

■ Long Block Verification System

Overview:

An engine manufacturer was experiencing growing warranty costs as a result of missing piston rings and engine compression issues. The existing end-of-line testing was not effective at detecting defects introduced during long block assembly. Sciometric's Long Block Verification System finds defects at the point of introduction, improving quality, decreasing manufacturing costs and saving repair time.

Benefits:

- Improved quality of shipped engines.
- Improved efficiency in repairing defects.
- Decrease warranty costs.
- Improve customer satisfaction.
- Catch defects that would not be identified using traditional end-of-line hot or cold testing.

Challenge

A major engine manufacturer was experiencing excessive warranty charges from customers who were complaining about their vehicles emitting black smoke. This smoke is typically symptomatic of an engine that is burning a disproportionate amount of oil. Upon closer examination, it was determined that the problem was caused by missing piston rings in the engine. Repairing this defect once the engine is installed in the vehicle is time consuming and costly. The manufacturer's existing end-of-line testing could not detect the missing piston rings or the resulting compression defects.

Solution

The engine manufacturer required a test system that was more effective at identifying timing and compression related defects. The manufacturer decided to implement Sciometric's Long Block Verification System at key points in their assembly process. This in-process testing enables them to catch the defects that were having the biggest impact on their bottom line and yield. One primary area of focus was to improve detection of compression and piston defects.

The Long Block Verification System is designed to provide consistent and reliable detection of defects such as: low compression, mis-assembled timing chains, head installation problems, incorrect engine timing, valve seating problems, missing piston rings and soft lash adjusters.

The system measures torque and combustion cylinder pressure as the crank is rotated through 720 degrees. Advanced algorithms assess the entire torque versus angle signature and the pressure versus angle signature for each cylinder. The system compares the results of these tests to results of known good long blocks to assess quality. Sciometric's core signature analysis testing technology uses algorithms designed specifically for engine long block verification. By installing the Long Block Verification System the manufacturer was able to identify piston ring and compression problems that were not being caught during end-of-line hot or cold testing.

Achievement

By testing as early as possible in the assembly process, the engine manufacturer was able to find defects at the point they were introduced during assembly.

As a result of implementing the Long Block Verification System the manufacturer was able to improve the quality of the engines they shipped to customers. This resulted in improved customer satisfaction and decreased warranty costs.

