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Larsen

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January 1940

## Test 352: M-M Twin City Model ZTU

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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Copy of Report of Official Tractor Test No. 352

Dates of test: September 3 to 7, 1940.

Name and model of tractor: M-M TWIN CITY ZTU

Manufacturer: Minneapolis-Moline Power Implement Company, Minneapolis, Minnesota.

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<br>shaft<br>speed<br>R.P.M. | Fuel Consumption   |                          |                         | Water<br>used<br>gal.<br>per<br>hr. | Temp.<br>Deg. F.     |     | Barometer<br>Inches of<br>Mercury |
|-------|-----------------------------------|--------------------|--------------------------|-------------------------|-------------------------------------|----------------------|-----|-----------------------------------|
|       |                                   | Gal.<br>per<br>hr. | H. P.<br>hr. per<br>gal. | Lb. per<br>H. P.<br>hr. |                                     | Cool-<br>ing<br>med. | Air |                                   |

TEST B - 100% MAXIMUM LOAD - TWO HOURS

|       |      |       |       |       |       |     |    |        |
|-------|------|-------|-------|-------|-------|-----|----|--------|
| 31.14 | 1500 | 2.909 | 10.70 | 0.578 | 0.000 | 189 | 83 | 28.965 |
|-------|------|-------|-------|-------|-------|-----|----|--------|

TEST C - OPERATING MAXIMUM LOAD - ONE HOUR

|       |      |       |       |       |       |     |    |        |
|-------|------|-------|-------|-------|-------|-----|----|--------|
| 30.55 | 1500 | 2.792 | 10.94 | 0.566 | 0.000 | 184 | 81 | 28.995 |
|-------|------|-------|-------|-------|-------|-----|----|--------|

\*TEST D - ONE HOUR

|       |      |       |       |       |       |     |    |        |
|-------|------|-------|-------|-------|-------|-----|----|--------|
| 27.94 | 1499 | 2.777 | 10.06 | 0.615 | 0.000 | 184 | 87 | 29.000 |
|-------|------|-------|-------|-------|-------|-----|----|--------|

TEST E - VARYING LOAD - TWO HOURS (20 minute runs; last line average)

|       |      |       |       |       |       |     |    |        |
|-------|------|-------|-------|-------|-------|-----|----|--------|
| 27.96 | 1499 | 2.777 | 10.07 | 0.615 | --    | 181 | 85 | --     |
| 1.51  | 1590 | 1.241 | 1.22  | 5.086 | --    | 152 | 83 | --     |
| 14.43 | 1542 | 1.943 | 7.43  | 0.834 | --    | 159 | 83 | --     |
| 29.53 | 1460 | 2.738 | 10.79 | 0.574 | --    | 192 | 84 | --     |
| 7.34  | 1568 | 1.522 | 4.82  | 1.283 | --    | 155 | 82 | --     |
| 21.22 | 1513 | 2.389 | 8.88  | 0.697 | --    | 169 | 82 | --     |
| 17.00 | 1529 | 2.102 | 8.09  | 0.765 | 0.000 | 168 | 83 | 28.980 |

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<br>bar<br>pull<br>pounds | Speed<br>miles<br>per<br>hr. | Crank<br>shaft<br>speed<br>R.P.M. | Slip<br>on<br>drive<br>wheels<br>% | Fuel Consumption   |                            |                           | Water<br>used<br>gal.<br>per<br>hr. | Temp.<br>Deg. F.     |     | Barometer<br>Inches of<br>Mercury |
|-------|-------------------------------|------------------------------|-----------------------------------|------------------------------------|--------------------|----------------------------|---------------------------|-------------------------------------|----------------------|-----|-----------------------------------|
|       |                               |                              |                                   |                                    | Gal.<br>per<br>hr. | H.P.<br>hr.<br>per<br>gal. | Lb.<br>per<br>H.P.<br>hr. |                                     | Cool-<br>ing<br>med. | Air |                                   |

TEST F - 100% MAXIMUM LOAD - Fourth - GEAR

|       |      |      |      |      |       |              |       |     |    |        |
|-------|------|------|------|------|-------|--------------|-------|-----|----|--------|
| 26.39 | 2258 | 4.38 | 1500 | 8.94 | ----- | Not Recorded | ----- | 205 | 88 | 28.990 |
|-------|------|------|------|------|-------|--------------|-------|-----|----|--------|

TEST G - OPERATING MAXIMUM LOAD

|       |      |      |      |       |       |              |       |     |    |        |
|-------|------|------|------|-------|-------|--------------|-------|-----|----|--------|
| 16.16 | 3254 | 1.86 | 1499 | 18.47 | ----- | Not Recorded | ----- | 183 | 89 | 28.990 |
| 19.18 | 3168 | 2.27 | 1501 | 17.40 | ----- | "            | "     | 179 | 79 | 28.990 |
| 25.78 | 2869 | 3.37 | 1501 | 11.97 | ----- | "            | "     | 190 | 77 | 29.015 |
| 26.10 | 2233 | 4.38 | 1500 | 8.89  | ----- | "            | "     | 202 | 87 | 28.995 |

\*TEST H - TEN HOURS - Fourth - GEAR

|       |      |      |      |      |       |      |       |       |     |    |        |
|-------|------|------|------|------|-------|------|-------|-------|-----|----|--------|
| 21.04 | 1748 | 4.51 | 1500 | 4.05 | 2.467 | 8.53 | 0.726 | 0.000 | 192 | 92 | 28.995 |
|-------|------|------|------|------|-------|------|-------|-------|-----|----|--------|

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

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UNIVERSITY OF NEBRASKA - AGRICULTURAL ENGINEERING DEPARTMENT  
AGRICULTURAL COLLEGE, LINCOLN

Copy of Report of Official Tractor Test No. 352

**FUEL, OIL, AND TIME**

Fuel Gasoline Octane 73 Weight per gallon 6.19 pounds  
Oil: S.A.E. No. 30 To motor 1.702 gal. Drained from motor 1.615 gal.

Total time motor was operated 56 hours

**BRIEF SPECIFICATIONS**

Advertised speeds miles per hour: First 2.2 Second 2.7  
Third 3.7 Fourth 4.7 Fifth 14.6 Reverse 1.1

Belt pulley: Diam. 14" Face 6-3/4" R.P.M. 786 Belt Speed 2880 f.p.m.

Clutch: Make Twin Disc Type Single plate Operated by hand

Seat Pressed steel

Total Weight as tested (with operator) 5025 pounds

**MOTOR**

Make Own Serial No. 53543 Type 4 cylinder, vertical

Head I Mounting Crankshaft lengthwise Lubrication Pressure

Bore and stroke 3-5/8" x 4-1/2" Rated R.P.M. 1500

Port diameter valves: Inlet 1-1/4" Exhaust 1-1/4"

Magneto: Make Fairbanks-Morse Model FMK4B

Carburetor: Make Schebler Model TRX12 Size 1"

Governor: Make Own Type Variable speed, centrifugal

Air Cleaner: Make United Type Oil-washed, crimped wire

Oil Filter: Make H-W Type Renewable waste element

Cooling medium temperature control: Dole thermostat

**CHASSIS**

Type Tricycle Serial No. 567884 Drive Enclosed gear

Tread width: Rear 54" - 84" Front: Top 14" Bottom 7"

Rear tires: No. 2 Size 9 x 38 - 4 ply Air pressure 16 pounds

Front tires: No. 2 Size 5.50 x 16 - 4 ply Air pressure 28 pounds

Added weight: Per rear wheel (Cast Iron 452 pounds  
(Water 153 pounds

Per front wheel (Cast Iron 56 pounds  
(Water -- pounds

Copy of Report of Official Tractor Test No. 352

REPAIRS AND ADJUSTMENTS

Because the engine side covers were not readily removable, they were raised during the belt tests to facilitate cooling.

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 97.8% of maximum belt horsepower.

|   | <u>DRAWBAR</u> | <u>BELT</u> |
|---|----------------|-------------|
| 2. Observed maximum horsepower (tests F & B)  | 26.39          | 31.14       |
| 3. Sea level (calculated) maximum horsepower<br>(based on 60° F. and 29.52" Hg.)  | 27.97          | 32.88       |
| 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) | 20.98          | 27.95       |

We, the undersigned, certify that the above is a true and correct report of official tractor test No. 352.

Carlton L. Zink  
Engineer-in-charge

E. E. Brackett

C. W. Smith

L. W. Hurlbut  
Board of Tractor Test Engineers