SUCCESS STORY

New Hydraulic System on Sugarcane Harvester Exceeds Performance Goals

Parker’s Global Mobile Systems (GMS) redesigns hydraulic system to improve efficiency and reduce system complexity

CHALLENGE
Over the past few years, market demand increased for mobile equipment that was powerful, but also more efficient. Noticing this opportunity, an OEM of Sugarcane Harvesters began a redesign of their machine. Previously, less efficient gear pumps were used in their hydraulic systems. This presented an opportunity to increase machine efficiency and productivity while reducing fuel consumption. The goal was at least 10% to make their product more attractive to end-users. The OEM consulted with Parker Hannifin Corporation’s Global Mobile Systems (GMS) team to create a new hydraulic system that would meet their new performance goals.

SOLUTION
GMS completely restructured the hydraulic system by switching to a variable displacement open circuit solution, using P1 Series pumps with Electronic Displacement Control (EDC) and F12 Series bent-axis piston motors. This compact electronic solution reduced system complexity and increased efficiency, which reduces operational costs over the machine’s lifetime. Open circuit EDC was chosen due to charge pump losses in a closed circuit solution and extra components needed for a load sense system. The system design also reduced the number of potential leakage points while providing better pump response and on-board diagnostics.

Market
Mobile - Agriculture

Customer
OEM

Application
Sugarcane Harvester

Solution
P1 EDC & F12

Results
• Increased Power Management
• Fuel Savings
• Increased Machine Productivity
• Lower System Costs

ENGINEERING YOUR SUCCESS.
Multiple P1 Series pumps were incorporated into the hydraulic circuit for different functions including the primary extractor, basecutter, and fan drive. The P1 Series was chosen because of its high efficiency and power density. This dynamic combination enables high efficiency power management by limiting torque to the current load requirements. By optimizing flow output at different pressures and speeds, the engine uses less fuel and produces less heat.

This P1 was also equipped with a displacement sensor that monitors in real-time the angle of the swashplate. This allowed the customer to achieve a more accurate flow output by closing the electronic loop via the sensor feedback giving them the ability to regulate overall vehicle power consumption more effectively. The P1-045 used for the cooling system also features ripple chamber technology, which reduces noise and pressure pulsations.

The lightweight, compact F12 Series bent-axis piston motor features a unique, lightweight spherical piston design, which provides high efficiency, speed, and acceleration capabilities. The result is unmatched power density with less heat generation. The F12 is utilized on the fan blower to convey leaves and stripped chaff out the rear of the machine.

RESULTS

- Lowered fuel consumption by over 10%, exceeding original goal
- Saved costs by simplifying the hydraulic system and reducing the number of components used
- Improved pump flow response and upgraded control versatility and stability that contributed to improved machine productivity

Global Mobile Systems (GMS) works directly with their OEM customers as trusted partners in developing innovative solutions. By understanding OEM goals, needs, and expectations they deliver value by improving the bottom-line and increasing machine performance.

To improve your hydraulic system, contact GMS at (847) 258-6200 or the Hydraulic Pump and Power Systems Division.