

TECHNICAL EQUIPMENT REPORT NO. ACF-5

SEPTEMBER 1959

TOTE-GOTE SCOOTER (PERFORMANCE TESTS)

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FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

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TOTE-GOTE SCOOTER

(Performance Tests)

Missoula Equipment Development Center
U. S. Department of Agriculture
Forest Service
Missoula, Montana

September 1959

Introduction

The Tote-Gote scooter manufactured by Bonham Company, 541 South First West Street, Provo, Utah, incorporates many of the requirements established by the Missoula Equipment Development Center for a special-purpose trail scooter. Prior to the design and manufacture of the first commercial models these requirements were discussed in detail with the manufacturer. The first production machines were tested by the Missoula Equipment Development Center in 1958 and the following changes suggested:

1. A variable-speed belt transmission should be incorporated in the design to increase the top speed to approximately 10 m.p.h. A proven commercial unit was suggested which would produce this speed without reducing the pulling power on steep grades or when trail conditions required slow travel for safety.
2. The lower frame should be extended to provide protection for the rider's feet. Experience has proved that this is a necessary safety feature for trail scooters.
3. With the installation of the variable-speed belt transmission, an additional brake was required for the rear wheel.
4. A modification to the handle bars was suggested to permit short turns without interference with the rider's knees.



Tote-Gote Scooter
A lightweight special-purpose scooter for general forestry use.

1959 Test Program

Two modified Tote-Gote scooters were purchased in 1959 and a test program was conducted to determine if the Tote-Gote met forestry requirements for a special-purpose scooter. Because of the variable conditions common to trail travel it was planned to average results of several trials with different riders. General test courses were selected that are representative of trail conditions common to Region 1. One of the two test scooters was equipped with an odometer and a grade indicator. A sensitive altimeter was used to measure elevation changes and a stop watch provided travel times.

With this equipment riders could record performance whenever noticeable changes in grade or tread condition were encountered during a test run. Test results were recorded on special forms for analysis (see sample profile and test results in appendix). Special records were also maintained of rider reactions, notes on trail conditions, fuel and oil used and mechanical adjustments or repairs. In addition to the controlled performance tests the scooters were loaned at various times throughout the season to other personnel for evaluation on their particular work (soil survey, fire control, and trail maintenance).



Test trails provided many variations in tread and ground cover conditions.

Test Results

1. <u>Total Miles Traveled</u>	348.56
a. In performance testing	200
b. In operational testing	148
2. <u>Average Travel Speeds</u>	
a. All travel	6.99 m.p.h.
b. Average, good tread - 0 to 25 percent grades	6.4 m.p.h.
c. Average, poor tread - 25 percent plus grades	5.23 m.p.h.
3. <u>Special Performance</u>	
a. Maximum climb with load (275 pounds average operating limit)	45 percent slope
b. Maximum trail speed (maximum operating limit)	9.4 m.p.h.
c. Maximum accessory load carried safely	75 pounds

4. Maintenance and Dependability

a. Number of breakdowns:

Machine No. 1 (governor control)	1
Machine No. 2	0

b. Mechanical adjustments:

Machine No. 1 - brakes adjusted (times)	2
Machine No. 2 - brake lever connection	1
brakes adjusted (times)	2

5. Operating Costs

a. Average fuel consumption - miles-per-gallon	30.36
b. Oil consumption (periodic changes only)	-

6. Rider Reactions

a. Safety (speed, weight, configuration, etc.)	Excellent
b. Comfort (ride, vibration, fatigue, etc.)	Fair
c. Handling ease (balance, weight, turning, etc.)	Excellent
d. Training requirements (ease of training)	Excellent
e. Possibilities for operational use	Very good

This lightweight scooter has many desirable features of which the most important are safety and ease of handling.



Conclusions

1. The Tote-Gote scooter as modified (latest commercial models) has the following advantages for general forestry use:
 - a. Safety is excellent due to the lightweight, compact arrangement and limited top speed.
 - b. It is easily man-handled. Because of the light weight it can be carried across streams and slides, lifted over logs, and easily loaded or unloaded from a carrier by the average rider.
 - c. With only limited experience, operators feel competent to handle the machine safely under average trail-travel conditions.
 - d. Because of the compact size, 2 or 3 machines are easily carried in the trunk of a sedan.
 - e. The scooter can carry light, compact loads in addition to the rider, such as required for administrative travel, smokechasing, or light-trail-maintenance work.
 - f. The low initial investment is quickly repaid by substantial savings in trail-travel time.
 - g. The design and general arrangement conforms closely to the requirements established by the Missoula Equipment Development Center for a lightweight special-purpose trail scooter.
2. The Tote-Gote scooter has the following disadvantages for general forestry use:
 - a. Without springs and with small tires, the machine is rough to ride over rocks and roots.
 - b. Because of the compact arrangement, loading space is limited.
3. Improvements could be made in future designs as follows:
 - a. Brake and throttle controls could be improved with better quality fittings.
 - b. Additional load space should be provided for carrying light loads in addition to the rider.

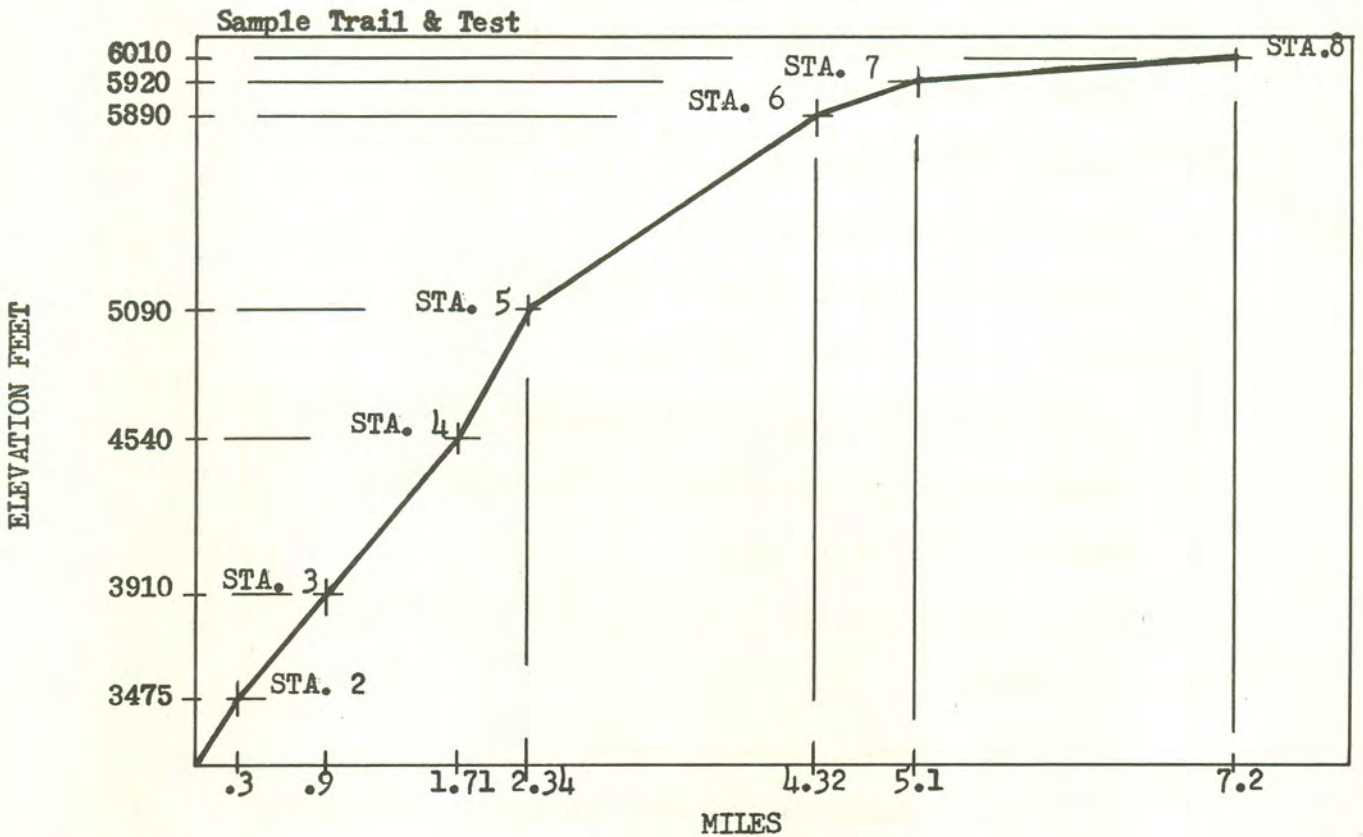
Recommendations

1. We recommend consideration of the Tote-Gote scooter for all activities requiring trail travel.
2. Purchasers should specify the modified frame and variable-speed belt transmission on all machines (Model FVS).



The Tote-Gote Scooter provides many operational possibilities to save expensive foot-travel time.

Appendix



Average sustained trail conditions.

STA. 1 to 2: Washed steep trail dirt. Two 40% pitches.

STA. 2 to 4: Wide graded trail, average grade 13%, several 24% pitches.

STA. 4 to 6: Rough unimproved mountain trail. Three portions washed and very rocky.

STA. 6 to 8: Rough unimproved side hill, mostly very rocky.

Test #1:	STA. 1 to 4:	1.71 mi.	16 min.	6.36 m.p.h.
Test #2:	STA. 4 to 6:	2.61 mi.	29 min.	5.4 m.p.h.
Test #3:	STA. 6 to 8:	2.88 mi.	31 min.	5.88 m.p.h.
Average Tests #1, 2 and 3:		7.17 mi.	76 min.	5.66 m.p.h.
Test #4:	STA. 8 to 1:	7.2 mi.	66 min.	6.54 m.p.h.
Average Tests #1, 2, 3 and 4:				6.1 m.p.h.

Specifications - Tote-Gote Scooter

1. Engine - B&S 4-cycle, 2-1/2 h.p.
2. Starter - retracting rope
3. Clutch - centrifugal "V" belt
4. Transmission - variable-speed "V" belt
5. Wheels - pressed-steel drop center
6. Tires - 4.00 x 8 - 2-ply, rear Suregrip - front rib
7. Brakes - front and rear wheels - hand controlled
8. Frame - steel tubing, welded
9. Seat - foam rubber, 10 inches x 12 inches x 4 inches
10. Dimensions:
 - a. Width - frame, 12 inches; handle bars, 22 inches
 - b. Height - frame, 24 inches; handle bars, 36 inches
 - c. Length - frame, 44 inches; wheelbase, 42 inches
11. Weight - 120 pounds
12. Clearance - 9 inches