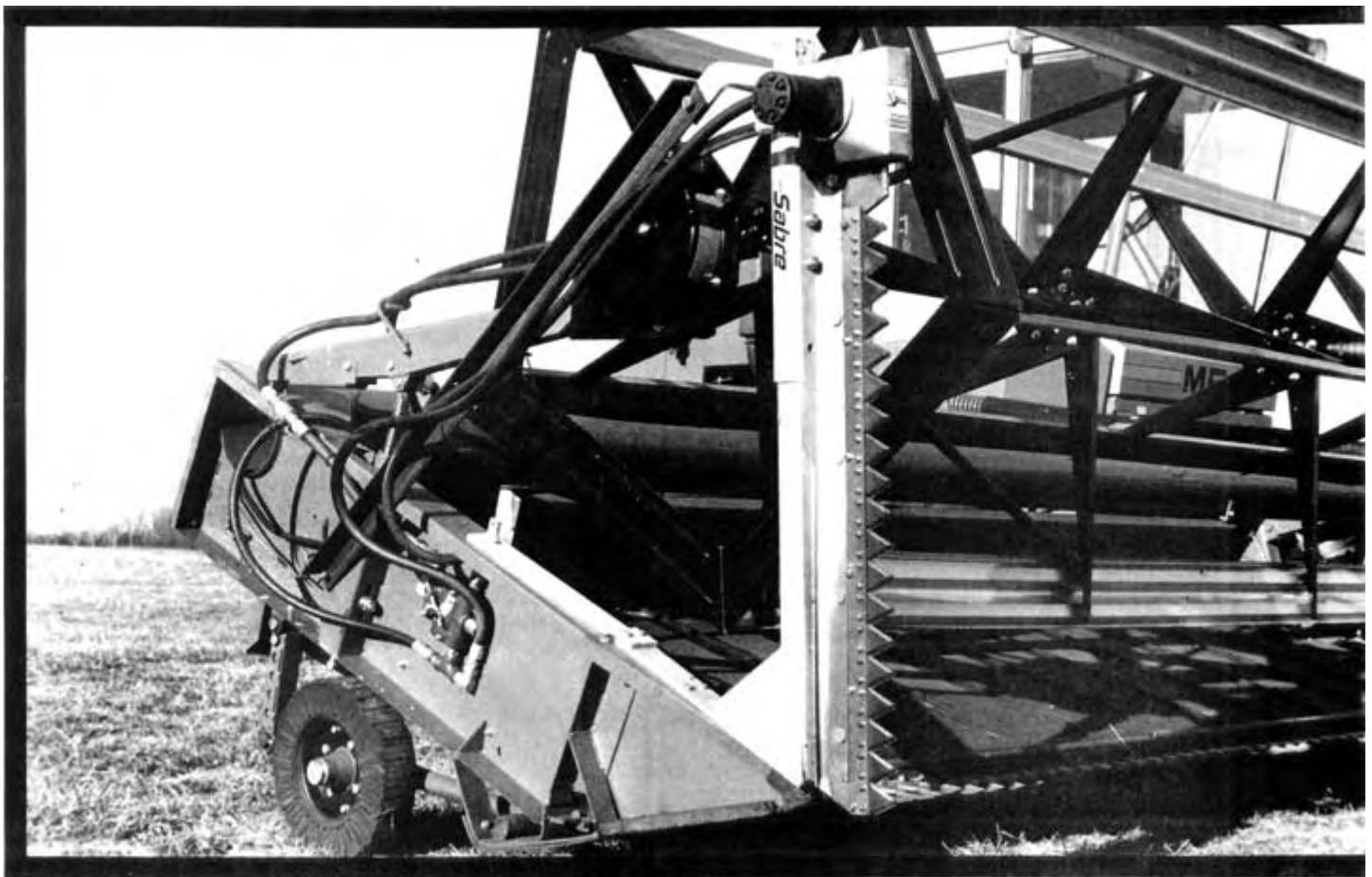


# Evaluation Report

477



## Fuma Sabre Crop Divider

A Co-operative Program Between



## FUMA SABRE CROP DIVIDER

### MANUFACTURER AND DISTRIBUTOR:

J.L.F. Enterprises Ltd.  
c/o Jose Corporation Ltd.  
612 Academy Road  
Winnipeg, Manitoba  
R3N 0E6  
(204) 489-7534

### RETAIL PRICE:

\$1,200.00 (February, 1986, f.o.b. Humboldt, with hydraulic motor, mounting hardware, and optional flow control valve).

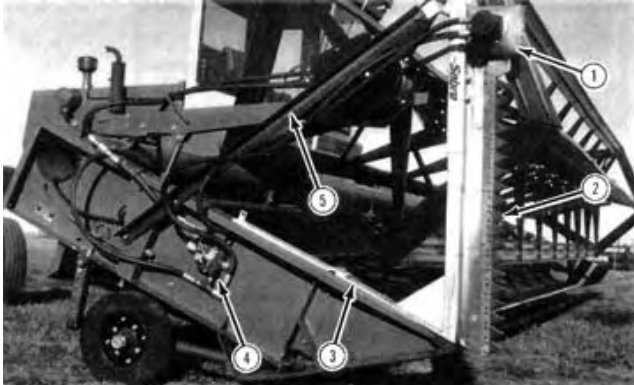


FIGURE 1. Fuma Sabre: (1) Drive and Motor, (2) Cutterbar, (3) Mount, (4) Flow Control, (5) Brace.

### SUMMARY AND CONCLUSIONS

**Quality of Work:** The ability of the Fuma Sabre to cut and separate the crop at the windrower divider was excellent, in rapeseed and flax, hairpinning on the windrow divider was prevented. This reduced crop toss and cutterbar plugging, in cereal crops, the powered divider was removed.

**Ease of Installation:** Ease of installing the Fuma Sabre crop divider was good. Complete installation took one man about 3 hours. Hydraulic hoses were not supplied. Instructions did not adequately explain the hydraulic hook-up.

**Ease of Operation and Adjustments:** Ease of operating and adjusting the Fuma Sabre was excellent. Height and speed adjustments were suitable. Very little maintenance was required.

**Power Requirements:** Required power was about 0.4 to 1.0 hp (0.3 to 0.8 kW). Suggested operating speed was 250 rpm. Hydraulic oil flow was 3.3 gpm (0.21 L/s). Maximum hydraulic pressure was about 500 psi (3450 kPa).

**Operator Safety:** Drive components were shielded. The exposed blades were potentially dangerous, but warning decals were supplied.

**Operator's Manual:** The operator's manual was good. It was clearly written and illustrated. Suggested operating speed was not given. Hydraulic installation instructions were not adequate.

**Mechanical History:** No major problems occurred.

### RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Supplying more detailed instructions for installing and operating the hydraulic drive.

Senior Engineer: G.E. Frehlich

Project Engineer: M.E. Jorgenson

### THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. Schematics showing the hydraulic hook-up for different windrowers, and the suggested operating speed of 250 rpm will be included in the new operator's manual.

## GENERAL DESCRIPTION

The Fuma Sabre (FIGURE 1) is a powered divider attachment, which replaces the left or right divider rod on combine or windrower headers. It consists of a vertical section of cutterbar with one stationary knife and one oscillating knife. The cutterbar cuts through the crop edge to separate the standing crop from the cut crop.

It is driven by a hydraulic motor and oscillating cam at the top of the cutterbar. Hydraulic flow is supplied by the windrower or tractor. Oscillation speed is adjusted with a flow control valve.

Detailed specifications are given in APPENDIX I.

## SCOPE OF TEST

The Fuma Sabre was mounted on the right divider of a Massey Ferguson 885 self-propelled windrower. It was operated in rapeseed, flax, and cereal crops for 74 hours while windrowing about 1045 ac (423 ha). It was evaluated for ease of installation, quality of work, power requirements, ease of operation and adjustment, operator safety, and suitability of the operator's manual.

## RESULTS AND DISCUSSION

### QUALITY OF WORK

The ability of the Fuma Sabre to cut and separate the crop at the windrower divider was excellent.

In rapeseed, the Fuma Sabre cut the crop cleanly (FIGURE 2). Although some plants were only partially cut, they were easily retrieved by the next pass. Even in heavy tangled rapeseed, at normal working speeds, the Fuma Sabre prevented crop from hairpinning on the divider. This eliminated cutterbar plugging and bunchy windrows that are often obtained when using a standard divider rod. FIGURE 3 shows a rapeseed windrow formed using the Fuma Sabre.

In flax, the Fuma Sabre cut cleanly and prevented crop from hairpinning on the divider. The hydraulic drive had adequate power. In the cereal crops, the powered divider cut well and left a clean crop edge. However, in leaning cereal crops, the powered divider had to be removed because some heads were being cut off and lost on the ground. In straight cereal crops, the Fuma Sabre was not needed.



FIGURE 2. Crop Edge left by the Fuma Sabre in Rapeseed.



FIGURE 3. Uniform Rapeseed Windrow Obtained with the Fuma Sabre.

### EASE OF INSTALLATION

Ease of installation was good. One man could install the Fuma Sabre in about 3 hours. Mounting hardware and the flow control were supplied, but hoses and fittings were not. Mounting instructions in the operator's manual were adequate. The hydraulic drive installation instructions were brief and not complete. There was no sketch or suggested method of connecting to the oil supply on a typical windrower and no suggested operating speed. It is recommended that the manufacturer consider supplying more

detailed instructions for installing and operating the hydraulic drive.

On the test machine, the flow control was bolted to the right divider plate and connected in series with the reel motor of the windrower. About 17 ft (5.2 m) of 1/2 in (13 mm) hydraulic hose, one tee, and fittings were required. Additional bracing was supplied to stiffen the top-heavy divider and keep it from contacting the reel. A power drill and hand wrenches were required for installation. When installed on the MF 885, a new divider skid plate had to be built because the windrower skid plate had to be removed with the divider rod.

The Fuma Sabre was easily removed for windrower operation in cereal crops by unbolting the mounts and disconnecting the hydraulic drive. When removing and reinstalling frequently during the tests, the divider was simply stored on the angle iron bracing, and the flow control was shut off (FIGURE 4).



FIGURE 4. Fuma Sabre Stored for Use in Cereal Crops.

#### EASE OF OPERATION AND ADJUSTMENT

Ease of operating and adjusting the Fuma Sabre was excellent. The cutterbar height was easily adjusted by removing two bolts on the vertical frame. Speed was easily adjusted with the flow control valve. There was no need to adjust speed on-the-go. The range of height and speed adjustments was adequate for all field and crop conditions. Suggested operating speed was not given in the operator's manual, but a motor speed of 250 rpm worked well in all crops. It was important to keep the bottom of the cutterbar high enough to avoid contact with the ground.

Very little maintenance was required except for daily inspection and occasional oiling of the cutterbar. Repairs were easily made.

#### POWER REQUIREMENTS

Power required to run the Fuma Sabre was 0.4 to 1.0 hp (0.3 to 0.8 kW). The hydraulic oil flow required at an operating speed of 250 rpm was 3.3 gal/min (0.21 L/s). Hydraulic pressure during normal operation was less than 500 psi (3450 kPa). A hydraulic pump supplying at least 5 gal/min (0.3 L/s) should have adequate flow to operate the Fuma Sabre. Most tractor and windrower hydraulic systems can easily supply this oil flow without affecting the performance of other hydraulically driven components.

#### OPERATOR SAFETY

The Fuma Sabre drive components were adequately shielded. A warning decal was affixed to warn of potential danger from the moving cutterbar. Caution must be exercised when working around powered crop dividers.

#### OPERATOR'S MANUAL

The operator's manual was good. It was clearly written and well illustrated. Information was provided on safety, installation, operation, service, and parts. A suggested operating speed was not given. Installation instructions did not adequately explain the hydraulic system hook-up. It has been recommended that the manufacturer supply more detailed installation and operating instructions.

#### MECHANICAL HISTORY

The Fuma Sabre was operated for 74 hours. The intent of the test was evaluation of functional performance. An extended durability

evaluation was not conducted.

Only two mechanical problems occurred. The bottom stationary sickle was knocked off and lost in a stony field after 4 hours of operation. It was easily replaced. The lower end of the cutterbar was bent sideways several times when it was mounted too low. It was easily restraightened without tools, but the tips of the cutting blades remained bent apart about 1/8 in (3.2 mm). Cutting ability was not affected. No damage occurred when the cutterbar was mounted high enough to clear the ground.

On some windrowers, the windrower divider may have to be reinforced to adequately support the Fuma Sabre.

APPENDIX I SPECIFICATIONS	
<b>MAKE:</b>	Fuma
<b>MODEL:</b>	Sabre
<b>SERIAL NO.:</b>	00283
<b>DIMENSIONS:</b>	
-- height	36 in (914 mm)
-- width	
- overall	7-3/4 in (197 mm)
- cutterbar	1-3/4 in (44 mm)
-- length	14 in (356 mm)
-- mass	
- cutterbar	48 lb (22 kg)
- cutterbar plus mount	81 lb (28 kg)
<b>CUTTER:</b>	
-- cutting length	32 in (813 mm)
-- sickle blades	
- number	19 moving, 19 fixed
- width	2 in (51 mm)
- length	2% in (73 mm)
-- height adjustment	3 at 2 in (51 mm) increments
<b>DRIVE:</b>	
-- type	3.0 cu in (49 cc) hydraulic motor and cam oscillator
-- operating speed	250 rpm
-- speed adjustment	flow control valve
<b>OPTIONAL EQUIPMENT:</b>	
-- electric drive	

APPENDIX II MACHINE RATINGS	
The following rating scale is used in Machinery Institute Evaluation Reports:	
excellent	fair
very good	poor
good	unsatisfactory

# SUMMARY CHART

## FUMA SABRE CROP DIVIDER

<b>RETAIL PRICE</b>	\$1,200.00 (February, 1986, f.o.b. Humboldt).
<b>QUALITY OF WORK</b>	<b>Excellent;</b> prevented hairpinning, reduced crop loss, and cutterbar plugging
<b>EASE OF INSTALLATION</b>	<b>Very Good;</b> took one man 3 hours, hoses not supplied, hydraulic hook-up not adequately explained
<b>EASE OF OPERATION AND ADJUSTMENT</b>	<b>Excellent;</b> height and speed adjustments suitable
<b>POWER REQUIREMENTS</b>	0.4 to 1.0 hp (0.3 to 0.8 kW), operating speed 250 rpm, 3.3 gpm (0.21 L/s) flow at maximum 500 psi (3450 kPa)
<b>OPERATOR SAFETY</b>	Drives were shielded, warning decal was supplied
<b>OPERATOR'S MANUAL</b>	<b>Good</b>
<b>MECHANICAL HISTORY</b>	No major problems



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