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No. 508/O.E.C.D.

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

FORD SUPER DEXTA DIESEL TRACTOR MODEL 3000

Manufactured by: Ford Motor Co. Ltd,
Tractor Division, Basildon, Essex



Date of Tests: February-March 1966
Test No.: R.66042/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
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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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PART I

SPECIFICATION OF TRACTOR

Tractor

Make:	Ford
Model:	Ford Super Dexta
Type:	3000
Serial No.:	B 814633 K145

Engine

Make:	Ford Motor Co. Ltd, type 3000, direct injection diesel, Serial No. ND 082673 J285
Cylinders:	3 cylinders, vertical, in-line, 4·2 in (106·7 mm) bore × 4·2 in (106·7 mm) stroke, capacity 174·6 in³ (2·86 l), compression ratio 16·5:1 (nominal). Monobloc construction, overhead valves
Rated speeds:	2000 rev/min, governor setting—no load engine speed 2175–2225 rev/min
Fuel system:	Fuel—Diesel oil Simms type 4665/1 injection pump, Serial No. 4246 PM; Simms type NL 413 injector nozzles. Manufacturer's production setting for injection pump 11·8–12·4 cm³ per element for 200 injections at 700 rev/min pump speed (test bench figures). Injection pressure 185–190 atm (191–196 kp/cm²), A.C. mechanical type VP 7950618 fuel feed pump, dual Simms parallel flow replaceable paper element fuel filters on pressure side of feed pump each with sediment bowl and water trap. Capacity of fuel tank 10·8 UKgal (49·1 l)
Governor:	Simms mechanical, incorporated in fuel injection pump. Governed range of engine speed 600–2225 rev/min
Air cleaner:	Burgess oil bath, under hood forward of radiator, centrifugal pre-cleaner above hood, oil capacity 2 pt (1·14 l)
Lubricating system:	Forced feed from eccentric rotor type pump with metal strainer in sump. Ford replaceable element filter. SAE 10W Supplement I oil for first 600 hours, then SAE 20W Supplement I or Series III oil when fuel sulphur content is more than 1%, recommended oil change period 300h; oil capacity 13·4 pt (7·6 l) including filter
Cooling system:	Water cooled, pressurized 7 lb/in² (0·49 kp/cm²), impeller assisted with 16 in (406 mm) dia, belt driven 4-blade fan, thermostat for temperature control, cooling water capacity 2·9 UKgal (13·2 l)

Transmission

Clutch:	Borg and Beck, dual, dry, two plates 8·5 in (216 mm) dia and 11 in (279 mm) dia for p.t.o. shaft and gear-box drive respectively, two stage foot-pedal operated
Gear-box:	Own make, constant mesh type, 8 forward speeds and 2 reverse
Differential:	Final drive with crown wheel and pinion and differential. Foot-pedal operated differential lock. Transmission oil capacities: gear-box 28·2 pt (16·0 l), rear axle 34·0 pt (19·3 l) SAE 80 EP oil

Gear	*Number of engine revolutions for one revolution of driving wheel*	*Theoretical travelling speed for 2000 rev/min rated speed of engine, mile/h (km/h)*
Forward 1	165·90	1·69 (2·72)
2	132·90	2·11 (3·39)
3	75·78	3·71 (5·97)
4	55·68	5·04 (8·11)
5	46·49	6·04 (9·72)
6	37·18	7·55 (12·15)
7	21·21	13·24 (21·30)
8	15·60	18·00 (28·96)
Reverse low	115·40	2·43 (3·91)
high	32·31	8·69 (13·98)

Steering device Recirculating ball type with double drop arms and drag links

Brakes Hand-lever operated transmission brake; independent or combined foot-pedal operated internal expanding brakes on differential half shafts

Wheels

Steering wheels: Two at front. Tyres 5·50–16, 6-ply pneumatic. Track 52 in (1321 mm) by 4 in (102 mm) steps to 80 in (2032 mm) changed by extending front axle and reversing wheels. Maximum permissible weight on each tyre: 1090 lb (494 kg) at 48 lb/in² (3·4 kp/cm²)

Driving wheels: Two at rear. Tyres 12–28, 6-ply pneumatic. Track 52 in (1321 mm) by 4 in (102 mm) steps to 76 in (1930 mm), changed by reversing wheel centres and offset lug type rims. Maximum permissible weight on each tyre: 3000 lb (1361 kg) at 20 lb/in² (1·4 kp/cm²)

Wheelbase: 6 ft 3¾ in (1924 mm)

Belt pulley

Location: Attachable to rear of tractor in two alternative horizontal positions, main p.t.o. driven

Diameter × width: 10¼ in (260 mm) × 6½ in (165 mm)

Speeds: 1114 rev/min giving 2989 ft/min (15·18 m/s) linear speed at 2000 rev/min rated engine speed. 1155 rev/min giving 3100 ft/min (15·75 m/s) at 2074 rev/min engine speed

Direction of rotation: Optional, depending on position of unit

Power take-off

Main: Live, manually engaged, proportional engine speed, 6 spline, 1⅜ in (34·9 mm) dia at rear of tractor

Height above ground: 19 in (483 mm)

Speeds: 596 rev/min at 2000 rev/min rated engine speed
540 rev/min at 1811 rev/min engine speed

Direction of rotation: Clockwise viewed from tractor rear

Power lift

Own make, hydraulic, engine driven piston type pump supplying oil from transmission at nominal pressure of 2500 lb/in² (176 kp/cm²) to ram cylinder and external tapping. Oil flow from external tapping at maximum horsepower delivered by hydraulic system, test figures: 4·03 UK gal/min (18·3 l/min) at 2400 lb/in² (169 kp/cm²) and 2000 rev/min rated engine speed, oil temperature 46 °C. Category 1 and 2 implement linkage, draught or position control with auxiliary service control and flow control device, maximum load liftable at end of lower links—test figures: through complete range—2230 lb (1012 kg); at top of lift range —3170 lb (1438 kg); manufacturer's recommended figure—1700 lb (771 kg) at 24 in (610 mm) to rear of lower link balls. Radius of motion of lower links 32 in (813 mm)

Drawbar

Fixed drawbar: (as tested)
On implement linkage with central hole and 5 holes 2 in (51 mm) apart either side of centre line, vertical adjustment from 14⅝ in (371 mm) to 29⅛ in (994 mm), changed by adjustable stay links. Distance behind rear axle 31 in (787 mm) as tested

Swinging drawbar:
Radius of swing 28 in (711 mm), lateral adjustment 18 in (457 mm), vertical heights to centre of clevis 14½ in (368 mm) and 15¼ in (387 mm). Distance behind rear axle 25¼ in (641 mm)

Hitch

None fitted

Electrical equipment

Voltage: 12, negative earth

Generator: Lucas type C40A

Battery: Ford type C5NN 10655D, lead acid, 80 Ah capacity

Starting device: Ford type C5NF 11001-A solenoid engaged starter motor, operable only when the gear selector lever is in neutral

Overall dimensions

Overall length:
11 ft 1¼ in (3·38 m) as tested with front frame and 2 weights
10 ft 8¼ in (3·26 m) as tested without ballast

Overall width:
9 ft 5 in (2·87 m) at 56 in (1422 mm) track to outside of wheel weights, 15 per wheel
5 ft 11 in (1·80 m) at 56 in (1422 mm) track, no ballast weights

Overall height:
6 ft 8½ in (2·04 m) to top of exhaust pipe
4 ft 10½ in (1·49 m) to top of steering wheel

Minimum ground clearance:
11 in (279 mm) to underside of drawbar frame

Weights

With full fuel tank, oil, cooling water, no driver

	Without additional weight, lb (kg)	*With maximum additional weight, lb (kg)*
On front wheels	1626 (738)	2170 (984)
On rear wheels	2234 (1013)	5390 (2445)
Total	3860 (1751)	7560 (3429)

Special remarks

Manually engaged excess fuel device fitted for cold starting

PART II

LABORATORY TESTS

1. Compulsory tests: Power take-off test
   Date and location of tests: 17th February 1966, N.I.A.E., Silsoe, Bedford, U.K.
   Type of dynamometer: Water brake, Heenan and Froude
   Fuel: Diesel oil, density 0·837 at 60 °F (15·6 °C), Cetane No. 54
   Engine oil: SAE 10W Supplement I
   Transmission oil: SAE 80 EP

Horse-power (Metric hp)	Speeds, rev/min		Equivalent crankshaft torque, lb ft (kp m)	Fuel consumption,			Temperature, °F (°C)			Atmos. conditions	
	Engine	P.t.o.		UKgal/h (l/h)	lb/hp h (g/metric hp h)	hp h/ UKgal (metric hp h/l)	Coolant	Oil	Fuel	Temp., °F (°C)	Press., inHg (mmHg)
A. Maximum power											
40·4 (41·0)	2052	612	103·5 (14·31)	2·07 (9·41)	0·429 (192)	19·5 (4·35)	187 (86)	203 (95)	73 (23)	65 (18)	29·69 (754)
B. Power at standard p.t.o. speed (540 rev/min)											
38·4 (38·9)	1811	540	111·5 (15·42)	1·90 (8·64)	0·413 (185)	20·3 (4·53)	187 (86)	200 (93)	71 (22)	63 (17)	29·69 (754)
C. Power at maximum torque											
34·0 (34·5)	1500	447	118·9 (16·44)	1·66 (7·55)	0·409 (183)	20·5 (4·57)	188 (87)	197 (92)	72 (22)	64 (18)	29·69 (754)
D. Power at rated speed											
40·3 (40·9)	2000	596	105·8 (14·63)	2·04 (9·27)	0·424 (190)	19·8 (4·42)	188 (87)	204 (96)	72 (22)	66 (19)	29·69 (754)
No load, maximum engine speed: 2225 rev/min											

2. Supplementary tests: Engine test (in installed condition)
   Date and location of tests: 8th March 1966, N.I.A.E., Silsoe, Bedford, U.K.
   Type of dynamometer: Water brake, Heenan and Froude
   Fuel: Diesel oil, density 0·838 at 60 °F (15·6 °C), Cetane No. 51·5
   Engine oil: SAE 10W Supplement I

Horse-power (Metric hp)	Speed, rev/min	Crank-shaft torque, lb ft (kp m)	Fuel consumption,			Temperature, °F (°C)			Atmos. conditions	
			UKgal/h (l/h)	lb/hp h (g/metric hp h)	hp h/ UKgal (metric hp h/l)	Coolant	Oil	Fuel	Temp., °F (°C)	Press., inHg (mmHg)
A. Maximum power										
42·7 (43·3)	2035	110·2 (15·24)	2·06 (9·36)	0·404 (181)	20·7 (4·62)	190 (88)	200 (93)	82 (28)	66 (19)	30·09 (764)
B. Power at standard p.t.o. speed (540 rev/min)										
40·8 (41·4)	1811	118·3 (16·36)	1·94 (8·82)	0·399 (178)	21·0 (4·69)	189 (87)	199 (93)	82 (28)	66 (19)	30·09 (764)
C. Power at maximum torque										
34·0 (34·5)	1440	123·8 (17·12)	1·62 (7·36)	0·398 (178)	21·1 (4·71)	190 (88)	193 (89)	82 (28)	64 (18)	30·09 (764)
D. Power at rated speed										
42·3 (42·9)	2000	111·2 (15·38)	2·04 (9·27)	0·404 (181)	20·7 (4·62)	189 (87)	200 (93)	82 (28)	66 (19)	30·09 (764)
No load, maximum engine speed: 2220 rev/min										

3. Supplementary tests: Belt test
Date and location of tests: 18th February 1966, N.I.A.E., Silsoe, Bedford, U.K.
Type of dynamometer: Electrical swinging frame
Fuel: Diesel oil, density 0·837 at 60 °F (15·6 °C), Cetane No. 54
Engine oil: SAE 10W Supplement I
Transmission oil: SAE 80 EP

Horse-power (Metric hp)	*Speeds*		*Equivalent crankshaft torque, lb ft (kp m)*	*Fuel consumption,*			*Temperature, °F (°C)*			*Atmos. conditions*	
	Engine, rev/min	*Belt, ft/min (m/s)*		*UKgal/h (l/h)*	*lb/hp h (g/metric hp h)*	*hp h/ UKgal (metric hp h/l)*	*Coolant*	*Oil*	*Fuel*	*Temp., °F (°C)*	*Press., inHg (mmHg)*
A. Maximum power											
38·5 (39·0)	2020	3020 (15·34)	100·1 (13·84)	2·03 (9·23)	0·442 (198)	19·0 (4·24)	183 (84)	204 (96)	61 (16)	61 (16)	29·77 (756)
B. Power at standard belt speed (3100 ft/min [15·75 m/s])											
36·5 (37·0)	2074	3100 (15·75)	92·4 (12·78)	1·98 (9·00)	0·453 (203)	18·5 (4·13)	182 (83)	204 (96)	65 (18)	64 (18)	29·77 (756)
C. Power at maximum torque											
31·2 (31·6)	1500	2243 (11·39)	109·2 (15·10)	1·61 (7·32)	0·432 (193)	19·4 (4·33)	184 (84)	197 (92)	59 (15)	61 (16)	29·77 (756)
D. Power at rated speed											
38·4 (38·9)	2000	2989 (15·18)	100·8 (13·94)	2·03 (9·23)	0·442 (198)	19·0 (4·24)	183 (84)	204 (96)	62 (17)	60 (16)	29·77 (756)
No load, maximum engine speed: 2225 rev/min											

PART III

DRAWBAR TESTS ON ARTIFICIAL TRACK

Date of tests: 29th March–1st April 1966
Type of track: Tarmacadam
Position of governor control lever: Fully open, giving no-load engine speed of 2175–2225 rev/min
Type of tyre: Rear—Goodyear, Traction Sure Grip, straight bar, open centre, 12–28, 6-ply pneumatic
Front—Goodyear, Super Rib, 5·50–16, 6-ply pneumatic
Fuel: Diesel oil, density 0·837 at 60 °F (15·6 °C), Cetane No. 54
Engine oil: SAE 10W Supplement I
Transmission oil: SAE 80 EP

A. Tests with maximum additional weight

Weight of tractor, without driver:

Weight without ballast: Front—1626 lb (738 kg)
Rear—2234 lb (1013 kg)

Ballast: Front: Weights, 1 per wheel—180 lb (82 kg)
Water—69 lb (31 kg)
Rear: Weights, 15 per wheel—2085 lb (946 kg)
Calcium chloride solution—1125 lb (510 kg)
Additional: 2 front frame weights and frame—241 lb (109 kg)

Weight with full ballast:	Front—2170 lb (984 kg) Rear—5390 lb (2445 kg) Total—7560 lb (3429 kg)
Tyre pressure:	Front—48 lb/in² (3·4 kp/cm²) Rear—18 lb/in² (1·3 kp/cm²)
Height of drawbar above ground:	18 in (457 mm)

(1) *Maximum powers and pulls*

Gear	Maximum powers						Air temp., °F (°C)	Atmos. press., inHg (mmHg)	Maximum pulls	
	Horse-power (Metric hp)	Corres-ponding pull, lb (kp)	Wheel slip, %	Engine speed, rev/min	Speed, mile/h (km/h)	Engine coolant temp., °F (°C)			Pull, lb (kp)	Reason for stall
1	27·1 (27·5)	6750 (3062)	16·7	2109	1·51 (2·43)	185 (85)	50 (10)	29·97 (761)	7250 (3289)	Wheelspin and bouncing
2	33·1 (33·6)	6500 (2948)	14·7	2084	1·91 (3·07)	183 (84)	50 (10)	29·97 (761)	7250 (3289)	Wheelspin and bouncing
3	36·1 (36·6)	3750 (1701)	5·8	2048	3·61 (5·81)	180 (82)	47 (8)	30·00 (762)	4375 (1985)	Engine stall
4	37·2 (37·7)	2800 (1270)	4·0	2028	4·98 (8·01)	183 (84)	47 (8)	30·00 (762)	3275 (1486)	Engine stall
5	37·6 (38·1)	2350 (1066)	3·2	2036	6·00 (9·65)	183 (84)	47 (8)	29·97 (761)	2700 (1225)	Engine stall
6	36·8 (37·3)	1820 (826)	2·4	2020	7·58 (12·20)	184 (84)	47 (8)	29·97 (761)	2125 (964)	Engine stall

(2) *Fuel consumption*

Gear	Optimum fuel consumption			Range of pull, lb (kp) over which specific fuel consumption does not exceed optimum consumption by more than 10%
	Specific fuel consumption, lb/drawbar hp h (g/metric drawbar hp h)	Drawbar hp h/UKgal (metric drawbar hp h/l)	Corresponding pull, lb (kp)	
1	0·574 (257)	14·6 (3·26)	6000 (2722)	3930 – 7030 (1783) (3189)
2	0·547 (245)	15·3 (3·41)	6100 (2767)	3780 – > 6800 (1715) (3084)
3	0·494 (221)	16·9 (3·77)	4200 (1905)	2930 – 4375 M.S.P. (1329) (1985)
4	0·499 (223)	16·8 (3·75)	3100 (1406)	2000 – 3275 M.S.P. (907) (1486)
5	0·486 (217)	17·2 (3·84)	2430 (1102)	1850 – 2700 M.S.P. (839) (1225)
6	0·502 (225)	16·7 (3·73)	2050 (930)	1430 – 2125 M.S.P. (649) (964)

B. **Tests without ballast**

Weight of tractor without driver :

Weight without ballast: Front—1626 lb (738 kg)
Rear—2234 lb (1013 kg)
Total—3860 lb (1751 kg)

Tyre pressure: Front—32 lb/in² (2·2 kp/cm²)
Rear—12 lb/in² (0·8 kp/cm²)

Height of drawbar above ground: 18 in (457 mm)

(1) *Maximum powers and pulls*

Gear	*Maximum powers*						*Air temp., °F (°C)*	*Atmos. press., inHg (mmHg)*	*Maximum pulls*	
	Horse-power (Metric hp)	*Corres-ponding pull, lb (kp)*	*Wheel slip, %*	*Engine speed, rev/min*	*Speed, mile/h (km/h)*	*Engine coolant temp., °F (°C)*			*Pull, lb (kp)*	*Reason for stall*
2	19·4 (19·7)	3800 (1724)	17·2	2130	1·91 (3·07)	180 (82)	52 (11)	29·86 (758)	4050 (1837)	Wheelspin
3	32·9 (33·4)	3660 (1660)	14·4	2077	3·37 (5·42)	185 (85)	53 (12)	29·86 (758)	4050 (1837)	Wheelspin and bouncing
4	36·5 (37·0)	2850 (1293)	8·0	2020	4·80 (7·72)	187 (86)	49 (9)	29·86 (758)	3275 (1486)	Engine stall
5	37·5 (38·0)	2350 (1066)	5·7	2056	5·98 (9·62)	186 (86)	54 (12)	29·86 (758)	2725 (1236)	Engine stall
6	37·5 (38·0)	1850 (839)	4·2	2059	7·60 (12·23)	184 (84)	55 (13)	29·74 (755)	2175 (987)	Engine stall

PART IV

1. Location of centre of gravity

	Tractor unballasted
Height above ground	29·5 in (749 mm)
Distance forward from the vertical plane containing the axis of the rear wheels	31·0 in (787 mm)
Distance from the median plane parallel to the longitudinal axis of the tractor bisecting the track	0

2. **Turning space and turning radius**

Wheel equipment: As for drawbar test without ballast

Wheel track: Front—52 in (1321 mm)
Rear—56 in (1422 mm)

	With brakes		*Without brakes*	
	Right-hand	*Left-hand*	*Right-hand*	*Left-hand*
Radius of turning space	9 ft 5 in (2·87 m)	9 ft 11½ in (3·04 m)	10 ft 11 in (3·33 m)	10 ft 11 in (3·33 m)
Turning radius	9 ft 1½ in (2·78 m)	9 ft 8 in (2·95 m)	10 ft 7½ in (3·24 m)	10 ft 7½ in (3·24 m)

PART V

1. **Repairs and adjustments during test:** A new fuel filter assembly was fitted after loss of power was traced to interference with injector performance by particles of metal from the original filter body

2. **Remarks:** None

Officer in charge: D. W. SMITH

Head of Tractor and Drier Performance Department: P. H. BAILEY

Date: 7th July 1966

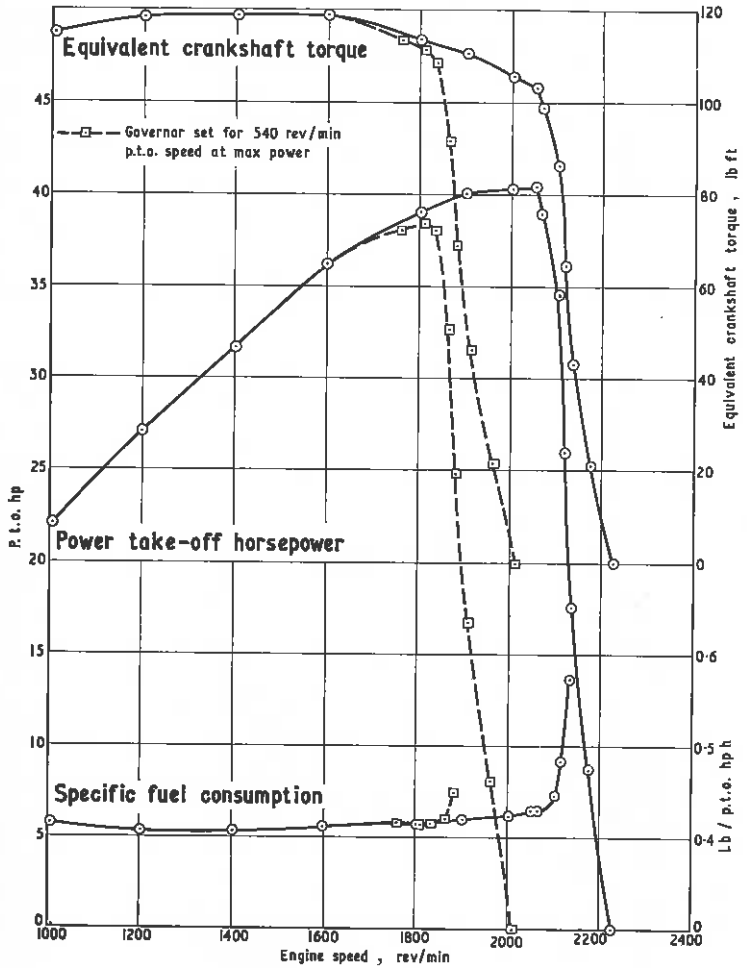


Fig. 1. Power take-off test

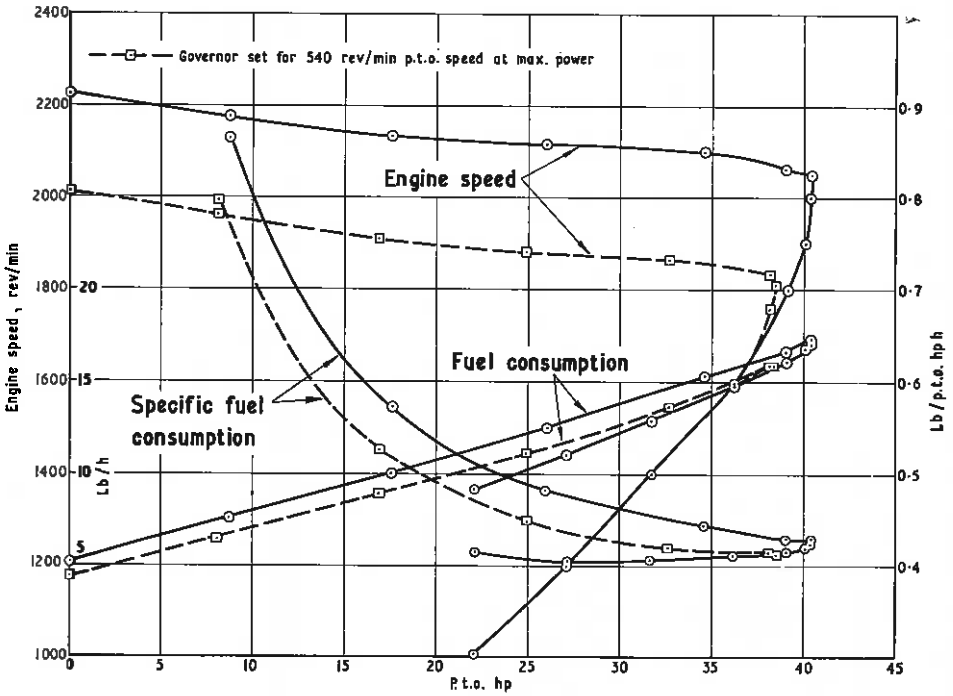


Fig. 2. Power take-off test

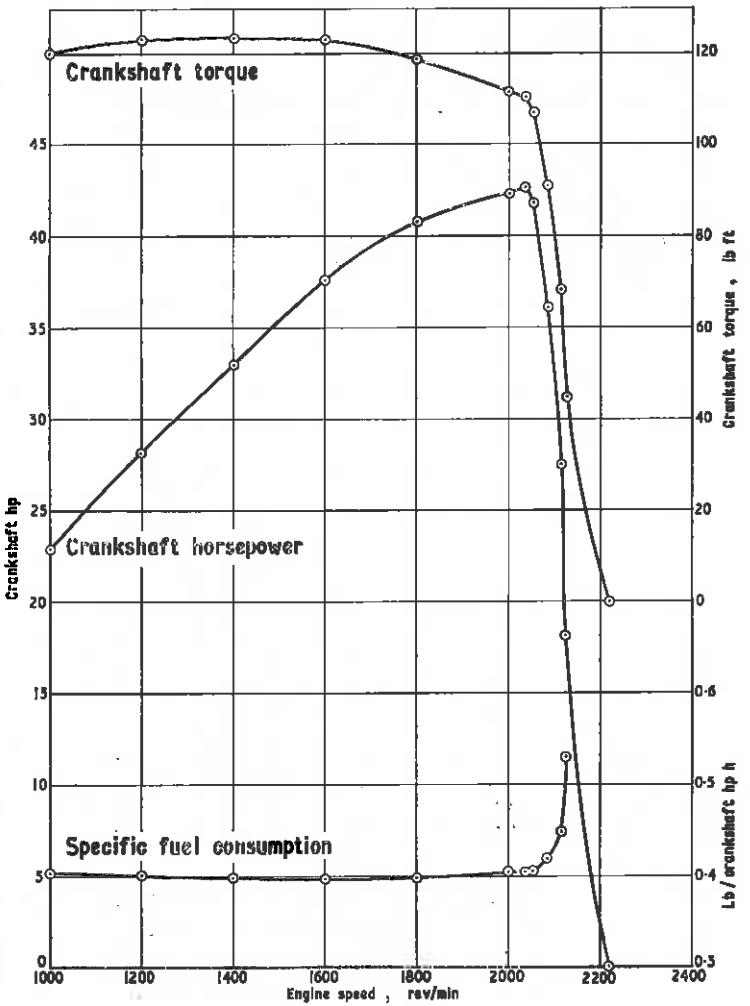


Fig. 3. Engine test

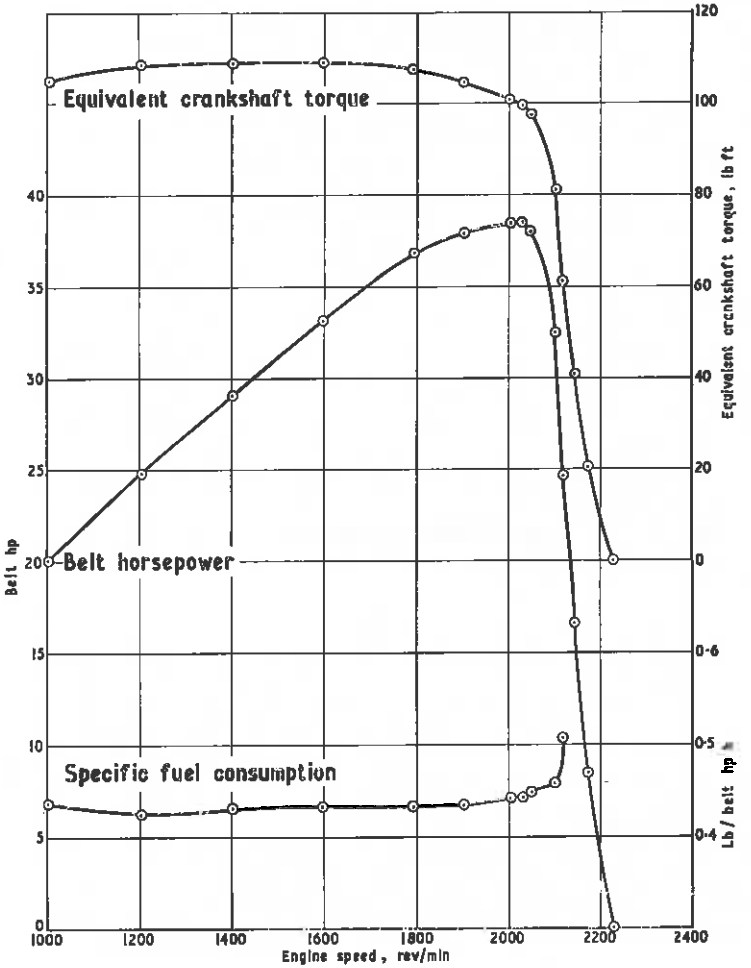


Fig. 4. Belt test

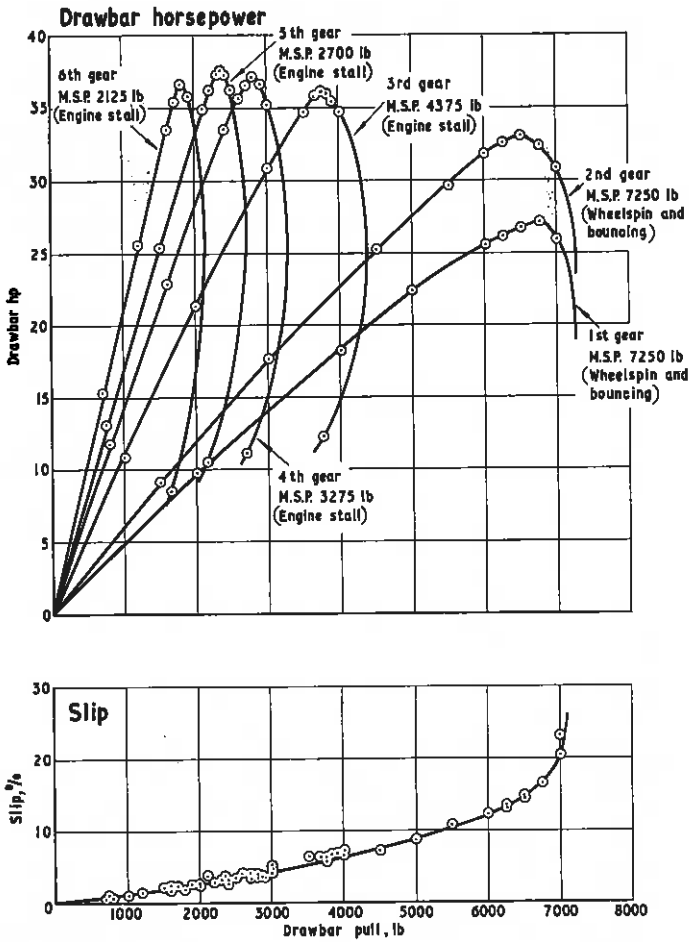


Fig. 5. Drawbar test on tarmacadam, with ballast

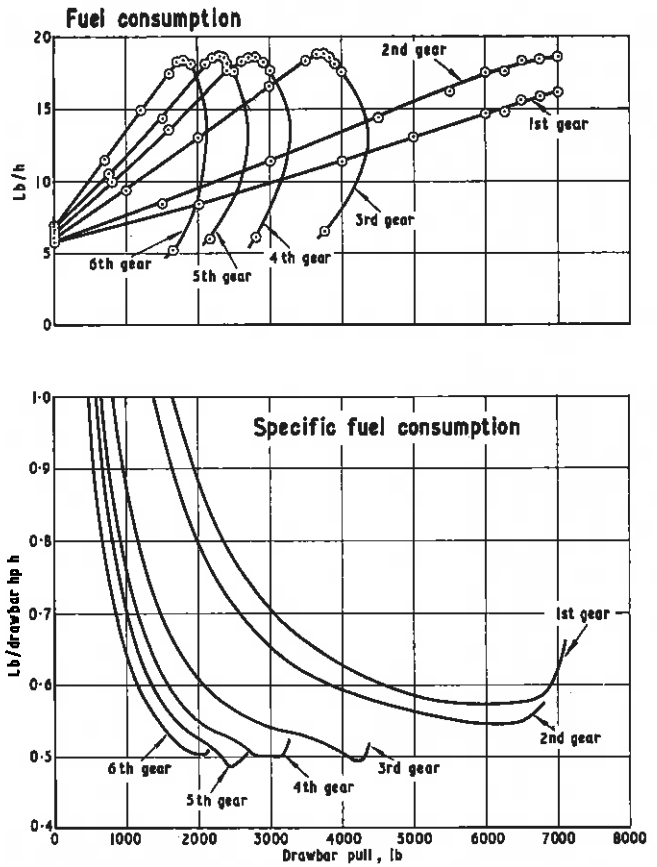


Fig. 6. Drawbar test on tarmacadam, with ballast

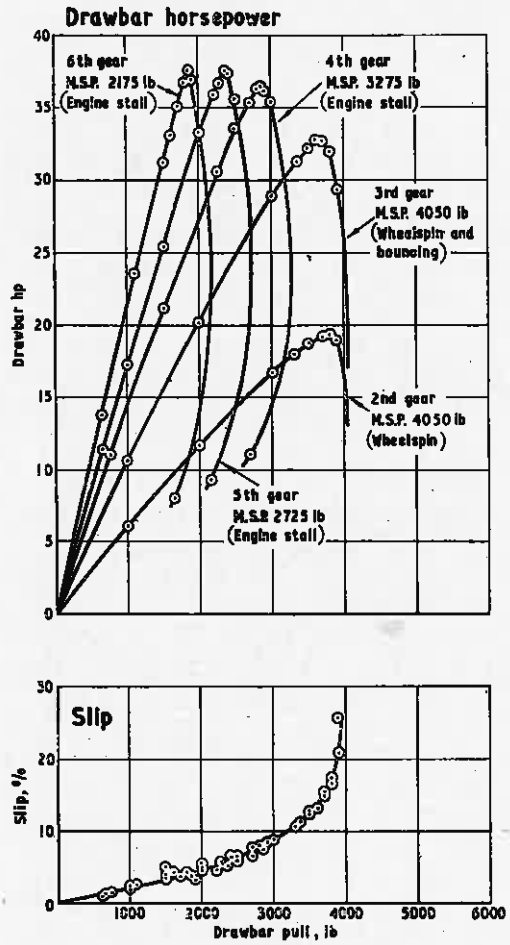


Fig. 7. Drawbar test on tarmacadam, without ballast

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