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Group 4e

Evaluation Report

620



New Idea 5209 Disc Mower Conditioner

A Co-operative Program Between



NEW IDEA 5209 DISC MOWER CONDITIONER

MANUFACTURER:

White New Idea Farm Equipment Co.
123 W Sycamore St.
Coldwater, Ohio
45828
Tel: (419)678-5532

DISTRIBUTOR:

White New Idea Farm Equipment Co.
Box 677
Regina, SK
S4P 3A3
Tel: (306) 352-2613

RETAIL PRICE: \$14,170.00 (September 1989, f.o.b. Portage la Prairie, Manitoba)

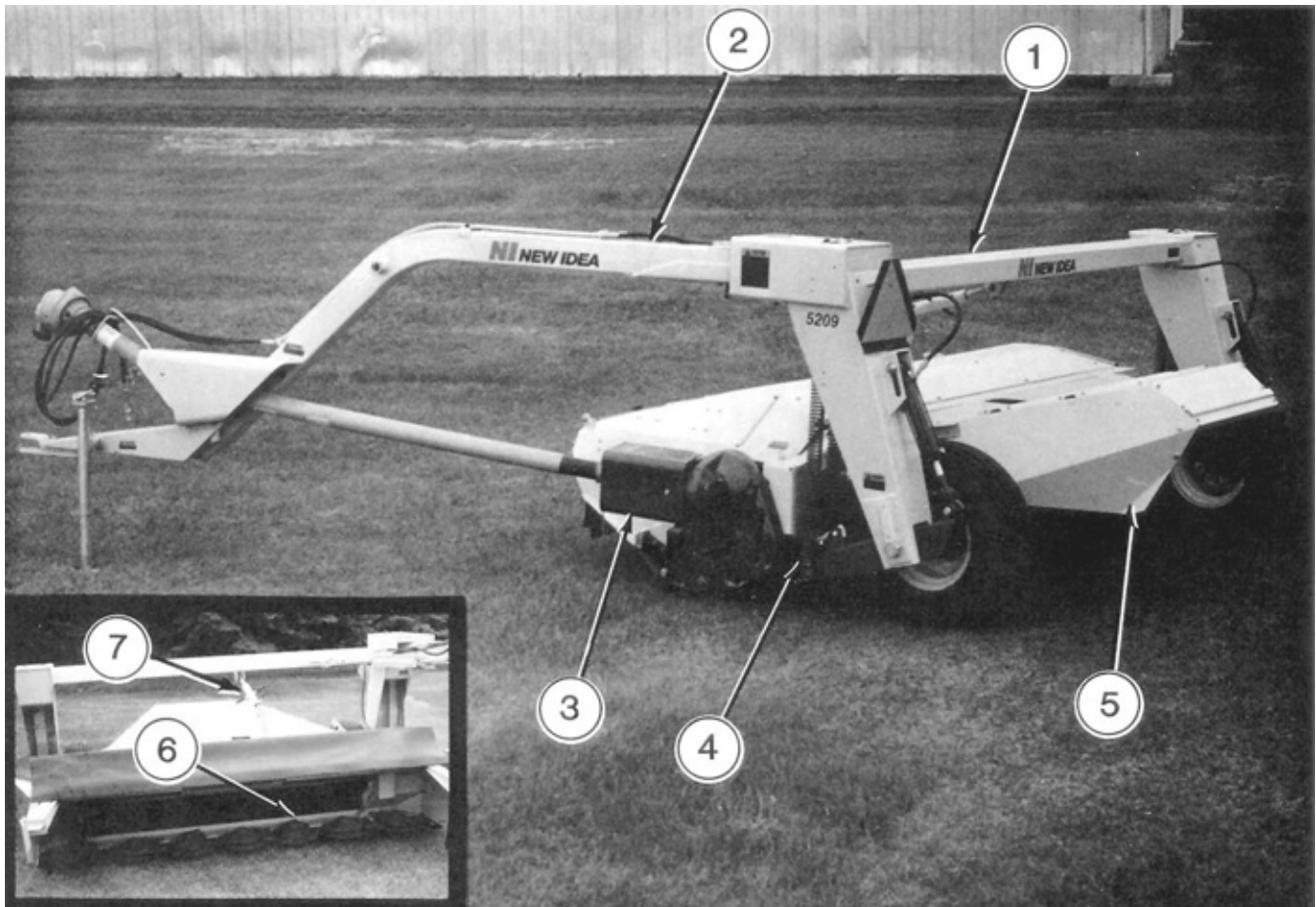


FIGURE 1. New Idea 5209 Disc Mower Conditioner: (1) Main Frame, (2) Hitch, (3) Slip Clutch & Gearbox, (4) Floatation Springs, (5) Windrow Former, (6) Cutting Discs, (7) Cutterbar Height Adjuster.

SUMMARY

Rate of Work: The average continuous ground speed for the New Idea 5209 disc mower conditioner was 4.9 mph (7.9 km/h). Average continuous work rate was 5.5 ac/h (2.2 ha/h).

Quality of Work: The performance of the New Idea 5209 mower conditioner in all crops tested was very good. The rotary disc performance was very good cutting alfalfa, native grasses, brome, timothy and clover. Performance of the conditioning rolls was very good in most crops and the 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, operating hydraulic controls, transporting, and lubricating were all very good. The New Idea 5209 was easy to operate and took little operator practise. Daily service took about 15 minutes.

Ease of Adjustment: All adjustments to the New Idea 5209 were easy to carry out. Ease of adjusting the cutting angle of the cutterbar was very good. Adjustments of roll clearance, windrow width and height, roll pressure, crop dividers, and floatation were all very good. Ease of maintaining the knives was good.

Power Requirements: The manufacturer recommended a mini-

mum tractor size of 60 hp (45 kW) with dual remote hydraulic outlets and a PTO shaft capable of 540 rpm, PAMI effectively operated the 5209 with a 75 hp (56 kW) tractor.

Operator Safety: The New Idea 5209 disc mower conditioner was safe to operate if normal safety precautions were followed. The New Idea 5209 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: Three mechanical problems occurred during the 200 hours of test time.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Supplying adjustable skid shoes that would better control the height of cut.
2. Supplying a stronger hitch.

Station Manager: B.H. Allen

Project Manager: R.K. Harris

THE MANUFACTURER STATES THAT

With regard to the recommendations:

1. New Idea currently offers an optional Topping Skid to gain additional cutting height when needed. Adjustment of the header tilt angle and maintaining proper header float weight will usually yield good control of the cutting height.
2. Beginning with the units built in late 1989, a hitch made from 1/4 in wall tubing and with longer reinforcements is being supplied. Previous units were supplied with 3/16 in wall tubing and shorter supports.

GENERAL DESCRIPTION

The White New Idea 5209 mower conditioner is designed to cut, condition and windrow forage and hay crops. It is a pull-type machine and has an offset single pole hitch. The unit is capable of cutting swaths up to 9.2 ft (2.8 m) wide in a single pass.

The New Idea 5209 is mechanically driven and derives its 540 rpm rotary power input from the power-take-off of a tractor. Power is transmitted through drive shafts to a gear box which in turn drives the seven rotating oval discs and the conditioning rolls. There are two knives mounted on each disc. The rotating knives direct the cut crop into the two rubber conditioning rolls.

The New Idea 5209 is supported on both sides with floatation tires. The height of the machine is hydraulically adjustable to permit ease of conversion from field to transport position. It utilizes mechanical locks. The conditioning rolls can also be hydraulically opened to remove slugs or foreign material by raising the header all the way up.

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

SCOPE OF TEST

The New Idea 5209 mower conditioner was operated in the crops shown in TABLE 1 for 200 hours, cutting and conditioning about 1095 acres (445 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	OPERATING HOURS	EQUIVALENT FIELD AREA	
		ac	(ha)
Alfalfa	130	715	(290)
Brome	12	60	(25)
Native Grasses	40	220	(90)
Timothy	11	60	(25)
Clover	7	40	(16)
TOTAL:	200	1095	(446)

RESULTS AND DISCUSSION

RATE OF WORK

The rate of work was dependent upon field roughness, soil moisture, machine width and operator experience. The average continuous ground speed was 4.9 mph (7.9 km/h) and the average work rate was 5.5 ac/h (2.2 ha/h). The New Idea 5209 was capable of cutting and conditioning at speeds up to 12 mph (19.2 km/h).

QUALITY OF WORK

Windrow Formation: The New Idea 5209 produced very good quality windrows in all crops tested. When the swath baffle handle was adjusted to its highest position, the forming shields produced a clean sharp edge that served as a guide for the tractor wheel for the succeeding row. When the handle was adjusted to the lower settings, wide flatter rows resulted.

Windrows up to 6.3 ft (1.9 m) wide or as narrow as 30 in (760 mm) could be achieved. The New Idea provided eleven settings for the windrow swath baffle width control. The centre delivery discharge allowed a continuous windrow to be formed around corners (FIGURE 2).

It was easy to adjust the windrow width to accommodate the pickups



FIGURE 2. Windrow Forming.

of all the balers subsequently used.

Cutterbar Performance: Cutting ability of the seven cutting discs was very good in all crops. The New Idea 5209 was effective in cutting native grasses due to the high speed rotation of the knives (2925 rpm) (FIGURE 3).

Damp and fine stemmed crops did not affect cutting ability. The cutting height was adjusted by changing the angle of attack of the knives.

The 5209 was not equipped with any mechanism that allowed the cutterbar to adjust for field abnormalities such as mole or gopher mounds. Therefore, in damp ground conditions, earth would build up between the cutting discs and strips of uncut crop would result.

It is recommended that the manufacturer consider equipping the 5209 with adjustable skid shoes to allow the cutterbar to ride above ground abnormalities.

In most cases, the New Idea 5209 produced ideal stubble in all crops if the header floatation was adjusted to suit the field. However, in areas that were trampled or lodged, stubble was ragged.

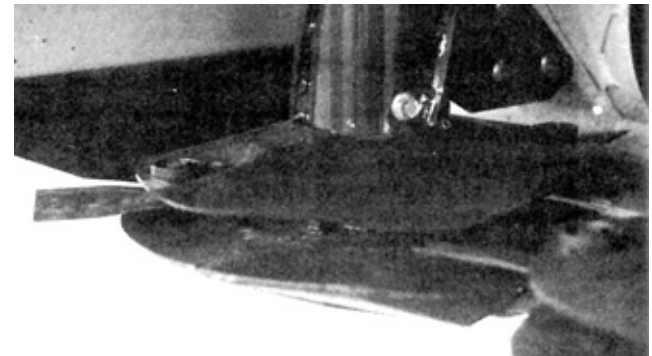


FIGURE 3. Cutting Discs and Knives.

Floatation: Header floatation was very good and allowed the header to follow ground contour. Four large tension springs provided header floatation on the New Idea 5209. Optional non-adjustable topping skids were available for operation in stoney fields.

Conditioner Performance: Conditioner performance was very good. The New Idea 5209 was equipped with two counter rotating rubber conditioning rolls. The 7 ft (2.1 m) wide rolls meshed together in a spiral design. As the crop was pulled through the rotating conditioning rolls, the stems were crushed or broken, allowing increased moisture evaporation. Grasses did not appear to be conditioned as thoroughly as a legume crop.

The difference in drying or curing time between a conditioned crop and an unconditioned crop is shown in FIGURE 4. The tests were carried out in the same crop on the same days and in parallel windrows. Relative humidity during the test period was unusually high. Other conditions that affect curing time are stubble height, ambient tempera-

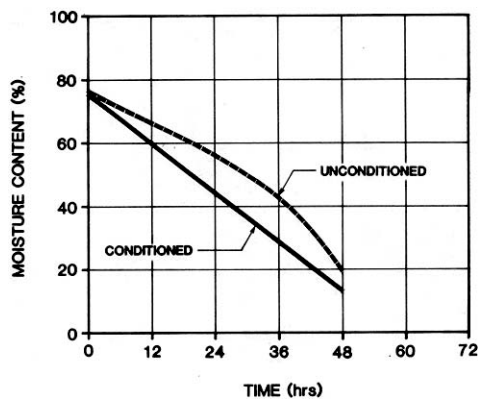


FIGURE 4. The Effect of Conditioning in Alfalfa at 1.7 ton/ac (3.8 t/ha) for the New Idea 5209.

ture and wind velocity. Generally, the advantage of a conditioned crop is one-half to one day advance in the start of baling.

Leaf Loss: Leaf loss was minimal and was considered very good on the New Idea 5209. Some leaf loss was observed in crops 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 very good. The New Idea 5209 was equipped with a single pole hitch which attached directly to the tractor drawbar. A suitable sized pin secured the mower conditioner to the tractor. Once the mower conditioner was attached to the tractor, the hitch jack was removed and stored on the jack storage post on the hitch. The 540 rpm power shaft was slipped onto the PTO shaft of the tractor. Hook-up was completed with the attachment of three hydraulic hoses to the remote couplers of the tractor. Hitching was easy and took one person about ten minutes.

Hydraulic Controls: Ease of operating the hydraulic controls was very good. The New Idea 5209 was equipped with two separate control circuits. Mower height was controlled by single acting cylinders attached to each of the ground wheels. These cylinders also lifted the mower high enough to remove or engage the transport locks. When the wheel cylinders reached their maximum extension length, oil was diverted to two small cylinders attached to the conditioner rolls which opened the gap between the rolls to allow unplugging (FIGURE 5). The second hydraulic circuit was used to power the double acting cylinder which swung the hitch into either the field or transport position.

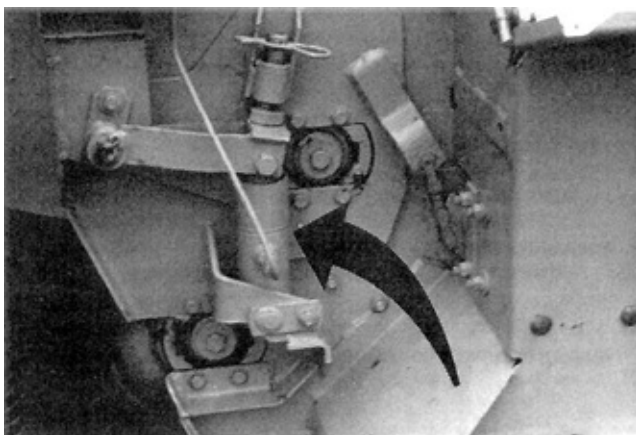


FIGURE 5. Cylinder to Spread Conditioning Rolls.

Transporting: Ease of transporting was very good. The New Idea 5209 was prepared for transport by moving the hitch to the transport position. The mower was raised to its maximum height and the transport locks on each side were engaged. Spring pins prevented the lock bars from dislocating once in the locked position.

The 11 ft (3.3 m) transport width was convenient when meeting

oncoming traffic, although caution had to be exercised on narrow roadways. The New Idea 5209 towed well at 30 mph (50 km/h) and had sufficient ground clearance over high crowned roads. The two floatation tires provided very good floatation over damp ground and met the requirements of the Tire & Rim Association Standard for the weight of the machine.

Lubrication: Ease of lubrication was very good. Checking the level of lubricant in the gearbox was easy and consisted of parking the mower conditioner on level ground, and removing a plug in the side of the gearbox. Normal daily lubrication took one person about 15 minutes and consisted of ten 8 hour grease points, six 10 hour grease points, six 20 hour grease points and eight 50 hour grease points. All pressure nipples were clearly marked and easy to get at.

Field Operation: Field operation was very good. The New Idea 5209 was placed in field position by raising the mower to its maximum height and removing the transport locks. The hitch 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. Once cutting began, a visual inspection of the cut stubble revealed what adjustments were required for that particular crop. Usually adjustments to the disc angle were required.

Due to the design of the hitch, all cutting had to be accomplished with the mower operating on the right hand side of the tractor. Cutting in this manner required all turns to be made to the right. Steering the mower conditioner around corners was easy and did not require activating the hitch cylinder to produce square corners.

EASE OF ADJUSTMENT

Crop Deflector: Ease of adjusting the crop deflector was very good. Adjustments consisted of removing a bolt on each side and replacing it in a lower hole. Crop deflector adjustment took one person about 5 minutes.

Cutterbar: Ease of adjusting the seven cutter heads that form the cutterbar was very good. The cutting height of the New Idea 5209 was regulated with this adjustment, and was usually required before crops of different types were cut. The angle adjustment was accomplished by loosening the locknut on the hand crank which was located in the middle of the header. Rotating the hand crank resulted in changes to the angle of the cutter discs from 0 to 8 degrees. Down and tangled crops required the cutting discs to be angled downward, while standing crops were cut with the discs level with the ground. Once adjustments were completed, the locknut was retightened. This took one person minimal time.

Conditioner Rolls: Adjustment of the conditioner rolls for clearance and pressure was very good. The conditioner roll gap was factory set at .0725 in (1.5 mm). The adjustment was carried out by removing the pin clips which locked the bumper bolts in position and then rotating the bumper bolts on each side of the header until the desired roll gap was achieved. Roll gap adjustment ranged from 0 to 2 in (0 to 50 mm). The spring pins were reinstalled once the desired adjustment was accomplished.

Roll timing was required after roll gap adjustment and was easily accomplished by loosening the bolts in the upper roll timing hub. The top roll was rotated to the desired position and the bolts re-torqued to 80 ft·lb (109 N·m).

Adjusting pressure was easy and was accomplished by turning a single nut until the space between the spring coils measured 0.250 in (6.4 mm). Both sides of the machine were adjusted in unison.

All conditioner roll adjustments took one person about 30 minutes.

Floatation: Ease of adjusting header floatation was very good. Four large tension springs provided header floatation on the New Idea 5209. Header floatation adjustments were required to prevent the cutting discs from plugging in soft field conditions and to provide an ideal cut. Header floatation adjustments were carried out by removing the lock plate which joined the four adjustment bolts in the upper ends of the floatation springs. The bolts were rotated 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 adjustments took one person about 15 minutes.

Swath Gate: Ease of adjusting the windrow width and height was very good. The adjustable swath width handle offered eleven settings which allowed windrow widths from narrow windrows of 30 in (760 mm) to a swath of 6.3 ft (1.9 m). Raising the swath width handle produced a

high narrow windrow while lowering the handle produced a wide swath. Adjustments were quick and easy.

Knives: Ease of maintaining the knives was good. Changing or reversing the fourteen individual knives was very good and took one person about 30 minutes. When a knife was replaced, the special bolt and its protective cup had to be replaced as well. In average conditions, a knife would last for about 450 ac (183 ha).

POWER REQUIREMENTS

Average and peak PTO power requirements for the New Idea 5209 were 38.2 hp (29 kW) and 52.9 hp (40 kW) respectively. Average drawbar pull at 6.5 mph (10.4 km/h) was 295 lb (1312 N) for a crop yielding 1.5 ton/ac (3.4 t/ha). PAMI used a variety of tractors throughout the evaluation which ranged from 75 hp (56 kW) to 140 hp (105 kW). It is unknown if a 60 hp (45 kW) tractor, recommended as minimum by the manufacturer, would have ample PTO reserve power.

Tractors also required at least two remote hydraulic circuits capable of supplying 1750 psi (12 MPa) and a PTO shaft capable of 540 rpm.

OPERATOR SAFETY

Safety on the New Idea 5209 was very good if normal safety precautions were followed. The 5209 was supplied with a safety curtain which spanned the width of the cutterbar. This curtain should be in place at all times. The New Idea 5209 complied with all ASAE standards for safety. All pulleys, sprockets, universal joints and shafts were adequately guarded and labelled. The New Idea 5209 was equipped with a slow moving vehicle sign, and a safety chain was available as optional equipment.

OPERATOR'S MANUAL

The operator's manual was very good and contained useful information on warranty, specifications, safety, operation, adjustments, lubrication, servicing, transporting, storage, trouble shooting, set-up and assembly. All information was found to be factual and accurate. The book was well written and illustrated. In addition, a parts catalogue was supplied.

MECHANICAL HISTORY

The mechanical history of the New Idea 5209 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	OPERATING HOURS	EQUIVALENT FIELD AREA	
		ac	(ha)
Slip Clutch was replaced at:	120	660	(267)
Hitch bent at:	120	660	(267)
Hydraulic fitting was bent and replaced at:	120	660	(267)

DISCUSSION OF MECHANICAL PROBLEMS

Slip Clutch: The slip clutch was heated momentarily upon initial start-up due to a burr or some other internal mechanical deficiency. It was replaced at 120 hours.

Bent Hitch: At 120 hours, the hitch was bent in a lateral direction due to operating on a steep side hill. The hitch deformed about 0.5 in (12 mm) and did not bend any further for the duration of the evaluation (FIGURE 6). It is recommended the manufacturer consider supplying a stronger hitch.

Hydraulic Fitting: A 45 degree elbow that attaches to the flexible wheel cylinder hose was bent when it came in contact with the tractor wheel during a tight turn. It was repaired at 120 hours and no further problems occurred.



FIGURE 6. Bent Hitch.

APPENDIX I

SPECIFICATIONS

MAKE: New Idea
MODEL: 5209
SERIAL NUMBER: 11235
OVERALL DIMENSIONS:

	Transport Position	Field Position
- length	15.1 ft (4.6 m)	14.7 ft (4.4 m)
- width	11.0 ft (3.3 m)	14.0 ft (4.2 m)
- height	5.0 ft (1.5 m)	5.0 ft (1.5 m)

DRIVES:

Mechanical - Power shafts and gearbox

HEADER:

- effective width of cut 9.2 ft (2.8 m)
 - range of cutting height 1.5 - 3.0 in (38-78 mm)
 - disc angle 0° to 8° down
 - number of discs 7
 - number of knives per disc 2
 - disc speed at 540 PTO rpm 2924
 - knives 14 double edged
 - cutterbar type modular component
 - cutterbar drive hex shaft

CONDITIONING ROLLS:

- number two
 - roll width 7.0 ft (2.1 m)
 - type of rolls Intermeshing reinforced rubber
 - roll diameter 9.5 in (241 mm)
 - roll speed 735 rpm
 - roll separation 0.5 in (12.7 mm)
 - roll pressure control Spring and roller chain

TIRES:

Two, 9.5 L - 14 SL farm service

WEIGHT:

- left wheel 1407 lb (639 kg)
 - right wheel 1266 lb (574 kg)
 - hitch 856 lb (388 kg)
TOTAL: 3529 lb (1601 kg)

HYDRAULIC CONTROLS:

- header lift Two single acting cylinders (one per wheel)
 - hitch pivot One double acting cylinder

NUMBER OF LUBRICATION POINTS:

- 8 hour 10
 - 10 hour 6
 - 20 hour 6
 - 50 hour 8

APPENDIX II

MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

SUMMARY CHART

NEW IDEA 5209 DISC MOWER CONDITIONER

RETAIL PRICE:	\$14,170.00 (f.o.b. Portage la Prairie, MB)
RATE OF WORK:	Average continuous speed was 4.9 mph (7.9 km/h). Average work rate was 5.5 ac/h (2.2 ha/h).
QUALITY OF WORK:	
Windrow Formation	Very Good; width and height controlled by fully adjustable swath gate.
Cutterbar Performance	Very Good; produced ideal stubble
Floatation	Very Good; followed ground contours.
Conditioner Performance	Very Good; effectively conditioned crop.
Leaf Loss	Very Good; minimal.
EASE OF OPERATION:	
Hitching	Very Good; easy, took 10 minutes.
Hydraulic Controls	Very Good; adequate for operation.
Transporting	Very Good; towed well at 30 mph (50 km/h)
Lubrication	Very Good; easy to lubricate.
Field Operation	Very Good; easy to operate.
EASE OF ADJUSTMENT:	
Crop Deflector	Very Good; easy, took 5 minutes.
Cutterbar	Very Good; easy, allowed 0° to 8° adjustment.
Conditioner Roll	Very Good; easy, ranged 0 to 2 in (0 to 50 mm).
Floatation	Very Good; soft fields required adjustment.
Swath Gate	Very Good; allowed eleven positions.
Knives	Good; took one person 30 minutes.
POWER REQUIREMENTS:	
Tractor Size	75 hp (56 kW) tractor was adequate to power mower conditioner 540 PTO and dual hydraulics were required.
OPERATOR SAFETY:	Very Good; conformed with ASAE Standards.
OPERATOR MANUAL:	Very Good; was clear, concise, well organized and illustrated.
MECHANICAL HISTORY:	Only three minor problems.



**ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE**

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