Valve Tappet Set

In-Process Test & Monitoring Solutions

sciemetric

Manufacturer uses sigPOD to improve repeatability and product quality while reducing manpower and cutting production costs

When a lack of repeatability in a precise fastening application was causing problems at end-of-line test, this manufacturer needed a reliable solution that would improve quality on their engine assembly lines. Sciemetric's sigPOD allowed them to improve first time through (FTT), decrease cycle time, reduce station personnel and cut rework costs—all while producing a much higher tolerance engine. The solution performed so well that it was applied across all three of their manufacturing facilities in North America.

With a large volume line producing over 1,700 parts per day, the manufacturer was experiencing issues on the engine line affecting yield, causing significant downtime and leading to profit loss. They were continually finding problems while rotating the engine during hot test and having to do extensive rework after the assemblies had reached the end of the line.

They needed an efficient and reliable solution for testing and monitoring during assembly to prevent these costly issues from going undetected.

It had become clear that one of the main problems with their engines was the valve tappet set and check stations. The tappets needed to be adjusted and tightened within exact parameters. If adjusted incorrectly, the valve lash could cause premature wear and excessive engine noise during operation.

The manual stations required several dedicated staff each shift. Operators were using feeler gauges to help guide the setting of the tappet by hand. Relying so heavily on a subjective process for such a precise application made it near impossible to achieve a repeatable set.

Eliminating guesswork in high-cost, precise production application

The manufacturer turned to Sciemetric's sigPOD to achieve the accuracy and reliability they needed on their line. To meet their needs, Sciemetric installed two sigPOD 1204 4-channel process monitoring systems with an expansion pack on each to accommodate 8 additional encoder channels. Through the use of a bidirectional connector, this solution allowed the manufacturer to receive information from all tappets being tested at one time for quicker testing and communication.

Using the sigPOD test solution combined with PSV™ (process signature verification) software (see Figure 1), they were able to control and maintain optimal limits on the test with minimal operator intervention, and track test results right on the test stand—even while the system is monitoring production—for real-time pass fail feedback.

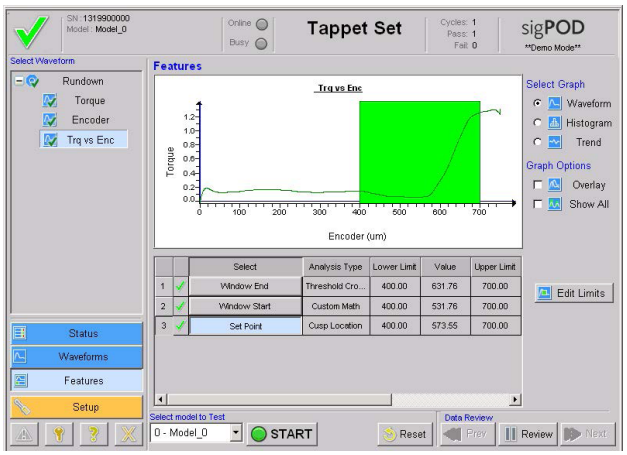

Figure 1: View of in-station monitor using sigPOD's PSV™ software for Tappet Set providing real-time pass/fail feedback.

The setup was simple, with operators running a few calibration tests on the tappet set station until the sigPOD determined the ideal tappet screw position for the part. Once ideal parameters were set, the sigPOD monitored the torque and angle measurements while the tappet screw was being turned. When the torque began to rise (see Figure 2), this signalled to the sigPOD that the screw had made contact with the valve tappet. The sigPOD ended the screw operation when the torque had met the ideal application within the set limits.

The tappet check was then performed at the next station to inspect the set application, verifying each of the tappet setting spindles. If the tappet check found any problems with the application, like a broken tappet or over- / under-screwed tappet, adjustment parameters would be automatically fed back to the tappet set machine through the PLC to bring the gap closer to the desired nominal on the next tappet set operation. This check resulted in automated continuous improvement on the line.

The manufacturer took the solution a step further by connecting the system to Sciemetric's QualityWorX data management and analysis solution, the manufacturer was able to collect and store all of the test data from each tappet set and check application categorized by serial number. If a part failed at the end of the line or in the field, operators would be able to quickly access and analyze the data to identify the problem part and adjust future tests immediately to prevent a reoccurrence.

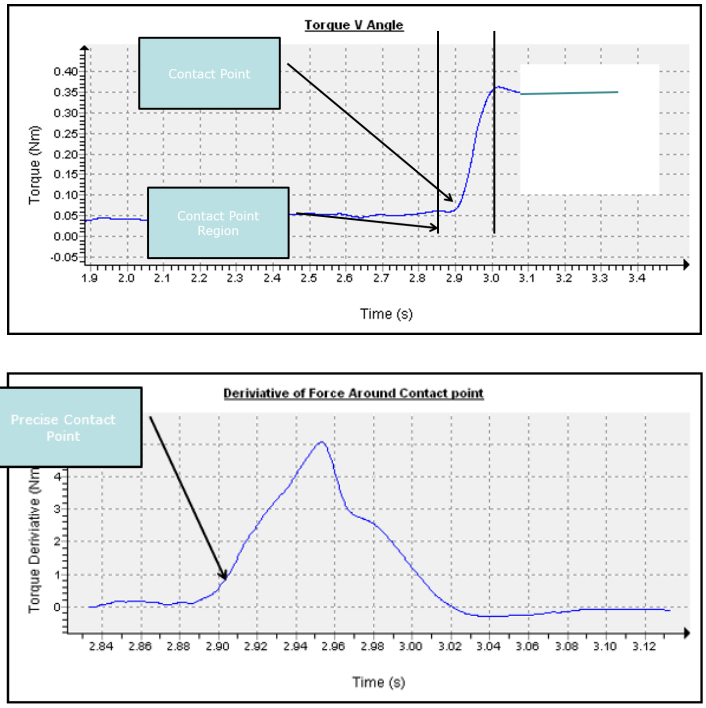

Figure 2: Using PSV™ (process signature verification) software, the sigPOD is able to identify the exact moment of contact during the tappet set screwing application and control the test within set limits.

Solution standardized across North American plants to control quality and cut production costs

Sciemetric's sigPOD solution allowed the manufacturer to achieve the repeatability they needed in this critical application to produce parts with consistent quality, while cutting downtime, dedicated manpower and production costs.

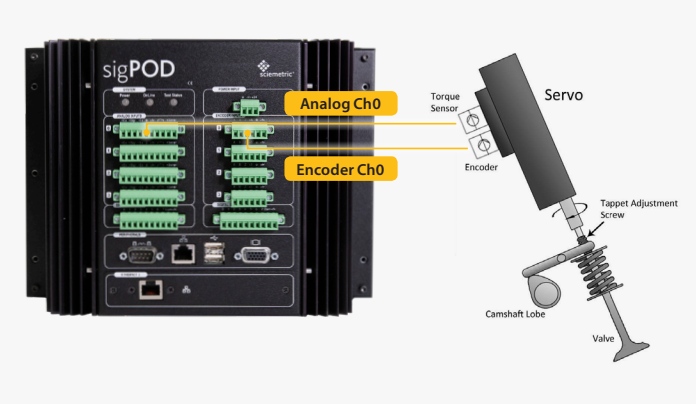

Figure 3: The sigPOD 1204 4-channel system (pictured above) uses the sigPOD PSV™ Tappet Set application to monitor torque and encoder sensors while the tappet screw is turned. This data is fed to the sigPOD through a bidirectional connector for real-time insight into the operation.

The sigPOD, working in combination with QualityWorX, also provided the ability to access a birth history record for every part coming off the line for full traceability and efficient root cause analysis in the event of a problem found at the end of the line or in the field.

The sigPOD solution performed so well in their first facility that the manufacturer applied this same solution to the rest of its three manufacturing facilities building this engine line across North America, installing over 12 tappet set and check stations across these facilities.

And they didn't stop at tappet set—there are now over 50 in-process stations throughout these three plants using sigPOD solutions for various tests on their lines, including leak tests, piston ring verification, crank torque-to-turn, piston stuffing and more. Installing the same solution across all sites has simplified maintenance and training, provided full traceability across the enterprise and enabled simplified test development for continuous improvement throughout production.

Contact Sciemetric to see how sigPOD could help you improve product quality while saving time and money on your line!

For more information on sigPOD, visit www.sigpod.com or email inquiries@sciemetric.com

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