FIRE CONTROL
in
Western Australia

✦

A Paper prepared for the
AUSTRALIAN FORESTRY CONFERENCE
1949

✦

by
A. J. MILESI

FIRE CONTROL IN WESTERN AUSTRALIA

By A. J. MILESI

Forests are one of Australia's greatest assets and forest fire is the greatest enemy with which the forester in Australia has to contend.

It strikes suddenly and the point and time of attack is unpredictable except within very wide limits. The fight against this destroyer has been waged down the ages and the destruction caused in the past, when nothing like modern methods were available for suppression of fires, has been tremendous.

The terror engendered by bush fires in the past and the seriousness of their implication is demonstrated by the fact that in ancient Lebanon the inhabitants invariably put to death any person who was found, even accidentally, to have been the cause of starting a bush fire.

In the height of summer we foresters sometimes think that there still might be something in the idea. The forester spends his life learning his profession, works hard to build up a properly managed forest, only to see his life's work reduced to a smoking ruin in a matter of a few minutes.

It is from a consideration of these facts that has arisen the modern highly complex fire control organisations. Of fundamental importance to the efficient working of fire suppression organisations are early detection and accurate location of fires; good roads and means of access to all parts of the area, and a well-trained fire-fighting unit provided with suitable equipment and adequate means of transport; the whole held together by a really efficient communication system. Without any of these the remainder becomes only partially efficient, for the secret of success lies in the ability to arrive at the scene of the fires as quickly as possible in order to extinguish the flames and reduce to a minimum the damage that is likely to accrue.

A comprehensive picture of steady progress in building up such an organisation to prevent, detect and suppress fires can be seen in the activities of the Forests Department. The growth can be traced from the early days of horse transport and hand beating, through the speeding up stage of look-out towers and road and firebreak development, to the modern set-up of heavy duty water-equipped motor transport with radio communication.

31523/11/49—500

The true beginning of organised fire control came when the first look-out towers were built in the Mundaring area in 1921. These were linked by a telephone line and the heliograph was used for communication with fire gangs in the forest, but transport was as yet in the primitive stage of horse and buggy. Fire-fighting methods of direct beating with bushes, raking and back-firing were crude and arduous in comparison with methods of today, and the life of the forester in the summer months was a hard one.

The firebreak system and the technique of controlling burning had not yet been developed, and the value of unburnt forest as a factor for increasing timber production was almost unknown to the public of that day.

In our hardwood forests controlled burning will always play a large part in forest protection and to enable this practice to be carried out successfully a main road, feeder road and firebreak system was gradually extended through the forest. In 1927 the system covered 1,093 miles, today its amounts to over 11,000 miles. In parallel with this ran the telephone lines linking divisions, districts and fire towers. Today 1,280 miles are in existence. To complete the practice of controlled burning it was necessary to institute light burning of the bush in advance of areas to be cut by sawmillers and hewers, and to provide for the burning of the resultant debris, advance burning and top disposal.

The stage was now set for the speeding up of the machinery of fire control. The regenerated forests had been provided with means of access in roads, means of communication in telephone lines and means of controlled burning from firebreaks surrounding areas of 500-1,000 acres.

The introduction of motor transport and the pack spray as a fire-fighting unit was the first step towards mobility. It was not, however, until 1934 that the first light duty outfit was used at Dwellingup. A light utility fitted with several pack sprays, 33-gallon tank of water, fire rakes, crosscut saws, axes, water bags and emergency rations, carried a gang of four men; speed and power had been harnessed to lighten the load of the fire-fighter.

With their introduction, however, the fire-fighter had to learn a new technique, so systematic training of fire gangs commenced. About the same time there came a rapid extension of the fire tower network and with it the introduction of modernised equipment for detection, including the use of direction finders, panorams and binoculars. Towers increased in height and in the low, undulating hills of the Karri country, lookout cabins have been constructed in Karri trees up to 200 feet high.

The number of lookouts today is 30 and they cover the forest area from Sawyers Valley to south of Pemberton, with one isolated tower overlooking the Mallet areas at Narrogin; and so speed of detection, communication and suppression, so vitally necessary in fire control, have, to a degree, been obtained.

Later on better roads and better motor vehicles will lead to further improvement.

Another aspect of the bush fire problem has been given attention ---the forecasting of fire weather. In the early days of fire control, it not infrequently happened that numerous outbreaks of fires on days of unexpected high temperature and low humidity caused disorganisation with resultant heavy losses. Sometimes, too, controlled burning was undertaken on days which unexpectedly turned out to be of high fire hazard. To overcome these disabilities and provide a forecast of fire weather from day to day during the summer months, a Fire Weather Research Station was established at Dwellingup in 1934. Working in conjunction with the Divisional Meteorologist in Perth, this station sends out daily a fire weather forecast which is relayed by phone to all divisions, districts, towers and outstations and broadcast over the Departmental radio from Dwellingup at 7.45 a.m. each morning.

This forecast provides a valuable guide to foresters in controlled burning operations and in the organisation of men and materials in periods of high hazard.

With the advent of better roads and the transformation of practically all the firelines surrounding the firebreaks into trafficable roads, the day came when the light duty outfit was augmented by a heavy duty unit capable of supplying up to 200 gallons of water per minute. These heavy duty outfits, coupled with special emergency units delivering up to 650 gallons per minute and manned by trained crews, are capable of combating almost any fire.

The technical knowledge necessary for the handling of this heavy mechanical equipment is provided by regular summer schools of instruction attended by senior officers, foresters, assistant foresters and overseers. Lectures and demonstrations are given on such kindred subjects as fire weather, care of vehicles, fire fighting methods and controlled burning technique. The fire-fighter of today is no longer a man who "belted" a fire with a bush, but a highly trained operator using modern equipment.

The latest addition to the modern fire-fighter's array of equipment is the radio. During the summer of 1946-1947, extensive trials on an experimental basis were made of radio equipment acquired from the Services, chiefly the Navy and the R.A.A.F.

Four fixed stations were operated in conjunction with several mobile units on fire trucks and extremely good results were obtained, the degree of coverage being highly satisfactory. This summer, radio transceivers are standard equipment on all fire trucks, gang trucks, and officers' vehicles, as well as at all Departmental stations.

Communication has been speeded up a step further and direct contact established with the actual fire-fighting personnel.

This is probably the biggest advance in fire control in Western Australia since the introduction of water and power—a spectacular advance from the days of the heliograph and the horse.

So much for the development of the system—This is how it works.

Probably the most important part of the forester's fire control job is fire prevention: that is the all-the-year-round efforts to ensure that during the danger period no fires will start. Our efforts in this direction are directed along two channels—risk reduction and hazard reduction.

Risk reduction, the more difficult, is the attempt to reduce the probability of a fire being started. Little, if anything, can be done about reducing the non-human risk, but by public lectures to bush fire brigades, tourist clubs, schools, the University, local governing bodies and local progress associations every effort is made throughout the year, and particularly just before the commencement of the summer, to make the travelling public thoroughly fire conscious and as anxious as we are to see that they do not start any fires.

Articles in the Press, propaganda films and the annual Fire Prevention Week are also weapons in the fight against the carelessly, man-caused fires. The way is long and hard, but there are encouraging signs that the public is being slowly educated towards the ideal of no uncontrolled fires in the forest.

A further measure of fire suppression practised in this State is the fitting of spark arresters to all steam locomotives and tractors at the beginning of the fire season.

Hazard reduction, the removal of the fuel, if it were practicable and desirable would, of course, be the ideal method of fire control.

However, it is impracticable over large areas of forest, and except in certain circumstances, definitely undesirable. In practice we find that only certain areas of the forest are liable to bush fires, such areas as those adjoining private property, railway lines, main roads and picnic spots. These produce a crop of fires each year, and to minimise the incidence of these fires and to confine those that do start to the smallest possible area, breaks are burnt through, round or along all such danger spots as frequently as they will burn, usually at least once in every three years.

A certain amount of break burning within compartments, subject to high risk, takes place each year and burning to protect mill villages, forest settlements and isolated schools is also carried out.

Presuppression measures, the activities that are necessary to ensure that when a fire does start, the whole organisation is ready to go into action are naturally a routine duty of the field staff.

As soon as the spring controlled burning season commences the towers begin to be manned and when the fire season proper starts, all towers are manned from early morning till after dark and the full radio routine of periodic calls comes into operation.

The lookouts are so dispersed that the whole of the 2,000,000 acres of protected forest is under observation of at least one, usually two, and frequently three towers.

The equipment in use at the present time for the detection and location of fires consists of:—

(1) A plan of the area on a scale of 80 chains to an inch, properly mounted and fitted with a direction finder.

(2) A set of panorams.

(3) A pair of binoculars.

(4) A telephone.

(5) A log book.

The plan is mounted on galvanised iron, varnished as a protection against the weather, and fixed to a soft wood board which is clamped to the top of a cupboard in which the telephone it fitted. The plan is fixed in a perfectly horizontal position and correctly orientated.

A protractor, centred on the position of the tower, is printed on the plan and the centre of the protractor is pierced vertically to receive the rustless steel bar which carries the direction finder.

The direction finder, mounted on this bar, consists of a sighting vane at the top of the bar, at approximately eye level, and a graduated brass arm which rests on the surface of the plan; these two are fixed in the same vertical plane and the arm indicates on the protractor the bearing on which the vane is sighted.

Our ideal being early detection and speedy attack, as soon as a towerman sights the faintest wisp of smoke, a bearing is taken, entered in the log book and communicated to the district office. Cross bearings are obtained from other towers and plotted on the co-ordinating plan at the control centre. The intersection of these cross-bearings fixes the position of the fire, and if it is within protected forest the nearest gang is contacted by telephone or radio and despatched to the fire.

These gangs usually consist of three or more permanent employees under the direction of an overseer. They are regular forest workmen, trained in fire-fighting technique and equipped with a light utility carrying a water tank up to 100 gallons, several pack sprays, a low-down force pump, fire rakes and shovels and fitted with a mobile radio set.

Their job is to extinguish the fire, or if this is not possible, to hold it in check at all costs until help arrives.

Usually while the gang is getting their equipment out of the truck, the overseer makes a quick reconnaisance of the fire, directs the gang to where they are to start and how to go about bringing the fire under control. He then radios a fairly detailed report back to headquarters, establishing the fact that the gang has arrived, and giving such details as exact location of the fire, its size, the type of fuel bed and terrain, and an estimate as to whether the gang can or cannot cope with the outbreak.

The fire is usually attacked with pack sprays and rakes, although if the truck can get close enough, the low-down pump replaces the pack sprays. Usually the gang can bring the fire under control before it has burnt more than a fraction of an acre.

If conditions are very severe, the controlling officer may order a heavy duty outfit to stand by or even proceed to the fire even if the first overseer considered that his gang could handle the situation.

If the fire has gained such proportions when the first gang reached it that they were unable to suppress it or if it eventually got out of hand, a radio call is immediately put through to headquarters, when one or more heavy units, and if necessary other gangs are sent as

reinforcements. No risks are taken in letting a fire gain large proportions. It is found that if a fire is kept small it is comparatively easy to handle, but when it becomes very large, the effort and time taken in suppression is out of all proportion to the increase in the area of the fire.

These heavy duty outfits consist of a 4-5 ton truck, usually with 4-wheel drive, carrying a specially constructed slip-on unit consisting of 600-gallon tank and power pumper.

The power pumpers range in size from small, high speed rotary pumps delivering 15-30 gallons per minute, to larger sizes capable of delivering better than 200 gallons per minute through anything up to eight hose lines. These outfits can utilise the water in the tanks or can pump water from dams or wells and through long lines of hose up to two miles in length.

Equipment such as this, with adequate water supply, is capable of handling almost any forest fire.

It frequently happens that a fire surges up to the forest boundary on a very wide face from private property contiguous to the forest boundary and is already of such magnitude that one heavy duty outfit cannot cover the whole face of the fire. In such an eventuality special emergency outfits, consisting of high powered fire engines, capable of handling hugh quantities of water are brought out and stationed on an adequate water supply. These engines pump water at the rate of up to 600 gallons per minute through up to three miles of hose, and are capable of feeding the units at the face of the fire.

Alternatively, they carry their own supply of 800 gallons.

Every fire is "knocked down" by one means or another and a cleared break constructed round the whole of the periphery. This break is a raked strip in the case of the small fire, but if the fire threatens to assume large proportions, a small bulldozer, on special transport, is despatched to the fire and takes part in the "knocking down" and "mopping up" of the outbreak. These bulldozers have been used for several years now and time and again have proved their worth, especially in the heavy undergrowth found in the lower South-West, where it is a physical impossibility for men to push their way through the more dense areas.

After the fire is "knocked down" the arduous job of putting it out and "mopping up" commences.

Every tree or spar that is alight within five chains of the edge of the fire is either put out or felled, and every log and stump burning close to the raked break must be extinguished with water, completely covered with earth or cut off and rolled in on to the burnt country. It is found that thorough "mopping up" and patrol pay big dividends.

When the fire is considered safe, a patrol is left on the area and the gangs and equipment return to headquarters for overhaul, refuelling and generally refitting. The patrol, equipped with a light unit and radio remain until the fire is completely safe, even up to several days, and a flying patrol is usually made some considerable time after the fire if particularly dangerous conditions develop.

It is felt that it is better to spend several man-days on patrol than very many man-days on re-extinguishing an escape.

Such is a brief outline of the Western Australian fire control set-up; it is not perfect. No fire control organisation is or ever will be. When a fire control organisation ceases to adopt new and improved methods it ceases to function as a worthwhile system. However, the results obtained to date are encouraging and it is our hope that they will continue to be so and our successes in the future will justify our continued expansion.