

# Repair of Tractor Parts by Welding

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**Contents in Brief**—Modern welding methods to repair various parts of a crawler tractor are outlined step by step. Data are made available as to the man hours of work necessary to rebuild each part, the cost of each repair, and the amount of wear that can be expected from the repaired member as compared to new parts.

**CONSERVATION OF STEEL** and the need to keep every piece of construction equipment operating has made arc welding more valuable than ever before as a means of quick and inexpensive repair of tractors, shovels and other heavy machinery. In rebuilding and resurfacing worn or broken tractor parts this process has found wide application.

Principal advantages of this method include: (1) The iron and steel saving is 90 percent or more of the weight of the worn parts, because the electrode required for the reconditioning work seldom amounts to 10 percent of the part's weight; (2) valuable time is often saved, as compared to waiting for new parts; (3) correctly reconditioned parts usually wear 20 to 100 percent longer than new ones, if the right types of electrodes are used, since the deposited metal is harder and more wear-resistant than the original; and (4) large money saving is possible because resurfacing by arc welding costs less than the new parts. See Table 1.

As an illustration, this article will discuss techniques and electrodes used in resurfacing the worn parts of a large crawler-type, diesel tractor. The electrodes recommended for certain applications and used in the repairs for which costs are given are suggested by the author out of his experience. Other makes of electrode, however, are also suitable. Thus, Lincoln Wear-weld, Airco 91, Champion Wear-Devil A, Metal & Thermo Co's. Rolex 450, or any other electrode suitable to resist severe impact and moderate abrasion could be substituted for General Electric W-93, and any electrode meeting AWS-ASTM Filler Metal Specification E6010 for General Electric's W-22.

Likewise, Stoddy Self-hardening, Haynes-Stellite's Hascrome or any drawn type, hard-surfacing, high-carbon electrode, containing 4 percent chrome and 2 percent molybdenum and resistant to a combination of impact and abrasion could be used in place of American Manganese Steel Co's. Economy. For the Moly-H electrode, which is made by Chicago Hardware Foundry Co., few substitutes are known, but an alloyed, cast-iron electrode, containing approxi-

mately 3 percent molybdenum and 1½ percent copper or nickel, capable of withstanding heavy abrasion and moderate impact, might be used for Moly-H, if Moly-H were not obtainable. The costs in Table I may or may not be reproducible with other than the electrodes listed. Also, when parts are worn to a greater extent, the costs in Table I must be proportionately increased.

## Rebuilding driving sprockets

When the driving sprockets become so worn that the track bushings slide instead of rolling on the teeth and cause seizing or galling, the tooth contours must be restored to their original shape. Usually this operation can be accomplished without detaching the sprockets from the tractor, although the track will have to be removed.

The normal procedure involves the use of a template, usually made from ¼-in. sheet metal and shaped to conform to the pitch and tooth contour of a new or unworn sprocket (Fig. 1).

In case the template shows that not more than one layer of weld metal is needed to restore the contour, the application of Amsco Economy electrode will best meet all requirements. If more than one layer is required, all but the final layer are put in with shielded-arc, Type W-93 electrode, which has proven especially desirable as a base deposit for hard-surfacing because it is inexpensive and at the same time impact resistant. This procedure provides an inexpensive base of medium hard metal, which stands up well under the harder, final layer deposited with the Amsco Economy electrode.

When the template reveals the wear to be more than ¼ in., a piece of solid metal may be used to advantage to reduce the number of layers of weld metal needed to restore the contour (Fig. 1). It is common practice to cut such segments from ordinary iron pipe, the outside diameter of which is chosen to fit the curvature of the

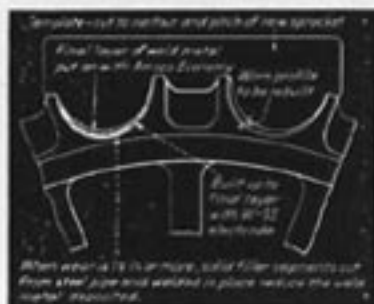


Fig. 1—Worn drive sprockets rebuilt by welding methods outlined above are good as new.



Fig. 2—This handy gage for rebuilding bottom rollers may be made by welding two 9x5/8x½-in. steel bars to a steel plate cross member shaped as indicated.