Printed: March, 1984
Tested at: Humboldt
ISSN 0383-3445
Groud 4 (d)

EVALUATION REPORT 353

CO-OP IMPLEMENTS 742 SELF-PROPELLED WINDROWER

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

CO-OP IMPLEMENTS 742 SELF-PROPELLED WINDROWER

MANUFACTURER AND DISTRIBUTOR:

Canadian Co-operative Implements Limited
770 Pandora Avenue E.
Winnipeg, Manitoba
R2C 3N1

RETAIL PRICE:

$76,045.00 (March, 1984, f.o.b. Humboldt with 42 ft (12.8 m) header and optional draper insert).

SUMMARY AND CONCLUSIONS

Rate of Work: Average speeds, for the Co-op Implements 742 windrower, were 5 to 6 mph (8 to 10 km/h). Slower speeds were required in tangled or tall leaning crops. Maximum speed was about 7 mph (11 km/h). Average work rates varied from 16 to 20 ac/h (6.5 to 8.1 ha/h).

Quality of Work: Performance of the dividers was *fair*. The end dividers normally flattened a path of crop. Reel performance was *good.* Material occasionally caught on the centre reel arms. In cereal grain and oilseed crops, cutting ability was *very good.* The flexible knife cut well and had sufficient power. Header flotation was *very good.* The hinged header followed rolling topography well. Draper performance was *very good.*

Parallel and fantail were the predominant windrow types formed. In leaning crops, parallel and angled parallel windrows occurred. Windrows were typically 6 to 7 ft (1.8 to 2.1 m) wide. Some bunching occurred when rapeseed caught on the centre divider and when tall crop caught on the flotation springs by the windrow opening.

Ease of Operation and Adjustment: Header visibility was *very good* for the entire 42 ft (12.8 m) of cutterbar. The cab was clean and quiet and operator comfort was *very good.* Sound level was about 80 dBA. Controls and instruments were *good.* The controls were conveniently located and easy to operate. Delays in operation occurred because the reel and header lifted slowly, and the two sides of the reel had to be frequently releveled. The instruments were poorly located out of the operator's line of sight and were not easily noticeable. In full transport, the instruments were behind the operator. The windrower was well lit for windrowing at night.

Handling was *good* but required considerable operator experience. The windrower tended to tip forward on downslopes and during sudden stops.

Ease of transporting was *very good* in both semi-transport and full transport. The windrower could be placed into full transport by one man in tess than 15 minutes. Semi-transport was suitable only for short moves or for maneuvering between fields.

Ease of adjustment was *very good.* All adjustments were accessible and easily made.

Ease of lubrication and maintenance was *good.* Daily lubrication took about 15 minutes. The knife drive line was difficult to grease. Routine maintenance was easily performed.

Power and Fuel Consumption: The motor had ample power and consumed about 2.8 gal/h (12.7 L/h) of fuel.

Operator Safety: The CI 742 was safe to operate if normal safety precautions were taken. Adjustments were safe to make and controls were located for easy operation. However, the neutral starting switch mounts interfered with the operation of a steering arm. Also, the instruments were behind the operator in transport and no rearview mirror was provided.

Operator Manual: The operator manual contained much useful information on operation and adjustments. However, it contained a few errors in the specifications and lubrication sections.

Mechanical History: Many mechanical problems occurred during the test. Most problems were due to poor assembly or defective components.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifications to improve the performance of the dividers.
2. Modifications to the reel lift system to make it more convenient to operate.
3. Relocating the instrument console for more convenient viewing or providing audible alarms for all instruments.
4. Modifications to improve the digital monitor accuracy.
5. Relocating the turn signal switch to provide safer and more convenient operation.
6. Modifications to the neutral starting switches and mounts to improve their performance and to prevent the mounts from interfering with the operation of the steering arm.
7. Providing a rearview mirror for safer operation when in full transport.
8. Correcting the errors in the operator manual.
9. Improving quality control during machine assembly.
10. Modifications to the range shift cable end to prevent the nuts from vibrating loose and falling out.
11. Modifications to strengthen the knife centre hinges.
12. Modifications to prevent bolts and pins from loosening on the knife drive lines.
13. Modifications to keep the draper motors in place.

Senior Engineer: G.E. Frehlich

Project Engineer: M.E. Jorgenson

THE MANUFACTURER STATES THAT

With regard to recommendation numbers:

1. An improved divider will be investigated.
2. A number of modifications have been made to improve the lift rate and to eliminate the need for frequent relevel-lng.
3. Improved operator viewing of the instrument console will be investigated.
4. Improved accuracy of the digital monitor will be investigated.
5. Relocation of the turn signal switch to a more convenient location will be investigated.
6. Modifications have been make to the neutral switch system to improve performance and eliminate any interference.

7. The provision of a rearview mirror will be considered.
8. All known errors in the operator manual will be corrected.
9. Quality control always receives top priority and improvements are continously being made. The problems stated in this report have been recognized and addressed for future production.
10. Modifications to the range shift cable have been made.
11. Modifications have been made to the structure and assembly procedure to strengthen the centre hinges.
12. Modifications have been made to components and procedures to prevent loosening of bolts and pins.
13. Modifications have been made to ensure the draper motors remain in position.

MANUFACTURER'S ADDITIONAL COMMENTS

1. The first year production of a new model, particularly one of advanced technology, normally requires more attention from the manufacturer's field service organization. This is the result of unpredictable and unavoidable manufacturing snags and does not reflect on the true potential of the machine.
2. In addition to the above, improvements have been made to the hydrostatic pressure sensors, the park brake cables, the hood lock assembly and the radio antenna reception.
3. Many of the modifications wilt be retro-fitted to the first year production machines.

GENERAL DESCRIPTION

The Co-op Implements 742 is a self-propelled, centre delivery windrower consisting of a three-piece hinged draper header with two wing wheels and a hydrostatic traction unit running on two traction drive wheels and two rear castor wheels. It is powered by an Isuzu 328 cu in (5.4 L) six cylinder diesel engine. The traction drive wheels are driven by a variable displacement hydraulic pump through separate hydraulic motors and planetary gear reducers. The two sections of cutterbar are mechanically driven from the traction unit through a series of 90o gearboxes and shafts. The flexible knives are hinged in the centre. The drapers and reel are driven by hydraulic motors.

Draper speed, reel speed, and wing wheel lifts are controlled by hand from the operator station. The header and two reel lifts are foot controlled. The CI 742 is placed into semi-transport by pivoting the wings up, and into full transport by detaching the header from the traction unit and pulling it lengthwise.

The test machine was equipped with a 42 ft (12.8 m) draper header and five bat reel. Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The CI 742 was operated in the conditions shown in TABLE 1 for 109 hours while cutting about 1914 ac (775 ha). It was evaluated in cereal grain and oilseed crops for cutting ability, windrow formation, ease of operation and adjustment, sound level, fuel consumption, operator safety and suitability of the operator manual.

TABLE 1. Operating Conditions

CROP	VARIETY	YIELD		HOURS	FIELD AREA	
		bu/ac	(t/ha)		ac	(ha)
Barley	Bonanza	60 to 70	(3.2 to 3.8)	11	177	(72)
	Klages	--	--	8	160	(65)
Flax	Dufferin	11	(0.7)	5	80	(32)
Rapeseed	Andor	30	(1.7)	6	70	(28)
Fall Rye	Puma	25 to 35	(1.6 to 2.2)	19	215	(87)
Wheat	Benito	30	(2.0)	9	180	(72)
	Columbus	35	(2.4)	4	100	(41)
	Neepawa	20 to 35	(1.3 to 2.4)	40	792	(321)
	Nepale	30	(2.0)	5	100	(41)
Tall Wheatgrass	Orbit	--	--	2	40	(16)
			TOTAL	109	1914	(775)

RESULTS AND DISCUSSION

RATE OF WORK

Uniform windrows were formed in most crops at average speeds of 5 to 6 mph (8 to 10 km/h). Slower speeds were required in tangled or tall leaning crops and in rough fields. Speeds up to 7 mph (11 km/h) were possible on level fields with straight even stands.

Average work rates for the 42 ft (12.8 m) windrower varied from 16 to 20 ac/h (6.5 to 8.1 ha/h) in most crops. In straight even stands on level fields, work rates of 30 ac/h (12 ha/h) could be achieved.

QUALITY OF WORK

Dividers: In average straight standing crops, divider performance was satisfactory. However, the wide divider and knife drive box normally flattened a strip of crop, causing a slight crop loss (FIGURE 1). Cutting in the opposite direction on the next pass recovered most of the flattened crop. The centre divider plugged in wet and tangled rapeseed and had to be cleared with the reel. It is recommended that the manufacturer consider modifications to improve the performance of the dividers.

Reel: Reel speed was variable from 0 to 84 rpm. Reel tip speed ranged from 0 to 14 mph (0 to 23 km/h). The reel was usually adjusted for a reel speed index* of 1.1 to 1.2 to minimize shatter losses, in heavy and tangled crops, material occasionally caught on the two centre reel arms, and stopped the reel (FIGURE 2).

The range of vertical and fore-and-aft reel adjustments was suitable for all crops.

FIGURE 1. Crop Flattened by the Divider.

FIGURE 2. Material Caught on the Reel Arm.

Reel Speed Index is the ratio of reel tip speed to travel speed.

Cutterbar: Cutting ability was very good in cereal crops and straight standing oilseed crops. Stubble was usually ideal (FIGURE 3). In tangled green rapeseed crops, material collected on dull sections of the knife. In hard-to-cut crops, it was important to replace worn knife sections and guards.

The flexible knife worked well as the wings pivoted up and down to follow ground contours. All field work was conducted with underserrated knife sections. The knife had adequate power in all test conditions and no knife hammering occurred.

The stubble height could be varied across the width of the header by angling the wing sections up to cut higher than the centre section. This procedure helps to reduce the quantity of straw in the windrow, and improves soil moisture by trapping snow.

Header Flotation: Header flotation was very good. Flotation was provided by four tension springs on the traction unit (FIGURE 4) and two tension springs on each wing wheel (FIGURE 5). Header flotation minimized cutterbar damage in stony fields. The hinged wings enabled the header to follow most ground contours. Undulating stubble occurred only in very rough fields.

Draper: Draper speed could be varied from 50 to 700 fpm (0.3 to 3.6 m/s). In most crops, the drapers were run at or near full speed. In thin stands, lower draper speeds improved windrow formations. In very tall leaning crops, such as fall rye, the drapers occasionally plugged when material was pulled under and caught on the cross braces beneath the draper.

The fixed platform angle was suitable for all crops tested.

Windrow Formation: Windrows may be classified into four general patterns (FIGURE 6), although many combinations and variations exist. FIGURES 7 to 11 show typical windrows formed by the CI 742. The CI 742 produced parallel and fantail windrows in most grain crops. Wheat and barley windrows were usually formed in two parts. Herringbone windrows occurred in light crops, while fantail windrows were predominant in heavy, tall stands or ripe crops. In thin stands, reducing draper speed resulted in a wider, more parallel windrow.

The direction of cut affected windrow formation when windrowing lodged or leaning crops. Cutting parallel to the direction of lean usually resulted in parallel windrows, while cutting at an angle to the direction of lean resulted in angled parallel windrows.

Windrows were normally 6 to 7 ft (1.8 to 2.1 m) wide. The optional canvas insert reduced the windrow width to 5 ft (1.5 m) to suit light crops.

Windrow Uniformity: Windrows were uniform in most crops at speeds up to 6 mph (10 km/h). In rapeseed, bunchy windrows resulted when the cutterbar plugged at the centre divider. In tall crops, some bunching occurred when material was dragged along by the main header flotation springs in the windrow opening.

EASE OF OPERATION AND ADJUSTMENT

Operator Comfort: The CI 742 was equipped with an operator's cab positioned behind the windrow opening and above the traction drive wheels. Visibility of the header was very good.

The seat and steering column were adjustable to suit most operators. Incoming air was adequately filtered, but the air vents were poorly located. The air was directed at the operator's legs which was uncomfortable and did not keep the windows from fogging up in moist cool conditions. Operator station sound level was about 80 dBA, which provided a quiet, comfortable ride.

Controls: Most of the controls for the CI 742 (FIGURES 12 and 13) were conveniently located, properly identified and easy to operate. The range shifter was difficult to engage, as it had to be forced into place. The travel speed control lever was convenient to operate in both field and transport positions.

The header height foot pedals were easy to operate, but lifting rates were too slow for convenient operation in varying field conditions and on corners when cutting back and forth. Header height was controlled by hydraulic cylinders hooked in series. As is common with series hydraulic systems, to maintain the set

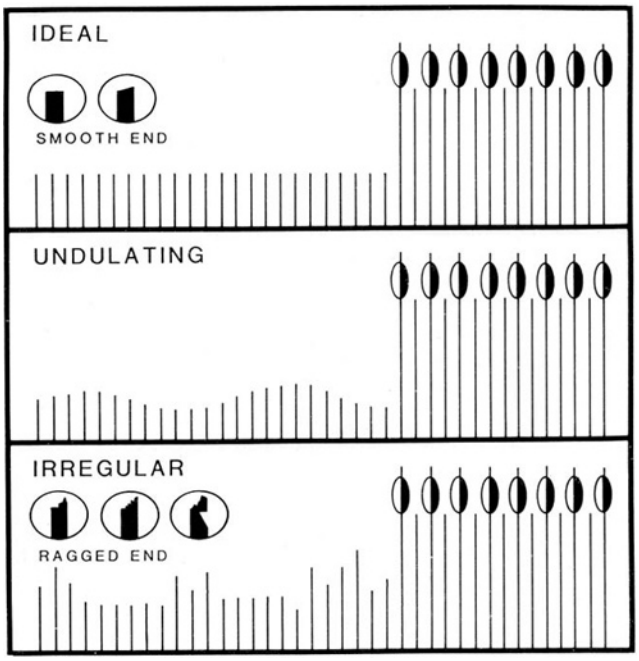

FIGURE 3. Types of Stubble.

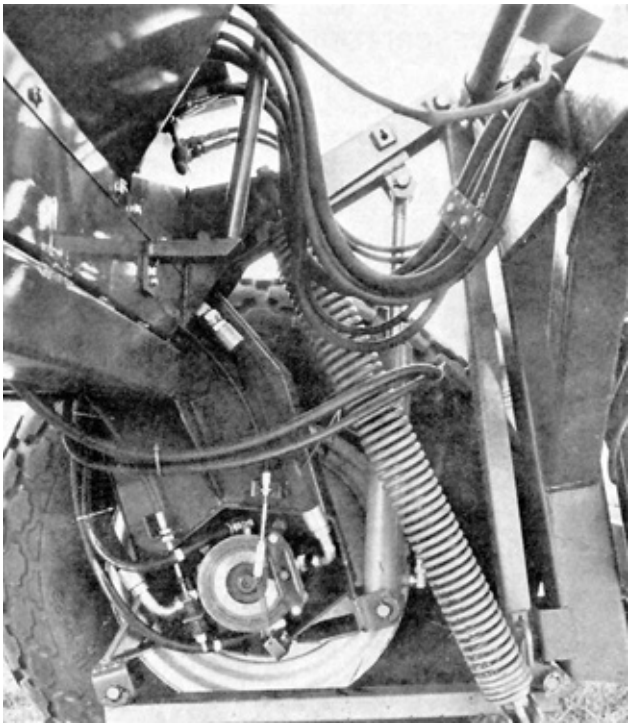
FIGURE 4. Header Flotation System Main Springs.

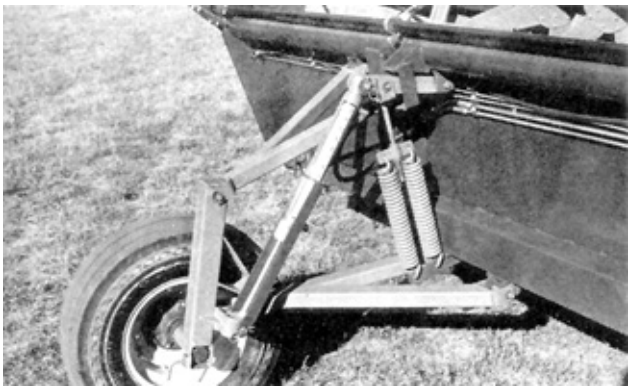
FIGURE 5. Wing Flotation System.

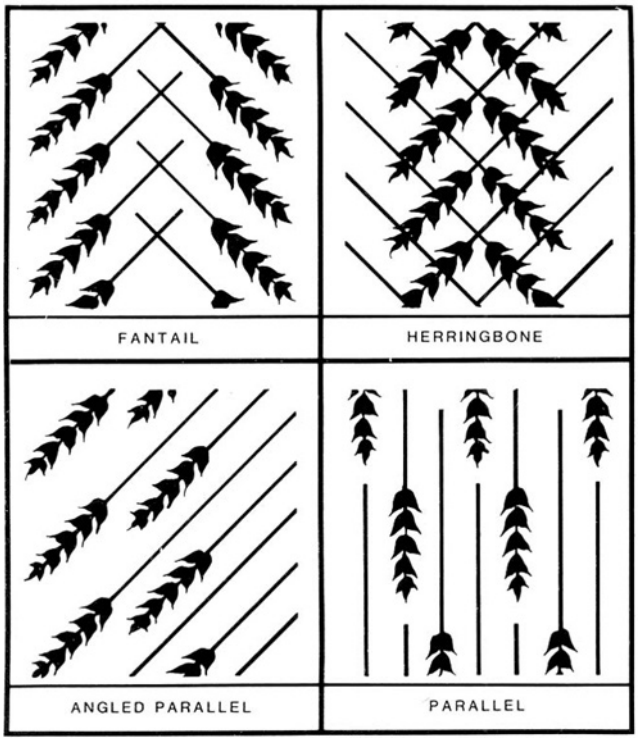

FIGURE 6. Windrow Types.

FIGURE 7. Wheat: 30 bu/ac (2.0 t/ha).

FIGURE 8. Barley: 70 bu/ac (3.8 t/ha).

height of the centre and wing sections, the cylinders had to be occasionally synchronized by completely extending them to a fully raised position.

The height of the two sides of the reel could be controlled separately by foot pedals, but lifting rate was too slow for varying crop conditions. Also, after the heights has been varied several times, operation had to be stopped to relevel the two sides by fully raising and lowering the lift cylinders. It is recommended that the manufacturer consider modifications to the reel lift system to make it more convenient to operate. The header and wing height indicators aided the operator in controlling stubble height. Reel and draper speeds were easily controlled on-the-go by hand levers.

FIGURE 9. Fall Rye: 35 bu/ac (2.2 t/ha).

FIGURE 10. Rapeseed: 30 bu/ac (1.7 t/ha).

FIGURE 11. Ripe Barley: 60 bu/ac (3.2 t/ha).

Instruments: The instrument console was located above the front windshield (FIGURE 14). It included gauges for fuel level, engine oil pressure, coolant temperature, battery voltage, and hydraulic oil temperature. Warning lights indicated neutral starting switch status; park brake engagement; engine, header and hydrostatic drive filter conditions; and the hydrostatic oil pressure. An audible alarm signalled an unsafe starting or operating condition. The instruments were located out of the operator's line of sight and were not easily noticeable. In full transport, the gauges were behind the operator. It is recommended that the manufacturer consider relocating the instrument console for more convenient viewing or providing audible alarms for all instruments.

The digital monitor did not indicate true engine, draper, reel, or travel speeds. Recalibrating engine speed only produced a correct reading at full speed. It is recommended that the manufacturer consider modifications to improve the digital monitor accuracy.

The hour meter was connected to the key which resulted in some time recorded without the engine operating. Radio reception was poor because the antenna was located inside the head liner.

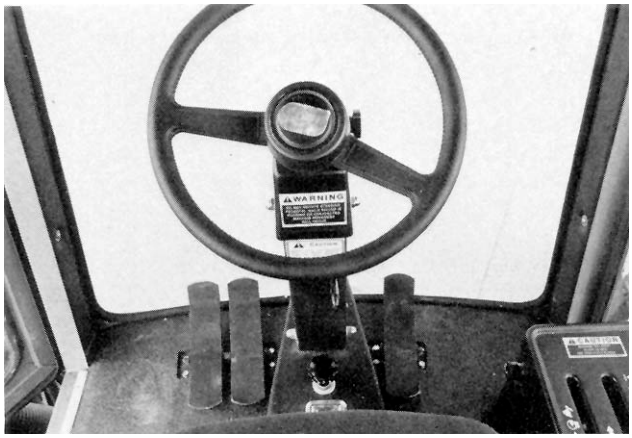

FIGURE 12. Steering Column and Foot Controls.

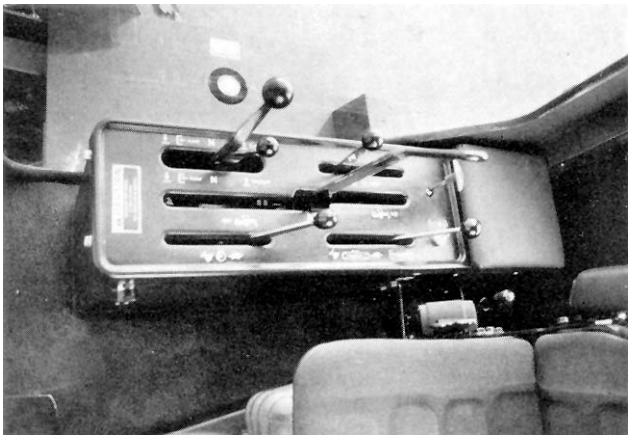

FIGURE 13. Hand Controls.

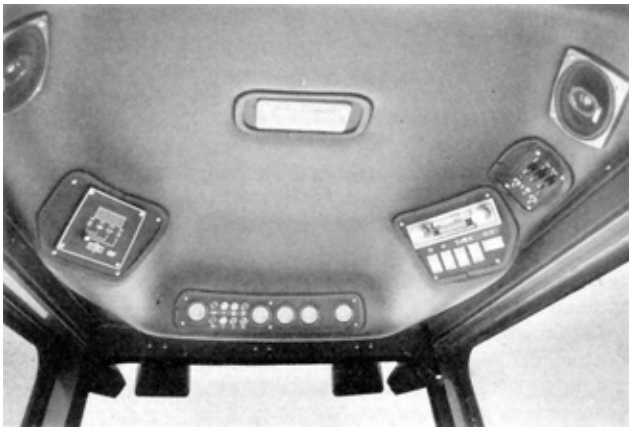

FIGURE 14. Instrument Panel.

Lights: The CI 742 was equipped with six forward lights and one rear light. This provided ample lighting for operation at night. The warning lights and turn signals were adequate for safe road travel, but the turn signal switch was located behind the operator, when travelling in full transport, making it very awkward to reach. It is recommended that the manufacturer consider relocating the turn signal switch for safer and more convenient operation.

Handling: The CI 742 was difficult to handle without sufficient operating experience. The long line of sight to the crop edge led to oversteering and missed crop. With experienced operators, the quick responsive steering provided good handling and easy cornering. Right angle corners were easily performed by pulling partially out of the crop just before turning the corner. Ground speed was limited by field roughness and sharply rolling fields because of the slow reel and header lifts.

The hydrostatic drive made reversing direction quick and easy. The windrower could be maneuvered over tall windrows and similiar obstacles by raising the wings into semi-transport. When operating down steep slopes or during sudden stops, the windrower easily tipped forward. Increased rear ballast would improve stability.

Transporting: The CI 742 travelled very well on open roads in semi-transport at speeds up to 7 mph (11 km/h), and in full transport (FIGURE 15) at speeds up to 10.5 mph (17 km/h). In semi-transport, the wings were high enough to clear most obstructions, but the unit was too wide for meeting traffic. In full transport, the header trailed well and the unit negotiated corners easily and safely.

The CI 742 could be placed in full transport by one man in less than 15 minutes. When placing in field position, the hitch jack had to be on firm ground or blocked to prevent it from sinking. It was important to follow the operator manual step by step when switching between full transport and field position.

Adjustments: For varied stubble heights, the wing wheel height could be easily adjusted using a hand lever to angle the wing sections to cut higher than the centre section. Raising the header high enough to clear windrows while cornering usually caused the wing wheel height setting to change. Wing height had to be reset when cutting resumed. The reel was easily adjusted fore-and-aft by repositioning four bolts, and sliding the drive motor and centre reel supports. The right and left drapers were easily tightened with a hand clamp. The polyester drapers did not have to be loosened overnight.

The monitor speed sensors were difficult to adjust for proper operation.

Lubrication: Daily lubrication took about 15 minutes. The CI 742 had eleven pressure grease fittings on the traction unit and thirty-one fittings on the header. Seventeen of these required greasing every 10 hours while the remainder required greasing seasonally or every 100 hours. In addition, three gearboxes, engine, and hydraulic oil levels had to be checked daily. The gearboxes required SAE 90 gear oil while the engine and hydraulics required SAE 10W30 engine oil. The knife had to be oiled every 5 hours, unless in abrasive soils where oiling was not recommended.

Most lubrication points were easily accessible, except the universal joints on the knife drive lines.

Maintenance: Routine maintenance and service, such as tensioning belts and chains, and changing guards and knife sections, were easily performed. Most repairs were easily made.

POWER AND FUEL CONSUMPTION

The engine had ample power for all conditions encountered. Average fuel consumption was 2.8 gal/h (12.7 L/h). The 58 gal (264 L) fuel tank permitted about 20 hours of operation between fillings.

FIGURE 15. Full Transport Position.

OPERATOR SAFETY

The operator manual emphasized safety. Several decals on the machine warned the operator of safety hazards. Moving parts were well shielded. The skid proof steps and platform made access to the operator cab safe and convenient. A slow moving vehicle sign was provided.

Neutral starting switches prevented the engine from starting if any drives were engaged. However, the switches had to be carefully adjusted to work properly, which was very difficult. On one occasion, the mounting bracket for one neutral starting switch caught and held the steering arm during a sharpturn causing the windrower to spin dangerously out of control. It is recommended that the manufacturer consider modifications to the neutral starting switches and mounts to improve their performance and to prevent the mounts from interfering with the operation of the steering arm.

Machine adjustments were safely and easily made. Controls were located near the operator for safe operation. In full transport, the instruments were not visible and no rearview mirror was provided. It is recommended that the manufacturer consider providing a rearview mirror for safer operation in full transport.

OPERATOR MANUAL

The operator manual contained much useful information on operation and adjustment of the windrower. However, the listed engine oil capacity was incorrect and some lubrication instructions were contradictory or omitted. It is recommended that the manufacturer consider correcting the errors in the operator manual. A separate operator manual provided complete and accurate information for the diesel engine.

DURABILITY RESULTS

TABLE 2 outlines the mechanical history of the C1742 during 109 hours of field operation while windrowing about 1914 ac (775 ha). The intent of the test was functional performance evaluation. Extended durability testing was not conducted.

TABLE 2. Mechanical History

ITEM	OPERATING HOURS	EQUIVALENT FIELD ac	EQUIVALENT AREA (ha)
Traction Unit:			
- The hood lock pin had fallen off at	The beginning of the test		
- Neutral starting switches did not work and had to be readjusted	Several times during the test		
- The range selector linkage nuts, washers and springs fell off and were replaced at	0, 64	0, 988	(0, 395)
- The woodruff key on the left range shifter arm fell out and was replaced at	22	270	(108)
- The header and hydrostatic pump pressure sensors failed at	3	60	(24)
They were replaced at	56	858	(343)
- The oil filter on the header drive system split apart at	8	105	(42)
- The oil filter vibrated loose and the o-ring blew. They were replaced at	65	1003	(401)
	97	1680	(672)
	105	1834	(734)
- The hose connecting the two fuel tanks was too short and pulled apart. It was replaced at	22	270	(108)
- The hydraulic hose on the right traction drive motor began to leak and was replaced at	70	1115	(446)
- The water temperature gauge readings became erratic at	80	1350	(540)
- The parking brake cables stuck in the locked position and had to be loosened with penetrating oil at	89	1528	(611)
Header:			
- A pressure grease fitting was missing from the knife drive line at	The beginning of test		
- Forty-one bolts on the reel were loose at	The beginning of test		
- The transport axle hook broke and was welded at	3	60	(24)
- A seal on the right draper drive motor blew and the motor was replaced at	5	75	(30)
- Both draper motors were replaced with a factory changeover at	46	720	(288)
- Bolts loosened on the left knife drive input shaft and had to be tightened at	10	115	(46)
	11	t22	(49)
	15	165	(66)
- Knife drive couplers on the 900 gearboxes came loose and were tightened at	46	720	(288)
	74	1200	(480)
They were damaged and replaced at	82	1388	(555)
- The drive sprockets for the reel chain were misaligned at the factory and the chain came off	Several times during the test		
- The reel speed sensor was damaged when the reel chain came off and was replaced at	22	270	(108)
- The knife centre hinge broke and was repaired at	30	420	(168)
	42	618	(247)
- The grease fitting on a knife drive universal joint was lost and replaced at	34	500	(200)
- Twelve knife sections were bent or broken	During the test		
- Nine guards were bent or broken	During the test		
- The left and right knife drives were retimed at	42	618	(247)
- The knife drive clutch switch failed and was replaced at	46	720	(288)
- The hydraulic hose to the reel motor leaked and was replaced at	44	680	(272)
- The draper motor shafts pulled partially out of the rollers, stopping the drapers at	52	798	(319)
	90	1528	(611)
- The centre section reel bats were bent when clearing material from the centre knife divider at	66	1012	(405)
The bats were replaced at	The end of test		
- A reel motor seal blew at	70	1118	(447)
	79	1320	(528)
The motor was replaced by a factory changeover at	90	1528	(611)
- The draper speed sensor failed at	70	1118	(447)
- The reel drive sprocket fell off at	82	1388	(555)

DISCUSSION OF MECHANICAL FAILURES

Factory Assembly: The windrower was received with components missing, bolts and nuts loose, sprockets misaligned and neutral starting switches and speed sensors out of adjustment. This caused unnecessary shutdowns and, in some cases, damage to components. It is recommended that the manufacturer consider improving quality control during assembly.

Range Selector Linkage: The locking nuts on the range selector arm adjusting pin vibrated loose several times and nuts, washers and springs fell off. It is recommended that the manufacturer consider modifications to prevent the nuts from loosening.

The range selector arm on the left drive wheel motor worked loose because a snap ring retainer was not installed at the factory. The snap ring was installed and no further problems occurred.

Hydraulic Oil Filter: After 8 hours of operation, the header pump filter split apart and most of the hydraulic system oil was lost. This was attributed to the pump control being out of adjustment and permitting reverse oil flow. The control was readjusted and no further problems occurred.

The filter vibrated loose three times which caused the filter o-ring to blow out. The filter had to be tightened about 1/2 turn beyond hand-tight to avoid further failures.

Hydraulic Motors: The original draper and reel motors were replaced by the manufacturer after they had begun to leak because of defective components. No further leaking occurred.

Knife Centre Hinge: Both knife centre hinges broke and had to be reinforced to prevent further breakage. It is recommended that the manufacturer consider modifications to strengthen the knife centre hinges.

Knife Drives: Bolts came loose on the knife drive mounts several times. Clamping bolts that loosened also caused wear on the universal joint couplers and 90o gearbox shaft. These bolts were checked daily and required tightening several times. It is recommended that the manufacturer consider modifications to the knife drive lines to reduce these problems.

Draper Motors: The draper motor shafts pulled out of the rollers a few times, when the motor mounts flexed, stopping the drapers. It is recommended that the manufacturer consider modifications to keep the draper motors in place.

Bent Reel Bats: The centre section reel bats bent when clearing rapeseed from the centre knife divider, improved divider performance, as recommended previously, should prevent the need to clear the divider with the reel.

APPENDIX I

SPECIFICATIONS

MAKE:	Co-op Implements Self-Propelled Windrower
MODEL:	742
SERIAL NUMBERS:	
- header	37269
- traction unit	37150
MANUFACTURER:	Canadian Co-operative Implements Ltd. Winnipeg, Manitoba
CUTTERBAR:	
- width of cut (divider points)	42.3 ft (12.9 m)
- effective cut (inside dividers)	41.6 ft (12.7 m)
- range of cutting height	31 in (787 mm)
- guard spacing	3.0 in (76 mm)
- length of knife section (underserrated)	
- full depth	3.2 in (81 mm)
- cutting length	2 in (51 mm)
- knife stroke	3.0 in (76 mm)
- knife speed	636 cycles/min
HEADER:	
- header angle	
- fully raised	60 below horizontal
- fully lowered	170 below horizontal
- number of drapers	2
- draper width	41 in (1040 mm)
- draper length	17.7 ft (5.4 m)
- draper material	rubber coated polyester with fiberglass slats
- draper speed range	50 to 700 fpm (0.3 to 3.6 m/s)
- draper roller diameter	3 in (76 mm)
- height of windrow opening	46 in (1170 mm)
- width of windrow opening	
- between windboards	73 in (1860 mm)
- between rollers	75 in (1910 mm)
- raising time	4.0 s
- lowering time	6.2 s
REEL:	
- number of bats	5
- number of arms per bat	
- telescoping ends	2
- wings	4
- centre	2
- diameter	54 in (1370 mm)
- speed range	0 to 84 rpm
- range of adjustment	
- fore-and-aft	18 in (457 mm)
- height above cutterbar	25 in (635 mm)
- raising time	2.2 s
- lowering time	4.4 s
TRACTION DRIVE:	
- type	Sperry Vickers hydrostatic pump and two speed driving motors with planetary gear reducers
- speed control	hand lever
- maximum forward speed	
- high range	10.5 mph (17 km/h)
- low range	7 mph (11 km/h)
- maximum reverse speed	
- high range	10.5 mph (17 km/h)
- low range	7 mph (11 km/h)
STEERING:	steering wheel mechanically linked to hydrostatic pumps
BRAKES:	hydrostatic control lever in neutral or caliper disc brakes with hand lever
HYDRAULIC SYSTEM:	
- hydrostatic traction drive	(see Traction Drive)
- reel and draper drives	auxiliary variable displacement pump, flow control valve, and motors on reel and drapers
- header, reel and wing lift	master and slave cylinders
NO. OF CHAIN DRIVES:	
- traction unit	1 (steering)
- header	1
NO. OF V-BELTS:	
- traction unit	4
LUBRICATION POINTS:	
- pressure grease fittings	42
- gearboxes	5
NO. OF PRELUBRICATED BEARINGS:	19
ENGINE:	
- make	ISUZU
- model	QD130 (six cylinder diesel)
- displacement	328 cu in (5.4 L)
- no load speed	2600 rpm
- power	111 hp (83 kW)
- fuel tank capacity	58 gal (264 L)
TIRES:	
- main drive wheels	two, 18.4 x 26, 6 ply
- castor wheels	two, 9.5L x 15, 6 ply
- wing wheels	two, 9.5L x 15, 6 ply

OVERALL DIMENSIONS:	FIELD		TRANSPORT	
- width	43.3 ft	(13.2 m)	12.2 ft	(3.7 m)
- length	23.6 ft	(7.2 m)	62.3 ft	(19.0 m)
- height	11.0 ft	(3.4 m)	11.0 ft	(3.4 m)
- wheel tread				
- front and rear	10.5 ft	(3.2 m)	10.5 ft	(3.2 m)
- drive to wing	11.5 ft	(3.5 m)		
- wheel base	12.5 ft	(3.8 m)		

WEIGHT: (fuel tanks empty)		
- traction unit	8130 lb	(3695 kg)
- header	5120 lb	(2327 kg)
TOTAL	13250 lb	(6022 kg)

	FIELD	
- drive wheels	9110 lb	(4140 kg)
- castor wheels	1060 lb	(482 kg)
- wing wheels	3080 lb	(1400 kg)

	SEMI-TRANSPORT	TRANSPORT
- drive wheels	12170 lb (5532 kg)	7000 lb (3182 kg)
- castor wheels	1080 lb (490 kg)	2480 lb (1127 kg)
- wing wheels	.....	3770 lb (1713 kg)

OPTIONS AND ATTACHMENTS: draper insert

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

IMPERIAL UNITS		MULTIPLY BY	SI UNITS
Acres (ac)		0.405	Hectares (ha)
Bushels/Acre (bu/ac)	- wheat	0.0672	Tonnes/Hectare (t/ha)
	- barley	0.0538	Tonnes/Hectare (t/ha)
	- rye	0.0628	Tonnes/Hectare (t/ha)
	- rapeseed	0.0560	Tonnes/Hectare (t/ha)
	- flax	0.0628	Tonnes/Hectare (t/ha)
Cubic Inches (cu in)		0 016	Litre (L)
Feet (ft)		0 305	Metres (m)
Feet per Minute (fpm)		0.005	Metre/Second (m/s)
Gallons/Hour (gal/h)		4,55	Litres/Hour (L/h)
Horsepower (hp)		0,75	Kilowatts (kW)
Inch (in)		25.4	Milhmetre (mm)
Miles per Hour (mph)		1.61	Kilometres/Hour (km/h)
Pounds (lb)		0.454	Kilograms (kg)

SUMMARY CHART

CO-OP IMPLEMENTS 742 SELF-PROPELLED WINDROWER

RETAIL PRICE: $76,045.00 (March, 1984, f.o.b. Humboldt Sask.)

	EVALUATION	COMMENTS
RATE OF WORK		
Average Speed	5 to 6 mph (8 to 10 km/h)	- slower in tangled or tall leaning crops - up to 7 mph (11 km/h) in straight even crops
Average Work Rate	16 to 20 ac/h (6.5 to 8.1 ha/h)	
QUALITY OF WORK		
Dividers	fair	- flattened some crops
Reel	good	- material caught on centre reel arms
Cutterbar	very good	- sufficient power
Header Flotation	very good	- hinged header followed topography
Draper	very good	
Windrow Formation		- parallel and fantail windrows predominant - parallel and angled parallel in leaning crops
Windrow Uniformity	very good	- uniform in most crops - some bunching in rapeseed and tall crops
EASE OF OPERATION AND ADJUSTMENT		
Visibility	very good	- the entire 42 ft (12.8 m) of cutterbar was visible
Operator Comfort	very good	- cab was quiet and clean
Controls and Instruments	good	- instruments were difficult to see - header and reels lifted too slowly
Handling	good	- operator experience required
Transporting	very good	- full transport in less than 15 minutes
Adjustments	very good	- all adjustments were convenient - reel lift system was awkward
Lubrication and Maintenance	good	- daily lubrication took 15 minutes - knife drives difficult to grease
POWER AND FUEL CONSUMPTION	2.8 gal/h (12.7 L/h)	- ample engine power
OPERATOR SAFETY	good	- neutral starting switch mounts interfered with operation of a steering arm - instruments behind the operator in full transport and no rearview mirror provided
OPERATOR MANUAL	good	- much useful information - contained a few errors

CAUTION:

This summary chart is not intended to represent the final conclusions of the evaluation reports. The relevance of the ratings is secondary to the information provided in the full text of the report. It is not recommended that a purchase decision be based only on the summary chart.

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