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Landwirtschafts-Gesellschaft
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No. 607/O.E.C.D.

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

COUNTY SUPER 4 MODEL 754 TRACTOR

Manufactured by: County Commercial Cars Ltd,
Fleet, Aldershot,
Hants.



Test No.: R.69/5513/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: 10th October 1969 *Serial No.:* 283

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:	County Commercial Cars Ltd, Fleet, Aldershot, Hants
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running-in:	Demonstration sites
Duration of running-in:	430 hours

Tractor

Make:	County	Model:	754
Type:	Super 4, four-wheel drive	Serial No.:	4F 19062

Engine

Make:	Ford Motor Co.Ltd	Model:	6Y 5000
Type:	Direct injection diesel	Serial No.:	E007937

Cylinders:	4 cylinders, vertical, in-line, 4·40 in (112 mm) bore x 4·20 in (107 mm) stroke, capacity 255 in^3 (4·186 l), compression ratio 16·5:1 (nominal); monobloc construction, overhead valves
Fuel system:	AC type VP 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. Fuel tank capacity 16·6 UKgal (75·5 l). Simms type P 4862 injection pump, Serial No. YM 99433; manufacturer's production setting for injection pump 14·5 - 15·3 cm^3 for 200 injections at 900 rev/min pump speed (test bench figures); C.A.V. type BDLL 140S6422 injector nozzles, injection pressure 185-190 atm (191-196 kg/cm^2)
Governor:	Simms mechanical, incorporated in fuel injection pump. Governed range of engine speed 600-2375 rev/min, rated engine speed 2100 rev/min

Air cleaner:	Burgess oil bath forward of radiator with centrifugal pre-cleaner outside hood, oil capacity $2\frac{1}{2}$ pt (1·42 l)
Lubrication system:	Forced feed from eccentric rotor type pump with metal strainer in sump. Powell Duffryn dual media replaceable element full flow filter; oil capacity $16\frac{3}{4}$ pt (9·5 l); recommended oil change period 300 h
Cooling system:	Water cooled, impeller assisted with 16 in (406 mm) dia, 4 blade belt driven fan; thermostat for temperature control; pressurized at 7 lb/in² (0·49 kg/cm²); cooling water capacity $25\frac{1}{2}$ pt (14·5 l)
Starting system:	Electrical, 12V Ford type C6NF 11000A solenoid engaged starter motor, operable only when the gear selector lever is in neutral, excess fuel device on fuel injection pump and thermostart for cold starting
Electrical system:	Voltage: 12 negative earth Generator: Lucas type C40T Battery: Exide type 6/LT 2S/31 lead acid, capacity 128 Ah

Transmission

Clutch:	Borg and Beck 13 in (330 mm) dia, single plate dry clutch, pedal operated
Gearbox:	Ford Motor Co. constant mesh type, 8 forward and 2 reverse speeds
Rear axle and final drives:	Crown wheel and pinion and differential with epicyclic gear final drives to rear wheels; own make constant engagement front wheel drive taken by bevel gears from each differential half shaft forward to twin telescopic and universally jointed propeller shafts, wheels driven through a separate crown wheel and pinion on each side; pedal operated differential lock effective on all four wheels
Oil capacity:	Gearbox $18\frac{1}{2}$ pt (10·5 l) SAE 20W/30 or SAE 80 EP oil; outer housings $10\frac{1}{2}$ pt (6·0 l) each, front axle housings 7 pt (4·0 l) each, drive shaft housings $\frac{1}{2}$ pt (0·3 l) each, SAE 80 EP oil; rear axle centre housing 49 pt (27·8 l) oil to Ford specification ESN-M2C 53A; recommended oil change period 1200 h

Gear	Number of engine revolutions for 1 revolution of driving wheel	Nominal travelling speed for 2100 rev/min rated speed of engine, mile/h	(km/h)
Forward			
1	217·17	1·50	(2·41)
2	174·12	1·87	(3·01)
3	99·19	3·28	(5·28)
4	72·79	4·46	(7·18)
5	60·66	5·36	(8·62)
6	48·76	6·66	(10·72)
7	27·83	11·67	(18·78)
8	20·46	15·88	(25·55)
Reverse			
Low	151·05	2·15	(3·46)
High	42·34	7·67	(12·34)

Power take-off

At rear of tractor, independent of main clutch, $1\frac{3}{8}$ in (34·9 mm) dia, 6-spline hydraulically engaged, height above ground 25 in (635 mm), proportional engine speed giving 596 rev/min at 2100 rev/min rated engine speed, 540 rev/min standard p.t.o. speed at 1902 rev/min engine speed, direction of rotation clockwise viewed from driving end

Belt pulley

Not fitted for test

Power lift

Ford Motor Co., hydraulic, gear pump driven from power take-off shaft, independent of main and p.t.o. clutches, supplies oil from transmission housing to ram cylinder and external tapping (external booster ram optional); Category 2 implement linkage, draught or position control with auxiliary service control and flow control device, oil capacity 49 pt (27·8 l), oil to Ford Specification ESN-M2C 53A

Drawbar

Swinging drawbar, vertical heights above ground to centre of clevis 14 in (356 mm) and $17\frac{3}{4}$ in (451 mm) changed by inverting clevis or drawbar; distance from rear axle $24\frac{7}{8}$ in (632 mm) and $30\frac{7}{8}$ in (784 mm), position relative to p.t.o. 8 in (203 mm) and 14 in (356 mm) to rear, lateral adjustment $13\frac{1}{2}$ in (343 mm) and 19 in (483 mm); pivot position on centre line of rear axle

Hitch	Not fitted
Steering	Recirculating ball type with single drag link, power assisted, hydraulic system with Plessey type C7NN 3K 514C pump supplying a Hydrosteer ram with Serck oil cooler in circuit
Brakes	Multiplate oil immersed disc type, mounted on differential half shafts, pedal operated independently or together, ratchet for parking; hand lever operated dry multi-disc transmission brake
Wheels	Two at front, two at rear, all tyres Goodyear Traction Sure Grip, 16·9/14-30, 6-ply pneumatic, steered by front wheels, all wheels driven; track 68½ in (1740 mm); maximum permissible weight on each front tyre 4383 lb (1988 kg) at 19 lb/in² (1·3 kg/cm²), on each rear tyre 3920 lb (1778 kg) at 16 lb/in² (1·1 kg/cm²)
Wheelbase:	5 ft 11 9/16 in (1818 mm)

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

Weight without ballast	Front:	4529 lb	(2054 kg)
	Rear:	3525 lb	(1599 kg)
	Total:	8054 lb	(3653 kg)
Ballast	Front:	weights - 10 per wheel, total 2183 lb	(990 kg)
		water - 1467 lb	(665 kg)
	Rear:	weights - nil	
		water - 1564 lb	(709 kg)
Weight with full ballast (Ref.1)*			
	Front:	8179 lb	(3710 kg)
	Rear:	5089 lb	(2308 kg)
	Total:	13 268 lb	(6018 kg)

Seat	Bostrom/Ford, covered pan type, parallelogram linkage, torsion bar suspension adjustable for driver's weight, range of adjustment 8 in (203 mm) fore and aft
Number of grease points	Whole tractor: 20

*The reference is to the manufacturer's comment on Page 15

Overall dimensions

Overall length:	11 ft $7\frac{5}{8}$ in (3·55 m) with lift arms in raised position
Overall width:	7 ft $1\frac{5}{8}$ in (2175 mm) at $68\frac{1}{2}$ in (1740 mm) track without ballast weights 8 ft 10 in (2692 mm) at $68\frac{1}{2}$ in (1740 mm) track to outside of front wheel weights, 10 per wheel
Overall height:	69 in (1753 mm) to top of steering wheel 96 in (2438 mm) to top of exhaust pipe
Minimum ground clearance:	$13\frac{1}{2}$ in (343 mm) to underside of swinging drawbar

Lighting

	Height above ground of centre, in	(cm)	Size, in	(cm)	Distance from outside edge of tractor at $68\frac{1}{2}$ in (1740 mm) wheel track, to centre, in	(cm)
Headlights	$39\frac{1}{4}$	(99·7)	4 dia	(10·2)	$38\frac{3}{4}$	(98·4)
Side lights	$57\frac{1}{2}$	(146·1)	2 dia	(5·1)	$18\frac{1}{4}$	(46·4)
Rear lights	58	(147·3)	4 x 2	(10·2) x (5·1)	$19\frac{3}{4}$	(50·2)
Reflectors	56	(142·2)	$3\frac{3}{4}$ x 2	(9·5) x (5·1)	$19\frac{3}{4}$	(50·2)

Unrestricted beam angle of headlight in plan view 42°

FUELS AND LUBRICANTS USED IN TESTS

Laboratory and track tests

Fuel:	Laboratory tests - Diesel oil, density 0·841 at 60°F (15·6°C), Cetane No. 51, to Class A, B.S.2869:1957 Track tests - Diesel oil, density 0·830 at 60°F (15·6°C), Cetane No. 53, to Class A, B.S.2869:1957
Engine oil:	SAE 20W/30
Gearbox oil:	SAE 80 EP
Transmission oil:	Ford specification ESN-M2C 53A
Final drive oil:	SAE 80 EP

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 21st February 1969; 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/UK gal (metric hp h/l)
Maximum power - 2 hour test					
67·8 (68·7)	2170	616	3·56 (16·18)	0·442 (198)	19·0 (4·24)
Standard p.t.o. speed (540 rev/min)					
65·5 (66·4)	1902	540	3·28 (14·91)	0·420 (188)	20·0 (4·46)
Standard belt speed of 3100 ft/min (945 m/min)					
			Not applicable		
Speed recommended by the manufacturer for drawbar work					
67·6 (68·5)	2100	596	3·47 (15·77)	0·432 (193)	19·5 (4·35)
Fuel consumption at part loads					
59·2 (60·0)	2229	633	3·04 (13·82)	0·432 (193)	19·5 (4·35)
0	2360	670	0·91 (4·14)	-	-
30·4 (30·8)	2289	650	1·84 (8·36)	0·508 (227)	16·6 (3·70)
67·8 (68·7)	2170	616	3·56 (16·18)	0·442 (198)	19·0 (4·24)
15·5 (15·7)	2326	660	1·33 (6·05)	0·719 (322)	11·7 (2·61)
45·0 (45·6)	2260	642	2·42 (11·00)	0·452 (202)	18·6 (4·15)

No load, maximum engine speed: 2360 rev/min

Equivalent crankshaft torque at maximum power: 164·2 lb ft (22·7 kg m)

Maximum equivalent crankshaft torque: 193·6 lb ft (26·8 kg m) at 1480 rev/min engine speed

Mean atmospheric conditions:

temperature	60°F (16°C)
pressure	29·27 in Hg (743 mm Hg)
relative humidity	43%

Maximum temperature:

coolant	220°F (104°C)
engine oil	257°F (125°C)
fuel	80°F (27°C)

2. DRAWBAR PERFORMANCE

Date of tests: 3rd-22nd May 1969 Type of track: Concrete Height of drawbar above ground: 13½ in (343 mm)

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)	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	47·0* (47·7)	12 800 (5806)	1·38 (2·22)	2203	15·0	0·583 (261)	14·2 (3·17)	193 (89)	73 (23)	210 (99)	59 (15)	89	29·70 (754)
2	53·8 (54·6)	11 500 (5216)	1·76 (2·83)	2195	12·4	0·571 (255)	14·5 (3·23)	196 (91)	65 (18)	210 (99)	75 (24)	66	29·70 (754)
3	55·6 (56·4)	6500 (2948)	3·21 (5·16)	2196	5·7	0·544 (243)	15·3 (3·41)	192 (89)	78 (26)	200 (93)	71 (22)	77	29·70 (754)
4	56·0 (56·8)	4650 (2109)	4·52 (7·27)	2124	3·7	0·557 (249)	14·9 (3·32)	189 (87)	83 (28)	195 (91)	74 (23)	78	29·94 (760)
5	55·5 (56·3)	3800 (1724)	5·48 (8·82)	2154	2·8	0·550 (246)	15·1 (3·37)	193 (89)	77 (25)	201 (94)	62 (17)	66	29·56 (751)
6	54·9 (55·7)	3050 (1383)	6·75 (10·86)	2032	2·1	0·574 (257)	14·5 (3·23)	193 (89)	87 (31)	202 (94)	63 (17)	95	29·56 (751)
(ii)	Five hour test at 75% of pull at maximum power												
3	44·5 (45·1)	4875 (2211)	3·42 (5·50)	2230	3·9	0·557 (249)	14·9 (3·32)	193 (89)	75 (24)	234 (112)	71 (22)	60	29·66 (753)
(iii)	+Five hour test at pull corresponding to 15% wheelslip in test (i)												
1	-	12 800 (5806)	1.36 (2·19)	-	-	-	-	198 (92)	90 (32)	223 (106)	60 (16)	73	29·69 (754)
(iv)	Maximum power (unballasted)												
1	33·7* (34·2)	9100 (4128)	1·39 (2·24)	2234	15·0	-	-	188 (87)	-	228 (109)	71 (22)	81	30·05 (763)
2	42·0* (42·6)	9100 (4128)	1·73 (2·78)	2218	15·0	-	-	188 (87)	-	221 (105)	71 (22)	81	30·05 (763)
3	56·4 (57·2)	6650 (3016)	3·18 (5·12)	2180	8·5	-	-	193 (89)	-	217 (103)	65 (18)	66	30·05 (763)
4	57·9 (58·7)	4900 (2223)	4·43 (7·13)	2130	5·5	-	-	197 (92)	-	212 (100)	70 (21)	81	29·98 (761)
5	57·7 (58·5)	4000 (1814)	5·41 (8·71)	2135	4·3	-	-	194 (90)	-	212 (100)	69 (21)	72	29·98 (761)
6	57·6 (58·4)	3200 (1452)	6·75 (10·86)	2075	3·4	-	-	197 (92)	-	200 (93)	62 (17)	79	29·99 (762)

Total oil consumption during ten hours duration of tests (ii) and (iii) 0·044 lb/h (20·0 g/h)

*Maximum power available at 15% wheelslip

+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 - 68½ in (1740 mm)
Rear - 68½ in (1740 mm)

	With brakes		Without brakes	
	Right hand	Left hand	Right hand	Left hand
Radius of turning space	10 ft 4 in (3·15 m)	10 ft 2½ in (3·11 m)	18 ft 8 in (5·69 m)	13 ft 8 in (5·69 m)
Radius of turning circle	9 ft 7½ in (2·93 m)	9 ft 6 in (2·90 m)	17 ft 11½ in (5·47 m)	17 ft 11½ in (5·47 m)

5. LOCATION OF CENTRE OF GRAVITY

Height above ground	31·0 in (787 mm)
Distance forward from the vertical plane containing the axis of the rear wheels	39·6 in (1006 mm)
Distance from the median plane of the tractor	0

6. BRAKING

Date of tests: 14th and 23rd May 1969

Type of track: Concrete

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/s² (m/s²)	30·8	(9·4)	21·7	(6·6)
Stopping distance, ft (m)	12·5	(3·8)	16·1	(4·9)
Force on brake pedal, lb (kg)	100	(45·4)	140	(63·5)

The above results were obtained at the limit of rear wheel contact with the ground

Brake fade characteristics (hot tests)

Maximum deceleration hot/maximum deceleration cold x 100:	94%
Stopping distance cold/stopping distance hot x 100:	98%
Force on pedal cold/force on pedal hot x 100:	100%
Efficiency of parking latch:	Satisfactory hot and cold
Efficiency of hand brake:	Not satisfactory
Pull on hand brake:	60 lb (27 kg)

7. MEASUREMENT OF AMBIENT NOISE EMITTED BY THE TRACTOR

Date of tests:	19th May 1969	
Type of sound level meter:	Brüel and Kjaer Type 2203	
Type of track:	Concrete	
Results of tests:	gear	8th
	travelling speed before acceleration	13·7 mile/h (22·0 km/h)
	sound level	84 dBA

8. NOISE MEASUREMENTS AT THE DRIVER'S EAR LEVEL

Date of tests:	19th May 1969
Type of sound level meter and octave filter:	Brüel and Kjaer Type 2203 with octave filter set Type 1612
Type of track:	Concrete

Results of Tests

Gear	Travelling speed, mile/h (km/h)	Loudness, sones
4th	4·69 (7·55)	95
3rd	3·40 (5·47)	105

9. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: 18th and 22nd April 1969, N.I.A.E., Silsoe, Bedford, U.K.

Hydraulic fluid:

Make and type:	Ford specification ESN-M2C 53A
Viscosity:	S.A.E.80
Viscosity index:	95

	Vertical movement, in	(mm)	Maximum force exerted through full range, lb	(kg)	Pressure, lb/in² (kg/cm²)	Linkage load at which unballasted front end of tractor lifts off the ground, lb	(kg)
At lower hitch points (height above ground in down position 10 in (254 mm))	27	(686)	3760	(1706)	2600 (183)	-	-
On the frame 24 in (610 mm) to rear of lower hitch points	$32\frac{5}{8}$	(829)	3220*	(1461)	2600 (183)	-	-
With external booster ram fitted							
At lower hitch points (height above ground in down position 10 in (254 mm))	27	(686)	5740	(2604)	2600 (183)	-	-
On the frame 24 in (610 mm) to rear of lower hitch points	$32\frac{5}{8}$	(829)	5130*	(2327)	2600 (183)	4900	(2223)

*These results were obtained with the top link attached to the centre rocker position on the tractor as recommended for heavy draught operation; if the top position is used, to obtain greater sensitivity of load for light draught operation, the lift force would be approximately 10% greater

Type of linkage lock for transport: Hydraulic

Opening pressure of the cylinder over-pressure relief valve (manufacturer's figures): 2750 - 2850 lb/in² (193 - 200 kg/cm²)

Pump characteristics

i) opening pressure of relief valve: 2200 lb/in² (155 kg/cm²)

sustained pressure of the open relief valve: 2600 lb/in² (183 kg/cm²)

Pump delivery at external tapping

ii) at minimum pressure (rated engine speed): 5·04 gal/min (22·9 l/min)

iii) at maximum hydraulic power: 5·03 gal/min (22·9 l/min)

delivery pressure: 2200 lb/in² (155 kg/cm²)

power: 7·75 hp (7·86 metric hp)

OPTIONAL TESTS

10. PERFORMANCE AT THE ENGINE CRANKSHAFT

Date and location of tests: 3rd March 1969; N.I.A.E., Silsoe, Bedford, U.K.

Type of dynamometer: Water brake, Heenan and Froude

Horsepower (Metric hp)	Engine speed, rev/min	Fuel consumption, UKgal/h (l/h)	Fuel consumption, lb/hp h (g/metric hp h)	Fuel consumption, hp h/UKgal (metric hp h/l)
Maximum power - 2 hour test				
71·8 (72·8)	2170	3·55 (16·14)	0·416 (186)	20·2 (4·51)
Standard p.t.o. speed (540 rev/min)				
69·1 (70·1)	1902	3·25 (14·77)	0·395 (177)	21·3 (4·75)
Standard belt speed of 3100 ft/min (945 m/min)				
	Not applicable			
Speed recommended by the manufacturer for drawbar work				
71·2 (72·2)	2100	3·48 (15·82)	0·411 (184)	20·5 (4·57)
Fuel consumption at part loads				
63·5 (64·4)	2260	3·09 (14·05)	0·409 (183)	20·6 (4·60)
0	2375	0·82 (3·73)	-	-
32·6 (33·1)	2321	1·83 (8·32)	0·471 (211)	17·9 (3·99)
71·8 (72·8)	2170	3·55 (16·14)	0·416 (186)	20·2 (4·51)
16·5 (16·7)	2347	1·30 (5·91)	0·661 (296)	12·7 (2·83)
48·3 (49·0)	2289	2·42 (11·00)	0·422 (189)	20·0 (4·46)

No load, maximum engine speed 2375 rev/min

Crankshaft torque at maximum power 173·7 lb ft (24·0 kg m)

Maximum crankshaft torque 203·5 lb ft (28·1 kg m) at 1390 rev/min engine speed

Mean atmospheric conditions
- temperature 63°F (17°C)
- pressure 29·88 in Hg (759 mm Hg)
- relative humidity 46%

Maximum temperature
- coolant 228°F (109°C)
- engine oil 249°F (121°C)
- fuel 76°F (24°C)

Optimum fuel consumption recorded: 0·364 lb/hp h (163 g/metric hp h) at 37·8 hp (38·3 metric hp) and 1298 rev/min engine speed

15.	REPAIRS AND ADJUSTMENTS DURING TESTS	A new p.t.o. clutch piston was fitted during preliminary tests. A new fuel tank was fitted during the drawbar tests
	REMARKS	None

Officer in charge: D.W. SMITH

Head of Tractor and Ergonomics Department: J. MATTHEWS

Date: 22nd August 1969

The manufacturer states that:-

Ref.1. The maximum weight used during the test corresponded with the tyre manufacturer's recommendation for optimum performance on hard ground

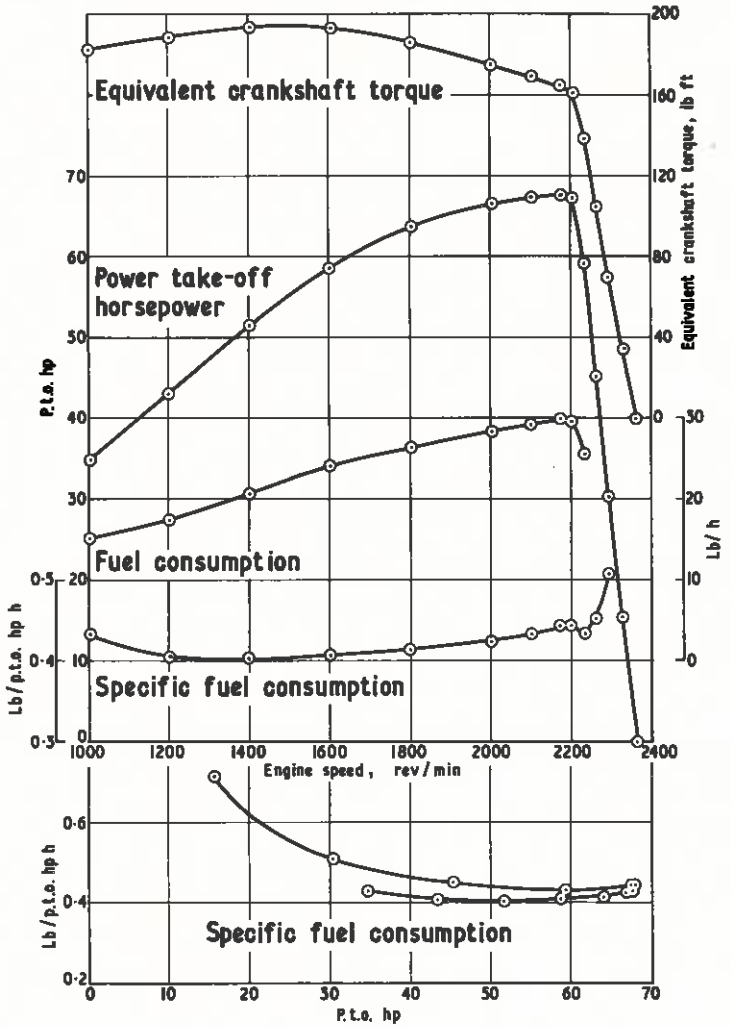


Fig. 1. Power take-off test

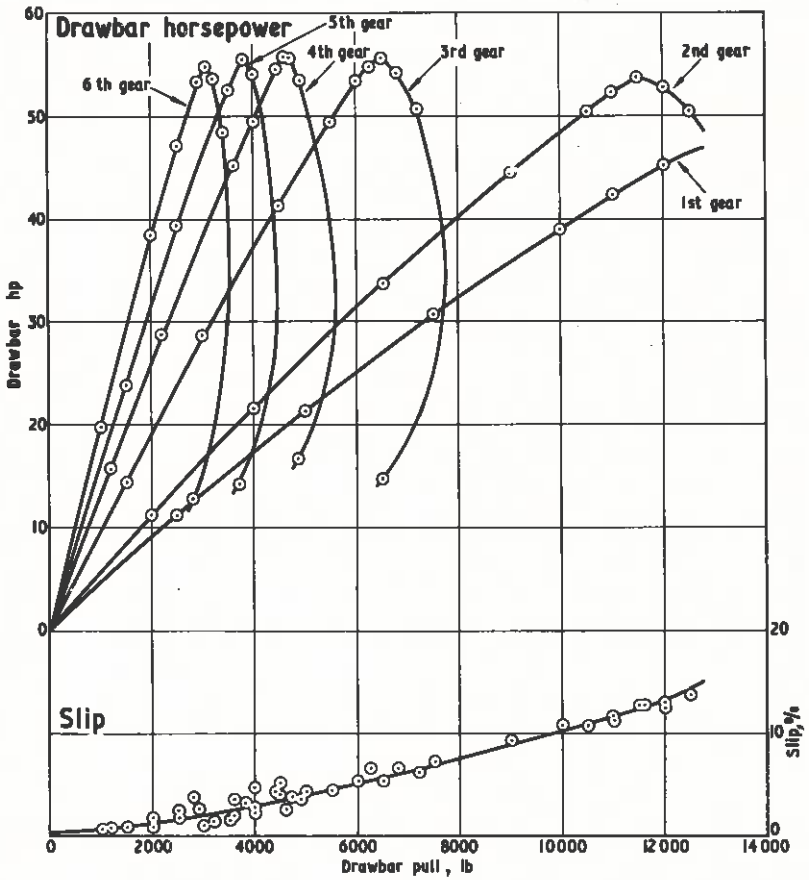


Fig. 2. Drawbar test on concrete, with ballast

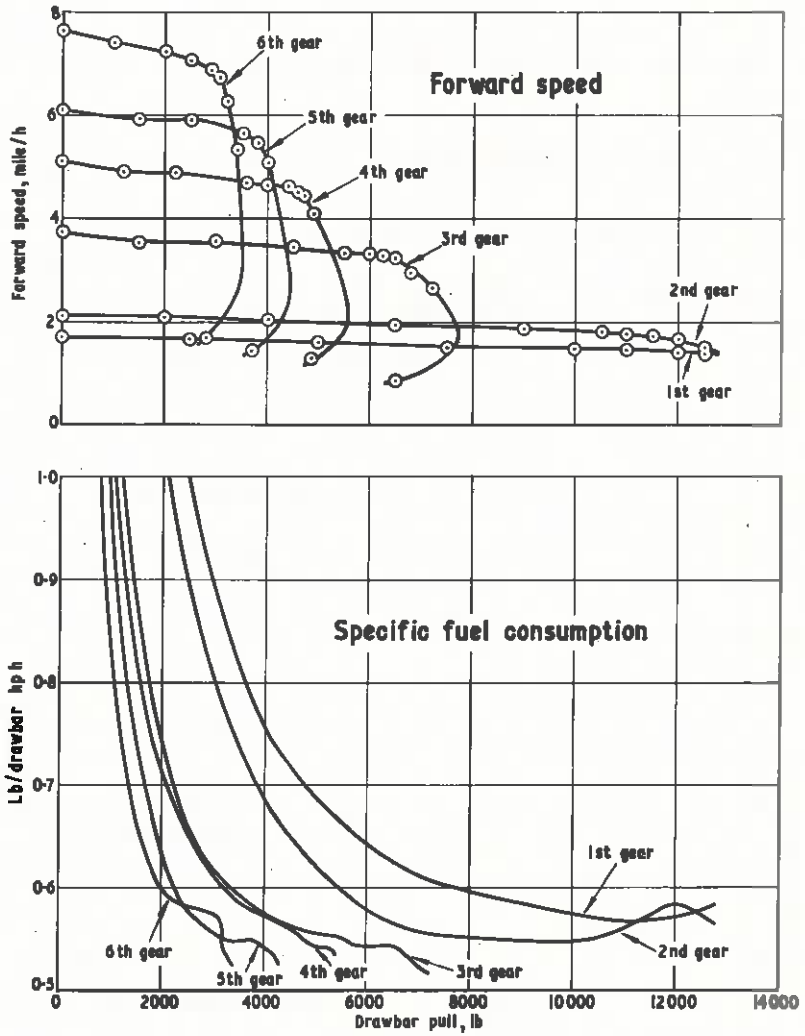


Fig. 3. Drawbar test on concrete, with ballast

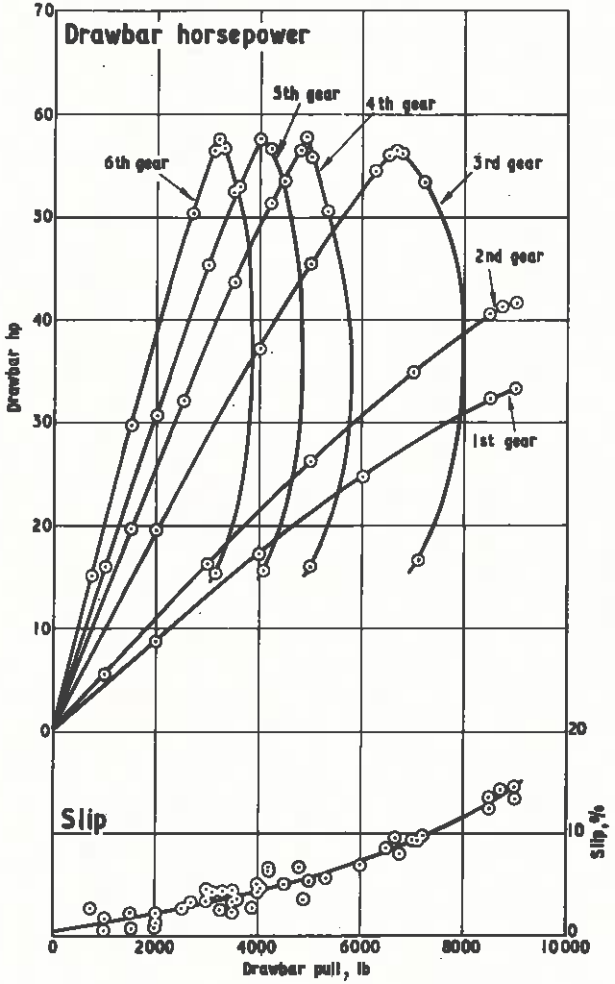


Fig. 4. Drawbar test on concrete, without ballast

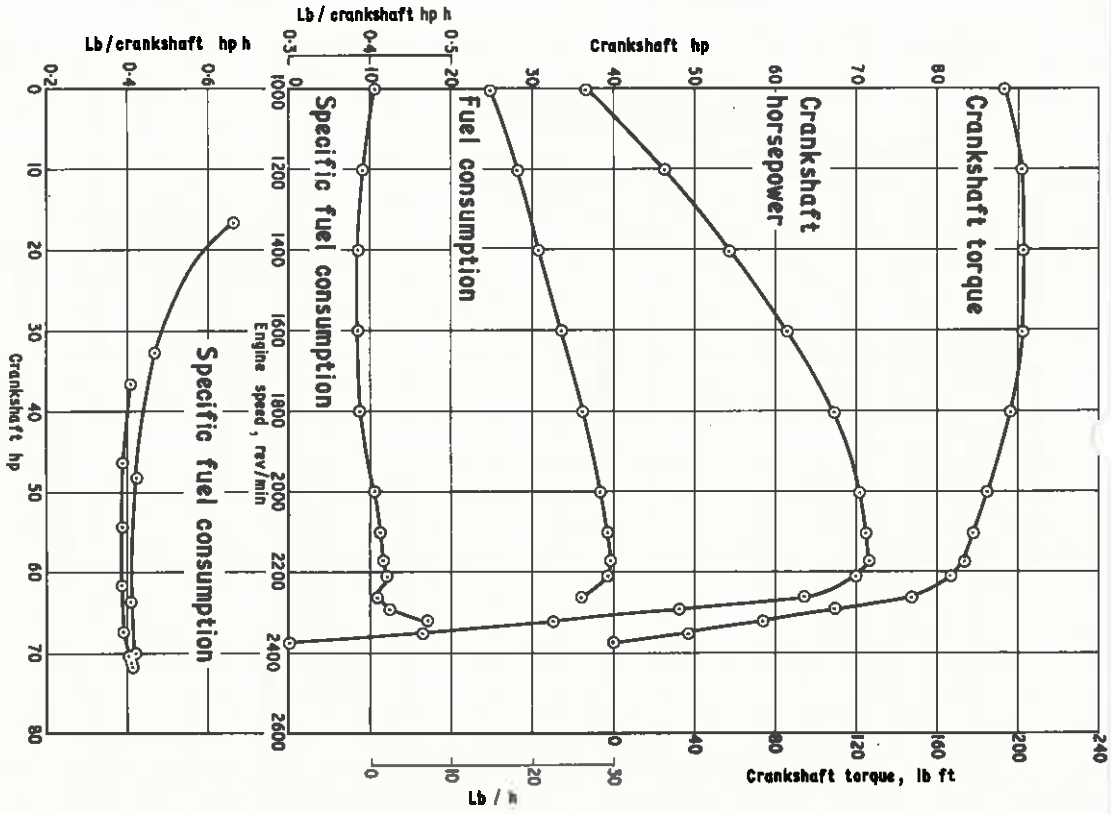


Fig. 5. Engine test

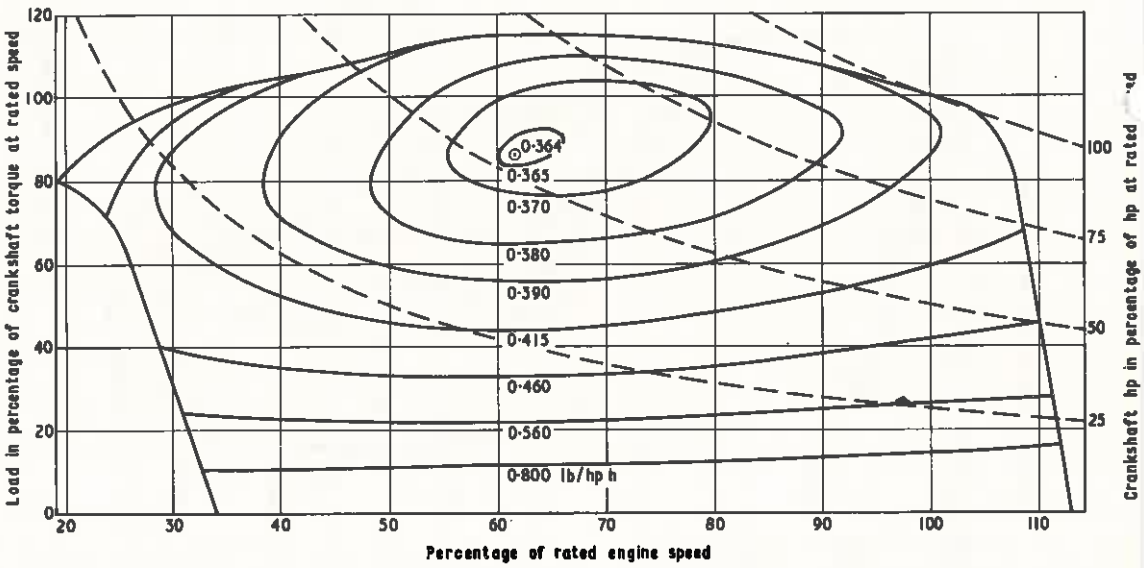


Fig. 6. Engine test

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