

Evaluation Report

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Morris M-881 Hay Hiker Round Bale Mover

A Co-operative Program Between



MORRIS M-881 HAY HIKER ROUND BALE MOVER

MANUFACTURER AND DISTRIBUTOR:

Morris Rod-Weeder Co. Ltd.
85 York Road
Yorkton, Sask.
S3N 2X2
Telephone: (306) 783-8585.

RETAIL PRICE:

\$11,173.00 (October 1986, f.o.b. Portage la Prairie, Manitoba)
includes: side rail kit \$553.00, freight \$142.00, assembly \$312.00

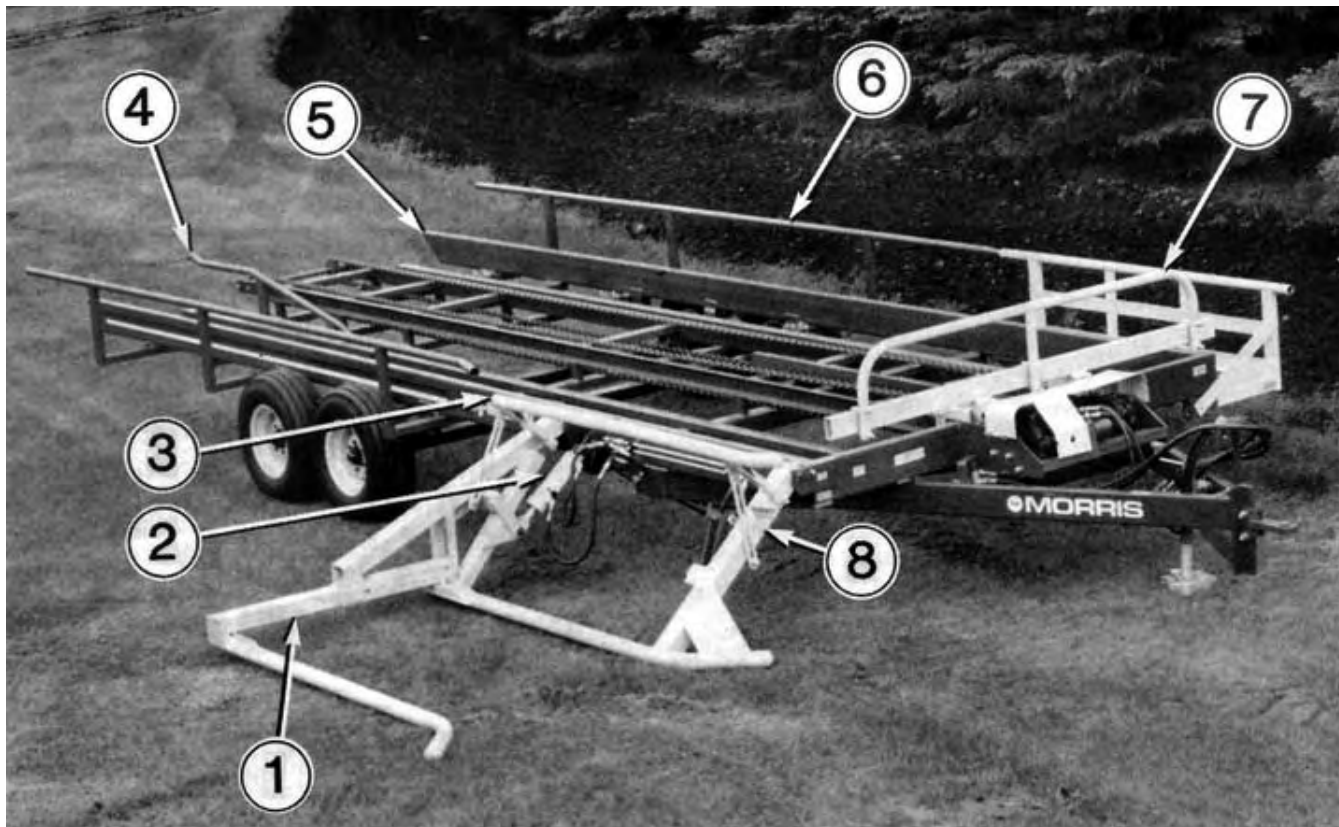


FIGURE 1. Morris M-881 Hay Hiker Round Bale Mover: (1) Bale Fork, (2) Lift Cylinder, (3) Bale Deflector, (4) Bale Divider, (5) Bed Rails, (6) Side Rails (Optional), (7) Bale Drag, (8) Lift Arm.

SUMMARY

Ease of Operation: The Morris M-881 Hay Hiker was easy to operate. Operators required some practice before bales could be loaded/unloaded in an efficient and orderly manner. The single bale fork had to be adjusted for width to be compatible with the size of bales being loaded. Push bar chains were individually adjustable and required periodic adjustment.

Capacity: The Morris M-881 had a load capacity of 12,000 lb (5440 kg). The 24 ft (7.2 m) beds allowed space for eight 1500 lb (680 kg) round bales.

Quality of Work: The Morris Hay Hiker's performance rated very good in all conditions. The Morris was effective in retrieving and moving round bales of most sizes. Operator experience was needed before bales could be loaded or unloaded in a continuous, uniform and orderly manner.

Crop losses and bale damage were negligible if well formed bales were handled. Some twine damage occurred when older ovate bales were loaded.

Rate of Work: In average field conditions, it took an experienced operator about 7.5 minutes to load 8 bales. Unloading took about 2 minutes including time taken to back to the stack. The Morris towed very well at speeds of 18 mph (29 km/h) when fully loaded.

Power Requirements: Tractors of at least 65 hp (49 kW) with dual hydraulic outlets were required to safely operate the Morris in most field conditions.

Operator Safety: The Morris Hay Hiker was safe to operate if usual safety precautions were followed and a tractor of sufficient size and weight was used.

Operator's Manual: The operator's manual was well written, well organized and illustrated. The manual contained useful information on assembly, warranty, operation, servicing, safety and parts.

Mechanical History: The optional bale divider tube broke at 60 hours. The tube was welded and remained intact for the remainder of the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifications to the hydraulic circuits that would prevent the lift fork from moving unless the push bar was in its forward position, or providing an audible alarm that would remind the operator to return the push bar to its forward position.
2. Modification of the bale deflector arm to prevent twine from snagging.
3. Modification of the right hand side rail to prevent hay and twine from snagging while bales are being pushed back.
4. Modification of the optional bale divider to make it more effective.

Senior Engineer: G.M. Ornichinski

Project Technologist: R.K. Harris

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. We will consider the feasibility of incorporating a system to help prevent this problem from occurring.

2. & 3. We will investigate and appropriately modify for future production models.
3. The bale divider is adjustable over a range of positions to vary bale separation.

GENERAL DESCRIPTION

The Morris M-881 Hay Hiker is a self-loading, tilting twin bed, four wheeled trailer with two axles. Suspension is arranged two wheels per side. The twin axles are suspended on leaf slipper springs with the springs mounted inboard of the wheels. It is intended for use with a tractor of at least 65 hp (49 kW) with dual hydraulic circuits. Bales are picked up on the right side only with a hydraulically operated fork. The lift fork has an integral bale deflector bar, which provides momentum to the first bale loaded to roll to the far side of the bale mover. Once two bales are loaded, they are pushed to the rear by a chain driven push bar. Bales are pushed far enough to the rear to allow room for two more bales to be loaded.

The twin rail beds consist of two rails spaced 29 in (736 mm) apart, and are each 24 ft (7.2 m) in length. Each bed holds four bales. For unloading, the push bar is engaged and the bales are moved rearward. When the mass of the bales comes off the front of the beds, the beds tilt and the push bar pushes the bales off the end of the beds.

The test machine was equipped with optional bale divider and side rails. Detailed specifications of the test machine are presented in APPENDIX I.

SCOPE OF TEST

The Morris M-881 Hay Hiker was operated in typical prairie fields (TABLE 1) for 350 hours, while moving approximately 5000 bales. It was evaluated for ease of operation, and adjustment, quality of work, operator safety, and suitability of the operator's manual.

TABLE 1. Operating Conditions

Crop	Hours	Number of Bales	Field Conditions
Native Hay	40	800	Rough & Stony
Alfalfa	250	3500	Fairly Smooth
Barley Straw	10	200	Typical Stubble
Wheat Straw	50	500	Typical Stubble
TOTAL	350	5000	

RESULTS AND DISCUSSION

EASE OF OPERATION AND ADJUSTMENT

Hitching: The Morris M-881 was equipped with an adjustable tongue hitch, and an implement jack to raise the hitch to the proper height. A properly sized hitch pin with a suitable locking device made hook-up reliable and safe. In addition, four hydraulic hoses had to be connected to the tractor.

Loading: The Morris M-881 was placed in field position by removing the cylinder lock from the front cylinder on the lift arms (FIGURE 2). Bales are approached with their axis being parallel to the bale mover. The fork is lowered to the ground and the fork width is adjusted to be compatible with the size of bales being handled. This adjustment was difficult for one person, due to a build up of paint on the adjustable lift arm. Bales are picked up by sliding the fork under the bale, being careful to centre the bale in the forks. Bales that were approached slightly off centre were sometimes knocked askew. The fork was raised when the bale touched the back brace of the lift arm. The bale rode up on the bale deflector arm attached to the lift arm and rolled to the bed on the opposite side of the trailer. The second bale is loaded in the same manner. Once two bales have been placed on the trailer side by side, the chains that operate the bale drag are activated and the two bales are moved to the rear, just far enough to load two more bales. Before another two bales could be loaded, the bale drag had to be returned to its frontal position (FIGURE 3) or the drag would be trapped between two pairs of bales (FIGURE 4). This situation was difficult to correct without outside assistance such as a front-end-loader. It is recommended that the manufacturer consider a modification to the hydraulic circuits to prevent this from happening. Subsequent bales are loaded until the bale mover is fully loaded.

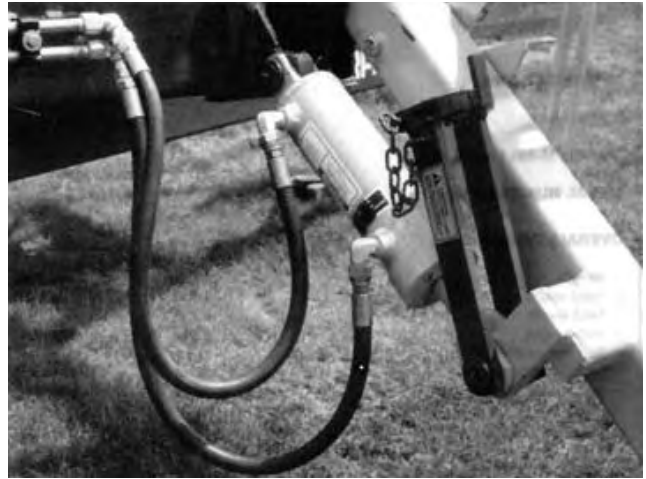


FIGURE 2. Cylinder Lock on Front Cylinder of Lift Arms.



FIGURE 3. Bale Drag in Normal Position.



FIGURE 4. Bale Drag Trapped Between Bales.

Operator experience was required before bales could be picked up non-stop and to prevent gaps in the load. Sometimes twine was snagged by the bale deflector arm, when loading a bale. It is recommended that the manufacturer consider a modification to the forward end of the arm to eliminate this problem. Additionally, when bales were moved rearward on the carriage beds, twine was snagged by the optional right hand side rail (FIGURE 5). It is recommended that the manufacturer consider modifications to the forward end of the side rail to prevent hay and twine from snagging. Drag bar chain tensions frequently required adjustment. This adjustment was easily accomplished by tightening the adjusting nuts provided at the front of the machine (FIGURE 6).

Capacity: The Morris M-881 has a load capacity of 12,000 lb (5454 kg). The 24 ft (7.2 m) deck allowed space for 10 bales, 5 ft (1.52 m) long or 8 bales 6 ft (1.82 m) long. The hydraulic relief valve was set to allow the lift arms to raise a bale of 1780 lb (809 kg) before the wheels on the opposite side of the wagon would lift off the ground.

Transporting: When transporting with a full or partially loaded

bale mover, the lift arm and fork should be raised to the maximum to reduce the overall width of the machine and to allow attachment of the cylinder safety lock. The 4, 11 x 15 tires provided good floatation in dry fields. When empty the Morris M-881 was stable at highway speeds and when fully loaded towed very well at speeds up to 20 mph (32 km/h). However, to maintain a stopping distance of 50 ft (15.2 m), PAMI recommends not exceeding a transport speed of 11 mph (18 km/h) when towing a fully loaded M-881, with the manufacturer's recommended tractor size of 60 hp (45 kW).



FIGURE 5. Twine Snagged by Optional Right Hand Side Rail.



FIGURE 6. Adjustment for Tension on Drag Bar Chains.

Unloading: The Morris M-881 was unloaded by backing to previously unloaded bales until resistance was felt when the bale mover contacted the bales on the ground. The tractor was then moved forward to provide clearance for the bale deck to tilt. Bales were moved off the deck by activating the hydraulically powered bale drag. As the weight of the bales moved rearward, the deck tilted and pushed the tractor and bale wagon ahead, depositing the bales in two neat rows on the ground. Damage to the bales and twine was negligible.

After the bales are off the bed rails, the drag was returned to the front of the deck and the deck returned to the horizontal position.

QUALITY OF WORK

The Morris M-881 rotated bales during loading, placing them on the beds in a different orientation from which they sat on the ground. During loading, the bales rolled from the lift fork onto the beds resulting in the previously weathered side placed down, and the ground-flattened side placed up. In this position, bales would have less ability to shed moisture tending to have increased spoilage.

The Morris M-881 was effective in unloading bales in straight, neat windrows. Distance between bale circumferences depended on the diameter of the bales being handled. The optional bale divider was ineffective and broke during the tests (FIGURE 7). It is recommended that modifications to the design of this bale divider be made to improve its performance. The Morris bale drag system of unloading was very gentle on the hay and kept bale twine breakage to a minimum.

RATE OF WORK

Table 2 gives the average time required to load, transport and unload, eight firm and well formed bales.

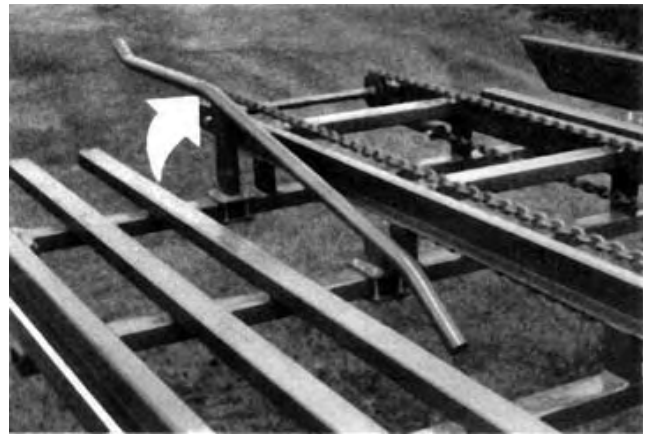


FIGURE 7. Broken Optional Bale Divider.

TABLE 2. Average Time Required to Load, Travel and Unload

Load 8 Bales	7.5 min
Travel 1/2 mi (.8 km) & back to stack	8.5 min
Unload	2.4 min
TOTAL:	18.4 min

This table gives the average time, based on 10 trips or 80 bales. In fields where bales were spaced close together, retrieval time was increased when the operator had to wait for the hydraulic system to return the bale drag to its frontal position. This also prevented non-stop loading in some instances. Operator experience was essential to achieve high rates of work.

POWER AND HYDRAULIC REQUIREMENTS

A tractor of at least 60 hp (45 kW) with dual remote hydraulic outlets was required, as recommended by the manufacturer. The Morris M-881 was equipped with dual cylinders to operate the lift arm and bale fork. A single cylinder was required to raise and lower the bale bed deck. The orbit motor, which operates the twin bale drag chains and the cylinder, which operates the tilt deck were plumbed in a parallel system. When the hydraulic pressure became too high for the orbit motor, pressure was diverted to the tilt cylinder, tilting the deck and making unloading easier. The Morris M-881 required 10.2 hp (7.5 kW) to keep it moving at 5.5 mph (8.9 km/h) on a typical alfalfa field.

OPERATOR SAFETY

The Morris M-881 was safe to use if normal safety precautions were observed. During transport, extreme care should be exercised when operating on busy public roads as visibility to the rear is somewhat obscured. To stop a fully loaded Morris M-881 within 50 ft (15.2 m) on a paved surface, PAMI recommends not to exceed 11 mph (18 km/h) when towing with a 60 hp (45 kW) tractor.

OPERATOR'S MANUAL

The operator's manual was very well written, organized and illustrated. It contained useful information on assembly, operation, maintenance, warranty, and safety. A parts catalogue complete with exploded view drawings was also included.

MECHANICAL HISTORY

The optional bale divider tube broke at 60 hours. The tube was rewelded and did not break again for the remainder of the test. The intent of the test was a functional evaluation, and an extended durability test was not conducted.

**APPENDIX I
SPECIFICATIONS:**

MAKE: Morris
MODEL: M 881 Hay Hiker
SERIAL NUMBER: 1826

OVERALL DIMENSIONS:
 -- length 30.2 ft (9.2 m)
 -- road width 13.5 ft (4.1 m)
 -- field width 18.8 ft (5.7 m)
 -- bed height 33 in (838 mm)
 -- bed rail width (centre to centre) 36 in 914 mm
 -- ground clearance at axles 12 in (305 mm)

TIRES: 4, 11 x 15LT

SUSPENSION: Twin axle, mounted to slipper springs, 2 wheels per side

HYDRAULICS:
 -- fork cylinders
 -bore 3.5 in (90 mm)
 -stroke 7.5 in (190 mm)
 -retracted length 20.5 in (520 mm)
 -extended length 28 in (700 mm)
 -- bed cylinder
 -bore 3 in (80 mm)
 -stroke 12 in (300 mm)
 -retracted length 22.5 in (570 mm)

ORBIT MOTOR:
 -- displacement per rev. 23.8 in³ (390 cc)

WEIGHT:
 -- empty 4215 lbs (1912 kg)
 -- capacity 12,000 lbs (5443 kg)

TRACTOR REQUIREMENTS:
 -- manufacturer recommended minimum size 60 hp (45 kW) with dual remote outlets

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in Machinery Institute Evaluation Reports:

Excellent	Fair
Very Good	Poor
Good	Unsatisfactory

SUMMARY CHART MORRIS M-881 HAY HIKER ROUND BALE MOVER

RETAIL PRICE: \$11,173.00, (March 1986, f.o.b. Portage la Prairie, Man.) includes side rail kit \$553.00, freight \$142.00, assembly \$312.00

EASE OF OPERATION: **Very Good;** The Morris was easy to operate and manoeuvre.

QUALITY OF WORK: **Very Good;** Very little hay loss or twine damage.

RATE OF WORK: **Good;** Operator experience was necessary to provide non-stop loading.

OPERATOR SAFETY: Safe to operate if normal safety precautions were observed.

OPERATOR'S MANUAL: **Very Good;** Well written, organized and illustrated.

MECHANICAL HISTORY: Bale divider tube broke at 60 hrs.



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