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Test 729: David Bradley Suburban (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 729 - DAVID BRADLEY SUBURBAN GASOLINE

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

BELT PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of mercury	
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
3.90	3599	0.623	0.969	6.26	Air Cooled	71	76	28.952	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
3.48	3767	0.647	1.129	5.38	Air Cooled	70	74	.....
0.07	3827	0.573	.....	.....	Air Cooled	68	72	.....
1.76	3781	0.662	2.284	2.66	Air Cooled	70	74	.....
3.84	3606	0.618	0.977	6.21	Air Cooled	70	74	.....
0.91	3821	0.628	4.187	1.45	Air Cooled	72	76	.....
2.61	3773	0.657	1.529	3.97	Air Cooled	71	75	.....
Av	2.11	3763	0.631	1.815	3.34	Air Cooled	70	74	28.990

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours											
2.80	431	2.43	3589	8.40	0.650	1.409	4.31	Air Cooled	33	38	29.053
75% of Pull at Maximum Power—Ten Hours											
2.35	322	2.74	3763	5.65	0.624	1.612	3.77	Air Cooled	33	40	29.094
50% of Pull at Maximum Power—Two Hours											
1.69	220	2.88	3810	4.35	0.640	2.299	2.64	Air Cooled	33	37	29.098
MAXIMUM POWER WITH BALLAST											
2.69	549	1.84	3771	14.52	.....	.....	.....	Air Cooled	33	37	29.060
2.75	513	2.01	3603	11.66	.....	.....	.....	Air Cooled	33	37	29.060
2.84	429	2.48	3618	7.60	.....	.....	.....	Air Cooled	33	37	29.060
2.77	351	2.96	3607	5.75	.....	.....	.....	Air Cooled	33	37	29.060
2.63	281	3.50	3607	4.47	.....	.....	.....	Air Cooled	33	37	29.060
2.53	231	4.11	3605	3.67	.....	.....	.....	Air Cooled	33	37	29.060
MAXIMUM POWER WITHOUT BALLAST											
2.63	394	2.51	3608	7.94	.....	.....	.....	Air Cooled	34	40	28.820
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST											
Pounds pull		430	485	515	510	535	475				
Horsepower		2.8	2.8	2.6	2.2	2.0	1.5				
Miles per hour		2.5	2.2	1.9	1.6	1.4	1.2				

Department of Agricultural Engineering

Dates of Test: November 17 to December 7, 1959

Manufacturer: DAVID BRADLEY MANUFACTURING WORKS, BRADLEY, ILLINOIS

Manufacturer's Power Rating: Engine rated at 5.75 Hp by its manufacturer

FUEL, OIL and TIME Fuel regular gasoline Octane No ASTM 84 research 92 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7292 Weight per gallon 6.070 lb Oil SAE 20-20W API service classification ML, MM, MS, DG To motor 0.371 gal Drained from motor 0.227 gal Transmission and Final-drive lubricant SAE No 90 Type E.P. Total time motor was operated 52½ hours.

ENGINE Make Briggs & Stratton Type 1 cylinder vertical air cooled Serial No 48741 Crankshaft mounted crosswise Rated rpm 3600 Lubrication splash Bore and stroke 2¾" x 2¾" Compression ratio 5.6 to 1 Displacement 14.1 cu in Carburetor size ¾" Ignition system magneto Cranking system 12 volt electrical Air cleaner oil washed wire mesh Muffler was used Oil filter none Cooling medium temperature control air cooled.

CHASSIS Type standard Serial No 4985 Tread width rear 24" to 28" front 26" Wheel base 43.4" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 19.3" Vertical distance above roadway 17.4" Horizontal distance from center of rear wheel tread 0" to the right or left Transmission manually controlled variable speed V-belt drive Advertised speeds mph 2.1 to 4.6 Belt pulley 2.70" pitch diameter B section V-belt rpm 3600 Belt speed 2545 fpm Belt B section V-belt length 70" Clutch single disc operated by hand lever Brakes contracting bands operated independently by hand levers Steering no power assistance Turning radius (on concrete surface with brake applied) right 69.5" left 69.5" (on concrete surface without brake) right 73.8" left 73.8" Turning space diameter (on concrete surface with brake applied) right 144.5" left 144.5" (on concrete surface without brake) right 152.5" left 152.5".

REPAIRS AND ADJUSTMENTS During preliminary belt runs, a new spark plug was installed and a new carburetor was substituted for the original unit.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code. Maximum power with ballast was run at various travel speeds at intervals of approximately ½ mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 729.

L. F. LARSEN
Engineer-in-Charge

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 6-12;2;6	Two 6-12;2;6
Ballast	—Liquid	None	None
	—Cast iron	40 lb each	None
Front tires	—No, size, ply & psi	Two 4.80/4.00-8;2;6	Two 4.80/4.00-8;2;6
Ballast	—Liquid	None	None
	—Cast iron	None	None
Height of drawbar		12 inches	12 inches
Static weight	—Rear	325 lb	245 lb
	—Front	205 lb	205 lb
Total weight with operator		705 lb	625 lb

L. W. HURLBUT
G. W. STEINBRUEGGE
J. J. SULEK
Boar of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ the 85% torque; maximum power; $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree

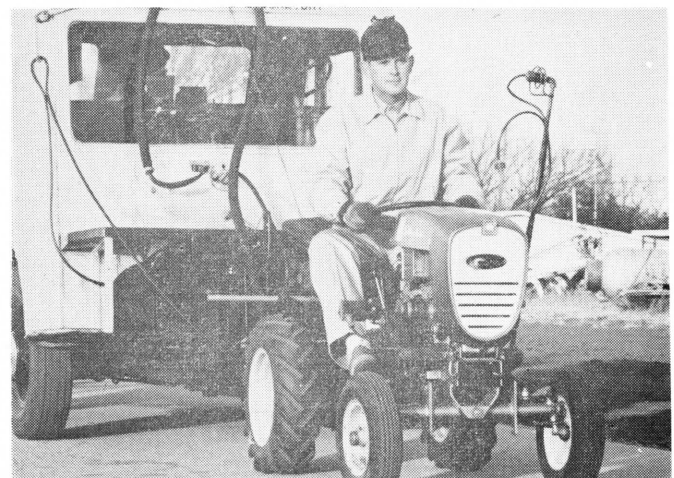
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



David Bradley Suburban Gasoline