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

REPORT No. 368/O.E.C.D.
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REPORT ON TEST IN ACCORDANCE WITH O.E.C.D. TEST CODE
FOR AGRICULTURAL TRACTORS

FIAT MODEL 450/6B DIESEL TRACTOR

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



Date of Tests: April - July 1971

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

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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None	

PERFORMANCE CURVES

	FIG. NO.
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 - Servizio Esperienze Trattori - TORINO (Italy)
Duration of running-in:	engine 50 hours; p.t.o. 20 hours; transmission 30 hours.

SPECIFICATION OF TRACTOR

Make:	FIAT
Model:	450/6B
Type:	Four wheel, rear wheel driven, unit construction
Serial No.:	317133

Engine:

Make:	FIAT
Model:	8035
Type:	4-stroke, direct injection diesel
Serial No.:	162564
Cylinders:	Three vertical, in-line, 100 mm bore x 110 mm stroke, capacity 2592 cm^3, compression ratio 17 : 1, overhead valves, replaceable dry cylinder liners.
Fuel system:	Forced feed; FISPA diaphragm-type, fuel pump; two CAV paper filters one of which is of a replaceable cartridge type; capacity of fuel tank: 54 litres. CAV injection pump model DPA 3233410, serial No. 53982; manufacturer's production setting 46.5 to 49.5 mm^3 stroke at 1200 rev/min pump speed and 15 °C fuel temperature. Own make injectors, model DLL 145 S 60 F; injector setting 230 ± 5 kg/cm^2.
Governor:	CAV Mechanical, incorporated in fuel injection pump. Governed range of engine-speed: 650 to 2610 rev/min. Rated engine speed 2400 rev/min.
Air cleaner:	Own make, oil bath with centrifugal type precleaner with automatic dust unloader; oil capacity 0.940 litres.
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: 7.5 litres. Recommended oil change period: 200 hours; cartridge change period: 400 hours.
Cooling system:	Water cooled from centrifugal pump (0.5 kg/cm^2); thermostat for temperature control; 4-blade belt driven 390 mm dia fan; cooling water capacity: 13 litres; visual temperature control with thermometer.
Starting system:	Electrical, BOSCH starter motor, 12 V and 4 metric hp.

Electrical system:

Voltage:	12 V, negative earth.
Alternator:	Own make, model A 12 M 124/12/42 X
Battery:	MARELLI, model 6 AT 21, lead acid; capacity 110 Ah.

Transmission:

Clutch:	Own make, dual dry clutch, two plates both of 254 mm dia: one pedal operated for gearbox drive and one hand lever operated for p.t.o. drive.
Gearbox:	Own make, mechanical type with sliding and constant-mesh gears, giving 6 forward and 2 reverse speeds. It consists of 3 forward and 1 reverse speed gearbox with dual range epicyclic reduction unit.
Rear axle and final drive:	Own make, crown wheel and pinion with bevel gear type differential; pedal operated differential lock; bull gear final drives.
Oil capacity:	Gearbox, differential and hydraulic lift: 17.6 litres; final drives: 2.2 litres each. Recommended oil change period: 1600 hours.

Gear	*Number of engine revolutions for one revolution of driving wheel*	*Travelling speed for 2400 rev/min rated engine speed km/h*
Forward		
1	233.451	2.36
2	129.143	4.27
3	82.036	6.72
4	64.847	8.50
5	35.873	15.37
6	22.788	24.20
Reverse		
1	158.945	3.47
2	44.152	12.49

Power take-off:

In centre-line at rear of tractor; proportional engine speed or proportional ground speed, manually engaged and clutch driven.
34.9 mm ($1\,^3/_8$ in) dia, according to ISO Standard, 6-spline; height above ground 575 mm.
Proportional engine speeds: 659 rev/min at 2400 rev/min rated engine speed; 540 rev/min at 1967 rev/min engine speed. Direction of rotation: clockwise viewed from tractor rear in forward gear. Proportional ground speed: 1 revolution of p.t.o. for approximately 252 mm of travel. Number of p.t.o. revolutions for one revolution of driving wheel: 15.18.
Direction of rotation: Clockwise viewed from tractor rear in forward gear.

Belt pulley:

Location:	Attachable to rear of tractor, in two alternative positions: on right or on left side of p.t.o. Driven from p.t.o. clutch through bevel gears.
Diameter/width of face:	250 mm/150 mm.
Speed:	1248 rev/min giving 980 m/min linear speed at 2400 rev/min rated engine speed.
Direction of rotation:	Clockwise with pulley on right side of p.t.o., anticlockwise with pulley on left side of p.t.o., viewed from tractor right side. Oil capacity 0.44 litres.

Power lift: Own make, fully independent hydraulic, gear-type oil pump.
Category 1 implement linkage, draught and position controls.
Oil capacity (uses transmission oil) 17.6 litres.

Drawbar: Swinging drawbar, with clevis end sliding on drilled guide. Radius of swing: 3 positions, from 510 mm to 590 mm.
Vertical height to centre of clevis: 4 positions from 335 to 490 mm, adjustments obtained by vertical movement of the drilled guide and invertion of the drawbar.
Drawbar hole 29 mm dia; distance behind rear axle: 620 to 700 mm; position relative to p.t.o.: from 0 to 165 mm below, 370 to 450 mm to rear (horizontal line).
Lateral adjustment: 4 positions from 0 to 230 mm each side.

Steering: Own make, worm gear mechanical type, steering wheel control.
Oil capacity 0.39 litres.

Brakes: Own make, band type with drums fixed to differential half-shafts; independent or combined pedal operated. Parking brake hand-lever operated with ratche and pawl.

Wheels:

Steering wheels: Two at front, PIRELLI « Tractor » 6.00-16 tyres, 4 ply rating. Maximum permissible weight on each tyre 560 kg at 2.50 kg/cm² pressure. Track width 1280 mm by 8 steps to 1980 mm obtained by extending front axle and reversing wheel discs.

Driving wheels: Two at rear, PIRELLI « Tractor cinturato » 13.6/12-28 tyres, 6 ply rating, mounted on W 12-28" rims. Maximum permissible weight on each tyre 1495 kg at 1.40 kg/cm² pressure. Track width 1200 mm by 8 steps to 1900 mm changed by reversing wheel centres and offset lugs on rims.

Wheel base: 1920 mm.

Tractor weights (without driver but with tank full).

	Front kg	*Rear* kg	*Total* kg
Without ballast	670	1090	1760
With ballast	780	1800	2580

Ballast

	Number of weights	*Total weight* kg	*Water* kg
Front	3 (*)	110	—
Rear	8 (4 per wheel)	450	260
Additional	—	—	—

(*) Placed on a suitable support ahead of front axle.

Seat: Own make, parallelogram suspension with rubber lined coil spring; range of adjustment 10 cm fore and aft in median plane of tractor.

Number of grease points

Whole tractor: 16.

Overall Dimensions:

	Length *m*	*Width* *m*	*Height* *m*
With ballast:			
— with power lift linkage	3.21	1.73 to 2.25	1.50
— without power lift linkage	3.09		
Without ballast:			
— with power lift linkage	3.10	1.55 to 2.25	1.50
— without power lift linkage	2.98		

Lighting (Tractor without ballast, 1.40 m rear track).

	Height above ground of centre *cm*	*Size* *cm*	*Distance from outside edge of tractor to centre* *cm*
Head lights	91.5	13 dia	40.5
Side lights	91.5	13 dia	40.5
Rear lights	120	7 × 5	37.5
Reflectors	108	5.5 dia	36.5

FUELS AND LUBRICANTS USED IN TESTS

Laboratory and track 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

COMPULSORY TESTS

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

Date and location of tests: 6th April 1971 - L.M.A. - TORINO (Italy)

Type of dynamometer: electrical, swinging frame

Horsepower	*Speeds*		*Fuel consumption*		
	Engine	*P.t.o.*	*Per hour*	*Specific*	*HP hour/unit of volume*
metric/hp	*rev/min*	*rev/min*	*l/h*	*g/metric hp h*	*metric hp h/l*
A. Maximum power: 2 hour test					
44.06	2440	670	10.67	201	4.13
B. Standard p.t.o. speed (540 rev/min)					
39.00	1967	540	8.92	190	4.37
C. Speed recommended by manufacturer for drawbar work					
43.61	2400	659	10.51	200	4.15
D. Part loads					
38.30	2495	685	9.10	197	4.21
—	2610	—	3.32	—	—
19.62	2555	702	5.99	254	3.28
44.06	2440	670	10.67	201	4.13
9.90	2580	708	4.69	394	2.11
29.10	2528	694	7.65	219	3.80

No load, maximum engine speed: 2610 rev/min

Equivalent crankshaft torque at max. power: 12.93 mkg

Maximum equivalent crankshaft torque: 14.96 mkg at 1200 rev/min engine speed

Mean atmospheric conditions:
— temperature 22 °C
— pressure 737.0 mm/Hg
— relative humidity 46%

Maximum temperature:
— coolant 80 °C
— engine oil 120 °C
fuel 24 °C

2. **Drawbar performance:**

Date of tests: 27th-28th April to 7th May 1971
Type of track: concrete
Height of drawbar above ground: 440 mm

Gear No.	Horse-power, metric hp	Drawbar pull, kg	Travelling speed, km/h	Engine speed, rev/min	Wheelslip, %	Specific fuel consumption		Temperature			Atmospheric conditions		
						metric drawbar hp h/l	g/metric drawbar hph	Coolant °C	Fuel °C	Engine oil °C	Temperature, °C	Relative humidity, %	Pressure, mmHg
1 - Maximum power (ballasted)													
(*) 1	17.15	2058	2.25	2541	10.9	2.68	310	80	30	105	15.5	63	737.5
(*) 2	30.26	2063	3.96	2488	11.3	3.37	246	80	30	108	15.5	63	737.5
3	38.82	1625	6.45	2430	6.3	3.58	232	80	32	115	16.2	60	737.8
4	40.50	1316	8.31	2434	4.6	3.77	220	80	32	115	14.5	69	738.5
5	39.66	698	15.34	2429	2.4	3.66	227	80	32	115	13.0	70	738.5
2 - Five-hour test at 75% of pull at maximum power													
3	30.70	1230	6.74	2492	4.2	3.51	236	80	32	110	14.5	69	739.0
(°) 3 - Five-hour test at pull corresponding to 15% wheelslip in test (1)													
2	32.58	2140	4.11	2482	7.4	3.56	234	80	32	112	21.5	75	744.8
4 - Maximum power (unballasted)													
(•) 2	22.11	1500	3.98	2515	11.5	3.08	270	82	35	107	25.0	60	747.0
3	33.88	1490	6.14	2462	11.3	3.52	236	84	35	110	25.0	60	747.0
4	41.06	1377	8.05	2435	7.2	3.83	217	84	35	115	21.5	80	748.0
5	41.52	740	15.15	2428	3.1	3.90	213	84	35	115	22.0	75	748.0

Oil consumption during ten hours duration of tests (2) and (3): 3 g/h.
(*) Maximum pull available at 15% wheelslip: 2120 kg
(°) Tractor with additional ballast
(•) Maximum pull available at 15% wheelslip: 1530 kg

3. **Turning space and turning circle:**

Details of wheel equipment: As in specification, without ballast

Track of wheels: Front 1380 mm
Rear 1400 mm

	With brakes		Without brakes	
	Right-hand	*Left-hand*	*Right-hand*	*Left-hand*
Radius of turning space m	3.14	3.09	3.41	3.38
Radius of turning circle m	3.00	2.95	3.27	3.24

4. **Location of centre of gravity:**

	mm
Height above ground	705
Distance forward from the vertical plane containing the axis of the rear wheels	700
Distance from the median plane of the tractor	0

5. **Braking:**

Date of tests	7th to 10th May 1971
Type of track	concrete
Type of decelerometer	SIEMENS BRAMSMESSER BIS
Weight of ballasted tractor	2580 kg

Cold brakes

		Tractor ballasted	*Tractor without ballast*
Travelling speed of tractor	km/h	25.0	25.0
i - Maximum deceleration	m/s²	4.4	4.6
ii - Stopping distance	m	9.4	7.0
iii - Force on brake pedal	kg	55	50
iv - Force on brake pedal to deceleration of 2.5 m/s²	kg	25	25

Brake fade characteristics (hot tests)

Maximum deceleration hot/maximum deceleration cold × 100 = 98%.

Stopping distance cold/stopping distance hot × 100 = 93%.

Force on pedal cold/force on pedal hot × 100 = 92%.

Parking brake:

Efficiency of handbrake on a slope of 16 per cent: with a 35 kg pull on handbrake no wheel rotation occurs with tractor facing first up and then down the slope.

6. Measurement of ambient noise emitted by the tractor:

Date of test: 8th July 1971
Type of sound level meter: ELIT type 905
Type of track: concrete
Results of test:
— gear 6th
— travelling speed 25.0 km/h
— sound level 84 dBA

7. Noise measurement at the driver's ear level:

Date of test: 8th July 1971
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 from 31.5 to 16,000 Hz

Results of test

Gear	*Travelling speed km/h*	*Loudness sones*
4th	8.30	91

8. Power lift and hydraulic pump performance:

Date and location of tests: 8th July 1971 - L.M.A. - TORINO (Italy)
Hydraulic fluid: Transmission oil
Type of linkage lock for transport: hydraulic
Opening pressure of the relief valve: 150 kg/cm²

Pump characteristics:

i) Opening pressure of the relief valve: 150 kg/cm²
Sustained pressure by the open relief valve: 170 kg/cm²
ii) Pump delivery rate at minimum pressure and rated engine speed: 21.8 l/min
iii) Pump delivery rate: 20.6 l/min
Delivery pressure: 170 kg/cm²
Power: 7.8 metric hp

	Height above ground in down position		*Vertical movement mm*	*Maximum force exerted through full range kg*	*Pressure kg/cm²*	*Lifting force when front of tractor lifts kg*
	Hitch point mm	*Frame mm*				
Linkage giving maximum mechanical advantage						
At hitch points	280	—	500	1450	170	—
On the frame	—	160	540	1300	170	900
Linkage giving minimum mechanical advantage						
At hitch points	160	—	620	1250	170	—
On the frame	—	125	660	1050	170	900

NOTE - On request this tractor is available with the following additional speeds and is designated FIAT 450/9B.

Gear	*Number of engine revolutions for one revolution of driving wheel*	*Travelling speed for 2400 rev/min rated engine speed, km/h*
Forward		
1	720.958	0.77
2	398.825	1.38
3	253.344	2.18

Officer in charge: Ing. R. Gioia

Head of L.M.A.: Dr. L. Lisa

Date: 20th July, 1971

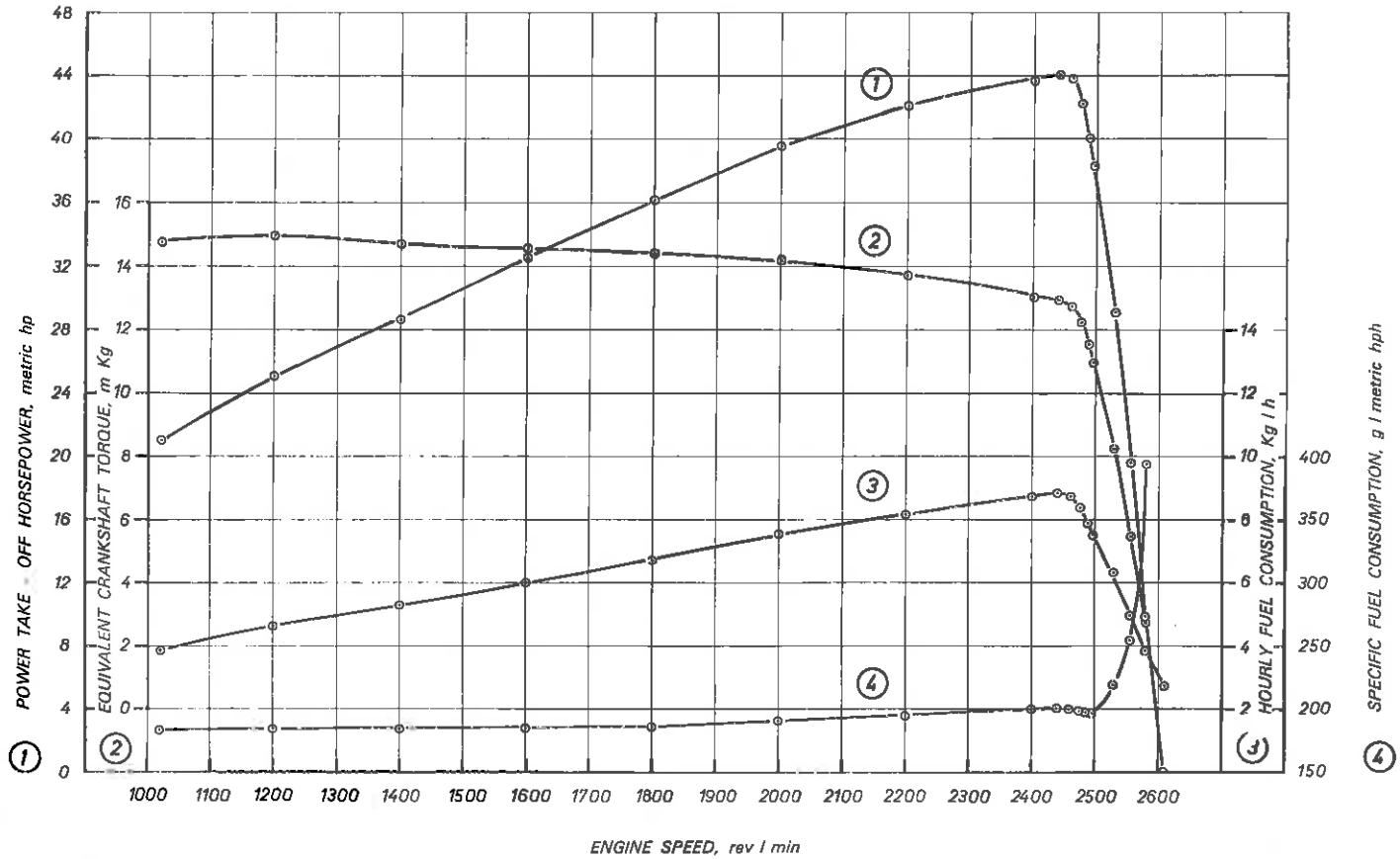


FIG. 1. Power take-off test

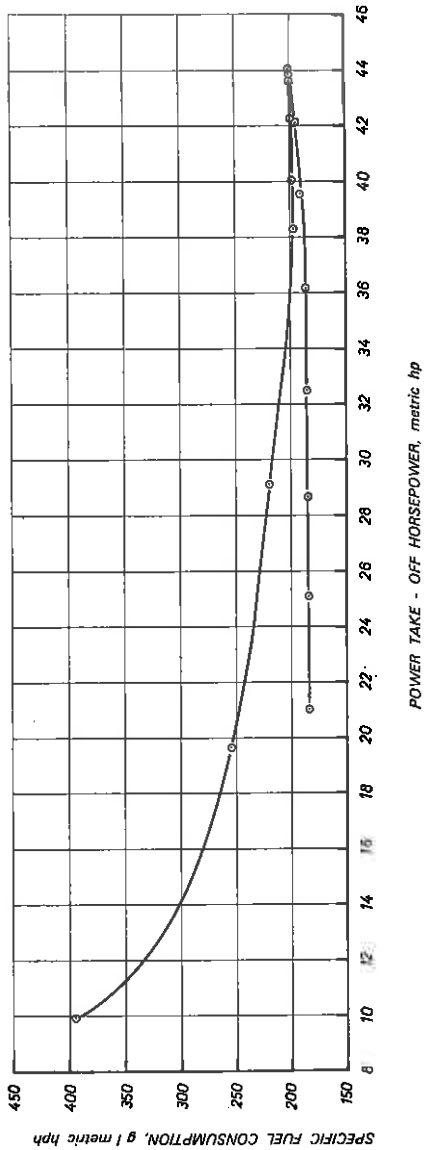


FIG. 2. Power take-off test

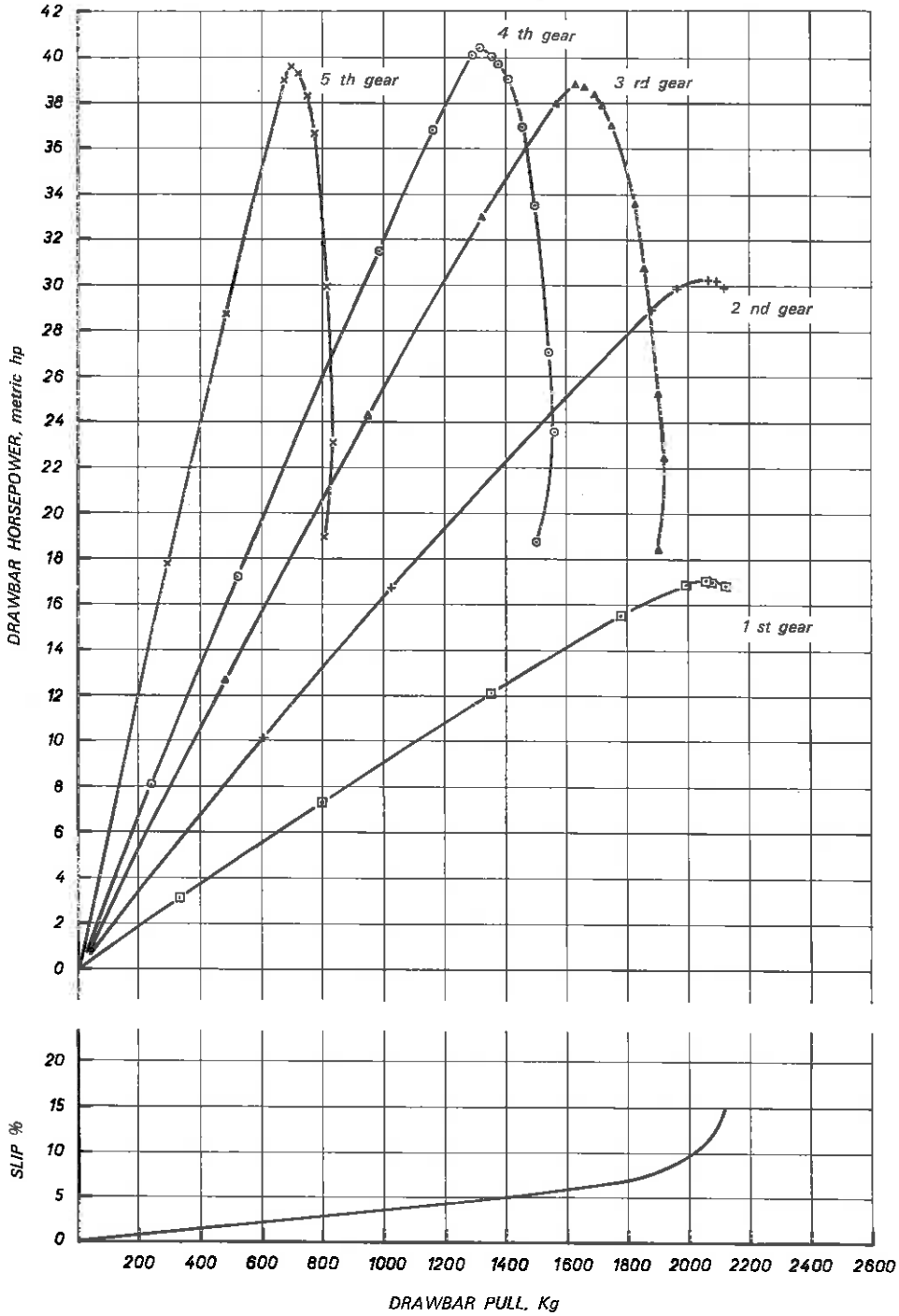


FIG. 3. Drawbar test on concrete, with ballast

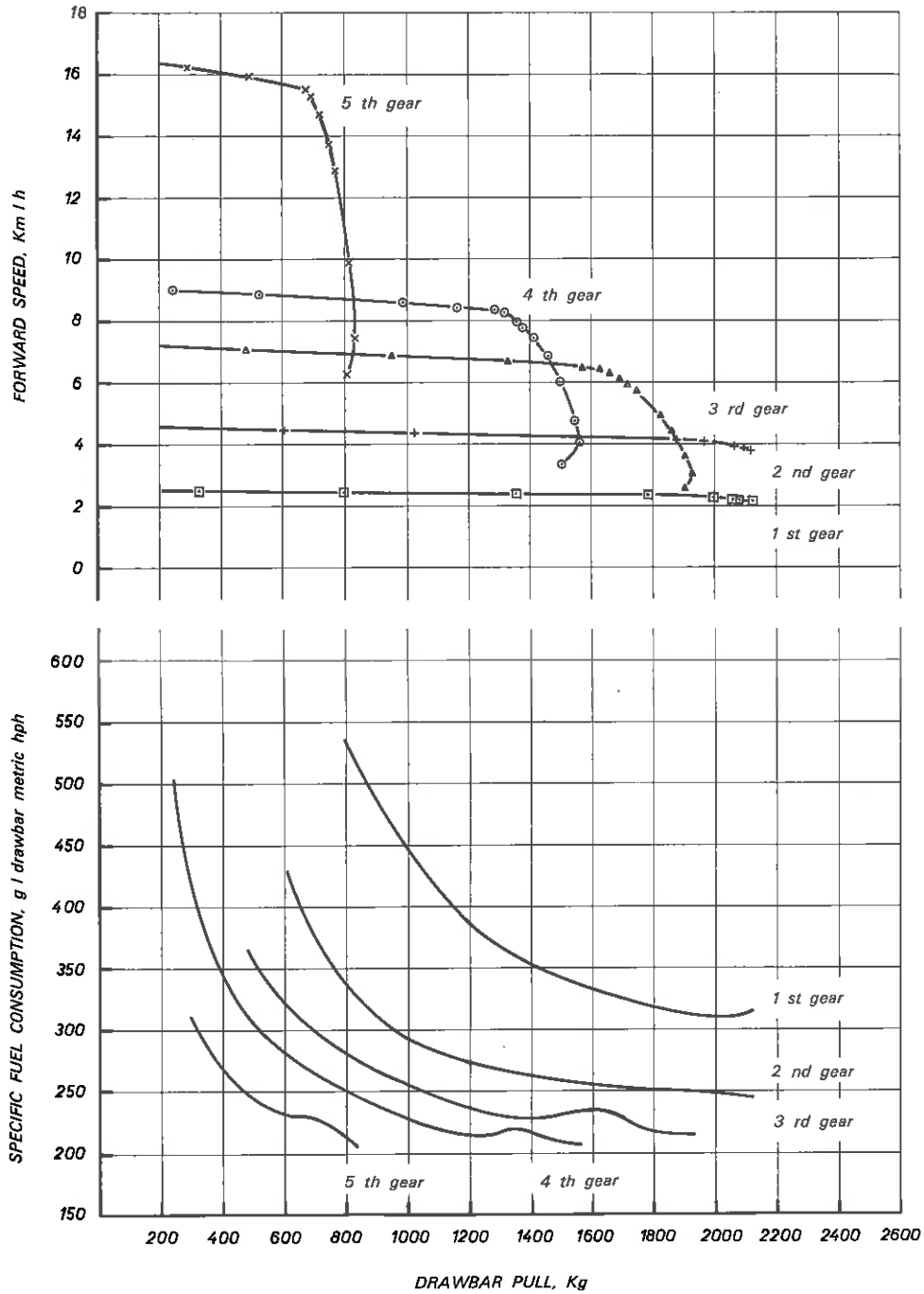


FIG. 4. Drawbar test on concrete, with ballast

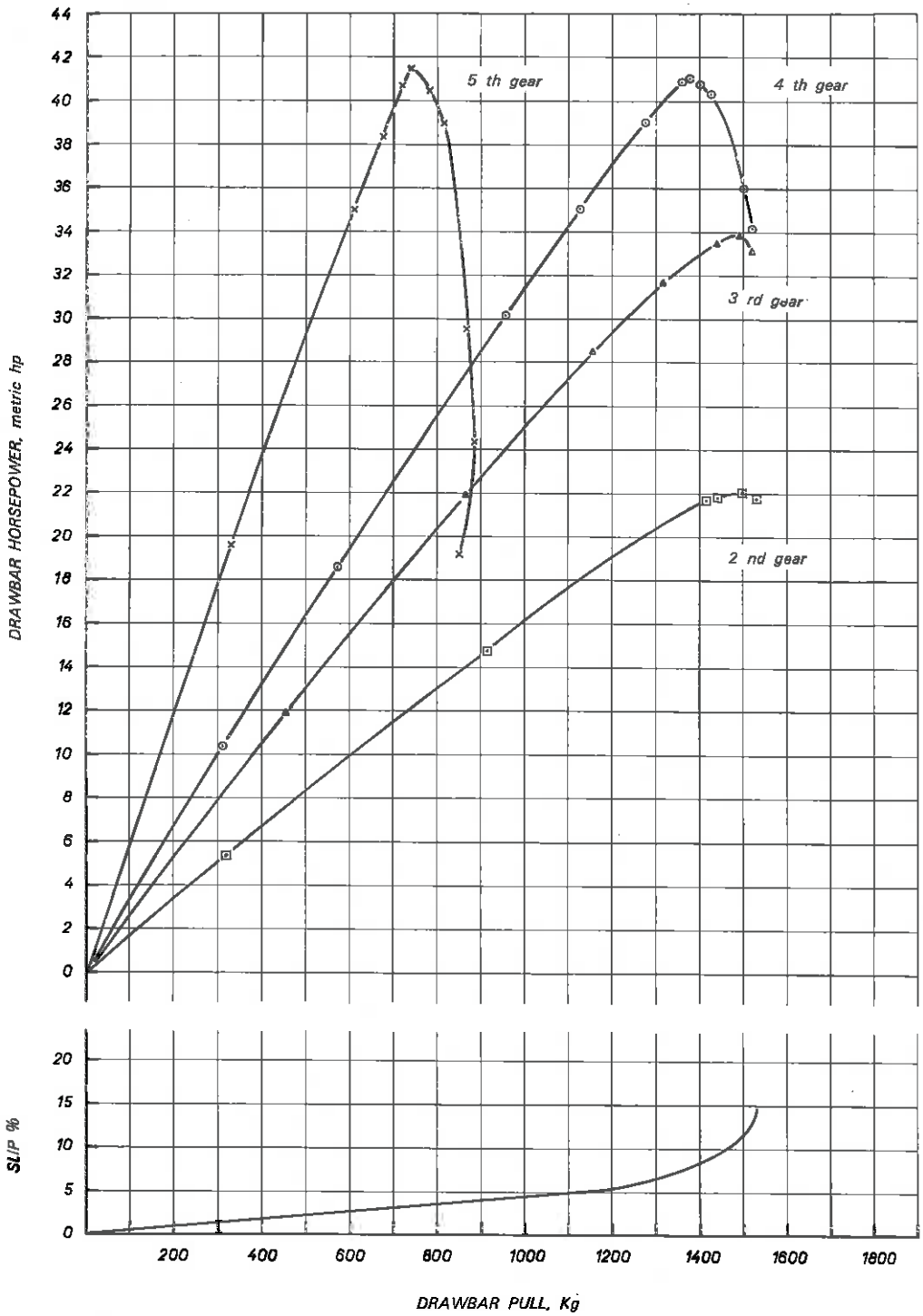


FIG. 5. Drawbar test on concrete, without ballast

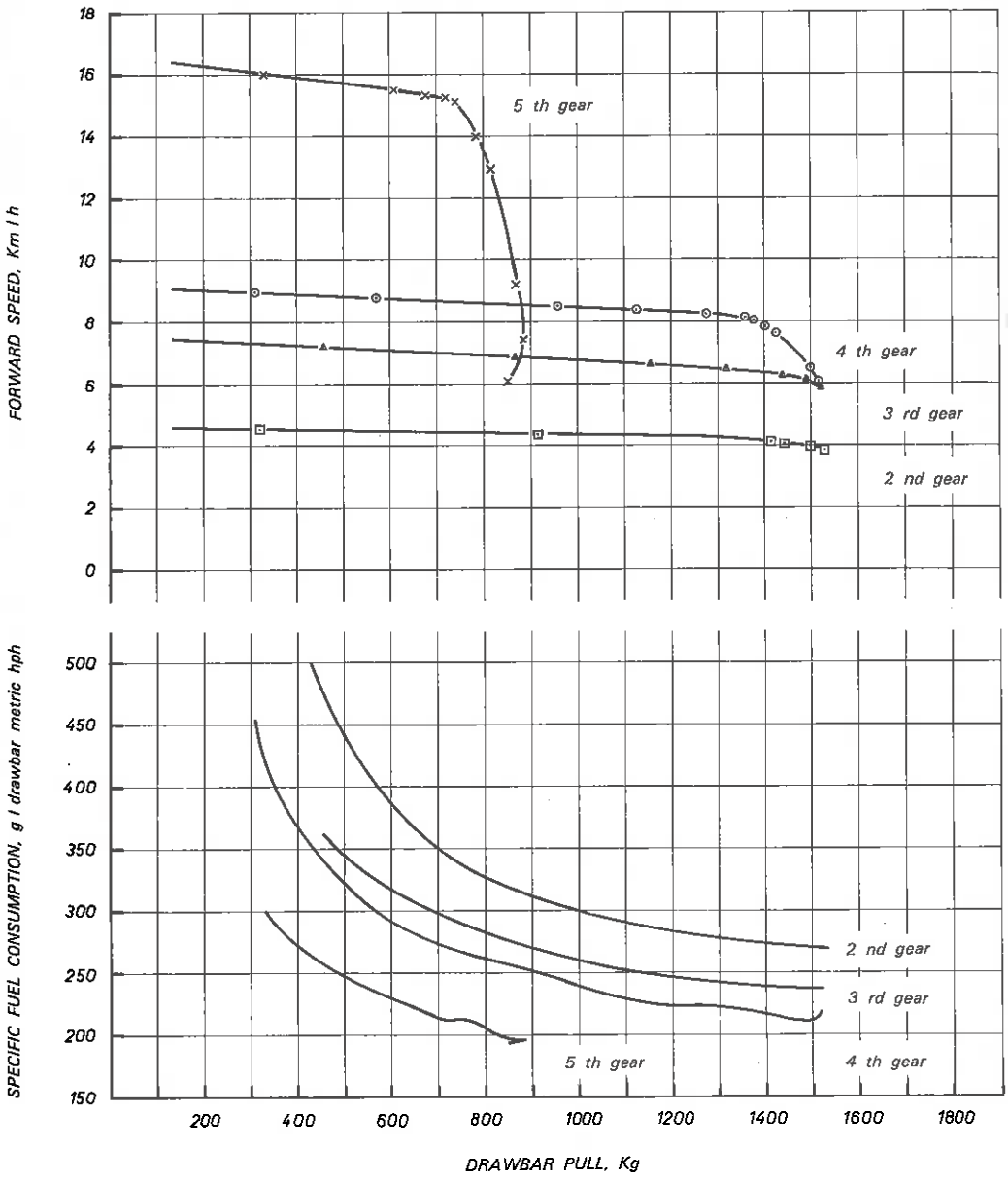


FIG. 6. Drawbar test on concrete, without ballast

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