

Challenge

A power steering pump manufacturer was having issues with subtle abnormalities discovered only once the pumps were mounted in a vehicle. These issues caused objectionable noise and unwanted vibrations, resulting in potential warranty repairs and or costly replacements. Previously the manufacturer had been testing their pumps mechanically for delivery rate and nominal output pressure. However the relative sizes of more subtle defects such as a slightly stuck vane(s) were hidden under the larger output discharge pressure and as a result were completely missed by conventional average pressure measurement techniques. The manufacturer required a solution where steering pump vane defects could be caught prior to final assembly.

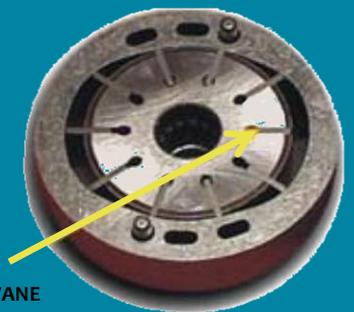
Solution

A Sciometric Test and Analysis System was seamlessly installed and configured to observe the pressure waveform. The complete set of waveform signature analysis tools were contained, enabling the analysis of the captured waveform(s) to determine the nominal discharge pressure and flow, thereby allowing easy detection of missing and fully stuck vanes. Advanced mathematical modules then re-process the signal to enhance or bring out the subliminal abnormalities of the waveform, allowing even the smallest deviations from normality easily observable such as the more sophisticated vanes which were slightly bent, nicked or slightly sticky (due to fine metal debris).

In the case of a field warranty issue occurring, Sciometric's system has the capability of traceability by storing each waveform for subsequent analysis based on the serial number. This allows complete part-by-part drill down as to where the defect occurred, what part has the defect and gives valuable insight as to issues in the process.

DEFECT DETECTION USING SIGNATURE ANALYSIS TEST KEY FEATURES

- Complete vane defect detection of nicked, bent, missing, fully and slightly stuck vanes
- Easily qualifies peak-to-peak and average discharge pressure
- Reduces manufacturing costs by finding noise and vibration (NVH) issues during assembly where repairs are less complex and costly
- 100% traceability for every part within the test, data including signatures, are automatically stored in a central database and cross-referenced by serial number



STUCK VANE

CLOSE UP OF PUMP

the science
of quality

Results

The manufacturer was pleased with the speed of the implementation of the Sciometric solution and that it did not require them to write complex code. Sciometric's test and analysis system combined with provided a cost-effective way to detect masked defects within the short cycle times required in the pump manufacturer's automated assembly line. The manufacturer no longer had to worry about NVH issues due to power steering pump assembly.

SCIOMETRIC SOLUTIONS

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