Kuratorium für Technik in der Landwirtschaft
Schlepper-Prüfstelle/Traktoren-Prüfstrecke

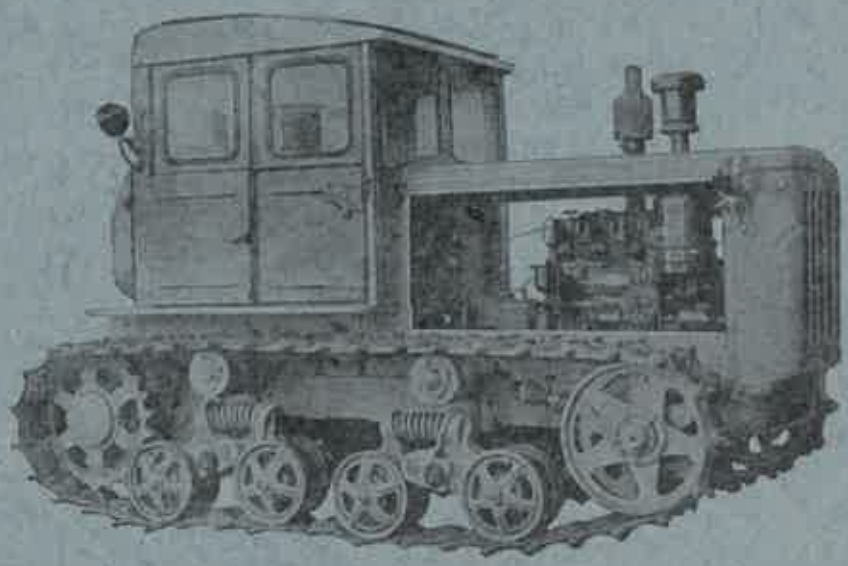
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SOCIALISTIC REPUBLIC OF CROATIA
INSTITUTE FOR MECHANIZATION IN AGRICULTURE
AGRICULTURAL FACULTY OF THE ZAGREB UNIVERSITY

TEST BULLETIN: O.E.C.D. No. 056

Date of Approval: 25th September 1964

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



CRAWLER TRACTOR
MODEL BNT-60 T
with a TORPEDO T 524 VJ/2 engine

Manufactured by: »BRATSTVO« Machine and Die Forgings Factory, Novi Travnik, Yugoslavia

Date of Tests: November 1963-June 1964

This report has been approved by the O.E.C.D. Coordinating Centre (C.N.E.E.M.A., Antony, France) as being in accordance with the O.E.C.D. Tractor Test Code.

Date of Approval: 25th September 1964 Serial No.: 056

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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POWER TAKE - OFF TEST

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SECTION I

SPECIFICATION OF TRACTOR

Tractor:

Make:	»Bratstvo« Machine and Die Forgings Factory, Novi Travnik
Model:	BNT-60 T
Type:	Diesel
No.:	Serial No. 1501

Engine:

Make:	»TORPEDO« Engine Factory, Rijeka
Model:	T 524 VJ/2
Serial No.:	10288
Cylinders:	4 cylinders, vertical, in-line, 112 mm (4·41 in.) bore × 140 mm (5½ in.) stroke, compression ratio 22 : 1, replaceable wet cylinder liners, overhead valves
Rated speed:	1650 rev/min
Fuel system:	Fuel: Diesel oil »RIKARD BENČIĆ« type P 24 T 8-3a 15A II RVO injection pump; »Rikard Benčić« type H1 S3·04/47 injector nozzles; sediment bowl and water trap on suction side of feed pump, double filter on pressure side of feed pump. Injection pressure 130 kp/sq. cm (126 atm) Injection timing: 19·5⁰ Capacity of fuel tank 250 l (55 UKgal)
Governor:	»Rikard Benčić« type R 4V 20—85/R 3 mechanical incorporated in fuel injection pump. Governed range of engine speed 500 rev/min to 1650 rev/min.
Air cleaner:	Oil bath with pre-cleaner outside hood. Oil capacity 2·0 l (3·5 pt)
Oiling system:	Forced feed from gear type pump with screen in pump, heavy duty oil. Recommended oil viscosity in summer SAE 30, in winter SAE 20. Savaro filter. Recommended oil change period, 150 h. Oil capacity 10·5 l (18·5 pt)
Cooling system:	Water cooled, pressuried, impeller assisted with 480 mm (18·9 in.) dia 4-blade belt driven fan Cooling water capacity: 43 l (11·3 UKgal)

Transmission:

Clutch:	Single-plate, dry, foot-pedal operated
Gearbox:	Own make sliding gear type, 5 forward speeds and 1 reverse. Total transmission oil capacity 12·4 l (21·8 pt). Recommended oil viscosity in summer SAE 140, in winter SAE 90. Oil change period, 500 h.

Gear. No.	Number of engine revolutions for one revolution of driving sprocket	Theoretical travelling speed for 1650 rev/min of engine, km/h	(mile/h)
1st	62.88	3.23	(2.01)
2nd	48.61	4.17	(2.59)
3rd	41.60	4.88	(3.03)
4th	35.93	5.64	(3.50)
5th	28.58	7.02	(4.36)
Reverse	94.32	2.15	(1.34)

Steering device:	By hand levers, and pedals, actuating steering clutches and steering brakes
Brakes:	Steering brakes. Foot-pedal operated, latch on foot-pedals for parking
Tracks:	Length of track 7370 mm (24 ft 21 in.) Length in ground contact 1620 mm (5 ft 3·8 in.) Width: 390 mm (15·4 in.) Track gauge 1435 mm (56½ in.). Bearing surface area 13875 sq. cm (2151 sq. in.). Ground pressure 0·4 kp/sq. cm (5·69lb/sq. in.). Driving sprockets pitch diameter 652 mm (25·6 in.)
Power take-off:	
Main:	6-spline, 34·9 mm (1⅜ in.) dia, at rear of tractor, not independent of main clutch
Height above ground:	750 mm (29·5 in.)
Speed:	696 rev/min (at 1650 rev/min engine speed)
Direction of rotation:	Clockwise viewed from tractor rear
Gear ratio:	1:2·37
Reduction-multiplication gears:	Gear ratio 1·44:1 or 1:1·44
Power lift:	None
Belt pulley:	None
Drawbar:	Vertical adjustment 340, 390, 470 or 510 mm (13·4, 15·4, 18·5 or 20·0 in.) With central hole and 2 holes 90 mm (3·55 in.) apart either side of centre line. Distance from rear axle: 530 mm (20·9 in.)
Hitch:	2 forward, 350 mm (13·8 in.) above ground
Electrical equipment:	
Voltage:	12 V
Generator:	»Iskra« type DHA (12/300/1400)
Batteries:	Two 12 V »Bosch« type BA/12/1800/2, lead-acid, capacity 180 amp h
Starting device:	»Iskra« type SN 3/N-12/4/9 starter motor
Overall dimensions:	
Overall length:	3630 m (11 ft 10·9 in.)
Overall width:	1880 mm (6 ft 2·91 in.)
Overall height:	2270 mm (7 ft 5·36 in.)
Minimum ground clearance:	With full grouser penetration: 330 (13 in.)
Weight:	Fully equipped: 5580 kg (12302 lb), without driver
Special remarks:	None

SECTION II

LABORATORY TESTS

Compulsory tests: Power take-off test (the test was performed with the multiplicator on the shaft)

Date and location of tests: 17th November 1963, Zagreb

Type of dynamometer: Electrical swinging frame, Siemens-Schuckert

Position of governor control: Fully open

Fuel: Diesel oil, density 0·837 kg/cu.dm at 15°C (59°F)
Cetane No. 58

Engine oil: R.n.R. EXTRA HD 30, SAE No. 30

Transmision oil: SAE No. 140

Horse-power,	Speed		Torque,	Fuel consumption			Temperature			Atmospher. conditions	
	engine,	p. t. o.		per hour,	specific,	h. p. h/ unit of vol.	Coo-lant,	Oil,	Fuel,	Air temp,	Atmos. press-ure,
Metric h. p. (U. S. h. p.)	rev/min	rev/min	kpm (lb ft)	kg/h (Uk gal/h)	g/metric h. p. h (lb/ h. p. h)	met. h. p. h/l (h. p. h/ gal)	°C (°F)	°C (°F)	°C (°F)	°C (°F)	mm Hg (in. Hg)
A. Maximum power — sustained											
60.2 (59.4)	1650	1002	26.0 (188.1)	12.2 (3.21)	202 (0.451)	4.14 (18.5)	66 (150)	86 (187)	23 (73)	18 (64)	754 (29.7)
B. Power at maximum torque											
39.1 (38.6)	995	602	28.2 (204.0)	7.38 (1.94)	188 (0.420)	4.44 (19.9)	70 (158)	84 (183)	25 (77)	18 (64)	755 (29.8)
C. Power at rated speed and at standard p. t.-o speed (1000 rev/min)											
60.5 (59.7)	1650	1002	26.3 (190.2)	12.4 (3.26)	204 (0.456)	4.08 (18.3)	75 (167)	72 (162)	18 (64)	18 (64)	753 (29.6)
No load, maximum engine speed: 1940 rev/min											

SECTION III

DRAWBAR TEST ON GRASSLAND

Date of teste:	28th April—7th June 1964, Zagreb
Type of surfase:	Grassland on clay soil
Position of governor control lever:	Fully open
Fuel:	Diesel oil, density 0·836 kg/cu.dm at 15° C (59° F) Cetane No. 58
Engine oil:	R.n.R. EXTRA HD 30, SAE No. 30
Transmision oil:	SAE No. 140
Weight with the driver:	5650 kg (12 216 lb)
Height of drawbar above ground:	340 mm (13·4 in.)

(1) MAXIMUM POWERS AND PULLS:

Gear No.	Maximum powers					Air temp, °C (°F)	Atmos. pressure, mm Hg (in. Hg)	Maximum pulls	
	Horse-power, metric h. p. (U. S. h. p.)	Corres-ponding pull, kp (lb)	Engine speed, rev/min	Forward speed, km/h (mile/h)	Engine coolant temp, °C (°F)			Pull, kp (lb)	Reason for stall
1st	49.5 (48.8)	4870 (10734)	1540	2.75 (1.71)	65 (149)	20 (68)	756 (29.8)	5090 (11223)	Engine stall
2nd	51.0 (50.3)	3480 (7673)	1605	3.96 (2.46)	65 (149)	29 (84)	758 (29.9)	3800 (8379)	Engine stall
3rd	50.1 (49.4)	3175 (7000)	1480	4.25 (2.64)	70 (158)	16 (61)	756 (29.8)	3275 (7221)	Engine stall
4th	49.5 (48.8)	2810 (6196)	1460	4.75 (2.95)	65 (149)	16 (61)	756 (29.8)	2825 (6229)	Engine stall
5th	47.5 (46.8)	2000 (4410)	1520	6.42 (3.98)	65 (149)	16 (61)	756 (29.8)	2110 (4653)	Engine stall

(2) FUEL CONSUMPTION

Gear No.	Optimum fuel consumption			Range of pull over which specific fuel consumption does not exced the optimum consumption by more than 10%
	Specific. fuel consumption, g/metric h. p. h (lb/h. p. h)	In h. p. h per unit of volume, drawbar metric h. p. h/l (h. p. h/gal)	Corresponding pull, kp (lb)	kp (lb)
1st	233 (0.521)	3.57 (15.9)	4930 (10870)	4080 — 5090 (8996) — (11223)
2nd	233 (0.521)	3.57 (15.9)	3655 (8059)	2890 — 3800 (6372) — (8379)
3rd	235 (0.525)	3.54 (15.8)	3275 (7221)	2660 — 3275 (5865) — (7221)
4th	245 (0.547)	3.40 (15.2)	2825 (6229)	2010 — 2825 (4432) — (6229)
5th	237 (0.530)	3.51 (15.6)	2110 (4652)	1990 — 2110 (4387) — (4653)

SECTION IV

I. **Location of centre of gravity:**
Tractor with tanks filled, with driver (75 kg) — 1221 mm (45½ in.) forward of driving sprocket centre

II. **Turning space:**
4·50 m (14·3 ft) diameter
Track 1435 mm (56½ in.)

SECTION V

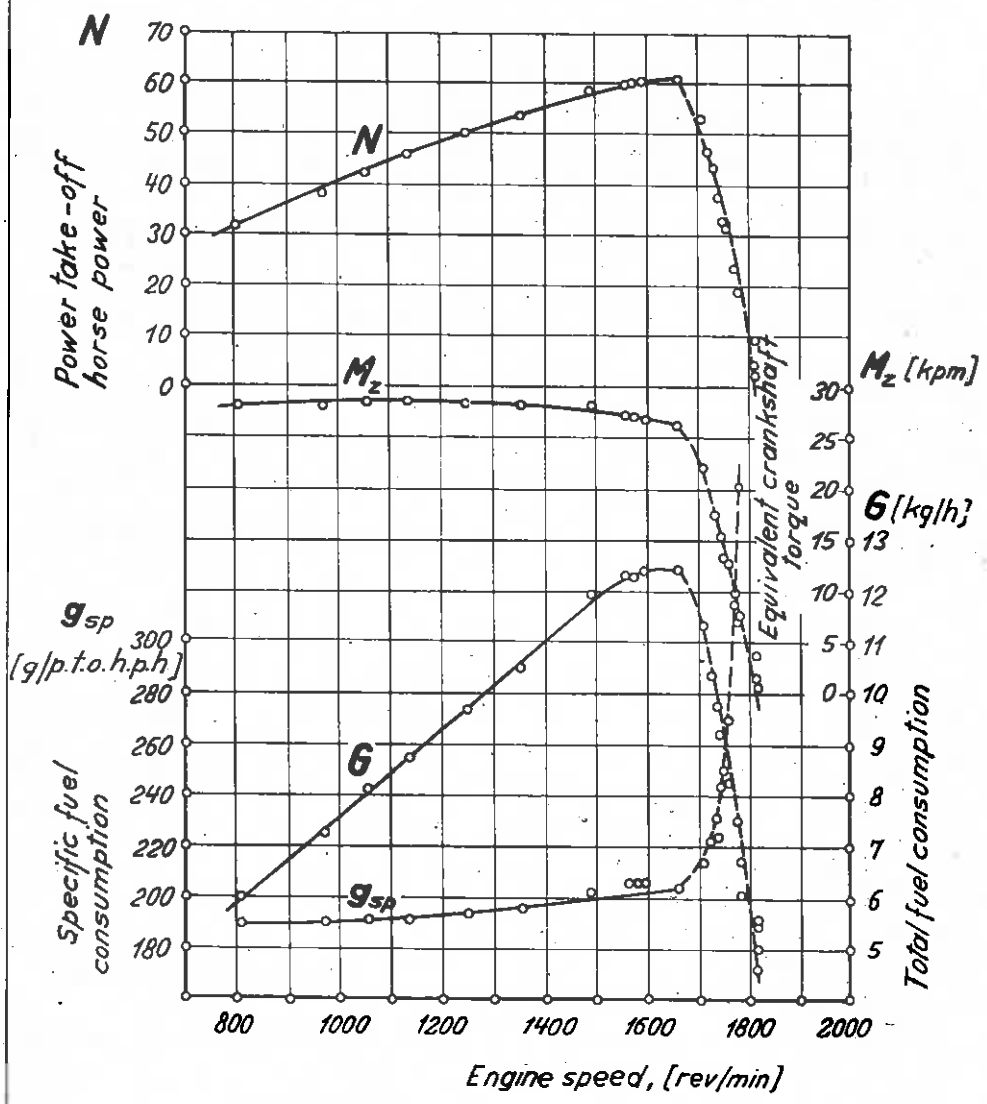
1. **Repairs and adjustments during test:** None

2. **Remarks:** None

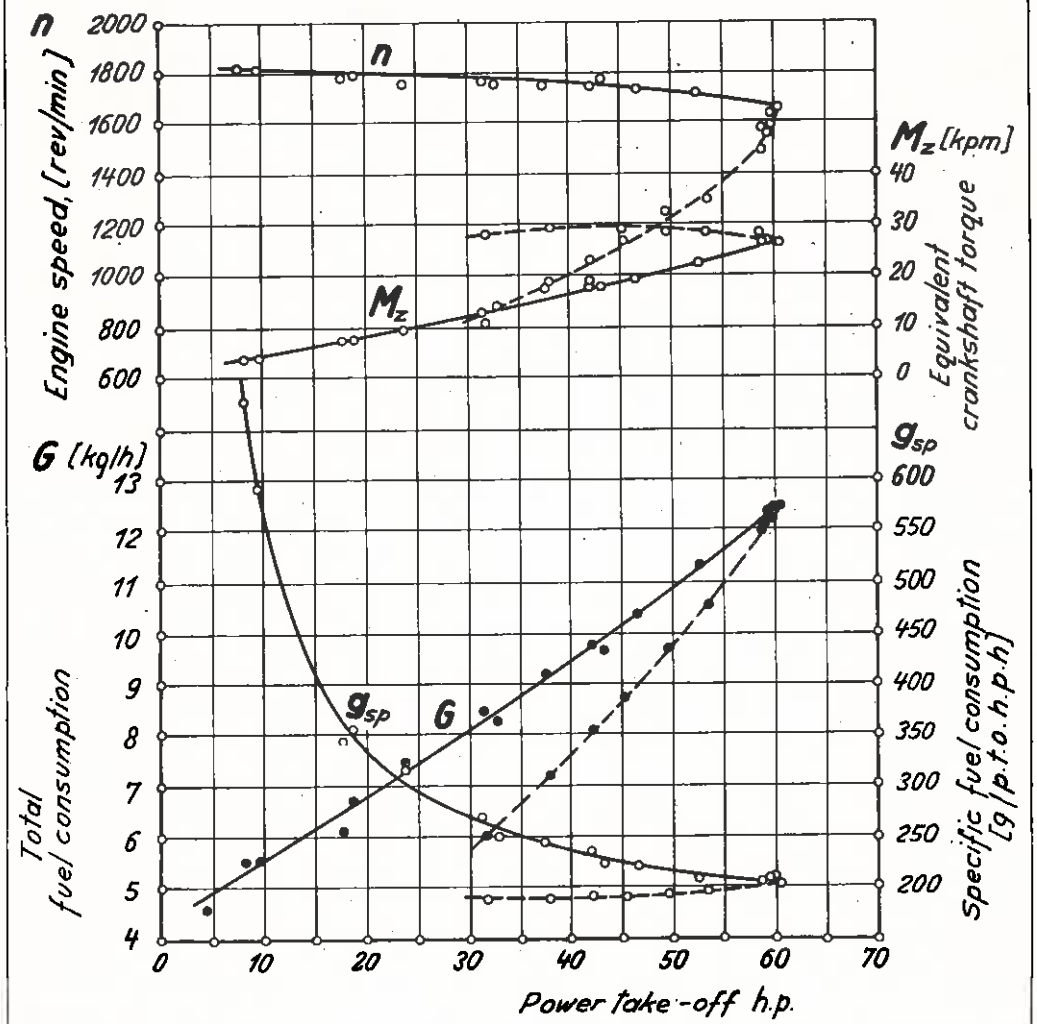
Test Engineer: D. KRPAN
Officer in charge: V. OBELIĆ
Director: N. DERETA
Date: 11th June 1964

APPENDIX

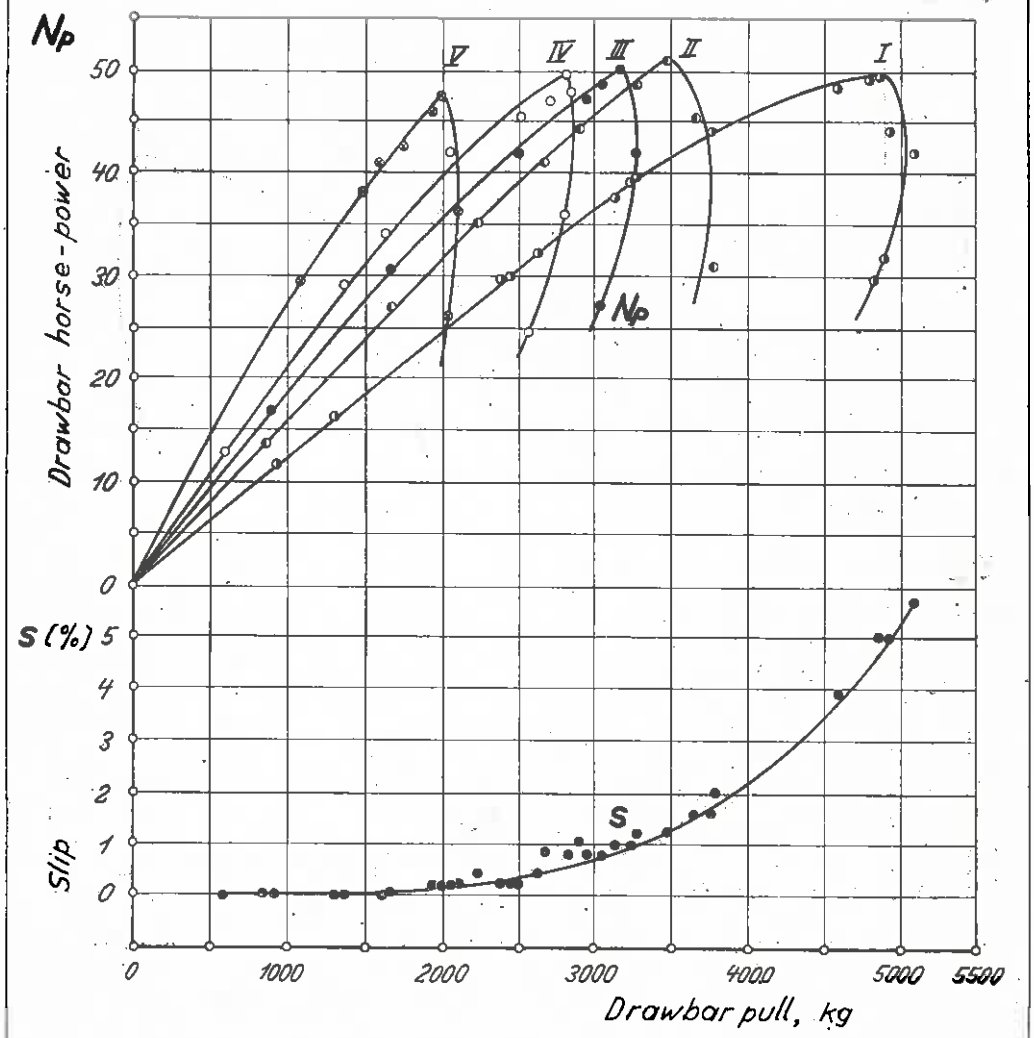
Institut za mehanizaciju poljoprivrede ZAGREB	Tractor BNT-60T Power take-off Test	Figure 1



Institut za mehanizaciju poljoprivrede ZAGREB	Tractor - BNT-60T Power take-off Test	Figure 2



Institut za mehanizaciju poljoprivrede ZAGREB	Tractor BNT-60T Drawbar-Test	Figure 3



Institut za mehanizaciju poljoprivrede ZAGREB	Tractor BNT-60T Fuel consumption	Figure 4

