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Field **Notes**

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FOREST SERVICE • U.S. DEPARTMENT OF AGRICULTURE

ENGINEERING FIELD NOTES

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The publication is not intended to be exclusive for engineers. However, because of the type of material in the publication, all engineers and engineering technicians should read each monthly issue.

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FIELD NOTES

INSTALLATION OF A PREFABRICATED ALUMINUM BIN WALL

by D. D. McCarthy, Angeles National Forest

On November 22 and 23, 1967 the Angeles National Forest installed an aluminum bin retaining wall on the Los Pinetos Road No. 3N17. Since this was the first installation of this type made by the Forest, records of costs and installation methods were kept.

The location was on the edge of the road where steep, decomposed granite side slopes contributed to severe erosion endangering the roadway. The natural side slope was about 1:1. Vegetative cover in the area was generally good. But this particular area had active erosion occurring and an area 30 feet wide had eroded 6 feet below the adjacent slope surface. Replacement of the slope would require that a toe-wall structure be erected and backfilled with a considerable amount of haul-in material. This process would destroy some of the well-established vegetative cover.

The bin wall structure was designed as a series of circular bins (16 gage, 1- by 6-inch corrugations), 6.2 feet in diameter by 8 feet high. The basic structure consisted of bins joined by fascia plates on the exposed face of the wall (see fig. 1).

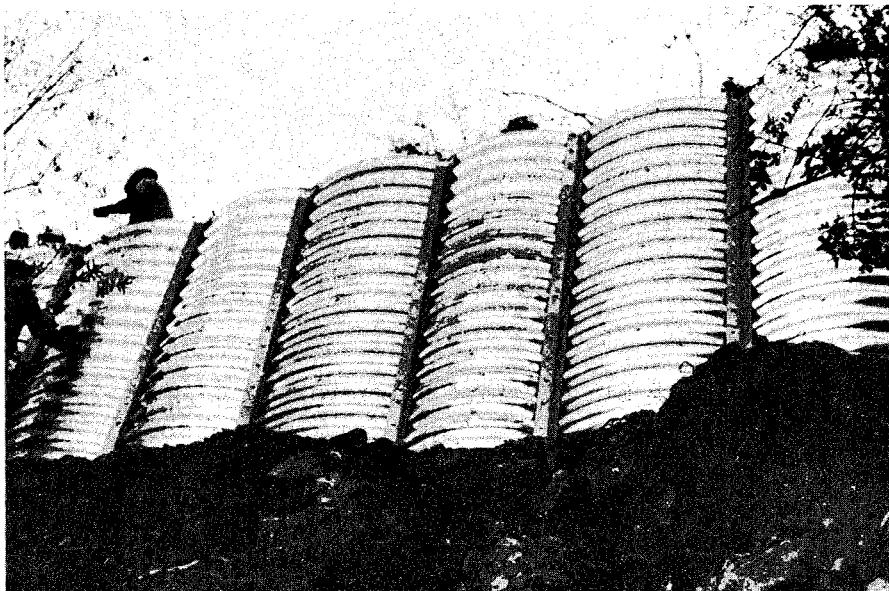


Figure 1.--View of installation from below.

Solid foundation material was reached by an excavator in 4 hours. The excavation was made so that the installed bin wall would be partly within the roadway prism and its outside edge would support the road berm. The footing was excavated with a 1:6 inslope so that the placed bins would have a 1:6 batter into the roadway.

The bin wall material was delivered in half-round sections for ease of shipment and handling. The half sections were easily handled by two men (see fig. 2). The sections were bolted together on the roadway and rope was tied around the circular bin to lower it into the excavation and position it easily by hand (see fig. 3). The arched fascia plates were then bolted onto the bins, giving them remarkable rigidity (see figs. 4 and 5).

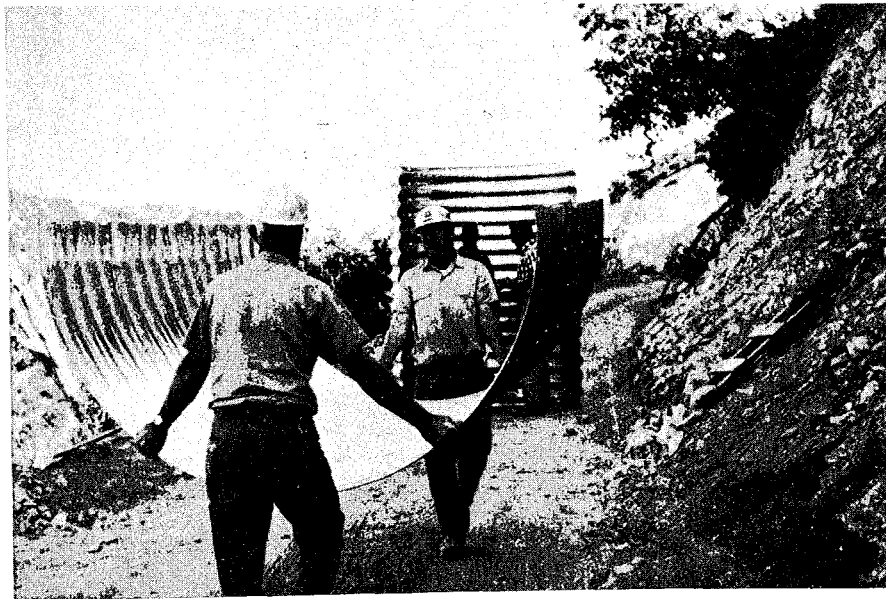


Figure 2. -- Crib bin 6. 2-foot diameter by 8-foot, delivered in half-round sections for ease of shipment and handling.

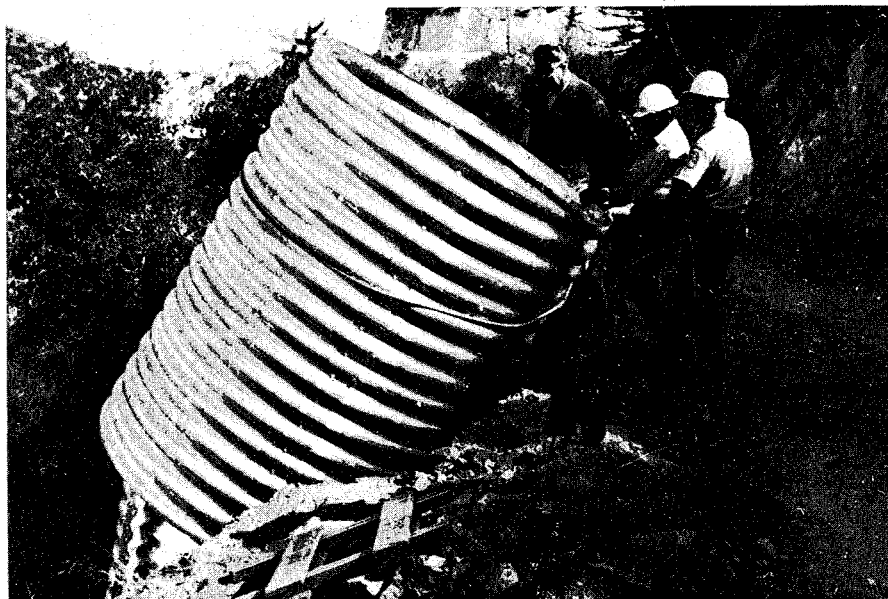


Figure 3. --Lowering assembled bin into excavation by hand.

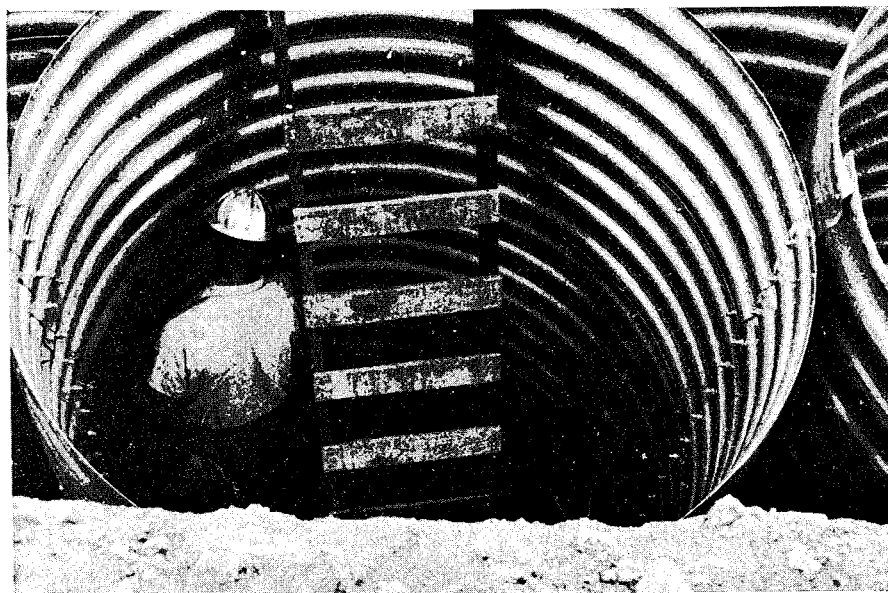


Figure 4. -- Bolting interstice fascia sheets to bins.



Figure 5. -- Positioning and bolting interstice facia sheets to bins.

The first 12 to 18 inches of backfill material was shoveled in by hand and tamped with pneumatic compactors to firmly anchor the bins in place before starting machine backfilling with an endloader.

The backfill was placed in 12- to 18-inch lifts and compacted with pneumatic compactors, even though the Kaiser engineers observing the installation did not consider this essential for getting satisfactory performance from their product. Water was added as needed for optimum compaction. The material removed from the excavation was used for the backfill. This material contained rocks up to 12 inches in diameter. The only precaution taken was to avoid compacting a sharp rock directly against the sides of the bins on the exposed face. On the sides which would be buried, no precautions were taken and no visible effects were observed, such as bending or bulging of the walls.

The backfill operation progressed rapidly. The bins were completely backfilled and tamped and the spaces between the bins and between the bins and excavation were backfilled and compacted. Then the backfill was placed over the top of the bin wall and compacted mostly by running the wheeled loader over it. Finally the berm was constructed with a road grader and the job was complete.

The cost of the material was \$620; excavation, \$112; labor for assembly and placement and backfill, \$177; equipment, including mileage, \$97. The total installed cost was \$1,006.

A similar Armco metal bin retaining wall was recently installed on the Forest for an approximate cost of \$1,600. Although all conditions at the two sites were not identical, the similarity is great enough for a comparison of savings to be drawn between the two installations. Most of the savings was in labor, because of the ease of handling and installing. Further considerable savings may be realized by using pneumatic impact wrenches for bolting.

This new use for an aluminum bin is most exciting and should be seriously considered where bin walls are needed. The ease of handling and erecting the material is a quality desired on all forest development road projects where additional equipment needed means considerable additional expense. All of the material required for this 8- by 31-foot aluminum bin wall could be loaded on a 3/4-ton pickup and hauled to the site by two men who could then erect and place the bins in the excavation. No mechanized work would be required except the original excavating.

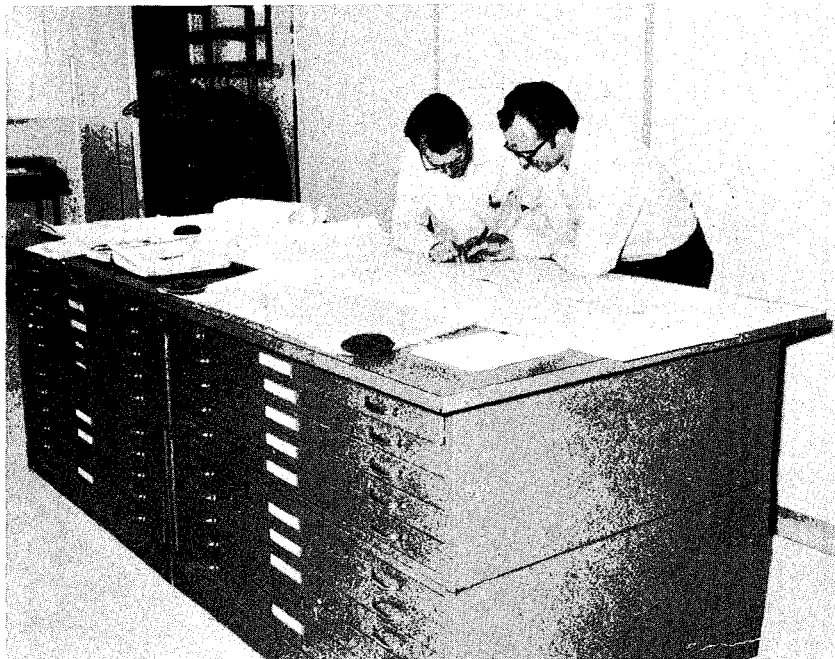
A 6.2-foot diameter bin may be used in installations up to 12 feet high. Further consideration should be given to the possibility of using smaller diameter bins for lower walls, such as a 4-foot diameter bin for a 6-foot high wall. There are many uses for lower walls and a reduction in diameter according to height would reduce material, excavation, and backfill costs. Interest in using the smaller diameter bin has been expressed to the Kaiser people and they are studying its feasibility.

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UTILIZATION OF 5-DRAWER FLAT MAP CABINETS AS A LAYOUT TABLE

by Richard G. Harris, Civil Engineer, Uinta National Forest

An attractive, functional layout table was built by constructing a top to cover four 5-drawer flat map cabinets. One cabinet was stacked on another to form a unit; two units side by side formed a foundation 9 feet long, 3 feet 6 inches wide, and 34-1/2 inches high for the layout table top. A 1-1/2 inch thick, 4-foot by 9-foot 6-inch top then had 3 inches of overhang all around and increased the height of the table to 3 feet. The overhang enables a person to stand against the table without having his feet hit the base and the height of the table enables a person to use it while standing or sitting on drafting stool. The working surface is large enough for reviewing plans, spreading out maps, comparing alternative plans, or laying out strips of aerial photographs.



Completed Layout Table

The top was constructed of exterior grade plywood. Since the standard plywood sheet is 4 feet by 8 feet, a 1-foot 6-inch extension was needed. Two 3/4-inch thick sheets were laminated together with the extension on opposite ends of each layer. The top and edges were covered with suitably colored formica. Small cleats were attached to the bottom of the table to fit the map cabinet corners and keep the top from sliding.

The completed job forms a smooth, solid, functional, layout table without the cracks and sags found when the metal tops of map cabinet units are used as a work table. The cabinet drawers are still fully functional. The total cost of the top (materials and labor) was \$120.

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BLOWER TO ASSIST WITH BURNING DURING CLEARING AND GRUBBING OPERATION

by Thomas Dooley, Zone Engineer, Ottawa National Forest

The South Range Construction Company of South Range, Mich. performing contract work on the Ottawa National Forest, has built a blower to assist in its burning operations. The blower was built with used parts from the company's maintenance shop and used materials purchased for specific use on the blower.

The blower is powered by a 110 horsepower Red Seal, 6-cylinder engine. The engine was previously used on a coal conveyor belt. A 275-gallon fuel oil tank is mounted alongside of the engine (fig. 1). The pump used to spray fuel oil on the fire came from a service station gasoline pump. A 3/8-inch high pressure hose with interchangeable nozzles shoots a constant stream of fuel oil. The fan blower was used for sawdust disposal in a sawmill, and there are adjustable vanes on the blower to direct the air from side to side or straight ahead. The blower outlet is adjustable also up or down (fig. 2).

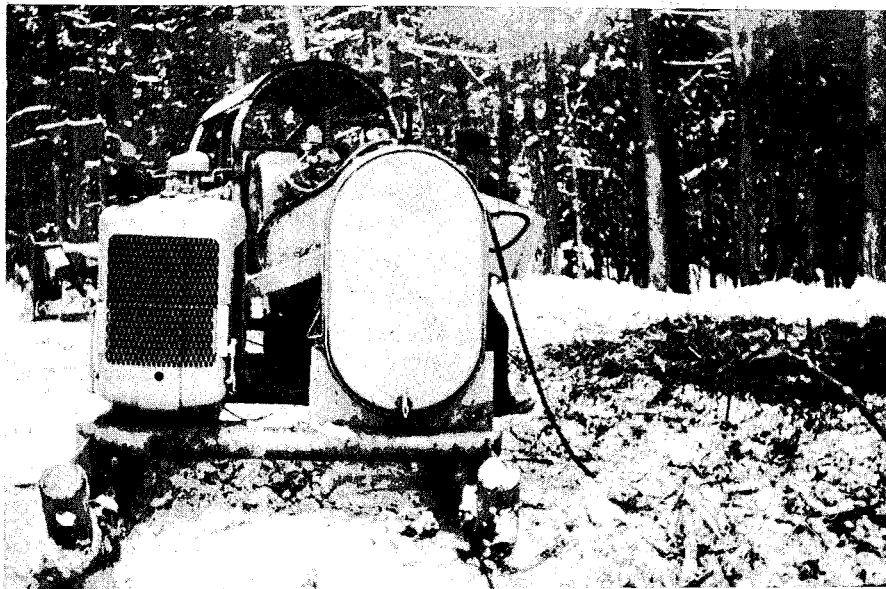


Figure 1. --End view of blower showing fuel oil tank and motor. Blower is hooked on a D-6c tractor ready to be skidded to new pile.

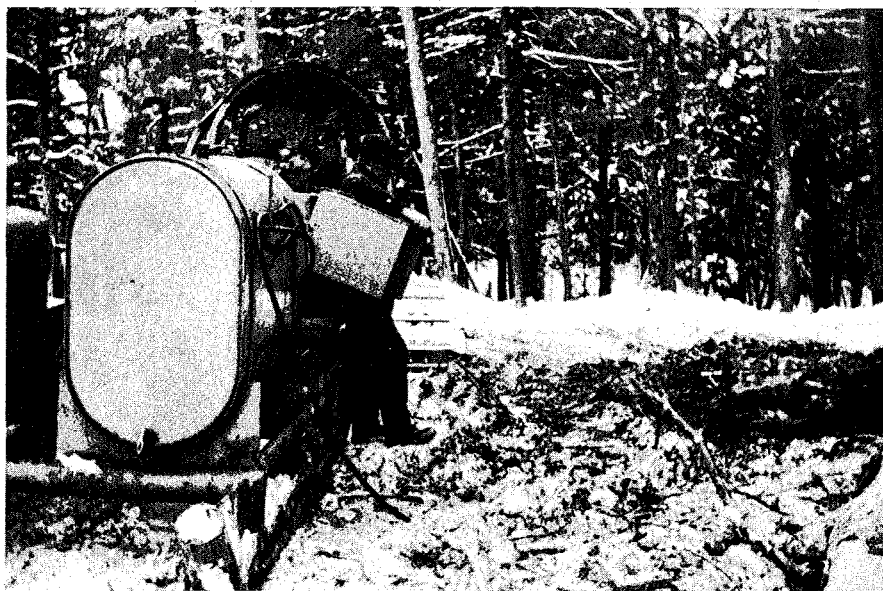


Figure 2. --Side view of blower showing adjustable vanes and fuel oil high pressure hose set-up.

The 6-cylinder engine is usually run at about 1,800 r. p. m. but can deliver up to 2,600 r. p. m. The slower speed supplies an adequate amount of air (the rating of the blower in c. f. m. was not known by the contractor). The belt and pulley operate at a higher r. p. m. and no over-heating problems are encountered.

The entire blower is mounted on 6-inch diameter steel pipe skids with an attached tow cable on both ends.

The fuel consumption of the sprayed fuel oil is about 100 gallons per day. The gasoline engine uses about 15 gallons per day.

The contractor stated that the blower replaces two laborers who would otherwise be needed to tend and keep the fires burning. The blower can be skidded from pile to pile. Small chains wrapped around the skids prevent the blower from sliding downhill uncontrolled when on packed snow or ice.

The South Range Construction Company intends to build another blower exactly like the first except that a brush guard will be added to prevent damage to the blower during skidding.

Blowers purchased commercially cost approximately \$6,000 and are mounted on tires. The contractor prefers that the blower be mounted on skids since most of his burning operations take place during the winter months or in rainy, muddy weather. The company did not keep track of the cost of labor and parts to build its blower but the owner was positive that the cost was much less than \$6,000.

The blower has been used on two contracts involving three roads and has performed very well. The contractor's only complaint was the absence of a second blower on the projects.

The following photographs show the burning operation.



Figure 3. -- Blower in operation. Note—the nozzle spraying fuel oil into the fire.

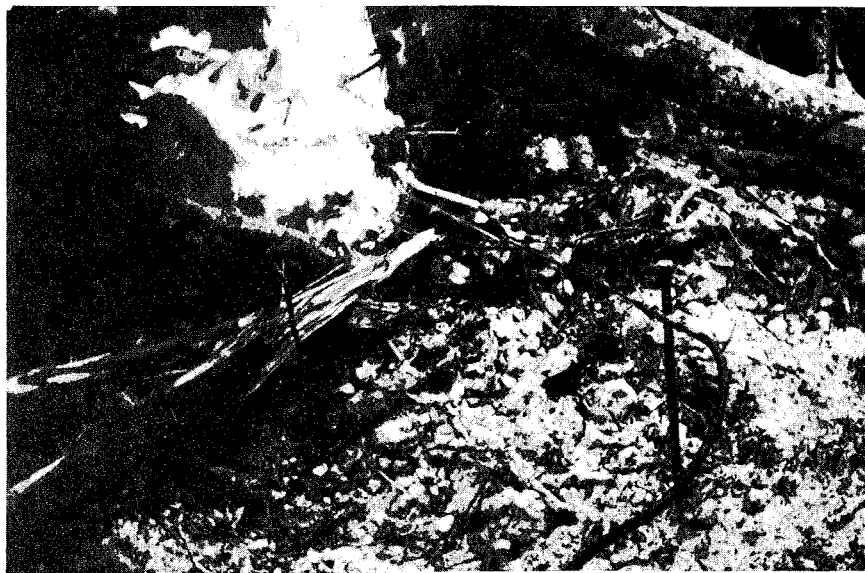


Figure 4. -- Close-up view of the fuel oil being sprayed into the fire. Support peg is welded to hanger bracket on hose.

