COMITATO DI COORDINAMENTO PER L'OMOLOGAZIONE
DELLE MACCHINE AGRICOLE IN ITALIA

REPORT No. 265/O.E.C.D.

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

FIAT 250 DIESEL TRACTOR

Manufactured by: FIAT S. p. A.
Torino, Italy



Date of Tests: January, 1968 - September 1969
Test No.: 265/O.E.C.D.

This report has been approved by the O. E. C. D. Coordinating Center (C.N.E.E.M.A., France) as beeing in accordance with the O. E. C. D. Tractor Test Code
Date of approval: 23rd December, 1969 *Serial No.: 293*

CONSIGLIO NAZIONALE DELLE RICERCHE
LABORATORIO PER LA MECCANIZZAZIONE AGRICOLA
TORINO - ITALY

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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PERFORMANCE CURVES

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Power take-off test	
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Manufacturer:	FIAT S.p.A. - TORINO (Italy).
Submitted for test by:	the Manufacturer
Selected by:	the Manufacturer with the agreement of the Testing Station
Place of running-in:	FIAT - Centro Tecnico Trattori - TORINO (Italy)
Duration of running-in:	engine 50 hours; p.t.o. 20 hours; transmission 30 hours.

SPECIFICATION OF TRACTOR

Make:	FIAT
Model:	250
Type:	Four wheel, rear wheel driven, unit construction
Serial No.:	010001

Engine:

Make:	FIAT
Model:	852 A
Type:	4 - stroke, direct injection diesel
Serial No.:	003638
Cylinders:	2 cylinders, vertical, in-line, 95 mm bore x 110 mm stroke, capacity 1560 cm^3, compression ratio 17 : 1, overhead valves, replaceable dry cylinder liners.
Fuel system:	Forced feed: own make type EP/KS 22 A: LA/10 plunger type fuel pump; replaceable cartridge type CAV paper filter with water separator; capacity of fuel tank 29 liters. BOSCH injection pump type PES 2 A 80 B 410/L4/101, serial No. 9535; manufacturer's production setting 45 to 47 mm^3 per cycle at 1125 pump rev/min and 15° C. Own make injector, model EPPZ 10 F 1, serial No. 2/9584; injector setting 230 $\pm$ 5 kg/cm^2.
Governor:	BOSCH mechanical, incorporated in fuel injection pump. Governed range of engine speed: 600 to 2400 rev/min; rated engine speed 2250 rev/min.
Air cleaner:	Own make, oil bath air cleaner; oil capacity: 0,280 liters.
Lubrication system:	Forced feed from gear - type pump. One screen type filter installed on pump suction and one replaceable cartridge type filter installed on the pressure line to the engine. Engine sump oil capacity: 4.2 liters. Recommended oil change period: 200 hours; cartridge change period: 400 hours.
Cooling system:	Water cooled from centrifugal pump (0.5 kg/cm^2) with thermostatic control; 320 mm diameter, 4 - blade, belt-driven fan. Visual temperature control with thermometer.
Starting system:	Electrical, own make starter motor type M 125 - 3/12 S Var. 1; 4.5 HP.

Electrical system:

Voltage:	12 V negative earth.
Alternator:	FIAT A 12 M - 124/12/42 X.
Battery:	MARELLI 6 AT M 15, lead acid, capacity 77 Ah.

Transmission:

Clutch:	Own make, single dry plate, pedal operated; plate diameter: 216 mm.
Gearbox:	Own make, mechanical sliding gear type; giving 6 forward speeds and 2 reverse; it consist of two separate gearboxes: one with 2 forward and one reverse and the other with 2 forward speeds.
Rear axle and final drive:	Own make; crown wheel and pinion with bevel gear type differential; pedal operated lock; bull gear final drives.
Oil capacities:	Gearbox and differential: 6.1 liters; final drives: 1.9 liters each. Recommended oil change period: 1600 hours.

Gear No.	*Number of engine revolutions for one revolution of driving wheel*	*Travelling speed for 2250 rev/min rated engine speed km/h*
I	185.226	2.36
II	108.818	4.02
III	66.892	6.54
IV	48.525	9.01
V	28.507	15.34
VI	17.523	24.96
I R.M.	121.996	3.59
II R.M.	31.947	13.69

Power take-off:

Main p.t.o.:	In center line indipendent from gearbox, hand lever operated. Diameter: 34.9 mm (1" 3/8) according to ISO standard; 6 splines; height above ground: 650 mm. Proportional engine speeds: 574 rev/min at 2250 rev/min engine speed; 540 rev/min at 2117 rev/min engine speed. Direction of rotation: clockwise viewed from tractor rear. Optional: the power take-off may be synchronised to the gearbox. Proportional ground speed: 0.27 m for each power take-off revolution. Number of p.t.o. revolutions for one revolution of driving wheels: 11.95.
Auxiliary p.t.o.:	Placed below the tractor transmission box, indipendent from the gearbox, hand lever operated. Diameter: 29.5 mm (1" 1/8); 10 splines. Height above ground: 550 mm. Proportional engine speed: 994 rev/min at 2250 rev/min of the engine. Direction of rotation: anticlokwise viewed from tractor rear.

Bel pulley:

Location:	At rear of tractor driven trough a clutch and bevel gears: two positions: on right or on left side of p.t.o.
Diameter/width:	210 mm/120 mm.
Speed:	1432 rev/min at 2251 rev/min rated engine speed giving 938 m/min linear speed. Engine speed at rated pulley lineary speed (945 m/min): 2266 rev/min.
Direction of rotation:	Clockwise viewed from tractor right side with pulley on right side of p.t.o.: apposite direction of rotation by mounting pulley unit on p.t.o. left side.

Power lift: Own make, gear-type oil pump operated; max working pressure: 170 kg/cm². First category implement linkage, controls for draught and position. Oil capacity of power lift reservoir: 3.5 liters.
Recommended oil change period: 800 hours Max vertical lift: 370 mm (from 40 mm above ground level).

Drawbar: Swinging with clevis end sliding on drilled guide.
Vertical height to centre of clevis: 505 mm. Drawbar hole: 29 mm dia.; distance behind rear axle: 550 mm; position: 170 mm below, and 230 mm behind p.t.o. Lateral adjustement: 4 positions from 0 mm to 300 mm each side.

Hitch: Clevis type; adjustable height trough drilled guides. Height above ground of centre of clevis: 5 positions, 375 mm to 645 mm.
Hitch hole: 29 mm dia.; distance from rear axle 390 mm, position: 0 mm to 270 mm below, 60 mm behind p.t.o.

Steering: Own make; mechanical type with pignon and bevel gear; steering wheel operated.

Brakes: Own make, hand type with drums fixed to differential half-shafts; dual control trough two independent or combined foot pedals. Parking brake hand operated lever with ratchet and pawl.

Wheels:

Steering wheels: Two at front PIRELLI « Tractor » 5.00-15 tyres, 4 ply rating. Maximum permissible weight on each tyre 340 kg at 2.50 kg/cm² pressure. Track width 1050 mm by 7 steps to 1650 mm obtained by extending front axle and reversing wheel discs.

Driving wheels: Two at rear; PIRELLI « Tractor cinturato » 11.2/10-24, tyres 4 ply rating. Maximum permessible weight on each tyre 780 kg at 1.10 kg/cm² pressure. W 10-24 rims. Track width 1000 mm by 8 steps to 1700 mm obtained by reversing wheel centres and offset lug type rims.

Wheel base: 1700 mm.

Tractor and ballast weights

(without driver but with tanks full)

Weight without ballast:

Front:	450 kg
Rear:	620 kg
Total:	1070 kg

Ballast:

Front:	Weights: 2 per wheel, total 100 kg
Rear:	Weights: 6 per wheel, total 470 kg Liquid 160 kg.

Weight with ballast:

Front:	550 kg
Rear:	1250 kg
Total:	1800 kg

Seat: Own make, flat spring suspension with rubber lined coil spring.

Number of grease points: 16

Overall dimensions:

Overall lenght: — including hydraulic lift: 2.95 m;
— without hydraulic lift: 2.74 m.

Overall width: — without ballast: 1.29 m to 1.99 m;
— with ballast: 1.51 m to 2.21 m.

Overall height: — to top of steering wheel 1.57 m.

Minimum ground clearance: — to underside gearbox 0.47 m;
— to underside of drawbar 0.42 m.

Lighting (tractor without ballast, rear track 1.29 m)

	Height above ground of centre *cm*	*Size* *cm*	*Distance from outside edge of tractor to centre* *cm*
Headlights	97	⌀ 130	46
Side lights	97	⌀ 130	46
Rear lights	105	7 × 5	39
Reflectors	93	⌀ 5.5	39

FUEL AND LUBRICANTS USED IN TESTS

Laboratory tests:

Fuel:	Diesel oil, density 0.831 kg/l at 15° C, cetane number not recorded.
Engine oil:	FIAT AMBRA, viscosity SAE 20 W-40
Transmission oil:	FIAT AMBRA, viscosity SAE 20 W-40

Track test:

Fuel:	Diesel oil, density 0.831 kg/l at 15° C, cetane number not recorded.
Engine oil:	FIAT AMBRA, viscosity SAE 20 W-40
Transmission oil:	FIAT AMBRA, viscosity SAE 20 W-40

COMPULSORY TESTS

1. **Power take-off performance:**

Date and location of tests: November 21st 1967 - L.M.A. - TORINO (Italy)

Type of dynamometer: electrical, swinging frame

Horse power	*Speeds*		*Fuel consumption*		
	Engine	*P.T.O.*	*Per hour*	*Specific*	*HP hours/unit of volume*
metric/hp	*rev/min*	*rev/min*	*l/h*	*g/metric hph*	*metric hp h/l*
A. Maximum power: 2 hour test					
23.64	2300	587	5.63	198	4.20
B. Standard p.t.o. speed (540 rev/min)					
22.56	2117	540	5.27	194	4.28
C. Manufacturer recommended speed for drawbar work					
23.56	2250	574	5.49	201	4.21
D. Part loads					
20.36	2332	595	5.05	206	4.03
—	2405	—	1.29	—	—
10.32	2364	603	3.32	267	3.11
23.64	2300	587	5.63	198	4.20
5.22	2390	610	2.31	368	2.26
15.40	2353	600	4.04	218	3.81

No load, maximum engine speed: 2405 rev/min

Equivalent crankshaft torque at max. power: 7.36 m/kg

Maximum equivalent crankshaft torque: 8.03 mkg at 1400 rev/min engine speed

Mean atmospheric conditions:
— temperature 15.5° C
— pressure 754.0 mm/Hg
— relative humidity 53%

Maximum temperature:
— coolant 88° C
— engine oil 110° C
fuel 39° C

2. **Drawbar performance:**

Date of test: February 17th and July 16th - 15th 1968
Type of track: concrete
Height of drawbar above ground: 485 mm

Gear No.	*Horse-power, metric hp*	*Drawbar pull, kg*	*Travelling speed, km/h*	*Engine speed, rev/min*	*Wheelslip, %*	*Fuel consumption*		*Temperature*			*Atmospheric conditions*		
						Specific g/hph	*Metric drawbar hph/l 4ph/l*	*Coolant °C*	*Fuel °C*	*Engine oil °C*	*Temperature, °C*	*Relative humidity, %*	*Pressure, mmHg*
1 - Maximum power (ballasted)													
I	11.82	1507	2.13	2340	13.0	2.97	280	32	88	102	5.0	73	732.2
II	19.33	1458	3.58	2272	11.4	3.34	251	38	88	106	7.1	74	732.0
III	20.48	886	6.24	2260	4.7	3.54	234	38	88	108	7.5	74	732.0
IV	21.30	665	8.65	2250	3.7	3.63	229	38	88	108	8.0	74	732.0
V	20.51	370	14.98	2256	2.3	3.60	231	38	88	108	8.0	75	732.5
2 - Five - Hour test at 75% of pull at maximum power													
IV	16.92	506	9.03	2332	3.1	3.39	245	40	88	106	25.0	62	739.0
3 - Five - Hour test at pull corresponding to 15% wheelslip in test (*)													
I	12.23	1497	2.25	2350	7.5	3.10	268	40	88	106	22.0	78	740.5
4 - Maximum power (unballasted)													
I	14.17	1075	3.56	2323	14.4	—	—	—	86	110	23.0	50.0	747.8
II	19.73	869	6.13	2268	7.0	—	—	—	88	110	23.5	48.0	747.5
III	20.73	650	8.61	2259	4.9	—	—	—	88	110	24.0	48.0	747.3
IV	20.34	368	14.92	2267	2.3	—	—	—	88	110	24.2	47.5	747.0

(*) Tractor with additional ballast (550 kg).
Oil consumption during ten hours duration of tests (2) and (3): 10 g/h.

3-4 **Turning space and turning circle:**

Details of whell equipment: As in specification, without ballast

Track of wheels: Front 1250
Rear 1300

		With brakes		*Without brakes*	
		Right-hand	*Left-hand*	*Right-hand*	*Left-hand*
Radius of turning space	m	2.80	2.75	3.24	3.15
Radius of turning circle	m	2.70	2.65	3.14	3.05

5. **Location of centre of gravity:**

	mm
Height above ground	715
Distance forward from the vertical plane containg the axis of the rear wheels	648
Distance from the median plane of the tractor	0

6. **Braking:**

Date of tests: August 29th 1969

Type of track: concrete

Cold brakes

		Tractor without ballast	*Tractor ballasted*
Travelling speed of tractor	km/h	25	25
Maximum deceleration	m/sec²	4,4	3,2
Stopping distance	m	8,00	11,45
Force on brake pedal	kg	32	44

Brake fade characteristics (hot tests)

Maximum deceleration hot/maximum deceleration cold × 100 = 100%.

Stopping distance cold/stopping distance hot × 100 = 104%.

Force on pedal cold/force on pedal hot × 100 = 100%.

Efficiency of hand brake: no wheel rotation, both when pulling braked tractor forward and backwards

Full on hand brake: — cold 40 kg
— hot 40 kg

7. Measurement of ambient noise emitted by the tractor:

Date fo test:	August 28th 1969
Type of sound level meter:	ELIT type 905
Type of track:	concrete
Results of test:	— gear VI — travelling speed 24.5 km/h — sound level 83 dBA

8. Noise measurement at driver's ear level:

Date of test:	August 28th 1969
Type of sound level meter and octave filter:	ELIT type 905 and 955
Type of track:	concrete
Type of frequency analyzer:	octave type, with 10 bands 31.5 ÷ 16.000 Hz

Results of test

Gear	*Travelling speed km/h*	*Loudness sones*
III	6.45	157

9. Power lift and hydraulic pump performance:

Date and location of tests:	September 5th 1969
Hydraulic fluid:	FIAT AMBRA SAE 20 W-40

	Vertical movement mm	*Maximum force exerted through full range* kg	*Pressure* kg/cm²	*Linkage load at which unballasted front end of tractor lifts off ground* kg
Linkage giving maximum mechanical advantage				
At lower hitch points (height above ground in down position 33 mm)	420	800	170	—
On the standard frame	490	550	170	400
Linkage giving minimum mechanical advantage (Only one position is possible at the hitch points)	—	—	—	—

Type of linkage lock for transport:	hydraulic
Opening pressure of the relief valve:	150 kg/cm²

Pump characteristics:

(1) Opening pressure of relief valve:	150 kg/cm²
Sustained pressure of the open relief valve:	170 kg/cm²

Pump delivery rate:

(2) At 2045 rev/min pump speed (corresponding to an engine rated speed of 2250 rev/min) at minimum pressure:	9.3 l/min.
(3) At 2045 rev/min pump speed (corresponding to an engine rated speed of 2250 rev/min) at maximum hydraulic power:	9.3 l/min.
Power:	3.1 HP
Pressure:	150 kg/cm²

Officer in charge:	Ing. R. Gioia
Head of L.M.A.:	Doct. L. Lisa
Date:	Turin, September 15th 1969

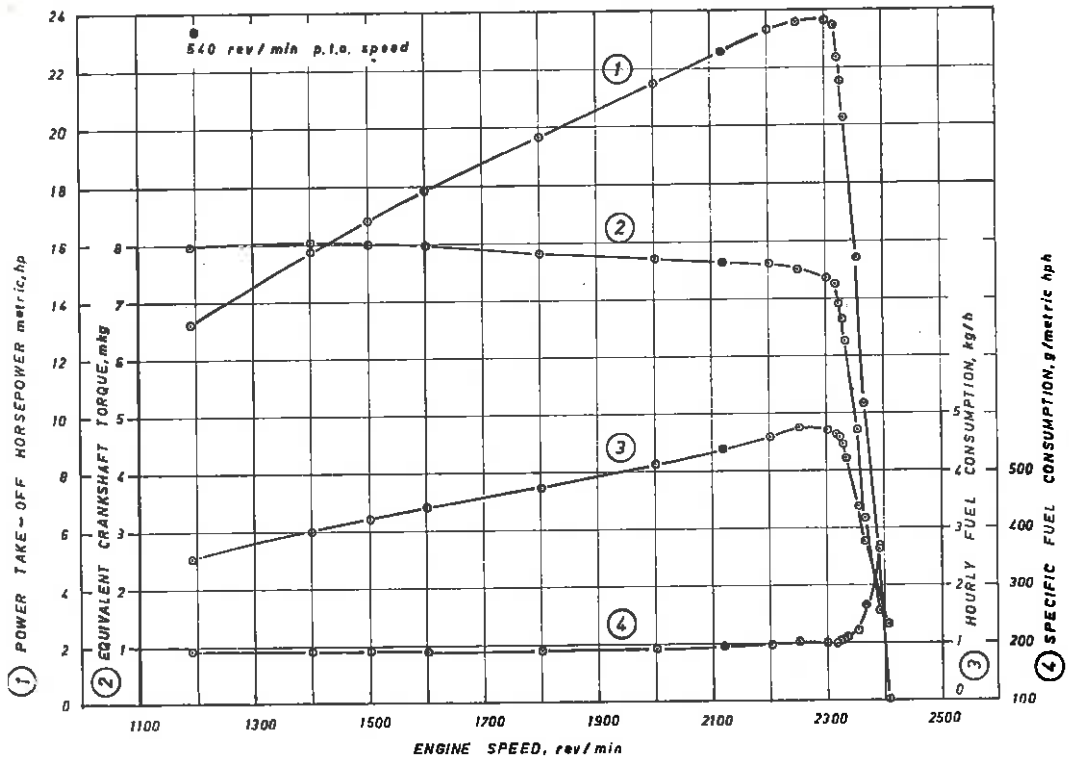


FIG. 1. Power take-off test

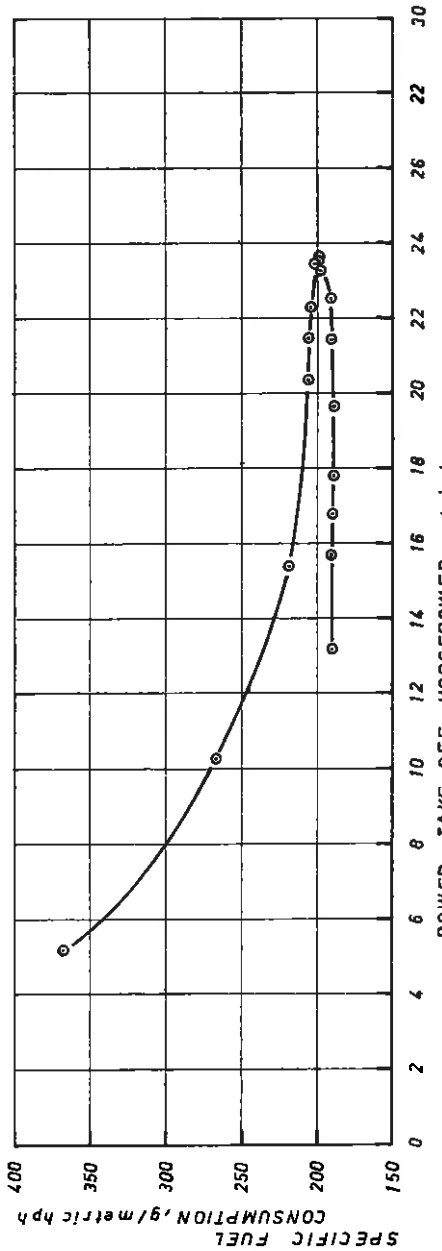


FIG. 2. Power take-off test

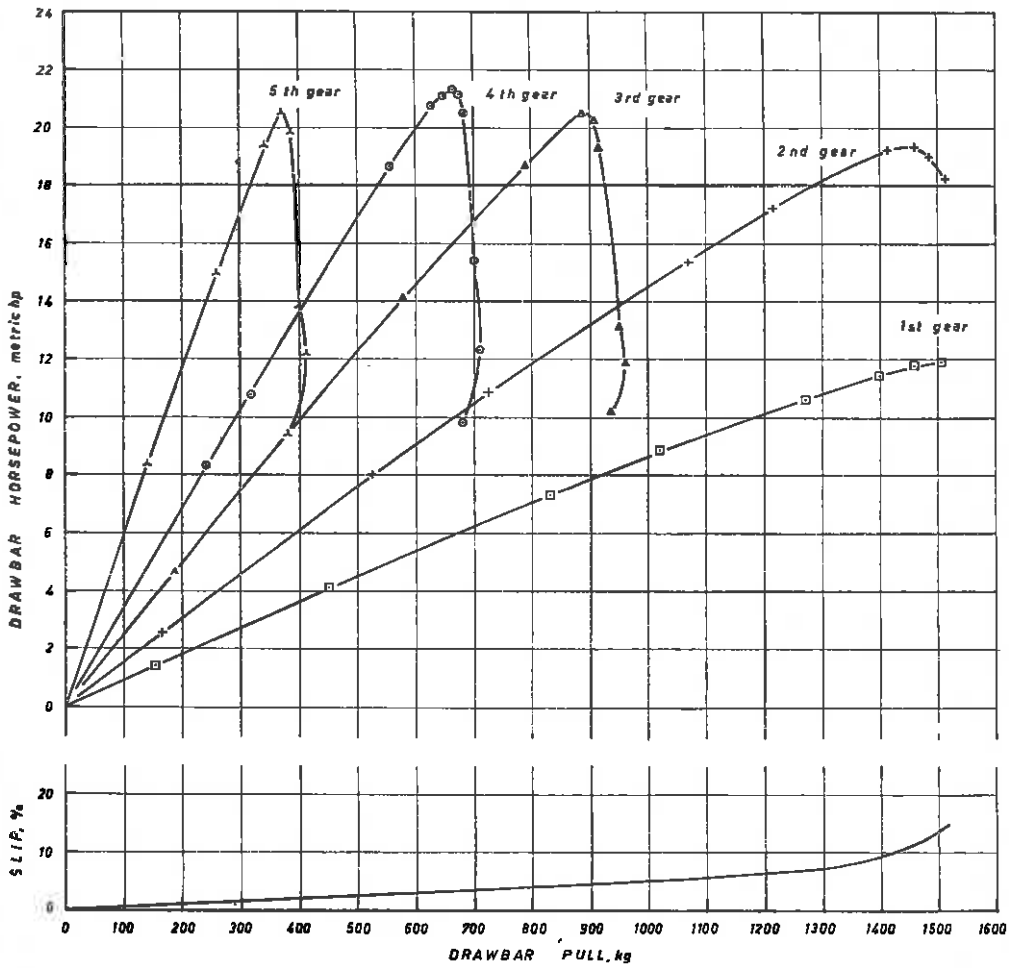


FIG. 3. Drawbar test on concrete, with ballast

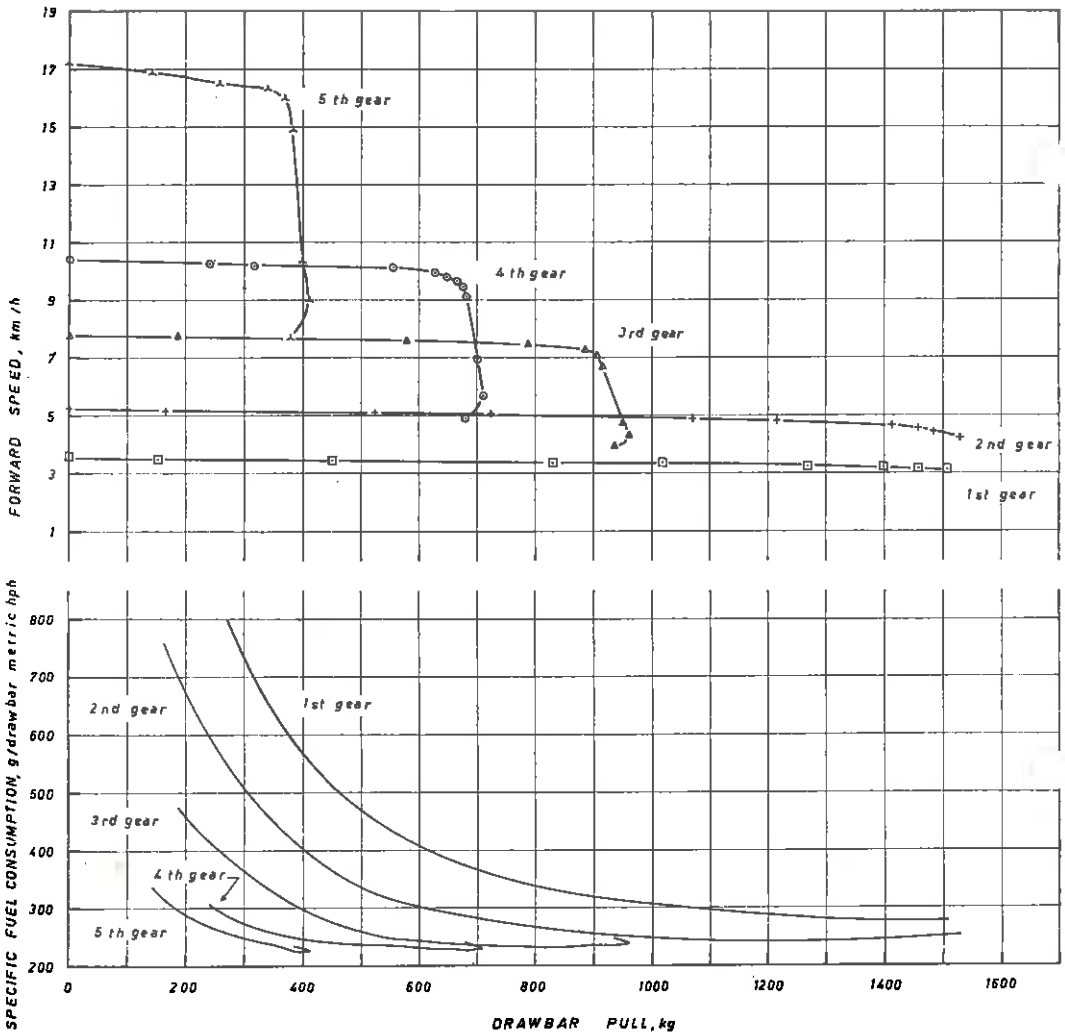


FIG. 4. Drawbar test on concrete, with ballast

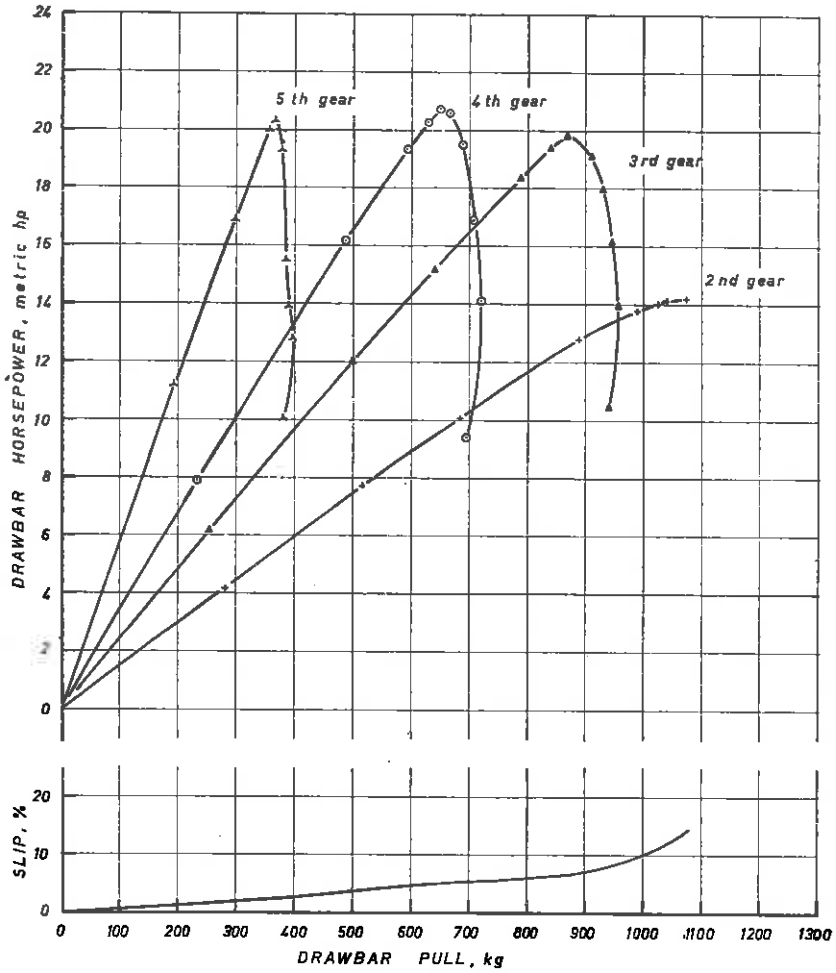


FIG. 5. Drawbar test on concrete, without ballast

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