

## 2022 TEAM ACHIEVEMENT AWARD

*MacDon FD2 Flexdraper*

**MacDon**  
*The Harvesting Specialists.*

The FD2 Flexdraper® was conceptualized, designed, and ultimately manufactured at MacDon Industries Ltd. in Winnipeg, Manitoba. The FD2 combine header is a farm implement used to harvest a wide variety of crops in many countries around the world. The FD2 was developed to deliver increased harvesting productivity

in response to a major shift in canola genetics in 2015 which allowed farmers to harvest their canola standing, rather than having to swath it.

Several patents were issued as part of the development of the FD2 Flexdraper®. The new ClearCut high speed cutting system with its patented geometry, 25% more cutting area and new knife drive system deliver up to 30% faster ground speeds. The new header frame accommodates industry leading 50 inch deep side drapers to ensure smooth crop flow increasing combine capacity up to 20%, especially beneficial in bulky crop conditions. The new header frame design allows for an increased flex range by up to 70%, which improves the ground following ability both on and off the ground for a more consistent stubble height and better crop gathering. This increase in flex range paired well with the ContourMax contour wheel system which provides the ability to hydraulically set cut height, in flex mode, anywhere from one inch to 18 inches off the ground. This can now all be done from the cab, on the go, making it easy and seamless for operators to maintain consistent stubble height. The team also developed a self-contained EasyMove Transport system, which requires less effort, and converts more quickly from field to transport.

The design of the FD2 was a joint effort between three separate MacDon design teams: Header, Float Module, and Transport Systems. Structural engineering analysis was conducted on the header frame to optimize strength while minimizing unnecessary weight. To keep weight to a minimum, aluminum materials were utilized, pushing the experience of the design team to provide adequate strength and appropriate wear properties. The knife drive was optimized utilizing MATLAB software to create cutting performance simulations. With the simulations, the team was able to determine the cutting geometry and minimize inertial loading to allow for higher speed cutting.

The designs were prototyped and tested; both in the lab as well as in the field by visiting hundreds of farms at various locations in Canada, United States, Europe, New Zealand, Australia, Brazil, and Uruguay. A MacDon test technician, who was generally an engineering student or recent graduate, travelled with the machine to report on any performance issues.

The impact of the FD2 is significant. In response to climate change and drought frequency, the FD2 maintains consistent stubble height to retain moisture in the soil for seed germination the following spring. The improvements in efficiency and performance results in lower fuel consumption, reducing greenhouse emissions and improving the bottom line for the farmer.

This product alone has challenged and elevated the experience of the MacDon engineering team, developing the skills needed to become world leaders in agricultural equipment design.

In recognition of the engineering excellence demonstrated in their innovative design and production of the FD2 Flexdraper, Engineers Geoscientists Manitoba is pleased to present the 2022 Team Achievement Award to MacDon.