

System Seals Tackles Extreme Loading in Gripper Cylinders

One of the world's top manufacturers of gripper cylinders experienced severe oil leaks in their large scale skidders and moving platforms while supporting extreme loads over heavy terrain. Uneven operating conditions would cause the weight to shift off-center, resulting in up to 3,800 metric tons of side load. This resulted in damaged seals and bearings, not to mention unplanned downtime.

This load shifting problem would likely worsen, as the company started manufacturing larger cylinders capable of carrying heavier loads. They realized a permanent solution was needed after internal testing of the existing sealing systems resulted in almost immediate failure when placed under a simulated load.

The company asked System Seals to seek an alternate solution for their newly designed 4- and 12-inch pistons. Using finite element analysis, System Seals proposed a new sealing design; made from System Seals' MP03 H-Polyurethane, and incorporated an integrated anti-extrusion ring to protect the seal under extreme loads. An additional recommendation was to replace the current bronze overlay guidance, with a composite bearing. This would increase the clearance between components and eliminate the potential for bore damage, thus preventing premature seal failure due to abrasion.

Initial testing was completed in the System Seals R&D laboratory to test their effectiveness. Under extreme loads and off-center positioning, the new sealing system worked flawlessly for over 2,000 cycles. This was a significant increase over the existing seal life time of just one cycle.

The company quickly adopted the System Seals sealing system with new confidence that their cylinders would perform as expected under the most extreme conditions. The composite guide bands offered additional savings through the elimination of costly bronze overlay, and through reduced manufacturing and maintenance costs. Warranty claims dropped significantly, as the new seals were introduced into the market.



CHALLENGE

To design a sealing system that can withstand extreme side-loading under various uneven terrain.

SOLUTION

System Seals upgraded both the main sealing profile and materials, as well as a replacement of bronze guidance with a proprietary composite material.

RESULT

Seal failures stopped under extreme off-center loads, resulting in improved warranty rates, reduced manufacturing costs and an increase in consumer confidence.