encompassed by fire, it is now abundantly clear that radiated heat is the main peril leading to exhaustion and collapse. Radiation causes heat stroke, which is essentially a state of utter exhaustion. Shielding yourself from radiation and desisting from any behaviour or activity such as fear, panic or flight that saps your strength are therefore vital.”

Many of the rules for safety and survival listed, are based on these considerations.

First Aid for Burns

- Avoid handling the affected area more than is necessary. See that your hands are as clean as possible.
- Do not apply lotions of any kind.
- Do not remove burned clothing and do not break blisters.

- Apply clean cold water to the affected area as soon as possible.
- Do not cover or bandage the burned area.
- Immobilise the affected area by suitable means.
- Treat for shock:
 - Reassure the casualty
 - Lie him down, position dependent on injuries
 - Loosen clothing of neck, chest, waist
 - Wrap in blanket, rug, coat, or whatever cover is available
 - If he complains of thirst, he may be given sips of water, tea, etc., but NOT alcohol.

If the casualty is badly burnt, he must be removed for medical aid as quickly as possible. The patient should not be given food or drink unless the journey will take more than four hours, as he will almost certainly need an anaesthetic. Should a delay be inevitable, water with a trace of salt (3 ml to 2 jugs) is the best drink.

First Aid Kits

All gang vehicles and others used during burning and fire-fighting must carry a complete, approved first aid kit, which will include:

- A good quantity of wide bandages
- A packet of common salt.

Overseers or nominated gang members should check these kits once per week to ensure correct quantity of supplies.

Vehicle Safety

Certain measures are needed to safeguard vehicles during prescribed burning or fire suppression operations.

Parked Vehicles. More often than not, vehicles will be parked for a greater 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 easily and safely.
- Left with cab windows closed and all inflammable material stowed away.

If a man is left with the vehicle he should know the outline of the whole operation, what other members of the gang are doing, any rendezvous with the others, and communication schedules.

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:

- Drive at a safe speed.
- Keep cab windows closed
- Switch on headlights and sound horn occasionally.
- Remove exposed inflammable material from truck.
- Men travelling on truck tray should have water available, through a powered pumper, tank or knapsack sprays, and must wear all available items of protective equipment.

Caught with no escape route. Should you be trapped in this situation, the vehicle does offer you the best chance of survival, provided you follow these basic rules:

- 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 adjacent to the vehicle. Do not completely exhaust yourself in doing so.
- Do not attempt to back burn unless you are *absolutely certain* of enough time for success.
- Ensure all windows and doors are shut to keep out smoke, heat and burning embers. 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 rugs, floor carpets, etc.
- Remain in the vehicle for as long as is humanly possible. The flaming or flash period rarely exceeds three to four minutes in a forest fire or 30 seconds in a grass fire.
- 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.

- When you are forced to leave the vehicle keep the exposed parts of the body covered as best you can. Move quickly to the coolest part of the burnt area away from the vehicle.
- Choose a safe spot from falling limbs or trees and take a rest. If possible let help come to you.

Felling Of Burning Trees

- Chain saw and associated tools must be appropriate for the task and maintained in top condition.
- Ensure safety equipment is in good condition and being worn at all times.
- Sector Boss or Overseer to inspect and mark each tree before felling commences.
- Only experienced fellers should be used when felling burning trees. FELLER reserves the right to refuse to fell any tree.
- Inspect nearby trees (within 2½ times height of tree) for dangerous conditions, e.g. burning hollow butts and burning crowns.
- Do not fell trees with multiple burning limbs.
- Ensure debris is removed from work areas to provide space for safe working conditions and give a firm footing.
- 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.
- Avoid felling directly into the sun when it is low on the horizon.
- Swamper, who is an experienced feller must be on hand in reasonable proximity at all times during felling operations.
- Before making back cut, STOP MOTOR, give audible warning to swamper, who must acknowledge area clear before continuing.
- Beware when using hammer and wedges on a tree, as burning limbs are likely to be shaken free.
- When felling is being done near road or track, prominent signs must be displayed each side of danger zone. Lookout man should be posted on track.
- Refuelling or maintenance of saw must be carried out away from danger zone.
- Check with Sector Boss or Overseer if you consider rest period necessary.

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