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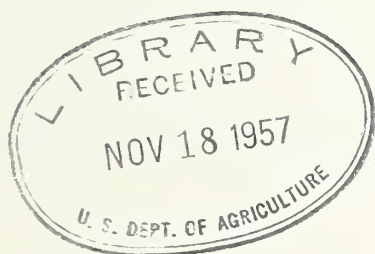
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REPORT  
OF  
T. E. B. PROJECT NO. 552  
VEHICLE FOR TRANSPORTING  
COMPRESSOR AND JACKHAMMER  
ON TRAILS



Field tests conducted and reported by  
Don Fife - Region 6

FOREST SERVICE  
U. S. DEPARTMENT OF AGRICULTURE  
June 1957



SELF-PROPELLED VEHICLE FOR TRAIL COMPRESSOR

DIVISION OF ENGINEERING - REGION SIX 1/

INTRODUCTION

Trail construction through rock formations has always been a slow, tedious and costly job. After World War II plastic type explosives were readily available at reasonable cost and were used extensively for this work with considerable success. As the supply became critical and its cost prohibitive, we were forced to revert to the use of conventional explosives and pneumatic drilling equipment.

Use of our existing trail compressors designed and developed for our mechanized trail construction program in the late 1940's was attempted. These machines were not suitable for the job. Their 30" tread width, weight and size was not adaptable to the 18" trail width intended.

It was apparent that development of a suitable air compressor with drilling equipment was needed. Of equal importance was the need for a suitable carrier on which to transport the drilling apparatus.

The Air Compressor

After a thorough survey of the commercially manufactured air compressors available, an Ingersoll-Rand Model 3R36 air compressor was purchased. It is a 36 cfm size, 80 psi single stage air-cooled machine weighing 280 lbs. A wheelbarrow carriage was also purchased for test purposes. This type of compressor had been used satisfactorily by railroad section gangs and utility crews with considerable success. Its size, capacity and air-cooled design made it readily adaptable to our trail work.

Field Tests

Field tests were conducted by trail crew personnel of the Wenatchee Forest.

(a) The Compressor Unit

Tests found the "I-R Spot-air" compressor performance equal to that of our much larger and heavier trail compressors. The manufacturer recommended the use of a J-10 (30#) size jackhammer. After brief testing, it was determined that the compressor had ample capacity to operate a Sullivan 30# jackhammer. The drilling was conducted at about 3500 ft. elevation. It may be necessary to substitute the lighter jackhammer at higher elevations. This phase of testing remains to be accomplished.

1/ Condensed from a field test and report conducted and prepared by Mr. Don Fife, Wenatchee National Forest.





(b) The Wheelbarrow Carriage

Use of this means of transportation was found undesirable except for short distances "on the job" (up to 100 yds.). Grades exceeding 10% were difficult to travel using this carriage. In general, the carriage was not favorably accepted for our type of trail work.

(c) Self-propelled Vehicle for Transporting Air Compressor

The Merry Packer (see attached brochure) is employed extensively on trail crew work throughout Region Six. Experienced crew personnel have transported loads considerably in excess of 500 pounds over long distances without difficulty. It was determined that a Merry Packer with only minor modification could handle the compressor and allied drilling equipment very satisfactorily. It was also decided that the cost of any self-propelled carrier designed specifically for a drilling unit would exceed the purchase costs of a Merry Packer (\$175.00) by a sizable amount. More important is the fact that a special carriage would not lend itself to multiple use. Cost of modifications to the Merry Packer to carry the drilling unit totalled \$151.00.

Modification of a Merry Packer to Transport Drilling Outfit

The first step in mounting the compressor was to get the center of gravity as low as possible. By removing the base and the 3/4" pipe stands the compressor could be lowered 4". This gives a lower center of gravity and yet leaves plenty of air circulation for cooling. Next, two of the compressor legs were welded onto a U bar. The third leg was welded to an angle iron. With this setup the angle iron is bolted to the packer with two bolts and the U bar is bolted on with two bolts.

This method of attachment makes it easy to mount or dismount the compressor so that the packer can be used for hauling other equipment. From this point on it was just a matter of placing the equipment where it would balance the load and make it handy to work from. The attached drawings show the placement of the equipment on the packer.

After completing the job of mounting the compressor and equipment the compressor was started. We found there is less vibration from the compressor than from the packer motor.

Stands (jack legs) were built for the packer to hold the weight off the tire while the compressor is being used. The construction of the stand is such that the pipe supports will settle into the ground about 1". Then the weight of the machine rests on the bottom cross brace. We believe this gives a better foundation for the packer. The front stand is hinged to the packer and the stops are positioned in a manner which holds the front stand against any forward motion of the packer while the drilling outfit is in use. The rear stand is attached with two bolts. (See drawings.) When these bolts are tight the machine is provided good support.



The air hose and jackhammer are mounted on the front of the packer. The hose is fastened to the compressor at all times.

Two complete oil changes are carried with the unit. Twelve quarts of oil, in cans, are fastened to a  $\frac{1}{4}$ " piece of plywood which is carried in the front end of the machine.

Mounted directly over the top of the oil is a tool container made from a powder box. This container is mounted on four brackets which can be removed from the packer. Inside the tool container are all the small items that are needed. They are listed at the end of this report.

At the back of the packer, mounted over the top of the motor, is 120 ft. of nylon rope with the safety belt attached, for use in difficult drilling situations.

Transportation of the packer-compressor is very simple. It can be loaded into a 1/2-ton pickup with the aid of a running plank by two men.

#### ADVANTAGES:

1. A satisfactory way to get an efficient compressor into the back country.
2. "Spot-Air" compressor produces sufficient air for good drilling.
3. Two experienced men are required to operate the packer and the equipment.
4. The unit is easy to move from one drilling job to another.
5. The unit can be loaded and unloaded from a pickup by two men.
6. The air hose attachment is available for pumping up tires and cleaning equipment.

#### DISADVANTAGES:

1. The construction of the compressor is such that it has to be lifted off the packer to change the oil, every 25 hours. Possibly a way can be found to change this by drilling and tapping the oil pan at some other point.

#### PACKER - COMPRESSOR WEIGHT

Compressor	280 lbs.
Hose and oiler attachment	40 "
Oil (12 qts.)	27 "
Tool box	43 "
Safety line and belt (120 ft. nylon rope)	28 "
Drill steel (two 2-ft., one 5 ft.)	20 "
Drill bits	10 "
Jackhammer (Sullivan)	32 "
Packer loaded	<u>480</u> lbs.
Packer weight	175 lbs.
Total unit weight	<u>655</u> lbs.



COST OF PACKER - COMPRESSOR UNIT

Compressor	\$1,175.00
Packer	175.00
Modification Costs	<u>151.00</u>
Total	\$1,501.00

TOOLS

Wrenches

- 1 - 8" crescent
- 1 - 10" crescent
- 1 - 14" pipe wrench
- 1 - 16" pipe wrench
- 1 - 6" screw driver
- 1 - 10" screw driver
- 1 - pair pliers
- 1 - set of open-box and wrenches 3/8" to 11/16"
- 1 - 12" file with handle

ATTACHMENTS AND ACCESSORIES

- 12 qts. Talona motor oil
- Gasket material
- 1 - Mighty Midget fire extinguisher with refill kit
- 20 ft. 1" compressor hose
- 25 ft. 1/4" air hose
- 32 lb. Sullivan jackhammer
- 2 - 2 ft. drill steels
- 1 - 5 ft. drill steel
- 15 drill bits
- 2 dust masks with replacement filters
- 2 pair of goggles
- 120 ft. nylon safety line with belt
- 2 - clevis with cotter pins
- 1 - Galvanometer
- 1 - tester, caps
- 1 - tire patching kit
- 1 - box assorted bolts and nuts



MATERIAL USED IN CONSTRUCTION OF  
PACKER-COMPRESSOR

- 6 - 1½"x2" thin wall pipe - drill steel brackets and jackhammer
- 3 - 6"x3/4" galv. pipe - compressor legs
- 2 - 1"x2" thin wall steel pipe - lower drill steel brackets
- 4 - 16"x3/4" steel pipe - pipe supports for stands
- 1 - 6"x3/8" galv. pipe - small air hose connection
- 2 - 3/4"x1½" nipple - compressor hose hookup
- 2 - 3/4"x1" nipple - compressor hose hookup
- 1 - 3/4" elbow - compressor hose hookup
- 1 - 3/4" tee - compressor hose hookup
- 1 - reduction 3/4"x3/8" small air hose hookup
- 2 sets male and female snap fittings - small air hose hookup
- 1 - 3/4"x25' hose, air with screw fittings
- 1 - tire inflater, small air hose
- 1 - 3/8"x1½"x18" channel iron - compressor base
- 1 - 1/8"x1½"x18" angle iron - compressor base
- 4 - 3/16"x1½"x2" angle iron - tool box bracket
- 2 - 1/8"x1"x18" strap iron, compressor hose bracket
- 1 - 3/16"x2"x18" strap iron - top plate, rear stand
- 1 - ¼"x3/4"x8' strap iron - cross braces, stands
- 1 - 2'x2'x¼" plywood, base for oil
- 1 - 16' of web belting, 1" wide with buckles, strap holder for oil cans
- 1 - air nozzle, small air hose





