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EVALUATION REPORT 331

GEHL 1250 FORAGE HARVESTER

A Co-operative Program Between
ALBERTA FARM MACHINERY RESEARCH CENTRE
PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

GEHL 1250 FORAGE HARVESTER

MANUFACTURER:
Gehl Farm Equipment
Westbend, Wisconsin
53095 U.S.A.

DISTRIBUTOR:
Allied Farm Equipment, Canada Ltd.
P.O. Box 910250 James St.
St. Mary's, Ontario
N0M 2V0

RETAIL PRICE:
$35,283 (January, 1984, f.o.b. Westbend, Wisconsin, with windrow pick-up, three-row row crop header, spout extensions and recutter screen.)

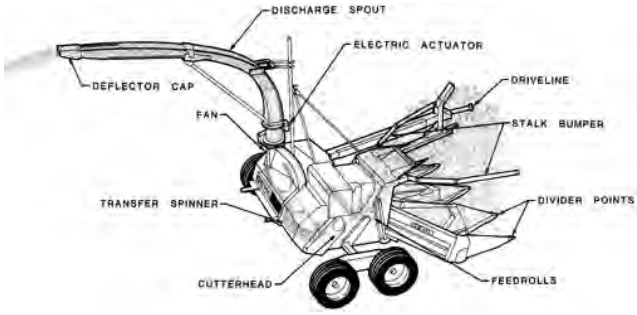

FIGURE 1. GEHL 1250.

SUMMARY AND CONCLUSIONS

Overall Performance: The overall performance of the Gehl 1250 was very good.[1]

Capacity: Workrates[2] ranged up to 111 ton/h (101 t/h) in standing corn, up to 56 ton/h (51 t/h) in alfalfa and up to 53 ton/h (48 t/h) in oats. Dry-weight workrates ranged up to 47 ton/h (40 t/h) in corn, up to 30 ton/h (28 t/h) in alfalfa and up to 24 ton/h (22 t/h) in oats. The three-row row crop header fully utilized cutterhead capacity. The pickup header had two speed adjustments and performed well at speeds up to 5.5 mph (9 km/h). The use of a 4 x 4 in (100 x 100 mm) recutter screen reduced workrates by up to 50% in alfalfa and 40% in corn.

At a 0.22 in (5 mm) cut length setting, 6% of alfalfa particles were longer than 1 in (25 mm) and none of the corn particles were longer than 1 in (25 mm).

Power Requirements: A tractor of 250 hp (190 kW maximum power take-off rating would have sufficient power to operate the Gehl 1250 in typical prairie crops.

Operation and Maintenance: The harvester was easy to maintain and service. Operation of the electric remote controls was convenient,

Operate Safety: The Gehl 1250 was safe to operate if the manufacturer's safety recommendations were followed.

Operator Manual: The operator manual was concise and clearly written.

Durability: A few minor mechanical problems occurred during the 245 hour test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Increasing the durability of the rebevel grinding stone,
2. Increasing the durability of the horizontal discharge spout extension.
3. Including information on the operation of the optional water tank in the operator manual.
4. Modifying the right row crop header mounting bracket, to increase its durability.

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

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. The manufacturer of our grinding stones has been changed. Our tests show a substantial improvement in the durability of the new stones.
2. The plates connecting the extension to the spout have been lengthened, greatly reducing the stress imposed on the extension.
3. The significance of adding relatively small amounts of water to a hay crop whose moisture content was below that, which would cause gumming was not appreciated at the time the operator manual was written. This information will be included in future publications.
4. The failure of the unit tested occurred in the area of a bolted on adapter necessary for accommodating the row crop header to a variety of harvester base units. Since this requirement is no longer necessary, the adapter will be eliminated on future headers.

GENERAL DESCRIPTION

The Gehl 1250 is a power take-off driven, pull-type forage harvester. The cylindrical cutterhead is fed by a reversible feedroll assembly. The cut length may be set either by changing feedroll drive gears or varying the number of cutterhead knives. Chopped forage is delivered from the cutterhead to the discharge fan, by a transfer spinner assembly.

The test machine was equipped with a 7 ft (2.1 m) windrow pick-up and a three-row row crop header.

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

SCOPE OF TEST[3]

The Gehl 1250 was operated in the crops shown in TABLE 1 for 245 hours while harvesting 895 ac (358 ha).

It was evaluated for rate of work, quality of work, power requirements, ease of operation and adjustment, operator safety, and suitability of the operator manual.

TABLE 1. Operating Conditions

Crop	Average Yield at 60% M.C.		Hours	Field Area	
	ton/ac	t/ha		ac	ha
Alfalfa	4.5	10.0	26	180	72
Clover	4.1	9.0	52	100	40
Oats	3.2	7.0	46	162	65
Grass	4.5	10.0	3	10	4
Corn	7.6 to 9.4	17.0 to 21.0	116	443	177
Total			245	895	358

RESULTS AND DISCUSSION

RATE OF WORK

TABLE 2 presents typical workrates for the Gehl 1250 in a variety of field conditions. The workrates for alfalfa were measured in crops yielding 4.5 ton/ac (10 t/ha), which had been windrowed with a 15 ft (4.6 m) wide windrower. The workrates in oats were measured in crops yielding 3.1 ton/ac (7 t/ha) and windrowed with a 15 ft (4.6 m) windrower, while the workrates in corn were measured in standing crops yielding 7.6 to 9.4 ton/ac (17 to 21 t/ha) and harvested with the three-row row crop header. The reported values are for average continuous feedrates, with the harvester loaded to optimum levels. They do not include time for maintenance and unloading wagons.

Both actual workrates and dry-weight workrates are reported in TABLE 2. The actual workrates, which include moisture in the crop, indicate the total mass of the crop harvested, but should not be used for comparing performance of different forage harvesters.

[1]See Machine Ratings APPENDIX II.
[2]The actual workrates, which include the moisture in the crop, indicate the total mass of crop harvested, but should not be used for comparing performance of different forage harvesters. The dry-weight workrates, which consider the mass of dry matter harvested, provide a better comparison of performance of different forage harvesters and assessment of the effect of crop variables and machine settings.
[3]Prairie Agricultural Machinery Institute Detailed Test Procedure for Forage Harvesters.

The dry-weight workrates, which consider the mass of dry matter harvested, provide a better comparison of performance of different forage harvesters and assessment of the effect of crop variables and machine settings. Actual workrates range up to 111.0 ton/h (101.0 t/h) whereas dry-weight workrates ranged up to 44.4 ton/h (40.4 t/h).

TABLE 2. Average Work Rates

Crop	Moisture Content	Length-of-Cut Setting		Workrates			
				Actual		Dry Weight	
	%	in	mm	ton/ac	t/ha	ton/ac	t/ha
Alfalfa	42	0.22	5	33.0	30.0	19.1	17.4
	47			39.6	36.0	20.9	19.0
	41	0.375	9	42.9	39.0	25.3	23.0
	46			56.1	51.0	30.3	27.5
	46	0.375*	9	28.6	26.0	15.5	14.1
Clover	55	0.22	5	37.6	34.2	16.9	15.4
		0.375	9	53.8	48.9	24.2	22.0
		0.375*	9	38.4	34.9	17.3	15.7
Corn	60	0.22	5	79.5	72.3	32.3	29.4
		0.375	9	111.1	101.0	44.4	40.4
		0.375*	9	69.3	63.0	27.7	25.2

*With 4 x 4 in (100 x 100 mm) recutter screen

Workrates were influenced by crop moisture content, cut length setting, use of a recutter screen and the type of header attachment used. Reducing the cut length setting from 0.375 to 0.22 in (9 to 5 mm) decreased the dry-weight workrates by 25% in alfalfa and 28% in corn. The use of a recutter screen reduced workrates by 50% in alfalfa, and 40% in corn.

The capacity of the three-row row crop header ensured that the cutterhead was operated to capacity in corn. The pickup header could be set at one of two speeds to permit ground speeds up to 5.5 mph (9 km/h).

QUALITY OF WORK

Uniformity of Cut:[4] FIGURE 2 presents typical particle length distributions in second-cut, full-bloom alfalfa, harvested at 46% moisture content (APPENDIX IV, FIGURE 8). Particle length variations are given for 0.22 and 0.375 in (5 and 9 mm) cut settings, with and without the use of a 4 x 4 in (100 x 100 mm) recutter screen. At a 0.22 in (5 mm) setting, only 6% of the silage had a length greater than 1.0 in (25 mm), while at the 0.375 in (9 mm) setting, 10% had a length greater than 1.0 in (25 mm). The 4 x 4 in (100 x 100 mm) recutter screen slightly decreased the percentage of longer particles at each cut length setting.

FIGURE 3 presents typical particle length distributions in corn, harvested at 60% moisture content, for 0.22 and 0.375 in (7 and 9 mm) settings (APPENDIX IV, FIGURE 8). None of the chopped corn had a length greater than 1 in (25 mm) at both 0.22 in and 0.375 in (5 and 9 mm) settings. The smaller percentage of longer particles in corn, compared to alfalfa, was due to perpendicular feeding of the row crop header.

Windrow Pickup Losses: Pickup losses were insignificant at speeds up to 5.5 mph (9 km/h), provided that the windrows were not severely wind scattered.

Row Crop Header Losses: Losses from the row crop header were insignificant at speeds below 7.5 mph (12.5 km/h) provided care was taken to keep the divider points centred between the rows.

POWER REQUIREMENTS

Tractor Size: The peak power take-off requirement, at maximum workrate, was about 182 hp (136 kW) in alfalfa and 225 hp (167 kW) in corn. Corresponding average power requirements were about 134 hp (100 kW) and 170 hp (126 kW) respectively.

Power requirements increased with shorter cut settings, higher moisture contents and use of a recutter screen. For example, reducing the cut setting from 0.375 to 0.20 (9 to 5 mm) while harvesting 40% moisture alfalfa yielding 4.5 ton/ac (10 t/ha), increased average power by 7 hp (5 kW). An increase of 10% moisture content in alfalfa increased the power requirements 5.4 hp (4 kW). The use of a 4 x 4 in (100 x 100 mm) recutter screen increased average power 8 hp (6 kW) in alfalfa and 12 hp (9 kW) in corn at 60% moisture content.

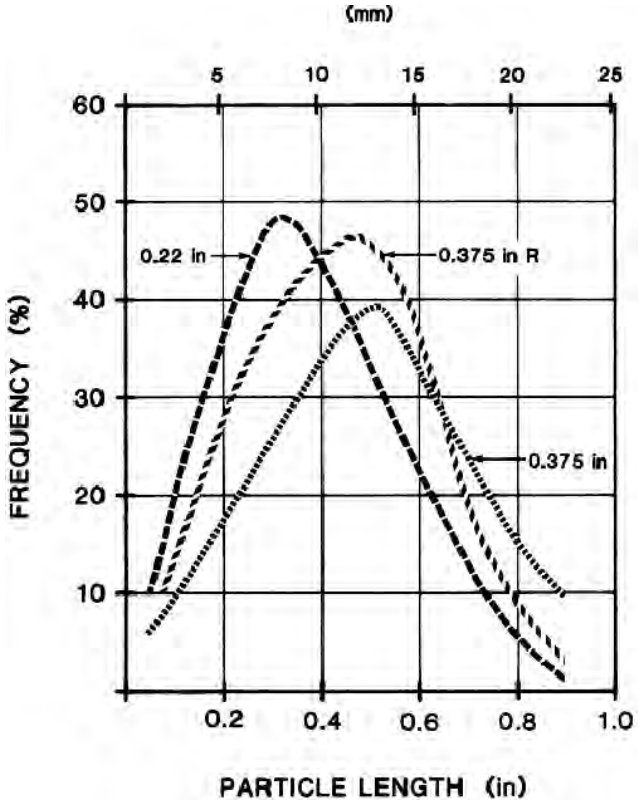

FIGURE 2. Particle Length Distribution in Alfalfa (R: with 4 x 4 in (100 x 100 mm) recutter screen).

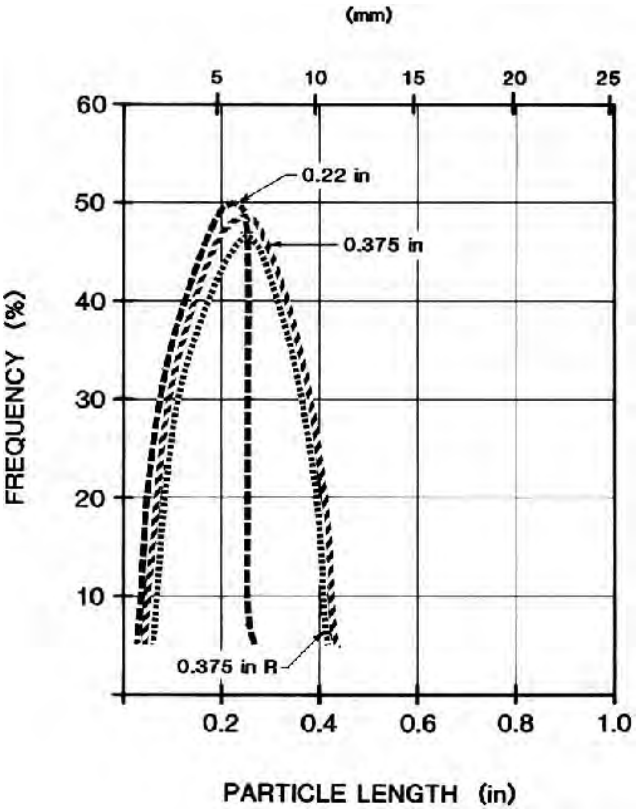

FIGURE 3. Particle Length Distribution in Corn (R: with 3 x 6.4 in (75 x 160 mm) recutter screen).

[4]*For each cut length setting, a forage harvester produces a range of particle lengths.*

Although variation in particle length has little effect on silage palatability, the performance of some silage unloading equipment may be adversely affected if a significant quality of material is longer than 1.5 in (40 mm). FIGURES 2 and 3 show material length distribution at various cut length settings, with and without recutter screens. A narrow curve with a high peak indicates uniform particle length distribution. The average material length is about that at the peak of the curve. Forage with a wide range of particle lengths has a wide curve with a low peak.

Total drawbar power requirements on firm, level fields were about 34 hp (25 kW) at 8 mph (13 km/h). This included the draft of the forage harvester and a dump wagon with a 3.3 ton (3 t) load. In soft, hilly fields, drawbar power requirements could be as great as 47 hp (35 kW).

A tractor of 250 hp (187 kW) maximum power take off rating should have sufficient power to operate the Gehl 1250 at optimum workrates, in most field conditions.

Specific Capacity:[5] FIGURE 4 shows the specific capacity of the Gehl 1250. Specific capacity is a measure of how efficiently a machine operates. A high specific capacity indicates efficient energy use, while a low specific capacity indicates less efficient operation. As shown in FIGURE 4, a 10% increase in crop moisture content increased the specific capacity by about 10% in alfalfa. Changing cut length settings from 0.35 to 0.22 in (9 to 5 mm) reduced specific capacity by about 30%. The use of a 4 x 4 in (100 x 100 mm) recutter screen reduced specific capacity by 50% at 0.375 in (9 mm) cut setting.

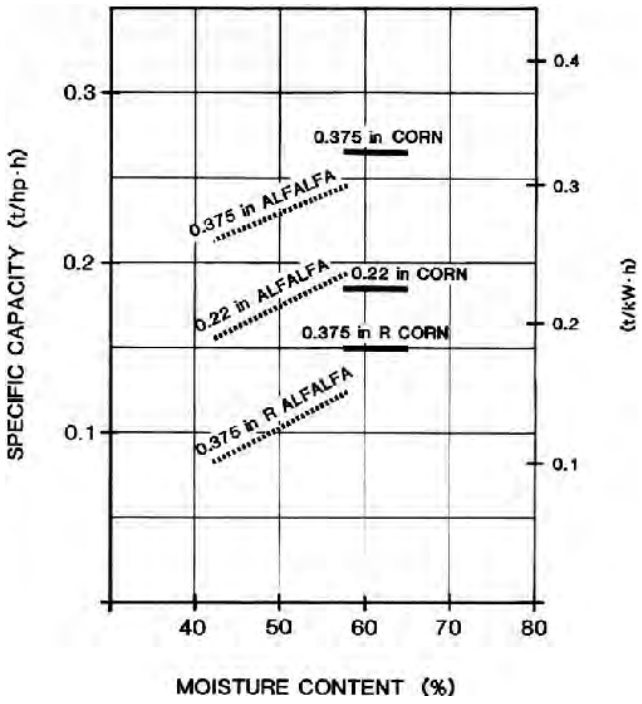

FIGURE 4. Specific Capacity (R: with 4 x 4 in (100 x 100 mm) recutter screen).

In corn, specific capacities ranged from 0.186 ton/hp-h (0.225 t/kW-h) at 0.20 in (5 mm) cut setting to 0.268 ton/hp-h (0.325 t/kW-h) at 0.375 in (9 mm) cut setting. The use of a 4 x 4 in (100 x 100 mm) recutter screen reduced specific capacity by 40% at 0.375 in (9 mm) cut length setting.

EASE OF OPERATION AND ADJUSTMENT

Hitching: The manufacturer recommended that the tractor drawbar be 15 in (380 mm) above the ground. The driveshaft height was adjustable. The Gehl 1250 was equipped with a 1000 rpm power take-off drive.

Remote Controls: The Gehl 1250 was equipped with electric remote controls for adjusting discharge spout direction, deflector cap angle, and the forward/reverse feedroll clutch. The electric control console, which mounted in the tractor cab, controlled the individual electric actuators.

The controls were effective and convenient to use.

Windrow Pickup: The pickup header had excellent feeding characteristics in most crops. Pickup losses were insignificant at speeds up to 5.5 mph (9 km/h). Two windrow pickup speeds were possible by changing harvester drive sprockets. Adjusting the speed took about 20 minutes. Adjustable gauge wheels made it possible to match pick up height to field and windrow conditions.

The pickup header was equipped with an optional water tank, designed to reduce gumming problems in the blower and discharge spout when harvesting legumes. Water was injected into the transfer spinner only when crop material was being blown through the tunnel. The system was controlled from the remote controls in the tractor cab.

Performance of the water tank was good. However, water should only be turned on when gumming begins. Several times during the test the premature injection of water increased gumming problems in the transfer spinner. It is recommended the manufacturer include comprehensive instructions for the water tank in the operator manual. It took approximately 3.5 hours to empty the tank.

Three-row Row Crop Header: The three-row row crop header (FIGURE 5) was equipped with a belt gathering system and rotary sickles, which operated at a row spacing of 38 in (960 mm). The header worked well at speeds up to 7.5 mph (12 km/h). Overall stalk gathering performance was excellent. For proper performance, maximum side drift from the row had to be less than 8 in (200 mm) which required some operator vigilance to minimize losses.

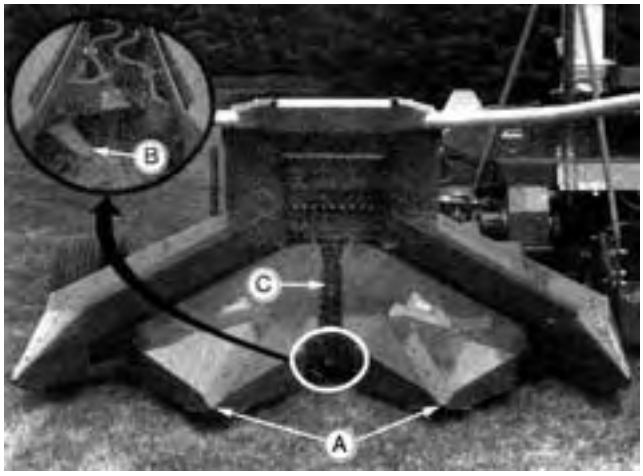

FIGURE 5. Three-row row crop header: (a) divider points, (b) rotary sickle, (c) gathering belts.

The header drive idler sprocket had to be adjusted and tightened several times during the test, especially after the feedrolls were reversed. It is recommended the manufacturer consider a more positive tightening device for the header sprocket.

The stationary knives of the row crop header were sharpened after 98 hours of testing. It took a skilled operator approximately 1.5 hours to remove and sharpen the knives.

Feedrolls: The feedrolls were very aggressive in all crops. Occasional plugging occurred in bunchy windrows. Unplugging was possible from the tractor seat by reversing the feed roll drive. It was necessary to reduce PTO speed before reversing the feed rolls to avoid breaking feedroll shear pins.

The smooth lower feed roll was equipped with an adjustable scraper. Scraper clearance was easily inspected and adjusted.

Cutterhead Plugging: Cutterhead plugging occurred infrequently and usually resulted in shearing the shear bolts. Plugging was usually caused by failure to allow all forage to pass through the harvester before disengaging the power take-off clutch. Access to the cutterhead and shear bolts was very good.

Discharge Spout: The lift and reach of the discharge spout could be adjusted by adding or removing pipe sections as shown in FIGURE 6. The extensions used for testing were 12 in (300 mm) vertical and 66 in (1650 mm) horizontal. Several other extensions were available. The dimensions in FIGURE 6 were determined at the maximum ground clearance setting of the adjustable axle, which could be positioned to give discharge heights 2 in (50 mm) and 4 in (100 mm) lower than those shown.

The forage discharge direction was controlled by spout rotation and deflector cap angle, which were operated by the remote controls. The range of adjustments was adequate for operation with wagons and trucks.

Recutter Screen: A 4 x 4 in (100 x 100 mm) recutter screen was used for about 40 hours of field testing. The recutter screen was effective, provided a close tolerance was maintained between the cutterhead knives and the screen. The clearance was adjusted with cam nuts and bolt, which passed through the side sheets of

[5] *Specific capacities in FIGURE 4 are based on dry-weight workrates. Direct comparison to specific capacities of haying equipment is not valid. Hay usually has a different moisture content and is not refined to the same degree as silage.*

the harvester. Access to the bolts and adjustment of the screen was very good. The screen was easy to install and took one experienced operator 25 minutes. Removal of the screen took 10 minutes.

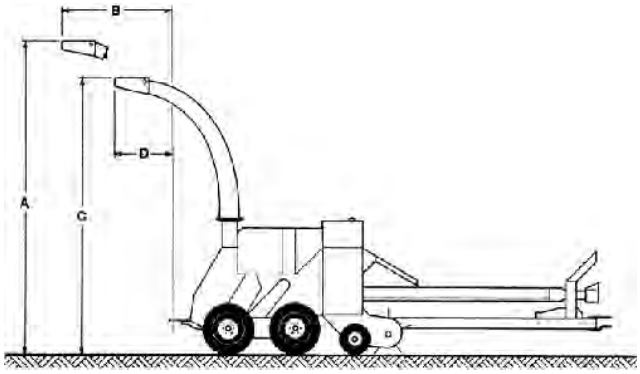

FIGURE 6. Discharge Spout Dimensions: (A) Lift with Extensions 148 in (3700 mm), (B) Reach with Extensions 103 in (2575 mm), (C) Lift 123 in (3075 mm), (D) Reach 38 in (950 mm).

Knife Grinding: The Gehl 1250 was equipped with a hydraulically driven cylindrical rebevel grinding stone, which grinds each knife individually. The power take-off was disconnected to allow free rotation of the cutterhead during grinding.

Guide rolls on the grinding mechanism insured proper alignment of the knife and grinding stone. Care had to be taken to ensure that residual crop material was removed from the knives to avoid uneven grinding of the knives.

Shear plate clearance was easily adjusted from the right side of the machine. It took an experienced operator about 30 minutes to sharpen the knives and adjust the shear plate.

The average period between knife sharpenings was 8 hours. During the 245 hour test, the knives incurred about 0.25 in (6 mm) of wear, due mainly to sharpening.

During the test the grinding stone had to be replaced twice due to wear. Replacement of the stone took approximately 15 minutes. It is recommended the manufacturer consider a more durable grinding stone.

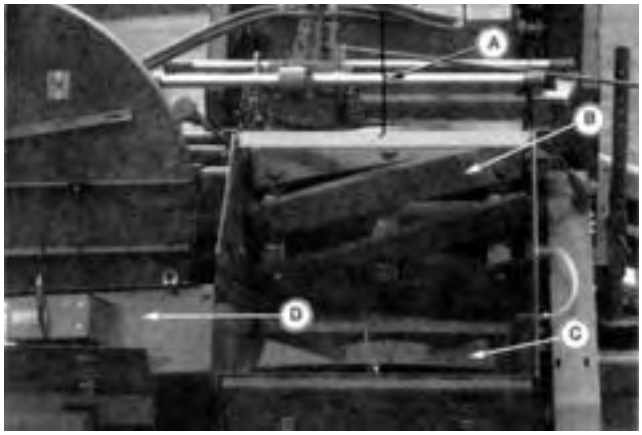

FIGURE 7. Cutterhead assembly: (A) hydraulic knife grinder, (B) knife, (C) transfer spinner, (D) transfer tunnel.

Adjusting Cut Length: The length of cut could be adjusted either by adding or removing cutterhead knives or by changing the feedroll drive gears. Changing or reversing the gears was the easier method and provided a more uniform cut. The gear set sprockets provided 0.15, 0.22, 0.30 and 0.375 in (4, 5, 7 and 9 mm) cut length settings, while an optional gear set permitted 0.60 in (15 mm) cut length settings. Changing or reversing gears took only a few minutes.

Exchanging Header Attachments: The windrow pickup header and the row crop header were both easy to mount and remove. Two pins held each header in place. Access to the pins was very good. It was necessary to break the header drive chain when removing the header.

Removing either header took one man about thirty minutes, while mounting took two men about thirty minutes.

Transporting: The drawpole could be placed in four positions. The extreme right position was used when transporting with either header. The extreme left position was used with both headers during field testing.

The Gehl 1250 was easy to maneuver and towed well in transport position. Ground clearance was adequate and there was ample hitch clearance for turning sharp corners. An adjustable hitch was provided for towing a wagon. A second hitch was provided for towing a wagon in line during road transport.

A spring-loaded drawpole locking arm could be retracted using a rope from the tractor seat. This made changing from field to transport position easy.

Lubrication: The Gehl 1250 had 45 pressure grease fittings of which 19 required lubrication at 10 hour intervals. The windrow pickup header had 3 pressure grease fittings, and the three-row row crop header had 12 pressure fittings located in a convenient remote bank. A total of four chains on the main unit and three on the pickup header required daily lubrication. Complete daily and seasonal lubrication could be completed in 25 minutes.

OPERATOR SAFETY

The Gehl 1250 was safe to operate and service, as long as common sense was used and the manufacturer's safety recommendations were followed. A comprehensive safety section was included in the operator manual.

Protective shields were opened easily for service.

The Gehl 1250 was equipped with a slow moving vehicle sign.

OPERATOR MANUAL

The operator manual was concise and clearly written, containing much useful information on operation, adjustment, servicing and safety. It is recommended the manufacturer consider supplying operator information on the optional water tank kit.

DURABILITY RESULTS

TABLE 3 outlines the mechanical history of the Gehl 1250 during 245 hours of operation while harvesting 452 ac (181 ha) of wind rowed crop and 443 ac (177 ha) of corn. The intent of the test was evaluation of functional performance. An extended durability test was not conducted.

TABLE 3. Mechanical History

Item	Operating Hours	Equivalent Field Area	
		ac	ha
-Rebevel grinding stone required replacement at	49, 192	293, 625	117, 250
	end of test		
-Horizontal discharge spout extension failed and was repaired at	146	478	191
-Spout rotation worm gear broke and was repaired at	181	698	279
-Stationary knives of row crop header required sharpening at	98	393	157
-Right row crop header mounting bracket was repaired at	108	411	164

DISCUSSION OF MECHANICAL PROBLEMS

Stationary Knives: The stationary knives of the row crop header were sharpened after 98 hours of testing. It took a skilled operator approximately 1.5 hours to remove and sharpen the knives.

Discharge Spout Extension: The discharge spout extension failed after 146 hours of testing. The extension was repaired and braced. It is recommended the manufacturer consider modifications to increase the durability of the discharge spout extension.

Row-Crop Header Mounting Bracket: The right bracket failed and was rewelded and braced after 108 hours. It is recommended the manufacturer consider modifications to increase the durability of the right row crop header mounting bracket.

APPENDIX I
SPECIFICATIONS

MAKE:	Gehl
MODEL:	CB 1250
SERIAL NO.:	82-12956
OVERALL DIMENSIONS:	
-- height (discharge spout removed)	4.9 ft (1.5 m)
-- length	15.5 ft (4.6 m)
-- width	
-without attachments	13.4 ft (4 m)
-with windrow pickup	14.6 ft (4.2 m)
-with three-row row crop header	13,8 ft (4.1 m)
--ground clearance(adjustable)	7, 9 & 11 in (180, 230 & 280 mm)
WINDROW PICKUP:	
-- model	HA 1200
-- serial number	822904
-- type	floating cylindrical drum with spring teeth
-- height adjustment	adjustable gauge wheels
-- working width	85 in (2130 mm)
-- overall width	108 in (2690 mm)
-- tooth spacing	3 in (75 mm)
-- number of tooth bars	5
-- pickup speed	100 rpm
-- auger diameter	20 in (510 mm)
-- auger length	85 in (2130 mm)
-- auger speed	115 mm
THREE-ROW ROW CROP HEADER:	
-- model	338
-- serial number	82-12956
-- distance between rows	38 in (965 mm)
-- type of cutter	rotary sickle
-- cutter speed	205 rpm
-- type of stalk gatherer	rubber belt on chain
-- gathering belt/ground synchronization speed	3.0 mph (4.9 km/h)
FEEDROLL ASSEMBLY:	
-- throat opening	24 x 28 in (550 x 140 mm)
-- roll width	23 in (580 mm)
-- front roll diameter	
-upper	11 in (280 mm)
-lower	9 in (215 mm)
-- rear roll diameter	
-upper	7 in (170 mm)
-lower	5 in (130 mm)
-- front roll speed (rpm at 0.22 in (5 mm) cut length setting)	
-upper	50 rpm
-lower	74 rpm
-- rear roll speed	
-upper	100 rpm
-lower	235 mm
CUTTERHEAD:	
-- type	cylindrical
-- number of knives	9
-- width	28 in (845 mm)
-- diameter	16 in (455 mm)
-- speed	1000 rpm
RECUTTER SCREEN:	
-- width	27 in (670 mm)
-- arc length	25 in (625 mm)
-- opening size	4 x 4 in (100 x 100 mm)
KNIFE SHARPENER:	
-- type	hydraulic rebevel grinder
-- size (diameter)	6 in (155 mm)
CONVEYING ASSEMBLY:	
-- Transfer Spinner	
-diameter	24 in (610 mm)
-speed	480 rpm
-- Fan	
-diameter	43 in (1070 mm)
-blade width	5 in (125 mm)
-discharge spout (diameter)	10 in (240 mm)
-speed	685 rpm
TIRES:	four, 9.5 x 15, 4-ply implement

WEIGHTS:	With pickup header	With row crop header
-- left wheals	2450 lb (1114 kg)	2590 lb (1176 kg)
-- right wheals	2950 lb (1342 kg)	2940 lb (1338 kg)
-- hitch	500 lb (230 kg)	630 lb (286 kg)
TOTAL	5800 lb (2686 kg)	6160 lb (2800 kg)

LUBRICATION:	
-- Main Unit	
-grease fittings	45 (19 @ 10 hrs, 18 @ 50 hrs, 6 @ 100 hrs and 2 every sharpening)
-chains	4 (4 @ 10 hrs)
-wheel bearings	4 (4 annually)
-gear boxes	3 (2 @ 200 hrs, sealed)
-- Windrow pickup	
-grease fittings	3 (3 @ 10 hrs)
-chains	3 (3 @ 10 hrs)
-- Three-row row crop header	
-grease fittings	12 (12 @ 50 hrs)
-chains	9 (1 @ 10 hrs, 6 @ 30 hrs, 2 @ 50 hrs)
OPTIONAL EQUIPMENT:	
-- auxiliary header lift spring	
-- tandem wheal axles	
-- spout extensions:	12 and 24 in (300 and 650 mm) vertical 42 and 66 in (1050 and 1650 mm) horizontal
-- driveline	1.75 in diameter (PTO)
-- hydraulic controls (spout rotating)	
-- recutter screens	7
stationary feeder attachment	

APPENDIX II
MACHINE RATINGS

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

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

APPENDIX III
CONVERSION TABLE

Acre (ac) x 0.405	= Hectare (ha)
Foot (ft) x 0.305	= Metre (m)
Inches (in) x 26.4	= Millimetres (mm)
Horsepower (hp) x 0.746	= Kilowatt (kW)
Miles/hour (mph) x 1.61	= Kilometre/Hour (km/h)
Pounds Force (lb) x 4.45	= Newton (N)
Pound Mass (lb) x 0.454	= Kilogram (kg)
Ton (ton) x 0.91	= Tonne (t)
Ton/Horsepower Hour (ton/hp-h) x 1.21	= Tonne/Kilowatt Hour (t/kW-h)
Ton/Hour (ton/h) x 0.91	= Tonne/hour (t/h)
Ton/acre (ton/acre) x 2.25	= Tonne/hectare (t/ha)

APPENDIX IV

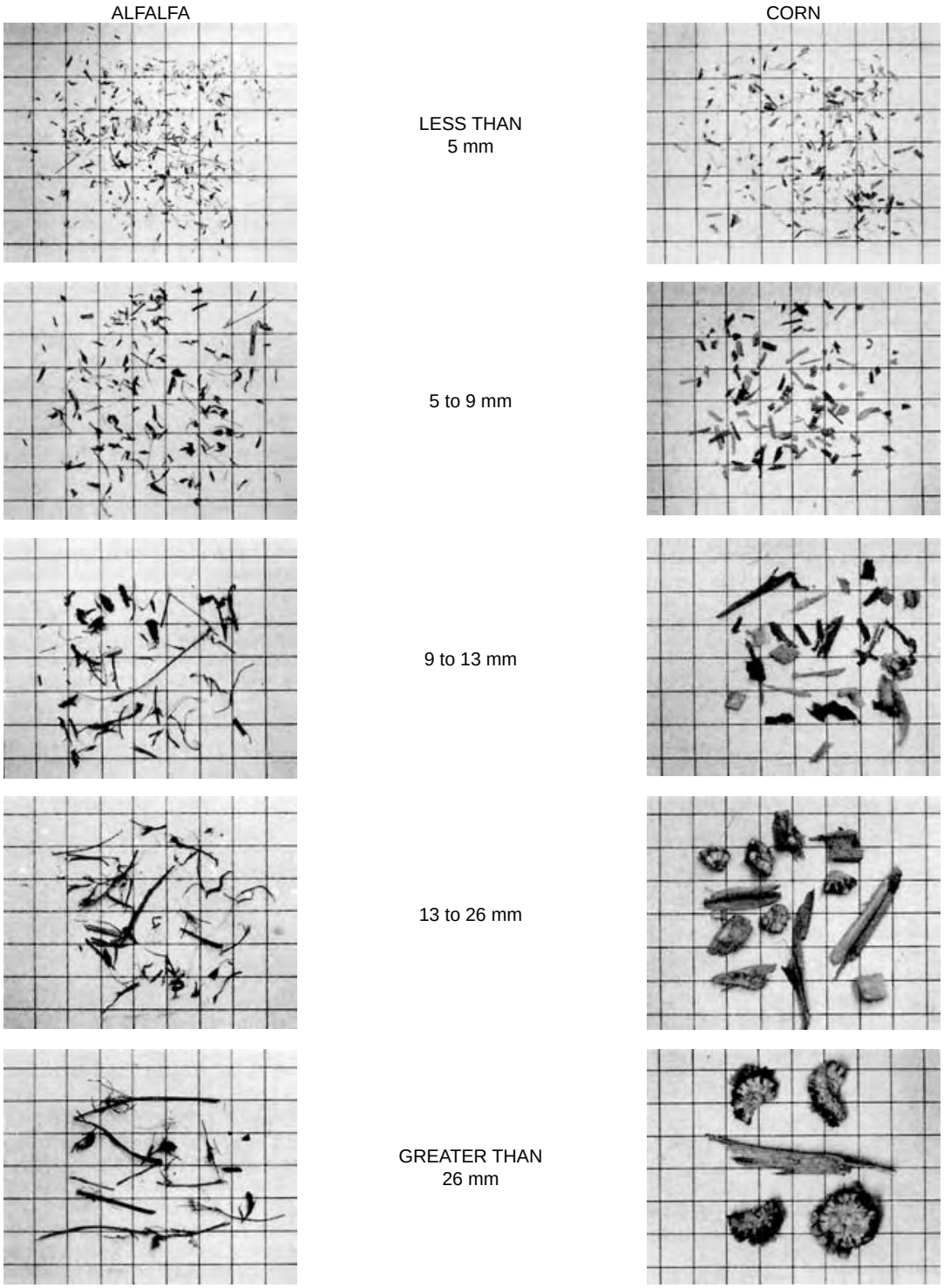

FIGURE 8. Distribution of Particle Lengths (20 mm grid).

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