

Improved Handtools for Site Preparation

Ben Lowman

Mechanical engineer, USDA Forest Service, Forest Service Equipment Development Center, Missoula, MT

Manual site preparation will continue to play an important role in reforestation efforts in the years ahead. New, more efficient handtools are now available that can make this labor-intensive, expensive task more cost effective. Tree Planters' Notes 37(2):12-14; 1986.

Hand scalping for site preparation before planting trees is a common practice in reforestation. Hand scalping is labor intensive and expensive, but it is well suited for steep slopes. Production rates are usually low, but workers are able to select the most favorable microsites for the tree seedlings.

Our contacts with land managers indicate that hand scalping will continue and may even increase as timber harvesting moves to steeper sites that make mechanical site preparation more difficult or impossible.

Because hand scalping will continue to play an important role in reforestation efforts in the foreseeable future, Forest Service Timber Management asked the Missoula Equipment Development Center (MEDC) to undertake a search for more efficient and effective handtools that would help reduce hand scalping costs.

Initial investigation uncovered a unique handtool that had been developed by Gordon Reinhart, a Forest Service fire management officer on the Umatilla National Forest in Pendleton, OR. This tool,

known as the Reinhart grubbing tool, was developed initially for fireline construction but is also used for scalping. A tool that can quickly and efficiently scrape away vegetation to mineral soil to build fireline is also a good tool for site preparation. Reinhart's grubbing tool was constructed using a fire

shovel and reversing a shortened blade and replacing the shovel handle with an adze handle (figure 1).

Joe Bruzda, a former Forest Service employee, redesigned the Reinhart grubbing tool and began manufacturing his version under the name Fyr-Tamer (figure 2).

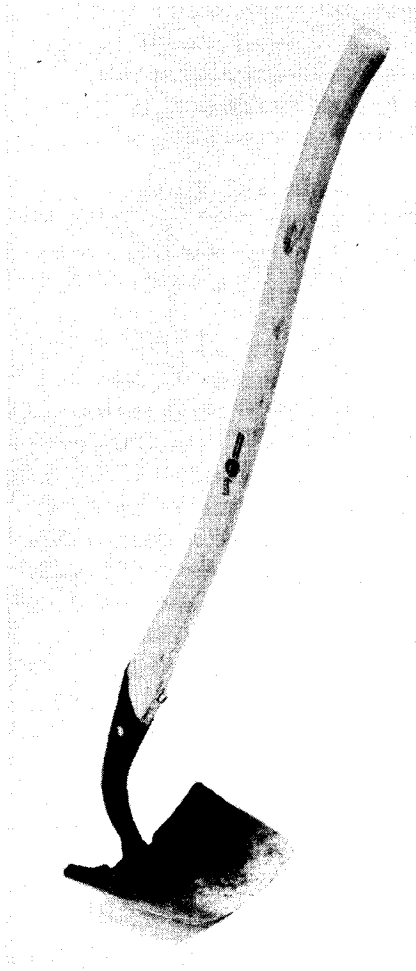


Figure 1—Reinhart grubbing tool.



Figure 2—Fyr-Tamer.

To determine how scalping tools like the Reinhart grubbing tool and the Fyr-Tamer compared to conventional tools for site preparation and fireline construction, MEDC conducted two evaluations.

In the first, the Reinhart, Fyr-Tamer, and a tool built by MEDC called the modified Reinhart (figure 3) were sent to Forest Service planting crews on ranger districts in four western regions for evalua-

tion. The Reinhart was modified by using an entrenching toolhead with a number 0 shovel blade welded to it and replacing the handle with an adze hoe handle.

Responses to all the tools were favorable. Most crew members preferred these tools to those they had been using. Increases in production of up to 30 percent were reported.

In the second evaluation, Center personnel compared these three new tools with the adze hoe, Pulaski, super Pulaski, and McLeod for performance and human energy cost efficiency. The results indicated that the Reinhart, modified Reinhart, and Fyr-Tamer are as efficient or more so than these conventional tools for digging fireline.

The evaluation further suggested that although the three new tools were efficient, they did not represent the optimum design possible. Field users had identified some deficiencies in the tools. As a result, MEDC designed a "combination" tool (figure 4) that corrected these shortcomings with a longer handle and a blade that had a more modified curve to increase efficiency and production.

A followup field evaluation of this "combi" tool indicated it is much closer to an optimum design for a scalping tool. The Center worked with a toolmaker to refine the design for actual production. Manufacturing specifications were written and 300 "combi" tools were produced for fireline construction evaluations during the

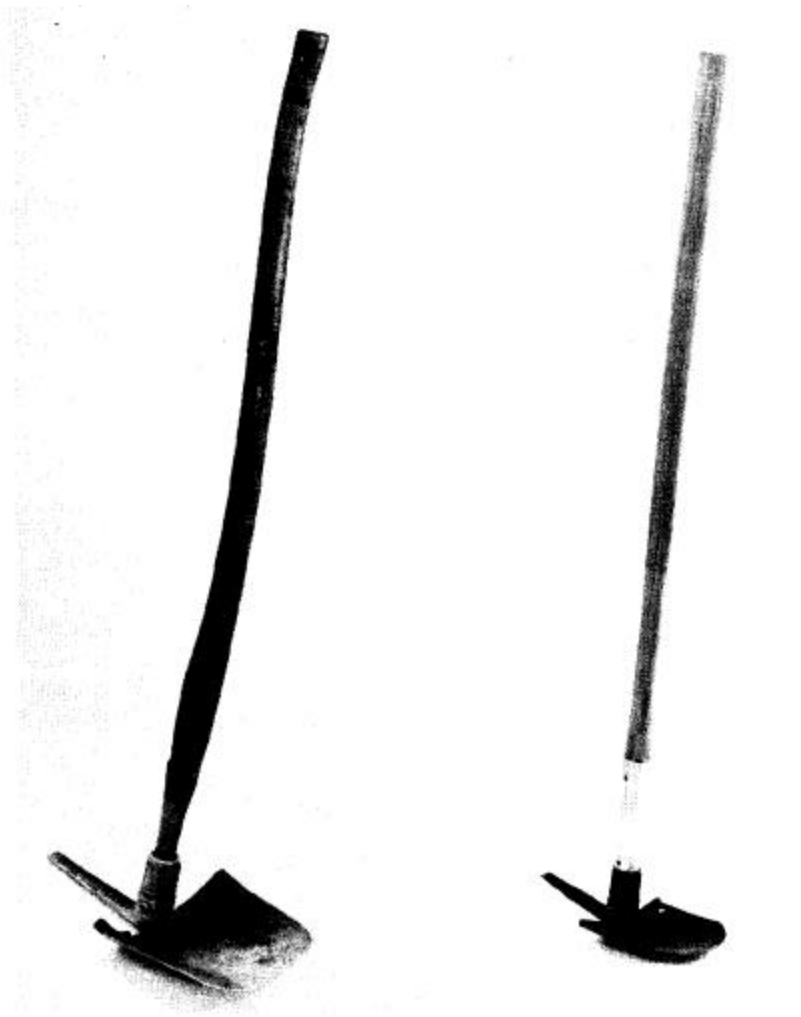


Figure 3—Modified Reinhart grubbing tool.

Figure 4—Combination tool.

1985 fire season. This tool should be available from the General Services Administration by the spring of 1986 for under \$30.

Construction drawings for the Reinhart grubbing tool and the

modified Reinhart tool may be obtained from the Center (request drawing number MEDC-674). The Fyr-Tamer is available from Fyr-Tamer Distributing, 30144 East Woodward Rd., Troutdale, OR

97060; (503) 695-4778.

For land managers faced with replanting steep sites, these new handtools represent a more efficient, cost-effective means for site preparation.