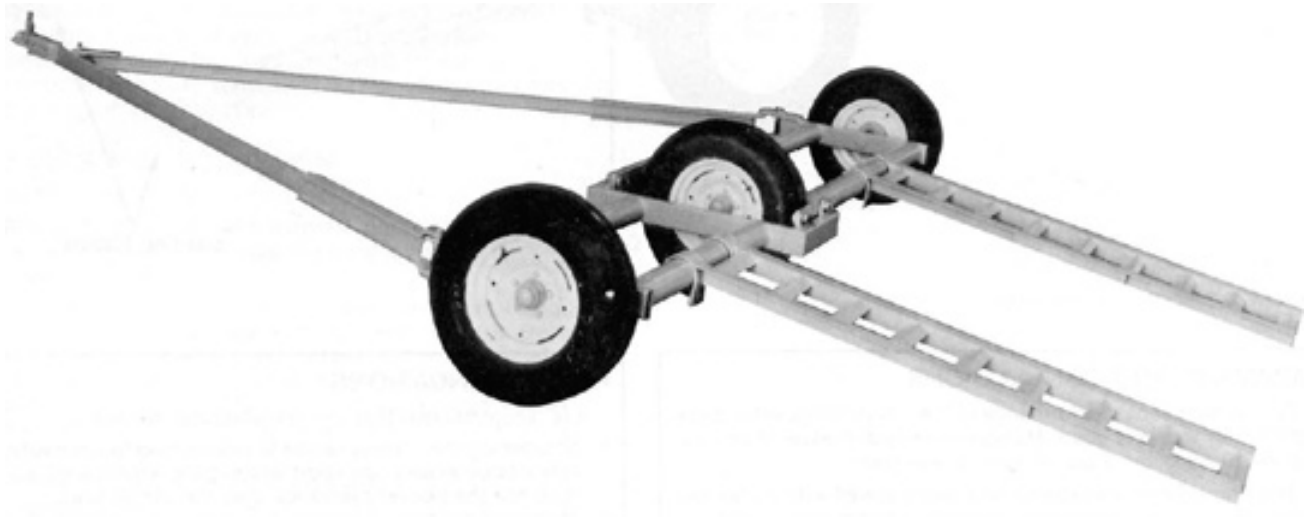


# Evaluation Report 119



## Smith-Roles Windrower Transporter

A Co-operative Program Between



ALBERTA  
FARM  
MACHINERY  
RESEARCH  
CENTRE



PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

# SMITH-ROLES WINDROWER TRANSPORTER

(Also known as the Blanchard)

## MANUFACTURER:

Blanchard Foundry Co. Ltd.  
P.O. Box 1444  
Saskatoon, Saskatchewan  
S7K 3P7

## RETAIL PRICE:

\$792.39 (March, 1979, f.o.b. Saskatoon, with 6.70 x 15, 4 ply tires)

## DISTRIBUTORS:

Frank Lawson and Sons Ltd.  
601 - 9th Street  
Brandon, Manitoba  
R7A 4B3

Smith-Roles Ltd.  
46th Street & Millar Avenue  
Saskatoon, Saskatchewan  
S7K 3M5

Renn Sales Ltd.  
1201-42 Avenue S.E.  
Calgary, Alberta  
T2G 1Z5

Renn Sales Ltd.  
12555 - 127 Avenue  
Edmonton, Alberta  
T5L 3E5

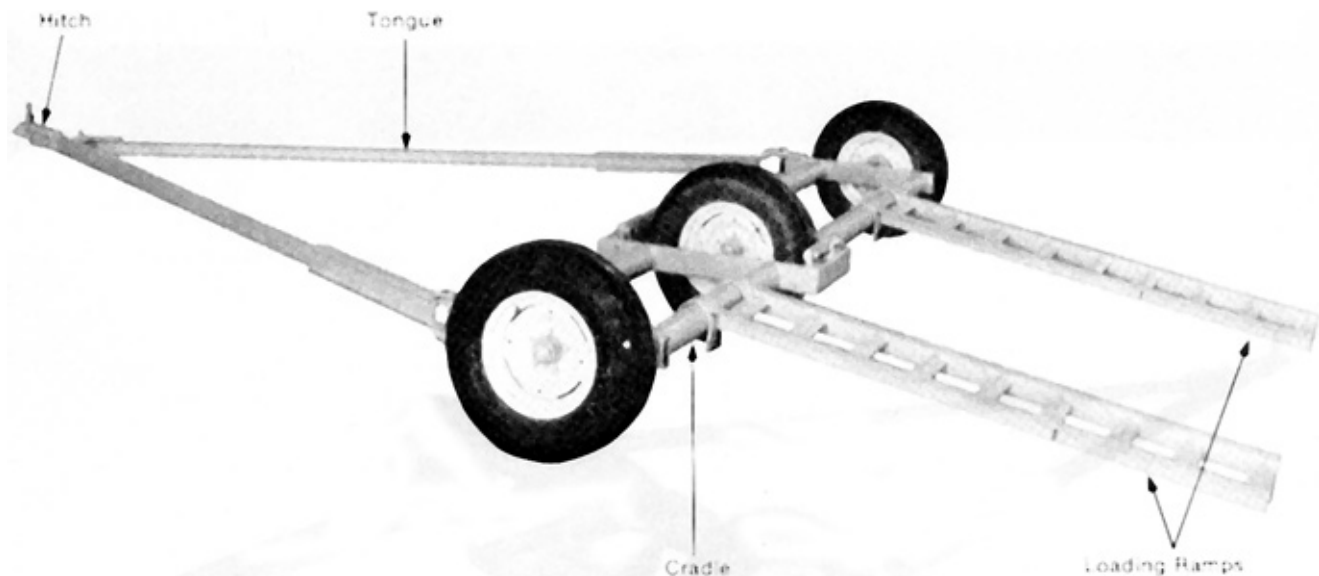


FIGURE 1. Smith-Roles Transporter.

## SUMMARY AND CONCLUSIONS

Overall functional performance of the Smith-Roles windrower transporter was very good. Maneuverability and ease of unloading were very good. Ease of loading was good.

The Smith-Roles transporter was easily towed with a one-half ton truck in most conditions, however, a larger towing vehicle with suitable brakes would be preferable.

Transport speeds up to 40 km/h (25 mph) were possible without excessive sway or bounce, but maximum speed was usually limited from 15 to 30 km/h (10 to 20 mph) due to shimmy of the windrower castor wheels. Transport speed usually depended upon the make and model of windrower being transported.

The Smith-Roles transporter was compatible with only a few self-propelled windrowers. This was due to the limited table lift on most machines, which did not provide adequate clearance above the centre wheel of the transporter. Shorter loading ramps would have reduced this problem.

The tire load rating permitted safe transport of loads of 1725 kg (3800 lb) at speeds up to 30 km/h (20 mph). Most windrowers subjected the tires on the transporter to loads of 2400 to 3000 kg, (5300 to 6600 lb) which resulted in tire overloads of 40 to 75 percent.

The ball and socket hitch was rated for a maximum gross weight of 1590 kg (3500 lb). Due to the location of the transporter wheel axles, there was a negative weight on the hitch when the transporter was loaded.

Rear visibility was completely obstructed when towing windrowers with a small truck. Transport width was determined by the windrower header width. As a result, the operator should install suitable signal devices when transporting on public roads.

No serious mechanical problems occurred during evaluation or load testing.

## RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Shortening the loading ramps to reduce interference with the rear castor wheels, on short wheel-base windrowers and to increase the header clearance over the centre tire.
2. Modifying the ramps, to raise automatically when windrower drive wheels drop into the cradle.
3. Modifying the axle location to ensure a positive weight on the hitch when the transporter is loaded.
4. Supplying approved hitch safety chains as standard equipment.
5. Supplying safety recommendations with the transporter, outlining items such as tire load ratings, tire pressures, maximum transport speeds, the use of slow moving vehicle signs, and other pertinent safety considerations.

Chief Engineer -- E. O. Nyborg

Senior Engineer -- J.C. Thauberger

Project Engineer -- G.R. Pool

## THE MANUFACTURER STATES

We agree to make the recommended changes and also as an option, on the transporter, heavier rims and larger tires will be available to prevent tire overload.

## GENERAL DESCRIPTION

The Smith-Roles transporter (FIGURE 1) is designed for transporting self-propelled windrowers. The 3.5 m wide, hinged, tubular cradle is supported by three wheels and an angle A-frame hitch, when used in the loaded towing configuration. For unloaded travel, the hinged cradle can be folded to reduce the transporter width (FIGURE 2).



FIGURE 2. Transporter in Folded Position.

Windrowers are driven forward up a pair of ramps, which can be adjusted to accommodate various windrower tread widths, until the drive wheels rest in the cradle. Windrowers are transported with the rear castor wheels on the ground.

Detailed specifications are given in APPENDIX I.

## SCOPE OF TEST

The Smith-Roles transporter was operated over a wide range of conditions varying from rough field trails to paved roads, while transporting a variety of self-propelled windrowers for a total distance of about 200 km. It was evaluated for ease of operation and operator safety. In addition, it was subjected to a dynamic load test on an obstacle track.<sup>1</sup>

## RESULTS AND DISCUSSION

### EASE OF OPERATION

**Hitching:** The Smith-Roles transporter was equipped with a ball and socket hitch. The unloaded hitch weight was 52 kg. No hitch jack was provided.

**Towing Vehicle:** For most field and road conditions, the loaded transporter was readily towed with a one-half ton truck. Selection of a suitable towing vehicle should be based on road conditions. Although a one-half ton truck may have adequate power to easily transport a windrower, it may not have adequate brakes or weight for emergency situations that may occur during high speed transport or on hills.

**Loading:** To load a wind rower, the transporter had to be hitched to a suitable towing vehicle. Then the transporter had to be unfolded from the folded position, and one loading ramp moved to the other side of the cradle. Also, the left hitch member had to be unhooked and secured in the open position. The loading ramps were easily lowered and positioned manually, to match the windrower wheel tread. No tools were needed.

Windrowers were loaded by driving forward, up the ramps, until the drive wheels dropped into the cradle. The ramps then had to be raised manually and secured to the windrower frame before transporting (FIGURE 3). This was difficult for one person. Most windrowers did not have sufficient table lift to clear the centre wheel during loading. For loading these machines, the transporter was placed in a small ditch to provide adequate clearance. In all cases, the windrower drive wheels seated firmly into the cradle with little possibility of them bouncing out during transport. However, it is recommended that the operator secure the wheels to the cradle for transport on public roads.

For some windrowers, with double rear castor wheels, the ramps were too long and interfered with the castor wheels. It is recommended that the manufacturer shorten the ramps to accommodate windrowers with shorter wheelbases. This would also improve the windrower header clearance above the centre tire, while loading.

The 3.5 m wide cradle was wide enough to accommodate all the windrowers transported.

**Transporting:** The Smith-Roles transporter well at speeds up to 15 km/h on rough roads and 40 km/h on smooth roads and paved highways. On rough roads, transport speed was limited by machine bounce. On smooth roads, transporter swaying oc-



FIGURE 3. Ramps Raised for Transporting.

curred at speeds above 40 km/h. In most instances, transport speed was limited by shimmy of the windrower castor wheels.

**Maneuverability:** The transporter was maneuverable in both loaded and transport modes. Sharp turns and backing were easy. The width of the windrower header established the operating width. As a result, passing vehicles on narrow roads with sharp ditches created problems due to the overhang of the windrower header. Even though the wheel tread of the transporter was wide, ground clearance was very good over ridges and road shoulders. This was due to the three wheel, hinged frame design of the transporter.

**Unloading:** To unload a windrower from the Smith-Roles, the ramps were dropped to the ground and the windrower was backed off the cradle.

No problems were encountered due to drive wheel slippage on the cradle.

### OPERATOR SAFETY

The Smith-Roles was safe to operate if normal safety precautions were observed.

Since the transporter was not equipped with brakes, the towing vehicle must have adequate brakes and must be large enough to stop safely in emergency situations.

A slow moving vehicle sign was required at the rear of the windrower before transport on public roads. The windrower header obstructed rear visibility when towing with a small truck. Truck brake lights and rear signal lights were obscured by the windrower.

The operator must be responsible for ensuring that adequate signal devices are installed for use on public roads.

The Smith-Roles was equipped with three, 6.70 x 15, 4 ply agricultural implement tires. Tire manufacturer specifications indicated that the three tires were capable of supporting a total load of 1725 kg, including the weight of the transporter. This rating was based on maximum speeds of 30 km/h and 220 kPa tire pressure. The largest windrower used in the evaluation, placed a load of 3020 kg on the tires. This resulted in a tire overload of 75% at 30 km/h. Tire overloads of this magnitude should be avoided. Smaller windrowers caused tire overloads in the range of 50%.

Although the unloaded hitch weight was only 52 kg, a hitch jack would have improved hitching safety and convenience. When the transporter was loaded, the hitch point had a negative weight. Caution had to be exercised when disconnecting the loaded transporter from a truck, as the hitch raised when unhooked. No safety chains were provided. It is recommended that the manufacturer supply approved hitch safety chains as standard equipment.

For transporting the Smith-Roles when unloaded, the left wheel section could be folded over on top of the right hand section. This operation required at least two men, as the wheel and cradle were quite heavy.

No operating instructions were provided with the Smith-Roles

transporter, and due to the simplicity of the machine, there may be little need for them. However, it is recommended that safety instructions be provided for the purchaser. These should include tire and wheel load ratings, maximum transport speeds, tire pressures, recommended size of towing vehicle, attachment of a slow moving vehicle sign, and other pertinent safety considerations.

#### DURABILITY RESULTS

The intent of the test was evaluation of functional performance. An extended durability evaluation was not conducted. No serious failures occurred during functional testing although one wheel hub was replaced to correct a pronounced wobble on the left wheel. This was judged to be a fault in manufacture.

In addition, the Smith-Roles was subjected to a dynamic load test on an obstacle track to assess wheel and frame strength. No permanent deformation or mechanical failures occurred during this test.

<sup>1</sup>PAMI T7717-R79 Detailed Test Procedures for Windrower Transporters

#### APPENDIX I

##### SPECIFICATIONS

<b>MAKE:</b>	Smith-Roles	
<b>LOAD RATING:</b>	1725 kg	
<b>OVERALL DIMENSIONS:</b>	<b>LOADED</b>	<b>TRANSPORT</b>
-- overall length	4420 mm	4725 mm
-- overall width	4040 mm	2465 mm
-- overall height	710 mm	1090 mm
-- wheel tread	3820 mm	2110 mm
-- ground clearance	280 mm	280 mm
<b>CRADLE:</b>		
-- opening	530 mm	
-- width	3505 mm	
-- height	405 mm	
-- material	114 mm round tubing	
<b>LOADING RAMPS:</b>		
-- width	460 mm	
-- length	2060 mm	
-- angle	11°	
<b>TIRES:</b>	3, 6.70 x 15.4 ply	
<b>HITCH:</b>		
-- type	SAE Class 2.51 mm (nominal 2 inch) ball and socket	
-- load rating	1590 kg	
<b>WEIGHT:</b>		
-- hitch point	52 kg	
-- transport wheels (3)	368 kg	
Total	420 kg	

#### APPENDIX II

##### MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports:

- |              |         |                   |
|--------------|---------|-------------------|
| a) excellent | c) good | e) poor           |
| b) very good | d) fair | 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 kilometre/hour (km/h)	= 0.62 miles/hour (mph)
1 metre (m) = 1000 millimetres (mm)	= 39.37 inches (in)
1 kilogram (kg)	= 2.2 pounds (lb)
1 kilopascal (kPa)	= 0.15 pounds/inch <sup>2</sup> (psi)



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