



# Portable windrow rock crusher can reduce road maintenance costs

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Forest managers understand the importance of having properly maintained roads. Environmental impacts, haul cycle times, equipment maintenance costs, grading costs, and crew transportation costs can all be reduced with a well-maintained road.



Ed Proteau photo

The BH-1220 Rockbuster, a hammer mill crusher that processes windrows of oversized waste rocks and boulders obtained from ditches and road edges.

A well-maintained road requires good surface material. Getting the proper surface material may require setting up a rock-crushing operation in a central pit and hauling the crushed or pit-run material to the site. However, trucking costs can make this costly.

A recent innovation

in road maintenance is to use portable windrow rock crushers. One such machine is the BH-1220 Rockbuster, a hammer mill crusher that processes windrows of oversized waste rocks and boulders obtained from ditches and road edges. This machine is manufactured in Australia and has been used there for about 30 years.

I recently viewed the BH-1220 Rockbuster at the UBC Malcolm Knapp Research Forest where it was being operated by Dacon Equipment Ltd. of Mission. The machine consists of two pieces of equipment: an agricultural tractor pulling the hammer mill crusher. A Caterpillar 3306 turbocharged engine powers the crusher, driving four hammer shafts which are attached to 18 heavy cast hammers, each weighing 20 kg. The hammer shaft spins up to 200 kilometres per hour, providing the force that enables the hammers to smash rock. A crushing chamber, which can be hydraulically raised or lowered, encloses the hammers and is equipped with removable plates, as well as safety chains and rubber flaps that allow other nearby equipment to operate safely.

The crushing process with the BH-1220 Rockbuster is as follows:

1. A grader or rubber-tired backhoe pulls the oversized rocks and boulders from the ditch to

the centre of the road to form a windrow that is approximately 1 m wide by 0.5 m high.

2. Next, the agricultural tractor pulls the BH-1220 Rockbuster up to the windrow. The operator hydraulically lowers the crusher to the desired height, where the hammers just clear the height of road. Then, the operator moves onto the crusher to engage the clutch of the crusher.
3. The tractor pulls the crusher over the windrow and the crushing starts. The tractor keeps a steady speed of 300 to 500 lineal metres per hour. A separate set of instruments, mounted in the tractor, allows the operator to monitor the crusher's rpm, oil pressure, and water temperature.
4. At the back of the machine, a consistent pile of crushed material 130 cm wide x 20 cm long is laid out with a crush size of 75 mm (3 in) minus.
5. The crushed material is usually graded before the oversized material is pulled from the outside of the road to create a windrow in preparation for a second pass.

Crushing is done in three different ways: hammers strike the rocks, rocks thrash upwards in the crushing chamber, and rock particles hit other rock particles during crushing.

The size of the crushed material can be varied by adjusting the tractor's speed. Depending on rock hardness, hammers last from 5 to 18 hours and can be changed in about 1 hour. Crushing time varies from 2 to 5 hours per kilometre, depending on the type and size of material being crushed and hammer wear. Total cost of crushing varies from \$1,000 to \$2,500 per kilometer, based on a one-windrow pass, with two passes being the norm. Mobile crushing works well in conjunction with a ditch-cleaning project because wood and other debris are eliminated in the crushing process.

**Doug Bennett** of FERIC's (the Forest Engineering Research Institute of Canada) Western Division conducted a series of studies examining the use of a portable windrow rock crusher in Mission and Maple Ridge. A FERIC Advantage report will be published later this year. 🌲

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