

Equip Tips

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United States
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Forest Service
Equipment
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Center—San Dimas, CA

Modifying A Commercial Rock Rake For Road Maintenance Projects

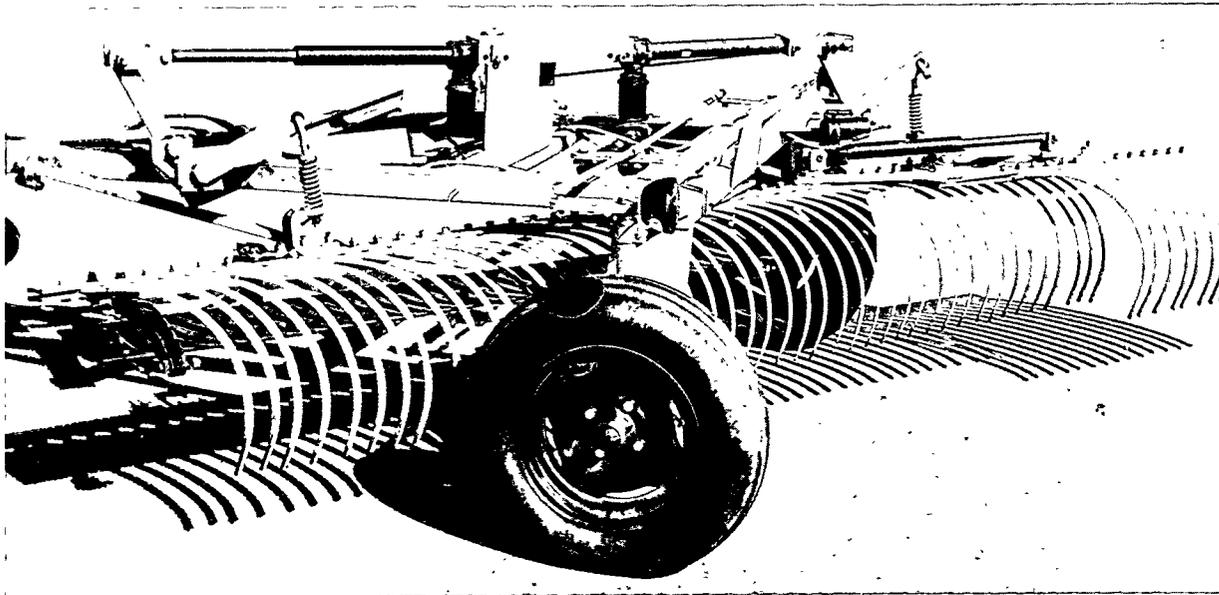


Figure 1. Model RB rock rake with electric actuators added.

Many National Forests are using a commercially available trailer-towed rock rake as a road maintenance tool; namely, the model RB (formerly the RA) rock rake manufactured by:

York Modern Corporation
1 Watson Street
Unadilla, NY 13849
Telephone: 607/369-2631

- Height: One for each end of the rake to raise, lower, hold, or exert down pressure
- Right-End Extension: To change the width of the rake (fig. 2)
- Trailer Wheel Steering: To place the rake up to 6 feet off track.

The York rake can be towed behind a ½-ton pickup truck. All height and extension adjustments to the rake have to be performed manually—the driver of the towing vehicle must stop, leave the cab, and change the rake controls. This is a tedious, time-consuming process.

ADDITION OF ELECTRIC ACTUATORS AND THEIR CONTROLS

The San Dimas Equipment Development Center (SDEDC) has modified the York model RB rock rake (fig. 1) by (1) adding four electric actuators to it and (2) placing a control for each actuator inside the cab of the towing vehicle. The actuators perform the following adjustments:

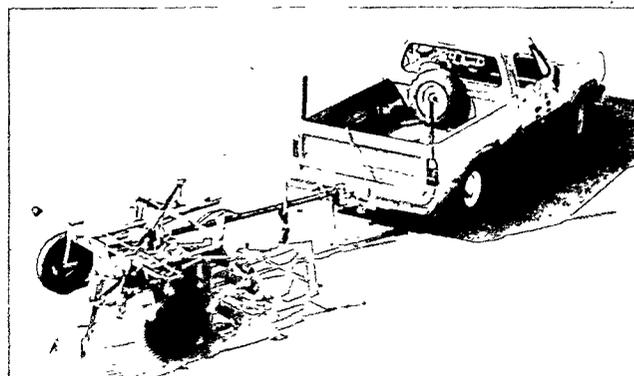


Figure 2. Fully retracted rock rake.

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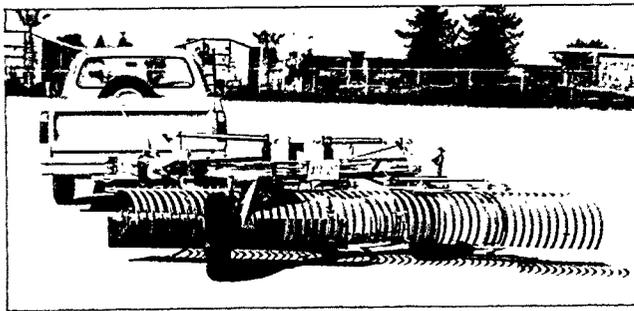


Figure 3. Fully extended rock rake in offtrack mode.

The spacing between the two rake wheels has to be increased by approximately 4 inches to accommodate the steering mechanism. The rake can offtrack (fig. 3) to either side of the towing vehicle. This enables the truck to stay on the roadway while the in-the-cab driver is maneuvering the rake.

Several firms offer suitable actuators. SDEDC obtained direct-current, linear ones—having a 12-inch stroke and a 1,000-pound force capacity—from Warner Electric Brake and Clutch Co. at a cost of approximately \$400 each. Only those actuators for desired adjustments need to be purchased and added, since each is independent of the other. SDEDC's cost to modify the model RB was:

Materials

Actuators, four	\$1,600.
Electrical parts	100.
Mechanical parts	100.

Labor

80 hr, machine/fabricate.	1,200.
8 hr, electrical.	120.
	\$3,120.

Data indicate that, when all four actuators are added, productivity of the York trailer-towed rock rake increases by at least 13 percent. Drawings that show how to add electric actuators to a model RB rake and controls to the cab of a towing vehicle are available from SDEDC upon request.

OTHER MODIFICATIONS RECOMMENDED

Whether or not the electric actuators are added, the York rake can be modified to improve its efficiency as a road maintenance device by:

- Replacing the standard implement tires with 165R15 tires filled to 20 psi (maximum) to obtain better handling and less tire wear.

- Attaching braces along the teeth of the rake to lessen chances of teeth breakage.
- Reinforcing the tips of new teeth by welding old worn or broken teeth to the new ones before installing the new teeth.

Braces for the rock rake teeth can consist of two 1½- by ¼-inch steel straps held in place by 3/8-inch nuts and bolts (fig. 4). The straps should be placed 3 inches from the main rake frame. The braces lower the teeth breakage rate, help stabilize the rake, and act as a safety device in that they hold in place some broken teeth that would otherwise fly off. Also, broken teeth should be saved and welded to new teeth as a reinforcement (fig. 5) before the new teeth are installed on the rake.

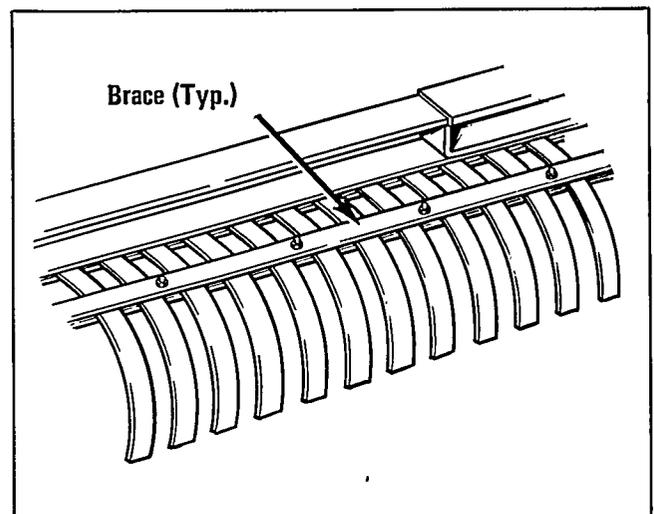


Figure 4. Bolted steel straps brace rock rake teeth.

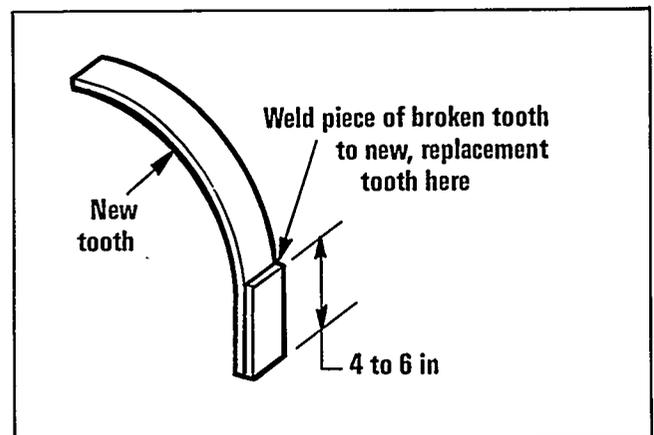


Figure 5. Welded on broken tooth reinforces new tooth.