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January 1939

Test 321: Caterpillar Model R-2 (Distillate)

Nebraska Tractor Test Lab

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UNIVERSITY OF NEBRASKA - AGRICULTURAL ENGINEERING DEPARTMENT
AGRICULTURAL COLLEGE, LINCOLN

Copy of Report of Official Tractor Test No. 321

Dates of test: July 24 to August 3, 1939.
Name and model of tractor: CATERPILLAR R-2 (Distillate)
Manufacturer: Caterpillar Tractor Company, Peoria, Illinois,
Manufacturer's rating: NOT RATED.

B E L T H O R S E P O W E R T E S T S

| H. P. | Crank shaft speed R.P.M. | Fuel Consumption | | | Water used gal. per hr. | Temp. Deg. F. | | Barometer Inches of Mercury |
|---|-----------------------------------|--------------------|--------------------------|-------------------------|-------------------------------------|----------------------|-----|-----------------------------------|
| | | Gal. per hr. | H. P. hr. per gal. | Lb. per H. P. hr. | | Cool- ing med. | Air | |
| TEST B - 100% MAXIMUM LOAD - TWO HOURS | | | | | | | | |
| 28.56 | 1526 | 3.684 | 7.75 | 0.894 | 0.000 | 204 | 99 | 28.755 |
| TEST C - OPERATING MAXIMUM LOAD - ONE HOUR | | | | | | | | |
| 27.78 | 1525 | 3.089 | 8.99 | 0.771 | 0.000 | 202 | 93 | 28.780 |
| *TEST D - ONE HOUR | | | | | | | | |
| 26.28 | 1524 | 3.000 | 8.76 | 0.791 | 0.000 | 194 | 87 | 28.720 |
| TEST E - VARYING LOAD - TWO HOURS (20 minute runs; last line average) | | | | | | | | |
| 26.06 | 1520 | 2.974 | 8.76 | 0.791 | -- | 194 | 89 | -- |
| 1.18 | 1599 | 1.636 | 0.72 | 9.610 | -- | 175 | 86 | -- |
| 13.63 | 1577 | 2.338 | 5.83 | 1.189 | -- | 178 | 86 | -- |
| 26.74 | 1467 | 2.866 | 9.33 | 0.743 | -- | 190 | 83 | -- |
| 6.89 | 1602 | 1.978 | 3.48 | 1.990 | -- | 173 | 78 | -- |
| 20.57 | 1593 | 2.766 | 7.44 | 0.932 | -- | 175 | 74 | -- |
| 15.85 | 1560 | 2.426 | 6.53 | 1.061 | 0.000 | 181 | 82 | 28.800 |

D R A W B A R H O R S E P O W E R T E S T S

| H. P. | Draw bar pull pounds | Speed miles per hr. | Crank shaft speed R.P.M. | Slip on drive wheels % | Fuel Consumption | | | Water used gal. per hr. | Temp. | | Baromete Inches o Mercury |
|--|-------------------------------|------------------------------|-----------------------------------|------------------------------------|------------------------|----------------------|---------------------------|-------------------------------------|----------------------|-----|---------------------------------|
| | | | | | Gal. per hr. | H. P. per gal. | Lb. per H.P. hr. | | Cool- ing med. | Air | |
| | | | | | | | | | | | |
| TEST F - 100% MAXIMUM LOAD - Second - GEAR | | | | | | | | | | | |
| 22.98 | 3596 | 2.40 | 1526 | 3.53 | -----Not Recorded----- | | | | 190 | 95 | 28.820 |
| TEST G - OPERATING MAXIMUM LOAD | | | | | | | | | | | |
| 22.49 | 5379 | 1.57 | 1528 | 6.89 | -----Not Recorded----- | | | | 194 | 85 | 28.850 |
| 22.26 | 3455 | 2.42 | 1526 | 2.72 | -----"----- | | | | 198 | 89 | 28.920 |
| 21.36 | 2722 | 2.94 | 1527 | 1.36 | -----"----- | | | | 198 | 96 | 28.915 |
| 21.31 | 2258 | 3.54 | 1525 | 0.64 | -----"----- | | | | 201 | 100 | 28.900 |
| 19.35 | 1423 | 5.10 | 1527 | 0.06 | -----"----- | | | | 200 | 100 | 28.900 |

*TEST H - TEN HOURS - Second - GEAR

| | | | | | | | | | | | |
|-------|------|------|------|------|-------|------|-------|-------|-----|----|--------|
| 18.95 | 2898 | 2.45 | 1524 | 1.19 | 2.801 | 6.77 | 1.024 | 0.013 | 192 | 93 | 28.910 |
|-------|------|------|------|------|-------|------|-------|-------|-----|----|--------|

*Formerly called RATED LOAD; see REMARKS 4, page 3.

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FUEL, OIL, AND TIME

Fuel Distillate Octane 38 Weight per gallon 6.93 pounds
Oil: S.A.E. No. 30 To motor 3.037 gal. Drained from motor 3.164 gal.
Total time motor was operated 55 hours

BRIEF SPECIFICATIONS

Advertised speeds, miles per hour: First 1.7 Second 2.5
Third 3.0 Fourth 3.6 Fifth 5.1 Reverse 2.1
Belt pulley: Diam. 12" Face 7 1/2" R.P.M. 850 Belt speed 2670 f.p.m.
Clutch: Make Own Type Dry disc Operated by hand
Seat Upholstered
Total weight as tested (with operator) 6835 pounds

MOTOR: Make Own Serial No. 6J254 SP Type 4 cylinder, vertical
Head I Mounting Crankshaft lengthwise Lubrication Pressure
Bore and stroke 3 3/4" x 5" Rated R.P.M. 1525
Port diameter valves: Inlet 1 5/8" Exhaust 1 7/16"
Magneto: Make Eisemann Model CM-4
Carburetor: Make Zenith Model K-5A Size 1 1/4"
Governor: Make Own Type Variable-speed, centrifugal
Air cleaner: Make Donaldson Type Oil-washed, wire screen filter and
collector pre-cleaner
Oil Filter: None
Cooling medium temperature control: Fulton thermostat, Pines radiator
shutter

CHASSIS: Type Tracklayer Serial No. 6J254 SP Drive Enclosed gear
Tread width: 50" Measured length of track 15.3675'
Cleats: Type Integral with shoes No. per track 30
Size 1 7/8" high x 12" long

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REPAIRS AND ADJUSTMENTS

During the drawbar maximum horsepower runs the line from the fuel tank to the fuel pump was broken, apparently due to vibration. A clip, normally used to attach the fuel line to the engine block was inadvertently omitted by the manufacturer. A new line and a clip were installed.

REMARKS

1. All results shown on page 1 of this report were determined from observed data and without allowances, additions, or deductions. Tests B and F were made with carburetor set for 100% maximum belt horsepower and data from these tests were used in determining the horsepower to be developed in tests D and H, respectively. Tests C, D, E, G, and H were made with an operating setting of the carburetor (selected by the manufacturer) of 96.6% of maximum belt horsepower.

| | <u>DRAWBAR</u> | <u>BELT</u> |
|---|----------------|-------------|
| 2. Observed maximum horsepower (tests F & B) | 22.98 | 28.56 |
| 3. Sea level (calculated) maximum horsepower (based on 60° F. and 29.92" Hg.) | 24.66 | 30.82 |
| 4. Seventy-five per cent of calculated maximum drawbar horsepower and eighty-five per cent of calculated maximum belt horsepower (formerly A.S.A.E. and S.A.E. ratings) | 18.50 | 26.20 |

We, the undersigned certify that the above is a true and correct report of official tractor test No. 321 .

Carlton L. Zink
Engineer-in-charge

E. E. Brackett

C. W. Smith

L. W. Hurlbut
Board of Tractor Test Engineers