



## Trail Buster: Portable Powered Fireline Builder

*Vince Welbaum, Helitack Supervisor; and Keith Windell, Project Leader*

The Trail Buster (Figure 1) is a gas-powered portable line digging machine. The tool can build fireline and recreational trails. It is powered by a Husqvarna Model 36 chain saw powerhead and is made by Ponsness/Warren of Rathdrum, ID. The machine costs about \$1,275, including the power head.

The Missoula Technology and Development Center (MTDC) organized a field evaluation of this machine based on a positive review by the Montana Department of Natural Resources and Conservation (DNRC). The DNRC

used the Trail Buster for fireline construction. In addition, they said the machine was very effective for helping mop up fires when it was used in conjunction with water from fire trucks. The manufacturer has received positive testimonials from loggers who used the machine to build firelines around logging units.

### Field Evaluation

The field evaluation was conducted by fire crews from the Payette National Forest, New Meadows

Ranger District (ID); the Chugach National Forest, Seward Ranger District (AK); the Wallowa-Whitman National Forest, LaGrande Ranger District (OR); and the Umatilla National Forest, North Fork John Day Ranger District (OR). The Trail Buster was used throughout the 1999 season on firelines for prescribed fires (Figure 2), for recreational trail projects (Figure 3), and for fireline construction during wildfire suppression.

The evaluating crews were trained in maintenance, safety, and use of the Trail Buster by the factory representative and MTDC. Crews were encouraged to practice with the machine before time and motion data were collected. They were instructed to keep track of:

- Productivity.
- Safety concerns.
- Machine breakdowns or stoppages.
- Problems encountered.
- Operator's comments.
- Overall impressions.
- Special niches the machine may fill.
- Improvements needed.

All crews were given an evaluation form to document their findings and suggestions. This Tech Tip summarizes their findings.



Figure 1—The Trail Buster being used to construct fireline for a prescribed fire.



Figure 2—Fireline constructed with the Trail Buster.



Figure 3—Dust will fly when the Trail Buster is used in dry soils.

## Results

### Productivity

Tables 1 and 2 summarize the productivity of the Trail Buster during the 1999 field evaluations.

### Safety Concerns

The need to “pull back” on the machine in a raking motion was a concern for most operators because the machine would come close to the forward foot. Rocks and large buried material (such as roots) would make the machine act erratically, affecting operator control. The amount of material thrown behind the machine could be dangerous. No one should be allowed within 50 feet of the operator. One evaluator noted that heat from the muffler was beginning to melt the shoulder harness.

### Machine Breakdowns or Stoppages

Machine breakdowns were minimal. When the machine was first used, a couple of screws began backing out. After the screws were tightened, no further problems were encountered. In heavier fuels and tall or green grass the head clogged with material, stopping it (Figure 4).

Table 1—Productivity of the Trail Buster when used to construct fireline on prescribed fires and a wildfire during 1999 on the North Fork John Day Ranger District (OR).

Reporting unit	North Fork John Day Ranger District			
	Wildfire line construction	Prescribed fireline	Prescribed fireline	Prescribed fireline
Machine task				
No. of operators	1	5	4	7
Percent slope	5 to 15%	0 to 5%	0 to 60%	0%
Aspect	—	—	—	—
Vegetation present	Ponderosa pine with some Douglas-fir, pine grass, needle mat.	Douglas-fir, ponderosa pine, light grass.	Fir, pine, thick grass with some timber litter.	Lodgepole pine regeneration, huckleberry.
Site conditions	Few surface rocks. 2 to 4 inches of soil/grass/needle mat.	Rocks with light grass and timber litter.	Thick grass, brush roots, timber litter, rocks. Ground was damp.	Scab flats, rocks, brush, and grass.
Average width of line cleared	12 inches	10 to 12 inches	6 to 12 inches	12 inches
Average depth of line cleared	4 inches	0 to 4 inches	2 to 6 inches	6 inches
Length of line constructed	260 feet	2000 feet	2000 feet	150 feet
Average line production per hour (includes operator rest breaks and machine downtime—excludes lunch break)	780 feet/hour [machine only operated for 20 minutes]	400 feet/hour [5 hours on work site—excluding lunch break]	286 feet/hour [7 hours on work site—excluding lunch break—broken down for 1 hour during that period]	50 feet/hour [3 hours on work site—excluding lunch break]
Percent machine downtime	0%	0%	14.3%	0%
Quality of line	Excellent	Acceptable	Acceptable to unacceptable.	Excellent

Table 2—Productivity of the Trail Buster when used to construct prescribed firelines and trails during 1999 on the La Grande (OR), Seward (AK), and New Meadows (ID) Ranger Districts.

Reporting unit	LaGrande Ranger District	Seward Ranger District	New Meadows Ranger District	New Meadows Ranger District	New Meadows Ranger District
Machine task	Prescribed fireline	Prescribed fireline	Prescribed fireline	Recreation trail	Walkway to heliport
No. of operators	2	4	2	4	10
Percent slope	0 to 20%	5 to 10%	20%	0 to 10%	0%
Aspect	South	West	East	South	Flat
Vegetation present	Douglas-fir, grassy brush understory, heavy duff, kinnikinnick.	Calamagrostis grass, fireweed, alder, mixed hemlock, and spruce.	Ninebark, grass, ponderosa pine, and ceanothus.	Tall grass, bunchgrass	Grass
Site conditions	Dense brush, decayed wood concentrations.	Thick roots, grassy, and a few rocks.	Primarily green brush.	Existing trail with some rockand rough uneven ground	Helibase site
Average width of line cleared	12 inches	16 inches	30 inches	30 inches	40 inches
Average depth of line cleared	6 inches	2 to 3 inches	2 inches	2 inches	5 inches
Length of line constructed	500 feet	1200 feet	200 feet	400 feet	300 feet
Average line production per hour (includes operator rest breaks and machine downtime—excludes lunch break)	330 feet/hour	150 feet/hour [8 hours on work site—excluding lunch break—broken down for 3 hours during that period]	80 feet/hour [2½ hours on work site—excluding lunch break—broken down for 20 minutes]	100 feet/hour	30 feet/hour, operators switched off every 10 minutes.
Percent machine downtime	10 minutes of machine downtime [percent could not be calculated because rest break data not recorded]	38%	13%	5% each hour stoppage to clean out head due to clogging from grass.	No downtime
Quality of line	Acceptable to unacceptable	Unacceptable	Unacceptable	Acceptable	Acceptable



Figure 4—Tall grasses occasionally get tangled up in the Trail Buster head and must be removed. Inset: grass roots wrapped around digging head.

## Problems Encountered

Vibration was discussed in many of the evaluations. Vibration limited the time that operators were able to use the Trail Buster. Back fatigue was a major factor—especially for taller operators—because of the machine’s weight, its length, and

the techniques used to operate it. Operators had best results when standing downslope of the Trail Buster and pulling the debris toward them. Working the Trail Buster on flat ground was harder on the back. Standing upslope of the

machine during operation was very difficult. Especially in hard-packed soils, the machine would tend to ride on top of the ground. The Trail Buster did not dig in until it was turned on an angle to “cut” the top few inches of ground litter. Controlling the machine was a problem, especially on slopes.

## Operator's Comments

Hard-packed ground and slight slopes affect the operator's ability to control the Trail Buster.

An unusual amount of energy is required to operate the unit on sloped, rocky areas or on hard-packed ground.

Interesting idea, but human output with handtools is far more productive than the Trail Buster.

Machine works well but requires that operator is above-average size, strength, and conditioning.

I'd like to be 24 years old again if I had to operate it daily.

It worked well in open areas and light slash; it did have a lot of vibration.

When digging fireline you have to be sideways of the line so you're always working in brush and not in the fireline.

Takes three to four passes over the same stretch of line.

This equipment would be difficult to pack long distances.

## Overall Impressions

The general consensus was that this machine is very heavy (45 pounds—as tested, full of gas), awkward, takes numerous passes to dig adequate line, and is very strenuous to operate, especially on the operator's back. Vibration limited the time that an operator could use the Trail Buster. Many breaks were needed to rest the operator's arms and back. Downtime due to breakdowns was minimal.

## Special Niches the Machine May Fill

The Trail Buster seemed to work better on existing trails that needed to be leveled or have material scraped from the surface. The machine works well on flatter surfaces and would be advantageous in recreational areas such as campgrounds or for established trails that need a "facelift." Another possible use may be for scalping tree planting sites.

## Improvements Needed

The digging head may need some sort of tooth configuration for digging through the topsoil. The machine seemed to ride on top of the compacted ground, requiring operators to tip the machine at an angle so the edges of the cutters could dig in. Another suggestion was to lengthen the machine by about 10 inches and to make the handle adjustable so that it could be positioned on either side of the belt/chain housing. Persons working on a slope could place the handle in a position that increased their comfort. An adjustable handle would also allow operators to switch hands, reducing fatigue. The strap system used to carry this machine needs to be improved. The Trail Buster is very heavy and awkward to carry long distances. A rubber flap along the bottom of debris guard could help protect the leading foot. If possible, the machine needs to be lightened.

## Discussion

Most of the comments compiled during this field evaluation were negative, although a few operators praised the machine for its ability to move a lot of dirt. One evaluator commented that the machine worked well in open areas and light slash, but that it had a hard time cutting through thick grass and short brush. Another evaluator who used the Trail Buster for 20 minutes on a wildfire claimed that it was two to four times faster than a 3-person crew. This evaluator was the only one who recommended the Trail Buster (for use on fires smaller than 5 acres and for mopup). All other evaluators had less than enthusiastic views of the Trail Buster as a fireline construction tool. Some evaluators were concerned that the machine predisposed the operator to lower back or foot injuries.

## Conclusions and Recommendations

Most evaluators opposed adding this machine (as currently designed) to their arsenal of fire suppression equipment. If most or all of the equipment modifications suggested by the field are incorporated, the Trail Buster may have a future on the fireline. Until that time, the Trail Buster is not recommended for general fireline construction.

## About the Authors...

**Vince Welbaum** is the helitack supervisor for the Price Valley Helitack on the New Meadows Ranger District of the Payette National Forest. He has a forestry degree from Kings River Community College and has worked in fire control for the Forest Service for the past two decades.

**Keith Windell** is a Project Leader for reforestation, fire and residues projects. He has a bachelor of science degree in mechanical engineering from Montana State University, as well as an extensive field background. He has worked for the California Department of Forestry, Bureau of Land Management, and the Forest Service.

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USDA Forest Service  
Missoula Technology and  
Development Center  
5785 Hwy. 10 West  
Missoula, MT 59808-9361  
Phone: (406) 329-3978  
Fax: (406) 329-3719  
OpenMail: pubs/wo\_mtdc  
Internet: pubs/wo\_mtdc  
@fs.fed.us

For more information on the Trail  
Buster contact:

Ponsness/Warren  
S 763 Highway 41, P.O. Box 8  
Rathdrum, Idaho 83858  
Phone (208) 687-2231  
Fax: (208) 687-2233

## For additional technical information, contact Keith Windell at the address above.

Phone: (406) 329-3956  
Fax: (406) 329-3719  
OpenMail: kwindell/wo\_mtdc  
Internet: kwindell/  
wo\_mtdc@fs.fed.us  
Lotus Notes: Keith N Windell/  
WO/USDAFS

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