

Evaluation Report

22



New Holland Model 85 Bale Handler

A Co-operative Program Between



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PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

New Holland Model 85 Bale Handler

Manufacturer:

Sperry New Holland
A Division of Sperry Rand Corporation
New Holland, Pennsylvania 17557
U.S.A.

Distributors:

Sperry New Holland
Box 777, Winnipeg, Manitoba
Box 1907, Regina, Saskatchewan
Box 1616, Calgary, Alberta

Retail Price:

\$4497.00 (June, 1977, f.o.b. Humboldt,
complete with all hydraulic cylinders
and hoses).



Figure 1. New Holland 85 in Transport Position.



Figure 2. New Holland 85 in Loading Position.

Summary and Conclusions

The functional performance of the New Holland Model 85 Bale Handler was very good for loading and hauling large round bales from the field as well as for unloading at the storage area.

The New Holland 85 handled firm bales effectively. Four large round bales could easily be loaded with little overhang on the bed rails, but if average bale weight exceeded 680 kg (1500 lb), the manufacturer's maximum load rating for the wagon could be exceeded. Operator experience was needed before bales could be loaded or unloaded in a continuous, uniform, and orderly manner.

The New Holland 85 towed very well, when fully loaded, at speeds up to 29 km/h (18 mph). The swing tongue enabled safe road transport and easy maneuvering in confined areas.

The overall durability was very good, but was reduced by bending of the power take-off drive line shield by contact with bales.

In average field conditions it took an experienced operator about five minutes to load four bales, while positioning and unloading four bales in the yard took just over two minutes. Field efficiency depended largely on the hauling distance and the speed at which the tractor could safely travel during transport. For example, in one field of alfalfa and brome grass it took from 22 to 27 minutes to load, transport, and unload four bales and return to the field. This included 0.4 km (0.25 mile) of field travel and 0.8 km (0.5 mile) of road transport.

No safety hazards were apparent when the mover was operated according to normal recommended procedures.

Recommendations

It is recommended that the manufacturer consider:

1. Modifications to prevent bales from damaging the power take-off drive line shield.
2. Supplying hydraulic hoses and an appropriate hose support stand.
3. Providing larger lubrication access openings in the drive line shield.
4. Modifying the bed tilt lock to prevent it from clogging with loose hay.
5. Providing a tapered end at the rear of the bed rails to permit easy rear loading.
6. Modifications to prevent the wagon load rating from being exceeded with four bales, as many hay bales weigh more than 680 kg (1500 lb).

Chief Engineer: E. O. Nyborg

Senior Engineer: L. G. Smith

Project Engineer: T. G. Strilchuk

The Manufacturer States That:

With regard to recommendation number:

1. While we have improved the hardware supporting the power take-off drive line shield, we believe that it is necessary for the operator to take care to avoid damage in this area.
2. Current production includes hydraulic hoses and cylinders as standard equipment. A hose support stand is being considered.
3. Greater care is being taken to improve the alignment of existing lubrication access openings in the drive line shield. If this proves to be inadequate, these openings will be enlarged.
4. We have not experienced a problem with the bed tilt lock, however, this area will receive our attention.
5. The limited occasion on which rear loading would be used has not warranted redesigning this area, however, it will receive consideration.
6. It is the operator's responsibility to ensure that the load capacity of this machine is not exceeded. Significant additional cost would be incurred if the rating was to be increased.

Additional comments are as follows:

1. We believe that it is imperative that once a round bale is formed, it is maintained in the same position so that the weathered surface will continue to shed moisture. We concur with your comments on this subject and believe that they warrant further emphasis.
2. Of prime concern is the safety aspect in the handling of round bales. We consider front end loader attachments and many other home-made devices to be particularly dangerous and believe that the safety aspect of the Sperry New Holland Model 85 Bale Handler could be emphasized more strongly.
3. An outrigger attachment is now available to prevent bales from falling off the bed when operating on steep hillsides or other adverse conditions.

General Description

The New Holland Model 85 Bale Handler (Figures 1

and 2) is a self loading, tilting bed, two wheel trailer for use with tractors 48 kW (65 hp), or larger, equipped with dual hydraulics and a 540 rpm power take-off. Tractors with a 1000 rpm power take-off may be used as long as the engine is run at reduced speed so that power take-off speed does not exceed 540 rpm when actuating the transporter chains.

The main frame consists of a solid axle with an offset single section tongue which swings outward hydraulically for loading and inward for transport.

The bale bed can hold up to four large round bales. It consists of two 6705 mm (22 ft) long chain rails spaced at 760 mm (2.5 ft). The transfer chains are driven from the tractor power take-off and the bed may be tilted either forward or rearward for loading or unloading.

Complete specifications are found in Appendix I.

Scope of Test

The New Holland 85 was operated in typical prairie fields (Table 1) for 115 hours while moving about 460 large round bales. It was evaluated for ease of operation, quality of work, operator safety, and suitability of the operator's manual.

Table 1. Operating Conditions

Crop	Hours	Field Topography	Field Condition
Native Grassland	11	Gently Rolling	Rough, Occasional Stones
Oat Straw	17	Gently Undulating	Slightly Ridged
Sweet Clover	20	Gently Undulating	Smooth
Alfalfa Bromegrass and Crested Wheatgrass	40	Gently Rolling	Rough, Occasional Stones
Wheat Straw	13	Gently Rolling	Smooth
Alfalfa	14	Moderately Rolling	Smooth

Results and Discussion

EASE OF OPERATION

Hitching: The New Holland 85 was equipped with a fixed clevis hitch. Using a properly sized hitch pin with a suitable locking device made the hook-up reliable and safe. Four hydraulic hoses, the reversing gearbox control rope, and the power take-off shaft also had to be attached to the tractor. In addition, a standard 203 mm (8 in) stroke hydraulic cylinder had to be installed on the rail swing linkage. The absence of a hydraulic hose support stand meant tying hoses to prevent interference with the power take-off shaft. It was also important to avoid a slack rope for the reversing gearbox so it would not become entangled in the power take-off.

Loading: The New Holland 85 is placed into field loading position by shifting the tongue outward with the appropriate tractor hydraulic control. Bales are approached from the end with the centre of the rails aligned with the bale axis and with the bed rails tilted downward so the front skid shoes just contact the ground. The tractor power take-off is engaged just as the rails contact the bale. Rail chain speed must be matched to tractor forward speed by selecting the most desirable ground and power take-off speed combination. The rail chains must be stopped when the rail tips become visible in front of the bale. The bed is then raised to clear the ground for travel to the next bale. Successive bales are loaded in the same manner (Figure 3) with the bale on the ground butted against the bale on the mover when the power take-off is engaged. Proper alignment of the mover with the oncoming bale is essential in forming a tight load. Slight misalignment

can be corrected by butting the approaching bale with the bale on the front of the load.

The transfer chains and drive line are protected from overload with a shearbolt. The shearbolt will fail under surge load if the power take-off is rapidly engaged.



Figure 3. Approaching the Fourth Bale.

Operator experience was needed before bales could be loaded without stopping the tractor. If the power take-off was engaged too soon, a gap was formed between bales leaving insufficient room on the bed for four bales. Engaging the power take-off too late caused the oncoming bale to skid on the ground, sometimes damaging the twines. A live tractor power take-off was needed for non-stop loading.

Occasionally, a bale would skew sideways as it entered the rails and would roll sideways as the bed was raised and lodge between the bed and the hitch tongue. This resulted in damage to the power take-off drive line shield (Figure 4). A wider chain rail spacing would eliminate the problem.

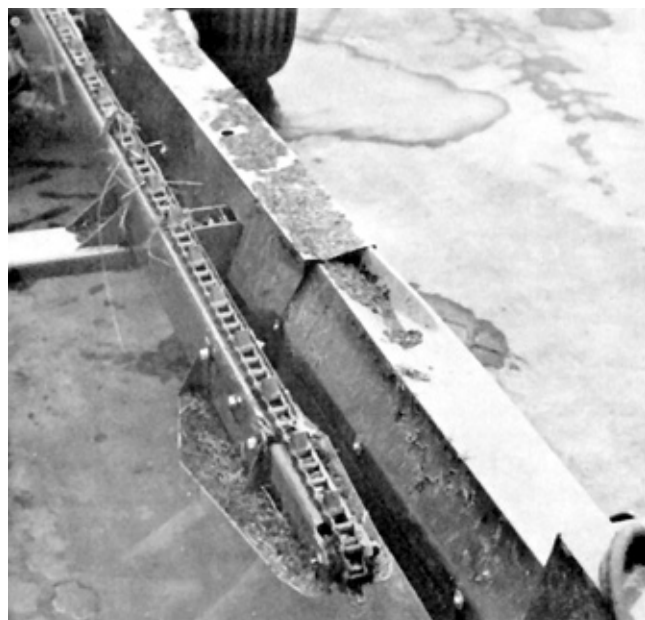


Figure 4. Bent Power Take-off Drive Line Shield.

Bales could also be loaded from the rear but with some difficulty. Rear loading was done by backing the tractor and running the rail transfer chains in reverse. The blunt design

of the rear rail ends make it difficult to advance under the bale. This method of loading should be restricted to bales which cannot be approached in the normal manner such as at field edges. Tapering the rear rail ends would improve rear loading.

If bales were picked down hill, the oncoming bale would sometimes up-end as it began to climb the bed rails. Up-ended bales could be turned over with the tilt bed, for a second picking attempt.

Bale damage during loading was insignificant with an experienced operator. Loading poorly formed or untied bales resulted in slight hay loss during pick up.

The New Holland 85 had a 6705 mm (22 ft) bed length. It could hold four 1700 mm (5.7 ft) long bales with little overhang. The manufacturer's maximum load rating for the wagon was 2725 kg (6000 lb). This meant that if average bale weight was more than 680 kg (1500 lb) the wagon load rating was exceeded with four bales. Since many bales weigh more than 680 kg (1500 lb) it would be desirable to increase the load rating of the wagon.

Transporting: When fully loaded, the bed is raised and the tongue is hydraulically swung into transport position (Figure 5).

The rail bed must be at the correct level when placing the wagon in transport so that the rail latch locks into the tongue. Loaded bales obscure the latch from view, making it difficult to tell when it is properly locked. An experienced operator can recognize the distinct snap of the latch engaging. Sometimes, loose hay hanging from a bale prevented locking. Since the latch is provided for safety to prevent the bed from tilting in transport, the operator should remove loose hay to enable the bed to swing to its locked transport position.

For travel on public roadways the tongue should also be locked in transport position by inserting the tongue retaining pin at the tongue hinge.



Figure 5. New Holland 85 Fully Loaded in Transport Position.

A permanent Slow-Moving Vehicle sign and bracket mounted at the rear provided for operation on public roadways.

The New Holland 85 towed well in rough fields. In transport the left tire trailed about 45 mm (1.5 ft) inside the left tractor wheel track. The New Holland 85 trailed well on roadways at speeds up to 29 km/h (18 mph). Loss during transport was insignificant even with ragged or untied bales.

Placement: After removal of the tongue retaining pin the mover is ready for unloading. The bed is swung away from the tongue only far enough to disengage the bed safety latch. This allows the bed to be tilted rearward with the load directly behind the tractor. The power take-off is engaged as the tractor advances in low gear. This method was used

very successfully for setting bales closely together in a row.

If preference was to space the bales in the row, poor visibility made it difficult to advance the mover to obtain uniform spacing when unloading from the rear. Uniform bale spacing could be obtained (Figure 6) by placing the hitch in loading position, tilting the bed forward and unloading bales from the front so that the bales were in full view.

Depending on operator preference, any row spacing could be obtained. With experience an operator could place rows tightly together (Figure 7).



Figure 6. Bales Uniformly Spaced in a Row.



Figure 7. Rows of Bales Placed Closely Together.

QUALITY OF WORK

The New Holland 85 was very effective in picking large round bales, transporting them and placing them in the storage yard. Both the quality of work and the rate of work were very dependent on operator experience.

Bale and twine damage was insignificant as long as the rail chain speed was matched with forward speed during loading or unloading. Losses of hay during loading and transport were insignificant.

The New Holland 85 placed bales in same orientation as they were picked. This left the weathered outer shell relatively undisturbed to shed moisture, and resulted in negligible increased spoilage due to handling.

Table 2 gives an indication of expected workrate with an experienced operator. This table gives the average time, based on five trips, to load, transport, and place a load of four large round brome-alfalfa bales from a rough field yielding 2.2 t/ha (1 ton/ac). The tractor used for these time trials did not have live power take-off. Each one-way trip involved 0.4 km (0.25 mile) of travel from the field to a grid road and 0.8 km (0.5 mile) of road travel. As can be seen, even for a short haul, most time is spent in transport rather than in loading or unloading.

Table 2. Average Rate of Work

Travel to Field (1.2 km)	8.4 Min
Load Four Bales (tractor not equipped with live power take-off)	5.2 Min
Travel to Storage Yard (1.2 km)	8.6 Min
Unload Bales	2.2 Min
Round Trip	24.4 Min

OPERATOR SAFETY

The New Holland 85 was safe to operate if the manufacturer's safety precautions were observed. Bystanders should not stand near the tongue or on the mover during operation. Maintenance should not be carried out with a full or partial load. Large bales can cause severe injury.

The towing tractor should be sufficiently heavy and be equipped With good brakes for road transport with a full load. The manufacturer recommends a minimum 48 kW (65 hp) tractor for safe road transport.

The New Holland 85 was equipped with a permanently attached Slow-Moving Vehicle sign for transport on public roads.

Individual tire loads calculated for fully loaded wagon with four 680 kg (1500 lb) bales, exceeded the tire manufacturer's maximum rating for 13.50 x 165-6 ply tires by 19%. This could be hazardous when operating at high road speeds.

OPERATOR'S MANUAL

The operator's manual clearly outlined set-up, operation, adjustment, and maintenance. It was well illustrated and easy to understand.

Durability Results

Table 3 outlines the mechanical history of the New Holland Model 85 Bale Handler during 115 hours of operation while moving about 460 large round bales. The intent of the test was evaluation of functional performance. The following failures represent only those which occurred during functional testing. An extended durability evaluation was not conducted.

Table 3. Mechanical History

Item	Hours	Number of Bales
The rail chains stretched and required tightening at	9 and 61	60 and 292
The power take-off drive shield bent when a bale rolled off the bed against it and was straightened at	23 and 83	140 and 396
The reversing gear output shaft bearing and seal required replacement at	47	236

Discussion of Mechanical Problems

Power take-off Shields: The metal shield over the power take-off drive line unavoidably gets damaged whenever a bale rolls off the bed and becomes lodged between the left rail and tongue. A more rigid shield may be needed.

Rail Chains: The rail chains required adjustment after a few hours of operation and did not stretch significantly after they were readjusted one more time.

**APPENDIX I
SPECIFICATIONS**

Model: New Holland Model 85 Bale Handler
Serial Number: 405034
Pickup Side: Right

Dimensions:

-Length	8319 mm (327.5 in)
-Width (road)	2540 mm (100 in)
-Bed Height	711 mm (28 in)
Length	6795 mm (267.5 in)
-Bed Rail Width	812 mm (32 in)
-Ground Clearance	241 mm (9.5 in)
-Tires	2, 13.5 x 15, 6 ply

Hydraulics:

-Tongue Cylinder (by customer)	
Bore	76 mm (3 in)
Stroke	203 mm (8 in)
Retracted Length	514 mm (20.25 in)
Port Size	2, 1/2 NPTF
-Bed Cylinder	
Stroke	293 mm (11.5 in)
Retracted Length	613 mm (24.1 in)
Port Size	2, 1/2 NPTF

Weight (unloaded)

Left Wheel	563 kg (1242 lb)
Right Wheel	498 kg (1098 lb)
Hitch	97 kg (215 lb)
TOTAL	1158 kg (2555 lb)

Load Capacity: 2725 kg (6000 lb)

Tractor Requirements:

- Manufacturer Recommended Minimum Size	48 kW (65 hp)
-Hydraulics	Dual
-Power Take-Off	540 rpm

Optional Equipment: Selector valve kit for tractors with a single hydraulic circuit

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:

(a) excellent	(d) fair
(b) very good	(e) poor
(c) good	(f) unsatisfactory

**APPENDIX III
METRIC UNITS**

In keeping with the Canadian metric conversion program, this report has been prepared in SI Units. For comparative purposes, the following conversions may be used:

1 hectare (ha)	= 2.47 acres (ac)
1 kilometre/hour (km/h)	= 0.62 miles/hour (mph)
1 tonne (t)	= 2 204.6 pounds (lb)
1 tonne/hectare (t/ha)	= 0.45 ton/acre (ton/ac)
1 metre (m) = 1000 millimetres (mm)	= 39.37 inches (inches)
1 kilowatt (kW)	= 1.34 horsepower (hp)
1 kilogram (kg)	= 2.2 pounds (lb)
1 kilopascal (kPa)	= 0.15 pounds/square inch (psi)



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