

Evaluation Report 458



Wheatheart Safety Auger Assembly

A Co-operative Program Between



ALBERTA
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PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

WHEATHEART SAFETY AUGER ASSEMBLY

MANUFACTURER & DISTRIBUTOR:

Wheatheart Hydrostatic & Machine Ltd.
855-60th Street East
Saskatoon, Saskatchewan
S7K 577

RETAIL PRICE: \$180.00 (6" & 7" models), \$200.00 (8" model) Aug.
1985, f.o.b. Saskatoon, Saskatchewan.

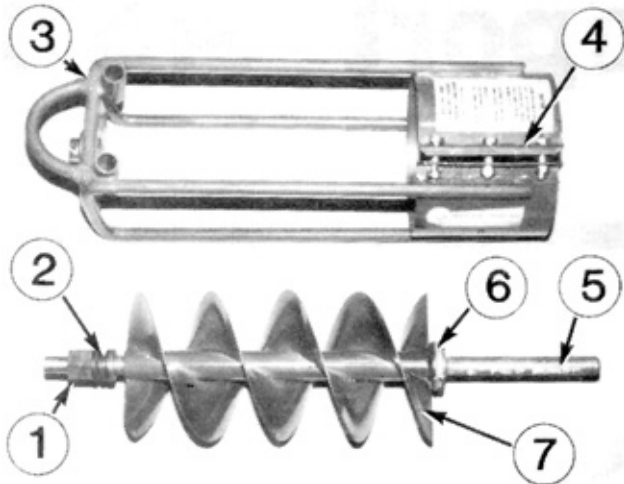


FIGURE 1. Wheatheart Safety Auger Assembly: (1) Locknuts, (2) Spring, (3) Frame, (4) Auger Tube Clamp, (5) Shaft, (6) Disc Clutch, (7) Inlet Flighting.

SUMMARY

Ease of Installation: The Wheatheart could be installed by one man in two hours with standard tools. The operator was required to allow an additional 3 hours for the Loctite glue to set.

Ease of Operation and Adjustment: Once the clutch force was set upon installation, the operator only needed to rotate the safety flighting a full turn by hand, daily, to ensure proper operation.

Performance: There was an increase in capacity by about 15% compared to that of the standard single flighting grain auger.

Operator Safety: The device provided safety to a shod foot from the auger inlet. The Safety Auger Assembly was not intended to prevent injury to fingers and no suitable guard attachment for this was provided.

Operator's Manual: The manual contained adequate instructions for installation and operation of the assembly.

RECOMMENDATIONS

It is recommended that the manufacturer consider: Providing a guard attachment to the Safety Auger Assembly to discourage an operator from placing his hand near the auger inlet flighting.

Station Manager: G.M. Omichinski

Project Engineer: R.R. Hochstein

THE MANUFACTURER STATES THAT

The product changes suggested by PAMI are under review.

GENERAL DESCRIPTION

The Wheatheart Safety Auger Assembly is an auger inlet safety device intended as an attachment to standard screw conveyors to both safeguard an operator against accidental injury and to increase capacity. This device replaces an auger inlet with a shaft,

about which an independent double flighting section rotates freely. A friction clutch comprising a fibre washer at the upper end, transmits power to the flighting, while a coil spring and locking nuts on the shaft at the lower end are used to maintain the necessary pressure on the clutch. The manufacturer instructs the operator to adjust the locknuts so that the intake flighting can be rotated one full turn with one hand.

The model tested was for a 7 inch (178 mm) grain auger. Models for installation on 6 and 8 inch (150 and 200 mm) augers are also available.

Detailed specifications are given in APPENDIX I, while FIGURE 1 shows the main components.

SCOPE OF TEST

The Wheatheart Safety Auger Assembly was mounted to a Brandt seven inch grain auger, in accordance with the manufacturer's instructions and was tested in wheat using test procedures developed by PAMI.

Auger performance was determined for various adjustments of the friction clutch spring force to determine the ideal setting and confirm the manufacturer's instructions. The Safety Auger Assembly was also evaluated for ease of installation, operation and adjustment, operator safety and suitability of the operator manual.

RESULTS AND DISCUSSION

EASE OF INSTALLATION

Installation of the Safety Assembly required cutting away the intake section of the grain auger tubing just above the welded inlet guard with a hacksaw. The flighting also had to be cut away in the same manner. With the intake flighting cut away, the shaft of the safety flighting was fitted within the flighting core and cemented with a Loctite glue. Final assembly included adjusting the locknuts and installing the new auger inlet cage. Both were easily accomplished. Including the recommended 3 hours for the glue to set, one man could install the safety device in about 5 hours with tools generally available on the farm.

PERFORMANCE

Capacity: The Wheatheart Safety Auger Assembly was adjusted according to the manufacturer's instructions, that is the intake flighting be easily rotated (using one hand) one complete turn against the force of the friction clutch. The breaking torque required at the flighting to accomplish this was measured to be about 5 ft-lb (7 N-m).

Performance of the modified auger was first evaluated by measuring the auger capacity and power input at the auger drive for the above setting. The locknuts were then adjusted to maintain a 10 ft-lb (14 N-m) torque or rotating the safety flighting with two hands and the auger was retested. There was no difference in capacity or power input, indicating that a 5 ft-lb setting of the clutch pressure was adequate for optimum performance of the auger.

The capacity of the modified auger was also compared to that of the conventional single flighting grain auger. The Wheatheart showed about a 15% increase in capacity for the same flighting speed and elevation angle of a conventional single flighting grain auger.

Safeguard: The safety of the auger device in terms of the ability of the Auger's Safety Assembly to slip when jammed with an operator's foot was also evaluated. Pigs feet were found to have bones of similar size and strength to that of the human foot. The pig's foot, when jammed into the flighting only suffered superficial damage to the skin. A non-safety shoe was also tried to see what damage would occur to the shoe. The leather barely scarred upon insertion. The safety device, however, provides little protection against injury to the fingers or a shoeless foot. The manufacturer advises against testing the safety performance of the Foot Saver, with one's foot.

EASE OF OPERATION AND ADJUSTMENT

The operator's instructions recommended rotating the safety auger flighting a complete turn before each operation of the auger. Jamming a stick into the auger inlet during operation was also suggested, to check the clutch slip. No other regular maintenance was required. The fibre washer was the only item that may eventually require replacing, however if the locknuts are properly set to the recommended torque, the wear on the washer will be minimal. Not enough pressure would encourage slipping, especially when conveying a highly dense material such as fertilizer, whereas too much pressure would limit the safety assembly's ability to protect one's foot.

OPERATOR SAFETY

The Wheatheart Auger Safety Assembly was not intended as a safeguard against dismemberment of fingers or toes. Despite this, there was still no safeguard against this. It is recommended that the manufacturer consider a guard attachment to discourage an operator from handling the inlet near where the flighting could cause injury to the hand.

OPERATOR MANUAL

An operator manual was provided with the Safety Auger Assembly. It contained appropriate installation, operating and servicing instructions.

DURABILITY

No durability problems occurred during the test. The intent of the test was evaluation of functional performance. An extended durability evaluation was not conducted.

APPENDIX I

SPECIFICATIONS:

MAKE: Wheatheart Safety Auger Assembly
MODEL: Seven Inch

OVERALL DIMENSIONS:

- outside diameter	9 in	(230 mm)
- inlet flighting length	12 in	(305 mm)
- flighting diameter	6.5 in	(165 mm)

DESCRIPTION:

- guard type	-- none
- slip device type	-- friction disc clutch
- slip clutch pressure adjustment	-- coil spring and locknuts
- inlet frame type	-- four 5/8" round bar, running from auger tube clamp to bearing plate at lower end
- method of attachment to auger tube	-- bolted clamp about outside of tube.
- method of attachment to flighting	-- Loctite glue between inlet shaft and flighting core

APPENDIX II

MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

**SUMMARY CHART
WHEATHEART SAFETY AUGER ASSEMBLY**

RETAIL PRICE:	\$180.00 (6" & 7" models), \$200.00 (8" model); (Aug. 1985 f.o.b. Saskatoon, Sask.)
EASE OF OPERATION:	
-- Installation	Very Good
-- Adjustment	Very Good
RATE OF WORK:	
-- Capacity at 30°	-- improves workrate by about 15%,
SAFEGUARD PERFORMANCE	-- when properly adjusted it will safeguard one's feet when leather shoes are worn.
	-- not recommended as a safeguard against injury to fingers or bare toes.
OPERATOR SAFETY	-- no inlet safety guard was provided.
OPERATOR MANUAL	Very Good



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