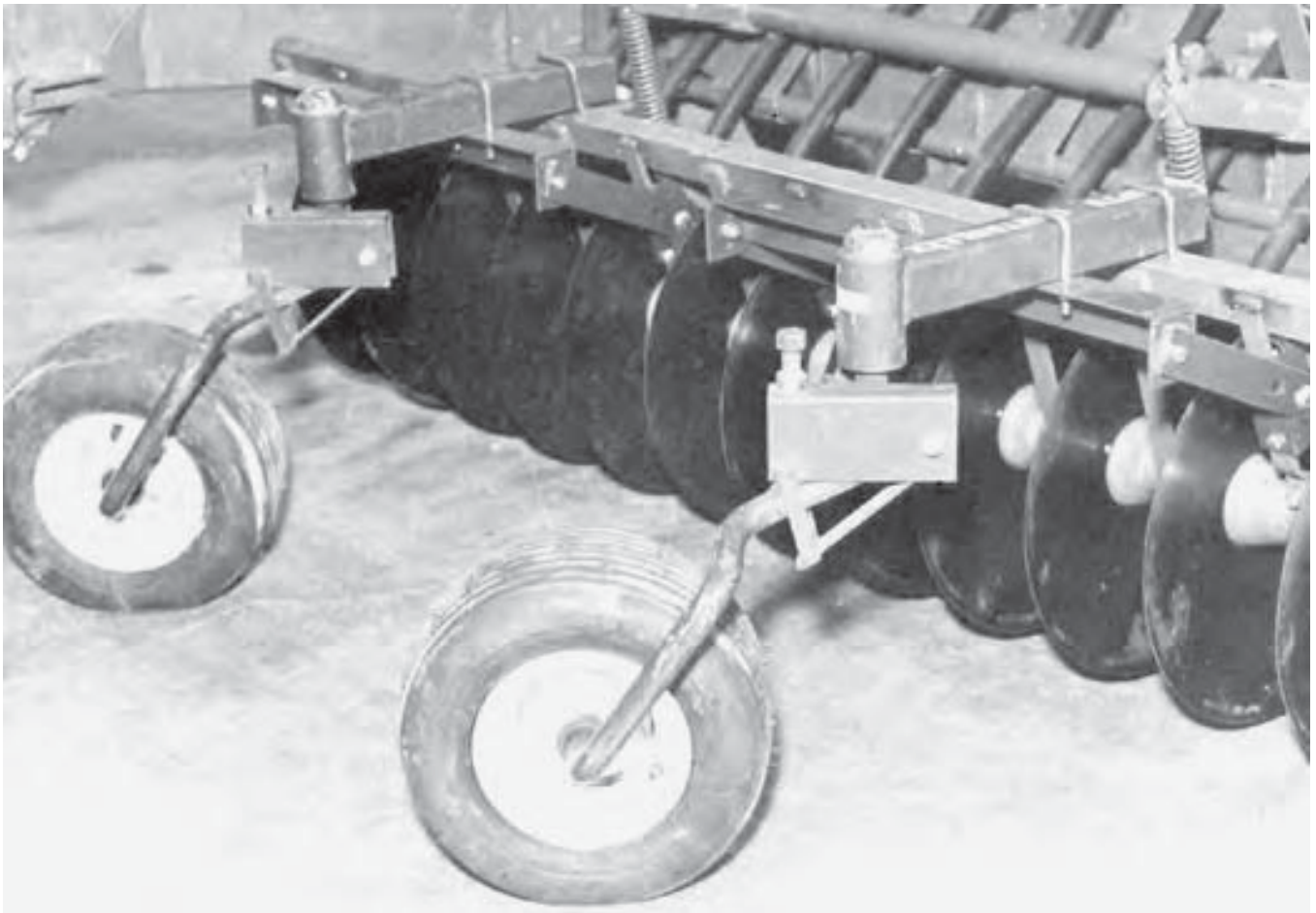


EVALUATION REPORT

363



Jeannotte Depth Controllers

A Co-operative Program Between



JEANNOTTE DEPTH CONTROLLERS

MANUFACTURER AND DISTRIBUTOR:

Jeannotte Manufacturing Ltd.
 Coderre, Saskatchewan
 S0H 0X0

RETAIL PRICE:

\$145.00 (April, 1984, f.o.b. Humboldt, Saskatchewan, one controller with hardware for mounting on a Massey Ferguson 369 disk gang).

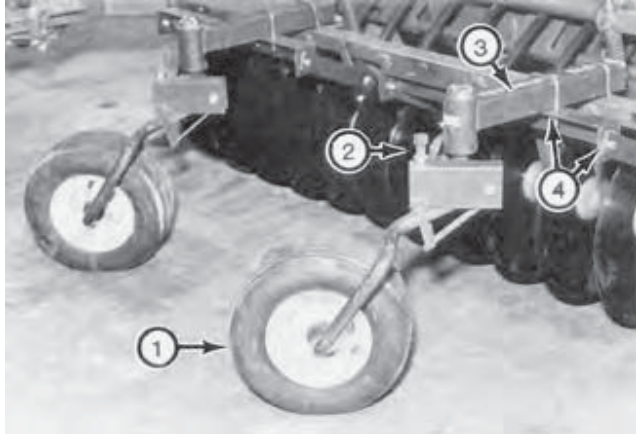


FIGURE 1. Jeannotte Controller Mounted to Disk Gang (1) Castoring Wheel, (2) Depth Adjustment Screw, (3) Mounting Arm, (4) Mounting Brackets and Clamps.

SUMMARY AND CONCLUSIONS

Quality of Work: The ability of the Jeannotte Depth Controllers to maintain a uniform seeding depth was good. Disk gangs with the controllers maintained a more uniform seeding depth in fields with varying soil hardness, than disk gangs without controllers. Additional weight or spring force could be added to the disk gangs to penetrate hard soils without excessive penetration occurring in soft soils.

The seeding depth with or without the controllers was not affected by changes in ground speed. In sharply rolling land, the disk gangs with the controllers followed the surface contours better than the disk gangs without controllers.

Disk stability was not affected by the controllers. Soil surface ridging did not occur. Mud did not build up excessively on the tires. The tires rode over trash and castored around stones and other obstacles.

Ease of Installation: Ease of installing the controllers was good. It took one man about 2 hours to install each controller.

Ease of Operation and Adjustment: Ease of operating and adjusting the controllers was very good. Disk gang and frame leveling and on-the-go adjustment of the depth control cylinders were less critical and seldom required when the Jeannotte controllers were used.

The seeding depth was easily adjusted and the wheels easily positioned behind the gangs. Clearance for transporting was adequate, however, the controllers interfered with the packer hitch when fully raised. A good, accurate low pressure gauge was required to measure tire pressure. Tire pressures were checked daily. No other servicing was required.

Operator Safety: No safety problems were apparent.

Operator Manual: Installation instructions were adequate. An operator manual was not available, but several operating hints were included with the installation instructions.

Mechanical History: No mechanical problems occurred during the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Providing an operator manual with the controllers.

Senior Engineer: G.E. Frehlich

Project Engineer: M.E. Jorgenson

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. A general operator manual including information on operation, servicing and parts will be provided.

GENERAL DESCRIPTION

The Jeannotte Depth Controllers are pneumatic gauge wheels that are mounted to each gang of a disk seeder to limit penetration and maintain a uniform seeding depth.

The controllers consist of a castoring wheel and mounting arm. The mounting arm is attached solidly to the trash bars of the disk gang and can be moved fore-and-aft to position the wheel behind the gang. Seeding depth is set by adjusting a depth stop on the castoring wheel.

Downward force on the disk gangs is applied by the existing gang springs, or by removing the springs and adding weight. Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The Jeannotte controllers were installed on a Massey Ferguson 360 Wide Level Disk Harrow which consisted of two 15 ft (4.6 m) units hitched in a piggyback configuration.

The controllers were operated in the conditions shown in TABLE 1 for 45 hours while seeding wheat and barley. They were evaluated for quality of work, ease of installation, ease of operation and adjustment, operator safety and suitability of the operator manual. Throughout the tests, comparisons were made to the uncontrolled disk unit.

TABLE 1. Operating Conditions

FIELD CONDITIONS	HOURS	EQUIVALENT FIELD AREA	
		ac	(ha)
Topography			
Level to undulating	11	118	46
Gently rolling	27	280	113
Moderately rolling	8	72	29
TOTAL	46	470	190
Stony Phase			
Occasional stones	29	308	125
Moderately stony	17	162	65
TOTAL	46	470	190

RESULTS AND DISCUSSION

QUALITY OF WORK

Seed Scatter: Accurate seed placement depends not only on how uniform the furrow opener depth is maintained but also on the amount of seed scatter that occurs when the seeds hit the bottom of the furrow.

Typically, on a disk seeder, even with all disks operating at the same depth on a level, uniform field, the seeds are scattered in a band with most seeds within 0.5 in (13 mm) of the average depth. This variation or seed scatter is caused by many factors such as seed spout design, seed drop height, ground speed, trash or lumps in the soil, and the smoothness of the soil surface. This variation occurs regardless of the depth of operation. Therefore, the Jeannotte controllers could not reduce the amount of seed scatter which occurred.

Seeding Depth Uniformity: The function of a depth controller is to maintain the disk gangs at a constant depth when conditions such as soil hardness, ground speed or field topography vary. Maintaining this constant disk gang depth will result in a uniform average seeding depth.

The average seeding depth did not change significantly due to variations in soil hardness when the Jeannotte Depth Controllers were used on the disk gangs (TABLE 2). However, without the controllers, large changes in the average seeding depth occurred. The controllers permitted large spring forces or weights to be applied to the disk gangs for penetrating hard soils while preventing the gangs from sinking too deep in the soft soils. Therefore, the controllers were beneficial in soils of varying hardness.

The average seeding depth did not change significantly due to variations in ground speed with or without the Jeannotte controllers. Generally, at higher ground speeds, the disks do not penetrate as well and the seeding depth decreases. However, the results shown in TABLE 2 were obtained from tests conducted in a soft, loose field where penetration was not a problem.

Also, the average seeding depth did not change significantly with changes in field topography when the Jeannotte Depth Controllers were used. However, without the controllers, the change in the seeding depth was significant. This was also evident from observing the disk gang penetration. In steep sided ravines, some of the gangs without controllers did not penetrate the soil at the bottom of the ravine. The wide rigid frame of the disk seeder did not flex to permit the gangs to follow the soil surface. With the controllers, although the seeding depth varied when going through a ravine, the seeds were still placed in the soil. Therefore, in sharply rolling land, the controllers improved depth control.

Effect on Disk Stability: The Jeannotte Depth Controllers did not greatly affect stability. In sharply rolling fields, the improved depth control slightly reduced the variation in the width of cut. In hard fields, stability can be improved by adding weights to the rear furrow wheel.

Soil Surface: The controller wheels had to be located far enough behind the disk gangs to prevent soil thrown by the disks from hitting the tire and forming a ridge. For speeds up to 5 mph (8 km/h) a distance of about 32 in (813 mm) from the gang shaft to the controller axle was suitable. The tire left a compacted track about 6 in (154 mm) wide (FIGURE 2), which was no longer visible after harrowing or packing.



FIGURE 2. Jeannotte Tire Tracks Behind the Disk Seeder.

TABLE 2. Summary of Seeding Depth Comparison¹

CONDITIONS	AVERAGE SEEDING DEPTH in (mm)			
	WITH CONTROLLERS		WITHOUT CONTROLLERS	
Field Hardness				
Soft summerfallow	1.9	47	2.0	52
Hard summerfallow	1.8	45	1.1	29
Ground Speed				
3 mph (4.8 km/h)	2.9	74	2.5	63
5 mph (8.0 km/h)	2.9	74	2.5	63
Field Topography				
Level ground	2.4	61	1.9	47
Ravine bottom	2.1	53	1.3	33
Crest of hill	2.1	53	2.4	60

¹See APPENDIX II for further analysis of the results.

Mud, Trash and Stone Clearance: In wet and sticky soils, tire pressure was maintained at 4 to 6 psi (27 to 41 kPa). This allowed the tires to flex sufficiently to clear off soil before too much built up (FIGURE 3). Depth of seeding was not significantly affected by a slight change in tire pressure.

The Jeannotte controller wheels castored around stones and other obstacles. The wheels did not interfere with normal trip clearance of the disk gangs. No damage occurred to the controllers or to the disks. However, at high gang spring settings for maximum penetration, spring compression and trip clearance were greatly reduced. Adding weights to the gangs would increase the chance of damage and put more stress on the lift system.

The tires easily rode over heavy trash and clumps of straw.



FIGURE 3. Operating in Wet Loam Soil.

EASE OF INSTALLATION

It took one man about 2 hours to mount each Jeannotte controller on a disk gang. Several sketches and detailed instructions adequately explained the installation procedure.

A welder, power drill and hand wrenches were required for installation. Some of the holes had to be drilled in awkward locations and could not be reached easily with a hand drill.

EASE OF OPERATION AND ADJUSTMENT

Seeding Depth Adjustment: Disk gang and frame leveling, and on-the-go depth cylinder adjustment were less critical and seldom required when the depth controllers were used. Without the Jeannotte Depth Controllers, these adjustments were more important and the operator had to frequently adjust the depth cylinders on-the-go to maintain a uniform seeding depth. Also, it was difficult for the operator to judge the tillage depth and make the necessary adjustment. This was especially true of a multiple disk hookup, since the depth cylinders of the last units could not be seen.

Seeding depth was adjusted by turning the threaded stop on the controllers to raise or lower the depth wheel. A locking nut secured the depth setting. A wrench was required for adjusting the depth, but since adjustments were made infrequently, this was not considered inconvenient.

Adjusting the controllers to obtain a uniform depth across the width of the machine was easily done using the procedure outlined by the manufacturer. The depth controllers greatly reduced the need for leveling the disk frame and adjusting gang spring pressure for different field conditions.

Fore-and-Aft Positioning: The Jeannotte controller wheels were adjusted fore-and-aft by sliding the mounting arm between two clamps on the trash bars. The wheel was adjustable between 22½ and 35 in (580 and 900 mm) from the gang shaft to the controller wheel axle. This was suitable for positioning the wheel as close to the gang as possible without interrupting the throw of soil from the disk.

Transporting: The Jeannotte controllers raised up with the gangs and castored in toward the gangs for transporting. The controller mounting arms interfered with the packer hitch when the controllers were fully raised.

Lubrication: The tire pressures were checked daily. No recommendations were given for lubrication of the castor arm or wheel bearings.

OPERATOR SAFETY

The Jeannotte controllers were safe to operate if normal safety precautions were observed.

OPERATOR MANUAL

An operator manual was not available for the Jeannotte controllers. Several sheets of assembly and installation instructions were supplied. They contained useful hints on operation and adjustments. It is recommended that the manufacturer consider providing an operator manual with the Jeannotte controllers.

DURABILITY RESULTS

The Jeannotte Depth Controllers were operated on a MF 360 Wide Level Disk Harrow for 45 hours. The intent of the test was to evaluate the functional performance of the machine. An extended durability test was not conducted. No mechanical problems occurred during functional testing.

APPENDIX I	
SPECIFICATIONS	
MAKE AND MODEL:	Jeannotte Depth Controllers
SERIAL NO.:	N/A
MANUFACTURER: Jeannotte Manufacturing Ltd. Coderre, Saskatchewan S0H 0X0	
DIMENSIONS:	
-tire size	16 x 650 8 NHS
-tire outside diameter	16 in (400 mm)
-tread width	5½ in (140 mm)
-fore-and-aft adjustment range	12½ in (320 mm)
-depth adjustment range	9½ in (240 mm)
LUBRICATION POINTS:	
-10 h	none
-seasonal	wheel bearings
NUMBER OF SEALED BEARINGS:	3 per controller
WEIGHT	
-as shipped	60 lb (27 kg)
OPTIONAL EQUIPMENT:	mounting hardware and installation instructions for GGIL G-100 CI-1001, MF 36, 360 JD 1900, IH 300, 310 diskers

APPENDIX III	
MACHINE RATINGS	
The following rating scale is used in Machinery Institute Evaluation Reports:	
excellent	fair
very good	poor
good	unsatisfactory

APPENDIX IV		
CONVERSION TABLE		
IMPERIAL UNITS	MULTIPLY BY	SI UNITS
Feet (ft)	03	Metres (m)
Inches (in)	254	Millimeters (mm)
Acres (ac)	04	Hectares (ha)
Pounds (lb)	045	Kilograms (kg)
Miles per hour (mph)	161	Kilometers per hour (km/h)
Pounds per square inch (psi)	689	Kilopascals (kPa)

APPENDIX II

SEED PLACEMENT RESULTS

The results of seed placement data are shown in TABLE 3. The analysis of variance was used to determine if field hardness, ground speed or field topography had a significant effect on the average seeding depth. Variance ratios marked with an asterisk (*) indicate there is a 95% probability that the condition affected the average seeding depth. Results obtained in different field conditions may vary considerably.

TABLE 3. Seed Placement Analysis

CONDITIONS	SEED PLACEMENT									
	WITH CONTROLLER					WITHOUT CONTROLLER				
	AVE. DEPTH		STD. DEVIATION		VARIANCE RATIO	AVE. DEPTH		STD. DEVIATION		VARIANCE RATIO
	in	mm	in	mm	%F	in	mm	in	mm	%F
Field Hardness										
Soft summerfallow	1.9	47	0.7	18	0.3	2.0	52	0.6	14	32.6
Hard summerfallow	1.8	45	0.6	15		1.1	29	0.6	14	
Ground Speed										
3 mph (4.8 km/h)	2.9	74	0.7	17	0.0	2.5	63	0.5	12	0.0
5 mph (8.0 km/h)	2.9	75	0.7	18		2.5	63	0.8	20	
Field Topography										
Level ground	2.4	61	0.5	12	1.5	1.9	47	0.6	14	15.4
Ravine bottom	2.1	53	0.7	19		1.3	33	1.0	25	
Crest of hill	2.1	53	1.0	25		2.4	60	0.6	15	



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