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

REPORT No. 314/O.E.C.D.

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

LANDINI R 5000 N Special S.A.
DIESEL TRACTOR

Manufactured by: MASSEY FERGUSON LANDINI S.p.A.
works of FABBRICO (Reggio Emilia) - Italy



Date of Tests: May - October 1969

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: 19th march 1970

Serial No.: 318

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

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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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Engine test:

— Engine crankshaft horsepower and torque, hourly consumption/ crankshaft rev/min 6

— Specific consumption/crankshaft horsepower 7

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Manufacturer:	MASSEY FERGUSON LANDINI S.p.A. - Works of FABBRICO (Reggio Emilia) - Italy
Submitted for test by:	The Manufacturer
Selected by:	The Manufacturer with the agreemen of the testing station
Place of running-in:	MASSEY FERGUSON LANDINI S.p.A. - Camerlata workshop (Como), Italy
Duration of running-in:	engine 100 hours, p.t.o. 50 hours, transmission 50 hours.

SPECIFICATION OF TRACTOR

Make:	LANDINI
Model:	R 5000 N Special S.A.
Type	TL 14 N/A - four wheel, rear wheel driven, unit construction
Serial No.:	1145264

Engine:

Make:	Perkins
Model:	AD 3.152
Type	4-stoke; direct injection diesel
Serial No.:	152 VA 77468 D
Cylinders:	3 cylinders, vertical, in-line, 91.4 mm bore × 127 mm stroke, capacity 2498 cm^3, compression ratio 18.5 : 1, overheard valves, replaceable dry cylinder liners.
Fuel system:	Forced feed; A.C. diaphragm-type fuel pump with sediment, bowl two replaceable cartridge type CAV paper filters. Capacity of fuel tank 38 liters. CAV injection pump, model DPA 3230180, serial No. 32830 N; manufacturer's production setting 8.40 to 8.50 kg/h at 2250 rev/min engine speed. CAV injector, model B DLL, serial No. 150 S 6372; injection pressure 175 ± 5 kg/cm^2.
Governor:	CAV mechanical, incorporated in fuel injection pump. Governed range of engine speed 550 to 2520 rev/min. Rated engine speed 2250 rev/min.

Air cleaner: AC DELCO oil bath type with centrifugal pre-cleaner; oil capacity 0.430 l.

Lubrification system: Forced feed from gear-type pump. One screen type filter installed on pump suction and one (make TECALAMIT model FA 5605) replaceable cartridge type installed on the pressure line to the engine. Oil capacity (engine sump) 7.1 liters. Recommended oil change period: 100 hours. Cartridge change period: 200 hours.

Cooling system: Water cooled from centrifugal pump (0.9 kg/cm²) with thermostatic control: 375 mm diameter, 6-blade, belt-driven fan. Cooling water capacity 13 liters. Visual control with thermometer.

Starting system: LUCAS model M 45 G electric motor, 12 V; cold starting device (<15°C); CAV thermostart model 375-5.

Electrical system

Voltage: 12 V, negative earth.

Generator: LUCAS C 40 A model.

Battery: EXIDE model TI3M, 12 V, lead acid; capacity 90 Ah.

Transmission

Clutch: BORG and BECK, dual dry clutch with two plates of 279 mm and 254 mm dia. for gearbox and p.t.o. drive, operated by a single foot pedal with progressive action.

Gearbox: Own make, mechanical type with sliding and constant-mesh gears, giving 12 forward speeds and 4 reverse.

Rear axle and final drive: Own make differential with Gleason type crown wheel and pinion; pedal operated differential lock; bull gear final drives.

Oil capacities: Gearbox and differential 13.3 liters; final drives 1.8 liters each. Recommended oil change period 1000 hours.

Gear No.	*Number of engine revolutions for one revolution of driving wheel*	*Nominal travelling speed for 2250 rev/min rated speed of engine km/h*
1	268.596	1.85
2	203.760	2.44 (*)
3	149.439	3.33
4	113.370	4.39 (*)
5	100.439	4.96
6	76.192	6.29 (*)
7	67.032	7.43
8	50.844	9.80 (*)
9	37.270	13.37
10	28.290	17.61 (*)
11	25.048	19.89
12	19.012	26.20 (*)
1 R.M	172.186	2.89
2 R.M.	151.513	3.29 (*)
3 R.M.	42.971	11.59
4 R.M.	38.807	12.84 (*)

Note — For the (*) please refer to remarks (paragraph 11).

Power take-off

Main p.t.o.: In centre-line at rear of tractor; indipendent or synchronised with the gearbox, hand lever operated; 34.9 mm (1 3/8") dia., 6 spline according to ISO Standard. Height above ground 560 mm. Proportional engine speed: 662 rev/min at rated engine speed (2250 rev/min), 540 rev/min at 1835 rev/min engine speed. Direction of rotation: clockwise viewed from tractor rear.
Proportional ground speed: 1 revolution of p.t.o. shaft for approximately 0.19 m of travel. Number of p.t.o. shaft revolutions for one revolution of driving wheels: 19.26.

Auxiliary p.t.o.: In centre-line at rear of tractor located above the main p.t.o.: independent or synchronised with the gearbox, hand lever operated, 34.9 mm (1 3/8") dia., 6-spline according to ISO Standard. Height above ground 680 mm.
Proportional engine speed: 2250 rev/min at rated engine speed (2250 rev/min). Direction of rotation anticlockwise viewed from tractor rear.
Proportional ground speed: 1 revolution of p.t.o. shaft for approximately 0.07 m of travel. Number of p.t.o. shaft revolutions for one revolution of driving wheels: 56.10.

Belt pulley

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

Diameter/Width: 240 mm/155 mm.

Speed: 1400 rev/min at 2250 rev/min rated engine speed giving 1048 m/min linear speed.
Engine speed at 945 m/min standard belt linear speed: 2029 rev/min.

Direction of rotation:

Clockwise viewed from tractor right side and pulley mounted on right side of p.t.o.; opposite direction of rotation by monuting pulley on left side of p.t.o.

Power lift

Own make, hydraulic, gear-type oil pump, max working pressure: 150 kg/cm². First category implement linkage; controls for draught and position.
Oil capacity 7.2 litres.
Max vertical lift: 700 mm (from 35 mm above ground).

Drawbar

Clevis type with end sliding on a drilled guide. Vertical height to centre of clevis: 2 positions, 365 mm and 470 mm above ground adjustements obtained by inverting the drawbar; drawbar hole 28.5 mm dia.; distance behind rear axle: 670 mm; positions relative to p.t.o.: from 90 mm to 195 mm below and 385 mm to rear (horizontal line).
Lateral adjustement: 3 positions from 0 at 270 mm per each side.

Hitch

Bridge type mounted on a drilled guide. Height above ground of hitch centre 485 mm. Hitch hole: 28.5 mm dia.; distance from rear axle 370 mm; position relative to p.t.o.: 75 mm above and 60 mm to rear.

Steering

Own make, model Burman, spherical knuckle joint, steering wheel operated.

Brakes

GIRILING dual disc type operated by two independent or combined foot pedals. Parking brake with hand operated lever with ratchet and pawl.

Wheels

Steering wheels: Two at front; PIRELLI « Tractor » type 6.00-16, 6 ply rating. Maximum permissible weight on each tyre: 415 kg at 1.50 kg/cm² and 620 kg at 3.50 kg/cm² pressure. Track width 1390 mm by 6 steps to 1890 mm obtained by extending front axle.

Driving wheels:	Two at rear; PIRELLI « Tractor cinturato » tyres 14.9/13-24, 6 ply rating. Maximum permissible weight on each tyre: 1285 kg at 0.90 kg/cm² and 1590 kg at 1.30 kg/cm² pressure; W 12" - 24" rims. Track width 1420 mm by 4 steps to 1700 mm obtained by changing the locking position of rims.
Wheelbase:	1930 mm.

Tractor and ballast weights

(without driver but with tanks full)

Weight without ballast:

Front:	765 kg
Rear:	1125 kg
Total:	1890 kg

Ballast:

Front:	None - no liquid in the tyres	
Rear:	Weights: 4 per each wheel, total	480 kg
	Liquid	310 kg
Additional:	8 front frame weights, total	240 kg

Weight with ballast:

Front:	1070 kg
Rear:	1850 kg
Total:	2920 kg

Seat:

Own make; adjusting type with rubber foam cushion; longitudinal adjustment: 50 mm

Number of grease points

10 points

Overall dimensions

Overall lenght:	— without front weights and with hydraulic lift installed: 3.22 m — without front weights and without hydraulic lift installed: 3.02 m — with front weights and with hydraulic lift: 3.51 m — with front weights and without hydraulic lift installed: 3.31 m
Overall width:	— without ballast weights: 1.80 m to 2.08 m — with ballast weights: 2.15 m to 2.43 m
Overall height:	— to top of steering wheel: 1.56 m; to top of exaust pipe: 1.87 m

Minimum ground clearance: — to underside of front axle 0.44 m

— to underside of drawbar 0.40 m

Lighting

	Height above ground of centre *cm*	*Size* *cm*	*Distance from outside edge of tractor to centre* *cm*
Headlights	100	15 × 9.5	48.5
Side lights	100	15 × 9.5	48.5
Rear lights	123	8.5 × 7.0	32.5
Reflectors	104	5 × 4.5	32.5

FUELS AND LUBRICANTS USED IN TESTS

Laboratory test:

Fuel: Diesel oil, density 0.831 kg/l at 15°C, cetane number not recorded

Engine oil: HDL MASSEY FERGUSON LANDINI, viscosity SAE 20

Transmission oil: L.O.T./C MASSEY FERGUSON LANDINI, viscosity SAE 90

Track test:

Fuel: Diesel oil, density 0.831 kg/l at 15°C, cetane number not recorded

Engine oil: HDL MASSEY FERGUSON LANDINI, viscosity SAE 20

Transmission oil: L.O.T./C MASSEY FERGUSON LANDINI, viscosity SAE 90

COMPULSORY TESTS

1. Power take-off performance

Date and location of test: May 20th, 1969 - 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 hph/l*
A. Maximum power: 2 hour test					
41.94	2325	684	10.32	205	4.06
B. Standard p.t.o. speed (540 rev/min)					
37.62	1835	540	8.74	193	4.30
C. Standard pulley speed (945 m/min)					
39.80	2029	597	9.48	198	4.20
D. Manufacturer recommended speed for drawbar work					
41.69	2250	662	10.18	203	4.10
E. Part loads					
37.41	2440	718	9.47	210	3.95
—	2512	739	3.30	—	—
19.02	2480	730	5.92	259	3.21
41.94	2325	684	10.32	205	4.06
9.56	2495	734	4.48	389	2.13
28.29	2460	724	7.36	216	3.84

No load maximum engine speed: 2512 rev/min

Equivalent crankshaft torque at max. power: 12.92 mkg

Maximum equivalent crankshaft torque: 16.16 mkg at 1300 rev/min engine speed

Mean atmospheric conditions:
- temperature 23.0°C
- pressure 742.5 mmHg
- relative humidity 55%

Maximum temperature:
- coolant 75°C
- engine oil 110°C
- fuel 26°C

2. Drawbar performance

Date of test: June 10th, 11th and 12th, 1969
Type of track: Concrete
Height of drawbar above ground: 470 mm

Gear	Horse-power	Drawbar pull	Travelling speed	Engine speed	Wheelslip	Fuel consumption		Temperature			Atmospheric conditions		
						Specific	Metric drawbar	Coolant	Fuel	Engine oil	Temper.	Relative humidity	Pressure
No.	metric hp	kg	km/h	rev/min	%	g/hph	hph/l	°C	°C	°C	°C	%	mmHg
1. Maximum power (ballasted)													
(*) 1	14.32	2101	1.84	2480	9.9	—	—	73	—	95	29.0	55	744.0
(*) 2	18.11	2120	2.31	2446	12.6	—	—	73	—	97	29.5	47	743.8
(*) 3	25.29	2175	3.14	2421	12.1	259	3.21	75	40	100	29.5	45	743.5
(*) 4	32.62	2141	4.11	2421	12.7	248	3.36	75	40	100	30.5	42	743.5
5	34.86	2004	4.70	2325	8.1	246	3.38	75	40	105	30.5	42	743.0
6	36.83	1560	6.35	2313	5.2	231	3.59	75	40	105	28.0	58	742.8
7	37.45	1386	7.29	2313	4.3	230	3.60	75	40	105	18.5	80	744.2
8	37.71	1050	9.70	2319	3.7	227	3.66	75	40	105	19.5	70	744.2
9	36.96	755	13.22	2310	3.0	234	3.55	75	40	105	22.0	65	744.2
2. Five-hour test at 75% of pull at maximum power													
7	23.03	792	7.85	2450	2.7	247	3.29	75	40	108	22.5	88	745.0
(°) 3. Five-hour test at pull corresponding to 15% wheelslip in test (1)													
2	19.64	2200	2.41	2444	8.3	—	—	75	—	105	21.5	91	747.8

(*) Maximum drawbar pull at 15% wheelslip: 2220 kg

(°) Tractor with additional ballast (550 kg)

2. Drawbar performance

Date of tests: July 8th, 1969

Type of track: Concrete

Height of drawbar above ground: 470 mm

Gear	Horse-power	Drawbar pull	Travelling speed	Engine speed	Wheelslip	Fuel consumption		Temperature			Atmospheric conditions		
						Specific	Metric drawbar	Coolant	Fuel	Engine oil	Temper	Relative humidity	Pressure
No.	metric hp	kg	km/h	rev/min	%	g/hph	hph/l	°C	°C	°C	°C	%	mmHg
4. Maximum power (unballasted)													
4	22.19	1487	4.03	2428	14.2	—	—	75	—	100	20.8	38	742.0
5	24.94	1461	4.61	2444	13.4	—	—	75	—	102	24.2	35	742.0
6	33.03	1407	6.34	2408	9.5	—	—	75	—	105	23.5	25	742.0
7	35.65	1385	6.25	2317	8.5	—	—	75	—	105	22.0	25	742.0
8	38.72	1079	9.69	2321	3.4	—	—	75	—	105	18.2	63	742.0
9	38.13	773	13.32	2326	2.7	—	—	75	—	105	18.5	60	742.0

Oil consumption during ten hours duration of tests (2) and (3): 13.5 g/h

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

Details of wheel equipment: As in specification, without ballast

Track of wheels: Front-1390 mm
Rear-1420 mm

	With brakes		*Without brakes*	
	Right-hand	*Left-hand*	*Right-hand*	*Left-hand*
Radius of turning space m	3.43	3.57	3.80	3.94
Radius of turning circle m	3.31	3.45	3.68	3.82

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

	mm
Height above ground	720
Distance forward from the vertical plane containing the axis of the rear wheels	747
Distance from the median plane of the tractor	0

6. **Braking**

Date of test: July 4th, 1969

Type of track: Concrete

Cold brakes:

	Tractor without ballast	*Tractor with ballast*
Travelling speed of tractor, Km/h	25.0	25.0
Maximum deceleration, m/s²	4.5	4.6
Stopping distance, m	7.0	7.8
Force on brake pedal, kg	28.0	37.0

Brake fade characteristics (hot tests)

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

Stopping distance cold/stopping distance hot × 100 = 94%

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 45 kg
— hot 45 kg

7. Measurement of ambient noise emitted by the tractor

Date of test: July 10th, 1969

Type of sound level meter: ELIT type 905

Type of track: Concrete

Results of test:
— gear 12
— travelling speed 25.0 Km/h
— sound level: 93 dBA

8. Noise measurement at the driver's ear level

Date of test: July 10th, 1969

Type of sound level meter and octave filter: ELITE types 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 tests

Gear	*Travelling speed km/h*	*Loudness sones*
6	6.66	193
7	7.66	176

9. Power lift and hydraulic pump performance

Date and location of tests: October 3rd 1969 - L.M.A. - TORINO (Italy)

Hydraulic fluid: ESSTIC

	Vertical movement mm	*Maximum force exerted through full range* kg	*Pressure* kg/cm²	*Linkage load at which unballasted front of tractor lifts off ground* kg
Linkage giving maximum mechanical advantage				
At lower hitch points (height above ground in down position 35 mm)	700	1100	170	—
On the standard frame,	660	950	170	950
Linkage giving minimum mechanical advantage (Only one position is possible at the hitch points)				

Type of linkage lock for transport: hydraulic

Opening pressure of 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 minimum pressure and at rated engine speed (2250 rev/min): 26.2 l/min

3) — at maximum hydraulic power (at 2250 rev/min rated engine speed): 10.5 hp (metric)
   delivery pressure: 170 kg/cm²
   delivery rate: 24.7 l/min

OPTIONAL TESTS

10. Engine tests

Date and location of tests: April 21st, 1969 - L.M.A. - TORINO (Italy)

Type of dynamometer: Electrical, swinging frame

Horsepower	*Speeds*	*Fuel consumption*		
	Engine speeds	*Per hour*	*Specific*	*HP hours/unit of volume*
metric hp	*rev/min*	*l/h*	*g/metric hph*	*metric hph/l*
A - Maximum power: 2 hour test				
44.64	2325	10.30	192	4.33
B - Standard p.t.o. speed (540 rev/min)				
39.58	1835	8.72	180	4.54
C - Standard pulley speed (945 m/min)				
41.93	2029	9.39	186	4.47
D - Manufacturer recommended for drawbar work				
44.14	2250	10.11	190	4.37
E - Part loads				
39.83	2440	9.60	197	4.15
3.16	2518	3.61	949	0.88
20.38	2495	5.92	241	3.44
44.64	2325	10.30	192	4.33
10.24	2512	4.48	363	2.29
30.17	2464	7.36	203	4.10

No load, maximum engine speed: 2520 rev/min

Crankshaft torque at max. power: 13.75 mkg

Maximum equivalent crankshaft torque: 16.85 mkg at 1300 rev/min engine speed

Mean atmospheric conditions: temperature 17.0°C
pressure 741.6 mmHg
relative humidity 53%

Maximum temperatures: coolant 75°C
fuel 18°C
engine oil 110°C

11. Remarks

The tractor here described may also be delivered (optional) with a gearbox including only six forward and two reverse speeds. The values of these speeds are indicated with (*) on the speed-table.

All other characteristics and performances remain unchanged.

This optional version is named LANDINI R 5000 S Special S.A., type TL 10 N/A.

Officer in charge: R. Gioia

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

Date: Turin, October 27th, 1969.

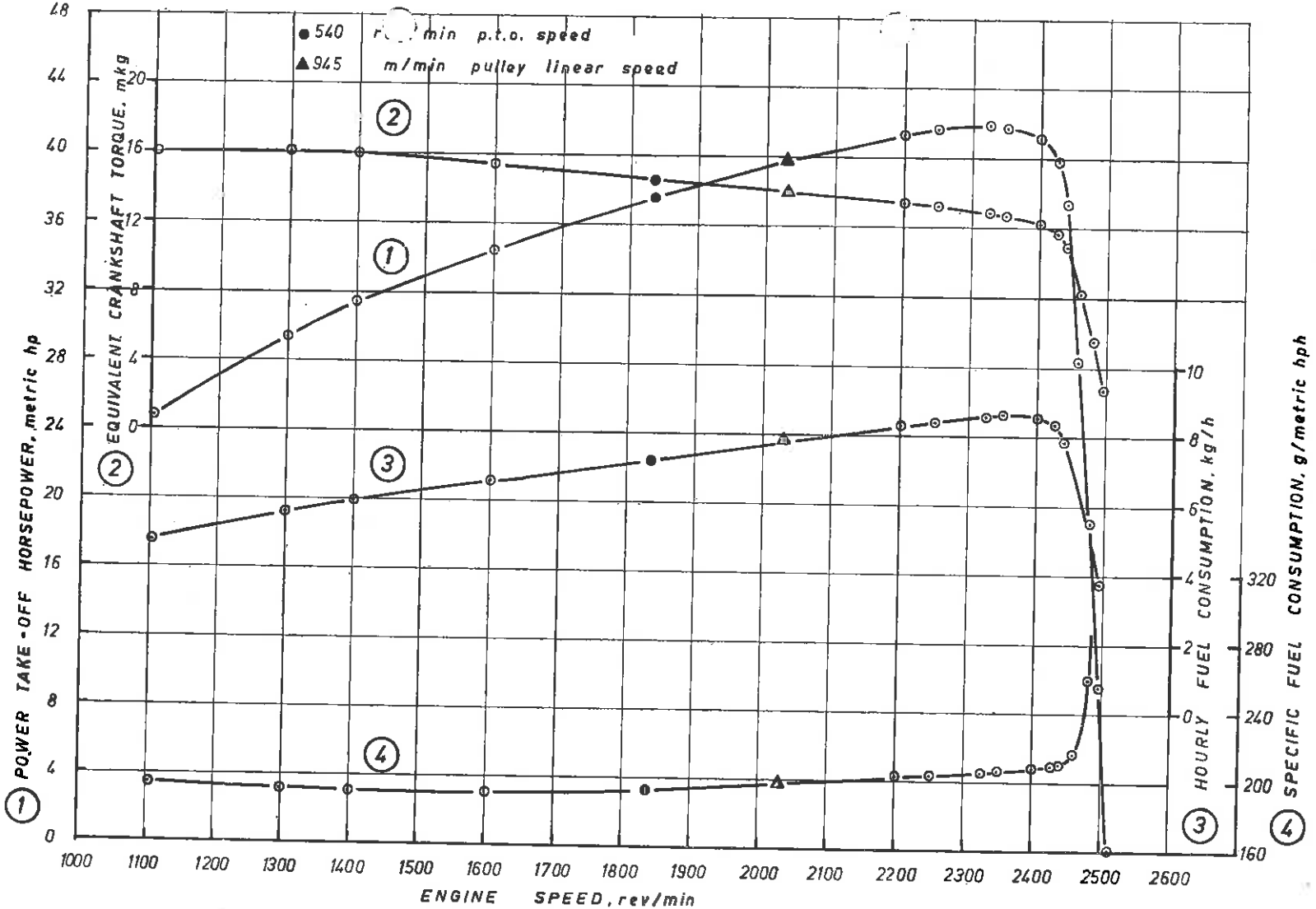


FIG. 1. Power Take-off Test

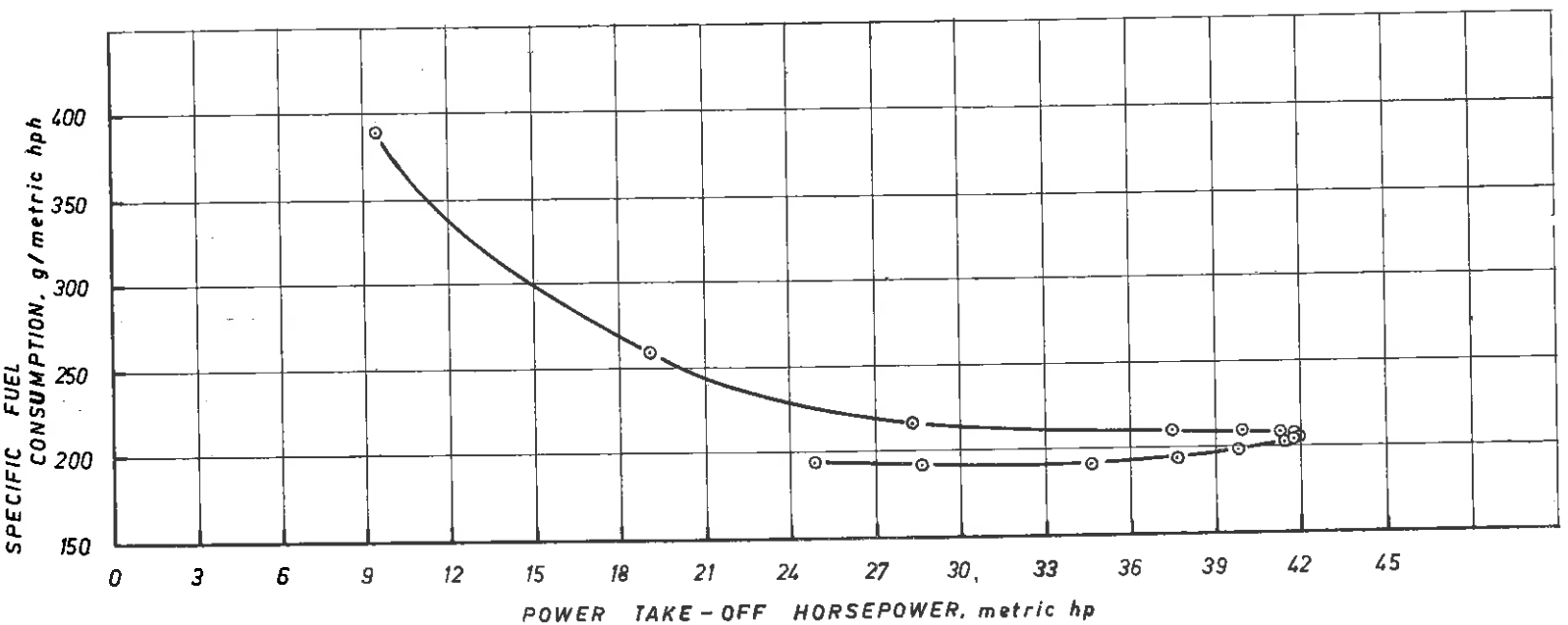


FIG. 2. Power Take-off Test

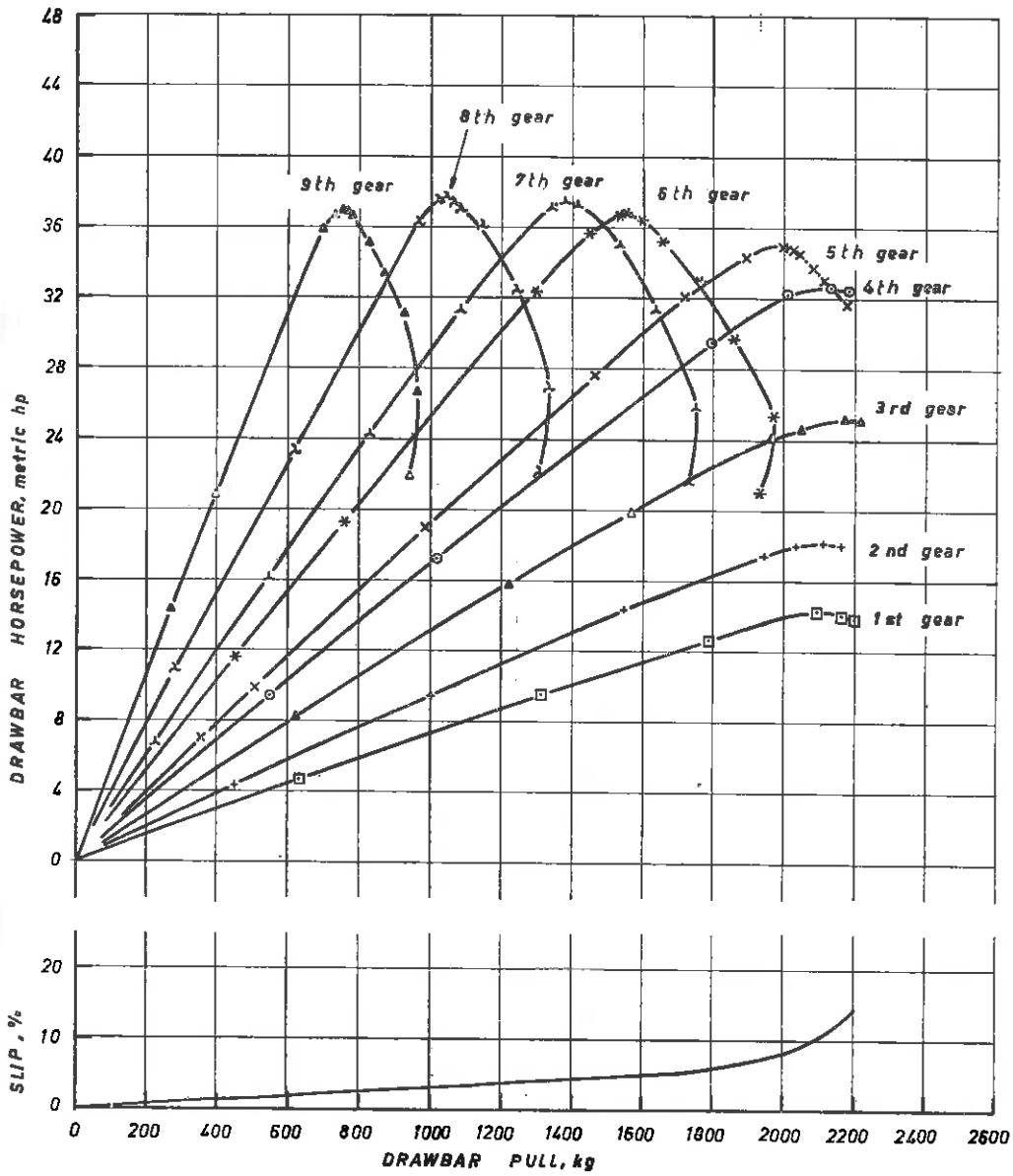


FIG. 3. Drawbar Test on concrete, with ballast

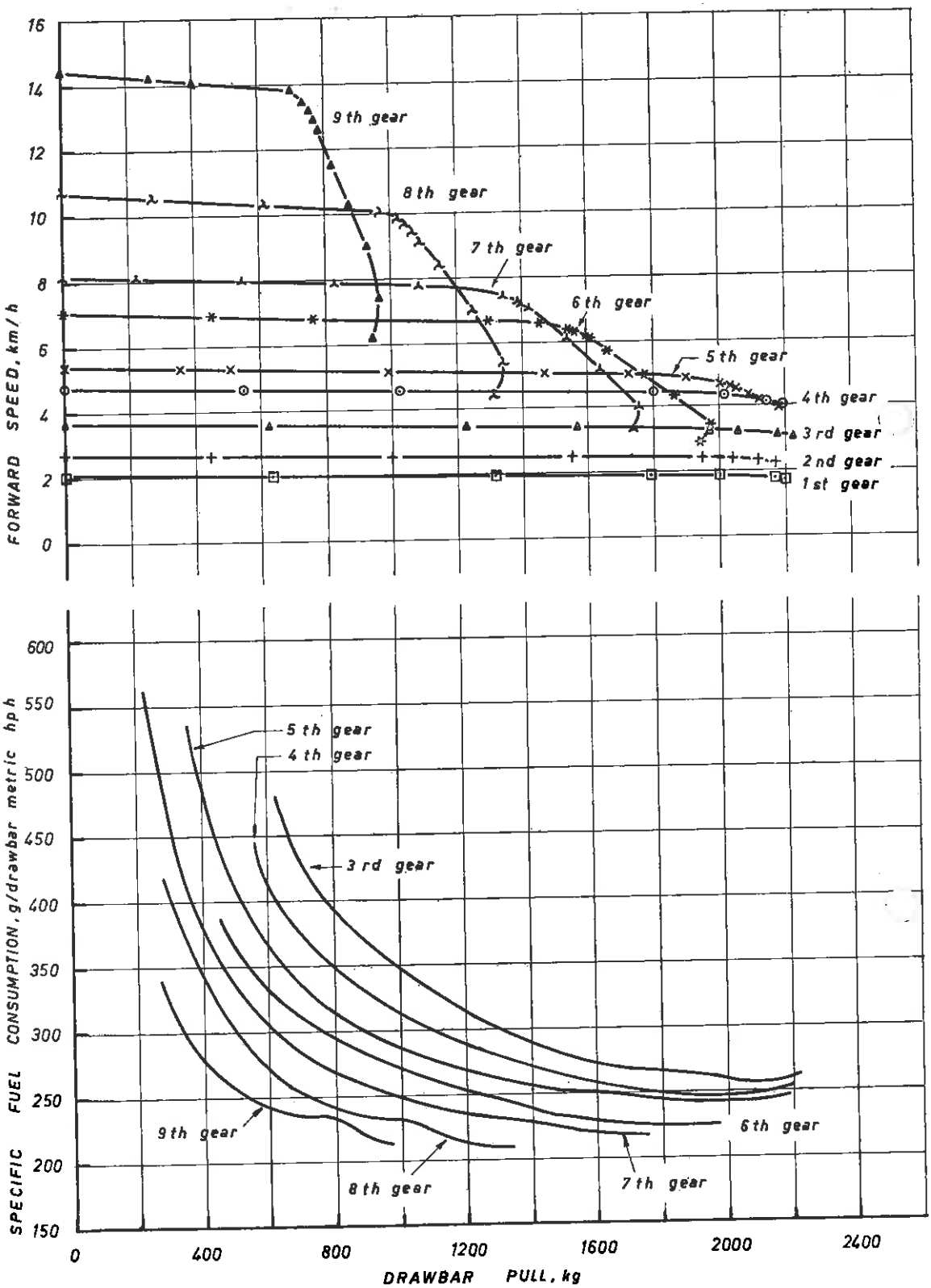


FIG. 4. Drawbar Test on concrete, with ballast

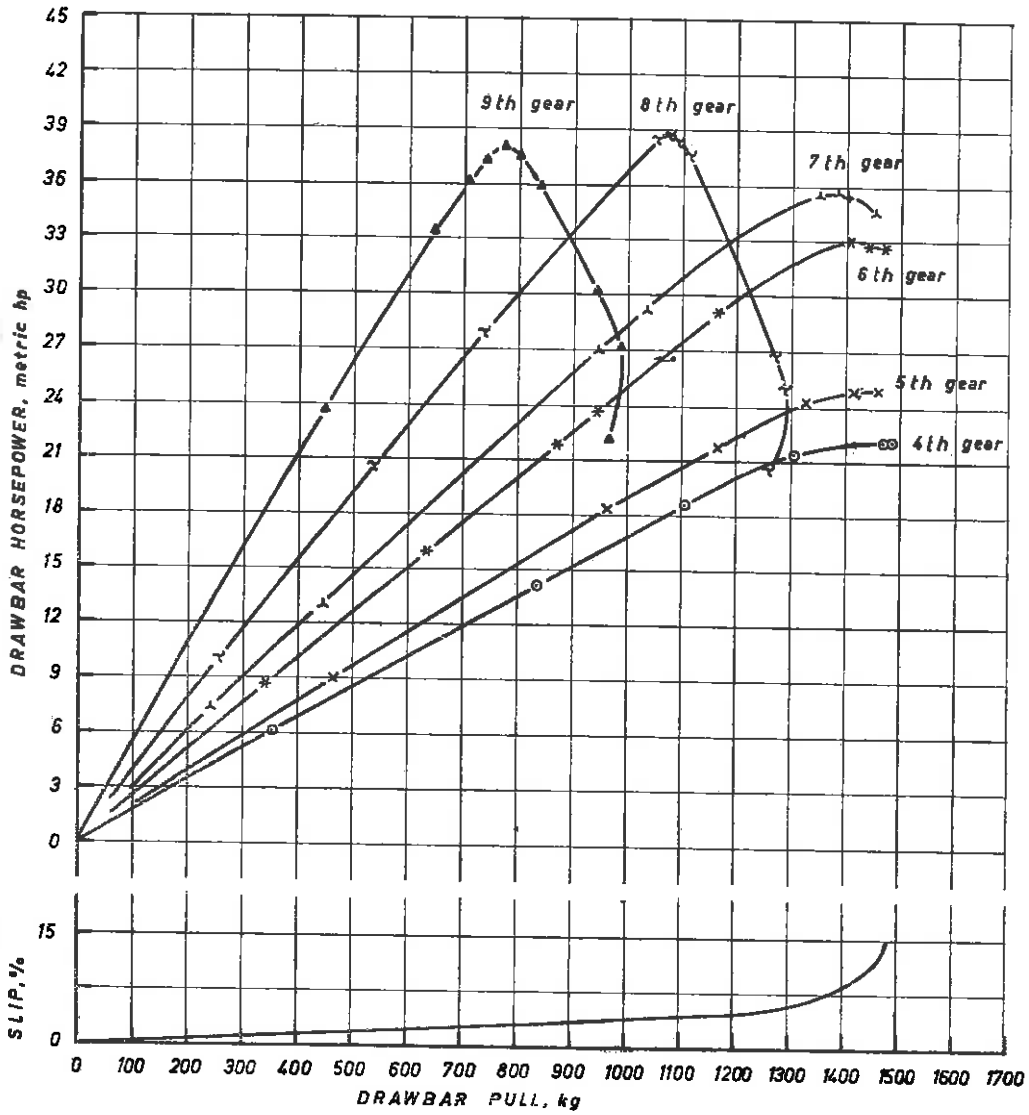


FIG. 5. Drawbar Test on concrete, without ballast

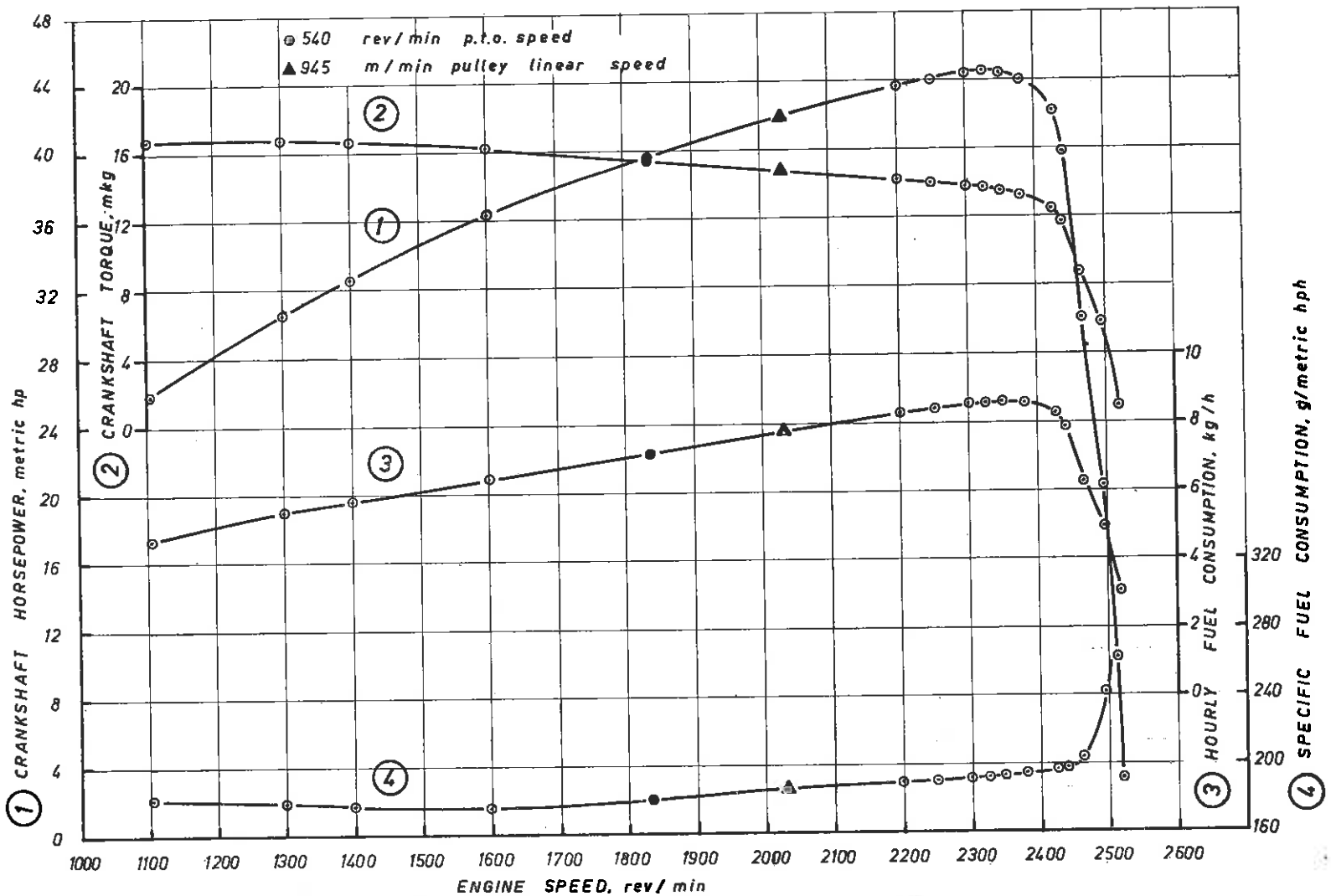


FIG. 6. Engine Test

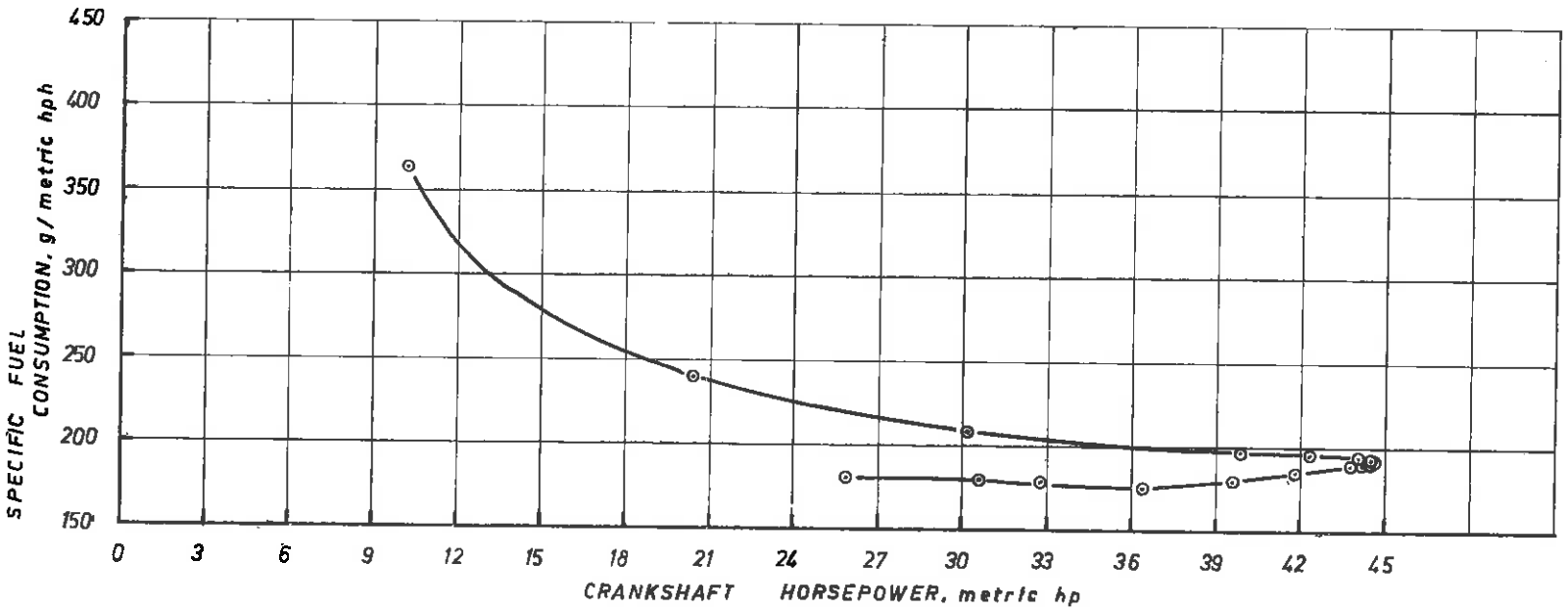


FIG. 7. Engine Test

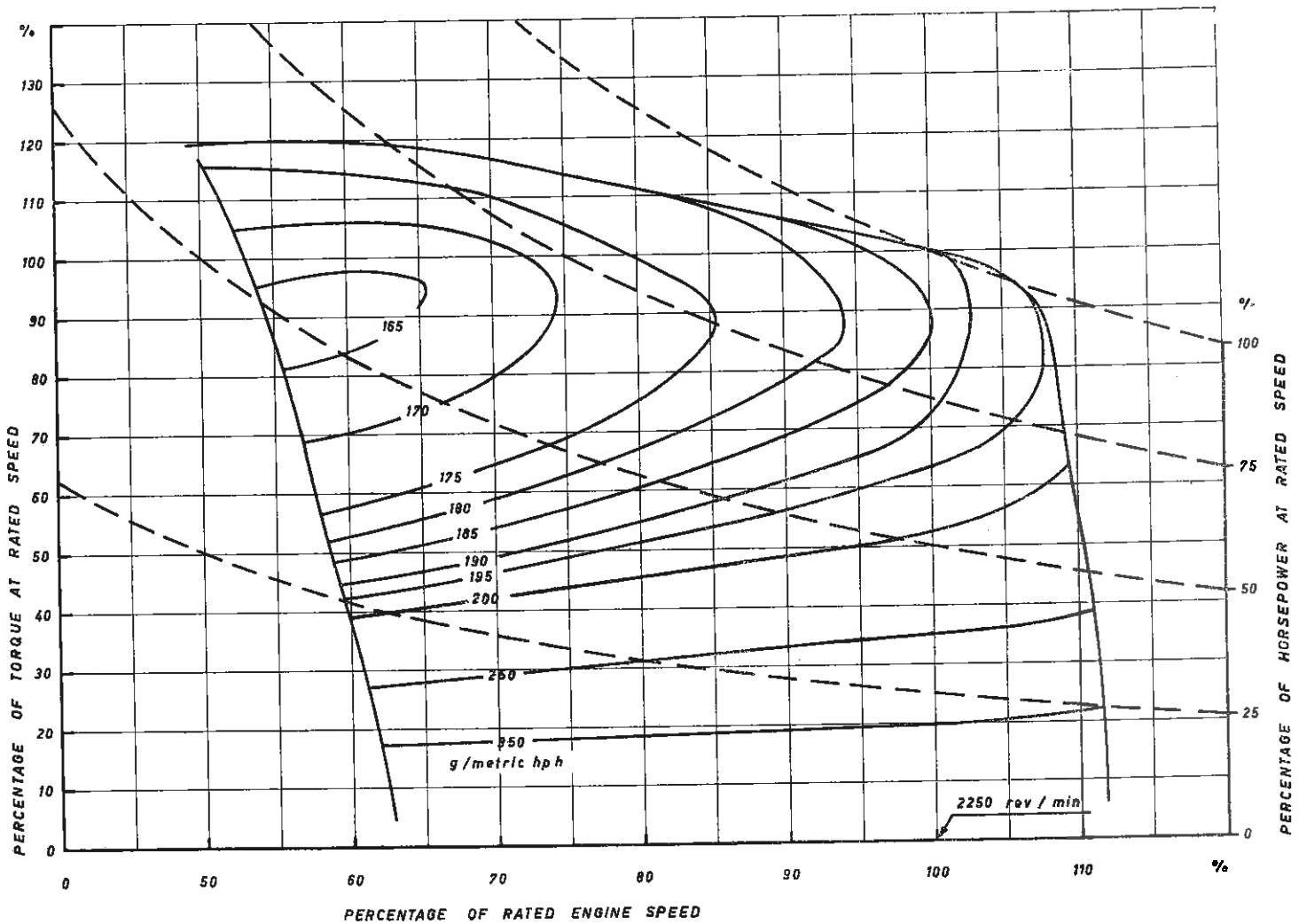


FIG. 8. Engine Test