OECD APPROVAL # 1198
Date of approval: May 24 ,1989

CENTER FOR AGRICULTURAL EQUIPMENT
DEPARTMENT OF AGRICULTURAL ENGINEERING
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF NEBRASKA - EAST CAMPUS
LINCOLN, NEBRASKA 68583-0832, USA

REPORT ON TEST IN ACCORDANCE WITH OECD STANDARD CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTOR PERFORMANCE

CASE INTERNATIONAL 7140 TRACTOR WITH MECHANICAL FRONT WHEEL DRIVE (4 WD).





MANUFACTURED BY: J.I.Case Company
700 State Street
Racine, Wisconsin 53404, USA

NEBRASKA TEST NO.1612

Test date: May-July 1988

This test report provides the results of the tests conducted in accordance with the OECD Standard Test Code for the Official Testing of Agricultural Tractor Performance - C(87)53 Final - Annex I.

This report has been approved by the OECD Coordinating Centre in Paris (CEMAGREF) on May 24 ,1989

Case International 7140 Diesel (4 WD) OECD # 1198

No reproduction of this report or any part of it can be made without prior approval by the Center for Agricultural Equipment.

Associate Director of the Center

Dr. Louis I. Leviticus

Senior Test Engineer

David L. Morgan

Test Engineers

Brent T. Sampson

Raymond E. Beckner

Chairman, Tractor Test Board

Dr. Kenneth von Bargen

Members, Tractor Test Board

Dr. Robert D. Grisso

Dr. Leonard L. Bashford

Date: July 31 1989

LINCOLN, NEBRASKA 68583-0832,USA

Table of Contents

		Page
1.	SPECIFICATIONS	1
2.	TEST CONDITIONS	10
3.	COMPULSORY TESTS	
	Main Power Take-Off Performance	13
	Power Lift and Hydr. Pump Perf.	16
	Drawbar Performance	18
	Turning Area & Turning Circle	20
	Location of Center of Gravity	20
	Brake Tests	21
	External Noise Levels	22
4.	GRAPHS	23
5.	OPTIONAL TESTS	
	Drawbar Performance with front-wheel drive disengaged	28
	Power lift test	29

SPECIFICATIONS OF TRACTOR.

Manufacturer's name/address	:	J.I.Case Company 700 State Street Racine, Wisconsin 53404, USA
Submitted for test by	:	The manufacturer.
Selected for test by	:	The manufacturer in agreement with the test station.
Place of running in	:	J.I.Case, Hinsdale, Illinois.
Duration of running in	:	169 hours
Location of Test	:	Center for Agricultural Equipment, Lincoln, Nebraska,USA.

TRACTOR.

Make	Case International
Model	7140
Type	Unit construction, mechanical front wheel drive (4 WD)
Number of driving wheels	4
Serial Number	*JJA0002026*
1st Serial number	9949073, Sequence changed January 1988: JJA 0001503.

ENGINE.

Make	Consolidated Diesel Company
Model	6TA-830
Type	Diesel, turbocharged.
Serial Number	*44236042*
Cylinders	
Number & Disposition	6, in-line, vertical
Bore x stroke	114 x 135 mm (4.488 x 5.315 in)
Cubic capacity	8268 cu.cm (504.5 cu.in)
Compression Ratio	16.5 - 1
Arrangement of valves	Overhead
Cylinder liners	Wet, replacable
Super charging/Intercooling	
Make/Model/Type	Holset/H1E/exhaust gas driven
Pressure	81-106 kPa (11.7-15.4 psi) at rated speed and load.
Intercooler	Charge air heat exchanger with engine coolant
Fuel System	
Feed system	Engine driven transfer pump
Make/Type/Model of filters	Two spin-on cartridges. Fleetguard/FF5038 and FF5052
Fuel Tank capacity	359 liter (95 US gallons)

Make/Model/Type injection pump	Robert Bosch/MW/in-line
Pump Serial number	75237565
Production setting of pump	
Flow Rate (Rated Eng.Spd & Full Load)	36.1 +/- 1.8 kg/hr 79.7 +/- 4.0 lb/hr
Make/Model/Type of injectors	Robert Bosch/Pt.# J908511/17 mm
Injection pressure	20.5-21.3 MPa (2970-3090 psi)
Timing	22 degrees before TDC

Governor

Make/Model/Type	Robert Bosch/RSV/Variable speed mechanical.
Governed engine speed range	From 825 to 2395 rev/min
Rated engine speed	2200 rev/min
High-idle speed range	2355 +/- 40 rev/min

Air Cleaner.

Pre-cleaner	
Make/Model/Type	Donaldson/6066A1605/aspirated
Air intake location	under hood, ahead of radiator
Main Cleaner	
Make/Model/Type	Donaldson/EGB11-0077/dual element; pleated paper. Or Nelson 71181A-pleated paper
Maintenance indicator	Service light on instrument panel.

Lubrication system.

Type of feed pump	Full pressure, positive displacement.
Type of filters	Full flow, spin on type.
Number	One
Oil cooler	Heat exchanger with engine coolant

Cooling system.

Type of coolant	Liquid
Type of pump & drive	Centrifugal, belt driven
Fan specification	Variable speed, viscous drive.
Number of fan blades	6
Fan diameter	600 mm (23.6 in.)
Coolant system capacity	29.3 liter (31 qt)
Type of temperature control	2 Thermostats
Superpressure system	103 kPa (15 psi)

Starting system.

Make/Model/Type of starter	Nippondenso/4 kW/Electric
Power Rating	4.0 kW
Cold starting aid	Ether spray in intake manifold.
Safety device	Electrical lockout on transmission and PTO controls.

Electrical system.	
Voltage & grounding.	12 Volt DC;negative ground
Generator	
Make/Model/Type	Bosch/N1/belt driven alternator
Power rating	110 Ampere at 2200 engine rev/min.
Batteries	
Number & connection	2-12 V batteries in parallel
Rating	180 amp-hours per battery at 20 hour rate.
Exhaust system.	
Make/Model/Type	Nelson(muffler)/21326A/ horizontal
Location	Underhood muffler; vertical exhaust pipe, rear of engine right front corner of cab

TRANSMISSION.

Clutch. (travel)	
Make/Type	Case International; wet multiplate, oil cooled.
Number of plates	9
Plate diameter	228.5 mm (9 inch)
Method of operation	Hydraulic, foot pedal.
Gear Box.	
Make/Type	Case International/full powershift
Arrangement	Countershaft type, with 6 forward and 2 reverse gears in speed transmission and 3 gears in range transmission section. (only lowest gear of range section used for reverse).
Number of gears	18 forward and 2 reverse, controlled by a single hand lever.
Oil cooler	Heat exchanger with air
Available options	Creeper option with 6 forward and 1 reverse additional speeds
Rear axle and final drives.	
Make/Type	Case International/crown wheel and pinion; differential; inboard planetary reduction.
Differential Lock	
Type	Hydraulic
Method of engagement	Electrical switch on console.
Method of disengagement	Electrical switch on console or actuation of either brake pedal

Front Axle and final drives.

Make/Model/Type	Dana/070BP123/crown wheel and pinion; differential and outboard planetary reduction.
Differential lock	
Type	limited slip
Method of engagement	self-locking
Method of disengagement	self-unlocking

Gear ratios and travel speeds.
(Tire dynamic radius of 905 mm (35.6 in)
(SAE J1261 Nov 84)

Gear Number	Number of Engine revolutions for one revolution of the driving wheels	Nominal travel speed at rated engine speed of 2200 rev/min [km/h]	[mph]
1 fwd	243.260	3.09	1.92
2 fwd	212.073	3.54	2.20
3 fwd	183.909	4.08	2.54
4 fwd	160.331	4.68	2.91
5 fwd	139.776	5.37	3.34
6 fwd	121.856	6.16	3.83
7 fwd	104.463	7.19	4.46
8 fwd	91.070	8.24	5.12
9 fwd	78.976	9.50	5.91
10 fwd	68.851	10.90	6.77
11 fwd	60.024	12.50	7.77
12 fwd	52.328	14.34	8.91
13 fwd	45.741	16.41	10.20
14 fwd	39.877	18.82	11.70
15 fwd	34.581	21.71	13.49
16 fwd	30.148	24.90	15.47
17 fwd	26.283	28.56	17.75
18 fwd	22.913	32.76	20.36
1 rev	168.997	4.44	2.76
2 rev	147.331	5.09	3.17
Creeper Gear Group (Not fitted on tested tractor)			
1 fwd	835.817	0.90	0.56
2 fwd	631.893	1.19	0.74
3 fwd	480.256	1.56	0.97
4 fwd	358.923	2.09	1.30
5 fwd	271.354	2.77	1.72
6 fwd	206.234	3.64	2.26
1 rev	580.657	1.29	0.80

Number of front wheel revolutions for one rear wheel revolution.	1.3228

POWER - TAKE - OFF.

Main Power-Take-Off.

Type	Independent
Method of engagement	Hydraulic clutch operated by hand lever, independent of main drive clutch, wet multiplate
Number of shafts	One

Standard PTO

Location	Rear of tractor, in vertical center plane.
Diameter of PTO shaft end	45 mm (1.75 inch)
Number of splines	20; conforms to ISO 500/1979.
Height above ground	815 mm (32.1 in)
Distance from median plane of tractor	0 mm
Distance behind rear axle	796 mm (31.3 in.)
PTO Speed @ Rated Engine Speed	1003 rev/min
Engine speed @ Std. PTO Speed	2193
Ratio of Engine rpm to PTO rpm	2.193
Direction of Rotation (viewed facing driving end)	Clockwise.

POWER LIFT.

Make	Case International
Type of hydraulic system	Closed center; load sensing
Number/Type of cylinders	1 internal, 2 external; all single acting.
Type of linkage lock for transport	Hydraulic with locking notch for hand lever on console.
Relief valve setting	18.27 +/- 0.35 MPa (2650 +/- 50 psi)
Opening pressure of cylinder safety valve	19.65-20.34 MPa (2850-2950 psi)
Lift pump type	Axial piston, pressure and flow compensated.
Power transmission to pump	Gear drive from transmission.
Type/Number of filters	1 spin-on replacable cartridge; 1 cleanable suction screen in the reservoir.
Location of oil reservoir	Transmission housing
Number/Type/Location of tapping points.	3 pairs of ISO standard coup - lings at rear of tractor.
Max. oil volume available for external cylinders.	8.5 l (9 qt)

THREE POINT LINKAGE

- Category 3 in conformity with ISO 730/1-1977
- Category adaptor - none

THREE POINT LINKAGE.

Figure 1.1

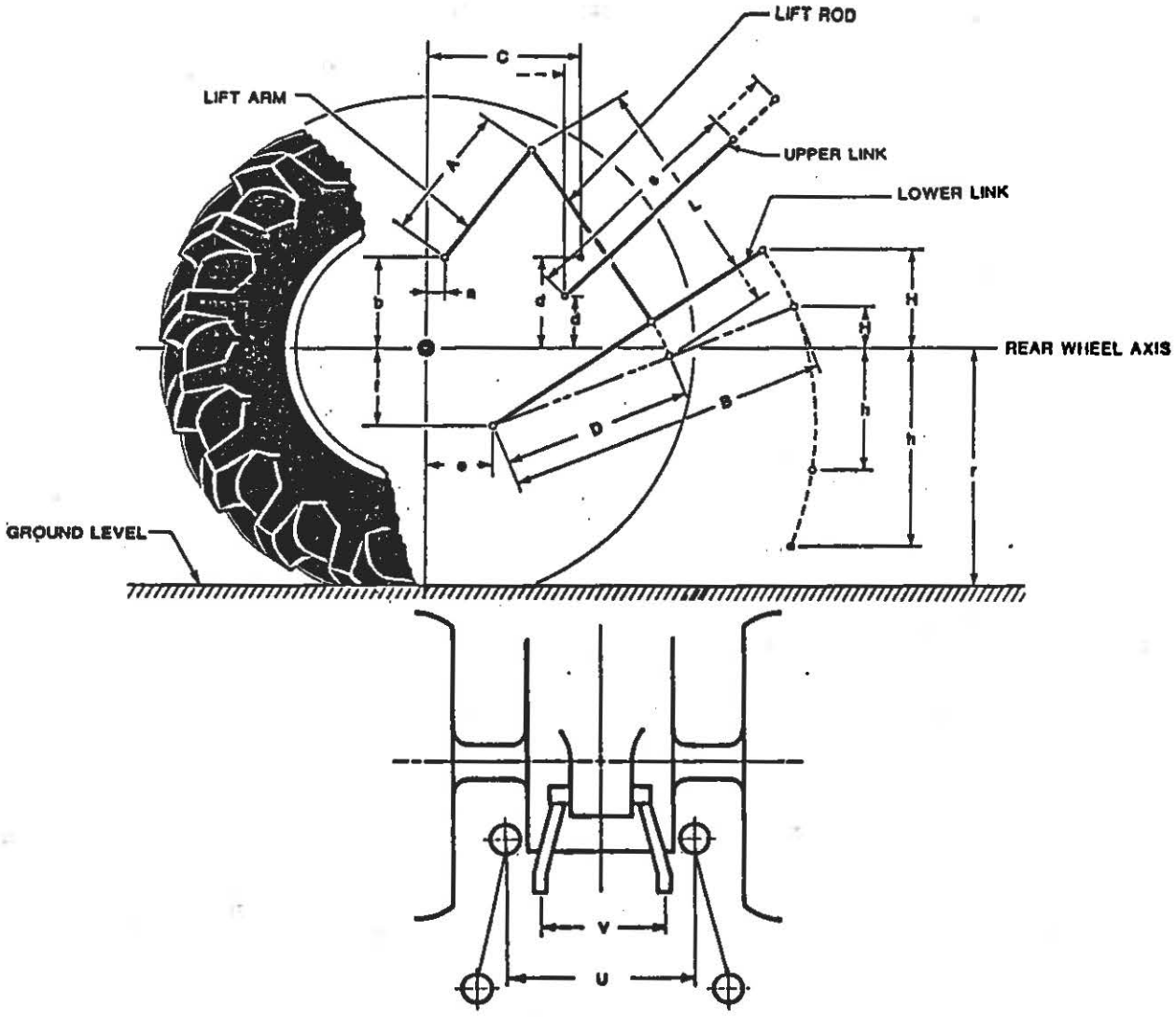


Figure 1.2

Table 1.1 - Linkage geometry dimensions.

		Dimension or range [mm]	Dimension or range [in]	Settings used on test [mm]	Settings used on test [in]
Lift category		III			
Rear tire - Radius Index	(r)	905	35.6		
Front tire - Radius Index	(r')	670	26.4		
Length of lift arms	(A)	381	15.0	same	
Length of lower links	(B)	861	33.9	same	
Distance of lift arm pivot from rear wheel axis: horizontal	(a)	364	14.3 to rear	same	
Distance of lift arm pivot from rear wheel axis: vertical	(b)	422	16.6	same	
Horizontal distance between the 2 lower link points	(u)	604	23.8	same	
Horizontal distance between the 2 lift arm end points	(v)	737	29.0	same	
Length of upper link	(S)	600 to 831	23.6 to 32.7	648	25.5
Distance of upper link pivot from rear wheel axis: horizontal	(c)	627	24.7	same	
Distance of upper link pivot from rear wheel axis: vertical: Upper	(d)	250	9.8	169	6.7
Distance of upper link pivot from rear wheel axis: vertical: Lower		169	6.7		
Distance of lower link pivot from rear wheel axis: horizontal	(e)	445	17.5	same	
Distance of lower link pivot from rear wheel axis: vertical	(f)	332	13.1	same	
Distance of lower link pivot points to lift rod pivot pts on lower links.	(D)	579	22.8	same	
Length of lift rods	(L)	660 to 866	26.0 to 34.1	826	32.5
Height of lower hitch points relative to rear wheel axis: In low position	(h)	378 to 699	14.9 to 27.5	657	25.9
Height of lower hitch points relative to rear wheel axis: In high position	(H)	3 to 269	0.1 to 10.6	58	2.3
Height above ground of lower hitch points when locked in transport position.		908 to 1174	35.7 to 46.2	963	37.9

SWINGING DRAWBAR.

Type	Oscillating
Height above ground	Max: 594 mm.(23.4 in) Min: 479 mm.(18.9 in)
Adjustments	Laterally adjustable plus 3 longitudinal positions.
Distance of hitch point from rear wheel axis,horizontal	1202/1304/1406 mm (47.3/51.3/55.3 in)
Distance of hitch point from PTO shaft end: Vertical	222/336 mm (8.7/13.2 in)
Horizontal	406/508/610 mm (16/20/24 in)
Lateral adjustment; Right side	210/228/246 mm (8.3/9.0/9.7 in)
Left side	210/228/246 mm (8.3/9.0/9.7 in)
Distance of pivot point from rear wheel axis; horizontal	50 mm (2.0 in) forward.
Diamater of drawbar pin hole	42 mm (i.65 in)
Maximum vertical static permissible load	Two forward positions 20.9 kN (4700 lb)
	Rearmost position 16.5 kN (3700 lb)

STEERING.

Make/Model/Type	TRW/HGE 20/hydrostatic steering control unit.
Method of operation	
Pump(s)	Main-axial piston pump through steering priority valve.
Ram(s)	Two double acting cylinders
Working pressure	16.2 to 16.9 MPa, (2350 to 2450 psi)

BRAKE SYSTEM.

Service brake.

Make/Model/Type	Case International/oil immersed disc
Method of operation	Hydraulically actuated from main system; operated by two pedals which can be locked together.

Parking brake.

Type	Transmission lock
Method of operation	Gear selector lever.

WHEELS.

Number.	
Front	Two; Driving and steering
Rear	Two or four; Driving
Wheelbase	3006 mm (118.3 inch)

Track width adjustment

	Minimum [mm]	Minimum [in]	Maximum [mm]	Maximum [in]	Adjustment method
Front	1577	(62.1)	2356	(92.8)	Reverseing wheels, off-set lug rims.
Rear	1626	(64.0)	2565	(101.0)	Adjustable clamping wedges on bar axle,offset lug rims

PROTECTIVE STRUCTURE.

Make/Model/Type	Case International/CX-96/Cab
Manufacturer's name/address	J.I.Case Company 700 State street Racine, Wisconsin 53404,USA
Protective device	Cab, not tiltable.
OECD approval number	4 WD version CSS 096/7

DRIVER'S SEAT.

Make/Model/Type	Sears/SA7633-000ED/air-oil suspension.
Type of suspension	Air ride;fore-aft isolator; weight adjustment
Type of damping	Hydraulic
Range of adjustment	
Longitudinal	152.4 mm (6.0 in.)
Vertical	76.2 mm (3.0 in.)

LIGHTING.

	Height above ground of center [mm]	Height above ground of center [in]	Size [mm]	Distance from out - side edge to median plane of tractor. [mm]	Distance from out - side edge to median plane of tractor. [in]
Headlights	1636	64.4	260.5x130.8	390	15.4
Rearlights	2104	82.8	100 x 45.2	654	25.7
Rear reflectors	2104	82.8	50 x 45.2	554	21.8
				and 704	27.7

TEST CONDITIONS.

Overall dimensions.

Length		5089 mm (200.4 in)
Width	Minimum	2896 mm (114.0 in)
	Maximum	3175 mm (125.0 in)
Height	- Top of cab	3067 mm (120.7 in)
	- Top of exhaust	3065 mm (120.7 in)

Ground clearance (unballasted)	489 mm (19.3 in)
Clearance-limiting part	Drawbar anchor point

Tractor Mass (with Cab, with full tanks)

		Without driver [kg]	Without driver [lb]	With driver [kg]	With driver [lb]
Unballasted (single tires)	Front	2547	5615	2547	5615
	Rear	5420	11950	5495	12115
	Total	7967	17565	8042	17730
Ballasted (with duals)	Front	3524	7770	3524	7770
	Rear	7262	16010	7337	16175
	Total	10786	23780	10861	23945

Ballast.

	Number of weights	Mass(total) [kg]	Mass(total) [lb]	Water [kg]	Water [lb]
Front	none			none	
Rear	none			1055	2325
Duals (rear)		830	1830	none	
Additional:					
Front frame		59	130		
+ weights	14	635	1400		
Test equipment		240	530		

Tire Specifications.

	Front wheels	Rear wheels
Make	Goodyear	Goodyear
Dimensions	18.4R26	20.8R42
Ply rating	Two star (10 ply)	Two star (10 ply)
Type	Radial	Radial
Max.load (tire manufacturer	2649 kg/tire (5840 lb/tire)	4150 kg/tire (9150 lb/tire)
Max.load(tractor manufacturer)	same	4128 kg/tire (9100 lb/tire)
Inflation pressure (tire mfr	165 kPa(24 psi)	165 kPa (24 psi)
Dynamic Radius Index	670 mm(26.4 in)	905 mm (35.6 in)
Chosen track width: singles	2009 mm(79.1 in)	1955 mm (77.0 in)
: duals-inner		1689 mm (66.5 in)
-outer		3099 mm(122.0 in)

Oils and Lubrication.

Capacity and change interval:

	Capacity liter	Capacity quart	Oil change hrs	Filter change hrs
Engine (w/o filter)	19	20	250	250
Gear Box + Rear axle + rear final drive + hydraulic system	191	202	1000	1000
Front axle	11.4	12	1000	--
Final drive, front	0.9	1	1000 (each side)	--

Oil and Lubricant specifications:

	Recommended	Used during test
Engine oil		
Type	Case IH No. 1 SAE 15W40	same
Viscosity	14.9 cSt @ 100 'C	
Classification	API SF/CD/CE	
Transmission		
Type	Case IH Hy-Tran Plus	same
Viscosity	6.3 cSt @ 100 'C	
Classification	None	
Hydraulic fluid	Same as transmission	same
Front axle diff. + final drive		
Type	Case IH 135 HEP Gear Lube	same
Viscosity	27 cSt @ 100 'C	
Classification	API GL-5 or MiL-L-2105D	
Grease		
Number of lubrication points	26	

Fuel

Type/grade	Diesel Fuel "Premier";grade 2-D
Density (Pto test)	0.827 g/cu.cm.(6.905 lbs/gallon) at 15 'C (59 'F)
(Drawbar test)	Same as Pto test.
Cetane number	51.2
Viscosity	2.33 cSt at 37.8 'C (100 'F)

Remarks: This tractor is equipped with a variable speed cooling fan. Since engine power is influenced by fan speed, all power tests were conducted at approximately the same ambient air temperatures.

COMPULSORY TESTS.

(1) MAIN POWER TAKE-OFF PERFORMANCE (1000 rev/min).

Date of tests : June 1, 1988
Location of tests : Center for Agricultural Equipment, University of Nebraska, Lincoln, Nebraska.
Type of Dynamometer: Eaton Dynamatic 2025 D.G.

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption hourly l/h (gal/h)	Fuel Consumption hourly kg/h (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
1.1 Maximum Power - 2 hour test.						
155.74 (208.85)	2000	913	42.83 (11.31)	35.44 (78.13)	0.228 (0.374)	3.64 (18.46)
1.2 Power at rated engine speed.(1 hour)						
147.30 (197.53)	2199	1004	42.32 (11.18)	35.01 (77.19)	0.238 (0.391)	3.48 (17.67)
1.3 Maximum power at standard PTO speed.(1000 rev/min)						
147.30 (197.53)	2199	1004	42.32 (11.18)	35.01 (77.19)	0.238 (0.391)	3.48 (17.67)

1.4 Part Loads - Governor hand lever set for maximum power at rated engine speed

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption Hourly l/h (gal/h)	Fuel Consumption Hourly kg/h (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
(i) Torque obtained at maximum power at rated engine speed.						
147.30 (197.53)	2199	1004	42.32 (11.18)	35.01 (77.19)	0.238 (0.391)	3.48 (17.67)
(ii) 85% of the torque obtained in (i)						
128.38 (172.17)	2256	1029	38.32 (10.12)	31.71 (69.90)	0.247 (0.406)	3.35 (17.01)
(iii) 75% of the torque defined in (ii)						
97.41 (130.63)	2282	1041	31.25 (8.25)	25.85 (57.00)	0.265 (0.436)	3.12 (15.82)
(iv) 50% of the torque defined in (ii)						
65.79 (88.23)	2314	1056	24.83 (6.56)	20.55 (45.30)	0.312 (0.513)	2.65 (13.45)
(v) 25% of the torque defined in (ii)						
33.37 (44.75)	2346	1070	16.94 (4.48)	14.02 (30.90)	0.420 (0.691)	1.97 (10.00)
(vi) Unloaded						
0.66 (0.89)	2379	1086	10.85 (2.87)	8.98 (19.80)	13.546 (22.269)	0.06 (0.31)

1.5 Part Loads - Governor hand lever set for maximum power at standard pto speed.

Power kW (hp)	Speeds engine rev/min	Speeds PTO rev/min	Fuel Consumption hourly l/h (gal/h)	Fuel Consumption hourly kg/hr (lb/h)	Fuel Consumption specific kg/kW.h (lb/hp.h)	Specific energy kW.h/l (hp.h/gal)
(i) Torque obtained at standard pto speed.						
147.30 (197.53)	2199	1004	42.32 (11.18)	35.01 (77.19)	0.238 (0.391)	3.48 (17.67)
(ii) 85% of the torque obtained in (i)						
128.38 (172.17)	2256	1029	38.32 (10.12)	31.71 (69.90)	0.247 (0.406)	3.35 (17.01)
(iii) 75% of the torque defined in (ii)						
97.41 (130.63)	2282	1041	31.25 (8.25)	25.85 (57.00)	0.265 (0.436	3.12 (15.82)
(iv) 50% of the torque defined in (ii)						
65.79 (88.23)	2314	1056	24.83 (6.56)	20.55 (45.30)	0.312 (0.513)	2.65 (13.45)
(v) 25% of the torque defined in (ii)						
33.37 (44.75)	2346	1070	16.94 (4.48)	14.02 (30.90)	0.420 (0.691)	1.97 (10.00)
(vi) Unloaded						
0.66 (0.89)	2379	1086	10.85 (2.87)	8.98 (19.80)	13.546 (22.269)	0.06 (0.31)

No-load maximum engine speed 2379 rev/min

Equivalent engine torque:

at rated engine speed	639.6 Nm(2200 rev/min)
at maximum power	743.6 Nm(2000 rev/min)
at maximum torque	862.1 Nm(1500 rev/min)

Mean atmospheric conditions:

Temperature-dry bulb	24 'C (75 'F)
Relative humidity	49%
Barometer -	97.65 kPa(28.84 in Hg)

Maximum temperatures :	
Thermostat housing	91 °C (195 °F)
Engine oil pan	113 °C (235 °F)
Fuel at injection pump	66 °C (151 °F)
Engine air intake	27 °C (81 °F)
Trans./Hydr. oil	60 °C (140 °F)
Turbocharger boost pressure	
at rated engine speed	92 kPa (13.4 psi)
at maximum power	96 kPa (14.0 psi)

2. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE TEST.

Date of test: July 20, 1988
Location: CAE/UNL, Lincoln, Nebr.

2.1 HYDRAULIC POWER TEST - Hydraulic pump performance

i. Sustained pressure at compensator cutoff: 18.1 MPa (2625 psi)

ii. Pump delivery rate @ minimum pressure & rated engine speed: 107.2 l/m (28.3 gpm)

iii.

	Flow Rate l/min (gal/min)	Pressure MPa (psi)	Power kW (hp)
At 90% of cutoff setting	78.7 (20.8)	16.5 (2400)	21.7 (29.1)
At maximum hydraulic power.	98.2 (25.9)	15.8 (2300)	26.0 (34.8)

Tapping point	Two hydraulic outlets combined
Hydraulic fluid temperature	
in oil reservoir	63 °C (145 °F)
at flow meter	66 °C (151 °F)

2.2 POWER LIFT TEST. (Upper link in bottom hole on tractor)

	Hitch Point	Frame
Lower hitch points above ground - down position: [mm/inch]	248/9.8	233/9.2
Vertical movement : [mm/inch]	660/26.0	736/29.0
Maximum corrected force through full range : [kN/lbf]	46.9/10550	44.6/10036
Corresponding pressure: [kPa/psi]	15858/2300	
Moment about rear axle:[kN.m/ft.lb]	61.3/45189	85.5/63062
Maximum mast tilt angle:[degrees]	--	5.5

Lifting height relative to horizontal position of lower links.

[mm]	-342	-324	-301	-204	-100	4
[in]	-13.5	-12.8	-11.9	-8.0	-4.0	0.2

Corrected lift forces

hitch points	[kN]	--	46.9	47.0	51.4	54.9	56.8
	[lb]	--	10550	10563	11547	12335	12769
at frame	[kN]	49.0	46.5	--	48.9	50.4	51.1
	[lb]	11015	10459	--	10998	11329	11479

Lifting height relative to horizontal position of lower links.

[mm]	98	199	298	337	395	
[in]	3.9	7.9	11.8	13.3	15.6	

Corrected lift forces

Hitch point	[kN]	58.2	58.3	59.1	60.1	--	
	[lb]	13084	13106	13280	13516	--	
At Frame	[kN]	50.2	48.2	--	45.9	44.6	
	[lb]	11291	10827	--	10312	10036	

3. DRAWBAR PERFORMANCE.

Date of tests: 02 June 88, 08 June 88
Location: CAE/UN,Lincoln, Nebr.
Type of Track: Concrete Oval

Date of tests: 02-Jun-88 08-Jun-88 Fuel density: 0.827 kg/l
Type of track: Concrete Case IH 7140 MFWD

Gear	Speed	Power	Pull	Engine Speed	Slip	SFC		Temperature, deg C					Rel hum	Pressure
	km/h	kW	kN	rev/min	%	kg/kW.h	kW.hr/l	Fuel	Coolant	Oil	Dry	Wet	%	kPa
I. Maximum Power (unballasted, single wheels, fwa) Drawbar height: 483 mm								Tire pressure: 110 kPa, rear 110 kPa, front						
5th	4.81	95.31	71.28	2260	14.05%	0.325	2.55	67	85	106	22	17	61	97.46
6th	5.51	111.48	72.79	2226	12.77%	0.313	2.65	66	86	106	22	17	61	97.46
7th	6.50	121.87	67.52	2180	9.95%	0.291	2.84	67	86	107	23	17	55	97.49
8th	6.90	127.50	66.51	2001	9.18%	0.276	2.99	66	87	109	23	18	62	97.49
9th	8.29	131.46	57.09	1999	5.45%	0.266	3.10	65	87	107	23	18	62	97.53
10th	9.65	132.33	49.34	2000	3.73%	0.265	3.12	66	87	109	23	18	62	97.53
11th	11.16	132.52	42.74	1999	3.12%	0.265	3.13	65	87	108	24	18	56	97.56
12th	12.89	130.95	36.57	1999	2.49%	0.268	3.09	65	88	109	24	18	56	97.56
II. Maximum Power (ballasted, dual wheels, fwa) Drawbar height: 521 mm								Tire pressure: 110 kPa, rear (inner) 83 kPa, rear (outer) 110 kPa, front						
1st*	2.83	76.62	97.31	2291	12.82%	0.344	2.41	65	84	104	25	17	44	98.14
2nd*	3.23	88.18	98.24	2273	12.89%	0.333	2.49	66	84	105	24	17	49	98.14
3rd*	3.74	103.21	99.23	2253	11.58%	0.317	2.61	67	85	106	24	16	43	98.14
4th*	4.18	115.32	99.20	2186	11.28%	0.308	2.69	68	86	107	23	16	48	98.17
5th	4.50	123.20	98.57	2001	9.15%	0.286	2.89	67	86	107	23	16	48	98.17
6th	5.31	126.29	85.59	1997	6.43%	0.279	2.96	66	88	107	26	17	40	98.10
7th	6.32	131.65	75.01	1999	4.66%	0.269	3.08	64	89	109	26	17	40	98.10
8th	7.33	132.34	65.02	1999	3.53%	0.268	3.09	65	89	111	27	17	36	98.10
9th	8.52	134.76	56.97	1999	2.91%	0.264	3.13	64	89	108	27	17	36	98.10
10th	9.82	132.55	48.60	1999	2.28%	0.268	3.09	65	89	111	27	17	36	98.07
11th	11.31	132.08	42.02	2001	1.74%	0.268	3.09	64	89	109	28	18	37	98.07
12th	13.02	128.86	35.62	2002	1.65%	0.275	3.01	65	90	111	28	18	37	98.07
III. Five Hour Test at 75% of Pull at Maximum Power														
9th	9.68	114.85	42.73	2251	1.85%	0.292	2.84	67	88	109	31	22	45	97.23
IV. Five Hour Test at Pull Corresponding to 15% Slip in Test II.														
3rd	4.01	110.57	99.24	2246	NA	0.306	2.71	67	89	109	30	22	50	97.13

Oil consumption during ten hours of tests III and IV - 0.144 kg/h. * Pull limited to prevent tractor bounce.

Date of tests: 02-Jun-88 08-Jun-88 Fuel density: 6.905 lb/gal
Type of track: Concrete Case IH 7140 MFWD

Gear	Speed	Power	Pull	Engine Speed	Slip	SFC		Temperature, deg F					Rel hum	Pressure
	mph	hp	lb	rpm	%	lb/hp-hr	hp-hr/gal	Fuel	Coolant	Oil	Dry	Wet	%	in Hg
I. Maximum Power (unballasted, single wheels, fwa) Drawbar height: 19 in								Tire pressure: 16 psi, rear 16 psi, front						
5th	2.99	127.81	16024	2260	14.05%	0.534	12.94	152	185	223	72	63	61	28.78
6th	3.43	149.50	16365	2226	12.77%	0.514	13.43	151	186	222	72	63	61	28.78
7th	4.04	163.43	15179	2180	9.95%	0.479	14.42	152	187	225	73	63	55	28.79
8th	4.29	170.98	14951	2001	9.18%	0.454	15.20	150	189	228	73	64	62	28.79
9th	5.15	176.29	12835	1999	5.45%	0.438	15.76	149	189	224	74	64	62	28.80
10th	6.00	177.45	11093	2000	3.73%	0.436	15.85	150	189	228	74	64	62	28.80
11th	6.94	177.72	9608	1999	3.12%	0.435	15.88	150	189	226	75	65	56	28.81
12th	8.01	175.60	8222	1999	2.49%	0.441	15.67	150	190	229	75	65	56	28.81
II. Maximum Power (ballasted, dual wheels, fwa) Drawbar height: 20.5 in								Tire pressure: 16 psi, rear (inner) 12 psi, rear (outer) 16 psi, front						
1st*	1.76	102.75	21877	2291	12.82%	0.565	12.23	150	184	219	77	62	44	28.98
2nd*	2.01	118.25	22086	2273	12.89%	0.547	12.63	151	184	221	76	62	49	28.98
3rd*	2.33	138.40	22309	2253	11.58%	0.522	13.23	152	186	222	75	61	43	28.98
4th*	2.60	154.65	22302	2186	11.28%	0.506	13.64	154	187	224	74	61	48	28.99
5th	2.80	165.22	22159	2001	9.15%	0.471	14.66	152	188	225	73	60	48	28.99
6th	3.30	169.36	19242	1997	6.43%	0.459	15.05	150	190	225	78	63	40	28.97
7th	3.93	176.55	16862	1999	4.66%	0.442	15.64	148	192	228	79	63	40	28.97
8th	4.55	177.47	14616	1999	3.53%	0.440	15.68	148	193	231	80	63	36	28.97
9th	5.29	180.72	12808	1999	2.91%	0.434	15.89	148	192	227	81	63	36	28.97
10th	6.10	177.76	10927	1999	2.28%	0.440	15.68	149	193	231	81	63	36	28.96
11th	7.03	177.12	9447	2001	1.74%	0.440	15.69	148	193	229	82	64	37	28.96
12th	8.09	172.80	8009	2002	1.65%	0.452	15.26	149	194	232	83	64	37	28.96
III. Five Hour Test at 75% of Pull at Maximum Power														
9th	6.01	154.02	9606	2251	1.85%	0.479	14.41	152	191	229	87	71	45	28.71
IV. Five Hour Test at Pull Corresponding to 15% Slip in Test II.														
3rd	2.49	148.28	22309	2246	NA	0.503	13.74	152	191	229	86	71	50	28.68

Oil consumption during ten hours of tests III and IV - 0.32 lb/hr. * Pull limited to prevent tractor bounce.

4. TURNING AREA AND TURNING CIRCLE.

4.1 Front wheel drive disengaged. Single rear wheels.

	With Brakes		Without Brakes	
	Right Turn	Left Turn	Right Turn	Left Turn
Turning area radius	4.90 m 193 in	4.85 m 191 in	5.56 m 219 in	5.44 m 214 in
Turning circle radius	4.67 m 184 in	4.62 m 182 in	5.33 m 210 in	5.21 m 205 in

4.2 Front wheel drive engaged. Single rear wheels.

	With Brakes		Without Brakes	
	Right Turn	Left Turn	Right Turn	Left Turn
Turning area radius	4.72 m 186 in	4.80 m 189 in	6.35 m 250 in	6.30 m 248 in
Turning circle radius	4.50 m 177 in	4.57 m 180 in	6.12 m 241 in	6.07 m 239 in

4.3 Front wheel drive disengaged. Dual rear wheels.

	With Brakes		Without Brakes	
	Right Turn	Left Turn	Right Turn	Left Turn
Turning area radius	4.83 m 190 in	4.83 m 190 in	5.99 m 236 in	5.82 m 229 in
Turning circle radius	4.60 m 181 in	4.60 m 181 in	5.77 m 227 in	5.59 m 220 in

4.4 Front wheel drive engaged. Dual rear wheels.

	With Brakes		Without Brakes	
	Right Turn	Left Turn	Right Turn	Left Turn
Turning area radius	4.80 m 189 in	4.88 m 192 in	7.14 m 281 in	6.96 m 274 in
Turning circle radius	4.57 m 180 in	4.65 m 183 in	6.91 m 272 in	6.73 m 265 in

5. LOCATION OF CENTER OF GRAVITY.

Height above ground	1120 mm	(44.1 in)
Distance forward of rear axle	958 mm	(37.7 in)
Distance from median plane of tractor	13 mm	(0.5 in) to left

6. BRAKING TESTS.

Date of tests: July 26-27,1988
Location : CAE/UNL,Lincoln, Nebr.

Tractor mass with operators.

	Without ballast (single tires)		With ballast (Dual tires)	
	[kg]	[lb]	[kg]	[lb]
Front	2508	5530	4536	10000
Rear	5557	12250	7031	15500
Total	8065	17780	11567	25500

Speed before application of brakes: 35.4 km/h (22.0 mph)

6.1 COLD SERVICE BRAKING DEVICE TEST. (Type 0 test)

Unballasted tractor:

Braking device control force	[N]	98	133	178	205	245
	[lb]	22	30	40	46	55
Mean deceleration	[m/s.s.]	1.89	2.22	2.67	2.85	3.07
	[ft/s.s.]	6.20	7.28	8.76	9.35	10.07

Ballasted tractor:

Braking device control force	[N]	125	178	276	320	356
	[lb]	28	40	62	72	80
Mean deceleration	[m/s.s.]	1.60	1.98	2.56	2.87	2.96
	[ft/s.s.]	5.25	6.50	8.40	9.42	9.72

6.2 FADE TEST. (Type 1 test)

Braking device control force	[N]	120	187	276	329	374
	[lb]	27	42	62	74	84
Mean deceleration	[m/s.s.]	1.32	1.84	2.49	2.75	2.94
	[ft/s.s.]	4.33	6.04	8.17	9.02	9.65

Maximum deviation of tractor from its original course: Not significant.
Abnormal vibration : None
Brake heating method : Driven with brakes applied for 1 km (0.62 mi) at 80% of maximum speed with a pedal force corresponding to a deceleration rate of 1 m/s.s. (3.3 ft/s.s.).

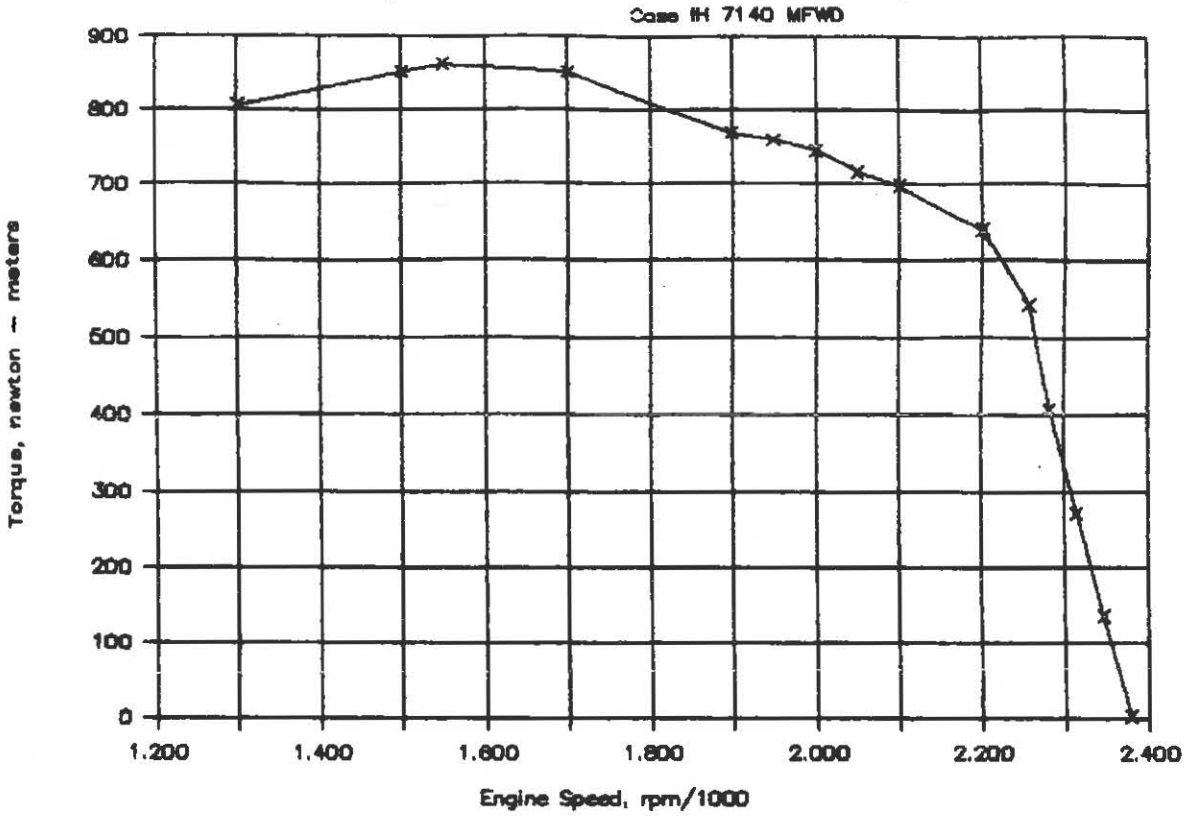
6.3 PARKING BRAKE DEVICE TEST.

Transmission lock, engaged by gear selector lever.

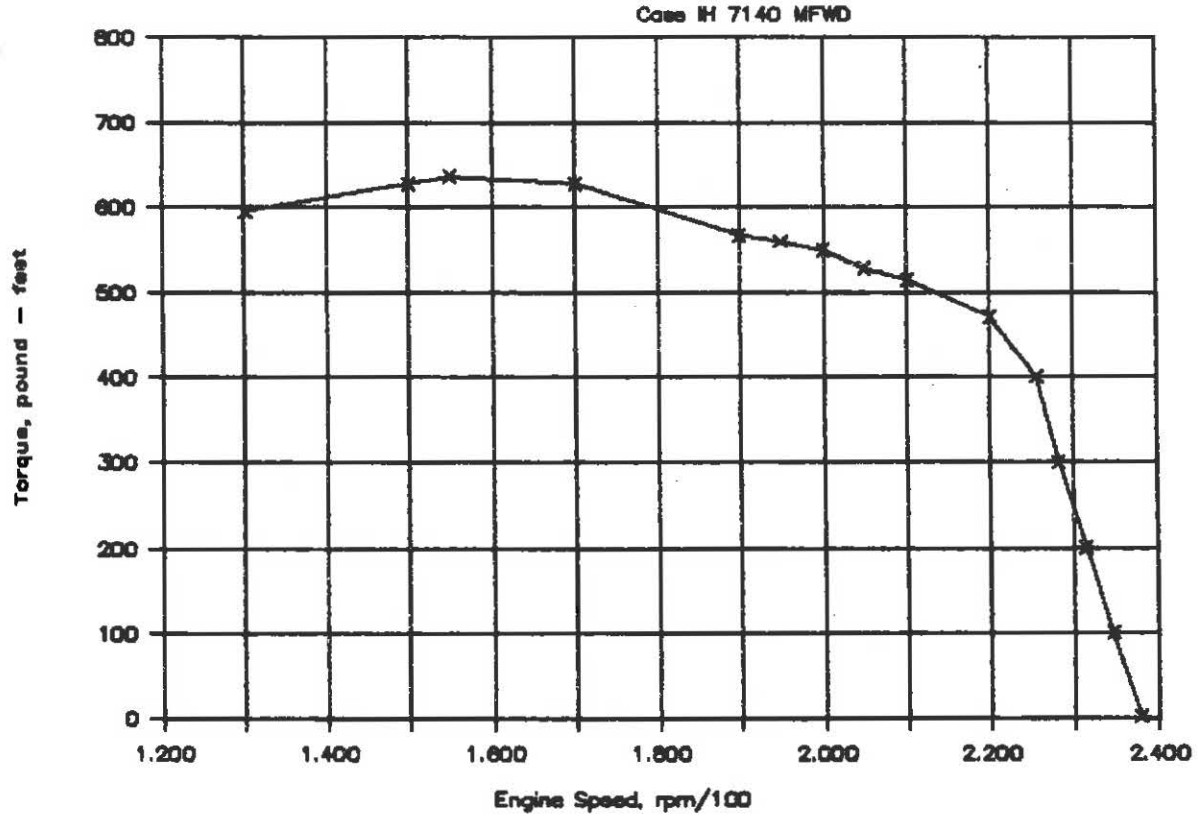
7. MEASUREMENT OF EXTERNAL NOISE LEVEL.

Date of test	:	June 2, 1988
Location of test	:	CAE/UNL, Lincoln, Nebr.
Sound level meter	:	B & K 2203
Type of track	:	Concrete oval
Gear number	:	18
Speed prior to acceleration	:	27.0 km/h (16.8 mph)
Sound level	:	85.5 dB(A)

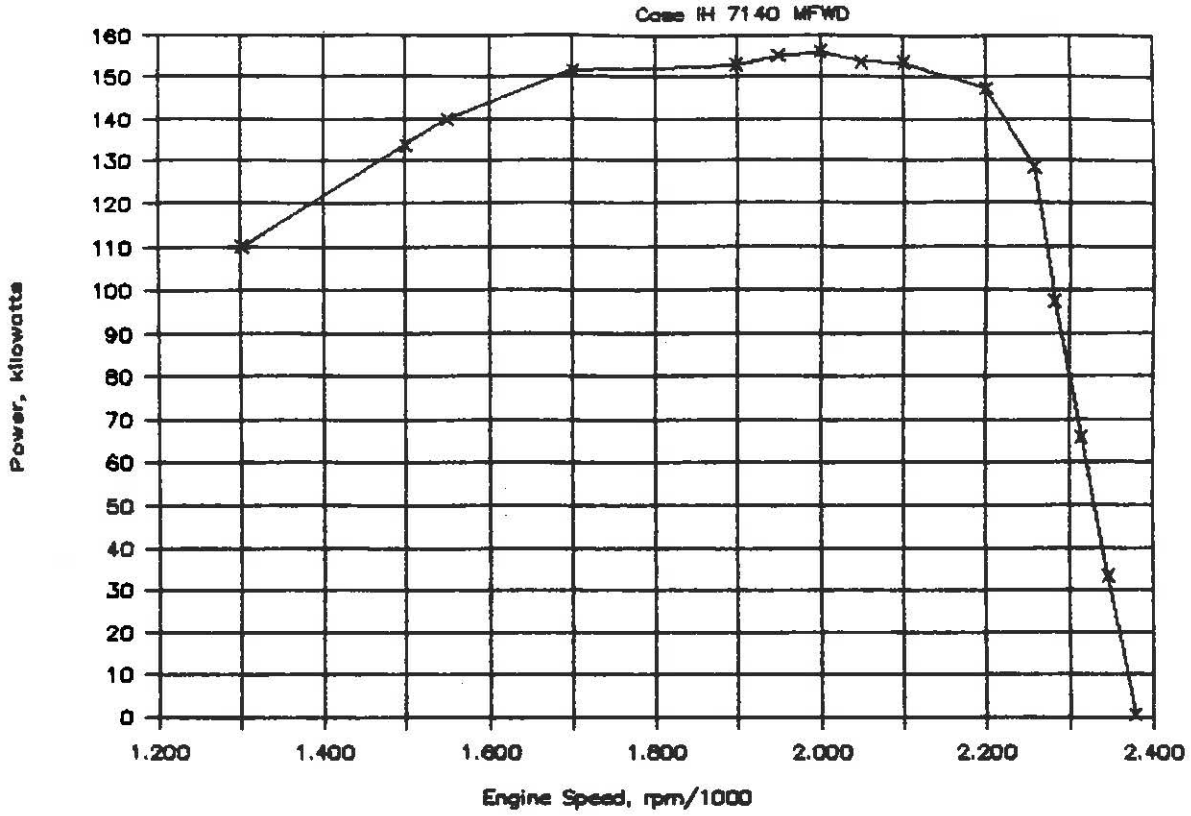
S.I. Equivalent Crankshaft Torque



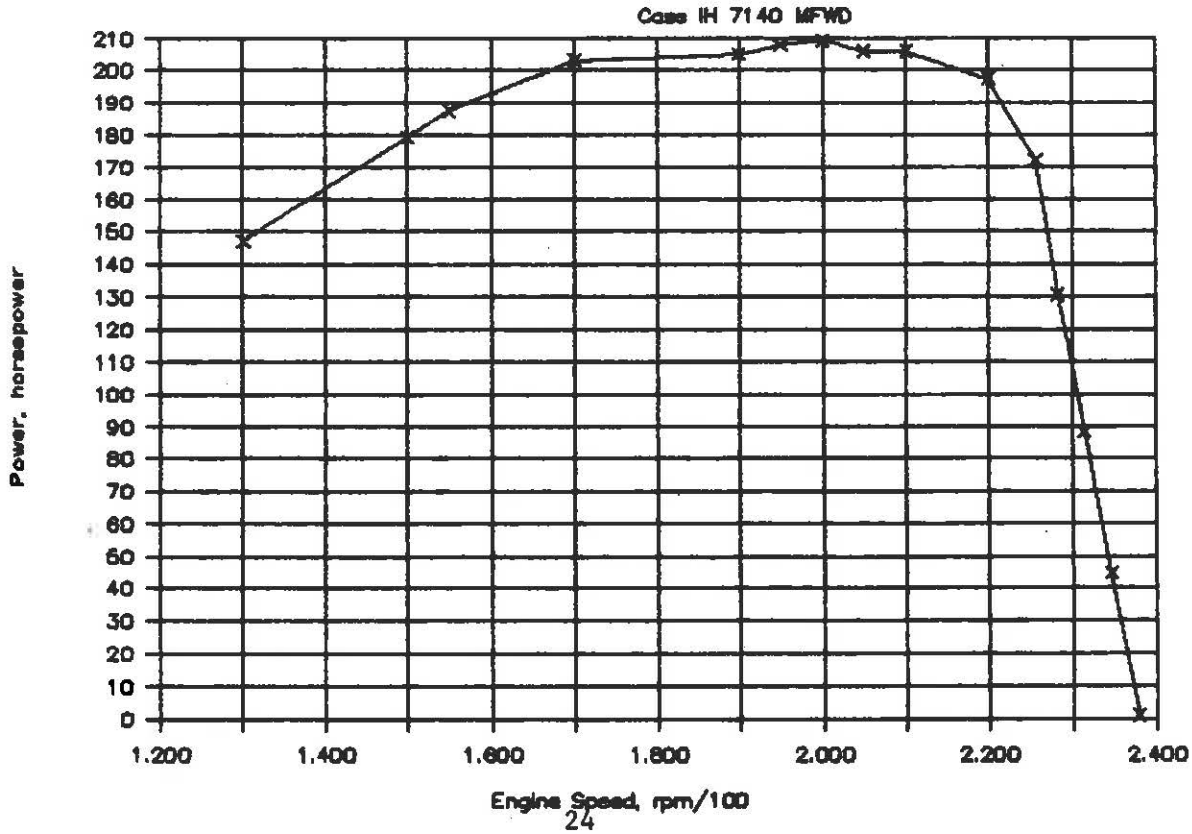
U.S. Equivalent Crankshaft Torque

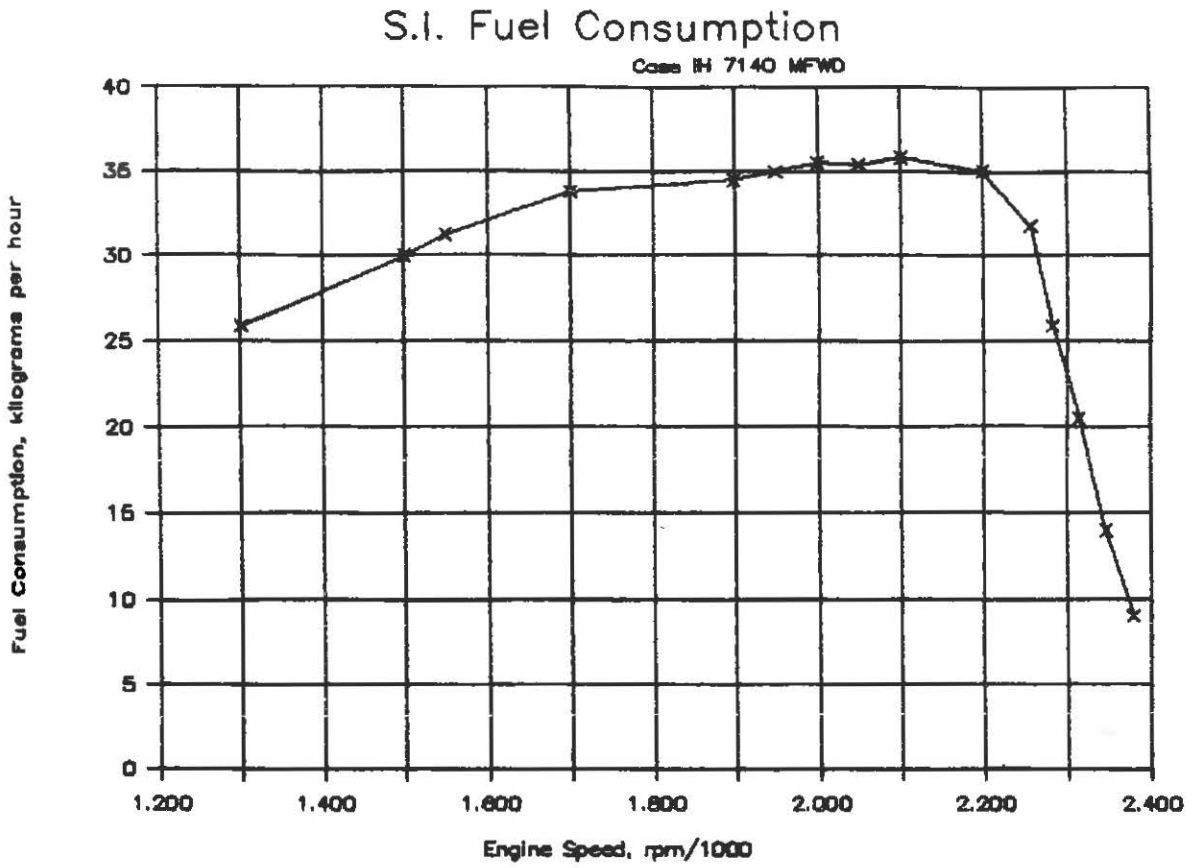


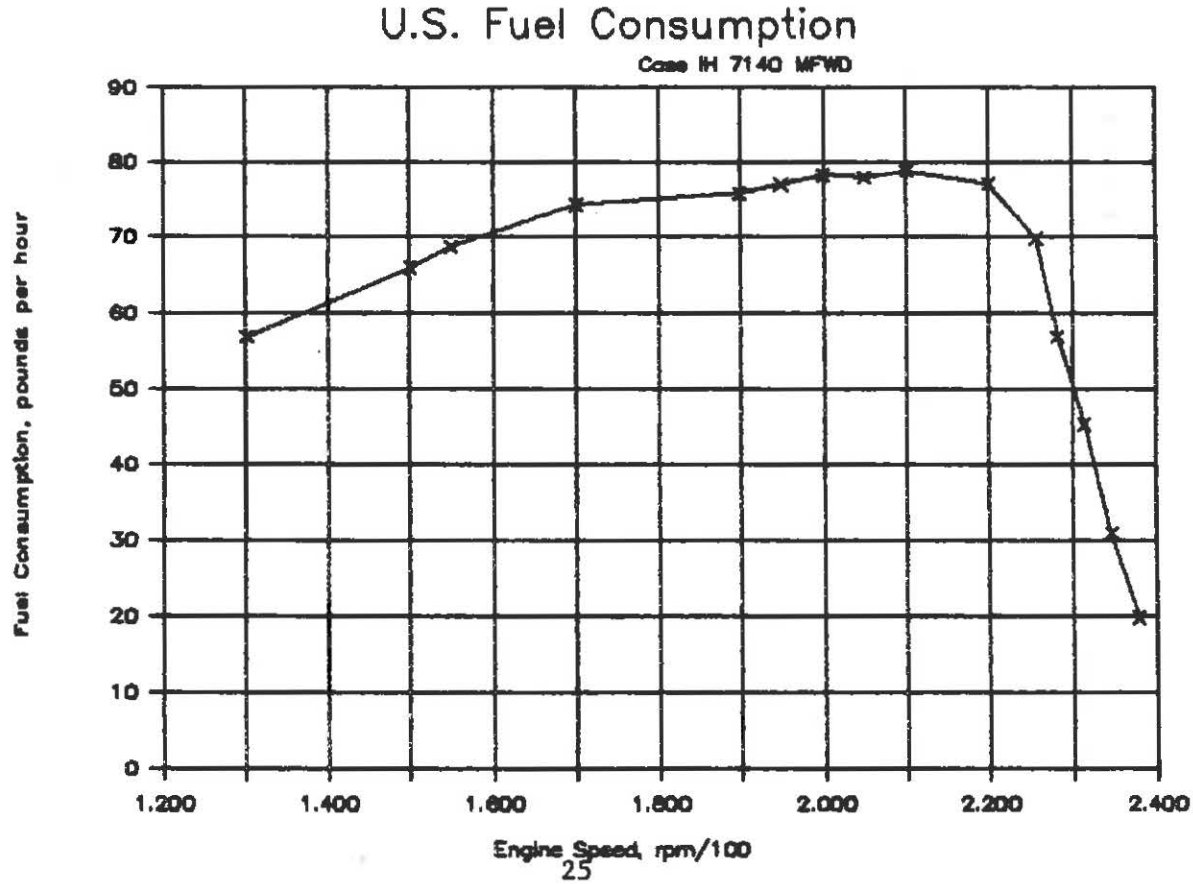
S.I. PTO Power

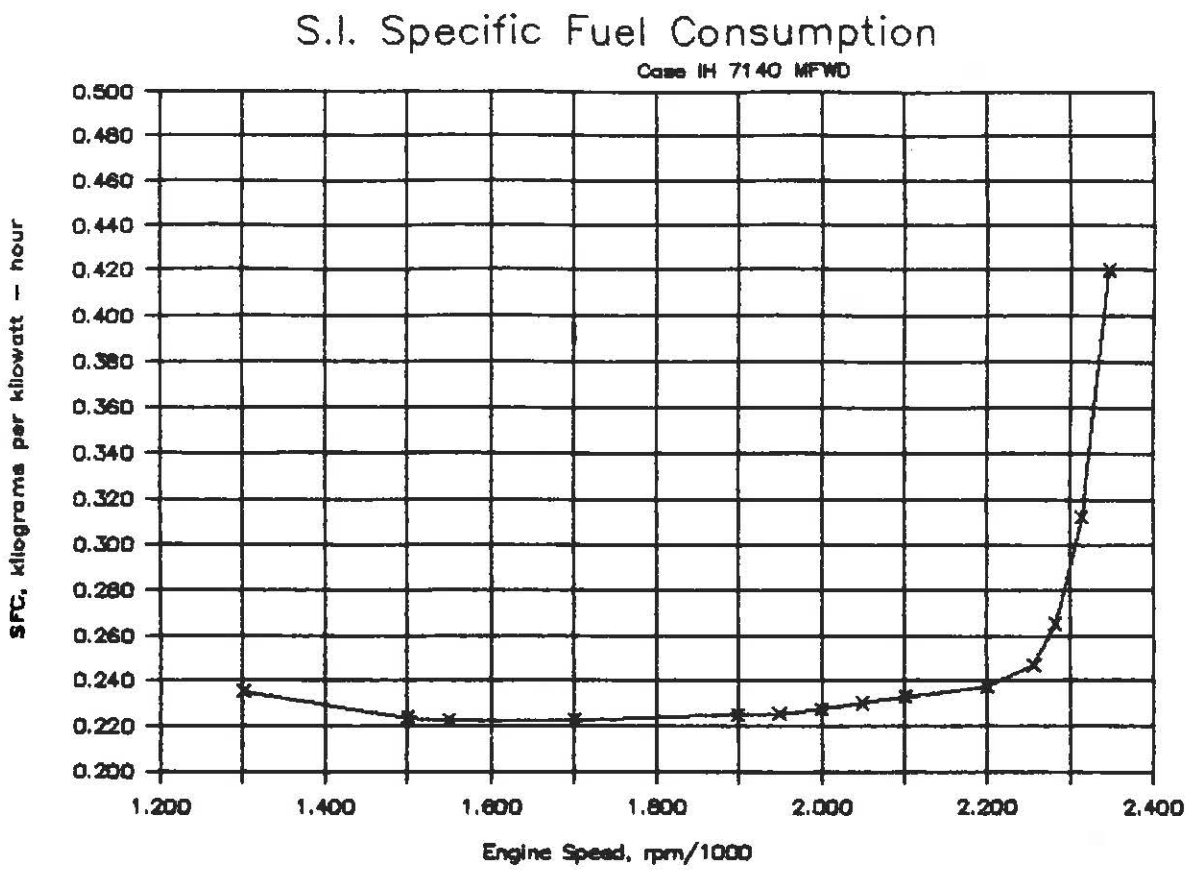


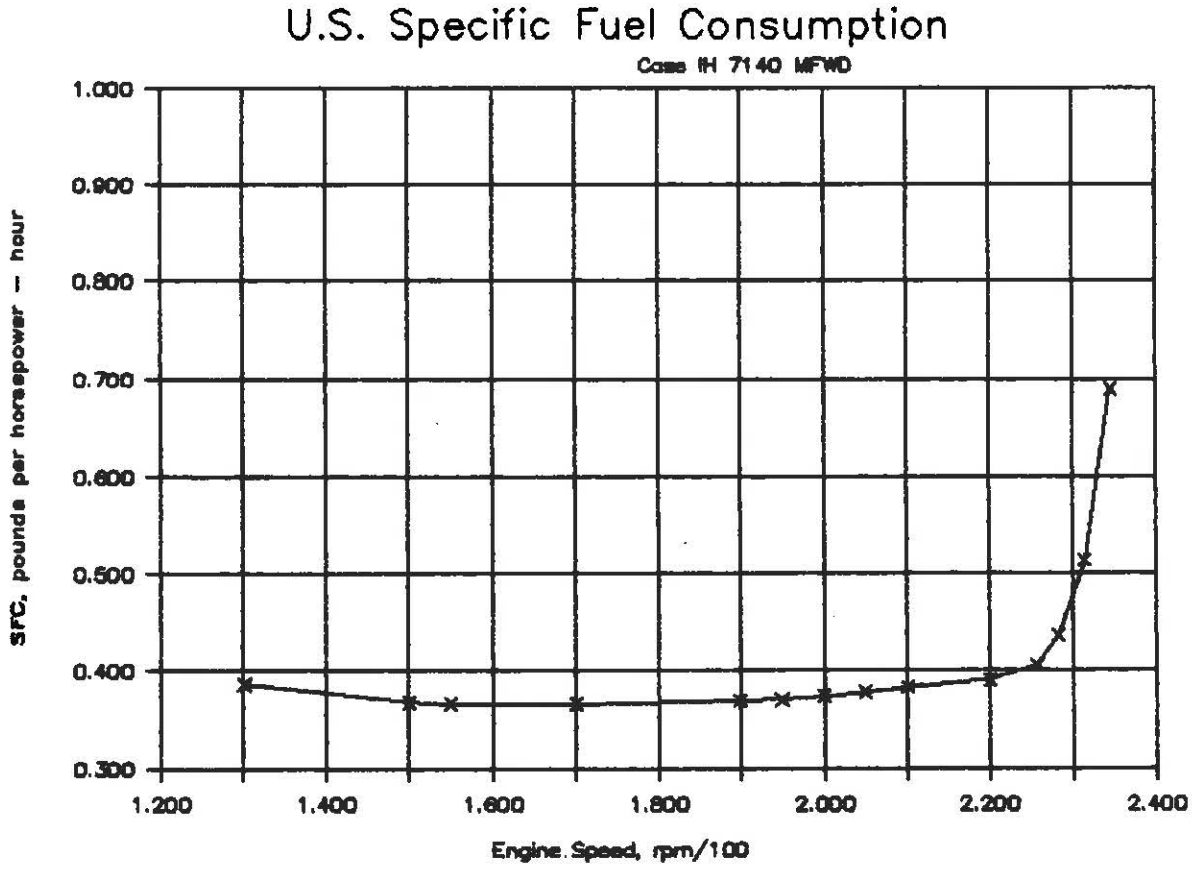
U.S. PTO Power

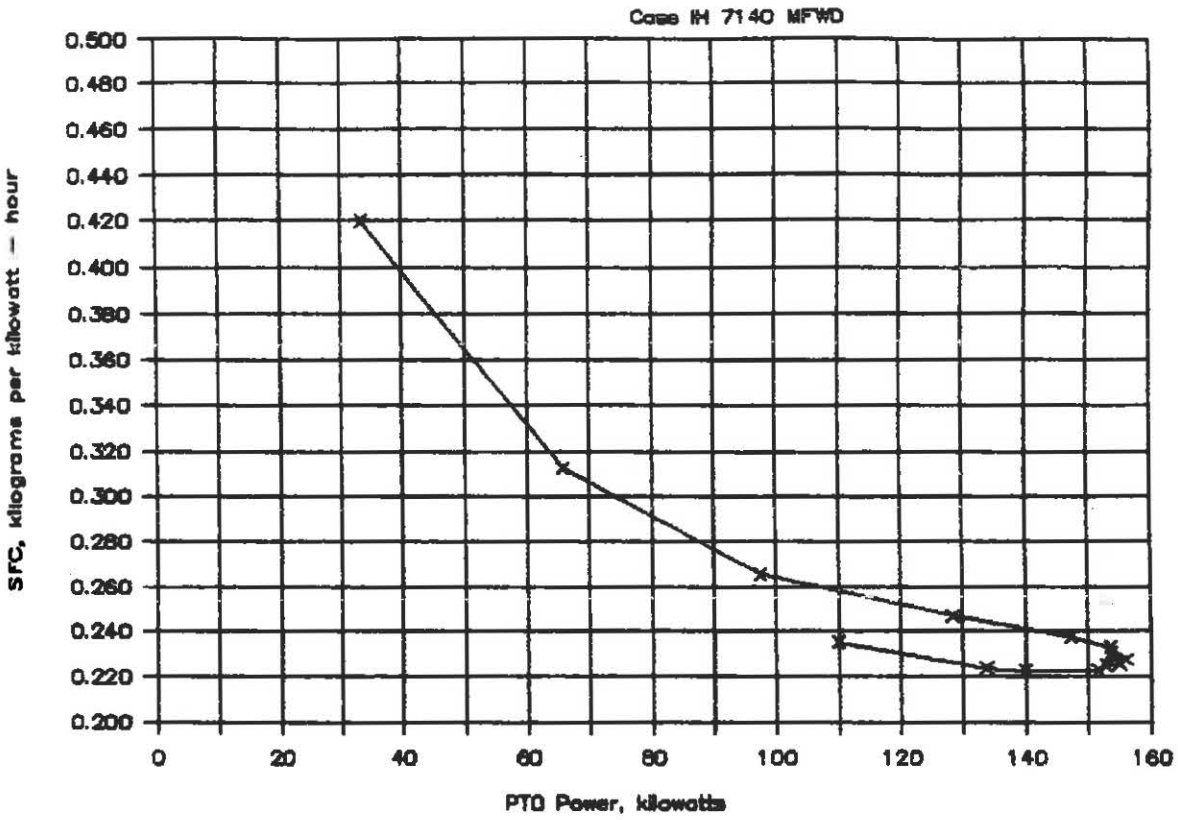


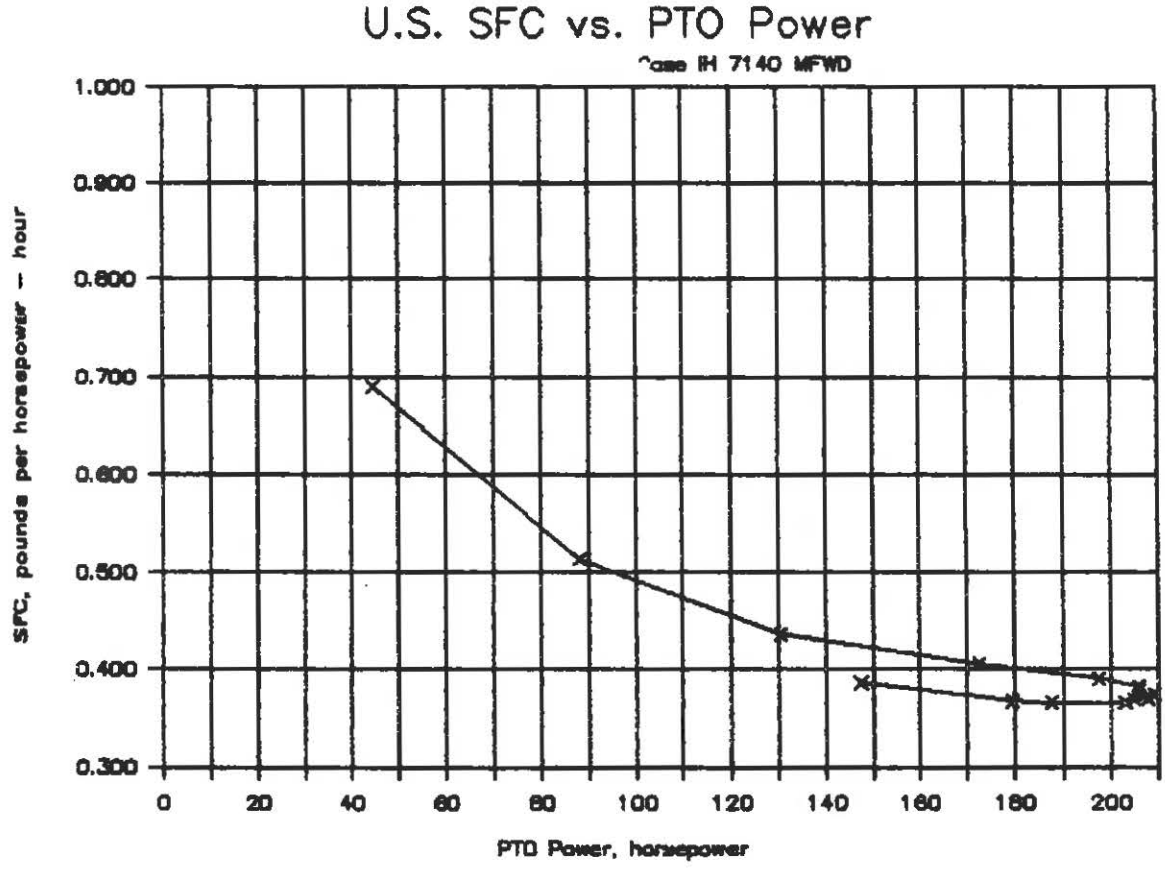

S.I. Fuel Consumption
Case IH 7140 MFWD
Fuel Consumption, kilograms per hour
40
35
30
25
20
15
10
5
0
1.200
1.400
1.600
1.800
2.000
2.200
2.400
Engine Speed, rpm/1000


U.S. Fuel Consumption
Case IH 7140 MFWD
Fuel Consumption, pounds per hour
90
80
70
60
50
40
30
20
10
0
1.200
1.400
1.600
1.800
2.000
2.200
2.400
Engine Speed, rpm/100


S.I. Specific Fuel Consumption
Case IH 7140 MFWD
SFC, kilograms per kilowatt - hour
0.500
0.480
0.460
0.440
0.420
0.400
0.380
0.360
0.340
0.320
0.300
0.280
0.260
0.240
0.220
0.200
1.200
1.400
1.600
1.800
2.000
2.200
2.400
Engine Speed, rpm/1000


U.S. Specific Fuel Consumption
Case IH 7140 MFWD
SFC, pounds per horsepower - hour
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
1.200
1.400
1.600
1.800
2.000
2.200
2.400
Engine Speed, rpm/100


S.I. SFC vs. PTO Power
Case IH 7140 MFWD
SFC, kilograms per kilowatt – hour
0.500
0.480
0.460
0.440
0.420
0.400
0.380
0.360
0.340
0.320
0.300
0.280
0.260
0.240
0.220
0.200
0
20
40
60
80
100
120
140
160
PTO Power, kilowatts


U.S. SFC vs. PTO Power
Case IH 7140 MFWD
SFC, pounds per horsepower – hour
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0
20
40
60
80
100
120
140
160
180
200
PTO Power, horsepower

8. OPTIONAL TEST RESULTS.

8.1 DRAWBAR PERFORMANCE.

Condition of test: Dual rear wheels, ballasted
Front wheel drive disengaged.

Date of tests: 02-Jun-88 08-Jun-88 Fuel density: 0.827 kg/l
Type of track: Concrete Case IH 7140 MFWD

Gear	Speed	Power	Pull	Engine Speed	Slip	SFC		Temperature, deg C					Rel hum	Pressure
	km/h	kW	kN	rev/min	%	kg/kW.h	kW.hr/l	Fuel	Coolant	Oil	Dry	Wet	%	kPa
IIa. Maximum Power (ballasted, dual wheels, 2wd) Tire pressure: 110 kPa, rear (inner) 83 kPa, rear (outer) 110 kPa, front Drawbar height: 521 mm														
5th	4.72	112.58	85.94	2201	13.70%	0.315	2.63	67	86	106	22	16	54	98.17
6th	5.56	117.54	76.17	2168	10.03%	0.305	2.72	65	88	109	26	17	40	98.10
7th	6.08	124.03	73.46	1999	8.31%	0.284	2.91	64	89	110	26	17	40	98.10
8th	7.23	129.61	64.53	1999	5.01%	0.273	3.03	64	89	111	27	17	36	98.10
9th	8.45	131.68	56.07	1999	3.71%	0.269	3.07	64	89	110	27	17	36	98.07
10th	9.78	131.14	48.28	2000	3.00%	0.271	3.06	65	90	111	28	18	37	98.07
11th	11.28	130.95	41.78	2001	2.38%	0.271	3.06	65	89	110	28	18	37	98.07
12th	12.99	128.15	35.50	2001	2.10%	0.276	3.00	65	90	111	28	18	37	98.07

Date of tests: 02-Jun-88 08-Jun-88 Fuel density: 6.905 lb/gal
Type of track: Concrete Case IH 7140 MFWD

Gear	Speed	Power	Pull	Engine Speed	Slip	SFC		Temperature, deg F					Rel hum	Pressure
	mph	hp	lb	rpm	%	lb/hp-hr	hp-hr/gal	Fuel	Coolant	Oil	Dry	Wet	%	in Hg
IIa. Maximum Power (ballasted, dual wheels, 2wd) Tire pressure: 16 psi, rear (inner) 12 psi, rear (outer) 16 psi, front Drawbar height: 20.5 in														
5th	2.93	150.97	19319	2201	13.70%	0.518	13.34	152	187	224	72	60	54	28.99
6th	3.45	157.62	17123	2168	10.03%	0.501	13.79	149	190	229	78	63	40	28.97
7th	3.78	166.32	16514	1999	8.31%	0.468	14.77	148	193	231	79	63	40	28.97
8th	4.49	173.80	14506	1999	5.01%	0.449	15.38	148	192	231	80	63	36	28.97
9th	5.25	176.59	12606	1999	3.71%	0.443	15.59	148	193	231	81	63	36	28.96
10th	6.08	175.87	10854	2000	3.00%	0.445	15.51	149	194	231	82	64	37	28.96
11th	7.01	175.61	9393	2001	2.38%	0.445	15.52	148	193	231	82	64	37	28.96
12th	8.07	171.85	7982	2001	2.10%	0.454	15.21	149	194	232	83	64	37	28.96

8.2 POWER LIFT TEST. (Upper link in top hole of tractor)

Linkage geometry dimensions.

		Dimension or range [mm]	Dimension or range [in]	Settings used on test [mm]	Settings used on test [in]
Lift category		III			
Rear tire - Radius Index	(r)	905	35.6		
Front tire - Radius Index	(r')	670	26.4		
Length of lift arms	(A)	381	15.0	same	
Length of lower links	(B)	861	33.9	same	
Distance of lift arm pivot from rear wheel axis: horizontal	(a)	364	14.3	to rear same	
Distance of lift arm pivot from rear wheel axis: vertical	(b)	422	16.6	same	
Horizontal distance between the 2 lower link points	(u)	604	23.8	same	
Horizontal distance between the 2 lift arm end points	(v)	737	29.0	same	
Length of upper link	(S)	600 to 831	23.6 to 32.7	648	25.5
Distance of upper link pivot from rear wheel axis: horizontal	(c)	627	24.7	same	
Distance of upper link pivot from rear wheel axis: vertical: Upper	(d)	250	9.8	250	9.8
Distance of upper link pivot from rear wheel axis: vertical: Lower		169	6.7		
Distance of lower link pivot from rear wheel axis: horizontal	(e)	445	17.5	same	
Distance of lower link pivot from rear wheel axis: vertical	(f)	332	13.1	same	
Distance of lower link pivot points to lift rod pivot pts on lower links.	(D)	579	22.8	same	
Length of lift rods	(L)	660 to 866	26.0 to 34.1	826	32.5
Height of lower hitch points relative to rear wheel axis: In low position	(h)	378 to 699	14.9 to 27.5	657	25.9
Height of lower hitch points relative to rear wheel axis: In high position	(H)	3 to 269	0.1 to 10.6	58	2.3
Height above ground of lower hitch points when locked in transport position.		908 to 1174	35.7 to 46.2	963	37.9

TEST RESULTS

		Hitch point	Frame
Lower hitch points above ground - down position	[mm/inch]	248/9.8	284/11.2
Vertical movement	[mm/inch]	660/26.0	653/25.7
Maximum corrected force through full range	[kN/lbf]	46.9/10550	53.0/11909
Corresponding pressure	[kPa/psi]	15858/2300	
Moment about rear axle	[kN.M/lb.ft]	61.3/45189	101.5/74830
Maximum mast tilt angle	[deg.]	---	2.9

Lifting height relative to horizontal position of lower links.

	[mm]	-324	-301	-293	-204	-100	4
	[in]	-12.8	-11.9	-11.6	-8.0	-4.0	0.1
Corrected lift forces							
hitch points	[kN]	46.9	47.0	--	51.4	54.9	56.8
	[lb]	10550	10563	--	11547	12335	12769
at frame	[kN]	--	--	59.1	57.4	57.7	57.7
	[lb]	--	--	13285	12914	12974	12964

Lifting height relative to horizontal position of lower links.

	[mm]	98	199	298	319	337	359
	[in]	3.9	7.9	11.8	12.5	13.3	14.2
Corrected lift forces							
Hitch point	[kN]	58.2	58.3	59.1	59.2	60.1	--
	[lb]	13084	13106	13280	13306	13516	--
Frame	[kN]	56.8	55.3	53.6	53.0	53.1	54.3
	[lb]	12766	12441	12052	11909	11926	12197