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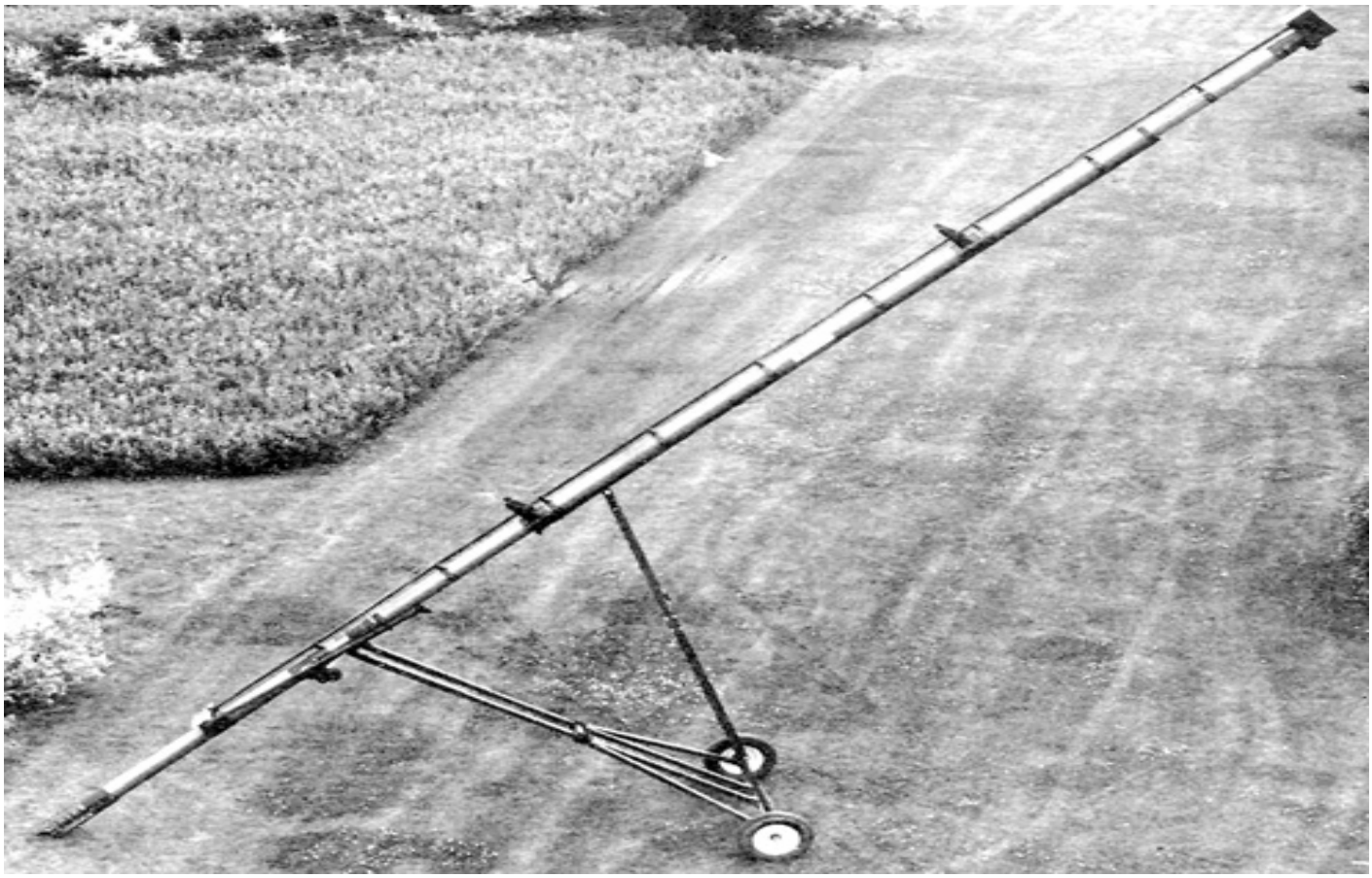

Blanchard 8 x 50 Grain Auger

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

BLANCHARD 8 x 50 GRAIN AUGER

MANUFACTURER AND DISTRIBUTOR:

Blanchard Foundry Ltd.
Box 1444
Saskatoon, Saskatchewan
S7K 3P7

RETAIL PRICE:

$2,324.00 (July 1983, f.o.b. Saskatoon, Saskatchewan)

(Distribution also available through dealer network.)

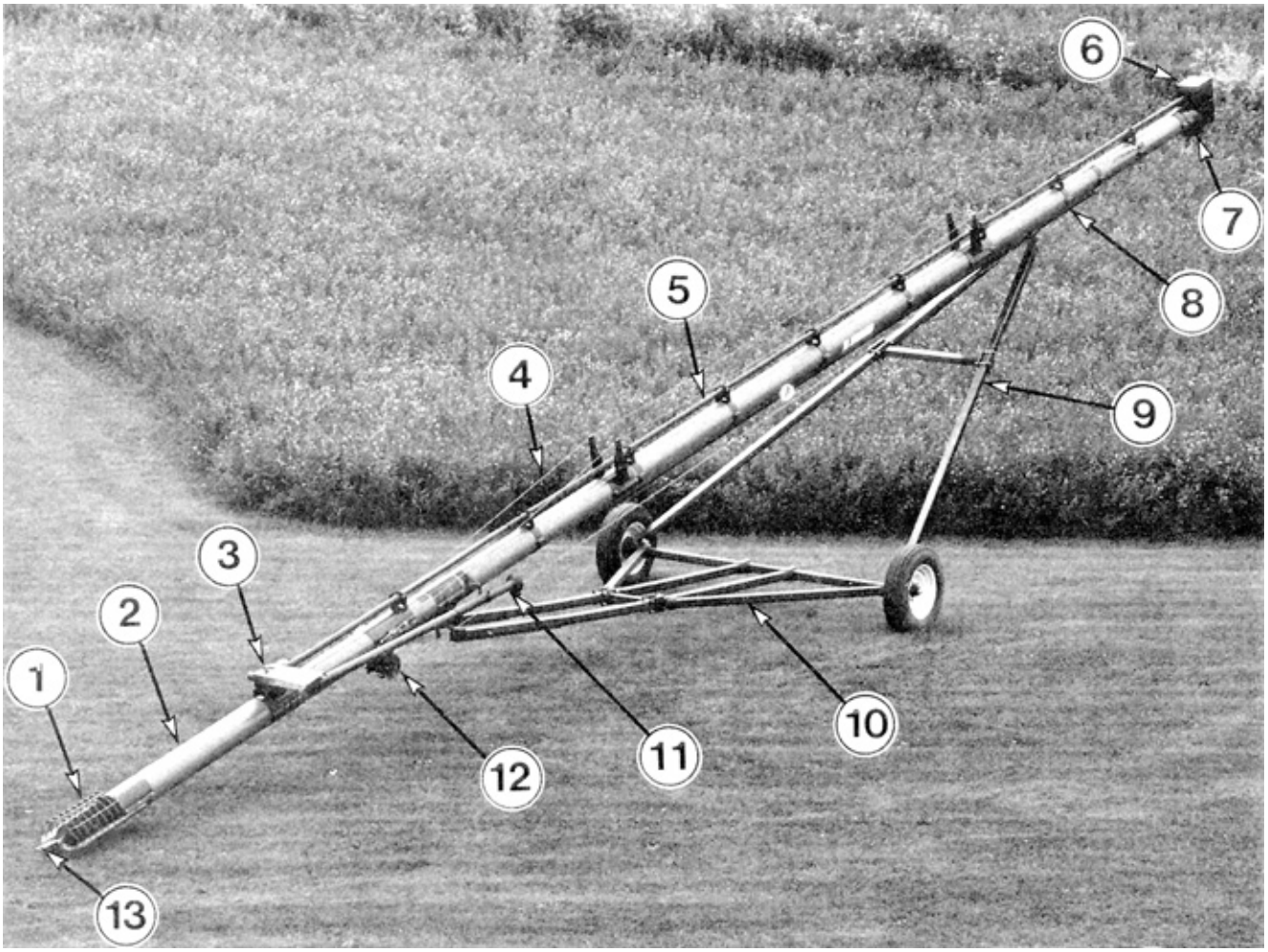

FIGURE 1. Blanchard 8 x 50 Grain Auger: (1) Inlet, (2) Auger Tube, (3) Gear Box, (4) Truss Cables, (5) Drive Shaft, (6) Upper End Drive, (7) Discharge Spout, (8) Elevating Track, (9) Lift Arms, (10) Lower Arms, (11) Power Take-off Driveline, (12) Cable Winch, (13) Tow Hitch.

SUMMARY AND CONCLUSIONS

Overall Performance: Performance of the Blanchard 8 x 50 Grain Auger was good[1]. At the 30° elevation angle, corresponding to a discharge height of 24.9 ft (7.6 m), maximum capacities were 1640 bu/h (72,0 t/h) in wheat, 2500 bu/h (38.6 t/h) in oats, 2270 bu/h (57.9 t/h) in corn and 2230 bu/h (50.6 t/h) in rapeseed. Maximum capacities were obtained at flighting speeds between 550 and 650 rpm.

Power Requirement: This ranged from 5 to 20 hp (4 to 15 kW) in dry grain. Capacity and power depended on flighting speed, elevation angle, grain type and moisture content.

Grain Damage: In dry wheat damage was less than 0.2% for each pass through the auger.

Maneuverability: This was regarded as poor due to the heavy weight and the position of the cable winch at high elevations.

Safety: All pulleys, nip points, and rotating d rive shafts were guarded, in accordance with current safety standards[2]. The inlet safety guard did not meet all of the standards.

Operator Manual: The manual provided adequate instructions for operation of this machine.

Durability: No durability problems occurred during the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Relocating the cable winch for easier operation at high auger elevations.
2. Modifications to the undercarriage to reduce the hitch weight and improve maneuverability.
3. Extending the inlet safety guard 2.5 in (64 mm) beyond the exposed flighting to meet current safety standards.

Senior Engineer -- G.M. Omichinski
Project Engineer -- C.W. Bolton

[1] *See rating table APPENDIX III*
[2] *American Society of Agricultural Engineers Tentative Standard ASAE S361.1T "Safety for Agricultural Auger Conveying Equipment", December 1982.*

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. Another clamp will be supplied with each auger to allow the operator to clamp the cable winch at any desirable location along the auger tube.
2. The undercarriage has been altered to reduce hitch weight and improve maneuverability'
3. Future production machines will be provided with safety guards which meet the safety standards.

GENERAL DESCRIPTION

The Blanchard 8 x 50 Grain Auger (FIGURE 1) is an 8 in (203 mm)[3] diameter, 50 ft (15.2 m) long portable screw conveyor. The auger tube is mounted on a tubular undercarriage and supporting truss cables. A hand-operated cable winch is used to adjust the discharge height.

The test machine was equipped with a 540 rpm tractor power take-off direct drive. The Blanchard may be equipped with a power take-off belt drive, gasoline engine or electric motor.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST[4]

The Blanchard 8 x 50 was operated for about 15 hours while conveying dry wheat, oats, corn and rapeseed. A standard test material (APPENDIX II) was also used. The machine was transported over gravel and paved highways for a distance of 30 miles (50 km). It was evaluated for ease of operation and adjustment, rate of work, power requirements, quality of work, operator safety and suitability of the operator manual.

RESULTS AND DISCUSSION

EASE OF OPERATION AND ADJUSTMENT

Discharge Height: The discharge height could be varied from 8.5 to 36.4 ft (2.6 to 11.1 m) with the hand operated cable winch. Corresponding elevation angles varied from 12° to 47°.

Adjustment of the discharge height was difficult at high elevations. FIGURE 2 shows a 6 ft (1.8 m) man attempting to reach the winch handle when the auger was at maximum elevation. It is recommended that the manufacturer consider relocating the cable winch to a more suitable location.

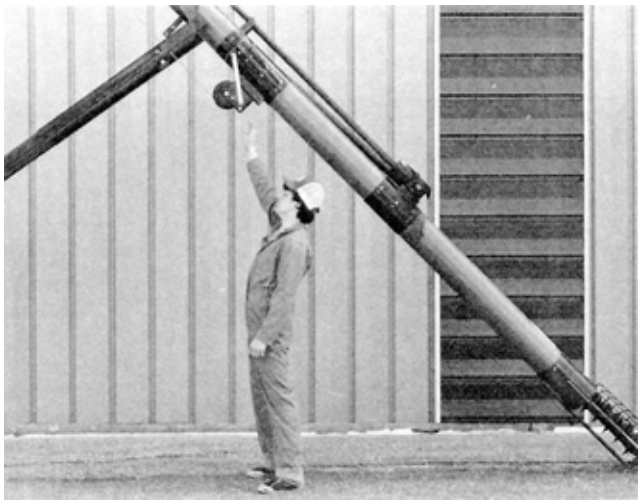

FIGURE 2. Cable winch position at maximum elevation.

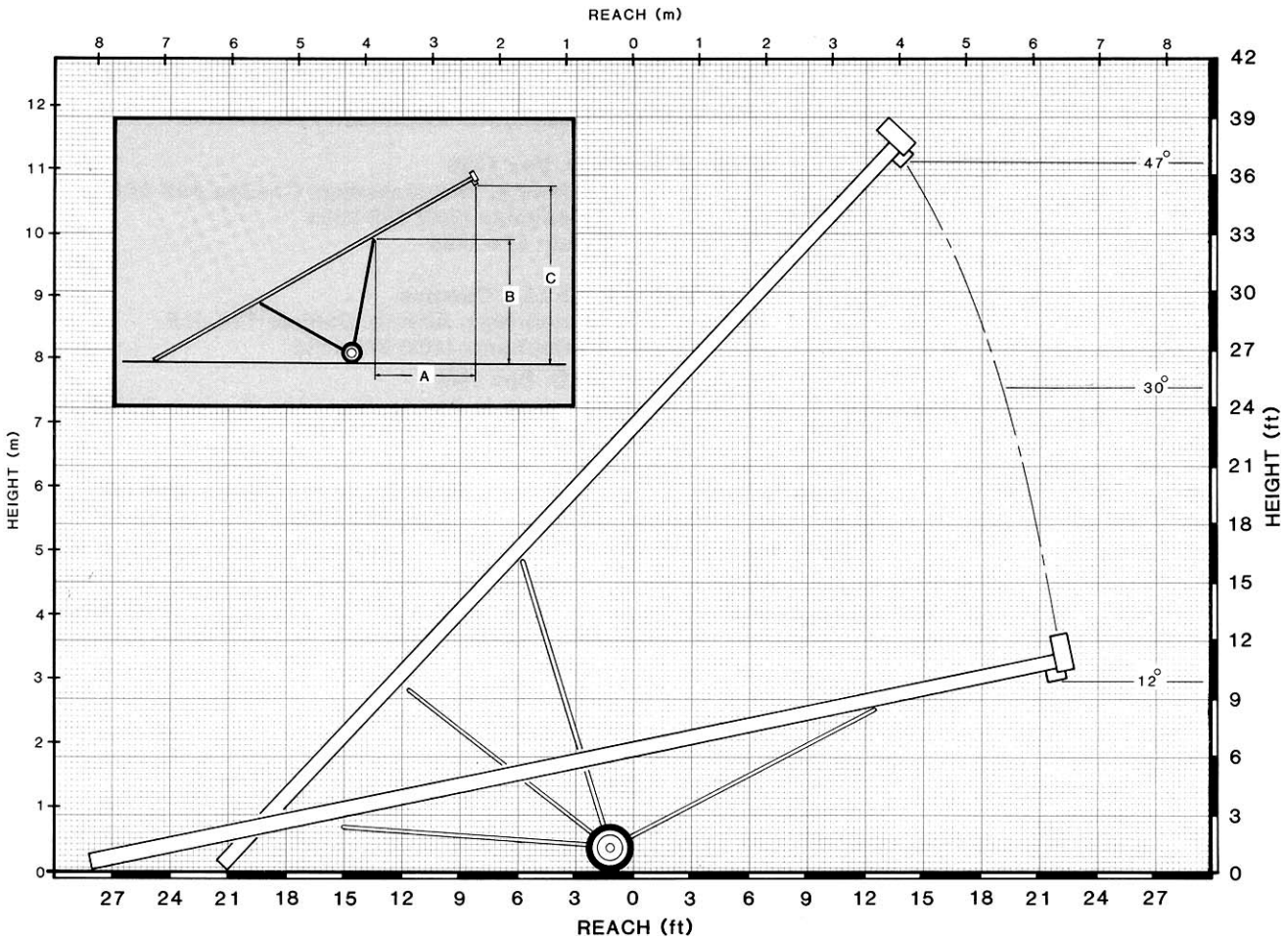

FIGURE 3. Reach and clearance at various heights: (A) Reach, (B) Bin Eave Clearance, (C) Discharge Height.

[3] *A conversion table is provided in APPENDIX IV*

[4] *Prairie Agricultural Machinery Institute Detailed Test Procedure for Grain Augers.*

With the auger empty, and the lift mechanism well lubricated, it took a maximum winch handle force of 36 lb (160 N) to raise the auger. It took about 175 turns of the winch handle to fully raise or lower the auger.

Auger Reach: The bin eave clearance and horizontal reach of the Blanchard 8 x 50 are shown in FIGURE 3. Bin eave clearance, measured from the ground to the foremost of the undercarriage, varied from 8.5 ft (2.6 mm) at 12° to 23.5 ft (7.2 m) at 47° elevation. The reach measured from the foremost part of the undercarriage to the centre of the discharge, ranged from 9.4 ft (2.9 m) to 15.3 ft (4.7 m).

Maneuverability: Hitch weight varied from 123 lb (56 kg) at minimum elevation to 265 lb (120 kg) at maximum elevation. This heavy weight made maneuvering of the auger by hand very difficult. It is recommended that the manufacturer modify the undercarriage to reduce the weight on the hitch.

The Blanchard 8 x 50 transported well and was stable at speeds up to 50 mph (80 km/h) on paved highways and up to 30 mph (50 km/h) on gravel roads. The removable single tongue hitch provided a reliable coupling to the tow vehicle. The operator should use a suitable hitch pin and safety chain to prevent accidental unhitching when transporting on public roads.

Clearance under power lines was adequate. The transport height was 11.3 ft (3.5 m) when fully lowered.

Adjustments: Chain tension in top and end drive should be checked annually.

RATE OF WORK

Capacity: FIGURE 4 shows the capacities[5] of the Blanchard 8 x 50 in various grains at 30° elevation angle. Maximum capacities were 2640, 2500, 2270, and 2230 bu/h (72.0, 38.6, 57.9 and 50.6 t/h) in dry wheat, oats, corn and rapeseed respectively. As flighting speeds are increased, the capacity of screw conveyors increases to a peak, then levels off or decreases. Maximum or peak capacities for the Blanchard 8 x 50 occurred at flighting speeds ranging from 550 to 650 rpm, which corresponds to power take-off speeds of 410 to 490 rpm.

The effect of elevation angle on capacity is illustrated in TABLE 1. Peak capacities in wheat dropped 45%, from 3490 bu/hr (95.3 t/h) at 20° elevation to 1920 bu/hr (52.3 t/h) at maximum elevation.

TABLE 1. Peak Capacity. Specific Capacity and Power Requirement vs Elevation Angle (Wheat).

ELEV. ANGLE DEG.	DISCHARGE HEIGHT FT.	(M)	PEAK CAPACITY BU/H	(T/H)	SPECIFIC CAPACITY TON/HP.H	(T)/(KW.H)	POWER INPUT HP	(KW)
20	17	(05)	3490	(95)	6.2	(7.6)	18	(13)
30	25	(08)	2640	(72)	4.8	(5.8)	17	(12)
40	32	(10)	2200	(60)	4.1	(5.1)	17	(12)
47	36	(11)	1920	(52)	3.8	(4.6)	15	(11)

Specific Capacity: Specific capacity is the amount of grain moved per horsepower hour (kilowatt hour). A high specific capacity indicates efficient use of energy. In general, specific capacity decreases (less grain is moved per horsepower-hour) with increasing the flighting speed and elevation angle. At 30° elevation, specific capacity ranged from 6.85 to 2.72 ton/hp-h (8.35 to 3.31 t/kW-h) in wheat, oats, corn and rapeseed. TABLE 1 indicates the effect of elevation angle on peak and specific capacities for the Blanchard 8 x 50.

Critical Speeds: At certain critical flighting speeds auger vibration becomes excessive. This phenomenon, known as resonance, is common to all augers and varies with grain type and operating conditions. Care should be taken not to operate at or near these critical speeds. On the Blanchard 8 x 50, vibration in PTO drive was excessive at the flighting speeds of 700-750 rpm.

[5]*Since the capacity is greatly dependent upon grain properties, such as variety and moisture content, FIGURE 4 should not be used for comparing different augers. The data presented in FIGURE 6, APPENDIX II, using a standard medium, may be used for comparisons of different augers.*

Power Requirements: FIGURE 4 gives power requirements for the Blanchard 8 x 50 in dry wheat, oats, corn and rapeseed at a 30° elevation angle. Power requirements ranged from 5 to 20 hp (4 to 15 kW). Power requirements would be greater in high moisture grain.

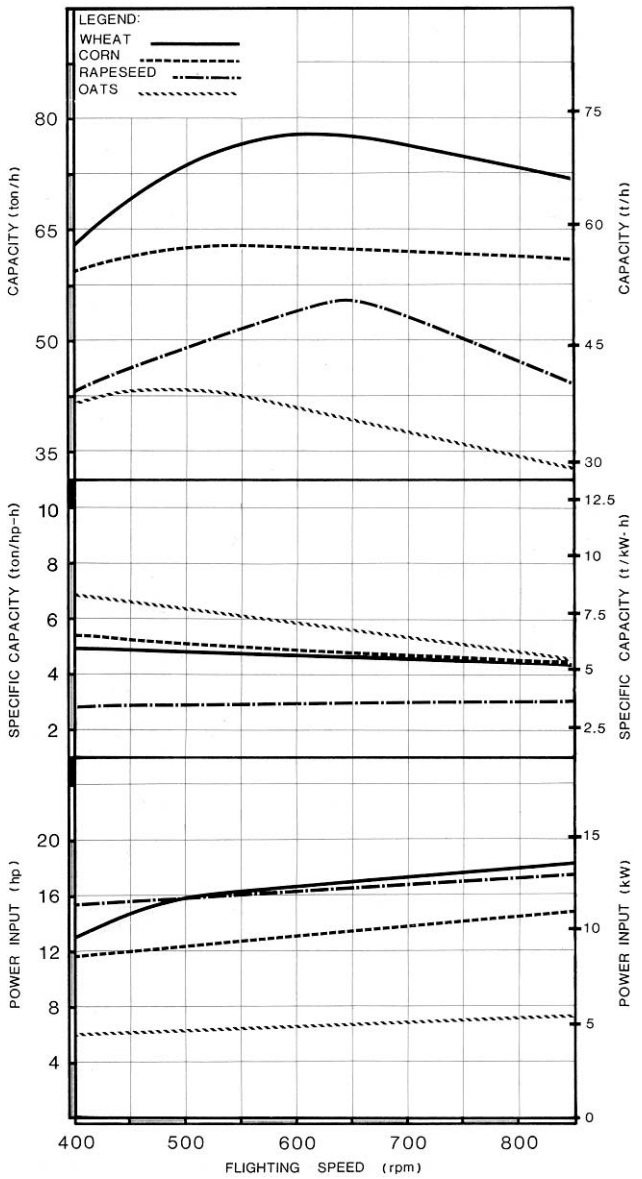

FIGURE 4. Capacity, specific capacity and power requirement for various flighting speeds at 30° elevation angle.

QUALITY OF WORK

Grain Damage: Damage in dry wheat was less than 0.2% for each pass through the auger. This was insignificant as long as the same grain was not augered many times. Crackage would be lower at higher moisture contents.

OPERATOR SAFETY

The Blanchard 8 x 50 has met current safety standards 2 for grain augers. It was safe to operate if normal precautions were observed. Safety signs were appropriately displayed alerting the operator of potentially hazardous areas.

Shielding was provided for all rotating shafts, pulleys and pinch points. The inlet safety guard (FIGURE 5) did not extend the recommended 2.5 in (64 mm) beyond the exposed flighting. It is recommended that the manufacturer consider modifying the inlet safety guard to meet the current safety standards. All capacities were determined with this auger safety guard (FIGURE 5). The Institute strongly recommends that grain augers be operated with all safety equipment in place.

OPERATOR MANUAL

The operator manual contained appropriate operating, servicing and safety instructions.

DURABILITY RESULTS

The Blanchard 8 x 50 operated for about 15 hours. The intent of the test was evaluation of overall performance. An extended durability evaluation was not conducted. No mechanical problems occurred during the test.

FIGURE 5. Inlet safety guard.

APPENDIX I

SPECIFICATIONS

MAKE:	Blanchard	
MODEL:	8 x 50	
SERIAL NUMBER:		
OVERALL DIMENSIONS:		
-- length	52.5 ft	(15.9 m)
-- width	9.2 ft	(2.8 m)
-- transport height	8.5 ft	(2.6 m)
DRIVE:		
-- 540 rpm tractor power take-off		
-- direct drive		
-- auxiliary drives		
-- chains	1 (#60)	
-- gearboxes	1	
-- power take-off to flighting speed ratio	1:1.33	
LUBRICATION:		
-- pressure grease fittings	1	
-- sealed bearings	11	
-- packed wheel bearings	2	
AUGER TUBE:		
-- inside diameter	7.9 in	(200 mm)
-- material thickness	0.12 in	(3.0 mm)
-- discharge spout	8.0 in dia.	(200 mm)
FLIGHTING:		
-- diameter	7.0 in	(180 mm)
-- pitch		
--exposed (double)	7.0 in	(180 mm)
-- covered	7.0 in	(180 mm)
-- exposed length	18.0 in	(460 mm)
INLET SAFETY GUARD:		
-- material dimensions	0.31 in dia.	(8.0 mm)
-- overall size	23 in L x 12 in dia	(480 mm x 305 mm)
-- grill openings		
-- maximum open area	8.10 in^2	(52.5 cm^2)
-- maximum open dimension	4.10 in	(105.0 mm)
WINCH:		
-- make	Work Winch	
-- model:	K-1500	
-- maximum handle force	35.9 lb	(160 N)

WEIGHT:	**Maximum Elevation**	**Minimum Elevation**
-- right wheel	726 lb (329 kg)	798 lb (362 kg)
-- left wheel	715 lb (325 kg)	785 lb (356 kg)
-- hitch	265 lb (120 kg)	t23 lb (56 kg)
TOTAL	1706 lb (774 kg)	1706 lb (774 kg)

OPTION EQUIPMENT:

-- belt drive

APPENDIX II

PERFORMANCE WITH STANDARD TEST MATERIAL

The standard test material is a high density granular polyethylene. The material is consistent and not subject to damage or changes in physical properties as are grains,

FIGURE 6 gives the capacity, specific capacity and power requirements for the Blanchard 8 x 50 in a standard test material. These Data may be used for comparison of different grain augers.

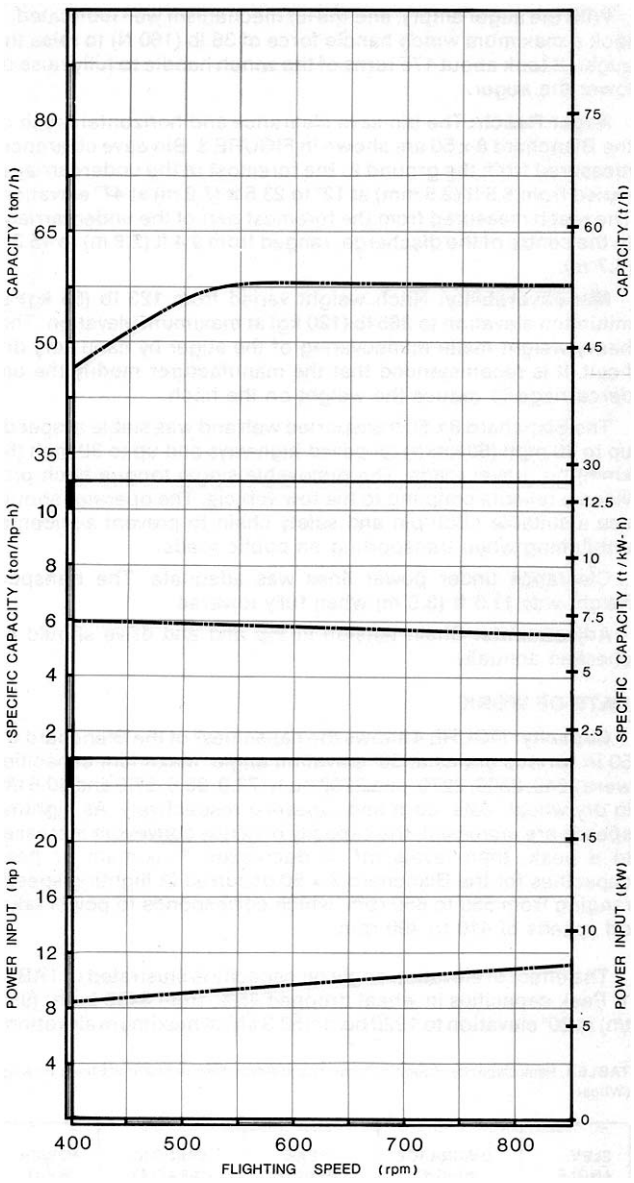

FIGURE 6. Capacity, specific capacity and power requirements with standard test material at 30° elevation angle.

APPENDIX III

MACHINE RATINGS

The following rating scale is used in Machinery Institute Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

APPENDIX IV

CONVERSION TABLE

Acre (ac) x 0.40	=	Hectare (ha)
Foot (ft) x 0.305	=	Metre (m)
Inches (in) x 25.4	=	Millimetres (mm)
Horsepower (hp) x 0.75	=	Kilowatt (kW)
Miles/Hour (mph) x 1.61	=	Kilometre/Hour (km/h)
Pounds Force (lb) x 4.45	=	Newton (N)
Pounds Force/Foot (lb/ft) x 14.6	=	Newton/Metre (N/m)
Pounds Force-Feet (lb-ft) x 1.36	=	Newton-Metre (N-m)
Pounds Force/Square Inch (psi) x 6.89	=	Kilopascal (kPa)
Pounds Mass (lb) x 0.454	=	Kilogram (kg)
Tons Mass (ton) x 1.1	=	Tonnes (t)

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