

# **Cost-effective Rollover Protective Structure (CROPS)**

for Wheeled Agricultural Tractors

Massey Ferguson 135 SERIES

## **TESTING INFORMATION**



**This document is in the public domain and may be freely copied or reprinted.**

## **Disclaimer**

Mention of any company or product does not constitute endorsement by the National Institute for Occupational Safety and Health (NIOSH). In addition, citations to Web sites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these Web sites. All Web addresses referenced in this document were accessible as of the publication date.

## **Ordering Information**

To receive documents or other information about occupational safety and health topics, contact NIOSH at

Telephone: 1–800–CDC–INFO (1–800–232–4636)

TTY: 1–888–232–6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

or visit the NIOSH Web site at [www.cdc.gov/niosh](http://www.cdc.gov/niosh).

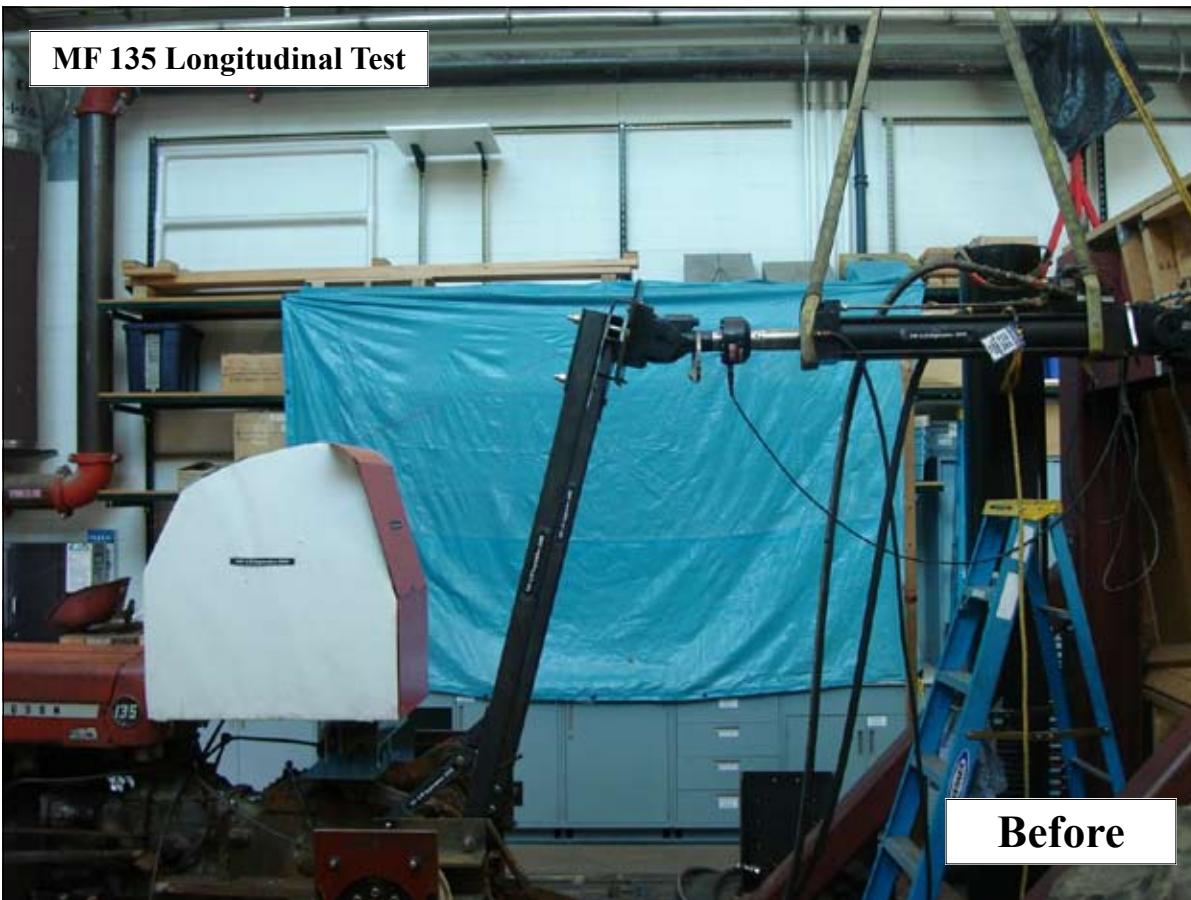
For a monthly update on news at NIOSH, subscribe to NIOSH eNews by visiting [www.cdc.gov/niosh/eNews](http://www.cdc.gov/niosh/eNews).

**SAFER • HEALTHIER • PEOPLE™**

Static testing of a fully assembled NIOSH CROPS was performed at the NIOSH Division of Safety Research laboratories in Morgantown, West Virginia, and in accordance with testing criteria outlined in SAE J2194. The main purpose of the static laboratory testing was to simulate field upset in a controlled and repeatable environment (SAE J2194). The static loading sequence consisted of four tests: (1) longitudinal loading, (2) 1st vertical crush loading, (3) transverse loading, and (4) 2nd vertical crush loading. During any of the four phases of static testing, the CROPS cannot be altered (e.g., bolts tightened, material repairs) and cannot touch or enter the operator clearance zone.

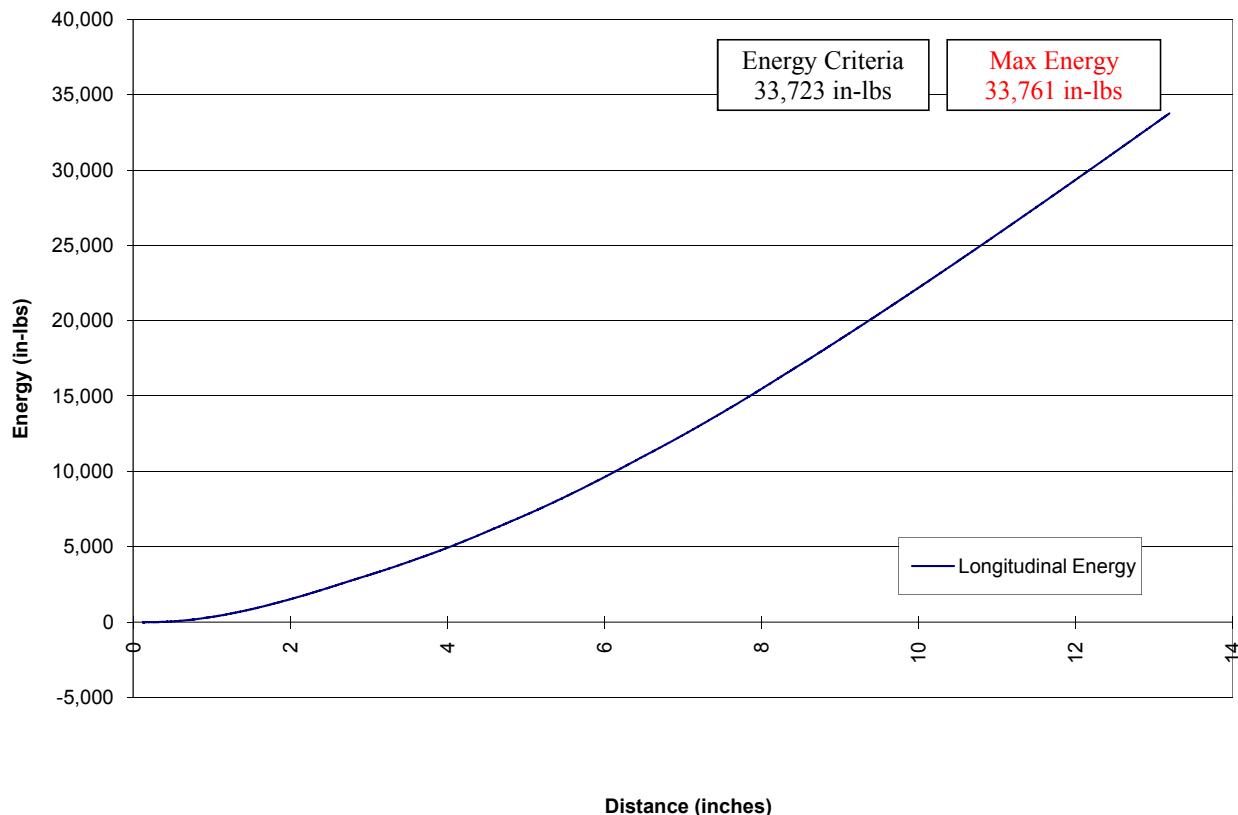
During the static laboratory testing, the loads were applied slowly over time, with the applied force and corresponding displacement collected. From these measurements, the energy absorbed by the CROPS was calculated (see graphs).

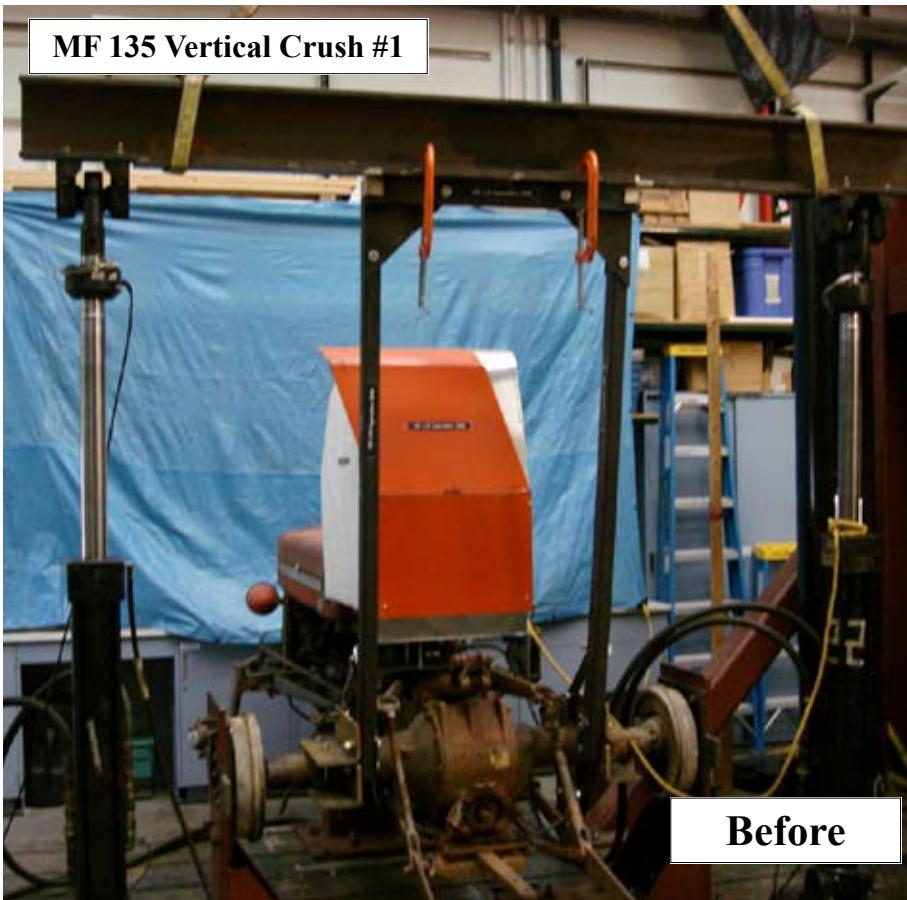
The photos show the condition of the tested CROPS at the beginning and the end of each of the four static tests.



CROPS Lab Testing September 2008 MF 135 Series

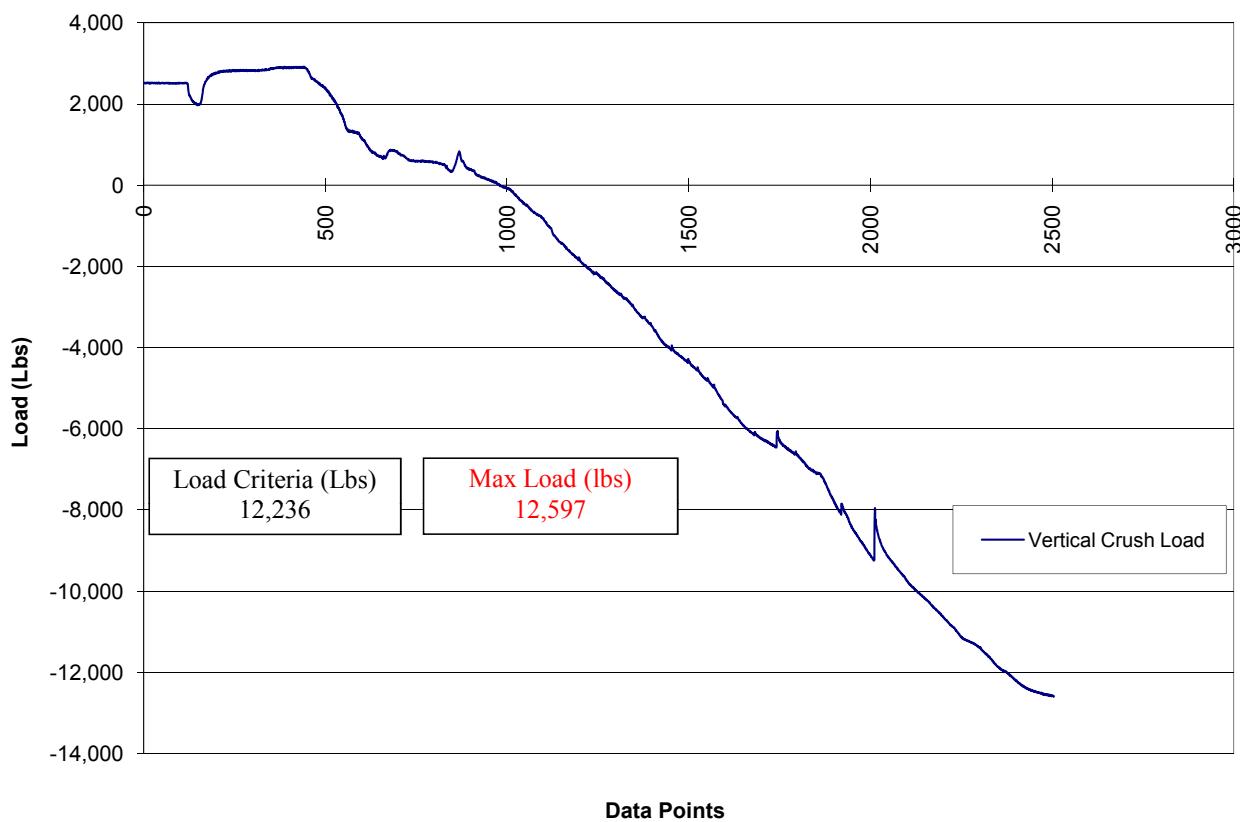
### MF 135 Longitudinal Test





CROPS Lab Testing September 2008 MF 135 Series

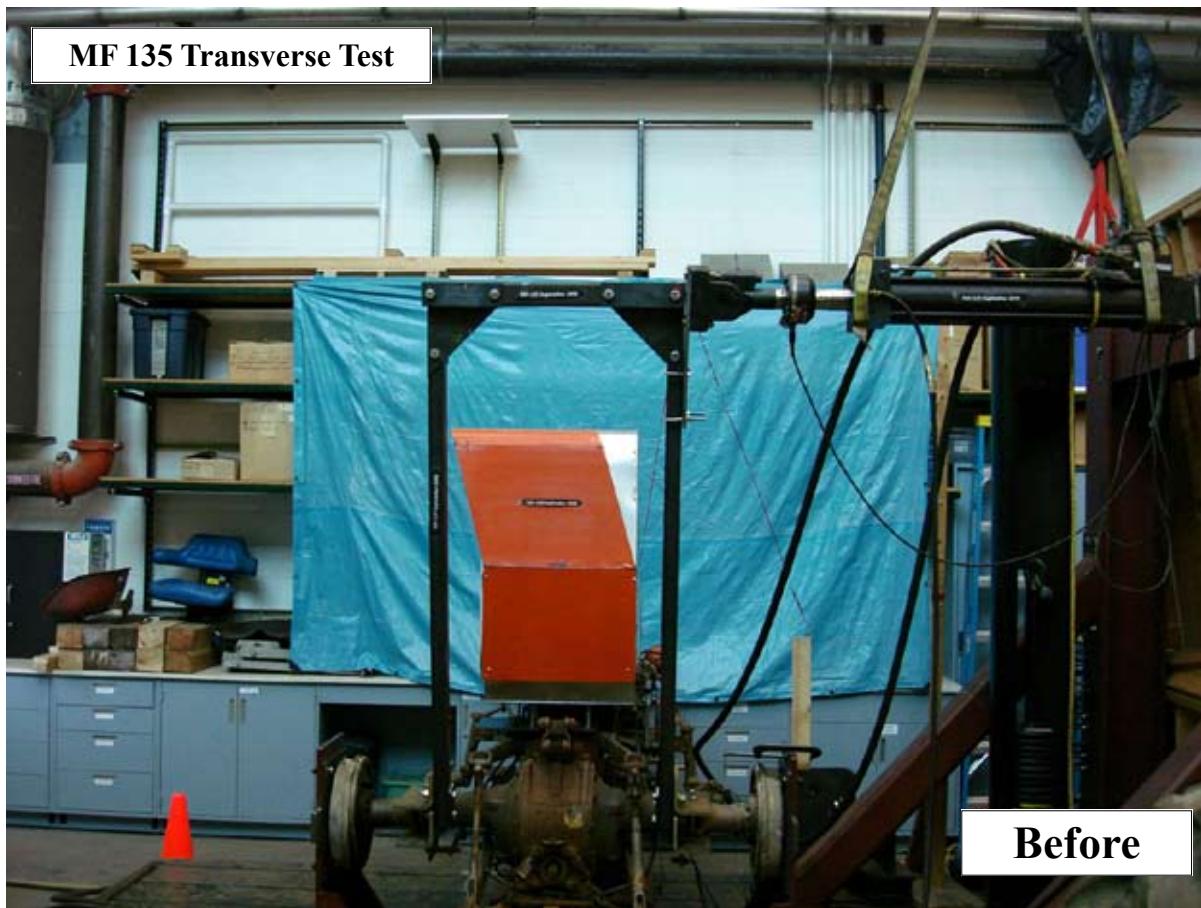
**MF 135 Vertical Crush #1**



*CROPS Testing Information, Massey Ferguson 135 Series*

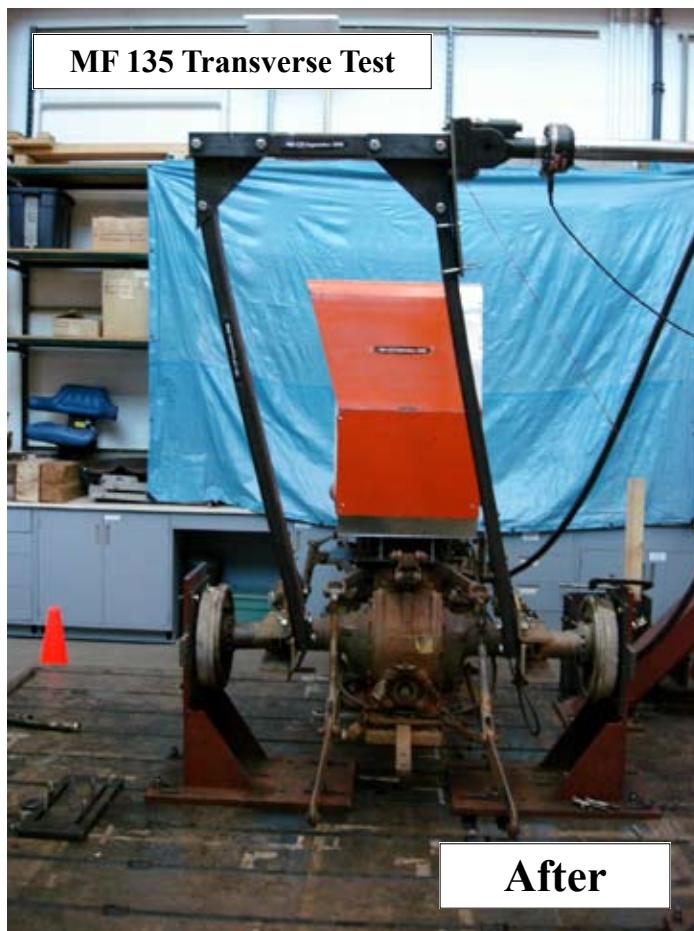
---

MF 135 Transverse Test



Before

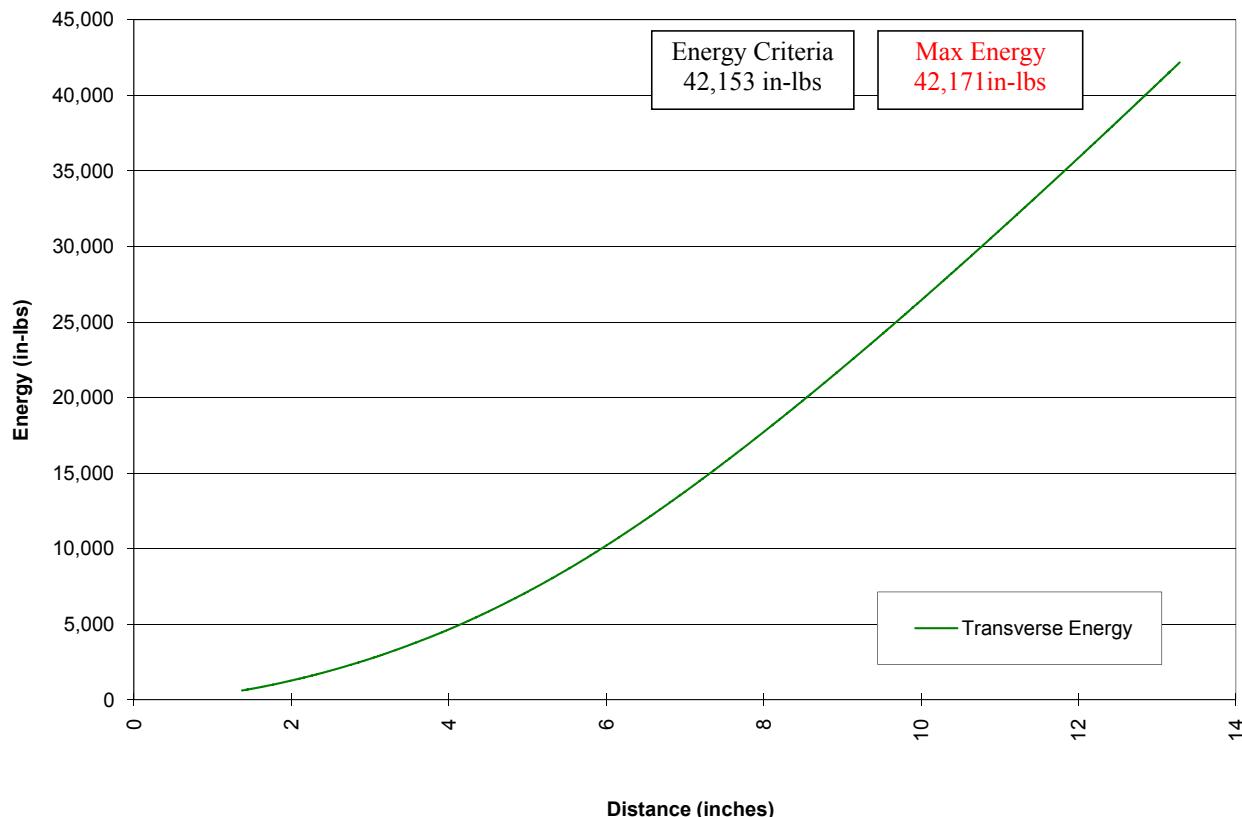
MF 135 Transverse Test



After

CROPS Lab Testing September 2008 MF 135 Series

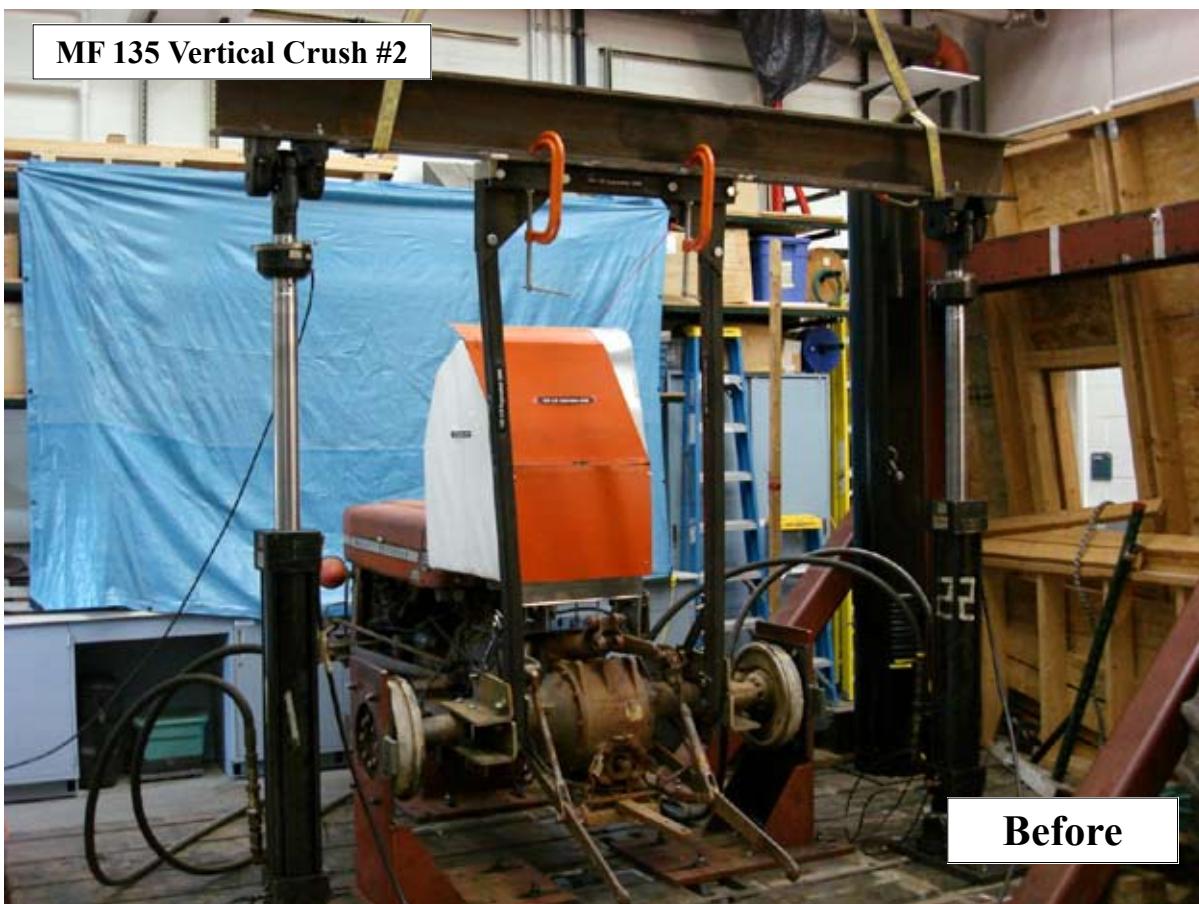
### MF 135 Transverse Test



*CROPS Testing Information, Massey Ferguson 135 Series*

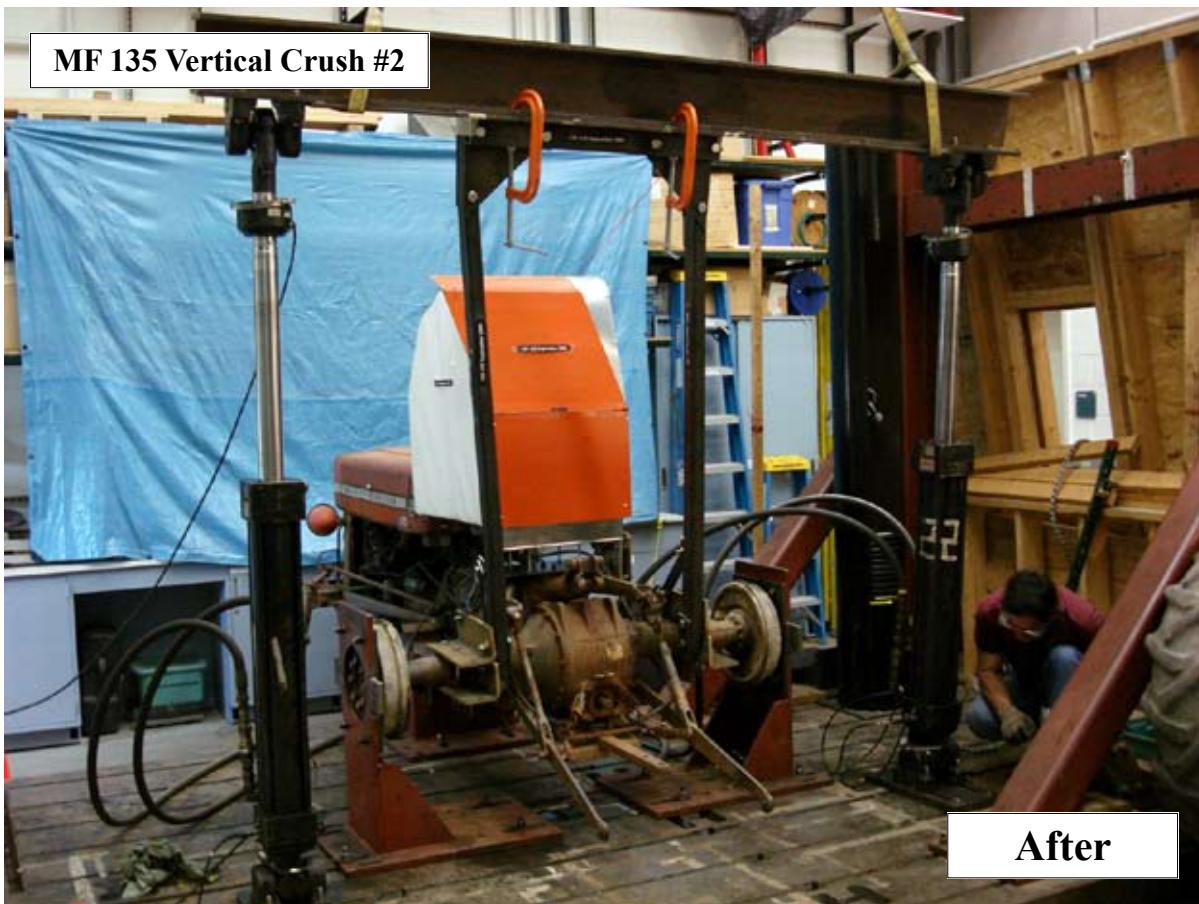
---

**MF 135 Vertical Crush #2**



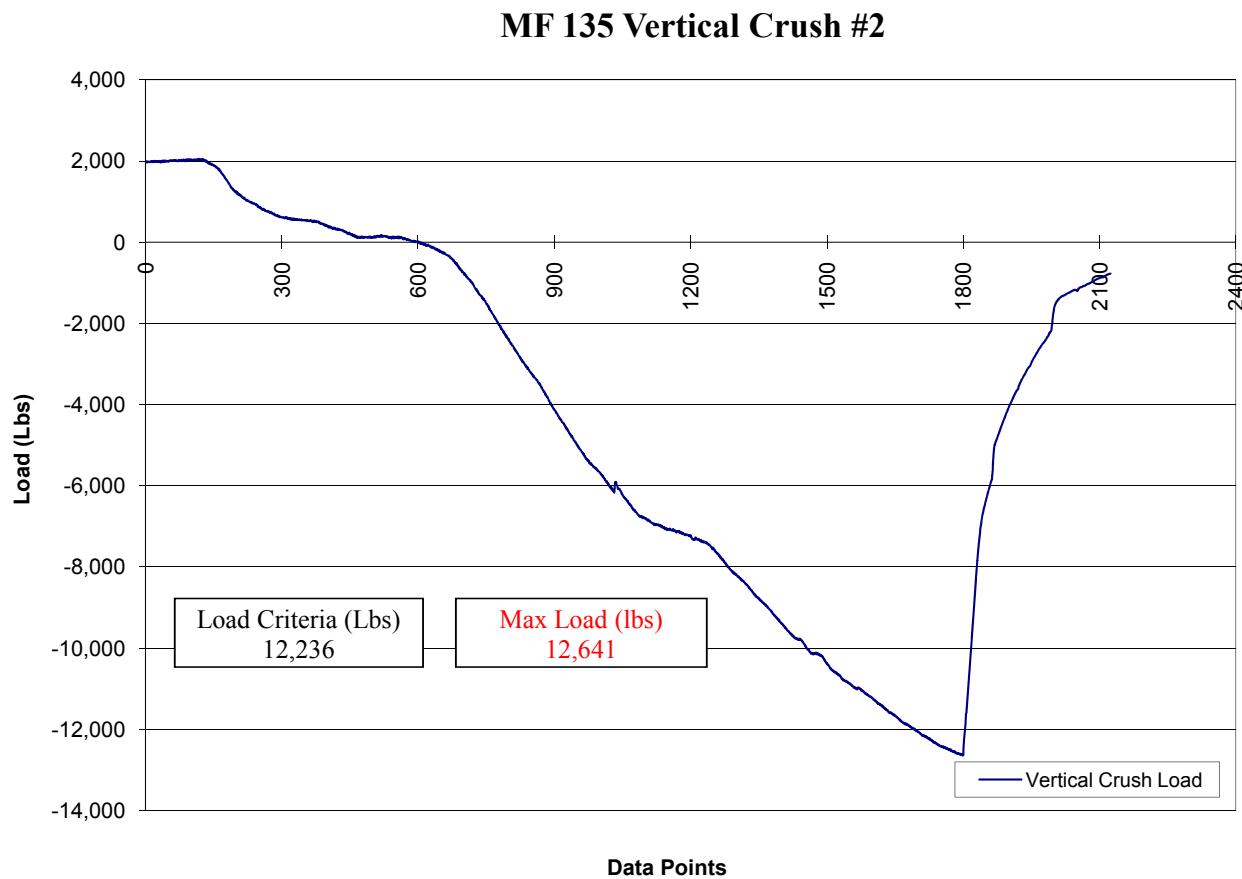
**Before**

**MF 135 Vertical Crush #2**



**After**

CROPS Lab Testing September 2008 MF 135 Series





**Delivering on the Nation's promise:  
Safety and health at work for all people  
through research and prevention**

To receive documents or other information about occupational safety and health topics, contact NIOSH at

Telephone: 1-800-CDC-INFO (1-800-232-4636)

TTY: 1-888-232-6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

or visit the NIOSH Web site at [www.cdc.gov/niosh](http://www.cdc.gov/niosh).

For a monthly update on news at NIOSH, subscribe to NIOSH eNews by visiting [www.cdc.gov/niosh/eNews](http://www.cdc.gov/niosh/eNews).

**SAFER • HEALTHIER • PEOPLE<sup>TM</sup>**