

by

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INTRODUCTION

Results from a previous study have shown that the equipment commonly used in the Jarrah forest may carry large volumes of diseased soil for considerable distances. The potential for initiating new infections varied greatly between the units tested. Where transfer of logging units from diseased to healthy areas becomes necessary, washing down with a high pressure hose has been recommended. As the effectiveness of this technique has not been tested under operational conditions, it was decided to investigate the quantities of soil carried and spread by washed equipment and to compare these results with those obtained using unwashed units.

METHOD

The tests were run on the following units:

1. Caterpillar D7 Tractor.
2. Caterpillar D4 Tractor.
3. Michigan Tractor Shovel (fitted with fork lift arms).
4. Bedford 7 ton tip truck (one set of duals).
5. Chevrolet 15 cwt. ex. Military truck.
6. Land Rover (Short wheelbase).

The soils were loams in plantation areas not affected by *P. cinnamomi*. Each of the units was bogged in a wet creek crossing and then moved onto a nearby road. They were then thoroughly washed by the driver using one of the standard Heavy Duty pumper units. Where necessary, large clods of earth were chipped away with a crowbar and the units moved forward so as to wash the remainder of the tracks.

The washed units were then walked or driven in second gear for seven chains along a gravelled road. A 50% sample (one track) of all soil falling onto the road was collected, air dried and weighed. At the seven chain mark, any readily removable soil was collected into bins, the unit was washed and scraped thoroughly and the soil removed collected on a tarpaulin. This was subsequently air dried and weighed. The tests were run in the same localities and using the same units as those used in the previous study involving unwashed equipment.

RESULTS

The weights of soil carried and dropped by different types of washed equipment are shown in Table 1. For comparison, the weights carried by unwashed equipment are shown in Table 2.

TABLE 1.
WEIGHT OF SOIL (AIR DRY) CARRIED BY DIFFERENT
TYPES OF EQUIPMENT, AFTER WASHING WITH A HIGH
PRESSURE HOSE.

UNIT	SOIL WEIGHT ON UNIT AFTER WASHING (lbs.)	SOIL WEIGHT LOST BETWEEN 0 AND 7 CHAINS (lbs.)	SOIL WEIGHT ON UNITS AT 7 CHAINS (lbs.)
Caterpillar D7	160	6	154
Caterpillar D4	105	9	96
Michigan Tractor	0.5	0.1	0.4
Bedford 7 Ton Truck	0.2	0.1	0.1
Chevrolet 15 cwt. Truck	Nil	Nil	Nil
Land Rover	Nil	Nil	Nil

TABLE 2.
WEIGHT OF SOIL (AIR DRY) CARRIED BY DIFFERENT
TYPES OF UNWASHED EQUIPMENT

UNIT	APPROXIMATE SOIL WEIGHT ON UNIT AT BEGINNING (lbs.)	SOIL WEIGHT LOST BETWEEN 0 AND 7½ CHAINS (lbs.)	SOIL WEIGHT ON UNIT AT 10 CHAINS (lbs.)
Caterpillar D7	1629	172	1457
Caterpillar D4	697	357	340
Michigan Tractor	181	45	136
Bedford 7 Ton Truck	270	260	10
Chevrolet 15 cwt. Truck	26	19	7
Land Rover	12	3	9

These tables indicate the very substantial weight of soil which can be removed by thorough washing with a high pressure spray. In the case of the D7 and D4 respectively, the weights of soil retained after washing were 10% and 15% of the original soil weights on the unwashed units. With the rubber tyred units, less than half a percent of the original soil weight was retained after washing.

Washing of the D7 was completed in 75 minutes, the D4 in 30 minutes and all rubber tyred units were washed in less than 15 minutes.

DISCUSSION

Once again, the data presented should be used to obtain trends rather than quoted as absolute values. Some soil loss occurred in the washing and collection processes, but these losses were not large and would not materially alter the trends obtained.

Overall, washing down greatly reduced the weight of soil retained on these units and, as a consequence, would reduce their ability to initiate new centres of infection in areas of healthy forest. Rubber tyred units were relatively easy to clean due to their construction and their height off the ground. In contrast, the D7 and D4 retained a considerable weight of soil after washing. Tracked equipment is difficult to clean completely due to the collection of soil in locations such as under the track adjustment spring covers, the top of the engine and transmission underside protection plate, the track shoes and the area around the track pins.

Nevertheless, washing has reduced the weight retained by these units by between 85 and 90% and the actual weight of soil falling onto the road was reduced by over 95%. The greater percentage retention observed with the D4 is probably due to its smaller size which created difficulty in access whilst washing.

The high pressure wash was carried out by the unit's driver. In a number of cases, some readily removable soil on the treads, the rear of the dozer blade and the track pins was missed in the original washing process. It is considered that these results would be quite typical of a reasonably thorough wash carried out under operational conditions. Minor structural modifications to some of these units should be considered, so as to reduce the weight of soil collected and assist the washing process.

CONCLUSIONS

1. A washed caterpillar tractor will still carry some diseased soil, but is much less likely to initiate new infections than is an unwashed tractor.

2. From a hygiene viewpoint, rubber tyred logging units are to be preferred. These units will collect less soil, are more efficient at self cleaning and are much easier units to wash thoroughly.
3. Minor structural modification to the tracked units should be considered in order to facilitate the washing process.
4. Washing down should only be used where absolutely necessary. It is much more efficient and less costly to plan the operation so as to avoid cross travel rather than to rely on washing as the only hygiene measure.
5. To be effiecient, washing down must be carried out conscientiously and large clods should be chipped away with a bar.

It would be preferable to wash tracked units on boards, moving the unit forward during the washing process so as to clean the portion of the tracks previously in contact with the ground. The unit should then be moved one or two chains in order to dislodge any soil missed in the washing process and this soil should then be removed by a short rewash. Using this technique it should be possible to remove over 90% of the original soil on even the most difficult units.

ACKNOWLEDGEMENT

The writers wish to thank the D. F. O. 's and staff of the Mundaring and Dwellingup Divisions for their assisstance with this study.