Firebreaks without erosion: hints to prevent firebreak erosion

Department of Agriculture, Western Australia

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AGRICULTURAL fire risks are now greater than they have been in the past and are steadily increasing with the advance of agriculture in Western Australia.

During the past 20 years the area of cleared arable land and the area under crop have more than doubled. The area of established pasture is four times as great as it was. Pastures and crops are much more productive—and more liable to carry destructive fires than they were.

Because of this growing fire hazard good firebreaks are needed more than ever to protect our greatly increased agricultural assets.

But firebreaks themselves present problems of their own because, if they are not made with care, they can cause serious erosion on some farm land. Such problems can nearly always be overcome by careful planning, special methods of construction and co-operation with local fire authorities.

Firebreaks need not be erosion hazards.

The Bush Fires Board has the responsibility of preventing or fighting fires in Western Australia and its policy on firebreaks is clear:

It is the policy of the Bush Fires Board that all local authorities should issue and enforce firebreak orders suitable to the general conditions existing in the district concerned which will ensure a reasonable degree of fire protection in the district.

Arising from the Royal Commission’s report the Government has directed the Board to take all possible measures to ensure that adequate protection is afforded in every district.

In the framing of general firebreak orders it is necessary that their location be clearly stated and for this reason breaks are usually required inside and along specified boundaries.

The Bush Fires Board, however, encourages local authorities to include in their firebreak orders a proviso to the effect that if for any reason it is impracticable or undesirable to clear firebreaks in the situations required by the order, the owner or occupier concerned should be able to secure approval to provide breaks in alternative situations.

The main aim of the Bush Fires Board is to ensure that each district is adequately protected and that all owners or occupiers of property are required to play their part in providing protection against fire.
hints to prevent firebreak erosion

In some years erosion has turned many firebreaks into gullies and farmers have sought support from the Soil Conservation Service against local government authority orders to make firebreaks which they have considered might cause erosion.

But the interests of all farmers demand good firebreaks so it is necessary to find ways of making firebreaks which will not erode.

Farmers can take several steps towards preventing erosion of firebreaks and local authorities can often help.

Avoiding Firebreak Erosion

Some ideas for avoiding firebreak erosion are given below.

- Ploughed firebreaks on slopes can stop erosion by water action if loops are ploughed every few chains.
- Tillage should leave a rough, cloddy surface on firebreaks. Both implement and speed can be adjusted to give a cloddy surface if the soil is moist and has the ability to form clods. High speed tillage usually leaves soil too fine. A cloddy surface helps to prevent erosion.
- Sands and some other soils will not give a cloddy surface. Ploughing to part bury and anchor grass and stubble in the soil, but leaving some above the surface, is an effective way of stopping erosion by wind. A cover much too thin to burn will stop wind erosion.
- Do not cultivate the same strip every year. Alter the position of the firebreak so that each strip is tilled only once in three to five years; this helps to preserve favourable soil structure and prevent erosion.
- Farm roads which are properly formed, drained and maintained, make good permanent firebreaks, as well as stopping erosion of roads and giving better access to various parts of the farm. (See Department of Agriculture Bulletin 2113 — "Roads Erode.")
Where soil conservation farm planning is adopted fences are placed along natural obstacles to cultivation and areas requiring different grazing management are fenced out. As such a farm plan is progressively adopted better location of firebreaks becomes possible. Farm planning is discussed in Department of Agriculture Bulletin 2592; further details may be obtained direct from district Soil Conservation Advisers.

On paddocks not usually top-dressed, superphosphate applied in strips one or two chains wide along firebreak lines may bring about concentration of grazing and leave too little grass to carry a fire. Doubling super on strips on top-dressed paddocks may give the same result. Old heavy land and pastures liberally top-dressed every year for several years are unlikely to respond to this treatment. There is not enough evidence to recommend this practice but it is probably worth trial as additional support for firebreaks.

Late seeding of strips of oats where firebreaks are required and grazing while the oats are green and other feed dry, has given good results in some cases and is probably worth trial. Cultivation should be kept to the minimum needed for a reasonable seedbed.

In some cases firebreaks can be taken round areas of severe erosion hazard instead of through them, so considerably lowering the erosion risk. Where such changes do not comply with local authority orders, farmers should ask local authority approval for the desired alterations. As there are over 1,500 bushfire control officers and some 3,000 captains and lieutenants of bushfire brigades, such requests should not prove too burdensome for local authorities.

Local authorities may feel it worthwhile to use the wording of the Act in their firebreak orders, “to plough, cultivate, scarify, burn or otherwise clear firebreaks” rather than just “plough,” so permitting breaks to be made as the farmer deems best in each situation.
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Hazards to Avoid

Some erosion hazards for firebreaks warrant special mention.

Ploughing below rocky outcrops or across depressions likely to carry water should be avoided. Plough across a low corner on contour, not right down. Firebreaks on a fenceline which runs diagonally across a slope or roughly level would be safer if accurately on contour.

Refinements

Some farmers have worked out good schemes to give effective firebreak systems with little risk of erosion.

One such farmer has a network of 14 ft. firebreaks totalling over 50 acres on boundaries, creeks and paddock fences. In his district of dense pastures, lightning strike often starts fires in summer and this system confines them to small areas.

Another farmer worked out the following valuable method of avoiding erosion on ploughed firebreaks. This virtually eliminates damage caused by concentration of water down long furrows by interrupting the flow and diverting the water.

While travelling uphill a complete left hand turn is made (see Fig. 1) every four or five chains.

This blocks out the furrow and water is diverted out along the bottom arc of the circle. The water is thus discharged in small quantities.

If there is a steep side slope to the right, the water would run back into the furrow. To avoid this it is necessary to plough as in Fig. 2.

While travelling downhill it is harder to achieve the same result unless the plough has a suitable automatic or screw lift. It is necessary to veer away from the fence

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**FIGURE 1.** Travelling uphill with downhill side to left

**FIGURE 2.** Travelling uphill but, with slope to the right

**FIGURE 3.** Travelling downhill
Loops in a firebreak. The concentration of water down long furrows is interrupted by the loops and discharged in small quantities.

at about 30 degrees until about 1\(\frac{1}{4}\) chains from the fence, the plough is lifted out and after turning (see Fig. 3) the furrow is crossed with the plough dropped while travelling uphill. The line then continues downhill. If two cuts are made only the second cut need be worked in this manner.

In contour banked paddocks the circle is turned above each bank so that the bank will handle the discharged water.

Firebreaks which depend on the cultivation and loosening of the soil to kill vegetation can be made with scarifier, disc harrows or plough. If the methods suggested are used the ploughed firebreak can be made to cope with the heavy rains but breaks cultivated by other implements may not do so.

Value of Good Roads

Probably the safest method is to use a formed road with spur drains for water disposal.
A formed road can be kept clean with a scraper or plough. If all farm tracks are formed into built-up roads and a road is put around the boundary of the farm these would give permanent firebreaks and the comfort and convenience of a stable system of smooth roads to all parts of the farm.

CHEMICAL FIREBREAKS

There are several situations where the use of chemicals is worth considering for making firebreaks:
- Around homestead yards, buildings and houses.
- Beneath fence lines.
- In paddock areas where cultivated firebreaks would be a serious erosion hazard.

A weakness of the conventional firebreak is that there is often a vigorous growth of plants along the fence line. In the case of fire, this area is often burnt, either deliberately or accidentally, with consequent damage to the fence. A chemically treated area alongside and beneath the fence would eliminate this hazard.

There are many places, such as in rocky country or in semi-cleared land, where use of circles or curves in the ploughed firebreaks is impossible. Chemical firebreaks could easily be used in these areas. If the chemical is applied early in the season, for instance immediately following seeding operations, the cost can be minimised.

One example of this practice can be seen in lupin country in the Dandaragan district. Because of the great bulk of lupins in August, one ploughing does not give an adequate firebreak. A spray of 4 oz. of 2,4-D (acid equivalent) per acre is used on firebreaks when the lupins are 6 in. to 12 in. high. There is much less growth to handle with one August or September ploughing following this chemical treatment. Much lupin country is very sandy and wash on firebreaks is little trouble, but with heavy rains bad wash will occur where a continuous furrow is used down a long slope.
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