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Test 859: Farmall 806 (Gasoline)

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 859 - FARMALL 806 GASOLINE

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

POWER TAKE-OFF 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 | | | | | | | | | |
| 93.27 | 2400 | 7.414 | 0.488 | 12.58 | 192 | 55 | 75 | 29.100 | |
| Standard Power Take-off Speed (1000 rpm)—One Hour | | | | | | | | | |
| 83.99 | 2071 | 6.557 | 0.479 | 12.81 | 200 | 55 | 74 | 29.130 | |
| VARYING POWER AND FUEL CONSUMPTION—TWO HOURS | | | | | | | | | |
| 82.84 | 2508 | 7.017 | 0.520 | 11.81 | 191 | 56 | 75 | | |
| 0.00 | 2655 | 2.562 | | | 170 | 55 | 74 | | |
| 42.77 | 2589 | 4.513 | 0.647 | 9.48 | 178 | 54 | 73 | | |
| 94.13 | 2401 | 7.438 | 0.485 | 12.66 | 199 | 56 | 75 | | |
| 21.75 | 2635 | 3.399 | 0.959 | 6.40 | 173 | 56 | 75 | | |
| 63.40 | 2560 | 5.751 | 0.556 | 11.02 | 186 | 56 | 75 | | |
| Av | 50.82 | 2558 | 5.113 | 0.617 | 9.94 | 183 | 55 | 74 | 29.153 |

DRAWBAR PERFORMANCE

| Hp | Draw- bar pull lbs | Speed miles per hr | Crank- shaft speed rpm | Slip of drivers % | Fuel Consumption | | | Temp Degrees F | | | Barometer inches of Mercury |
|---|-----------------------------|-----------------------------|---------------------------------|----------------------------|------------------|--------------------|---------------------|---------------------|--------------------|--------------------|-----------------------------------|
| | | | | | Gal per hr | Lb per hp-hr | Hp-hr per gal | Cool- ing med | Air wet bulb | Air dry bulb | |
| VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST | | | | | | | | | | | |

MAXIMUM POWER WITH BALLAST

| | | | | | | | | | |
|-------|------|-------|------|-------|-----------------------|-----|----|----|--------|
| 63.78 | 9003 | 2.66 | 2505 | 14.83 | 5th Gear (3rd Lo-TA) | 182 | 39 | 43 | 28.820 |
| 76.85 | 8342 | 3.45 | 2400 | 13.25 | 6th Gear (4th Lo-TA) | 182 | 39 | 43 | 28.840 |
| 77.92 | 7514 | 3.89 | 2407 | 11.30 | 7th Gear (3rd Lo-DD) | 181 | 40 | 45 | 28.840 |
| 80.48 | 7536 | 4.00 | 2404 | 11.55 | 8th Gear (1st Hi-TA) | 183 | 41 | 47 | 28.850 |
| 80.28 | 5582 | 5.39 | 2407 | 7.94 | 9th Gear (4th Lo-DD) | 180 | 46 | 54 | 28.860 |
| 81.04 | 5496 | 5.53 | 2400 | 7.94 | 10th Gear (2nd Hi-TA) | 181 | 46 | 54 | 28.880 |
| 79.98 | 4859 | 6.17 | 2401 | 6.85 | 11th Gear (1st Hi-DD) | 182 | 47 | 58 | 28.880 |
| 79.79 | 3555 | 8.42 | 2412 | 4.89 | 12th Gear (2nd Hi-DD) | 183 | 47 | 58 | 28.880 |
| 80.06 | 2996 | 10.02 | 2404 | 4.02 | 13th Gear (3rd Hi-TA) | 185 | 47 | 60 | 28.880 |
| 76.84 | 2125 | 13.56 | 2411 | 2.99 | 14th Gear (4th Hi-TA) | 185 | 48 | 61 | 28.880 |
| 75.28 | 1893 | 14.91 | 2402 | 2.39 | 15th Gear (3rd Hi-DD) | 185 | 49 | 62 | 28.880 |

MAXIMUM POWER WITHOUT BALLAST

| | | | | | | | | | |
|-------|------|------|------|------|-----------------------|-----|----|----|--------|
| 82.74 | 5619 | 5.52 | 2403 | 9.03 | 10th Gear (2nd Hi-TA) | 184 | 33 | 37 | 29.210 |
|-------|------|------|------|------|-----------------------|-----|----|----|--------|

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 10th Gear (2nd Hi-TA)

| | | | | | | | | |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Pounds pull | 5496 | 5673 | 5880 | 5933 | 5955 | 5948 | 5963 | 5862 |
| Horsepower | 81.04 | 74.94 | 68.53 | 60.66 | 51.88 | 43.08 | 34.62 | 25.35 |
| Crankshaft speed rpm | 2400 | 2154 | 1910 | 1678 | 1431 | 1190 | 954 | 710 |
| Miles per hour | 5.53 | 4.95 | 4.37 | 3.83 | 3.27 | 2.72 | 2.18 | 1.62 |
| Slip of drivers % | 7.94 | 8.20 | 8.60 | 8.87 | 8.87 | 9.00 | 9.00 | 8.87 |

TIRES, BALLAST and WEIGHT

| | | With Ballast | Without Ballast |
|----------------------------|----------------------|---------------------|---------------------|
| Rear tires | —No, size, ply & psi | Two 18.4-34; 8; 16 | Two 18.4-34; 8; 16 |
| Ballast | —Liquid | 1038 lb each | None |
| | —Cast iron | 142 lb each | None |
| Front tires | —No, size, ply & psi | Two 7.50L-15; 8; 32 | Two 7.50L-15; 8; 32 |
| Ballast | —Liquid | None | None |
| | —Cast iron | None | None |
| Height of drawbar | | 20½ inches | 21½ inches |
| Static weight | —Rear | 8580 lb | 6220 lb |
| | —Front | 2290 lb | 2255 lb |
| Total weight with operator | | 11045 lb | 8650 lb |

Department of Agricultural Engineering

Dates of Test: October 28 to November 22, 1963

Manufacturer: INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILLINOIS

Manufacturer's Power Rating: Not rated

FUEL OIL and TIME Fuel regular gasoline Octane No Motor 84 Research 92.8 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7370 Weight per gallon 6.135 lb Oil SAE 10W-20W-30 API service classification MS To motor 2.280 gal Drained from motor 1.560 gal Transmission and final-drive lubricant IH Hy-Tran fluid Total time engine was operated 43½ hours.

ENGINE Make International Gasoline Type 6 cylinder vertical Serial No 1041C301 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 3¹³/₁₆" x 4²⁵/₁₆" Compression ratio 7.7 to 1 Displacement 301 cu in Carburetor size 1½" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner two stage dry type with automatic dust unloader using replaceable pleated paper element Oil filter full flow replaceable paper element Oil cooler radiator for transmission and hydraulic oil Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type Tricycle Serial No 630 SY Tread width rear 56" to 94" front 8" or 16" Wheel base 101.2" 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 27.4" Vertical distance above roadway 37.4" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.26 second 1.67 third 1.84 fourth 2.45 fifth 2.90 sixth 3.87 seventh 4.26 eighth 4.39 ninth 5.68 tenth 5.84 eleventh 6.44 twelfth 8.56 thirteenth 10.14 fourteenth 13.53 fifteenth 14.87 sixteenth 19.84 Reverse first 2.16 second 2.87 third 3.17 fourth 4.21 fifth 4.98 sixth 6.65 seventh 7.31 eighth 9.75 Clutch single plate dry disc operated by foot pedal Brakes dry disc hydraulically power actuated operated by two foot pedals Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 113" left 113" (on concrete surface without brake) right 123" left 119" Turning space diameter (on concrete surface with brake applied) right 241" left 241" (on concrete surface without brake right 260" left 254" Belt pulley 1067 rpm at 2100 engine rpm diam 11" face 7.5" Belt speed 3073 fpm Power take-off 539 or 1014 rpm at 2100 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First, second, third, and fourth gears were not run as it was necessary to limit the pull in fifth gear to avoid excessive wheel slippage. Sixteenth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 859.

L. F. LARSEN

Engineer-in-Charge

L. W. HURLBUT, Chairman

G. W. STEINBRUEGGE

J. J. SULEK

Board 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 trans-

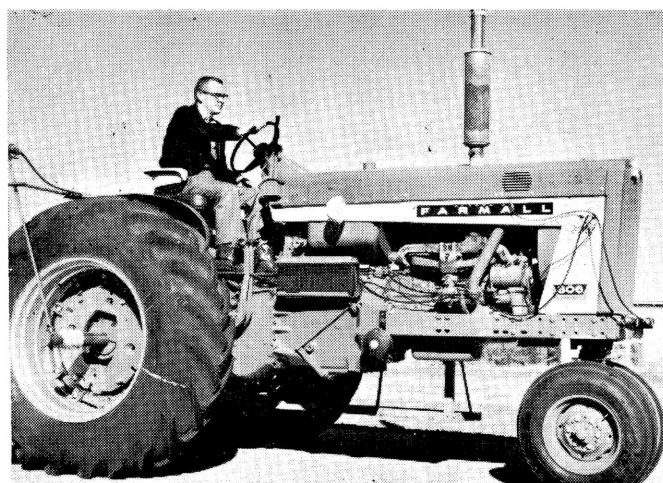
mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the 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.



Farmall 806 Gasoline