

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

REPORT No. 266/O.E.C.D.

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

FIAT 450/6 DIESEL TRACTOR

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



Date of Tests: November 1967 - October 1968

Test No.: 266/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 being in accordance with the O. E. C. D. Tractor Test Code*

Date of approval: 31th March, 1969

Serial No.: 262

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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Manufacturer: FIAT Spa - 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: 450/6
Type: Four wheel, rear wheel driven, unit construction
Serial No.: 300001

Engine:

Make: FIAT
Model: 853 A
Type: 4-stroke, direct injection diesel
Serial No.: 000011
Cylinders: 3 cylinders, vertical, in-line, 95 mm bore x 110 mm stroke, capacity 2339 cm³, compression ratio 17 : 1, overhead valves, replaceable dry cylinder liners
Fuel system: Forced feed; FISPA diaphragm-type fuel pump; two CAV cartridge filters: one replaceable and one sediment bowl integral with the first; capacity of fuel tank 54 l. Bosch distributor-type injection pump model EP/VA3/110 H 1200 ALV 145, serial No. 00395; manufacturer's production setting 45 to 48 mm³ per cycle at 1200 pump rev/min and 15° C. Own make injector, model EPPZ 10 F1, serial No. 2/9584; injector setting 230 ± 5 kg/cm².
Governor: Bosch hydraulic, incorporated in fuel injection pump. Governed range of engine speed 600 to 2650 rev/min. Rated engine speed 2400 rev/min.
Air cleaner: FIAT oil bath with centrifugal pre-cleaner with automatic dust unloader; oil capacity 0.650 l
Lubrication system: Force feed from gear-type pump. One screen filter installed on pump suction side and one replaceable cartridge-type filter installed on pressure side to the engine. Oil capacity (engine sump) 7.5 l. Recommended oil change period: 200 h. Cartridge change period: 400 h
Cooling system: Water cooled from centrifugal pump (0.5 kg/cm²); thermostat for temperature control; 4-blade belt-driven fan with a diameter of 390 mm. Cooling water capacity 13 l. Visual control with thermometer
Starting system: Electrical, 12 V and 4 HP Bosch type starter motor

Electrical system:

Voltage: 12, negative earth
 Alternator: FIAT A 12 M - 124/12/42 X
 Battery: Marelli 6 AT 21, lead acid, capacity 110 Ah

Transmission:

Clutch: Own make, dual dry clutch, two plates both of 254 mm dia. for gearbox drive and for p.t.o. shaft drive, operated by single foot pedal

Gearbox: Own make, mechanical type with sliding and constant-mesh gears, giving 6 forward speeds and 2 reverse; it consists of 3 forward and 1 reverse speed gearbox with dual range planetary 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 capacities: Gearbox, differential and hydraulic lift 17.5 l; final drives 2.2 l each. Recommended oil change period 1600 h

Gear No.	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for 2400 rev/min rated speed of engine, km/h
1	233.498	2.36
2	129.145	4.27
3	82.012	6.72
4	64.859	8.50
5	35.874	15.37
6	22.782	24.20
R. Low	158.947	3.47
R. High	44.152	12.49

Power take-off: In centre-line at rear of tractor; it can work two ways: live or proportional to ground-speed; manually engaged; 34.9 mm ($1\frac{3}{8}$ " dia. following ISO standard; 6-spline; height above ground 560 mm. Proportional engine speed: 659 rev/min at 2400 rev/min rated engine speed; 540 rev/min at 1970 rev/min engine speed. Direction of rotation: clockwise viewed from tractor rear. Proportional ground speed: 1 revolution of p.t.o. shaft for approximately 0.25 m of travel. Number of p.t.o. revolutions for one revolution of driving wheel 15.17

Belt pulley:

Location: At rear of tractor, driven from p.t.o. clutch trough bevel gears; two alternative positions: on right side or on left side of p.t.o.

Diameter/width: 250 mm/150 mm

Speed: 1248 rev/min at 2400 rev/min rated engine speed giving 973 m/min linear speed. Engine speed at 945 m/min standard belt speed: 2330 rev/min

Direction of rotation: Clockwise viewed from tractor right side with pulley on right side of p.t.o.: opposite direction of rotation by reversing pulley unit

- Power lift:** Own make, fully independent hydraulic, gear-type pump supplying oil at 170 kg/cm². Category 1 implement linkage, controls for draught, position and response. Oil capacity (uses transmission oil) 16 litres. Max vertical lift movement: 620 mm (from 160 above ground). Minimum vertical lift movement: 500 mm (from 280 mm above ground).
- Drawbar:** Swinging with clevis end, sliding on drilled guide. Radius of swing: 4 positions, from 495 to 685 mm. Vertical height to centre of clevis: 4 positions from 335 to 490 mm, through adjusting the position of drawbar guide and inverting the drawbar. Drawbar hole: 29 mm dia.; distance behind rear axle: 615 to 805 mm; position relative to p.t.o.: from 5 to 155 mm below, 365 to 546 mm to rear (horizontal line). Lateral adjustment: 4 positions from 250 to 345 mm
- Hitch:** Clevis type; adjustable height through drilled guides. Height above ground to centre of clevis: 4 positions, 385 to 760 mm. Hitch hole: 29 mm dia.; distance from rear axle 330 mm; position relative to p.t.o.: 185 mm above, 185 below, 60 mm to rear (horizontal line)
- Steering:** Own make, worm gear mechanical type, steering wheel control
- Brakes:** Own make, band type with drums fixed to differential half-shafts; dual control through independent or combined foot pedal. Parking brake hand-lever operated with ratchet and pawl
- Wheels:**
- Steering wheels: Two at front; Pirelli «Tractor» tyres 6.00-16, 4 ply rating. Maximum permissible weight on each tyre 430 kg at 1.50 kg/cm². Track width 1280 mm, by 8 steps to 1980 mm changed by extending front axle and reversing wheel discs.
- Driving wheels: Two at rear; Pirelli «Tractor cinturato» tyres 13.6/12-28, 6 ply rating. Maximum permissible weight on each tyre 1360 kg at 1.40 kg/cm², W12-28" rims. Track width 1200 mm by 8 steps to 1900 mm changed by reversing wheel centres and offset lug type rims.
- Wheelbase: 1920 mm

Tractor and ballast weights

(without driver but with tanks full)

Weight without ballast

Front:	670 kg
Rear:	1070 kg
Total:	1740 kg

Ballast

Front:	Weights—no. Liquid—nil
Rear:	Weights—4 per wheel, total 480 kg. Liquid—310 kg
Additional:	3 front frame weights, total 110 kg

Weight with ballast

Front: 780 kg
 Rear: 1840 kg
 Total: 2620 kg

Seat: Own make; parallelogram suspension with rubber lined coil spring; range of adjustment 25 mm fore and aft in median plane of tractor

Number of grease points

Whole tractor: 16

Overall dimensions

Overall length: — without front weights: with hydraulic lift installed 3.10 m
 — without front weights: without hydraulic lift installed 2.98 m
 — with front weights: with hydraulic lift installed 3.21 m
 — with front weights: without hydraulic lift installed 3.09 m

Overall width: — without ballast weights 1.52 m to 2.22 m
 — with ballast weights 1.61 m to 2.31 m

Overall height: — to top of steering wheel 1.49 m

Minimum ground clearance: — to underside of front axle 0.36 m
 — to underside of drawbar 0.265 m

Lighting

	<i>Height above ground of centre</i> cm	<i>Size</i> cm	<i>Distance from outside edge of tractor to centre</i> cm
Headlights	113	13 dia.	42
Side lights	113	13 dia.	42
Rear lights	116	7 × 5	37
Reflectors	105	5.5 dia.	37

FUELS AND LUBRICANTS USED IN TESTS**Laboratory tests:**

Fuel: Diesel oil, density 0.831 kg/l at 15° C, Cetane No. not recorded
Engine oil: FIAT AMBRA, viscosity SAE 20 W-40
Transmission oil: FIAT AMBRA, viscosity SAE 20 W-40

Track tests:

Fuel: Diesel oil, density 0.831 kg/l at 15° C, Cetane No. 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: 17th November, 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 hp h	metric hp h/l

A. Maximum power: 2 hour test

42.01	2440	670	10.23	202	4.11
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B. Standard p.t.o. speed (540 rev/min)

36.80	1967	540	8.95	202	4.11
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C. Manufacturer recommended speed for drawbar work

41.65	2400	659	10.29	205	4.05
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D. Part loads

36.56	2500	686	8.66	197	4.22
0	2640	—	3.03	—	—
18.74	2561	703	5.63	250	3.33
42.01	2440	670	10.23	202	4.11
9.50	2598	713	4.33	379	2.19
27.66	2520	692	7.22	217	3.83

No load, maximum engine speed: 2640 rev/min

Equivalent crankshaft torque at maximum power: 12.33 mkg

Maximum equivalent crankshaft torque: 14.60 mkg at 1400 rev/min engine speed

Mean atmospheric conditions: temperature 17.5° C
pressure 751.8 mm Hg
relative humidity 83%

Maximum temperature: coolant 88° C
engine oil 110° C
fuel 41° C

2. Drawbar performance:

Date of tests: 23rd and 24th April and 18th June, 1968

Type of track: Concrete

Height of drawbar above ground: 440 mm

Gear	Horse-power, metric hp	Drawbar pull, kg	Travelling Speed, km/h	Engine speed, rev/min	Wheelslip, %	Fuel consumption,		Temperature °C			Atmospheric conditions		
						g/metric drawbar hp h	metric drawbar hp h/l	Coolant	Fuel	Engine oil	Temperature, °C	Relative humidity, %	Pressure, mmHg
(i) Maximum power (ballasted)													
1	16.98	2122	2.16	2555	14.1	302	2.76	80	42	102	16.5	55	748.0
2	29.47	2116	3.76	2475	14.7	250	3.33	84	42	104	19.5	47	747.2
3	36.76	1534	6.47	2420	4.6	234	3.54	88	42	110	13.5	51	746.0
4	37.55	1226	8.27	2415	3.8	230	3.62	88	42	110	18.5	48	745.8
5	36.31	648	15.13	2406	1.8	236	3.52	88	42	110	19.0	52	745.5

(ii) Five-hour test at 75% of pull at maximum power

3	23.61	928	6.87	2521	2.7	247	3.37	88	42	112	18.6	75	743.0
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(iii) Five-hour test at pull corresponding to 15% wheelslip in Test (i)

2	31.86	2140	4.02	2460	7.3	257	3.13	88	44	112	20.5	88	744.5
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(iv) Maximum power (unballasted)

2	22.02	1494	3.98	2524	11.3	—	—	82	—	100	23.5	57	742.5
3	33.57	1441	6.29	2465	9.3	—	—	82	—	100	22.0	60	742.0
4	38.04	1265	8.12	2430	5.2	—	—	86	—	106	21.3	56	742.8
5	37.87	674	15.17	2431	2.2	—	—	86	—	106	24.0	54	742.0

Oil consumption during ten hours duration of tests (ii) and (iii): 15 g/h

3 and 4. Turning space and turning circle:

Details of wheel equipment: As in specification, without ballast

Track of wheels: Front—1300 mm
Rear—1420 mm

	<i>With brakes</i>		<i>Without brakes</i>	
	<i>Right-hand</i>	<i>Left-hand</i>	<i>Right-hand</i>	<i>Left-hand</i>
Radius of turning space, m	2.86	2.91	3.22	3.24
Radius of turning circle, m	2.80	2.85	3.16	3.18

5. Location of centre of gravity:

	<i>mm</i>
Height above ground	693
Distance forward from the vertical plane containing the axis of the rear wheels	737
Distance from the median plane of the tractor	0

6. Braking:

Date of test: 25th October, 1968

Type of track: Concrete

Cold brakes

	<i>Tractor without ballast</i>	<i>Tractor ballasted</i>
Travelling speed of tractor, km/h	25	25
Maximum deceleration, m/s ²	4.4	4.8
Stopping distance, m	8.0	7.4
Force on brake pedal, kg	25	25

Brake fade characteristics (hot tests)

Maximum deceleration hot/maximum deceleration cold × 100: 96%

Stopping distance cold/stopping distance hot × 100: 93%

Force on pedal cold/force on pedal hot × 100: 100%

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

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

7. Measurement of ambient noise emitted by the tractor:

Date of tests: 28th October, 1968
 Type of sound level meter: ELIT type 905
 Type of track: Concrete
 Results of tests: gear 6th
 travelling speed 24.5 km/h
 sound level 87 dBA

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

Date of tests: 28th October, 1968
 Type of sound level meter and octave filter: ELIT types 905 and filter set 955
 Type of track: Concrete
 Type of frequency analyzer: octave type, with 10 bands from 31.5 to 16,000 Hz

Results of Tests

<i>Gear</i>	<i>Travelling speed, km/h</i>	<i>Loudness, sones</i>
3	6.60	79
4	8.35	80
5	15.30	95

9. Power lift and hydraulic pump performance:

Date and location of tests: 23rd October, 1968; L.M.A. - TORINO (Italy)
 Hydraulic fluid: FIAT AMBRA, viscosity: SAE 20 W/40

	<i>Vertical movement, mm</i>	<i>Maximum force exerted through full range, kg</i>	<i>Pressure, kg/cm²</i>	<i>Linkage load at which unballasted front end of tractor lifts off the ground, kg</i>
<i>Linkage giving maximum mechanical advantage</i> At lower hitch points (height above ground in down position 280 mm)	500	1450	170	—
On the standard frame	540	1300	170	900
<i>Linkage giving minimum mechanical advantage</i> At lower hitch points (height above ground in down position 160 mm)	620	1250	170	—
On the standard frame	660	1050	170	900

Type of linkage lock for transport: Hydraulic

Opening pressure of the relief valve: 150 kg/cm²

Pump characteristics:

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

Pump delivery rate:

(ii) at minimum pressure (rated engine speed): 21.8 l/min
(iii) at maximum hydraulic power (rated engine speed): 20.6 l/min
delivery pressure: 150 kg/cm²
power: 6.9 metric hp

Officer in charge: R. Gioia

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

Date: 16th January, 1969

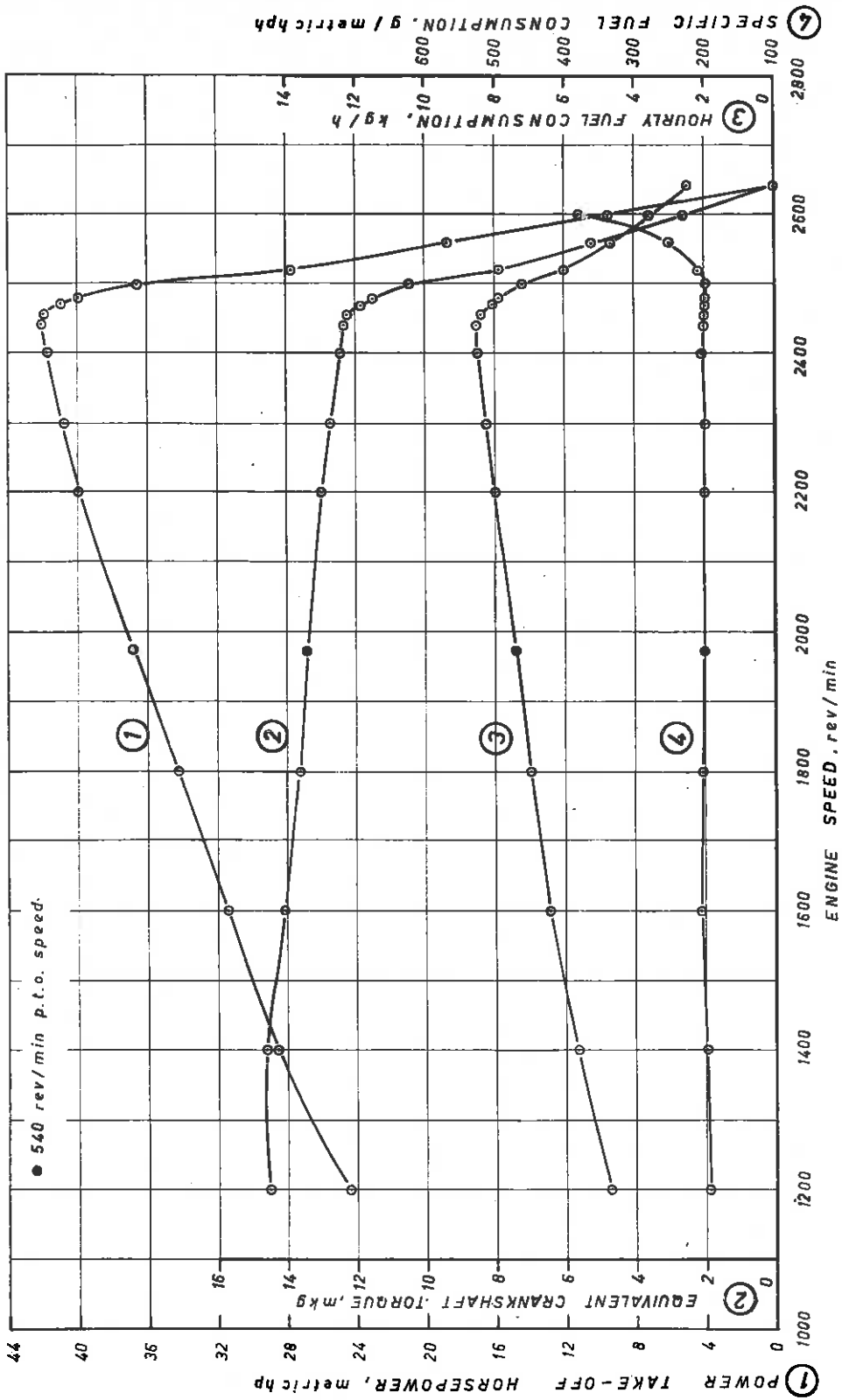


Fig. 1. Power take-off test

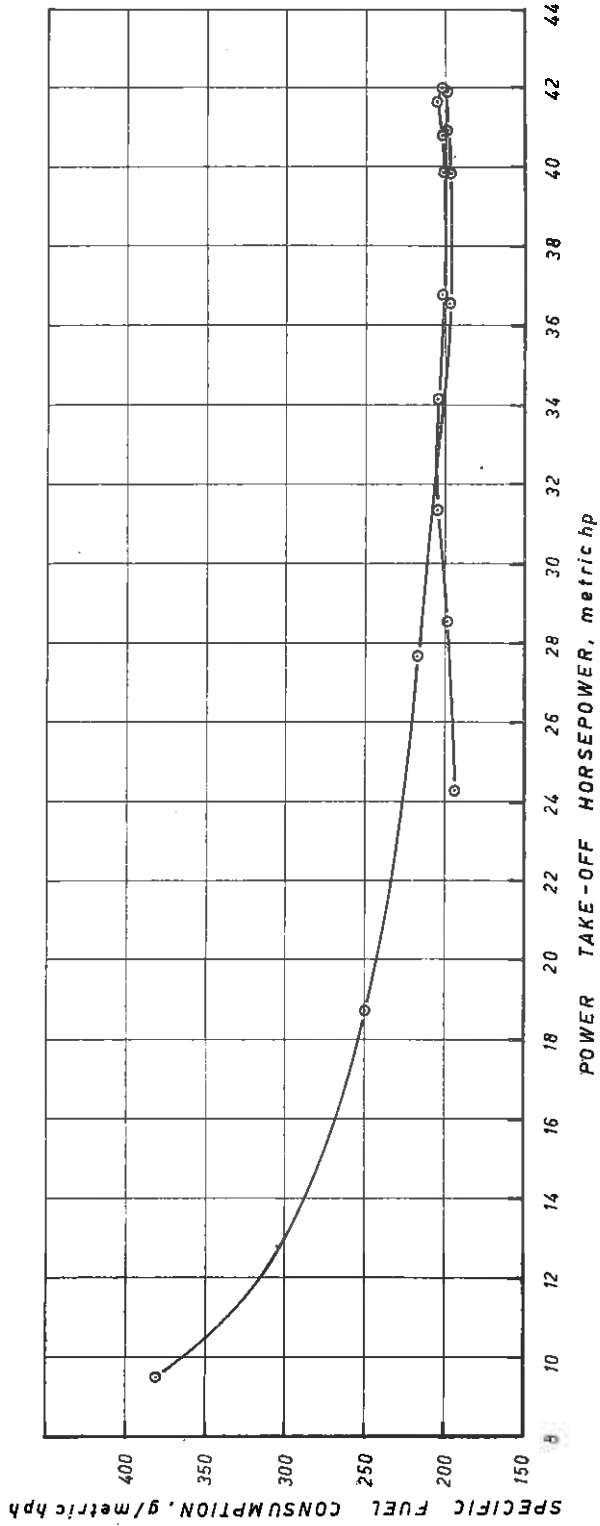


Fig. 2. Power take-off test

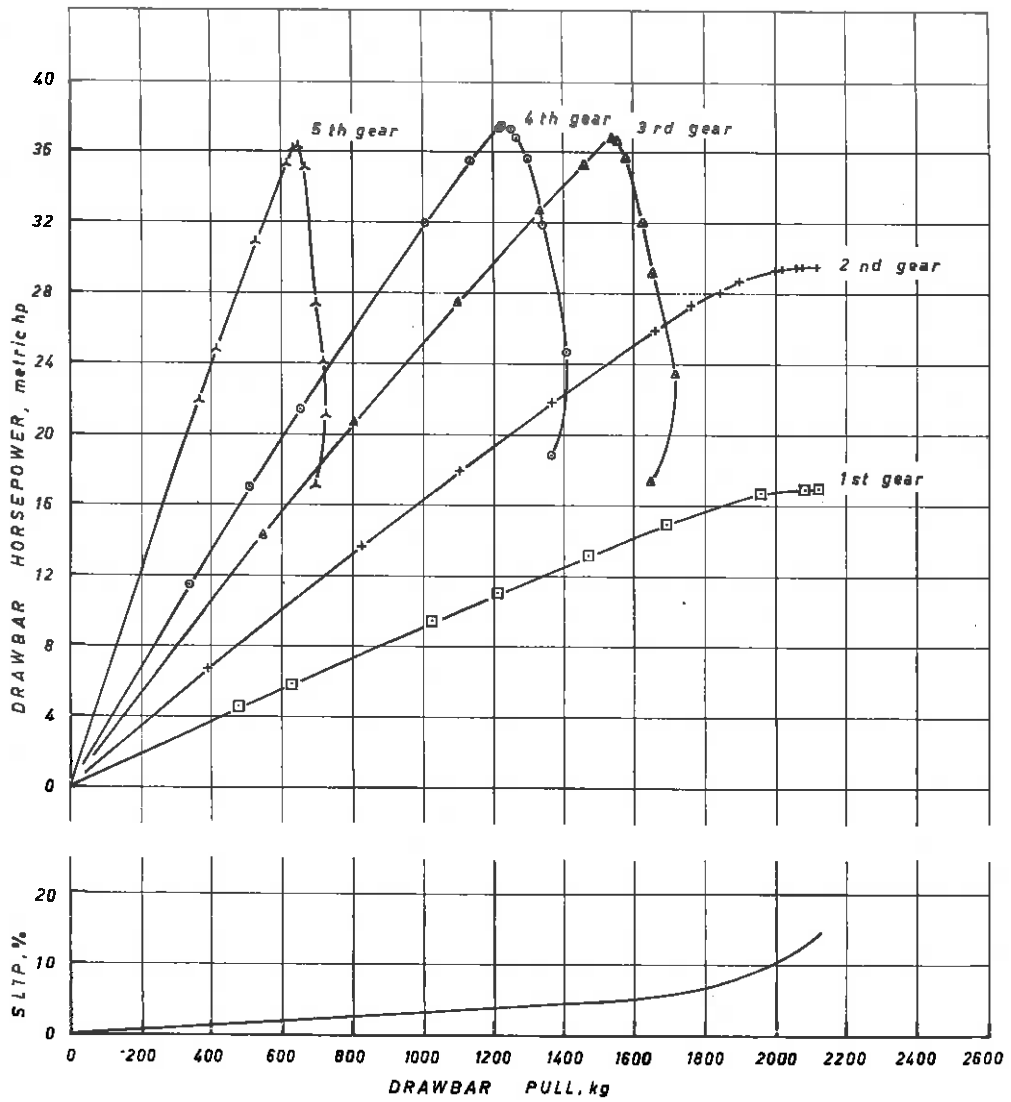


FIG. 3. Drawbar test on concrete, with ballast

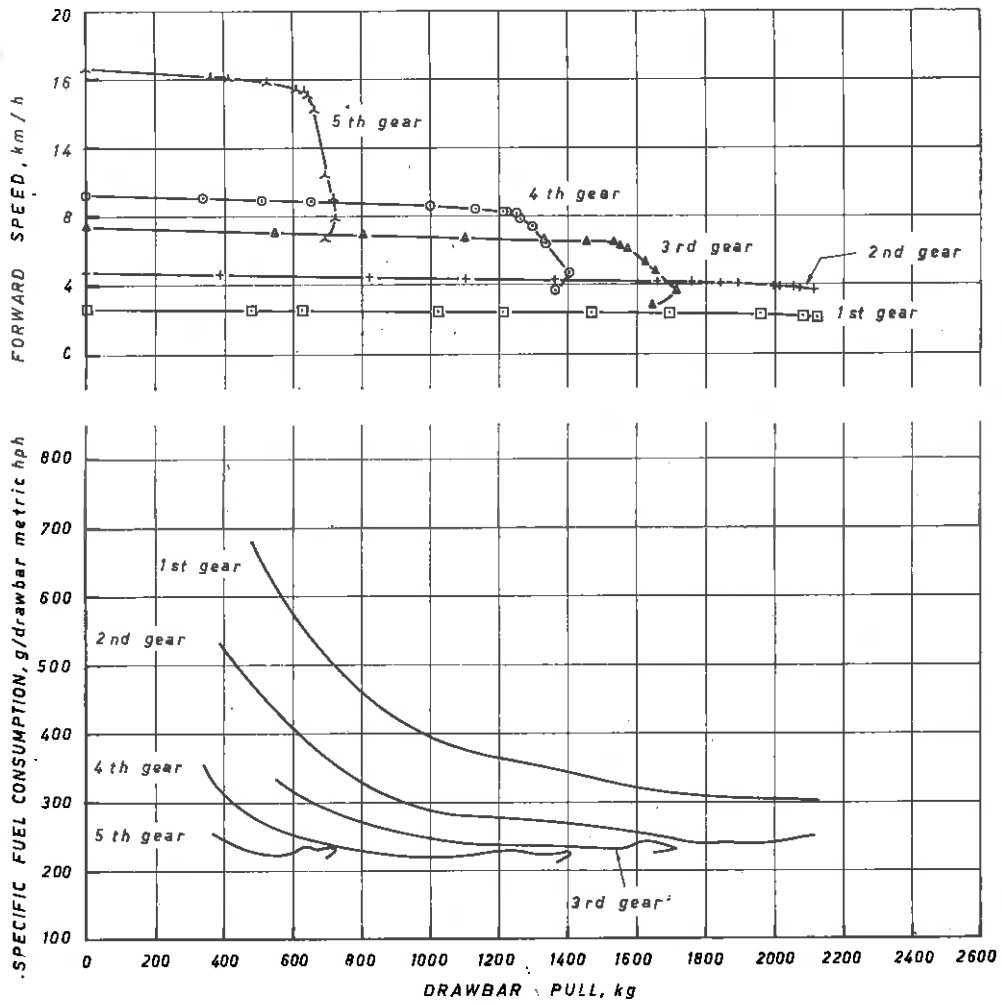


FIG. 4. Drawbar test on concrete, with ballast

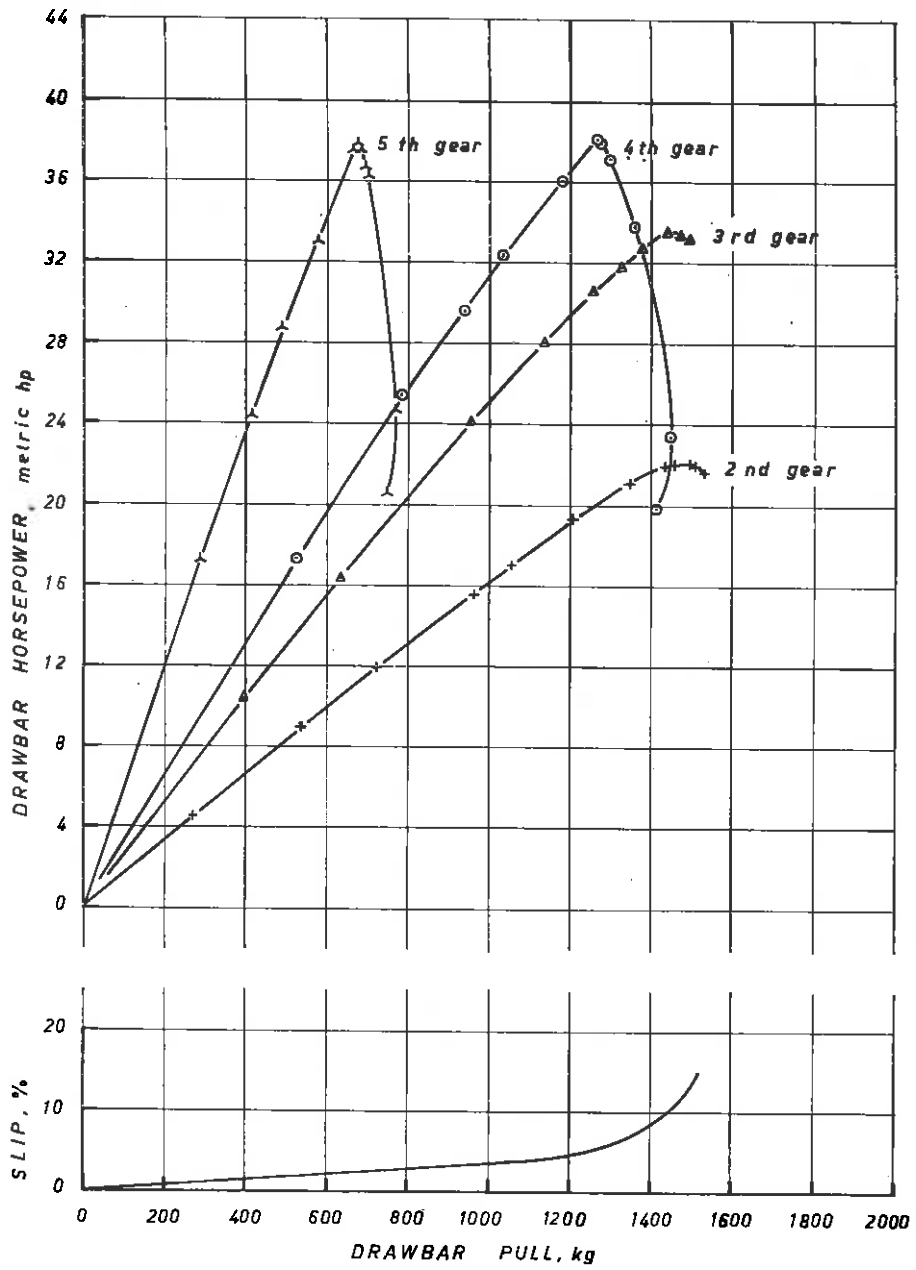
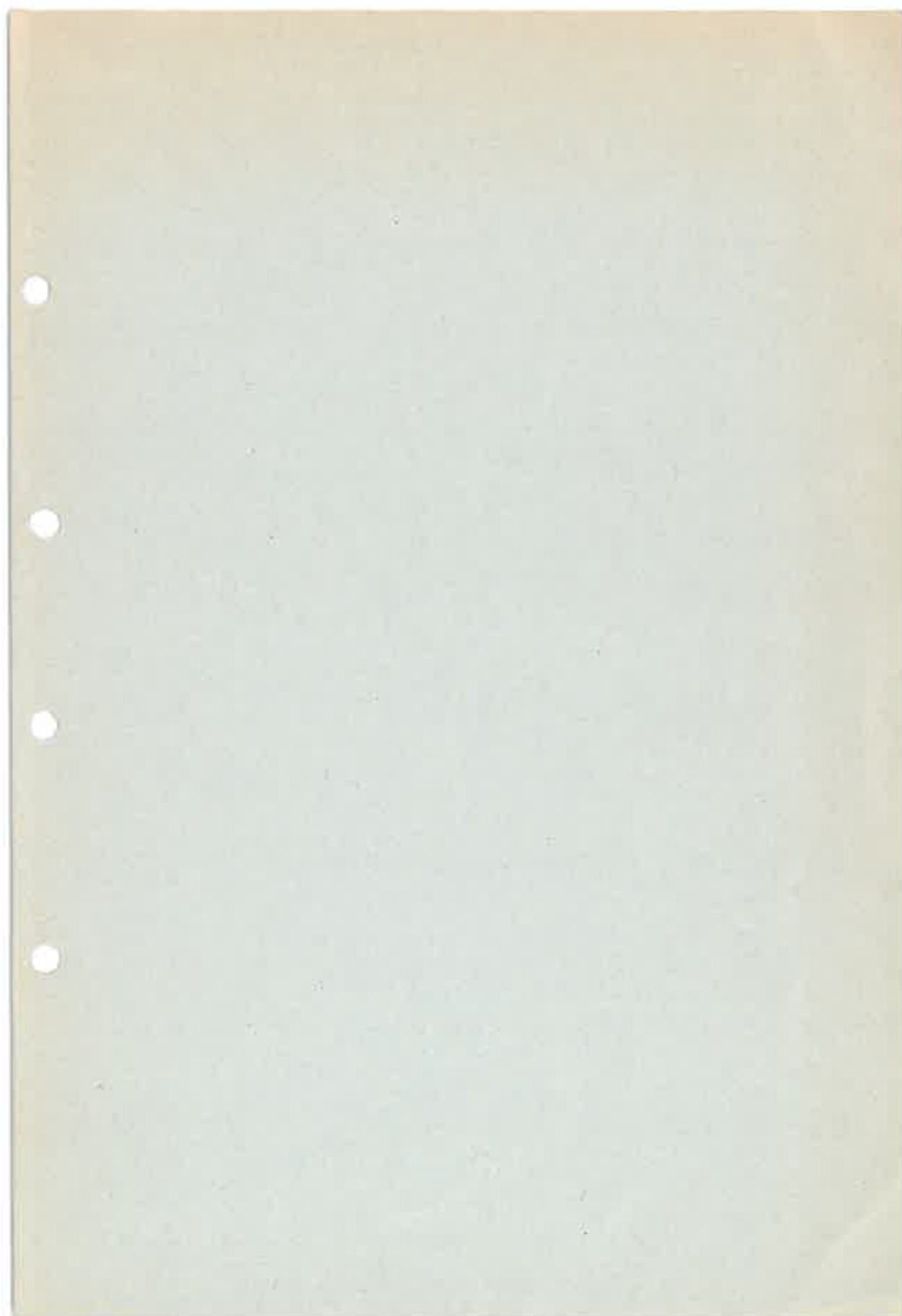


FIG. 5. Drawbar test on concrete, without ballast



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