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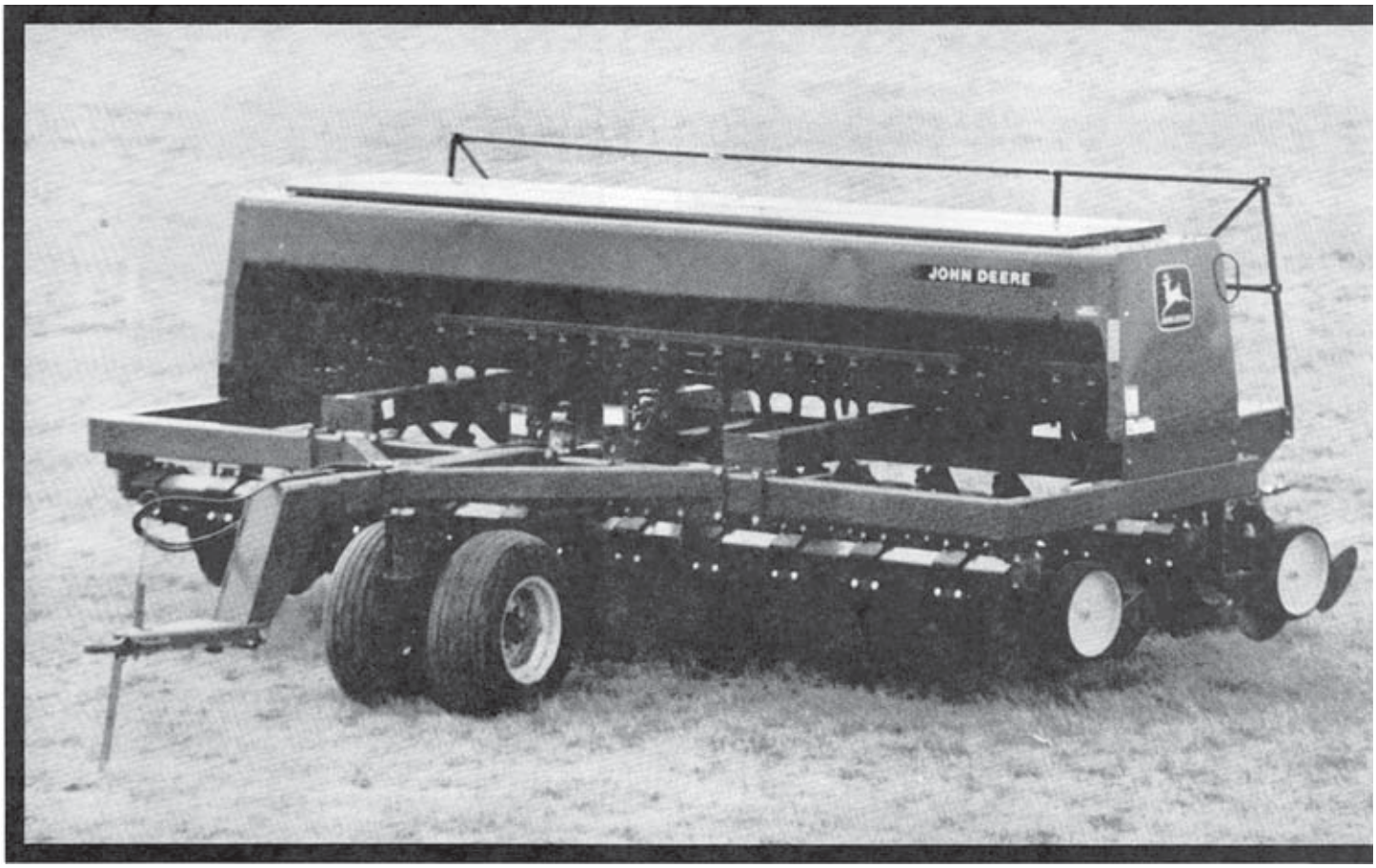

John Deere 752 Grain Drill

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

JOHN DEERE 752 GRAIN DRILL

MANUFACTURER AND DISTRIBUTOR:

John Deere Des Moines Works
P.O. Box 1595
Des Moines, Iowa
USA 50306

RETAIL PRICE:

$36,112.00 (March 1992, f.o.b. Lethbridge, Alberta) John Deere 752 Grain Drill

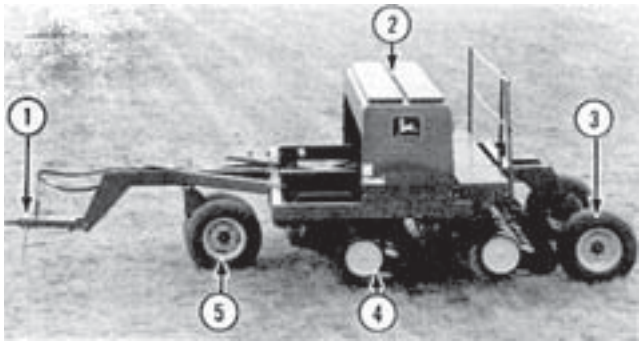

FIGURE 1. John Deere 752 Grain Drill: (1) Hitch, (2) Grain and Fertilizer Boxes, (3) Support Wheels, (4) Opener Assembly, and (5) Castor Wheels.

SUMMARY

QUALITY OF WORK

Penetration of the John Deere 752 Grain Drill was good. Penetration was more uniform across the entire width of the drill when seeding into soils with adequate moisture or at shallow depths.

Seed and fertilizer placement was good. Variation in seed and fertilizer depth was small when seeding in firm untilled soil or at shallow seed depths. Variation in seed and fertilizer depth was large when seeding in tilled or light untilled soils at deep seed depths.

Soil finishing was good. After seeding into untilled stubble fields some stubble remained standing and the majority of the straw was left on the surface. An uneven soil surface was usually left after seeding into previously tilled fields.

Trash clearance was very good. The opener systems allowed trash to flow with no plugging. Operation in stony conditions was very good. The lift height of the openers was adequate to clear large rocks.

Metering accuracy was good. Differences between the manufacturer's and Alberta Farm Machinery Research Centre's (AFMRC) metering calibrations were attributed to the difference in seed size, density and moisture content. Uphill and downhill slopes caused a 16% decrease and a 13%t increase in the metering rate of 11-51-00 fertilizer.

The distribution uniformity of the application rate was very good. The seeding rate across the width of the drill was very uniform for wheat, barley, canola, peas and 11-51-00 fertilizer.

EASE OF OPERATION AND ADJUSTMENT

Ease of performing routine maintenance was fair. Access to the grease fittings on the front row of openers was difficult. Total time required to service all 137 grease fittings was 45 minutes for one person.

Ease of filling and cleaning was good. The seed and fertilizer boxes emptied unevenly during the test due to the position of the box supports. The seed cups were not adequately protected from moisture by a heavy rain or water running down the front of the box. Fertilizer would eventually cake in the corrugation of the hoses, fall down and plug the seed boots if not cleaned after applying fertilizer.

Ease of transporting was very good. Five minutes were required to place the unit in transport position. Operation in the field was hampered by the lack of a field marker.

Monitoring was good. A four digit acre meter with reset was supplied with the unit. The seed cups could be viewed from the tractor during field operation to monitor the seed flow to the openers. No motion indicator was provided for the metering shafts.

Ease of changing the seed and fertilizer rates was very good. The seed rate was set by sliding the fluted feed rolls using a lever for each side of the drill. The fertilizer feed shaft speed was set using drive sprocket combinations and a gear case.

Ease of setting the seeding depth was fair. The opener down pressure was set by changing the depth stop for the hydraulic cylinder. Five various adjustments were required on each opener to set the seeding depth.

POWER REQUIREMENTS

Average tractor size needed varied from 66 PTO hp (50 PTO kW) to 87 PTO hp (65 PTO kW). Maximum tractor size needed was 139 PTO hp (104 PTO kW).

OPERATOR SAFETY

The John Deere 752 Grain Drill was safe to operate if normal safety precautions were observed. A safety chain and warning lights were not provided with the test unit but were available. A slow moving vehicle sign was provided.

OPERATOR'S MANUAL

The operator's manual was very good. The manual was clearly written, with many photographs for explanations.

MECHANICAL HISTORY

Several of the rubber delivery hoses were damaged on the front row of openers due to interference with the drill frame. Average wear for each disk blade opener was 0.3 in (8 mm) after seeding 34 ac (14 ha),

RECOMMENDATIONS

The AFMRC recommends that the manufacturer consider:

1. Modifying the seed metering system to meter canola rates of less than 8 lb/ac (9 kg/ha).
2. Modifying the fertilizer metering system to eliminate the effect of slopes on rates.
3. Modifying the seed and fertilizer boxes for more uniform emptying.
4. Installing a cover or drip edge on the front of the seed box to prevent moisture from entering the seed cups.
5. Offering a field marker as optional equipment.

Manager: R.P. Atkins

Project Engineer: L.W. Papworth

THE MANUFACTURER STATES THAT:

With regards to recommendation number:

1. A half-speed drive kit, John Deere part number BN211041, is available to reduce the seeding rate by approximately 50%. This kit is recommended when seeding canola and other crops at very low rates.
2. Sloping ground affects the fertilizer application rate on most drills on the market today. Experience has shown that John Deere fertilizer meters operate within acceptable limits.
3. We are evaluating revisions to the seed and fertilizer boxes to provide more uniformity of emptying. It is important that the ends of the drill box be filled completely in order to achieve even emptying of the various compartments.
4. The drip edge recommended has been built into the seed boxes since September 1991, to prevent water from running down the box and into the seed cups. The drip edge is located on both the front and rear sides of the box.
5. We are considering providing markers for the 752 drills. At the present time, several manufacturers offer markers that fit the drill.

THE MANUFACTURER ALSO STATES THAT:

1. The acre meter is provided as standard equipment on all John Deere grain drills.

2. The grease interval on the openers was increased from 25 to 50 hours for drills built after September 1991. New pivot bushings were incorporated at that time.
3. Access to the fertilizer compartment was improved for drills built after September 1991. This will aid clean out.

GENERAL DESCRIPTION

The John Deere 752 Grain Drill is a seeding unit, which consists of a seed and fertilizer box mounted above two rows of opener assemblies. The front of the unit is supported by the tractor hitch or an optional castor wheel assembly. The back of the unit is supported by two wheels. Available widths of the drill are 10 and 15 ft (3.1 and 4.6 m).

Seed is metered by externally straight fluted feed rolls and fertilizer is metered with externally ridged traction wheels. A flexible rubber hose delivers the seed and fertilizer to the opener assembly. Seed rate is adjusted by sliding the feed roll to vary the exposed length in the seed cup. Fertilizer rate is adjusted by sprocket combinations and a variable speed gear case.

The opener and closing assemblies consist of a disk blade, pressure spring, gauge wheel, seed boot, press wheel and closing wheel. Seed depth is controlled by the gauge wheel and the force on the disk blade is controlled by the pressure spring. The assemblies are mounted on rockshafts, which rotate to raise and lower the openers. A hydraulic cylinder rotates the rockshaft.

Opener spacings are 7.5 or 10 in (191 or 254 mm). The front row of openers can be locked up to double the opener spacing. Optional equipment includes an acre meter and a grass seeding attachment.

The test unit was 15 ft (4.6 m) wide and equipped with the front castor wheel assembly and acre meter. FIGURE 1 shows the location of major components. Detailed specifications are given in APPENDIX 1.

SCOPE OF TEST

The John Deere 752 Grain Drill was operated in the field conditions shown in TABLE 1 for 107 hours while seeding 811 ac (325 ha). The unit was evaluated for quality of work, ease of operation and adjustment, power requirements, operator safety and suitability of the operator's manual. Seed and fertilizer metering systems were calibrated in the laboratory.

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

TABLE 1. Operating Conditions

Material	Soil Type and Operation	Stone Conditions	Field Area		Hours
			ac	ha	
Wheat	Clay Loam Secondary	Occasioal Stones	34	14	7
Wheat	Sandy Loam Primary	Occasioal Stones	102	41	12
Wheat	Sandy Loam Secondary	Moderately Stony	40	16	5
Wheat	Sandy Loam Primary	Stone Free	97	39	14
Wheat	Clay Loam Secondary	Stone Free	18	7	4
Canola	Clay Secondary	Stone Free	30	12	4.5
Wheat	Clay Primary	Stone Free	57	23	6.5
Barley	Clay Loam Secondary	Occasioal Stones	23	9	4
Wheat	Silt Loam Secondary	Occasioal Stones	80	32	9.5
Wheat	Silt Loam Primary	Occasioal Stones	103	41	13.5
Wheat	Clay Loam Primary	Occasioal Stones	227	91	27
Total			811	325	107

RESULTS AND DISCUSSION

QUALITY OF WORK

Penetration: Penetration of the Model 752 was good. The disk blades occasionally rode out when seeding at a 2 in (51 mm) depth into hard untilled soils. Penetration was more uniform across the entire width of the drill when seeding into soils with adequate moisture or at shallow depths. Penetrating ability decreased as the seed and fertilizer box emptied. The addition of weights would have increased the penetration when operating with a low level of material in the boxes. Individual openers were set deeper in the tractor tire tracks.

The unit was operated at 4 to 5 mph (6 to 8 km/h) during the test.

The front castor and the back support wheels provided adequate support for the drill. The gauge wheels provided adequate support for each opener assembly. The spring openers allowed the drill to follow rolling field contours. The openers came out of the ground while operating through sharp gulleys.

The opener and closing system (FIGURE 2) consisted of a compression spring, disk blade opener, gauge wheel, press wheel and closing wheel. The compression spring force was varied by turning the rockshaft with the hydraulic cylinder. FIGURE 3 shows the force deflection curve for the compression spring on the opener system. The force applied to the disk blade was less depending on the angle of the spring to the ground.

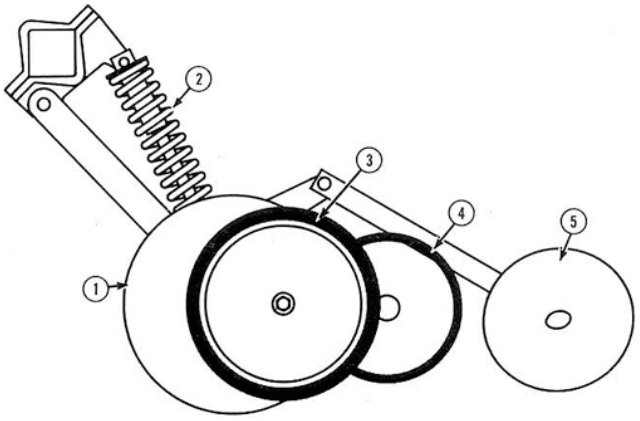

FIGURE 2. John Deere 752 Opener and Closing System: (1) Disk Blade Opener, (2) Compression Spring, (3) Gauge Wheel, (4) Press Wheel and (5) Closing Wheel.

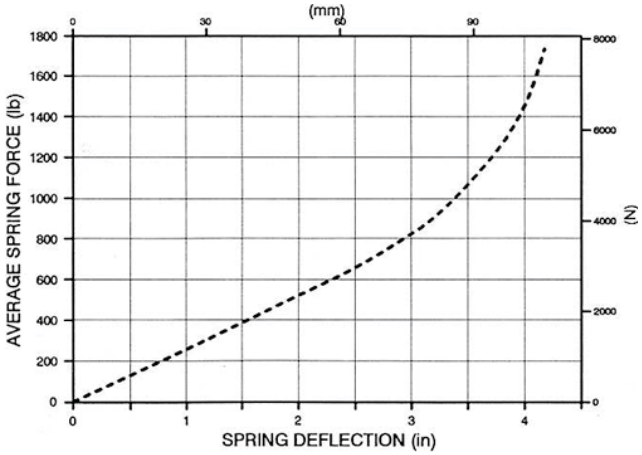

FIGURE 3. Force Deflection Curve for the John Deere 752 Opener Compression Spring.

Seed and Fertilizer Placement: The seed and fertilizer placement of the Model 752 was good. The seed and fertilizer were placed together in the furrows. The seed boot was located beside the disk blade. The band widths of the rows were an average of 1.4 in (36 mm).

Variation in seed and fertilizer depth was small when seeding in firm untilled soil or at shallow seed depths. For example, at an average seed depth of 1.4 in (36 mm), most seeds were placed within 0.5 in (13 mm) of the average seed depth while seeding wheat.

Variation in seed and fertilizer depth was large when seeding in tilled or light untilled soils at deep seed depths. The back row of openers threw soil over the rows seeded by the front row of openers. This resulted in the front row being seeded by as much as 1.1 in

(28 mm) deeper than the back row. This variation in seed depth could be eliminated by operating at speeds below 4 mph (6 km/h). Operating the drill with the seed boots in the middle or top position would also have eliminated the uneven seed depths in light soils. At these operating positions seed depths greater than 1 in (25 mm) were not possible.

Soil Finishing: Soil finishing of the Model 752 was good. FIGURE 4 shows the soil surface before and after seeding into an untilled wheat stubble field. The majority of the straw was left on the surface and some stubble remained standing except in the path of the gauge wheels.

FIGURE 4. Soil Surface Before (right) and After (left) Seeding into a Mustard Stubble Field.

FIGURE 5 shows the soil surface after seeding into a previously tilled field. As mentioned before, the back row of openers threw soil over the rows seeded by the front row of openers. This resulted in an uneven soil surface. The path of the gauge wheels was left smooth and lump free in light soil conditions.

Ridge depths left by the soil openers varied depending on the soil, operating speed and seed depth. The packing force was adequate for the soils and conditions encountered during the test. Operation of the drill in wet soil conditions was not possible during the test. The closing wheels left ribbons of soil on the surface and soil built up between the seed boots and disk blade openers.

Turning corners with the openers in the ground in loose soil left large furrows. Smaller furrows were left in firm soil.

FIGURE 5. Soil Surface Before (left) and After (right) Seeding into a Previously Tilled Field.

Trash Clearance: Trash clearance of the Model 752 was very good. The opener systems allowed trash to flow with no plugging. Hairpinning of straw in the furrow was not significant during the test.

Stony Conditions: Operation of the Model 752 in stony conditions was very good. The only damage that occurred to the opener system was small metal chips on the closing wheels. The lift height of the openers was adequate to clear large rocks.

Metering Accuracy: Metering accuracy of the Model 752 was good. The metering rate for seed was varied by changing the amount of exposed flute. The metering rate for fertilizer was varied by changing the gear ratio for the fluted traction wheels. The calibration curves obtained by AFMRC and the manufacturer for the Model 752 in wheat, barley, canola, peas and 11-51-00 fertilizer are given in Figures 6 to 10. The manufacturer's adjusted rate was calculated by adjusting the manufacturer's rate for the difference in seed and fertilizer density. The middle feed gate setting was used to meter the peas. Any differences between the calibration curves obtained by AFMRC and those given by the manufacturer are likely due to different seed size, density and moisture content. The densities obtained by AFMRC and the manufacturer are indicated on the graphs. The minimum seeding rate for canola was 8 lb/ac (9 kg/ha). The AFMRC recommends that the manufacturer consider modifying the seed metering system to meter canola rates of less than 8 lb/ac (9 kg/ha).

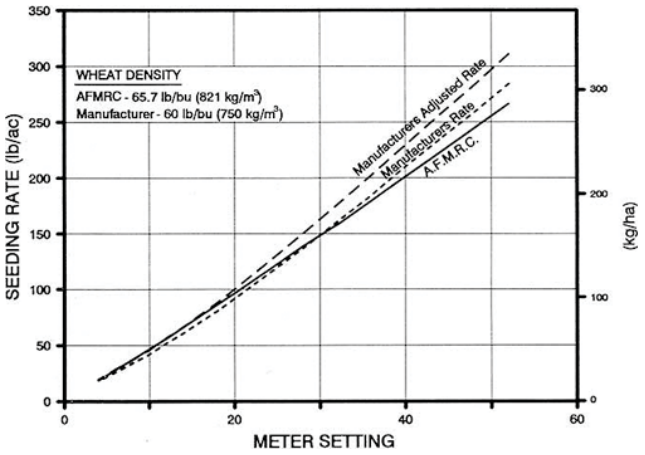

FIGURE 6. Metering Accuracy in Wheat.

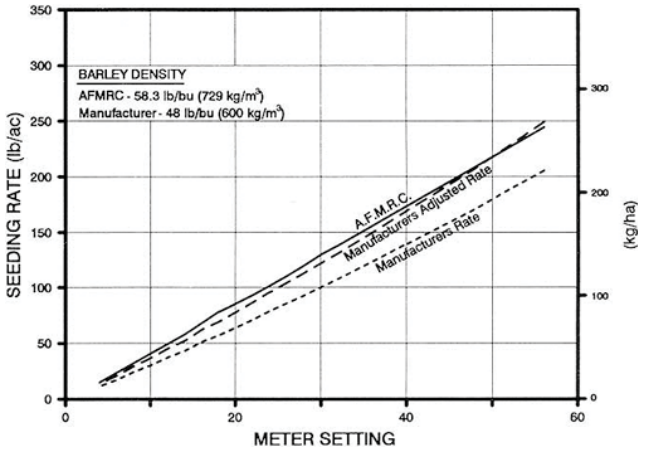

FIGURE 7. Metering Accuracy in Barley.

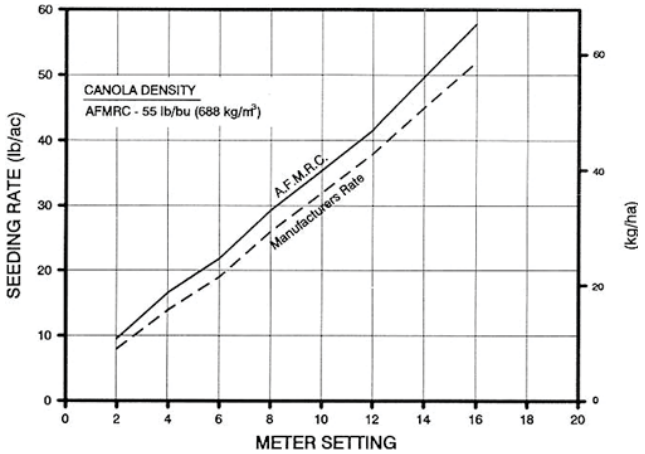

FIGURE 8. Metering Accuracy in Canola.

Level of material in the tank, field roughness and variations in ground speed had no significant effect on metering rates.

Operating the Model 752 on slopes did not affect the metering rate of wheat but did affect the metering rate of 11-51-00 fertilizer as shown in FIGURE 11. Travelling on a 15° side slope caused a 5% increase in the metering rate of 11-51-00 fertilizer. Travelling on

a 15° downhill slope caused a 13% increase and travelling on a 15° uphill slope caused a 16% decrease in the metering rate of 11-51-00 fertilizer. The AFMRC recommends that the manufacturer consider modifying the fertilizer metering system to eliminate the effect of slopes on rates.

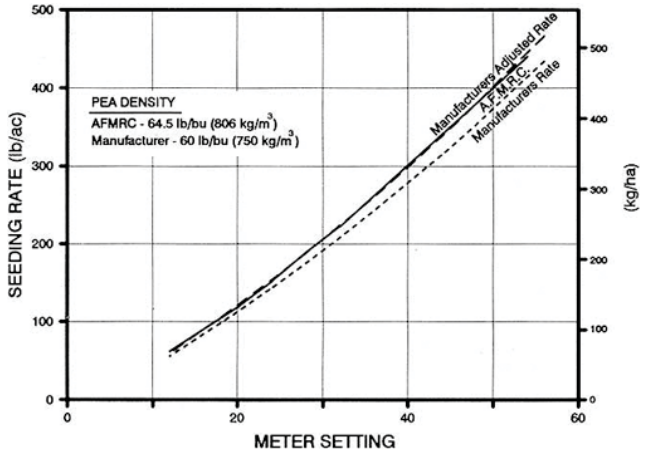

FIGURE 9. Metering Accuracy in Peas.

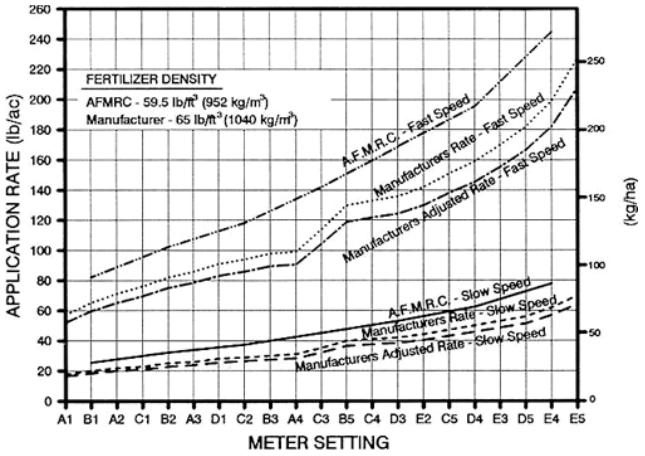

FIGURE 10. Metering Accuracy in 11-51-00 Fertilizer.

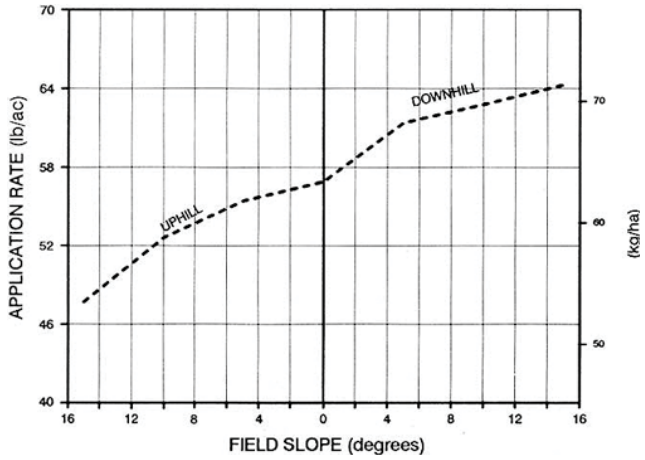

FIGURE 11. Variation in 11-51-00 Fertilizer Application Rate with Change in Slope.

Distribution Uniformity: Uniformity of distribution of the application rate for the Model 752 was very good. The seeding rate, across the width of the machine, was very uniform for wheat, barley, canola, peas and 11-51-00 fertilizer. The coefficient of variation (CV)[1] varied from 1 to 7% for wheat, 3 to 8% for canola and 1.5 to 5% for barley and peas. The higher CV's were obtained at the lower application rates. The CV for 11-51-00 fertilizer averaged 3 per cent at all application rates.

[1]The coefficient of variation (CV) is the standard deviation of application rates from individual seed cups expressed as a percent of the average application rate. An accepted variation for seeding or applying fertilizer is a CV value not greater than 15%. If the CV is less than 15%, distribution is acceptably uniform, whereas if the CV is greater than 15%, the variation in application rate among individual seed cups is excessive.

Level of material in the tank and field slopes had no effect on the uniformity of distribution of the application rates.

Seed Handling: Seed handling was very good. Damage by the metering system was negligible for both small and large seeds.

EASE OF OPERATION AND ADJUSTMENT

Maintenance: Ease of performing routine maintenance on the Model 752 was fair. Each opener assembly required greasing in one place every 50 hours and in four places every 25 hours. Access to the grease fittings on the front row of openers was difficult. The rest of the unit required greasing every 5 to 50 hours depending on the grease fitting. The wheel hubs required greasing every 150 hours. The level of oil in the fertilizer speed gear case had to be checked annually. Total time required to service all 137 grease fittings was 45 minutes for one person.

Filling/Cleaning: Ease of filling and cleaning the Model 752 was good. The wide metal walkway and safety rail made filling the seed and fertilizer boxes safe and convenient. The seed box held 29.1 bu (1058 L) and the fertilizer box held 26.1 ft³ (0.74 m³) of fertilizer.

The boxes were filled by pail or with a drill fill during the test. Some short drill fills would not reach the drill boxes. A spill shield was provided for the seed box to prevent seed from getting in the 3.5 in (89 mm) wide area between the two lids.

The seed and fertilizer boxes emptied unevenly during the test due to the position of the box supports. The AFMRC recommends that the manufacturer consider modifying the seed and fertilizer boxes for more uniform emptying.

The 8.5 in (216 mm) wide seed box opening and the 9 in (229 mm) wide fertilizer box opening allowed only a small pail to be used when cleaning large amounts of material out of the boxes. Seed in the bottom of the box was brushed through the feed cups after fully opening the feed gates. The agitator shaft in the seed box hindered this procedure. A vacuum cleaner or compressed air was faster and usually used during the test to clean small amounts of seed out of the box.

The inside bottom of the fertilizer box was difficult to reach from the walkway. Small amounts of fertilizer in the bottom of the box were easily brushed through by removing the drop bottom covers, baffles and feed shaft. Removing the baffles was difficult due to binding.

The seed box was adequately sealed to prevent leakage during a rain. The seed cups were not adequately protected from moisture by a heavy rain or water running down the front of the box. The AFMRC recommends that the manufacturer consider installing a cover or drip edge on the front of the seed box to prevent moisture from entering the seed cups.

The fertilizer box was not adequately sealed to prevent leakage during a rain. The manufacturer recommended that the fertilizer box be cleaned out before storing overnight or during winter. Fertilizer would cake in the corrugations of the rubber delivery hoses, fall down and plug the seed boots. To avoid this problem the rubber delivery hoses were cleaned out after applying fertilizer during the test.

Transporting: Ease of transporting the Model 752 was very good. Five minutes were required to place the unit in transport position (FIGURE 12). A hydraulic valve locked the hydraulic system (FIGURE 13) to hold the openers in transport position. Transport width was 15.5 ft (4.7 m) and transport height was 6.7 ft (2.0 m).

FIGURE 12. Transport Position.

The unit required the use of a tractor with one set of remote hydraulics to raise and lower the openers.

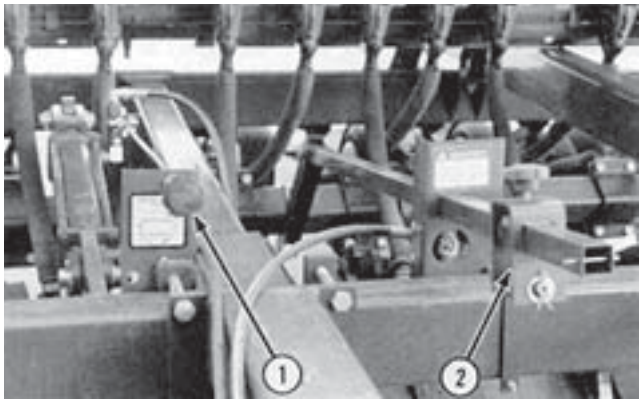

FIGURE 13. John Deere 752 Components: (1) Transport Hydraulic Lock and (2) Sliding Lock for Opener Down Pressure.

The manufacturer recommended that a transport speed of not more than 10 mph (16 km/h) be used when the drill contained seed or fertilizer. The maximum ground clearance of 7.5 in (191 mm) was adequate for transporting during the test. The wheel tread of 8.4 ft (2.6 m) provided adequate stability for both field operation and transporting.

Operation of the Model 752 in the field was hampered by the lack of a field marker. Visibility of the far left opener from the tractor was poor because it was located on the back row of openers. A marker was built by AFMRC for use during the test because of the low soil disturbance by the drill. The AFMRC recommends that the manufacturer consider offering a field marker as optional equipment.

Monitoring: Monitoring on the Model 752 was good. Monitoring equipment included an acre meter. The acre meter (FIGURE 14) was a four digit mechanical unit with a reset. The acre meter read an average of 3 per cent high. This varied with the amount of weight on the metering drive wheel.

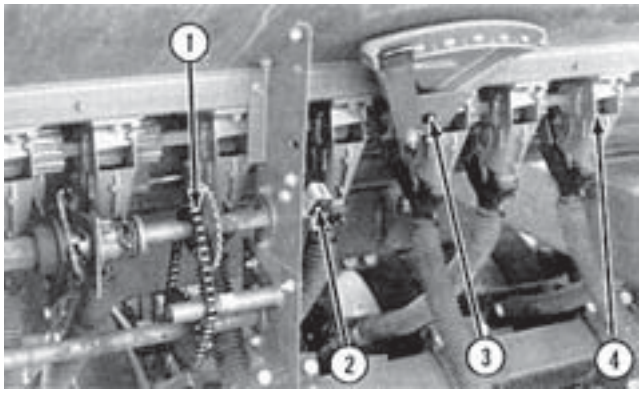

FIGURE 14. John Deere 752 Components: (1) Fertilizer Speed Drive Sprockets, (2) Acre meter, (3) Seed Meter Lever Adjustment and (4) Seed Feed Gate.

The seed cups were viewed from the tractor during field operation to monitor the flow of seed to the openers. A plugged delivery hose or opener was indicated by material overflow out of the seed cup. No motion indicator was provided for the metering shafts. A window was provided on the seed box to indicate the seed level.

Seeding and Fertilizer Rates: Ease of changing the seed and fertilizer rates was very good. The seed rate was set by sliding the fluted feed rolls using a lever. A lever adjustment (FIGURE 14) was provided for each side of the drill. The numerical scales for the lever notches ranged from 0 to 60. Access to the levers was difficult due to the drill frame. The seed cup feed gates (FIGURE 14) were set at one of three positions. Each feed gate was set separately. The bottom setting was for large seeds such as peas and beans. The middle setting was for medium seeds such as corn. The top setting was for cereals and oilseeds.

The fertilizer feed shaft speed was set using drive sprocket combinations and a gear case. The drive sprocket combinations were changed by moving a chain between two sets of sprockets (FIGURE 14). The gear case (FIGURE 15) contained two sliding selector arms and a lock. Twenty-one gear combinations were available from the gear case for each of the two drive sprocket combinations. The Model 752 was calibrated by removing an outside delivery hose from a seed cup and attaching a collection bag on the cup. The drive wheel was then raised and turned a measured number of turns or the drill was operated for a measured distance in the field. The seed cups were zeroed at the start of the test. Several seed cups on the right side of the drill could not be completely zeroed. The lever adjustments could also not be zeroed on the numerical scale settings. This would have made the seed cups easier to zero.

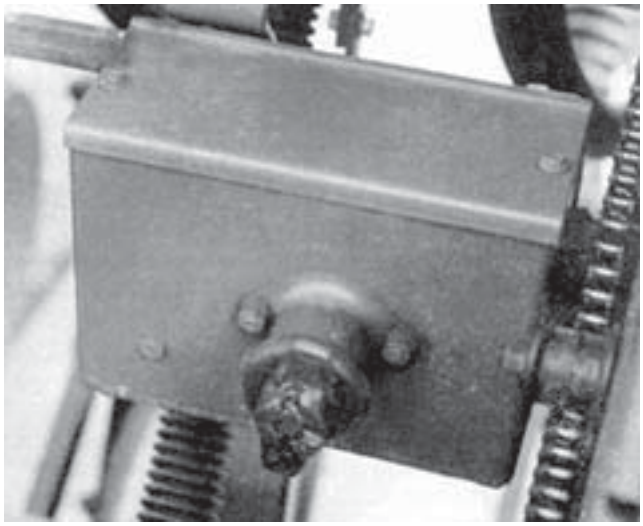

FIGURE 15. Fertilizer Speed Gear Case.

Depth Adjustment: Ease of setting the seeding depth was fair. The opener down pressure was set by sliding the lock (FIGURE 13) along a tube to change the depth stop for the hydraulic cylinder. A numerical scale on the tube for easy reference was not provided on the test unit but was available. Too high a down pressure lifted the left rear transport wheel off the ground. Five adjustments were made or checked on each opener to set the seeding depth. An adjustment tool was supplied to make the various adjustments. The opener depth was set by rotating the adjusting plate (FIGURE 16) to one of seven locking positions. An open end wrench was also needed to unlock the locking pin for the adjusting plate.

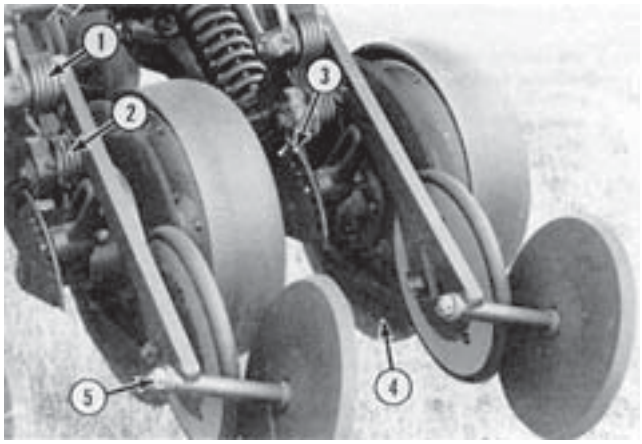

FIGURE 16. John Deere 752 Opener Settings: (1) Closing Wheel Pressure Setting, (2) Press Wheel Pressure Setting, (3) Adjusting Plate for Seed Depth, (4) Seed Boot, and (5) Closing Wheel Lateral Adjustment.

Pressure on the press wheel was adjusted by moving the spring end (FIGURE 16) to one of two positions. No spring pressure was provided in one of the positions. Pressure on the closing wheel was adjusted by moving the spring end (FIGURE 16) to one of three positions. Heavy, light or no spring pressure were applied in the three positions. The spring ends were moved with the tube of the adjustment tool.

Lateral adjustment of the closing wheel was made by moving the flat washers (FIGURE 16) to various sides of the closing wheel. The seed boots (FIGURE 16) were held vertically in one of three positions by a bolt. A U-shaped spring pressed the seed boots

against the disk blades. Removing the bolt and moving the seed boot was difficult. The seed boots were moved once during the test.

POWER REQUIREMENTS

Draft: Draft (drawbar pull) requirements depended on previous field operations, soil texture, soil moisture content, ground speed and the amount of seed and fertilizer in the boxes.

Average draft, in primary conditions, at a 2 in (51 mm) seed depth and at 5 mph (8 km/h), in clay loam soil for the 15 ft (4.6 m) unit tested, ranged from 2740 lb (12.2 kN) to 3620 lb (16.1 kN). Maximum draft was measured at 5780 lb (25.7 kN).

Tractor Size: The average tractor size needed to operate the 15 ft (4.6 m) test unit varied from 66 PTO hp (50 PTO kW) to 87 PTO hp (65 PTO kW). Maximum tractor size needed to operate the test unit was 139 PTO hp (104 PTO kW). These tractor sizes have been adjusted to include tractive efficiency and represent a tractor operating at 80 percent of maximum power take-off ratings as determined by Nebraska Tractor Tests or as presented by the tractor manufacturer. The tractor sizes given will have ample power reserve to operate in the stated conditions.

OPERATOR SAFETY

The Model 752 was safe to operate if normal safety precautions were observed. Railing was provided around the walkway. Caution was taken when servicing the front row of openers because of the limited access under the drill between the rows of openers. A safety chain and warning lights were not provided with the test unit but were available. A slow moving vehicle sign was provided.

Tire loads did not exceed the Tire and Rim Association maximum load rating for the recommended tire inflation pressure and recommended transport speed for the drill.

OPERATOR'S MANUAL

The operator's manual for the Model 752 was very good. Information on safety, preparation, hitching, transporting, operation, attachments, maintenance, troubleshooting and service was contained in the operator's manual. A Field Quick Check chart was also provided with additional information on the opener settings. The manual and chart were clearly written, with many photographs for explanations.

MECHANICAL HISTORY

The Model 752 was operated for 107 hours while seeding about 811 ac (325 ha). The intent of the test was evaluation of functional performance and an extended durability evaluation was not conducted. TABLE 2 outlines the mechanical problems that did occur during the functional testing.

TABLE 2. Mechanical History.

Item	Operating Hours	Equivalent Field Area ac	(ha)
Several seed tubes separated from the seed boots. Replaced the tubes and tightened the bolts	throughout the test		
Front row rubber delivery hoses were pinched and damaged. Repaired	throughout the test		
Tightened drive chain from ground drive wheel at	15	100	(40)
Seed cup split apart. Repaired at	19	136	(54)
Tightened bolts holding drive wheel rockshaft at	66.5	481	(192)
Replaced a failed closing wheel bearing at	end of test		

DISCUSSION OF MECHANICAL PROBLEMS

Damaged Delivery Hoses: The drill frame interfered with the rubber delivery hoses for the front row of openers when the openers were in transport position. Bouncing of the openers during transport caused damage to the hoses.

Disk Blade Opener Wear: Average wear on the disk blade openers was 0.3 in (8 mm). Maximum disk blade opener wear was 0.5 in (13 mm) while minimum wear was 0.2 in (5 mm) in diameter. Each disk blade opener seeded 34 ac (14 ha).

APPENDIX I
SPECIFICATIONS

MAKE:	John Deere
MODEL:	752 Grain Drill
SERIAL NUMBER:	N00750X000524
MANUFACTURER:	John Deere Des Moines Works P.O. Box 1595 Des Moines, Iowa USA 50306

DIMENSIONS OF SINGLE UNIT:	**Field Position**	**Transport Position**
-- height	6.7 ft (2.0 m)	6.7 ft (2.0 m)
-- length	20 ft (6.1 m)	20 ft (6.1 m)
-- width	15 ft (4.6 m)	15.5 ft (4.7 m)
-- effective seeding width	15 ft (4.6 m)	
-- transport ground clearance	7.5 in (191 mm)	
-- wheel tread		8.4 ft (2.6 m)

SEED METERING SYSTEM:	
-- type	externally fluted feed rolls
-- drive	chain and gear from drive wheel
-- adjustment	lever controlling feed inlet size with adjustable gates
-- transfer to openers	convoluted rubber hoses
FERTILIZER METERING SYSTEM:	
-- type	externally ribbed traction feed wheels
-- drive	chain and gear drive from drive wheel
-- adjustment	multiple speed gearbox
-- transfer to openers	convoluted rubber hoses
OPENER AND CLOSING SYSTEM:	
-- type	single disk opener with gauge wheel for depth control and press and closing wheels for soil finishing
-- number	24
-- spacing	7.5 in (191 mm)
-- number or rows	2
-- distance between rows	4.0 ft (1.2 m)
-- opener	
-type	single disk
-diameter	18 in (457 mm)
-- press wheels	
-type	steel with rubber rim
-diameter	12 in (305 mm)
-width	1 in (25 mm)
-- gauge wheels	
-type	semi-pneumatic
-diameter	16 in (406 mm)
-width	4.5 in (114 mm)
-- closing wheels	
-type	cast iron
-diameter	12 in (305 mm)
-width	0.75 in (19 mm)
CASTOR WHEELS:	
-- number	one dual set
-- tire size	11 L - 15 SL
CASTOR WHEELS:	
-- number	one dual set
-- tire size	11 L-15 SL
TRANSPORT WHEELS:	
-- number	2
-- tire size	11 L - 15 SL
TRANSPORT LOCK:	valve in hydraulic circuit
HITCH:	
-- type	floating (only with optional dual front castor)
-- pin hole size	maximum 2.25 in (57 mm)
SEED AND FERTILIZER BOX CAPACITIES:	
-- seed	29.1 bu (1058 L)
-- fertilizer	26.1 ft³ (0.74 m³)

WEIGHTS:	**Boxes Empty**	**Boxes Full**
-- weight on front castor wheels	4050 lb (1835 kg)	5800 lb (2630 kg)
-- weight on transport wheels	4780 lb (2170 kg)	6450 lb (2925 kg)
-- weight of hitch	30 lb (15 kg)	30 lb (15 kg)
Total	8860 lb (4020 kg)	12280 lb (5570 kg)

NUMBER OF CHAIN DRIVES:	5
NUMBER OF LUBRICATION POINTS:	137 grease nipples, one gear box
NUMBER OF HYDRAULIC LIFTS:	1
NUMBER OF SEALED BEARINGS:	105
OPTIONS INCLUDED ON TEST MACHINE:	front castor wheel; fertilizer box; acremeter
OTHER AVAILABLE OPTIONS:	grass seeding attachment

APPENDIX II
MACHINE RATINGS

The following rating scale is used in Alberta Farm Machinery Research Centre Evaluation Reports.

-Excellent	-Very Good
-Good	-Fair
-Poor	-Unsatisfactory

SUMMARY CHART

JOHN DEERE 752 GRAIN DRILL

RETAIL PRICE:	$36,112.00 (March 1992, f.o.b. Lethbridge, Alberta
QUALITY OF WORK:	
-Penetration:	**good;** better in adequate moisture soil and at shallow seed depths
-Seed and Fertilizer Placement:	**good;** varied in tilled soils
-Soil Finishing:	**good;** uneven surface in tilled fields
-Trash Clearance:	**very good;** no plugging
-Metering Accuracy:	**good;** fertilizer affected by uphill and downhill slopes
-Distribution Uniformity:	**very good;** very uniform
EASE OF OPERATION AND ADJUSTMENT:	
-Maintenance:	**fair;** 137 grease fittings
-Filling/Cleaning:	**good;** seed and fertilizer boxes emptied unevenly
-Transporting:	**very good**
-Monitoring:	**good;** seed cups viewed from tractor
-Seed and Fertilizer Rates:	**very good**
-Depth Adjustment:	**fair;** five possible adjustments on each opener
POWER REQUIREMENTS:	maximum tractor size 139 PTO hp (104 PTO kW)
OPERATOR SAFETY:	safe; Slow Moving Vehicle sign provided
OPERATOR'S MANUAL:	**very good;** clearly written, many photographs
MECHANICAL HISTORY:	average disk wear, 0.3 in (8 mm) after seeding 34 ac (14 ha) per opener

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