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Evaluation Report 305

Sperry New Holland Model 8500 Round Bale Wagon

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

SPERRY NEW HOLLAND MODEL 8500 ROUND BALE WAGON

MANUFACTURER:

Sperry New Holland
Division of Sperry Rand Corporation
New Holland, Pennsylvania 17557

DISTRIBUTOR:

Sperry New Holland
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RETAIL PRICE:

$75,375.00 (June 1983, f.o.b. Lethbridge, Alberta)

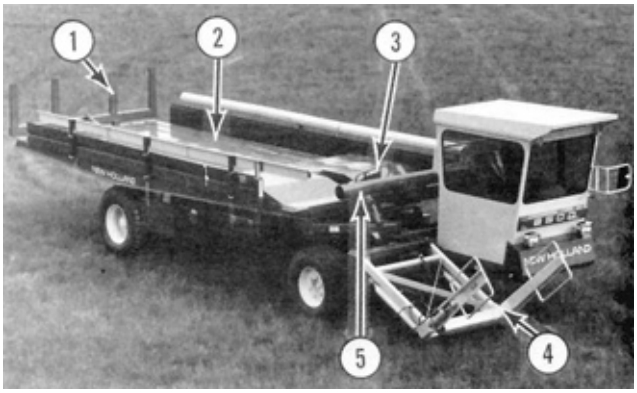


FIGURE 1. New Holland Model 8500 Round Bale Wagon: (1) Tailgate, (2) Load Deck, (3) Cross Conveyor, (4) Loader, (5) Pusher.

SUMMARY AND CONCLUSIONS

Overall Performance: Overall performance of the New Holland Model 8500 round bale wagon was very good. Ease of loading was very good while load placement with well formed bales was good.

Bale Retrieval: The New Holland 8500 loaded firm, well formed bales effectively. When loading soft core bales, interference between the bale edge and the right operator's cab window caused damage to the window. When loading eight, 72 in (1830 mm) diameter bales, the rear tailgate was forced partially open.

Load Placement: Operator experience was needed to produce neat uniform rows at the stack area. Unloading was easy once the wagon was aligned at the stack area. Rear visibility was limited, however a skilled operator could easily align and position the wagon. The most weather resistant bale spacing was one in which adjacent loads were placed tightly together and successive loads slightlyspaced.

Ease of Operation: Most controls were conveniently located. The gear shift lever and foot throttle were inconveniently located resulting in operator fatigue. Most lubrication and adjustments were easily accomplished with the load deck lowered.

The New Holland transported well, fully loaded, at speeds up to 30 mph (48 km/h). Caution had to be exercised when transporting due to restricted rear visibility.

Rate of Work: Bales could be loaded at speeds up to 4.0 mph (6.5 km/h). In average field conditions, it took an experienced operator about three and one-half minutes to load eight bales while unloading usually took less than two minutes. Field efficiency depended mainly on operator experience and field surface condition. Material losses during transport were negligible.

Operator Safety: The New Holland 8500 was safe to operate if the manufacturer's safety recommendations were closely followed. The operator's manual was clearly written and contained much useful information.

Mechanical Problems: Several mechanical problems occurred during the test. The load rack extensions bent when attempting to unload on uneven ground. Several load rack extension J-pins bent and the right operator's cab window was damaged on four occasions.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifications to eliminate bale interference at the operator's cab side window while loading large, soft core hay bales.
2. Modifications to the load deck and rear tailgate to properly accommodate eight, 72 in (1830 mm) diameter bales.
3. Modifications to the gear shift lever and foot throttle location to eliminate operator fatigue.
4. Supplying an accurate coolant temperature gauge.
5. Modifications to the rear view mirror location to eliminate cab door interference and to improve rear visibility.

Senior Engineer: E. H. Wiens

Project Engineer: M. V. Eliason

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. A soft core bale loading kit has been designed and is offered as an attachment.

2, 3, 4 and 5.

These recommendations will be taken under advisement by our Engineering Department for future consideration.

GENERAL DESCRIPTION

The New Holland Model 8500 round bale wagon is a self-propelled automatic bale wagon with a maximum carrying capacity of ten, 55 in (1400 mm) diameter, or eight, 66 in (1680 mm) diameter round bales. It will accommodate bale widths from 55 to 66 in (1400 to 1680 mm). The New Holland 8500 consists of a loader, cross conveyor arm, pusher, load rack and tailgate mounted on a main frame supported by four wheels on two axles.

The New Holland 8500 is powered with a six-cylinder Perkins diesel engine, through a rear wheel drive, five-speed transmission and two-speed differential. It is equipped with front wheel steering, a pressurized cab and a self contained hydraulic system.

For field retrieval, bales are approached from the front with the axis of the bale perpendicular to the direction of travel. Bales are retrieved with the loader, located on the right side of the cab and are lifted to the load deck. The cross conveyor arm automatically pushes the first bale to the left side of the load *deck.* When the second bale is delivered to the load deck the pusher automatically slides the bales toward the rear of the load deck. This loading sequence occurs a total of five times for 55 in (1400 mm) diameter bales and four times for 66 in (1680 mm) diameter bales.

To unload, the New Holland 8500 is appropriately aligned at the stack site. Raising the load deck automatically releases the tailgate and allows the bales to slide off. Lowering the load deck automatically raises the tailgate.

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

SCOPE OF TEST

The New Holland 8500 was operated in the crops shown in TABLE 1 for 160 hours while stacking about 2180 bales. It was

evaluated for quality of work, ease of operation, rate of work, operator safety and suitability of the operator's manual.

TABLE 1. Operating Conditions.

CROP	HOURS	NO. OF BALES
Alfalfa	16	208
Alfalfa-bromegrass	64	1088
Native Grass	45	316
Oat Straw	4	120
Barley Straw	15	248
Wheat Straw	4	80
Greenfeed	12	120
TOTAL	160	2180

RESULTS AND DISCUSSION

QUALITY OF WORK

Bale Retrieval: Bale loader performance depended primarily on operator experience and dexterity. An experienced operator could load dense, well formed bales on the go at speeds up to 4.0 mph (6.5 km/h). In rough field conditions, or when loading loosely formed bales, it was necessary to stop while loading each bale.

When loading loosely formed or poorly tied bales, the cross conveyor arm occasionally slipped beneath the bale and failed to push the bale to the left side of the load deck. When loading 72 in (1830 mm) diameter soft core hay bales, the inside edge of the bale often interfered with the right side of the operator's cab (FIGURE 2). Modifications are recommended to eliminate this interference as damage to the operator's cab side window occurred on four occasions.

FIGURE 2. Bale Interference with the Operator's Cab while Loading 72 in (1830 mm) Soft Core Hay Bales.

Load Quality: The New Holland 8500 formed a durable load which transported well with little shifting or settling. Material loss during transporting was negligible. When handling 72 in (1830 mm) diameter bales, the tailgate was forced partially open during the last cycle of the pusher (FIGURE 3). The partially opened tailgate did not affect load quality. However, to ensure safe road transport, modifications to permit adequate accommodation of eight, 72 in (1830 mm) diameter bales are recommended.

Placement Quality: Placement quality was good with solid, well formed bales (FIGURE 4). The New Holland 8500 placed bales in two rows with the circumferences of each bale touching in each row. Bale spacing was not possible within each load. Adjacent loads, however, could be easily spaced according to operator preference. An experienced operator could place adjacent loads together forming uniform rows of tightly spaced bales.

In areas of high precipitation, excessive spoilage may occur where the circumferences of each bale touch. In such areas, spaces should be left between successive loads (FIGURE 5) while adjacent loads should be placed as closely together as possible. Close spacing of adjacent loads decreases the exposed surface area and reduces weathering.

The New Holland 8500 rotated bales during loading, placing them on the load deck in a different orientation from which they sat on the ground. During unloading, bales rolled to an arbitrary position, usually different than the original orientation. To reduce the possibility of weathering on two sides, it is recommended that bales be moved to storage as soon after baling as possible.

Bale and twine damage was insignificant for firm bales. Losses occurred only when handling loose or poorly tied bales. Material loss during transport of firm bales was insignificant.

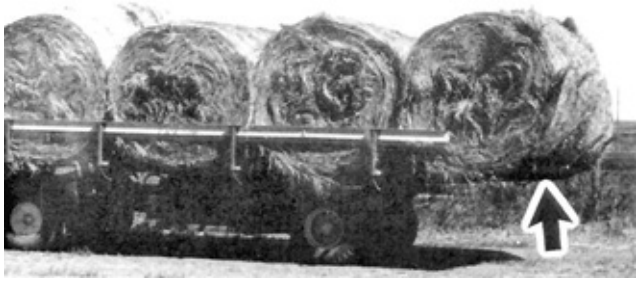


FIGURE 3. Partially Opened Tailgate when Loaded with Eight, 72 in Diameter Bales.

FIGURE 4. Bale Placement with New Holland 8500.

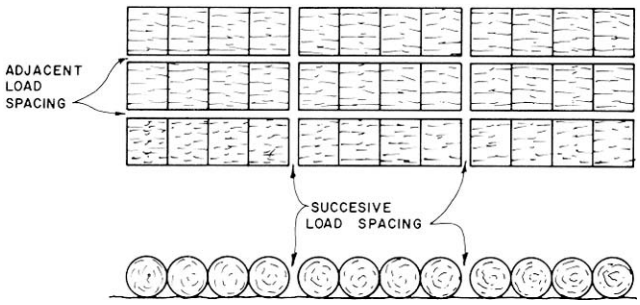


FIGURE 5. Load Spacing to Reduce Spoilage.

EASE OF OPERATION

Instruments and Controls: FIGURE 6 shows the instrument and control arrangement of the New Holland 8500 operator's cab. Loader and load deck controls were easily accessible from the operator location. Visibility of the loader was very good. The gear shift lever and foot throttle were inconveniently located. The operator had to reach forward to shift gears while maintaining an awkward leg position. Operator fatigue occurred after several hours. Modifications to the gear shift lever and foot throttle locations are recommended.

The instruments were located on a console in front of the operator. Gauges were provided for coolant temperature, battery voltage, oil pressure, fuel level and ground speed. An hour meter registered the amount of time the ignition switch was on. The coolant temperature gauge indicated overheating at normal operating temperatures. It is recommended that an accurate gauge be supplied.

Lighting was good for night-time operation. Care had to be exercised when unloading due to reduced visibility.

The optional air conditioner provided suitable cab temperatures. The optional cab heater failed to maintain suitable cab temperatures during very cold operating temperatures.

The rear view mirror provided poor rear visibility when loaded. Interference between the cab door and mirror (FIGURE 7) prevented the door from completely opening. Modifications to the rear view mirror location are recommended to eliminate door interference and to improve rear visibility when loaded.

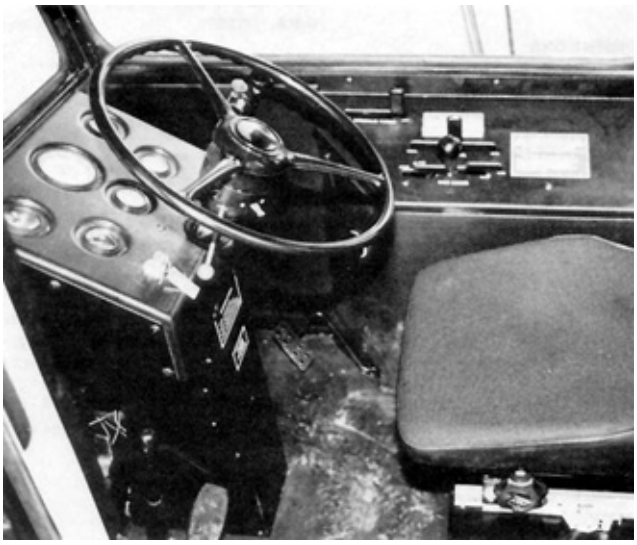


FIGURE 6. New Holland 8500 Instrument and Control Arrangement.

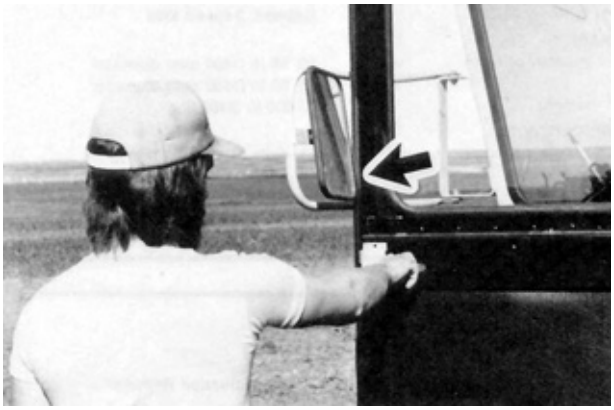


FIGURE 7. Interference between Rear View Mirror and Cab Door.

Loading: The ease with which the New Holland 8500 could be loaded depended mainly upon operator experience and bale quality. An experienced operator had little difficulty loading firm, dense, uniform bales.

Properly aligning the loader with the oncoming bale was important for efficient pickup. Bales could be loaded at a slight angle to the direction of travel if the bales were allowed to contact the loader throat and rolled to the proper alignment.

Operation of the cross conveyor arm and pusher were automatic and did not require operator control. Proper sequencing of the cross conveyor arm and pusher was required prior to initial loading Or when sequencing became interrupted. Raising and lowering the loader the appropriate number of times was all that was required to sequence the cross conveyor arm and pusher.

Loose material often collected below the pusher (FIGURE 8). Pusher operation was not affected but excessive build-up required occasional removal.

Transporting: The New Holland 8500 was easy to transport. All that was required after load completion was to disengage the hydraulic pump. The New Holland 8500 travelled well at speeds up to 30 mph (50 km/h) while loaded, and 45 mph (72 km/h) when unloaded.

FIGURE 8. Collection of Loose Material below Pusher.

Unloading: Unloading the New Holland 8500 was easy once the wagon had been aligned at the stack area. A skilled operator had little difficulty backing squarely into position. Visibility to the rear was limited (FIGURE 9). Aligning the wheels with previous tracks or markers aided in load alignment.

Raising the load deck automatically lowered the tailgate and released the bales. Operator experience was required to obtain a uniform spacing between successive or adjacent loads.

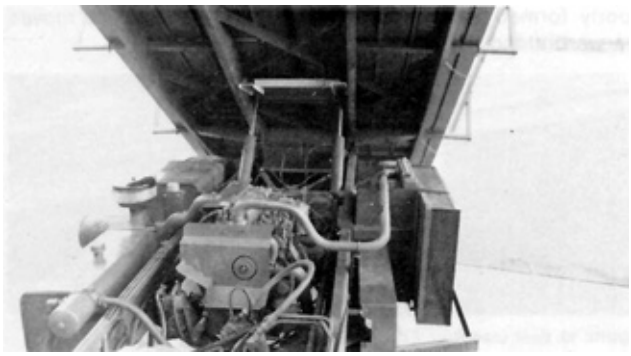


FIGURE 9. Limited Visibility when Backing into Unloading Position.

Adjustments: The load deck side panels and loader width were easily adjusted to accommodate various bale sizes. Proper adjustment of the side panels was important in maintaining a tight load.

Most adjustments were easily made with the load deck lowered. Extreme care must be used when working under a raised deck. A mechanical lock was provided for the load deck.

Lubrication: The New Holland 8500 had 14 grease fittings which required daily lubrication and 36 fittings requiring weekly lubrication. Daily servicing took about 15 minutes.

RATE OF WORK

Work rate depended upon operator experience and dexterity, bale quality, field condition, crop yield, transport distance, and accessibility at the stack area. In ideal field conditions, the minimum measured loading time for.eight and ten bales was 1.7 and 2.0 minutes, respectively. These times represent minimum times and cannot be attained in normal field conditions. Average loading times based on nine, eight bale loads was 3.5 minutes. Unloading times were typically *less* than two minutes.

OPERATOR SAFETY

Extreme care must be exercised when handling large round bales. The New Holland 8500 was safe to operate as long as the manufacturer's safety precautions were observed and common sense used.

OPERATOR'S MANUAL

The operator's manual was clearly written, containing much useful information on operation, servicing, adjustments and safety precautions.

MECHANICAL PROBLEMS

TABLE 2 outlines the mechanical history of the New Holland 8500 during 160 hours of operation while transporting about 2180 bales. The intent of the test was evaluation of functional performance. An extended durability evaluation was not conducted.

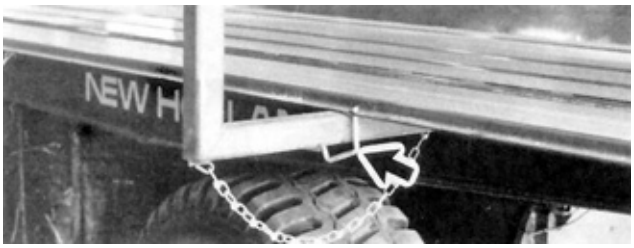
TABLE 2. Mechanical History

ITEM	OPERATING HOURS	NUMBER OF BALES
Two J-pins were lost and were replaced at	9	77
The right side window was pushed inward and was repaired at	16, 64, 100	182, 1042, 1410
The left rear load rack extension bent and was straightened at	24, 142	270, 1757
The outer cross conveyor cylinder pin was lost and replaced at	38	422
The fuel cap was lost and replaced at	51	682
The right side window broke and was repaired at	71	1162
Several load rack extension J-pins bent and were repaired at	end of test	

DISCUSSION OF MECHANICAL PROBLEMS

J-Pins: The J-pins were lost when the retaining pin clips were inserted from the rear. Bales sliding rearward along the load deck occasionally caught and removed the retaining pin clips. Inserting the retaining pin clips from the front eliminated the problem.

Several J-pins bent (FIGURE 10) when loose twine from poorly formed bales became entangled as the bale moved rearward along the load deck.



FI**GURE 10.** Bent Load Rack Extension J-Pins.

Load Rack Extensions: The load rack extensions bent (FIGURE 11) while attempting to unload on uneven ground. Unloading on uneven ground tended to slide bales off the corner rather than the end of the load deck.

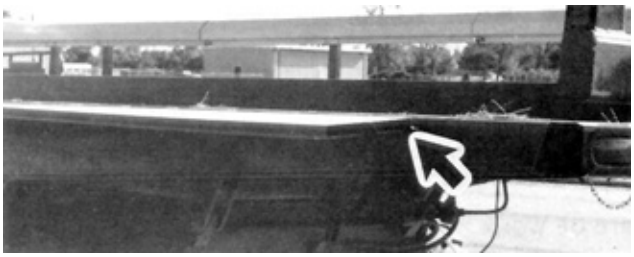


FIGURE 11. Bent Load Rack Extensions.

Cab Side Window: The right operator's cab window broke (FIGURE 12) due to bale interference when loading large, soft core bales.

FIGURE 12. Damaged Cab Window.

APPENDIX I

SPECIFICATIONS

MAKE:	New Holland Round Bale Wagon	
MODEL:	8500	
SERIAL NUMBER:	6612	
MANUFACTURER:	Sperry New Holland Division of Sperry Rand Corporation New Holland, Pennsylvania U.S.A. 17557	
DIMENSIONS:		
- length	372 in	(9448 mm)
- width - maximum	152 in	(3860 mm)
- minimum	96 in	(2438 mm)
- height	96 in	(2438 mm)
- ground clearance	85 in	(2159 mm)
- wheel base	166 in	(4216 mm)
- wheel tread - front	80 in	(2032 mm)
rear	68 in	(1727 mm)
TIRES:		
- front	2, 36 x 16-17.5, 8-ply	
- rear	2, 40 x 19-19.5, 14-ply	

WEIGHTS:	FIELD POSITION	TRANSPORT POSITION
- right front	3115 lb (1402 kg)	3080 lb (1386 kg)
- left front	3410 lb (1534 kg)	3365 lb (1514 kg)
- right rear	3255 lb (1465 kg)	3290 lb (1480 kg)
- left rear	2430 lb (1093 kg)	2475 lb (1114 kg)
Total	12210 lb (5494 kg)	12210 lb (5494 kg)

HYDRAULICS:	
- type	self contained shaft driven
- reservoir capacity	15 gal (68 L)
ENGINE:	
- make	Perkins
- type	diesel
- number of cylinders	6
- displacement	354 in^3
- governed speed	2750 rpm
- fuel tank capacity	46 gal (209 L)
TRANSMISSION:	
- type	5 speed, 2-speed axle
CAPACITY:	
- number of bales	10, 55 in (1400 mm) diameter 8, 66 in (1680 mm) diameter
- weight	12000 lb (5400 kg)
LUBRICATION:	
- grease fittings	14, daily service 36, weekly service
OPTIONS:	cab heater cab air conditioner

APPENDIX II
MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports:
- Excellent
- Very good
- Good
- Fair
- Poor
- Unsatisfactory

APPENDIX III
CONVERSION TABLE

miles/hour (mph) x 1.61	= kilometres/hour (km/h)
feet (ft) x 0.305	= metres (m)
inches (in) x 25.4	= millimetres (mm)
pounds (lb) x 0.45	= kilograms (kg)
gallons (gel) x 4.55	= litres (L)

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