

Evaluation Report

194



International 1190 Mower-Conditioner

A Co-operative Program Between



INTERNATIONAL 1190 MOWER-CONDITIONER

MANUFACTURER:

International Harvester Company
East Moline, Illinois 61244
U.S.A.

DISTRIBUTOR:

International Harvester of Canada
660 Wall Street
Winnipeg, Manitoba
R3C 2W8

RETAIL PRICE:

\$8,594.00 (June, 1980, f.o.b. Humboldt, Saskatchewan with optional stone shoe and tall crop divider).

SUMMARY AND CONCLUSIONS

Overall functional performance of the International 1190 mower-conditioner was very good. Ease of operation and adjustment both were good.

Average field speeds varied from 5 to 9 km/h (3 to 5.5 mph) while average workrates varied from 1.3 to 2.0 ha/h (3.2 to 5.0 ac/h). Ground speed was usually limited by cutter bar performance.

Cutting ability was good in most standing crops. Windrow formation and quality varied from good to very good depending on crop type and stand.

Peak power take-off requirements varied from 5 to 7 kW (7 to 9 hp). A 20 kW (30 hp) tractor should have ample power to operate the International 1190 in most field conditions.

Header flotation was adequate once flotation springs and skid shoes were properly adjusted.

The International 1190 was safe to operate as long as common sense was used and the manufacturer's safety recommendations were followed.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Making a wider cutter bar available to more adequately suit prairie hay conditions.
2. Modifying the header locks to improve accessibility.

Chief Engineer -- E.O. Nyborg

Senior Engineer -- J.D. MacAulay

Project Technologist -- D.H. Kelly

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. Additional cutter bar widths are under consideration.
2. Improved access for header locks is under consideration.

Note: This report has been prepared using SI units of measurement. A conversion table is given in APPENDIX III.

GENERAL DESCRIPTION

The International 1190 mower-conditioner is a pull-type, power take-off driven mower-conditioner. The one-piece cutting platform uses a conventional reciprocating cutter bar with a cam action reel to move hay to the conditioner. The conditioner rolls crimp the hay, throwing it rearward where it is formed into a windrow with adjustable shields. The knife is actuated by a belt driven wobble drive.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The International 1190 was operated in the conditions shown in TABLES 1 and 2 for 85 hours while cutting about 145 ha (360 ac).

It was evaluated for quality of work, rate of work, ease of operation, power requirements, operator safety, and suitability of the operator's manual.

TABLE 1. Operating Conditions

Crop	Hours	Field Area
		ha
Bromegrass	9	17
Clover	20	28
Alfalfa, Bromegrass & Crested Wheatgrass	31	61
Green Feed	1	2
Prairie Hay & Slough Grass	24	37
Total	85	145

TABLE 2. Operation in Stony Fields

Field Condition	Hours	Field Area
		ha
Stone Free	19	32
Occasional Stones	22	45
Moderately Stony	33	52
Very Stony	11	16
Total	85	145

RESULTS AND DISCUSSION

QUALITY OF WORK

Windrow Formation: The International 1190 produced good quality windrows (FIGURE 1) in most hay crops. Windrow formation was controlled by two fixed side shields and an adjustable top baffle. In short, light crops, loose scattered windrows were produced (FIGURE 2) since the 2.7 m (9 ft) cut often was not wide enough to accumulate sufficient hay to form a windrow. The narrow cut also limited the daily workrate when compared to a 3.7 or 4.3 m (12 or 14 ft) mower-conditioner. It is recommended that the manufacturer consider producing a wider cutter bar option to more adequately suit prairie hay conditions.



FIGURE 1. Typical Windrow Formed in Heavy Crops.



FIGURE 2. Typical Windrow Formed in Light Crops.

Windrows were uniform in most crops. In light, short crops, hay sometimes collected on the cutter bar causing slight bunching. Some bunching also occurred in badly lodged hay due to uneven clearing of the cutter bar. Forward speed had little effect on windrow quality. Speed was usually limited by field roughness or cutting performance. Due to the centre delivery, continuous windrows were formed around corners. Higher reel speed and moving the reel forward reduced bunching in lodged crops.

Cutting Ability: All tests were conducted with under-serrated knife sections. Cutting ability was good in most hay crops as long

as the knife sections and guards were sharp. Cutter bar plugging occurred in fine stemmed, damp hay crops. A smooth knife assembly, which is available as an option for use in damp, fine-stemmed crops, was not evaluated.

Clean cut corners were possible with the International 1190. A tractor drawbar extension was provided with the 1190 to give equal angle universal joint operation and to provide clearance between the draw-pole and the rear tractor tire on sharp corners.

Stubble: Three general types of stubble are formed by a mower. These are ideal, undulating, and irregular as shown in FIGURE 3. The International 1190 produced ideal stubble in most hay crops as long as the cutter bar was sharp. Once the cutter bar became worn, irregular stubble was formed, especially in fine stemmed hay. When the header support springs were set as recommended by the manufacturer, the header followed ground contours well, producing uniform stubble height even in rough fields.

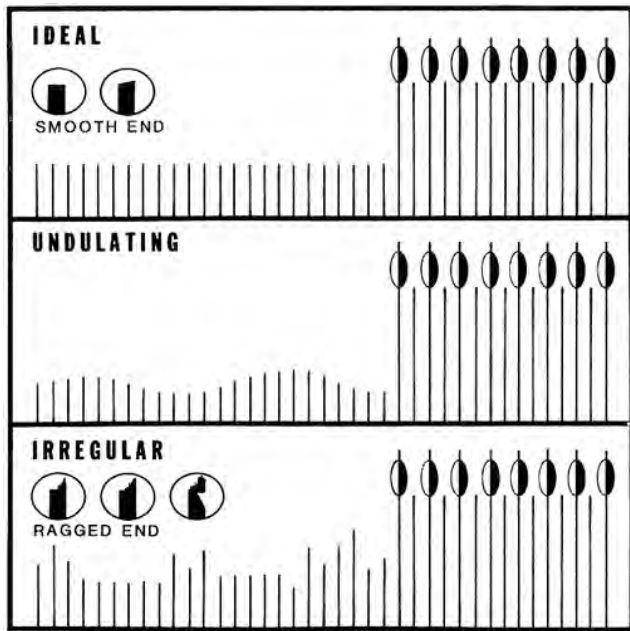


FIGURE 3. Types of Stubble.

Header Flotation: The header on the International 1190 is equipped with adjustable skid shoes designed to follow the field contour. Two sets of adjustable springs provide flotation. The operator's manual recommended that the springs be set to obtain a header lift force of 310 N (70 lb.). At this setting, the header effectively cleared field obstructions without cutter bar damage.

Reel Performance: Reel performance was good in all crops. Reel position had to be adjusted when cutting very short or very long hay to provide uniform flow to the conditioner.

Reel speed was variable from 56 to 79 rpm by adjusting the belt drive sheave. For optimum performance, reel tip speed should be about 10% faster than the ground speed. The reel speed range permitted ground speeds from 8 to 11 km/h (5 to 7 mph).

Reel tooth movement was controlled by an adjustable cam. The resulting tooth action was used to ensure an even flow of hay to the conditioner.

Conditioner Performance: The International 1190 was equipped with two rubber conditioner rolls, with an intermeshing herringbone design. Roll clearance could be set with removable shims, while roll pressure could be adjusted through a set of springs.

Conditioner performance was very good in all crop conditions. Feeding was aggressive in all crops except in heavy fine-stemmed slough grass. The operator's manual recommends adjusting the reel rearward, to assist the feeding of fine-stemmed materials.

The purpose of a conditioner is to reduce field curing time, by bruising the plant stems, resulting in more uniform drying. FIGURES 4 and 5 show the average effects that can be expected in using a conditioner in typical prairie haying conditions. The figures compare average drying times for hay cut with a 3.7 m (12 ft) wide windrower with and without conditioning. In average hay conditions, the use of a conditioner will likely permit baling from one-half to one day sooner.

A second benefit is in reduced leaf loss, since stems and leaves are at a more uniform moisture content in conditioned windrows. Much variation can be expected due to weather conditions.

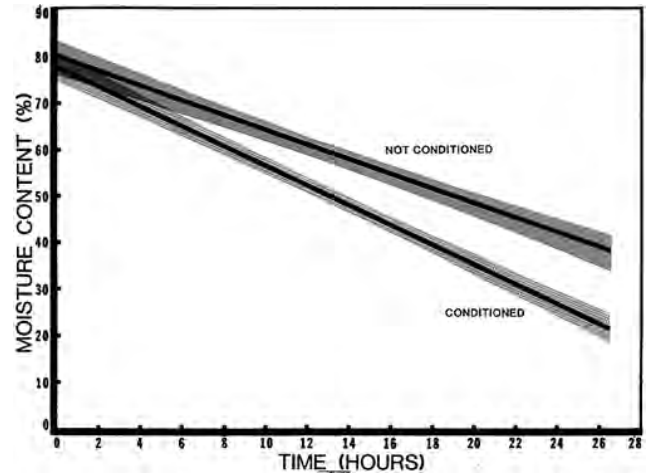


FIGURE 4. The Effect of Conditioning in a 3 t/ha Sweet Clover Crop.

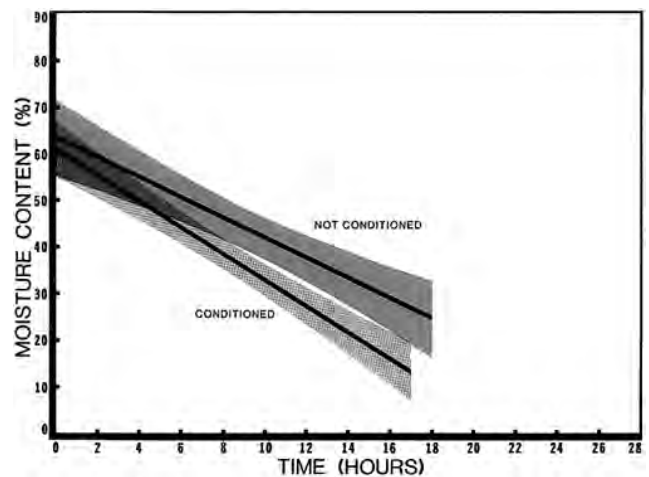


FIGURE 5. The Effect of Conditioning in a 2.5 t/ha Brome-Alfalfa Crop.

Leaf Loss: Leaf loss from the conditioner was negligible. The high moisture content of standing hay crops allows aggressive roll action with little leaf loss.

RATE OF WORK

Average field speeds varied from 5 to 9 km/h (3 to 5.5 mph) while average workrates varied from 1.3 to 2.0 ha/h (3.2 to 5.0 ac/h). Ground speed was usually limited by cutter bar performance.

EASE OF OPERATION

Controls: Header height was controlled through the tractor hydraulics. Installation of a tractor drawbar extension was required. Header locks were provided to allow safe cutter bar servicing, however, due to their position, they were difficult to install. Modifications to the header locks, improving accessibility, is recommended.

Transporting: To transport the International 1190, the hitch tongue is swung to the right to locate the hitch point in front of the cutter bar (FIGURE 6). A rope running to the tractor enabled the machine to be adjusted between field and transport positions without leaving the tractor. Installation of an optional hydraulic cylinder allowed the machine to be placed hydraulically in the transport or intermediate operating positions. This control can be used to overcome skewing during side-hill operation.

Adjustments: Reel speed was adjusted manually by varying the two halves of the drive sheave. The reel drive belt had a spring loaded tightener which needed occasional adjustment. Fore-and-aft reel position as well as the reel height, and reel tooth action were adjustable.

Conditioner speed was not adjustable. The clearance between the two rolls was adjusted with removable shims, while the pressure between the rolls was adjusted by springs.



FIGURE 6. Full Transport Position.

Servicing: Daily lubrication took from 5 to 10 minutes. The International 1190 had 12 grease fittings, three chains and two gearboxes.

POWER REQUIREMENTS

Measured peak power take-off requirements varied from 5 to 7 kW (7 to 9 hp). A 20 kW (30 hp) tractor should have ample power to operate the International 1190 in most field conditions.

OPERATOR SAFETY

The International 1190 was safe to operate and service as long as common sense was used and the manufacturer's safety recommendations were followed. Rotating parts were well shielded.

OPERATOR'S MANUAL

The operator's manual was clear, well written and contained necessary information on operation, servicing, adjustments, and safety procedures.

DURABILITY RESULTS

TABLE 3 outlines the mechanical history of the International 1190 during 85 hours of field operation while cutting about 145 ha (360 ac). The intent of the test was functional evaluation. The following failures represent those, which occurred during functional testing. An extended durability evaluation was not conducted.

TABLE 3. Mechanical History

<u>Item</u>	<u>Operating Hours</u>	<u>Equivalent Area (ha)</u>
Conditioner Rollers: -The bolts attaching a conditioner roll drive sprocket were lost and replaced at	17	29
Cutter Bar: -Individual knife sections or guards were damaged and replaced at	21, 27, 59, 72, 83, 85	36, 46, 100, 122, 141, 145

DISCUSSION OF MECHANICAL PROBLEMS

Cutter Bar: Occasional guard and knife section breakages occurred when cutting close to the ground in stony conditions. This is a normal occurrence with most mower-conditioners.

**APPENDIX I
SPECIFICATIONS**

MAKE: International Mower-Conditioner
MODEL: 1190
SERIAL NUMBER: 0220027U10Z665

HEADER:
 -- width of cut (divider pointers) 2735 mm
 -- effective cut (inside dividers) 2735 mm
 -- range of cutting height 25 to 138 mm
 -- guard spacing 78 mm
 -- length of knife section (under-serrated) 78 mm
 -- knife stroke 78 mm
 -- knife speed 796 cycles/min

REEL:
 -- number of bats 4
 -- bat action cam
 -- number of reel arms per bat 3
 -- diameter 750 mm
 -- number of teeth per bat 24
 -- bat teeth spacing 105 mm
 -- reel speed range 59 to 80 rpm
 -- reel position adjustment
 -fore and aft 50 mm
 -height above cutter bar 10 mm

CONDITIONER ROLLS:
 -- number of rolls 2
 -- roll construction reinforced rubber
 -- length 2685 mm
 -- diameter 220 mm
 -- speed 664 rpm
 -- roll pressure control spring

OVERALL DIMENSIONS:

	<u>Field Position</u>	<u>Transport Position</u>
-- length	4670 mm	4900 mm
-- width	4380 mm	3605 mm

TIRES:
 -- size 2, 9.50 x 15

WEIGHT:

	<u>Field Position</u>	<u>Transport Position</u>
-- left wheel	425 kg	568 kg
-- right wheel	697 kg	557 kg
-- hitch pin	318 kg	315 kg
Total	1440 kg	1440 kg

SERVICING:
 -- grease fittings 9, every 10 hours
 3, every 50 hours
 -- chains 3, every 50 hours
 -- wheel bearings 2, yearly
 -- gearbox 2, yearly

**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
CONVERSION TABLE**

1 hectare (ha)	= 2.5 acres (ac)
1 kilometre/hour (km/h)	= 0.6 miles/hour (mph)
1 tonne/hectare (t/ha)	= 0.5 ton/acre (ton/ac)
1 metre (m)	= 39 inches (in)
1 millimetre (mm)	= 0.04 inches (in)
1 kilowatt (kW)	= 1.3 horsepower (hp)
1 kilogram (kg)	= 2.2 pounds mass (lb)
1 newton (N)	= 0.2 pounds force (lb)



**ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE**

3000 College Drive South
 Lethbridge, Alberta, Canada T1K 1L6
 Telephone: (403) 329-1212
 FAX: (403) 329-5562
<http://www.agric.gov.ab.ca/navigation/engineering/afmrc/index.html>

Prairie Agricultural Machinery Institute

Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0
 Telephone: (306) 682-2555

Test Stations:
 P.O. Box 1060
 Portage la Prairie, Manitoba, Canada R1N 3C5
 Telephone: (204) 239-5445
 Fax: (204) 239-7124

P.O. Box 1150
 Humboldt, Saskatchewan, Canada S0K 2A0
 Telephone: (306) 682-5033
 Fax: (306) 682-5080