

# Biodegradable roads

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## Abstract

This project assessed whether mulching windrows of waste wood from right-of-way logging could produce an all-weather road surface for in-block roads. Three in-block spur roads in the Alex Fraser Research Forest at Williams Lake, B.C., were divided into three 50-m sections with: (1) waste wood collected from a 40 m right-of-way, (2) waste wood collected from a 20 m right-of-way, and (3) no waste wood. A gravel truck was loaded to produce drive axle loads similar to a loaded logging truck and was used in the cyclic loading of the test road. The mulched wood roads clearly out-performed the soil roads. Failure occurred in the mulched wood roads at points of localized rutting in weak spots within the mulched layer. In an operational setting, the weak spots could easily be filled by hand or with a skidder blade.

**KEYWORDS:** *Alex Fraser Research Forest, all-weather roads, in-block roads, mulched wood.*

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## Introduction

The objective of this project was to assess whether mulching windrows of waste wood from right-of-way logging could produce an all-weather road surface for in-block roads. Using mulched wood for the road surface reduces the environmental impact of in-block roads because:

1. it does not produce fine sediments,
2. the permeability of mulched wood is much higher than for most gravels and sand, and
3. it poses less of a barrier for reforestation.

## Methods

This project was conducted in the Alex Fraser Research Forest at Williams Lake, B.C. Three in-block spur roads were divided into three 50-m sections with the following treatments:

- waste wood collected from a 40 m right-of-way,
- waste wood collected from a 20 m right-of-way, and
- no waste wood.

The waste wood from the right-of-way was windrowed along the centerline using a John Deere 1270 Feller Processor. A Gyro Tech GT-25 mulcher was used to mulch the waste material (Figure 1).

A gravel truck was loaded to produce drive axle loads similar to a loaded logging truck and was used in the cyclic loading of the test road (Figure 2). Using the gravel truck permitted rapid application of multiple



FIGURE 1. Gyro Trac GT-25 mulching windrow of waste material.

*This project assessed whether mulching windrows of waste wood from right-of-way logging could produce an all-weather road surface for in-block roads.*



FIGURE 2. Cyclic loading tests of mulched wood road.

axle loads during a period when the subgrade was saturated. The gravel truck used in this study had a combined drive axle load of 18 750 kg and a steer axle load of 6970 kg. The gravel truck was instructed to retrace its path for each pass along the road, and no action was taken to repair ruts as they formed. Failure of a road section was considered the point when the gravel truck was unable to move, or when the driver was unwilling to risk damage to the truck. In this study, the gravel truck remained loaded while travelling in both directions along the road; therefore, a pass was considered a one-way trip over a road section.

## Results

The mulched wood roads clearly out-performed the soil roads (Table 1). Failure of the mulched wood roads was due to localized rutting at weak spots in the mulched wood layer, and the weak spots were more frequent in the sections with the 20 m right-of-way. In an operational setting, the weak spots could easily be filled by hand or with a skidder blade, which would increase the performance of the 20 m right-of-way roads significantly.

**TABLE 1.** Number of vehicle passes required to cause road failure

Spur no.	40 m RW	20 m RW	No Wood
1	70	10	1
2	112	6	1
3	86	46	1

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