

Evaluation Report

648



Hesston 1170 Mower Conditioner

A Co-operative Program Between



HESSTON 1170 MOWER CONDITIONER

MANUFACTURER:

Hay and Forage Ind.
P.O. Box 4000Hesston, Kansas
USA 67062-2904
Tel: (316) 327-6158

DISTRIBUTOR:

Hesston Industries
2-2315 30th Ave. NE
Calgary, Alberta T2E 7C7

RETAIL PRICE:

\$27,139.00 (September 1990, Portage la Prairie, MB). Options included: auger slip clutch, crop dividers, short crop forming shields and 540 rpm hydraulic pump.

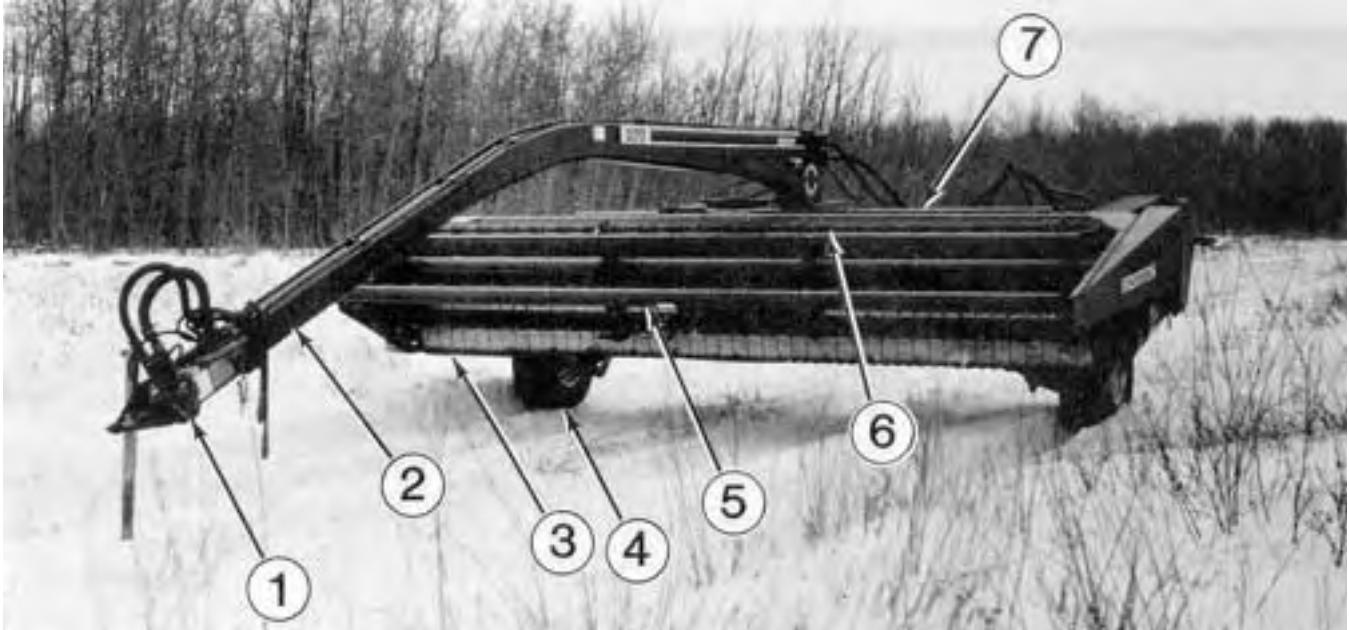


FIGURE 1. Hesston 1170 Mower Conditioner: (1) Hydraulic Pump, (2) Swing Tongue, (3) Cutterbar, (4) Push Bar, (5) Bat Reel, (6) Floatation Tires, (7) Main Frame.

SUMMARY

Rate of Work: The average continuous ground speed for the Hesston 1170 mower conditioner was 6.1 mph (9.7 km/h). Average continuous work rate was 11.8 ac/h (4.7 ha/h).

Quality of Work: The performance of the Hesston 1170 mower conditioner in all crops tested was very good. The twin knife cutterbar was excellent cutting alfalfa, native grasses, brome, timothy and clover. Performance of the conditioning rolls was very good in all crops tested and windrow formation was very good. Floatation was very good and was easily set to meet field conditions. Leaf loss was minimal.

Ease of Operation: Ease of hitching was good if the mower conditioner was used with different tractors. If used with the same tractor all of the time, hitching was very good. Ease of operating hydraulic controls, and lubricating were all very good. The Hesston 1170 was easy to operate and took little operator practice. Daily service took about 15 minutes. Ease of transporting was good.

Ease of Adjustment: Most adjustments to the Hesston 1170 were easy to carry out. Ease of adjusting the cutting angle of the cutterbar and guards was fair and time consuming. Adjustments for tine bar timing and reel position and speed were very good. Adjustments for the lean bar were fair. The windrow forming shields adjustment was good. Adjustments for roll clearance, floatation, skid shoe height were all very good.

The auger speed and position were not adjustable. The stripper bar angle adjustment was poor. It was difficult to adjust accurately. Conditioner adjustments for gap, timing and pressure were all very good.

Power Requirements: The manufacturer recommended a tractor capable of at least 75 hp (56 kW) with dual remote hydraulic outlets and a PTO shaft capable of 540 or 1000 rpm.

Operator Safety: The Hesston 1170 was safe to operate if normal safety precautions were followed. The Hesston 1170 complied with all applicable ASAE Standards for safety.

Operator's Manual: The operator's manual was very good. It

contained useful and accurate information.

Mechanical History: Only a few mechanical problems occurred during the 122 hour test time.

RECOMMENDATIONS:

It is recommended that the manufacturer consider:

1. A modification to the hydraulic pump that would lock it in its transport position when transporting by truck.
2. An addition to the operator's manual that would instruct the operator to place the header in the proper position before attempting to adjust the knife guard angle.
3. A method that would allow a more accurate adjustment of the stripper angles.
4. A modification to allow the manual rotation of the augers and conditioning rolls that would be an aid in unplugging.

Station Manager: B. Allen

Project Manager: R.K. Harris

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. A modified design will be investigated for future production.
2. Instructions in the Operator's Manual for changing the guard angle will be clarified.
3. Due to their location, auger strippers are difficult to adjust to the proper auger clearance. We will be looking at ways to improve this.
4. A shaft flat is provided on the machine to allow rotation with a wrench. Instructions will be added to the Operator's Manual.

GENERAL DESCRIPTION

The Hesston 1170 mower conditioner is designed to cut, condition, and windrow hay and forage crops. It is a pull type

machine with a centre mounted tongue that allows operation on both sides of the towing tractor. The unit is capable of cutting swaths up to 16 ft (4.8 m) wide in a single pass.

The Hesston 1170 is hydraulically powered and derives its 1000 rpm (540 rpm optional) rotary power from the power take-off shaft of the towing tractor. Fluid power is transmitted through a power shaft mounted hydraulic pump to a hydraulic motor mounted on the header frame. Power is then transmitted mechanically to the four component drives on the header; the reel, augers, knives, and conditioning rolls. The Hesston 1170 has two opposing knives that overlap at the centre of the header. The knives utilize top serrated sickles that are mounted to the knife bars with nuts and bolts.

The reel is supplied with 5 bat bars and tine tubes. The reel is adjustable for fore and aft movement as well as for height and rotational speed. The tine bars are controlled by a cam track located on the right hand side of the header.

The Hesston 1170 has dual counter rotating feed augers, which feed the cut crop into the dual conditioning rolls. The conditioning rolls mesh together in a spiral design and are arranged within the header one on top of the other. The upper roll is constructed of rubber while the lower is constructed of steel.

Sheet metal panels at the rear of the header are adjustable for forming windrows of desired width and height.

The mower conditioner is supported by pneumatic rubber floatation tires and the header floatation weight is controlled by 12 large tension springs arranged 6 per side.

The height of the machine is hydraulically adjustable to permit ease of conversion from field to transport position. It utilizes mechanical transport locks.

Detailed Specifications are given in APPENDIX I, while FIGURE 1 shows the location of major components.

The Hesston 1170 Mower Conditioner was tested under a different brand name. These mower conditioners were identical machines and the test results would be expected to be the same

SCOPE OF TEST

The machine evaluated by PAMI was configured as described in the General Description, FIGURE 1 and the Specifications section of this report. The manufacturer may have built different configurations of this machine before or after PAMI tests. Therefore, when using this report, check that the machine under consideration is the same as the one reported here. If differences exist, assistance can be obtained from PAMI or the manufacturer to determine changes in performance.

The Hesston 1170 mower conditioner was operated in the crops shown in TABLE 1 for 122 hours, cutting and conditioning about 820 ac (332 ha). It was evaluated for rate of work, quality of work, ease of operation and adjustment, power requirements, operator safety and suitability of the operator's manual. In addition, mechanical problems were monitored throughout the test.

TABLE 1. Operating Conditions

Crop	Hours	Equivalent Field Area	
		ac	ha
Alfalfa	59	400	162
Brome	6	40	16
Native Grasses	30	200	81
Timothy	9	60	24
Clover	18	120	49
Total	122	820	332

RESULTS AND DISCUSSION

RATE OF WORK

The rate of work was dependent upon field roughness, soil moisture, crop density, machine width and operator experience. The average continuous ground speed was 6.1 mph (9.7 km/h) and the average continuous work rate was 11.8 ac/h (4.7 ha/h). The Hesston was capable of cutting and conditioning at speeds up to 8 mph (12.8 km/h).

Average daily work rates are lower than continuous work rates because continuous rates do not account for time due to turning, and other field irregularities.

QUALITY OF WORK

Windrow Formation: The Hesston 1170 produced very good

windrows in all crops tested. When the windrow forming shields were adjusted to their narrowest settings, the forming shields produced a clean edged compact windrow that easily served as a guide for the tractor wheel for the succeeding row. When the shields were spread further apart, wider flatter windrows resulted. When operating in cross wind conditions, sometimes a clump of crop would be dropped outside the windrow on the leeward side.

Windrows up to 9.0 ft (2.7 m) wide or as narrow as 3.3 ft (1.0 m) could be achieved. The Hesston 1170 provided adjustment to form any width windrows within these parameters.

The centre delivery discharge allowed a continuous windrow to be formed around corners. It was easy to adjust the windrow width to accommodate the pickups of all balers subsequently used.

Cutterbar Performance: Cutting ability of the two opposing knife bars was excellent in all crops tested. The Hesston 1170 was very effective when cutting native grasses (June grass, etc) due to the high cyclic rate of the knives. Damp and fine stemmed crops did not adversely affect the cutting ability. In damp field conditions, especially new alfalfa fields, dirt would build up on the skid shoes and eventually plug the cutter bar. The Hesston 1170 utilized nuts and bolts to attach the over serrated sickle sections to the knife bars. Changing individual sickles was easy and convenient.

The Hesston 1170 produced ideal stubble in most crops. In areas that were trampled or lodged, stubble was ragged. Stubble height was controlled by the adjustable skid shoes beneath the header.

Floatation: Twelve large tension springs provided very good floatation on the Hesston 1170. Three adjustable skid shoes were located on the header underside. The skid shoes provided cutter bar height adjustments of up to 5 in (127 mm). For crops that require floatation above 5 in (127 mm), cylinder stops were provided to prevent the header from cutting at less than 5 in (127 mm).

Conditioner Performance: Conditioner performance was very good. The Hesston 1170 was equipped with two counter rotating conditioning rolls. The two 9.1 ft (2.8 m) rolls meshed together in a spiral design. The rolls were arranged in the header, one above the other. The upper roll was 8.0 in (203 mm) diameter rubber while the lower roll was 7.8 in (197 mm) diameter steel. As the crop passed through the conditioning rolls, the stems were crushed or broken, allowing increased moisture evaporation.

The difference in drying or curing time between a conditioned crop and an unconditioned crop is shown in FIGURE 2. The tests were carried out in the same crop on the same days in parallel windrows. Other conditions that affect curing time are stubble height, ambient temperature and wind velocity. Generally the advantage of a conditioned crop is one-half to one day advance baling.

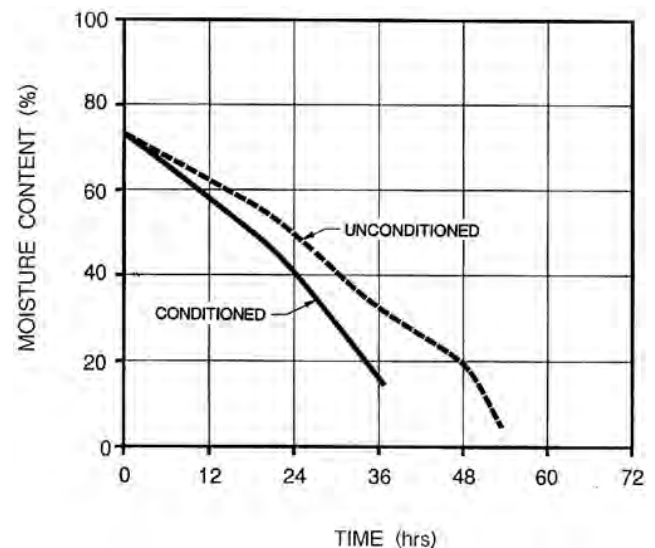


FIGURE 2. The Effect of Conditioning in Alfalfa at 1.2 ton/ac (2.6 t/ha) for the Hesston 1170.

Leaf Loss: Leaf loss was minimal and was considered very good on the Hesston 1170. Some leaf loss was observed in crops of alfalfa that were quite heavy and would not allow sunlight to penetrate to the bottom of the plant. After the mower passed, yellowed leaves could be found on the ground.

EASE OF OPERATION

Hitching: Ease of hitching was considered good. The Hesston 1170 was equipped with a drawbar extension that had to be bolted to the tractor drawbar before the mower conditioner could be attached. Once the hitch extension was attached, the mower conditioner hitch was lowered onto the hitch extension pin (FIGURE 3).



FIGURE 3. Drawbar Extension.

A suitable sized cotter pin through the drawbar extension pin locked the mower conditioner in position. The hitch jack was raised, removed from the hitch and stored on the rear of the main frame. The PTO driven hydraulic pump was placed on the power shaft of the tractor and its anti-torque lever was adjusted to bear against the drawbar and was chained in position.

Hook-up was completed with the attachment of three hydraulic hoses to the remote hydraulic couplers of the tractor and proper attachment of the safety chain. Hitching was easy, and took one person about ten minutes.

Hydraulic Controls: Ease of operating the hydraulic controls was very good. The Hesston 1170 was equipped with two separate hydraulic control circuits.

Mower height was controlled by single acting cylinders attached to each of the ground wheels. These cylinders also lifted the 1170 high enough to allow placement or removal of the safety locks.

Movement of the header was easy and required only the fore and aft movement of the appropriate hydraulic lever.

The second hydraulic circuit was used to power the double acting cylinder, which swung the tongue from side to side. Swinging the header from one side of the tractor to the other was easy, and required only the fore and aft movement of the appropriate lever.

Transporting: Ease of transporting was good. The Hesston 1170 was prepared for transport by centralizing the centre pivot tongue and installing a roading pin. The roading pin locked the tongue in position perpendicular to the header for transport. The mower conditioner was raised to its full maximum height and the locks were placed on the wheel cylinder rams and pinned in place. The cylinder locks ensured the header could not be lowered to the ground while in transport.

The 17.8 ft (5.4 m) overall width was not convenient when meeting oncoming traffic or traversing bridges. Caution had to be exercised on narrow roadways. When towing with a truck, the hydraulic pump must be securely tied or chained in its transport position on the tongue. It is recommended that the manufacturer consider a modification to the hydraulic pump that would lock it in its transport position when transporting by truck. The Hesston 1170 towed well at 30 mph (50 km/h) and had sufficient ground clearance over high crowned roads. The floatation tires provided very good support over damp ground and met the requirements of the Tire and Rim Association for the weight of the machine.

Lubrication: Ease of lubrication was very good. The tongue of the Hesston 1170 also served as the hydraulic fluid reservoir. Checking the level of hydraulic fluid was easy and consisted of parking the mower conditioner in a level area, removing the dipstick and reading the level.

Many sealed bearings are used throughout the machine and therefore do not require additional lubrication. There are however, fifteen - 50 hour lubrication points and two - 20 hour lubrication points. In addition, there are chain cases and gearboxes, which require lubrication and level checks every 250 hours. The operator's manual illustrates where and when lubrication is required.

Normal daily lubrication took one person about 15 minutes to complete. All grease pressure nipples were easy to get at with the exception of those within universal joints.

Field Operation: Field operation was very good. The Hesston

1170 was placed in field position by raising the mower to its maximum height and removing and storing the transport locks. The tongue roading pin was also removed and stored. The tongue was moved to the field position, the header was lowered to the ground, the PTO engaged and the mower conditioner advanced into the crop to initiate cutting, conditioning and windrowing.

Once cutting began, a visual inspection of the results determined what adjustments had to be made. Usually adjustments to the header floatation had to be made to be compatible with ground conditions.

Due to the design and location of the hitch tongue, cutting on both sides of the tractor was possible. Moving the mower conditioner from one side of the tractor to the other was simple. Steering around corners and obstacles required a little operator practice.

EASE OF ADJUSTMENTS

Lean Bar: Ease of adjusting the lean bar was fair. The lean bar adjustment allowed the placement of the bar at a high or a low position. The bar was adjusted by removing the retaining bolts and repositioning the bar at the desired height and reinstalling the bolts. The adjustment range allowed 4 in (100 mm) of lean bar adjustment. The adjustment was difficult for one person and took 2 people about 10 minutes.

Cutterbar: Adjustment of the cutterbar was fair. The operator's manual does not instruct the operator to either raise or lower the header before affecting adjustments. It is recommended that the manufacturer consider an addition to the operator's manual that would instruct the operator to place the header in the proper position before attempting to adjust the knife guard angle. Adjustments to the knife guard angle were provided on each side of the header and consisted of removing the anchor bolts and loosening the pivot bolts in each upper lift arm. The adjustments allowed operation of the cutterbar at 4°, 7° and 10° from horizontal. The angles were selected by placing the anchor bolts in the appropriate holes in the lift arms and retightening the bolts.

Reel: Ease of adjusting the reel speed was very good. Reel speed was adjustable for 4 speeds, ranging from 64 to 74 rpm. The speed was adjusted by the removal or the addition of shims between the two halves of the drive sheaves.

Reel speed adjustment took one person about 10 minutes. The position of the reel was also adjustable for height and back and forward position. The reel adjustment for height was very good and allowed 2 in (50 mm) of movement. The adjustment was easily accomplished and consisted of turning four full thread cap screws equally until the desired height was achieved. The adjustment for height took one person about 10 minutes.

Fore and aft positioning of the reel was very good. Adjusting the fore and aft reel position consisted of loosening the three bolts on each side of the header and sliding the reel to the desired position and retightening the bolts. Fore and aft reel position adjustments took one person about 15 minutes.

The reel tines release timing adjustment was very good and easily accomplished. Tine timing was carried out by loosening the three bolts that attach the cam track to the desired position. Retightening the bolts completed the adjustment. The adjustment took one person about 5 minutes.

Augers: The dual feed augers were not adjustable for speed or position. The Hesston 1170 was equipped with auger stripper angles to prevent crop from wrapping. The adjustment of the stripper angles was poor and was difficult for one person to accomplish with any degree of accuracy. The strippers were located at the rear of the augers in a position where they were difficult to see. It is recommended that the manufacturer consider a method that would allow a more accurate adjustment of the stripper angles. Several times during the test period, the augers plugged with cut crop. Freeing the plugged augers was difficult and time consuming. It is recommended that the manufacturer consider a modification to allow the manual rotation of the augers and conditioning rolls that would be an aid in unplugging.

The adjustment for tensioning the auger drive chains was very good, and consisted of loosening the idler sprocket, repositioning at desired chain tension and retightening. Auger chain tension took one person about 5 minutes.

The Hesston 1170 tested by PAMI was equipped with an optional auger slip clutch. The slip clutch was effective in preventing

mechanical damage to the augers and the auger drives when a plug occurred.

Conditioner Rolls: Ease of adjusting the conditioner roll pressure was very good. Adjustment of the conditioner rolls for roll pressure and gap was factory set to accommodate most crops. Roll pressure was increased by increasing the length of springs. Roll pressure was increased by increasing the length of springs. Adjusting nuts to both springs had to be equal to maintain even pressure throughout the length of the rolls. The roll gap spacing was easily adjusted by loosening the locknut on both sides of the hay conditioner and rotating the adjustment nut clockwise to increase the spacing and counter clockwise to decrease the spacing. The Hesston 1170 was equipped with roll spacing indicators, which allowed an accurate measurement of the roll spacing. Conditioner roll spacing adjustments took one person about 5 minutes. Roll timing adjustments were very good and very accurate adjustments were possible if instructions in the operator's manual were followed. Roll timing adjustments took one person about 15 minutes.

Floatation: Ease of adjusting header floatation was very good. Twelve large tension springs provided header floatation on the Hesston 1170. Header floatation adjustments were required to prevent the cutterbar from plugging in soft and damp field conditions and to provide an ideal cut.

Header floatation adjustments were carried out by removing the lock plates which surrounds the head of the floatation adjustment bolts and rotating the bolts until the desired floatation was achieved. Both sides were adjusted until an equal amount of upward pressure would lift each end of the header clear of the ground. Floatation adjustment took one person about 15 minutes.

Swath Gate: Ease of adjusting the windrow width and height was good. The adjustable windrow forming panels offered windrow width adjustments that ranged from a narrow 3.3 ft (1.0 m) width to a wide swath of up to 9.0 ft (2.7 m). Each side of the windrow forming shields were individually adjustable. The forming shields were moved close together to form a high narrow windrow and spread apart to form a wide flatter windrow. Adjustments were easy and took one person minimal time. The test machine was supplied to PAMI with optional forming shields for short or light crops. These shields were not tested due to heavier crop conditions.

Knives: Ease of maintaining the knives was very good. The individual sickle sections were attached to the knife bars with nuts and bolts. When a section required replacement, the guard was loosened, sickle nuts removed and the damaged sickle removed and replaced. Sickle replacement took one person minimal time.

POWER REQUIREMENTS

Average and peak power requirements for the Hesston 1170 were 26.9 hp (20.1 kW) and 30.1 hp (22.5 kW) respectively. Average drawbar pull at 5 mph (8 km/h) was 623 lb (2771 N) for a crop yielding 1.9 ton/ac (4.3 t/ha). PAMI used a variety of tractors throughout the evaluation, which ranged from 75 hp (56 kW) to 140 hp (105 kW). Tractors also required at least two remote hydraulic outlets capable of supplying 1750 psi (12.1 MPa) and a PTO shaft capable of 1000 rpm (540 rpm optional).

OPERATOR SAFETY

Safety on the Hesston 1170 was very good if normal safety precautions were followed. The test machine was supplied with a lighting kit, which provided warning and running lights while the machine was in transport mode.

The 1170 complied with all ASAE Standards for safety. All pulleys, sprockets, universal joints and shafts were adequately guarded and labelled.

The Hesston 1170 was not equipped with a slow moving vehicle sign, although a bracket was provided to mount a slow moving vehicle sign. A hitch safety chain was provided as standard equipment.

OPERATOR'S MANUAL

The operator's manual was very good and contained useful information on specifications, serial numbers, checklists, safety, general information, lubrication, operation, maintenance and adjustments, optional equipment, storage and trouble shooting.

The manual was well written and illustrated, while all information contained was factual and accurate.

The manual did not include a statement, which would instruct

the operator as to what position the header should be before cutterbar angle adjustments were attempted.

MECHANICAL HISTORY

The mechanical history of the Hesston 1170 mower conditioner is outlined in TABLE 2. The intent of this evaluation was the functional performance of the machine and an extended durability evaluation was not conducted.

TABLE 2. Mechanical History

Item	Hours	Equivalent Area	
		ac	(ha)
Right lift cylinder was defective and replaced at:	4	20	(8.1)
Link pin failed within the right sway bar assembly. The sway bar was replaced as an assembly at:	106	720	(292)
Output shaft seal on hydraulic motor leaked a small quantity of oil:		Throughout the test	

DISCUSSION OF MECHANICAL HISTORY

Lift Cylinder: At 4 hours the lift cylinder on the right side of the machine failed to lift the header clear of the ground. The problem was corrected by replacing the cylinder.

Sway Bar: At 106 hours the lower link pin in the right sway bar failed (FIGURE 4). Damage was confined to the sway bar assembly and the sickle head on the right knife bar. The sway bar was replaced as a unit. The sickle head was also replaced.



FIGURE 4. Failed Knife Drive Mechanism.

Hydraulic Motor: The oil seal on the output shaft leaked a small quantity of oil throughout the duration of the test. No attempt to repair was made (FIGURE 5).



FIGURE 5. Leaking Oil Seal

**APPENDIX I
SPECIFICATIONS**

MAKE:	Hesston	
MODEL:	1170 Mower Conditioner	
SERIAL NUMBER:	700901688	
OVERALL DIMENSIONS:	<u>Transport Position</u>	<u>Field Position</u>
-- length	25.3 ft (7.7 m)	19.5 ft (5.9 m)
-- width	17.8 ft (5.4 m)	24.0 ft (7.3 m)
-- height	6.3 ft (1.9 m)	5.4 ft (1.6 m)
DRIVES:		
-- main drive	Hydraulic	
-- secondary drives	Mechanical	
HEADER:		
-- effective width of cut	16 ft (4.8 m)	
-- ranged cutting height	1.0 to 5.0 in (25 to 127 mm)	
-- guard angle	4°, 7°, 10°	
-- guard type	Twin forged steel	
-- guard spacing	3.0 in (76 mm)	
-- knife speed	1800 strokes per minute	
-- knife section	Over serrated	
-- length of knife bars	8.0 ft (2.4 m)	
REEL:		
-- number of bats	5	
-- diameter	3.5 ft (1.06 m)	
-- number of tines per bat	24	
-- bat teeth spacing	4.0 in (100 mm)	
-- reel speed range	64 to 74 rpm	
AUGERS:	Dual opposed rotation	
-- speed		
-upper	310 rpm	
-lower	515 rpm	
-- length	15.7 ft (4.7 m)	
-- outside diameter		
-upper	9.0 in (230 mm)	
-lower	9.0 in (230 mm)	
-- inside diameter		
-upper	6.0 in (152 mm)	
-lower	6.0 in (152 mm)	
-- fighting pitch	10.5 in (268 mm)	
CONDITIONING ROLLS:		
-- number of rolls	2	
-- length	9.1 ft (2.7 m)	
-- roll construction		
-upper	Rubber	
-lower	Steel	
-- roll diameter		
-upper	8.0 in (203 mm)	
-lower	7.8 in (197 mm)	
-- roll speed		
-upper	900 rpm	
-lower	930 rpm	
-- roll pressure control	Roller chain and springs	
WEIGHT:		
-- left wheel	2759 lb (1252 kg)	
-- right wheel	2733 lb (1240 kg)	
-- hitch	1078 lb (488 kg)	
TOTAL:	6570 lb (2980 kg)	
TIRES:	2, 12L x 15, 6-ply	
DRIVES:		
-- number of chain drives	2	
-- number of belt drives	1	
HYDRAULIC CONTROLS:		
-- header lift	Two single acting cylinders (one per wheel)	
-- pivot hitch	One double acting cylinder	

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

SUMMARY CHART

HESSTON 1170 MOWER CONDITIONER

RETAIL PRICE:	\$27,139.00 (September 1990 f.o.b. Portage la Prairie MB)
RATE OF WORK:	
Average continuous speed was	6.1 mph (9.7 km/h)
Average continuous work rate was	11.8 ac/h (4.7 ha/h)
QUALITY OF WORK:	
Windrow Formation	Very Good; fully adjustable
Cutterbar Performance	Excellent; cut all crops cleanly
Floation	Very Good; after initial adjustment
Conditioner Performance	Very Good; effective on all crops
Leaf Loss	Very Good; minimal
EASE OF OPERATION:	
Hitching	Good; after drawbar extension installation, hitching took about 10 minutes
Hydraulic Controls	Very Good; adequate for operation
Transporting	Good; width required extreme caution
Lubrication	Very Good; easy to lubricate
Field Operation	Very Good; easy to operate
EASE OF ADJUSTMENTS:	
Lean Bar	Fair; difficult for one person
Cutterbar	Fair; two adjustments
Reel	Very Good; simple adjustments
Auger Strippers	Poor; difficult to adjust accurately
Conditioner Roll Pressure	Very Good; easy to adjust
Conditioner Roll Timing	Very Good; accurate adjustment
Floation	Very Good; one adjuster per side
Swath Gate	Good; numerous adjustments
Knives	Very Good; utilized nuts and bolts to hold sickles to knife bar
POWER REQUIREMENTS:	
Tractor Size	75 hp (56 kW) was sufficient
OPERATOR SAFETY:	Very Good; conformed with ASAE Standards
OPERATOR MANUAL:	Very Good; contained useful information
MECHANICAL HISTORY:	Only a few mechanical problems were noted



3000 College Drive South
Lethbridge, Alberta, Canada T1K 1L6
Telephone: (403) 329-1212
FAX: (403) 329-5562
<http://www.agric.gov.ab.ca/navigation/engineering/afmrc/index.html>

Prairie Agricultural Machinery Institute

Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0
Telephone: (306) 682-2555

Test Stations:
P.O. Box 1060
Portage la Prairie, Manitoba, Canada R1N 3C5
Telephone: (204) 239-5445
Fax: (204) 239-7124

P.O. Box 1150
Humboldt, Saskatchewan, Canada S0K 2A0
Telephone: (306) 682-5033
Fax: (306) 682-5080