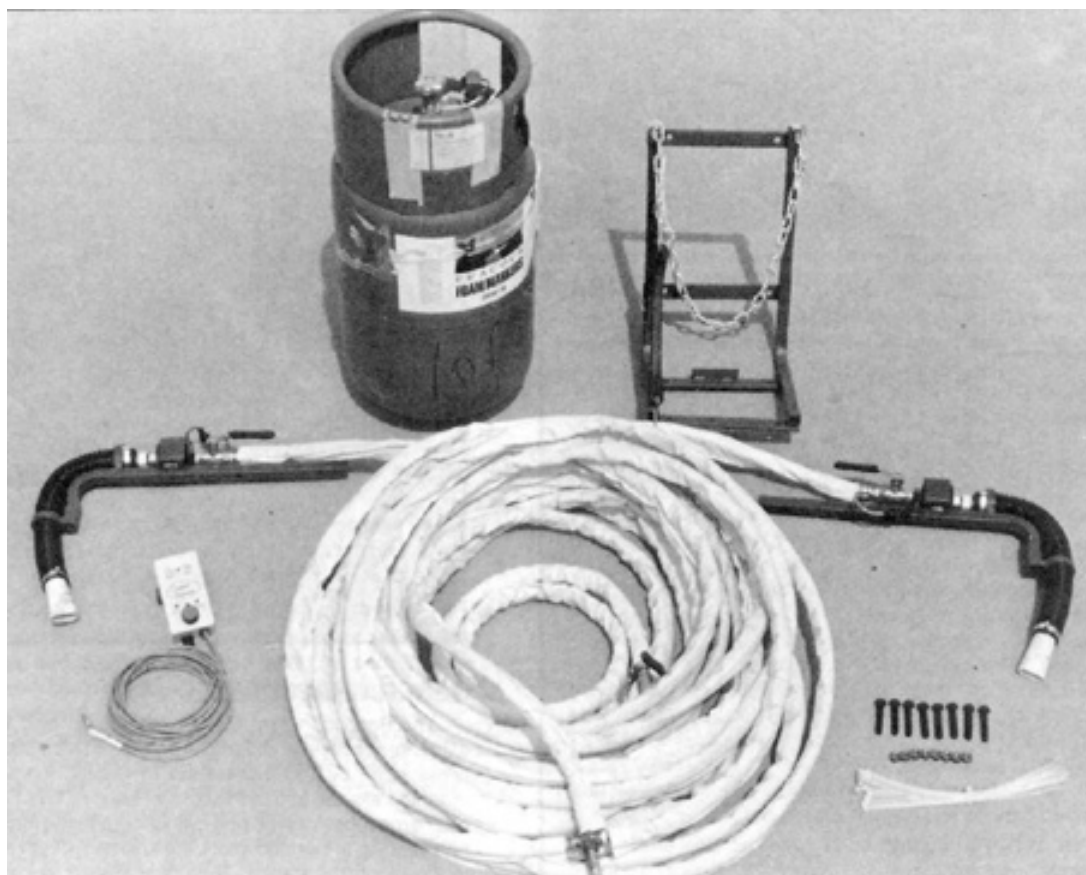


Evaluation Report

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Peacock Foam Marker

A Co-operative Program Between



PEACOCK FOAM MARKER

MANUFACTURER AND DISTRIBUTOR:

Peacock Industries (1988) Inc.
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PH: (306) 225-4691

RETAIL PRICE: (\$795.00 April 1991, f.o.b. Lethbridge, Alberta)

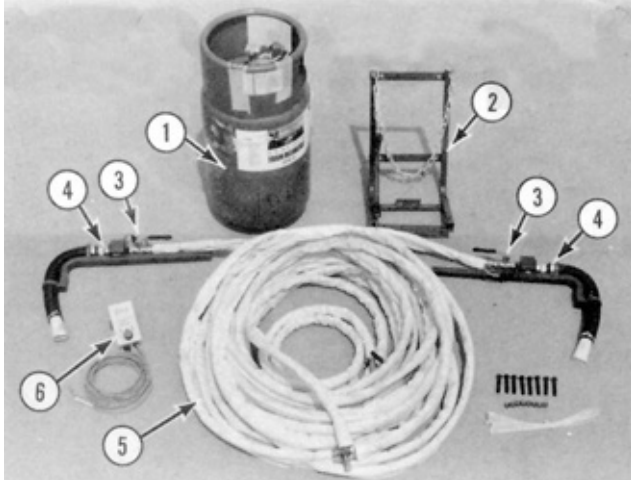


FIGURE 1. Peacock Foam Marker: (1) Foam Tank, (2) Foam Tank Stand, (3) Shut-off Valve, (4) Solenoid Valve and Foam Discharge Tubes, (5) Foam Tubes and Wiring Housing, (6) Control Console.

SUMMARY AND CONCLUSIONS

Quality of Work: Mark visibility was good when mark spacing and length were adjusted to suit forward speed and field conditions. At a mark spacing of 150 ft (46 m) and a mark length of 3 ft (1 m) the marks were easily visible without searching. The foam marks were less visible in chemfallow fields.

Foam mark durability was good. In normal spraying conditions the foam lasted about two hours. Depending on weather conditions, the foam marks could last less than an hour to as long as 15 hours.

Foam mark placement was good and quality of foam was very good in normal spraying conditions.

Depending on conditions, one tank of foam lasted about 285 to 800 ac (115 to 324 ha) using a 83 ft (25 m) sprayer at 7 mph (11 km/h). Operating cost for foam was about 9 to 25 cents/ac (22 to 62 cents/ha).

Marker component performance was good in the dust and moisture common to spraying operations.

Ease of Operation and Adjustment: Ease of refilling the foam tank was very good. The foam tank simply had to be replaced.

The control console switches were easy to use and rated as very good.

Ease of cleaning was very good.

Ease of sprayer alignment was good. Good operator skill and judgement was required to align the sprayer boom end with the foam marks. This was more difficult with wider sprayers.

Ease of adjusting foam marks was very good. The marks could be adjusted to precise lengths and regular intervals to suit field conditions. Mark length could be adjusted from 0.5 to 9 ft (0.2 to 2.7 m). Mark spacing could be adjusted from 2 to 462 ft (0.6 to 141 m). This was adequate for trailing type sprayers.

Ease of Installation: Ease of installation was very good. The foam tubes and wiring harness were housed in a vinyl cover making installation easy. Installation time was about 2 hours for one man.

Operator Safety: The foam was flammable and pressurized. Care had to be exercised during maintenance and replacing the foam tank.

Operator's Manual: The operator's manual was fair. It was useful but contained no information on installation and foam durability.

Mechanical History: Foam leaked from the foam discharge assembly throughout the test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the stand to properly secure the foam tank to the sprayer.
2. Modifying the operator's manual to include information on foam quality and durability.
3. Modifying the boom end foam discharge assembly prevent it from leaking.

Manager: R.P. Atkins

*Project Technologist:
B.L. Storzynsky*

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. We have changed the locking system to an over-center lock on a nylon strap which holds the tank securely.
2. We have made a new manual to include more information on installation and operation trouble shooting.
3. Boom end units have been changed to afford more protection of the electrical and brass parts which tended to vibrate loose and cause leaks, also the foam nozzle has been modified to achieve 10% - 20% better coverage from tanks.

Peacock has also incorporated a filter into the system to eliminate any plugging problems with debris from inside the reusable tank or material that has entered the system at the time of tank hookup.

GENERAL DESCRIPTION

The Peacock Foam Marker mounts on field sprayers to aid in aligning successive passes in the field. A refillable 4.8 gal (22 L) pressurized tank delivers foam to flexible foam discharge tubes mounted at each end of the sprayer booms. The 1.5 in (38 mm) foam discharge tubes deliver long cylindrical shaped foam. Both the length and spacing of the foam mark are adjustable from the control console mounted on the tractor. The console also has a manual override switch.

Figure 1 shows the components of the marker while detailed specifications are given in APPENDIX 1.

SCOPE OF TEST

The Peacock Foam Marker was mounted on a 83 ft (25 m) trailing field sprayer and used for 83 hours of typical spraying. The Alberta Farm Machinery Research Centre (AFMRC) evaluated the foam marker for quality of work, ease of operation and adjustment, ease of installation, operator safety and suitability of the operator's manual.

At the end of the test, Peacock Industries supplied a new control console. The new console was tested for about 8 hours in typical spraying conditions.

RESULTS AND DISCUSSION

Quality of Work:

Mark Visibility: Mark visibility was good. Mark visibility was good in most field conditions encountered as long as mark spacing and length were adjusted to suit forward speed and field conditions. For

best visibility on young green crops, mark spacing and length were adjusted to about 150 and 3 ft (46 and 1 m) respectively. Foam marks spaced too far apart caused the operator to search for the next mark. This resulted in a zig zag spraying pattern, unless the grain rows were followed. In addition, more foam was used at large mark spacings because the mark length usually was increased to maintain good visibility.

The marks were most visible on green crops less than 7 in (178 mm) high. The marks were less visible in chemfallow fields with tall canopies.

Mark Durability: Foam mark durability was good. The foam marks lasted about 2 hours in normal spraying weather conditions, but the foam stain was visible longer, up to 4 hours. FIGURE 2 shows a typical foam mark immediately and 2 hours after discharging. In hot breezy weather conditions, the foam lasted less than an hour. In cool cloudy mornings the foam marks lasted up to 15 hours.

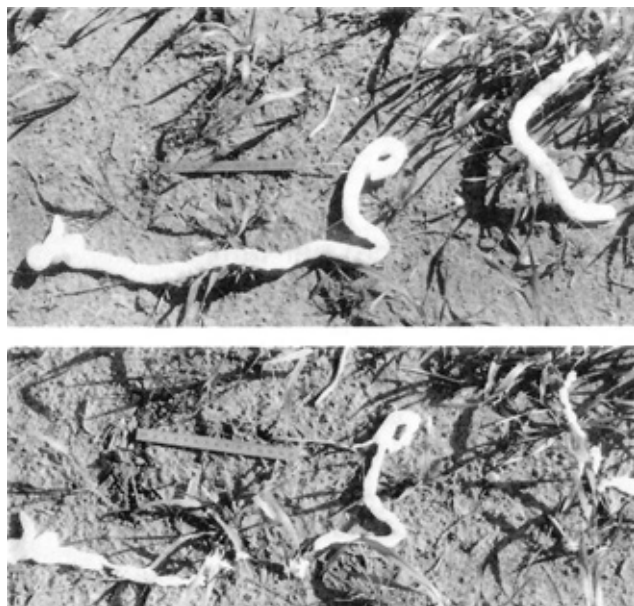


FIGURE 2. Typical Foam Mark After Discharging (upper) and Two Hours Later (lower).

Mark Placement: Foam mark placement was good. In typical spraying conditions the foam marks landed directly below the foam discharge tubes. In breezy weather conditions the foam marks drifted and the drift distance had to be compensated for on the successive pass. Extra foam marks could be placed during turning and cornering which was very convenient.

Quality of Foam: The foam generated was rated as very good. The quality of foam remained stable in the spraying conditions encountered. The white vinyl housing shielded the foam tubes from excessive heat absorption to enhance foam stability.

Quantity of Foam Used: The quantity of foam used depended on field surface, field topography, sprayer size, operator skill and weather conditions. Amount of acres marked per foam tank varied from 285 to 800 ac (115 to 324 ha) using an 83 ft (25 m) sprayer at 7 mph (11 km/h). About 285 ac (115 ha) were marked in chem fallow fields with the mark spacing set to mark at 100 ft (30 m) intervals. Mark length varied from 7 to 12 ft (2.1 to 3.7 m). About 800 ac (324 ha) were marked in young cereal crops at 200 ft (61 m) mark intervals. The mark length control dial was adjusted near the zero setting, resulting in mark lengths from 2 to 5 ft (0.6 to 1.5 m).

Mark length varied because the control dial was sensitive to small adjustments. The desired 3 ft (1 m) mark lengths were difficult to obtain, reducing area marked per foam tank. AFMRC received a new control box at the end of the field test. The desired mark lengths were easier to obtain with the new control box.

Operating cost for the Peacock foam ranged from about 9 to 25 cents/ac (22 to 62 cents/ha).

Environmental Effects: The Peacock foam marker component performance in field conditions was rated as good. The control console, foam tank, solenoid valves and wiring harness were not affected by the dust and moisture common to spraying operations. The foam had no adverse effect on the crop or operator.

EASE OF OPERATION AND ADJUSTMENT

Refilling: Ease of refilling was very good. The foam tank had to be removed from the sprayer and replaced at the local dealer. For convenience, a spare foam tank was carried to avoid running to the foam dealer in the middle of spraying. Removing the foam tank from the stand and the foam tubes from the foam tank was easy. To prevent the foam tank from falling off the stand during spraying an additional strap was used to hold the foam tank. It is recommended the manufacturer consider modifying the stand to properly secure the foam tank to the sprayer.

The fluid in the tank had to be agitated a minute each day before using. The fluid was agitated by rocking the foam tank back and forth. Once agitated, the foam stayed agitated during spraying due to the motion and vibration of the sprayer. The amount of foam remaining was determined by judging the weight of the foam tank during agitation.

Controls: Ease of operating the controls was very good. FIGURE 3 shows the Peacock Foam Marker control console. The control console was equipped with a power off/on switch, solenoid valve switches, override switch, mark spacing and length adjustment dials and three LED indicator lights. The mark adjustment dials were small and difficult to adjust in rough field conditions. All controls were convenient to operate and responsive. An override switch was useful in providing extra marks on corners and during turns. The foam solenoid switch controlled the flow of foam to either the left or right foam funnels.

The three manual valves on the foam lines were useful in preventing foam from escaping from the tubes during maintenance.



FIGURE 3. Control Console.

Cleaning: Ease of cleaning was very good. Occasionally the solenoid valve assemblies required cleaning.

Sprayer Alignment: Ease of aligning the sprayer boom end to the mark was good. The foam marks allowed successive passes of the sprayer to be properly aligned (FIGURE 4). Marks were left at the outer edge of the previous pass, so on the next pass an operator could align the outer end of the spray boom with the marks. This still required considerable operator skill and judgement, since the outer ends of most sprayer booms were over 30 ft (9 m) from the tractor. Therefore, the sprayer could not be aligned by sighting down the row of marks. The operator had to judge the distance from the mark to where he should be driving and then use the mark as a check on whether the sprayer was properly aligned.

From the tractor seat the sprayer boom end looked properly aligned with the foam mark, when in fact the mark was several feet from the sprayer boom end. The operator should get off the tractor and check the mark distance from the sprayer boom end, and adjust accordingly. After several checks, aligning the sprayer boom end to the mark becomes more accurate.

Mark Adjustments: Ease of adjusting foam mark spacing and length was very good using the new control console. Mark length

and spacing dials could be set to open the solenoid valves from 0.06 to 1.3 s and to close the solenoid valves from 0.3 to 63 s. This meant that at 5 mph (8 km/h) mark length could be varied from 0.5 to 9 ft (0.2 to 2.7 m). Mark spacing could be varied from 2 to 462 ft (0.6 to 141 m). The dials did not contain reference markings and therefore, it was difficult to set the mark at the desired length and spacings.

Foam discharged each time the solenoid valve opened resulting in consistent lengths of foam marks at regular intervals.

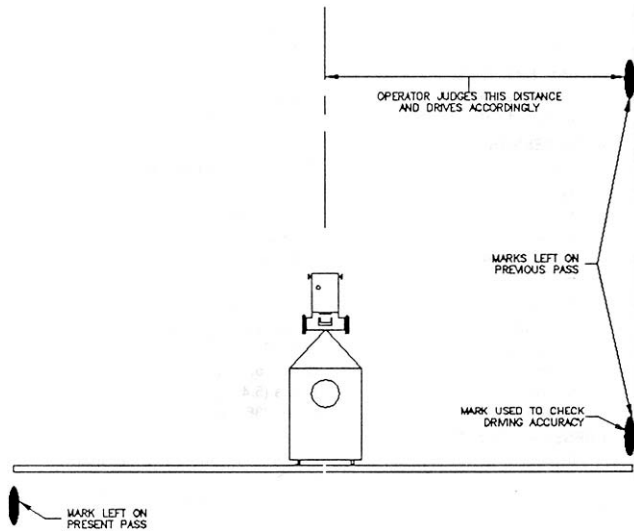


FIGURE 4. Schematic Illustrating Peacock Foam Marker Operation.

EASE OF INSTALLATION

Installation Time: Ease of installation was very good. The foam marker was easily installed on the Bourgault sprayer in about two hours by one man. No installation instructions were provided.

Foam Tank: The foam tank was mounted on the stand provided. The stand was bolted to the sprayer hitch (FIGURE 5) at a location easily accessible for removing the foam tank.

Control Console: The control console was mounted at a suitable location on the tractor. The unit was small, light and used velcro for mounting on a tractor cab window. A quick electrical pull-apart connector was provided to disconnect the control console when unhitching the tractor.

Wiring Harness and Delivery Tubes: The wiring harness and foam tubes were enclosed in a vinyl housing (FIGURE 1) which made it easy to install along the sprayer trailer and booms with the ties provided. The vinyl housing prevented the wire harness from being pinched and tangled. The foam discharge tubes were easily installed 10 in (254 mm) from the end nozzle with the bracket provided.



FIGURE 5. Foam Tank and Stand.

OPERATOR SAFETY

No safety hazards were observed if normal safety precautions were adhered to. The foam was flammable and the foam tank and hoses were pressurized. Therefore, care had to be exercised during maintenance and replacing the foam tank.

OPERATOR'S MANUAL

The operator's manual was fair. The operator's manual included useful information on safety and operation. More information on foam spacing, quality and durability of the foam marks should be indicated to give the operator an idea of what to expect in field conditions. It is recommended that the manufacturer consider modifying the operator's manual to include information on foam durability.

MECHANICAL HISTORY

TABLE 1 outlines the mechanical history of the Peacock Foam Marker during 83 hours of field operation, while marking about 3830 ac (1551 ha). The intent of the test was evaluation of the functional performance and an extended durability evaluation was not conducted.

TABLE 1. Mechanical History

ITEM	OPERATING HOURS	EQUIVALENT FIELD AREA ac (ha)
-- the right solenoid valve plugged and was cleaned at	54	400 (2175)
-- the foam leaked near the solenoid valve and foam tube connection and was repositioned		throughout the test
-- a wire at the hitch connector was loose and repaired at		end of test

DISCUSSION OF MECHANICAL PROBLEMS

Leaking Solenoid Valves: The foam leaked between the solenoid valve and foam discharge tube. The connection was held together by a spring. The spring weakened and could not hold the solenoid valve against the foam discharge tube and resulted in foam leaking at the connection. It is recommended the manufacturer modify the foam discharge assembly to prevent foam from leaking.

APPENDIX I

SPECIFICATIONS

MAKE:	Peacock Foam Marker
ELECTRICAL POWER REQUIREMENTS:	
- volts	12 V dc
- current draw	1.1 amps, solenoid valve
CONTROL CONSOLE:	
- size	2.5 x 5 x 1.5 in (64 x 127 x 38 mm)
- controls	power off and solenoid valve switches, mark space and length dials, override switch and three indicator lights
MARKING SYSTEM:	
- type	foam
- marker fluid	premixed and pressurized
- tank capacity	4.8 gal (22 L)
MARK DELIVERY SYSTEM:	
- foam tubes	
- diameter	D.375 in (10 mm)
- length	46 ft (14 m) along boom and 15 ft (4.5 m) along trailer.
- discharge tubes	
- diameter	1.5 in (38 mm)
- length	16 in (406 mm)
- control valve	
- make	Texas Industrial Remcor
- model	2050
- power	12 V, 1 amp
- regulating nozzle	0.077 in (1.7mm) orifice plate
WIRING HARNESS:	
- power cable	5.5 ft (1.7 m)
- solenoid valve cable	same length as foam tubes
WEIGHT:	
- console	1 lb (0.45 kg)
- foam tank	7.9 lbs (36 kg) (full)
- foam and discharge tubes	30 lbs (14 kg)
- hardware	8 lbs (3.6 kg)
Total	118 lbs (54 kg)

SUMMARY CHART

PEACOCK FOAM MARKER

RETAIL PRICE:	\$795.00 (Jan 1990, f.o.b. Lethbridge)
QUALITY OF WORK:	
Mark Visibility	Good; at 150 ft (46 m) spacings and 3 ft (1 m) lengths
Mark Durability	Good; about 2 hours
Mark Placement	Good
Quality of Foam	Very Good; stable
Quantity of Foam Used	
- area marked	about 400 ac (162 ha) per tank
- cost	18 cents/ac (44 cents/ha)
Environmental Effects	Good; components not affected, foam had no effect on crop
EASE OF OPERATION AND ADJUSTMENT:	
Refilling	Very Good; replacable foam tank
Controls	Very Good; easy to use
Cleaning	Very Good; no maintenance
Sprayer Alignment	Good; required good judgement
Mark Adjustments	Very Good; mark spacing and length at regular intervals
EASE OF INSTALLATION:	Very Good; about 3 hours
OPERATOR SAFETY:	Foam is flammable and tank is pressurized
OPERATOR'S MANUAL:	Fair; no information on foam durability
MECHANICAL HISTORY:	Foam discharge assembly leaked



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