Australian tractor test report no. 53 : Chamberlain Countryman 354

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THE Chamberlain Countryman 354 is a broad-acres cultivation tractor of 77 drawbar horsepower. With 87 h.p. at the P.T.O. at rated engine speed it comes within Class 7 of the Australian Standard Classification of Wheeled Tractors for Agricultural Purposes, A.S. D-10: 1967. It is equipped with 21.3 x 26 pneumatic tyres. It has a three speed gear box with High, Intermediate, and Low ratio changes giving 9 forward and 3 reverse gears. However since 6th (1.3) and 7th (H.1) gears are for all practical purposes the same, there are, effectively, 8 forward and three reverse speeds. The tractor is designed solely for drawbar working.

The tractor has a Perkins 6-cylinder 4-stroke direct injection diesel engine of 354 cubic inches capacity, rated speed 2,000 r.p.m. The recommended fuel is distillate. The manufacturer’s advertised value for power output of 92 shaft h.p. at rated speed refers to a fully equipped engine.

Further details, including an abstract of the manufacturer’s specifications, are contained in the full Technical Report from which this abridgment has been made.

The test tractor

The test tractor was chosen at random from stock at Chamberlain’s Welshpool, W.A. manufacturing plant by a representative of the W.A. Director or Agriculture. It was run-in at the Testing Station for 12 hours. Full power was measured in a 2-hour test after running in; a check test after a further 30 hours of test running showed no significant change in output. As will be seen from the Performance Summary: the test value of full power output confirmed the manufacturer’s expectations.

Fuel pump calibration was set within specified limits; governor setting, 2,140 r.p.m. manufacturer’s specification being 2,130 r.p.m. Fuel used was “Shell Diesoline” weighing 8.34 lb. per gallon.

Tractor identification numbers were: Serial No. 354/1600, Engine No. 354/U34077N. No water was added during the tests. Oil consumption for the 37 hours of test running was approximately 3½ pints. The engine and the transmission were partly dismantled after the test, and found to be in satisfactory condition.

Drawbar tests were done with the tractor ballasted to the maximum recommended by the Company for normal agricultural drawbar work. Total weight, including the driver, was 12,760 lb. (front axle 2,810 lb.; rear axle, 9,950 lb.). This weight included no ballast on the front (8.25 x 20) wheels, but 75 per cent. water ballast in the rear (21.3 x 26) tyres, and solid ballast of 880 lb. comprising 4 x 110 lb. weights per rear wheel.

Drawbar height was 18 in. The tests were done on a level tarmac road.

Further information on the effect on performance of varying drawbar height, weight, wheel equipment, road surface and other questions of the interpretation of tractor test may be obtained from the Tractor Testing Officers at the University of Melbourne.

inspection report

Power Take-Off

The P.T.O. gives 540 r.p.m. at 1,600 r.p.m. engine speed not at the rated engine speed of 2,000 r.p.m.; this is on the limit of 80 per cent. of rated speed specified in B.S. 1495:1964. The P.T.O. is a standard 6-spline 1\(\frac{3}{8}\) in. dia. independent drive with guard and cover according to B.S. 1495:1964, located 1\(\frac{3}{8}\) in. right of centre rear, 29 in. above the ground on 23.1 x 26 tyres. Control is by hand operated independent clutch; lever at driver’s left hand.

Clearance around P.T.O. generally accords with B.S. 1495, but clearance to drawbar at max. height is 6 in.; 8 in. is minimum recommended.
Belt Pulley

The belt pulley unit supplied for this model is the same as that used on the Chamberlain Champion 306. It mounts on the P.T.O. for rearward working, in either direction of rotation at 1,188 r.p.m. at 1,600 r.p.m. engine rated speed. At this speed, speed of belt is 3,100 f.p.m. in accordance with B.S. 1495 : 1964. Pulley 10\(\frac{1}{4}\) in. dia. 6\(\frac{1}{2}\) in. face width. No tests were done of belt power output; in practice, the power delivered through the belt would be limited by the capacity of the 6 in. belt employed to about 55 h.p. as found in Test No. 52 on the 306 model.

Hydraulics

A vane pump, 2\(\frac{1}{2}\) gallon reservoir, and control valve are mounted on the right hand side of the engine. This system gives 11.67 g.p.m. at 1,900 p.s.i. at 2,000 engine r.p.m. and supplies power for external hydraulic circuits.

Drawbar

A fixed drawbar mounting plate 20 in. above ground is provided with 15\(\frac{1}{2}\) in. clearance holes. A swinging roller-mounted drawbar runs on this; 17 positions are available offsetting the drawbar pin by 2.6 in., 5.2 in., 7.8 in., 10.3 in., 12.9 in., 15.4 in., 17.6 in., 20.1 in. either side of centre. Height is adjustable (13\(\frac{1}{3}\) in. by 6 steps, to 21\(\frac{3}{4}\) in. to centre of clevis) by refitting the clevis unit on the drawbar mast.

Drawbar and clevis dimensions conform with B.S. 1495.

Driver's Accommodation

There is good access to the seat from either side forward of the rear wheels with a footstep and handgrips on either side. The driver's area has a full width platform.

The seat is a full width bench seat rigidly mounted on the tractor. It has a loose cushion and back rest upholstered with foam rubber. Fore-and-aft adjustment is 2 in. Stand-up working is possible.

All controls are conveniently placed and easily operated and conform generally to B.S. 1495 : 1964, except that the P.T.O. independent clutch lever moves forward to disengage not towards the operator; also, the STOP control returns to the RUN position, and the engine may be started in gear. Since the tests, the manufacturer has advised that these last two matters are to be rectified in future production.

Performance Summary

<table>
<thead>
<tr>
<th>Engine Crankshaft</th>
<th>P.T.O.</th>
<th>Belt Pulley</th>
<th>Drawbar (3rd Gear)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer's rating*</td>
<td>92</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Full power—h.p.</td>
<td>93</td>
<td>2000</td>
<td>6000</td>
</tr>
<tr>
<td>At engine speed—r.p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel economy—lb./h.p.-hr.</td>
<td>0.38</td>
<td>0.41</td>
<td>0.47</td>
</tr>
<tr>
<td>Fuel consumption—gal./hr.</td>
<td>3.5</td>
<td>3.7</td>
<td>3.6</td>
</tr>
</tbody>
</table>

* From current advertising.

Full crankshaft torque—at rated speed 244 ft. lb. at 1,400 r.p.m., 256 ft. lb. (max.).

Best economy—0.365 lb./shaft h.p.-hr. at 80 per cent load, at about 1,200 r.p.m.

High idle speed—2,140 r.p.m.

Drawbar Performance

<table>
<thead>
<tr>
<th>Gear</th>
<th>d.b.h.p.</th>
<th>Engine (r.p.m.)</th>
<th>Pull (lb.)</th>
<th>Speed (m.p.h.)</th>
<th>Slip (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (L. 1)</td>
<td>63</td>
<td>2130</td>
<td>9500</td>
<td>2.5</td>
<td>14</td>
</tr>
<tr>
<td>2 (L. 1)</td>
<td>70*</td>
<td>2000</td>
<td>8500</td>
<td>3.1</td>
<td>11</td>
</tr>
<tr>
<td>3 (L. 2)</td>
<td>77*</td>
<td>2000</td>
<td>6750</td>
<td>4.3</td>
<td>7</td>
</tr>
<tr>
<td>4 (L. 2)</td>
<td>78*</td>
<td>2000</td>
<td>5200</td>
<td>5.6</td>
<td>6</td>
</tr>
<tr>
<td>5 (L. 3)</td>
<td>78*</td>
<td>2000</td>
<td>4100</td>
<td>7.1</td>
<td>4</td>
</tr>
<tr>
<td>6 (L. 3)</td>
<td>77*</td>
<td>2000</td>
<td>3150</td>
<td>9.2</td>
<td>3</td>
</tr>
<tr>
<td>7 (H. 1)</td>
<td>77*</td>
<td>2000</td>
<td>3000</td>
<td>9.5</td>
<td>3</td>
</tr>
<tr>
<td>8, 9</td>
<td>Road gears, not tested</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* These correspond with engine at full power rated speed.

Fuel Consumption

<table>
<thead>
<tr>
<th>Pull (lb.)</th>
<th>Speed (m.p.h.)</th>
<th>d.b.h.p.</th>
<th>Slip (%)</th>
<th>Fuel Consumption gal./hr.</th>
<th>Fuel Consumption lb./d.b.h.p./hr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>4</td>
<td>7</td>
<td>38</td>
<td>3</td>
<td>2.7</td>
</tr>
<tr>
<td>4000</td>
<td>4</td>
<td>7</td>
<td>38</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>5400</td>
<td>4</td>
<td>6</td>
<td>36</td>
<td>6</td>
<td>3.9</td>
</tr>
<tr>
<td>6400</td>
<td>4</td>
<td>5</td>
<td>35</td>
<td>6</td>
<td>4.2</td>
</tr>
</tbody>
</table>
Operating Features

Turning circles (minimum outside diameters on a consolidated gravel surface) with track widths front 60 in. and rear 66 in. were: no brakes 33 ft., with brakes 25 ft. Ground clearance is 13½ in. under the drawbar fitting.

Centre of gravity is 4 in., above and 20 in. ahead of the rear axle for the tractor as tested in the maximum weight condition.

The tractor has a sprung front axle.

Standard and Optional Features

Standard equipment includes tachometer incorporating an hour meter, water temperature gauge, oil pressure gauge, ammeter; independent P.T.O.; lighting equipment; fixed and swinging drawbar.

Optional features fitted on the test tractor included the belt pulley unit and wheel-weights. Other optional equipment includes power steering.

Users' Service

A well selected kit of hand tools is supplied and were delivered with the test tractor; a well illustrated Operator's Handbook is supplied. Service is available throughout Australia from Chamberlain dealers and agencies.

G. H. Vasey,
Officer-in-Charge, Tractor Testing.

W. F. Baillie,
Testing Officer.

University of Melbourne,
March, 1968.
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Farm Management


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