

■ Short Block Crank Torque to Turn Test

Overview:

An engine manufacturer was experiencing growing warranty costs as a result of missing short-block bearings. Their existing end-of-line testing was not effective at detecting defects in their short block as they were masked by subsequent components added to the engine. Sciometric's Short Block Crank Torque to Turn solution finds defects at the point of introduction. This leads to improved quality, decreased manufacturing costs and reduced repair time.

Benefits:

- Improved quality of shipped engines.
- Improved efficiency in repairing defects.
- Identify potential machining issues before machines or parts are damaged.
- Catch defects that would not be identified using traditional end-of-line hot or cold testing.



Challenge

An engine manufacturer needed to determine ways to improve their first time yield. Too many defective engines were making it all the way to end-of-line hot testing. In some cases, severe defects resulted in irreparable engines and costly waste. If the manufacturer could detect defects earlier in the process it would reduce the required repair time for each defective engine and would also minimize waste resulting from severe defects. During end of line testing one of the most detrimental defects was severely defective crankshafts. One primary focus area during the assembly process involved excessive damage to short-blocks caused by crank-shaft defects that were not being detected until later in the assembly process. When more severe defects were not identified prior to end-of-line testing, many engines were experiencing warranty claims as a result of overheating engines. Upon analysis of the failed engines, the root cause was determined to be missing bearings in the short block. The missing bearings caused improper oil distribution which starved certain sections of the engine and caused the engine to overheat. The resulting negative customer satisfaction and costly warranty repairs were damaging the reputation and bottom line for this manufacturer. As a result they decided to examine options for improved quality testing. In order to achieve this objective, they looked to detect and fix defects as early as possible in the production process.

Solution

The manufacturer required a test system that would identify virtually any bearing related defect. By introducing testing as early as possible in the assembly process the manufacturer was able to identify bearing problems that were not being caught during end-of-line hot or cold testing. The Sciometric Short Block Crank Torque to Turn solution measures the torque as the crank is rotated. It also measures air back pressure as pressurized air is forced into the oil gallery

while all the other oil holes have been plugged. The system compares the results of these tests to results of known good short blocks to assess quality. Sciometric's core testing technology uses algorithms designed specifically for engine short block verification. The system provides consistent and reliable detection of short block defects such as: contaminated main bearings, debris, incorrect fit, insufficient lubrication, nicked or bent cranks. The short block verification system is ready to install out-of-the-box for fast implementation, immediate quality improvement and minimal disruption to the live production line.

Achievement

By introducing testing as early as possible in the production cycle, the manufacturer was able to find defects at the point they were introduced during the assembly process. This made it possible for them to detect defects that otherwise would not be caught until the engine was in the field and resulted in warranty costs and customer dissatisfaction. The test system also identifies when machining issues are starting to cause defects. This enables the engine manufacturer to conduct preventative maintenance on the machines and minimize line down-time.

As a result of implementing the Sciometric Short Block Crank Torque to Turn solution, 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.

