No. 588/O.E.C.D.

REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE FOR AGRICULTURAL TRACTORS

DAVID BROWN MODEL 1200 SELECTAMATIC TRACTOR

Manufactured by: David Brown Tractors Ltd,
Meltham,
Huddersfield,
Yorkshire



Test No.: R.68/5507/O.E.C.D.

This report has been approved by the O.E.C.D. Coordinating Centre (C.N.E.E.M.A., France) as being in accordance with the O.E.C.D. Tractor Test Code
Date of Approval: 26th September 1968 *Serial No.:* 244

NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING
WREST PARK SILSOE BEDFORD

This Bulletin is based on engineering tests in accordance with the O.E.C.D. Tractor Code. It does not contain an evaluation of the performance of the tractor on practical farm work

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SPECIFICATION OF TRACTOR

Manufacturer:	David Brown Tractors Ltd, Meltham, Huddersfield, Yorkshire
Submitted for test by:	The manufacturer
Selected by:	The manufacturer with the agreement of the testing station
Place of running-in:	Meltham
Duration of running-in:	51 hours

Tractor

Make:	David Brown Tractors Ltd, Meltham, Huddersfield, Yorkshire
Model:	1200 Selectamatic
Type:	Four wheel, rear wheel driven
Serial No:	1200A 705615

Engine

Make:	David Brown	Model:	455001
Type:	4-stroke, direct injection diesel	Serial No:	AD455A 6406

Cylinders:	4 cylinders, vertical, in-line, 3.939 in (100.1 mm) bore x 4.5 in (114.3 mm) stroke, capacity 219.4 in^3 (3.595 l), compression ratio 17:1, overhead in-line valves
Fuel system:	AC model E/FP 63154-A mechanical type fuel feed pump with hand primer; two pressurised C.A.V. type 2 FS filters in series with paper replaceable elements, sediment bowl and gauze strainer on fuel feed pump; capacity of fuel tank 18 UKgal (81.8 l); Simms Minimec type P 5009 injection pump, Serial No. 5585 HM; manufacturer's production setting for injection pump: 19.4 pt/h (11.02 l/h) - 20.7 pt/h (11.76 l/h) at 1600 rev/min engine speed; C.A.V. BDLL 140S 6417 injector nozzles, injector setting 175 atm (181 kg/cm^2)
Governor:	Simms mechanical, incorporated in fuel injection pump, governed range of engine speed 700-2480 rev/min, rated engine speed 1800 rev/min
Air cleaner:	AC oil bath with centrifugal pre-cleaner above hood, oil capacity $1\frac{1}{2}$ pt (0.85 l)

Lubrication system: Forced feed from gear-type pump with metal strainer in sump, Purolator full flow replaceable paper element oil filter; oil capacity 13 pt (7.4 l), recommended oil change period 125 h

Cooling system: Water cooled, impeller assisted, with 16 in (406 mm) dia, 7 blade belt driven fan, thermostat for temperature control, pressurised at 4 lb/in^2 (0.3 kg/cm^2), cooling water capacity 3 UKgal (13.6 l)

Starting system: Electrical, 12V Lucas type M 45G solenoid engaged starter motor, operable only with clutch pedal fully depressed; heater plug in inlet manifold, and manually operated excess fuel device on fuel injection pump for cold starting

Electrical system

Voltage: 12, negative earth
Generator: Lucas type C 40 A
Battery: Exide type 6-TXAZ15R, lead acid, capacity 96 Ah

Transmission

Clutch: Borg and Beck dual dry clutch, two 11 in (279 mm) dia plates, one pedal operated for gearbox drive and one hand lever operated for p.t.o. drive

Gearbox: Own make, sliding gear type, 6 forward speeds and 2 reverse

Rear axle and final drive: Own make, crown wheel and pinion with differential and outboard spur gear final drives; pedal operated differential lock

Oil capacities: Transmission 72 pt (40.9 l), final reduction units 4 pt (2.3 l) each, recommended oil change period 1000 h

Gear	Number of engine revolutions for 1 revolution of driving wheel	Nominal travelling speed for 1800 rev/min rated speed of engine, mile/h	(km/h)
Forward			
1	155.70	1.89	(3.04)
2	93.85	3.14	(5.05)
3	75.49	3.90	(6.28)
4	54.60	5.39	(8.67)
5	45.49	6.47	(10.41)
6	26.48	11.12	(17.89)
Reverse			
1	94.53	3.12	(5.02)
2	45.83	6.43	(10.35)

Power take-off

Main: At rear of tractor, 6-spline, $1\frac{3}{8}$ in (34.9 mm) dia, proportional engine speed; height above ground 29 in (737 mm)

Speeds: Low ratio 532 rev/min at 1800 rev/min rated engine speed, 540 rev/min (standard p.t.o. speed) at 1828 rev/min engine speed

High ratio 900 rev/min at 1800 rev/min rated engine speed, 1000 rev/min at 2000 rev/min engine speed

Direction of rotation clockwise viewed from tractor rear

Power lift: Own make, live hydraulic, twin chamber gear pump driven from front of engine crankshaft supplying oil from transmission to ram cylinder and take-off valve for external supply; Category 2 implement linkage with top link sensing; draught, position and T.C.U. controls selected on single operating lever; vertical lift movement above ground: 13 in (330 mm) to 38 in (965 mm)

Drawbar: Swinging drawbar, height above ground to centre of clevis $12\frac{1}{2}$ in (318 mm), $14\frac{1}{2}$ in (368 mm), $16\frac{1}{2}$ in (419 mm) and $18\frac{1}{2}$ in (470 mm); distance from rear axle centre 21 in (533 mm) or 28 in (711 mm); position relative to p.t.o. shaft 7 in (178 mm) or 14 in (356 mm); lateral adjustment 9 in (229 mm) or $11\frac{1}{2}$ in (292 mm); pivot position relative to rear wheel centre 2 in (51 mm) forward

Steering: Recirculating ball and nut with single drop-arm and drag link

Brakes: Internal expanding drum brakes on spur pinion shafts independent or combined pedal operated; hand lever with ratchet operating both brakes for parking

Wheels

Steering wheels: Two at front, Goodyear Super Rib 7.50 -16 tyres, 6 ply rating, maximum permissible weight on each tyre 1560 lb (708 kg) at 36 lb/in^2 (2.5 kg/cm^2); track width 52 in (1321 mm) by 4 in (102 mm) steps to 72 in (1829 mm) changed by extending front axle

Driving wheels: Two at rear, Goodyear Traction Sure Grip 15 - 30 tyres, 8 ply rating mounted on D.W.12 rims; maximum permissible weight on each tyre 5320 lb (2413 kg) at 20 lb/in^2 (1.4 kg/cm^2); track width 56 in (1422 mm) by 4 in (102 mm) steps to 80 in (2032 mm) changed by reversing wheel centres and offset lug type rims

Wheelbase: 7 ft $4\frac{1}{2}$ in (2248 mm)

Tractor and ballast weights (without driver but with tanks full)

Weight without ballast	Front:	2260 lb (1025 kg)
	Rear:	3521 lb (1597 kg)
	Total:	5781 lb (2622 kg)
Ballast	Front:	8 frame weights and frame, total 321 lb (146 kg)
	Rear:	Weights - 8 per wheel, total 1414 lb (641 kg)
		Liquid - 1726 lb (783 kg)
Weight with full ballast	Front:	2633 lb (1194 kg)
	Rear:	6609 lb (2998 kg)
	Total:	9242 lb (4192 kg)

Seat: Bostrom, upholstered cushion with matching back rest, parallelogram linkage with torsional spring suspension, hydraulic shock absorber, suspension adjustable for driver's weight Range of adjustment $3\frac{1}{2}$ in (88.9 mm) fore and aft

Number of grease points

Whole tractor: 25

Overall dimensions

Overall length:	Without front weights	12 ft 6 in (3.81 m)
	With front frame weights	12 ft 8 in (3.86 m)
Overall width:	Without ballast weights at 60 in (1524 mm) wheel track	6 ft $5\frac{1}{2}$ in (1.97 m)
	With ballast weights at 60 in (1524 mm) wheel track	7 ft $7\frac{1}{2}$ in (2.32 m)
Overall height:	To top of exhaust pipe	$90\frac{3}{4}$ in (2305 mm)
	To top of steering wheel	$67\frac{3}{8}$ in (1711 mm)
Minimum ground clearance:	To underside of drawbar frame in lower position	$13\frac{1}{4}$ in (337 mm)

Lighting

	Height above ground of centre, in	(cm)	Diameter, in	(cm)	Distance from outside edge of tractor at 60 in (1524 mm) wheel track, to centre, in	(cm)
Headlights	$39\frac{1}{4}$	(100)	4 13/16	(12.2)	$24\frac{3}{4}$	(62.9)
Side lights	$58\frac{3}{4}$	(149)	2	(5.1)	17	(43.2)
Rear lights	$57\frac{1}{2}$	(146)	2	(5.1)	$17\frac{1}{4}$	(43.8)
Reflectors	$49\frac{3}{8}$	(125)	$1\frac{1}{2}$	(3.8)	$21\frac{5}{8}$	(54.9)

Unrestricted beam angle of headlight in plan view 58°

FUELS AND LUBRICANTS USED IN TESTS

Fuel:	Diesel oil, density 0.845 at 60°F (15.6°C), Cetane No. 53 to Class A B.S.2869:1957
Engine oil:	Shell Multi-Purpose SAE 20W/30
Gearbox oil:	Shell Multi-Purpose SAE 20W/30
Final drive reduction oil:	Shell SAE 140 EP

COMPULSORY TESTS

1. **MAIN POWER TAKE-OFF PERFORMANCE**

Date and location of tests: 3rd - 4th April 1968; N.I.A.E., Silsoe, Bedford, U.K.

Type of dynamometer: Water brake, Heenan and Froude

Horsepower (Metric hp)	Speeds, rev/min		Fuel consumption,		
	Engine	P.t.o.	UKgal/h (l/h)	lb/hp h (g/metric hp h)	hp h/UKgal (metric hp h/l)
Maximum power - 2 hour test					
64.6 (65.3)	2302	680	3.19 (14.50)	0.418 (187)	20.2 (4.51)
Standard p.t.o. speed (540 rev/min)					
56.2 (57.0)	1828	540	2.72 (12.37)	0.409 (183)	20.7 (4.62)
Standard belt speed					
			Not applicable		
Speed recommended by the manufacturer for drawbar work					
55.6 (56.4)	1800	532	2.68 (12.18)	0.408 (182)	20.7 (4.62)
Fuel consumption at part loads					
56.4 (57.2)	2370	700	2.75 (12.50)	0.412 (184)	20.5 (4.57)
0	2467	729	0.74 (3.36)	-	-
28.8 (29.2)	2420	715	1.60 (7.27)	0.469 (210)	18.0 (4.02)
64.4 (65.3)	2302	680	3.19 (14.50)	0.418 (187)	20.2 (4.51)
14.5 (14.7)	2438	720	1.18 (5.36)	0.689 (308)	12.3 (2.74)
42.8 (43.4)	2400	709	2.15 (9.77)	0.424 (190)	20.0 (4.46)

No load, maximum engine speed: 2467 rev/min

Equivalent crankshaft torque at maximum power: 146.9 lb ft (20.3 kg m)

Maximum equivalent crankshaft torque: 170.9 lb ft (23.6 kg m) at 1320 rev/min engine speed

Mean atmospheric conditions:
- temperature 67°F (19°C)
- pressure 29.46 in Hg (748 mm Hg)
- relative humidity 33%

Maximum temperature:
- coolant 190°F (88°C)
- engine oil 190°F (88°C)
- fuel 98°F (37°C)

The following results were obtained with the p.t.o. in high ratio:

Horsepower (Metric hp)	Speeds, rev/min		Fuel consumption,		
	Engine	P.t.o.	UKgal/h (l/h)	lb/hp h (g/metric hp h)	hp h/UKgal (metric hp h/l)
Maximum power - 2 hour test					
64.2 (65.1)	2300	1150	3.21 (14.59)	0.423 (189)	20.0 (4.46)
Standard p.t.o. speed (1000 rev/min)					
60.8 (61.7)	2000	1000	2.95 (13.41)	0.410 (183)	20.6 (4.60)

2. DRAWBAR PERFORMANCE

Date of tests: 19th - 31st May 1968

Type of track: Tarmacadam

Height of drawbar above ground: 19 in (483 mm)

See table on page 10

Gear	Horse-power (Metric hp)	Drawbar pull, lb (kg)	Speed, mile/h (km/h)	Engine speed, rev/min	Wheel-slip, %	Specific fuel consumption, lb/drawbar hp h (g/metric drawbar hp h)	Specific fuel consumption, drawbar hp h/ UKgal (metric drawbar hp h/l)	Temperature, °F (°C) Coolant	Fuel	Engine oil	Atmospheric conditions Temperature, °F (°C)	Relative humidity, %	Pressure, in Hg (mm Hg)
(i) Maximum power (ballasted)													
1	49.3 (50.0)	8700 (3946)	2.13 (3.43)	2336	14.3	0.531 (238)	15.9 (3.55)	177 (81)	68 (20)	113 (45)	54 (12)	64	29.85 (758)
2	55.6 (56.4)	5500 (2495)	3.79 (6.10)	2295	6.8	0.503 (225)	16.8 (3.75)	177 (81)	63 (17)	114 (46)	55 (13)	76	30.05 (763)
3	56.7 (57.5)	4500 (2041)	4.73 (7.61)	2268	5.1	0.497 (222)	17.0 (3.79)	175 (79)	72 (22)	95 (35)	54 (12)	59	30.05 (763)
4	54.8 (55.6)	3100 (1406)	6.63 (10.67)	2259	3.3	0.510 (228)	16.6 (3.70)	175 (79)	74 (23)	132 (56)	58 (14)	83	30.05 (763)
5	54.0 (54.8)	2550 (1157)	7.94 (12.78)	2250	2.7	0.507 (227)	16.7 (3.73)	177 (81)	74 (23)	126 (52)	58 (14)	66	30.05 (763)
(ii) Five hour test at 75% of pull at maximum power													
3	44.9 (45.5)	3375 (1531)	4.99 (8.03)	2359	3.7	0.510 (228)	16.6 (3.70)	179 (82)	78 (26)	161 (72)	65 (18)	66	30.05 (763)
(iii) *Five hour test at pull corresponding to 15% wheelslip in test (i)													
1	-	8800 (3992)	2.22 (3.57)	-	-	-	-	-	-	-	57 (14)	82	30.21 (767)
(iv) Maximum power (unballasted)													
1	31.8 (32.3)	5400 (2449)	2.21 (3.56)	2383	13.9	-	-	179 (82)	-	120 (49)	72 (22)	57	30.07 (764)
2	51.3 (52.0)	5400 (2449)	3.56 (5.73)	2317	13.9	-	-	179 (82)	-	120 (49)	59 (15)	72	30.30 (770)
3	56.1 (56.9)	4500 (2041)	4.68 (7.52)	2295	8.1	-	-	179 (82)	-	138 (59)	59 (15)	72	30.30 (770)
4	56.6 (57.4)	3200 (1452)	6.64 (10.68)	2275	4.7	-	-	179 (82)	-	140 (60)	59 (15)	72	30.30 (770)
5	56.6 (57.4)	2650 (1202)	8.01 (12.89)	2237	3.7	-	-	179 (82)	-	138 (59)	61 (16)	63	30.30 (770)

Total oil consumption during ten hours duration of tests (ii) and (iii) 0.038 lb/h (17.0 g/h)

*Test (iii) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance

3. and 4. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: As in specification, without ballast

Track of wheels: Front - 52 in (1321 mm)
Rear - 60 in (1524 mm)

	With brakes		Without brakes	
	Right hand	Left hand	Right hand	Left hand
Radius of turning space	11 ft 11 in (3.63 m)	11 ft 11 in (3.63 m)	13 ft 4 in (4.06 m)	13 ft 0 in (3.96 m)
Radius of turning circle	11 ft 4 in (3.45 m)	11 ft 4 in (3.45 m)	12 ft 9 in (3.89 m)	12 ft 5 in (3.78 m)

5. LOCATION OF CENTRE OF GRAVITY

Height above ground	34.9 in (886 mm)
Distance forward from the vertical plane containing the axis of the rear wheels	33.8 in (859 mm)
Distance from the median plane of the tractor	0

6. BRAKING

Date of tests: 25th June 1968

Type of track: Tarmacadam

Cold brakes

	Tractor without ballast		Tractor ballasted	
Travelling speed of tractor, mile/h (km/h)	15.5	(25.0)	15.5	(25.0)
Maximum deceleration, ft/s^2 (m/s^2)	14.8	(4.5)	17.1	(5.2)
Stopping distance, ft (m)	15.8	(4.8)	13.9	(4.2)
Force on brake pedal, lb (kg)	105	(48)	180	(82)

Brake fade characteristics (hot tests)

Maximum deceleration hot/maximum deceleration cold x 100:	91%
Stopping distance cold/stopping distance hot x 100:	105%
Force on pedal cold/force on pedal hot x 100:	91%
Efficiency of handbrake:	Satisfactory
Pull on handbrake:	Not applicable - lock for brake pedals

7. MEASUREMENT OF AMBIENT NOISE EMITTED BY THE TRACTOR

Date of tests: 11th June 1968

Type of sound level meter: Brüel and Kjoer Type 2203

Results of tests:

gear	6th
travelling speed before acceleration	11.6 mile/h (18.7 km/h)
sound level	90 dBA

8. NOISE MEASUREMENTS AT THE DRIVER'S EAR LEVEL

Date of tests: 11th June 1968

Type of sound level meter and octave filter: Brüel and Kjoer Type 2203 with octave filter set Type 1613

Type of track: Tarmacadam

Results of Tests

Gear	Travelling speed, mile/h (km/h)	Loudness sones,
3rd	4.92 (7.92)	130

9. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: 5th and 9th April 1968; N.I.A.E., Silsoe, Bedford, U.K.

Hydraulic fluid:

make and type: Shell Tractor Oil Universal
viscosity: 20W/30
viscosity index: 105

	Vertical movement, in (mm)	Maximum force exerted through full range, lb (kg)	Pressure, lb/in^2 (kg/cm^2)	Linkage load at which unballasted front end of tractor lifts off the ground, lb (kg)
Linkage giving maximum mechanical advantage				
At lower hitch points (height above ground in down position 13 in (330 mm))	25 (635)	4400 (1996)	2360(166)	- -
On the frame 24 in (610 mm) to rear of lower hitch points	25 (635)	3600 (1633)	2360(166)	3900 (1769)

Type of linkage lock for transport:	Mechanical
Opening pressure of the cylinder over pressure relief valve (manufacturer's figures):	2600 lb/in^2 (183 kg/cm^2)
Pump characteristics	
i) opening pressure of relief valve:	2000 lb/in^2 (141 kg/cm^2)
sustained pressure of the open relief valve:	2440 lb/in^2 (172 kg/cm^2)
Pump delivery rate at external tapping	
ii) at minimum pressure (rated engine speed):	5.63 gal/min (25.6 l/min)
iii) at maximum hydraulic power:	7.25 gal/min (33.0 l/min)
delivery pressure:	2040 lb/in^2 (143 kg/cm^2)
power:	10.35 hp (10.49 metric hp)

When the outlets from the twin hydraulic pump were combined, the following results were obtained:-

Pump characteristics	
i) opening pressure of relief valve:	1950 lb/in^2 (137 kg/cm^2)
sustained pressure of the open relief valve:	2440 lb/in^2 (172 kg/cm^2)
Pump delivery rate at external tapping	
ii) at minimum pressure (rated engine speed):	11.07 gal/min (50.3 l/min)
iii) at maximum hydraulic power:	12.9 gal/min (58.6 l/min)
delivery pressure:	1950 lb/in^2 (137 kg/cm^2)
power:	17.62 hp (17.87 metric hp)

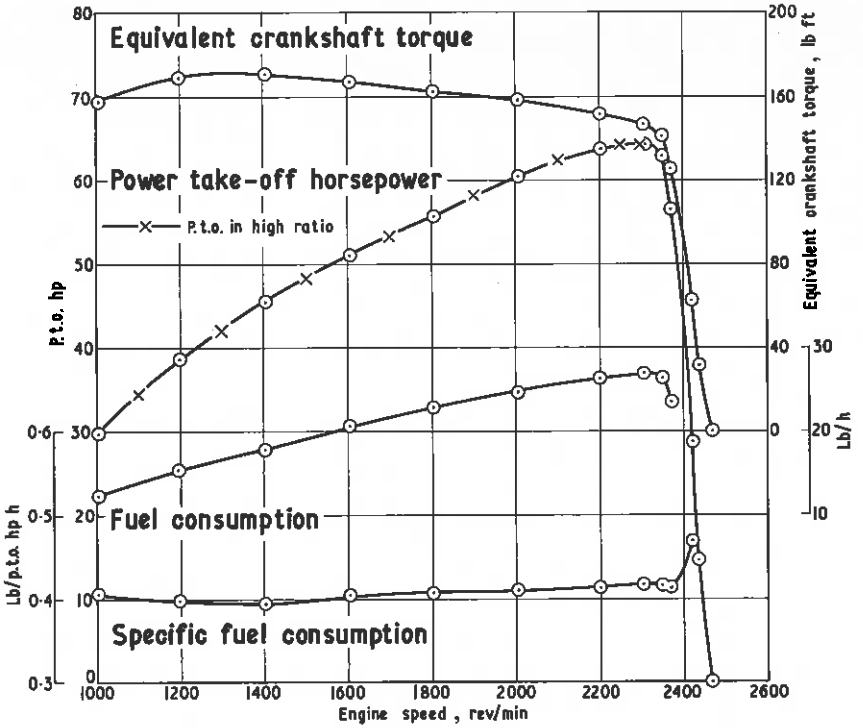
15. REPAIRS AND ADJUSTMENTS DURING TESTS: Two injector pipes were replaced

REMARKS: None

Officer in charge: D.W. SMITH

Head of Tractor Performance Department: P.H. BAILEY

Date: 20th August 1968



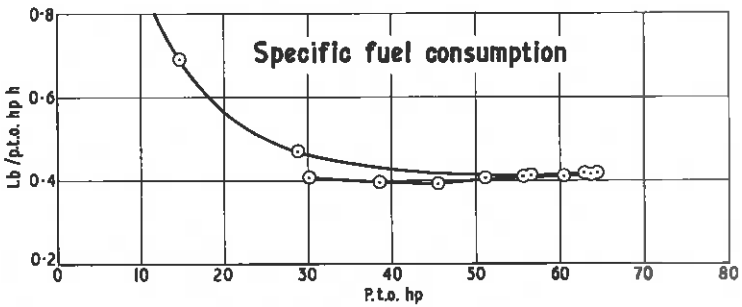
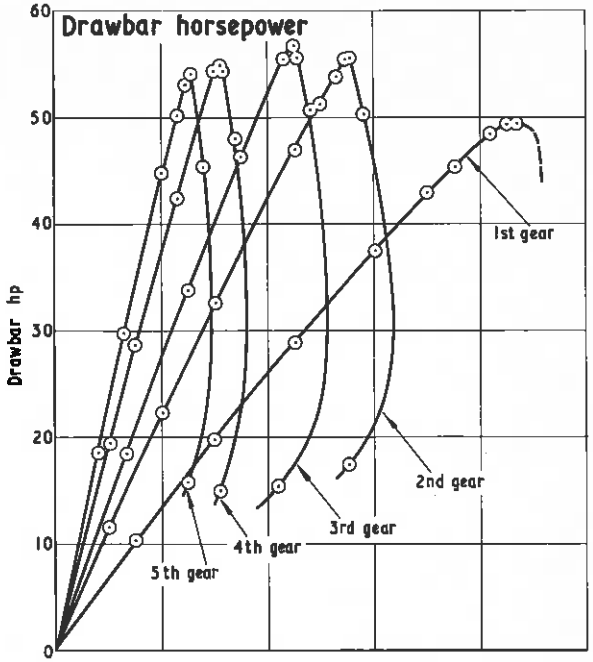


Fig. 1. Power take-off test



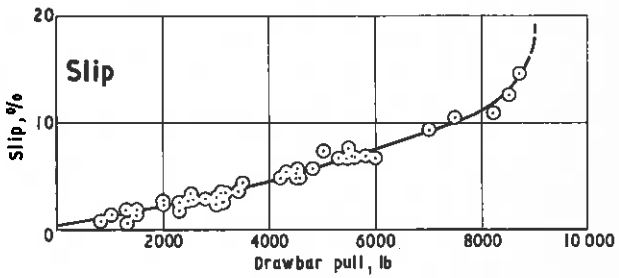


Fig. 2. Drawbar test on tarmacadam, with ballast

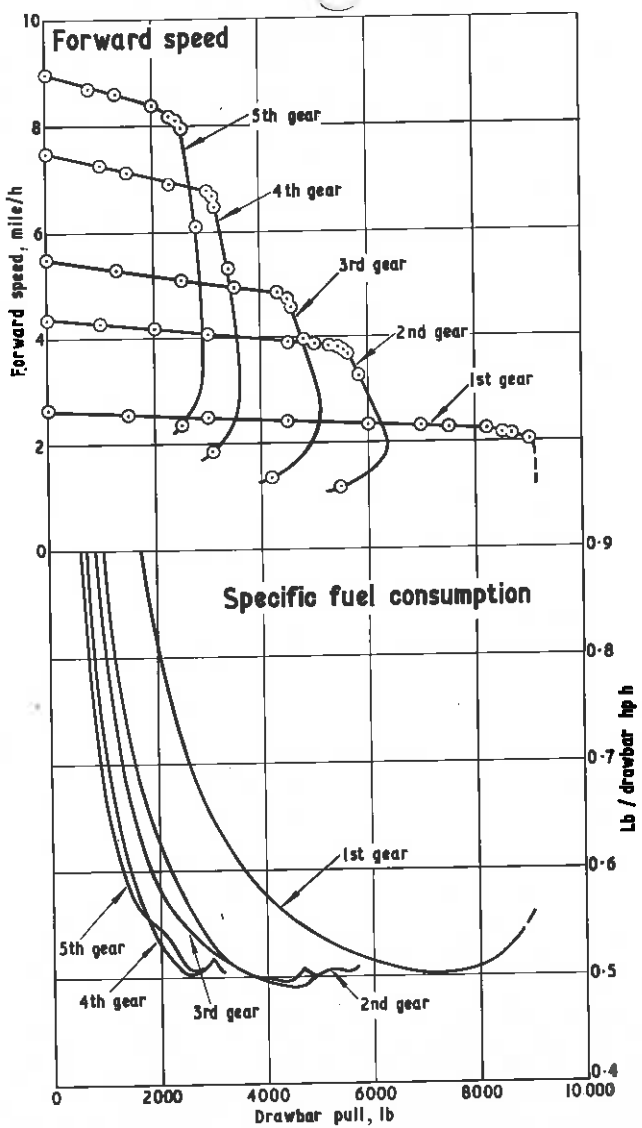


Fig. 3. Drawbar test on tarmacadam, with ballast

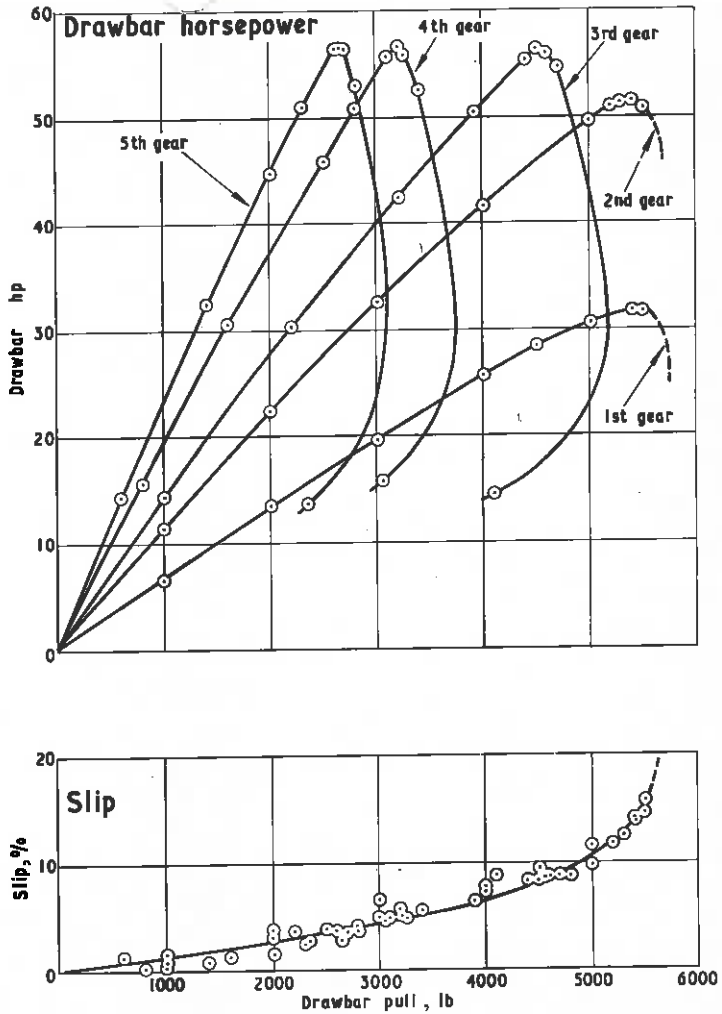


Fig. 4. Drawbar test on tarmacadam, without ballast

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