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Test 553: Caterpillar D-2

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The Experiment Station
University of Nebraska College of Agriculture
W. V. Lambert, Director, Lincoln, Nebraska

NEBRASKA TRACTOR TEST NO. 553

Department of Agricultural Engineering
Dates of test: July 25 to July 30, 1955
Manufacturer: CATERPILLAR TRACTOR COMPANY, PEORIA, ILLINOIS
Manufacturer's rating: 38 maximum drawbar horsepower (corrected to standard conditions)

CATERPILLAR D-2

BELT HORSEPOWER TESTS

| Hp | Crank shaft speed rpm | Fuel Consumption | | | Water used gal per hour | Temp Deg F | | Barometer inches of mercury | | |
|---|-----------------------|------------------|---------------|----------------|-------------------------|-------------|-------|-----------------------------|-------|-------|
| | | Gal per hour | Hp-hr per gal | Lb per hp-hour | | Cooling med | Air | | | |
| TESTS B AND C—100% MAXIMUM LOAD—TWO HOURS | | | | | | | | | | |
| 41.86 | 1650 | 3.402 | 12.30 | 0.571 | 0.00 | 199 | 106 | 28.757 | | |
| TEST D—RATED LOAD—ONE HOUR | | | | | | | | | | |
| 38.68 | 1650 | 2.991 | 12.93 | 0.543 | 0.00 | 199 | 106 | 28.700 | | |
| TEST E—VARYING LOAD—TWO HOURS (20 minute runs; last line average) | | | | | | | | | | |
| 38.74 | 1650 | 2.991 | 12.95 | 0.542 | ... | 197 | 106 | | | |
| 3.07 | 1764 | 1.184 | 2.59 | 2.707 | ... | 154 | 104 | | | |
| 20.75 | 1755 | 1.970 | 10.53 | 0.667 | ... | 157 | 104 | | | |
| 39.01 | 1445 | 3.073 | 12.69 | 0.553 | ... | 206 | 103 | | | |
| 10.46 | 1757 | 1.509 | 6.93 | 1.012 | ... | 157 | 102 | | | |
| 30.38 | 1732 | 2.440 | 12.45 | 0.564 | ... | 164 | 100 | | | |
| 23.74 | 1684 | 2.194 | 10.82 | 0.649 | 0.00 | 172 | 103 | 28.700 | | |
| TORQUE (At Dynamometer) | | | | | | | | | | |
| Eng rpm | 1647 | 1567 | 1478 | 1392 | 1305 | 1225 | 1142 | 1052 | 964 | 879 |
| Lb-ft | 274.4 | 280.5 | 287.9 | 294.0 | 297.5 | 302.2 | 304.9 | 307.8 | 306.6 | 298.9 |
| Dyn rpm | 807 | 767 | 723 | 681 | 638 | 598 | 556 | 511 | 466 | 425 |

DRAWBAR HORSEPOWER TESTS

| Hp | Draw bar pull lb | Speed miles per hr | Crank shaft speed rpm | Slip of drive wheels % | Fuel Consumption | | | Water used gal per hour | Temp Deg F | | Barometer inches of mercury |
|--------------------------------------|------------------|--------------------|-----------------------|------------------------|-------------------------------|---------------|--------------|-------------------------|-------------|--------|-----------------------------|
| | | | | | Gal per hour | Hp-hr per gal | Lb per hp-hr | | Cooling med | Air | |
| TEST H—RATED LOAD—TEN HOURS—2nd Gear | | | | | | | | | | | |
| 29.03 | 4147 | 2.63 | 1651 | 2.69 | 2.717 | 10.68 | 0.657 | 0.00 | 177 | 96 | 28.854 |
| TESTS F & G—100% MAXIMUM LOAD | | | | | | | | | | | |
| 34.55 | 7413 | 1.75 | 1648 | 4.17 | 1st gear (part throttle)..... | | | 173 | 95 | 28.840 | |
| 36.62 | 5205 | 2.64 | 1655 | 2.81 | 2nd gear..... | | | 172 | 83 | 28.920 | |
| 35.84 | 4223 | 3.18 | 1653 | 2.17 | 3rd gear..... | | | 177 | 87 | 28.920 | |
| 35.01 | 3436 | 3.82 | 1652 | 1.70 | 4th gear..... | | | 178 | 89 | 28.920 | |
| 32.85 | 2234 | 5.51 | 1653 | 0.89 | 5th gear..... | | | 180 | 89 | 28.920 | |

FUEL, OIL and TIME Diesel fuel Cetane No. 50 (rating taken from oil company's typical inspection data) weight per gallon 7.020 lb Oil SAE 30 to motor 3.022 gal drained from motor 2.348 gal Total time motor was operated 42 hours.

CHASSIS Type Tracklayer Serial No. 5U15427 Tread width 50" Wheel base 60 13/16" Measured length of track 196" Cleats integral with shoes Cleats per track 32 Size of cleats 12" x 1 1/8" Advertised speeds mph first 1.8 second 2.7 third 3.2 fourth 3.9 fifth 5.5 reverse 2.2 Belt pulley diam 12" Face 7 1/2" rpm 960 Belt speed 3015 fpm Clutch dry single plate clutch operated by hand lever Seat upholstered Brakes contracting bands operated by two foot pedals one of which can be locked by latch Steering two hand levers controlling multiple disc clutches.

ENGINE Make Caterpillar Diesel Type 4 cylinder vertical Serial No. 5U15427 Crankshaft mounted lengthwise Head I Lubrication pressure Bore and stroke 4" x 5" Rated rpm 1650 Compression ratio 18.5 to 1 Displacement 252 cu. in. Port diameter valves inlet 1 1/8" exhaust 1 1/8" Governor variable speed centrifugal Air cleaner oil washed wire mesh with precleaner Muffler not used Oil filter replaceable paper element Fuel filter four cotton wound replaceable elements Cooling medium temperature control thermostat.

STARTING ENGINE Make Caterpillar Type 2 cylinder horizontal opposed Mounted behind Diesel engine Mfg. rating 10 hp at 3000 rpm Bore and stroke 2 1/4" x 3" Ignition system magneto Air cleaner oil washed wire mesh Starting system rope.

TOTAL WEIGHT AS TESTED (with operator) 8536 lbs.

REPAIRS AND ADJUSTMENTS Track roller guards were mounted on tractor following test A.

REMARKS All test results were determined from observed data and without allowances, additions or deductions. Test F was made with a fuel pump setting, selected by the manufacturer to develop approximately 38 corrected maximum drawbar horsepower in second gear and data from this test were used in determining the horsepower to be developed in tests D and H, respectively. Tests B, C, D, E, G, and H were made with the same setting.

HORSEPOWER SUMMARY

| | Drawbar | Belt |
|--|---------|-------|
| 1. Sea level (calculated) maximum horsepower (based on 60° F and 29.92" Hg) | 38.75 | 45.43 |
| 2. Observed maximum horsepower (tests F and B) | 36.62 | 41.86 |
| 3. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly ASAE and SAE ratings) | 29.06 | 38.62 |

We, the undersigned, certify that this is a true and correct report of official tractor test No. 553.

L. F. LARSEN
Engineer-In-Charge

L. W. Hurlbut
G. W. Steinbruegge
J. J. Sulek
Board of Tractor
Test Engineers

