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MERCURY
Mercury Marine

CASE STUDY

industrial

Verado Six-cylinder, 275 hp Engine

Mercury Marine's new line of outboard engines leverages Sciemetric's proven engine testing methodology to ensure quality is built in.

During the spring of 2004, Mercury Marine unveiled its newest line of four-stroke outboard engines. The Verado is a six-cylinder, 275-horsepower engine. It is the industry's first supercharged outboard engine and delivers superior acceleration, speed, performance and durability. Development of the engine required years of research and testing. Since it's unveiling, the Verado has tweaked the curiosity and interest of many marine enthusiasts.

To help ensure each of these powerful and complex engines satisfies Mercury Marine's stringent quality and performance specifications, they have implemented new production testing methodology. Working with Sciemetric Instruments, Mercury Marine has applied an in-process engine testing approach designed to verify quality throughout the manufacturing process. The process is common practice for auto manufacturers but is a new paradigm in assembly for Mercury Marine.

Challenge

Many engine manufacturers use end-of-line hot testing to verify quality. Once the engine is fully assembled it is started and left running for a given period of time. If there is a quality issue detected at this point, the manufacturer experiences an impact on their cycle time and throughput. At this stage it can be difficult to diagnose the root cause of any failure, requiring greater time and effort to make the necessary repair. Hot test stations also tend to be quite costly and the cycle time required to complete a test typically results in the station creating a production bottle-neck.

Mercury Marine wanted a more efficient and effective way to test each engine and to ensure 100% quality.

> "The Sciemetric based test systems that we utilize in our VERADO assembly process has been vital in improving first pass yield, providing data for continuous improvement opportunities, and validating our processes. This results in improved throughput, reduced cost and improved quality. The test systems are a key part of Mercury's ability to give our customers a product that is unmatched in quality!"

Mike Oswald
Manufacturing Engineer Manager

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Solution

Mercury Marine decided to apply proven automotive quality testing methodology on its Verado production line. They implemented an in-process-testing approach to streamline productivity and ensure quality is built into each engine, from start-to-finish.

With any production line, a defect can be introduced at any machining or assembly station. It can be the result of a damaged sub-component or a problem with one of the assembly machines. The ability to catch a quality issue as soon as it is introduced is key when manufacturing complex products with many production stages.

Sciemetric's in-process engine testing is specifically designed to catch defects as early as possible in the production process. Sub-assemblies are continually measured and tested throughout the assembly line. This approach ensures that valuable cycle time is not wasted processing an engine with a quality issue.

The in-process stations are located at key points during the manufacturing process where engines can be tested before additional modules are added during assembly. As additional sub-components/sub-assemblies are added to a core component, it makes it more difficult to diagnose the root cause of a defect and also makes any repair of the engine more complex and time consuming. Detecting and addressing a quality issue as soon as it is introduced streamlines the production process and provides for better process control.

Achievement

The Verado system embodies the very essence of Mercury Marine: power, reliability and state-of-the-art technology. With an in-process testing approach, Mercury Marine can ensure the quality of each engine without relying on hot-testing. This capability will reduce wasted cycle time and cut manufacturing costs. Ultimately these savings translate into savings for the end consumer.

In-process testing has helped to ensure that the Verado engine satisfies engineering specifications for emissions, power and sound. More comprehensive quality testing also equates to a better quality product for the end consumer.

About Mercury Marine

The success of Mercury Marine has not occurred by chance. Since the company was founded in 1939, Mercury has consistently emphasized quality, innovation and reliability. That pledge remains as strong today as ever. Mercury Marine, a division of Brunswick Corporation of Lake Forest, Ill, began as the Kiekhaefer Corporation of Cedarburg, Wis., when Carl Kiekhaefer and a small but dedicated staff of employees sought to design and produce the best possible boat engine.

As each goal was accomplished, it was replaced by more. That tradition has resulted in a literal embodiment of the Great American Dream. From a modest and inauspicious start, Mercury has grown into an industry leader recognized worldwide for its ability to foresee and fulfill the needs of its consumers. Its product brands include Mercury and Mariner outboards, Mercury MerCruiser stern drives and inboards, Mercury Racing products, Mercury Precision Parts and Accessories, Mercury and Typhoon propellers and Mercury Jet Drives.

About Sciemetric

Since its start in 1981, Sciemetric Instruments has become the premier provider of software and systems for quality control in manufacturing. Companies around the world use our signature analysis systems to detect and analyze manufacturing defects as they occur, improve quality, increase productivity and decrease costs across the entire production lifecycle.

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