

ANNEX #4.

## Attachment for an R-4 bulldozer

The 19th Engineer Regiment has long felt the necessity of a small portable derrick to be used in the handling of timber, pipe, Bailey bridge members, etc. This need was brought out emphatically when "F" Company started work on a 110' timber trestle bridge near Grigento. Therefore, a truss attachment was designed and constructed to fit on an R-4 dozer to supply a moveable crane.

Materials were particularly difficult to obtain; therefore, the derrick had to be made of any available materials. The main members were of light rail, and the supports and braces were of channel beams and ribbon steel.

The design was calculated to set the main boom at an angle of 60 degrees from the horizontal, and to give the top end a height of about 20'. The main frame was to be made in an "A" frame shape with the sheave at the apex or upper end (See plate No. 1 also photo No. 1). The main members were to be supported by leg braces, and stiffened by a system of cross-bracing. The entire attachment was to be attached to the rear angle-frame supports of an R-4 dozer, and to operate over the rear end of the dozer.

The structure was assembled, welded together, and the clamp fittings were attached to the braces of the dozer (plate 2 Fig. 2). Next the frame was lifted into place and welded on the clamp fittings. The frame was then cut, and the hinges were welded into place (plate 2 Fig. 3). Difficulty was encountered in aligning the hinges. The hinges were so located as to allow the entire top portion of the truss to fold forward and lay along the longitudinal brace over the dozer (See photo No. 3). The pins in the hinges may be removed, and the whole frame can be disassembled into three parts or reassembled in a few minutes. The boom can be raised or lowered by means of its own winch attachment (See photo No. 2). As the derrick is run from the auxiliary winch, it in no way hinders the normal operation of the dozer; in fact, when the derrick is operating, the blade serves as a counter-balance. "U" bolts welded on the boom fit over the frame of the seat when the boom is lowered, and thus the whole frame may be clamped down for moves (plate No. 4). When the boom is in a lateral position, (photo No. 5) it adds only 2' to the height of the dozer, and only 3' to the length. Guy cables run from turnbuckles fastened to "U" bolts (plate No. 2 Fig. 1) on the front "A" members on the dozer to the boom (plate No. 3, Fig. 5) and serve as additional support.

The derrick was put into immediate service as soon as it was completed. It easily lifted the knee braces of the trestle bridge and set them in place. Later it lifted 8" x 12" x 16' stringers, four at a time, and laid them in their positions. The capacity seems to be from 1½ to 2 tons for normal work.

It is expected that the device will prove itself very useful for engineer work such as the following:

1. Building trestle bridges
2. Lifting Bailey bridge members
3. Moving rocks, pipelines, etc.
4. As a drag line (using both winches with the blade tied up)
5. As a pile driver
6. For well drilling
7. For loading trucks, and general engr. work.

The structure itself is not likely to fall; therefore, the lifting capacity may be increased by hanging weights on the blade of the dozer.

It is believed that this device will serve admirably to fill the gap in T/B engr. equipment and will furnish an answer to the need for a light traveling crane.

(Extracted from 19th Engineer Report)