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Mission: Automation

This article adapted from MAHLE Newspaper, author: Maghen Browder

In December 2013, a group of Tennessee Tech University mechanical engineering students expressed their interest in working with MAHLE Engine Components USA, Inc., on their senior design project. MAHLE, based in Morristown, Tenn., is a supplier of pistons for Chrysler and other manufacturers.

Management and engineers from MAHLE met with the TTU group to discuss possible project opportunities. The students selected an off-line gauging project; the project involved a Kawasaki RS10 robot, a Keyence laser

measuring system and all the mechanical components required to build the system. The entire process can be traced using an Excel spreadsheet that tracks faulty parts and reasons for rejection.

"It takes as long as two hours to switch from one production run to another," said Cookeville native Zach Henderson, a 2014 graduate. "There are as many as 30 measurements involved, making the job for production line setup mechanics pretty labor-intensive. The system that we've developed can make 15 simultaneous measurements in .045 second."

The project, begun in December, was completed in May of this year. This is the first collaboration between MAHLE and TTU's mechanical engineering department.

The seniors received additional help from their advisers at TTU, ATC in Cookeville, MAHLE process technology electrical engineers, funding from University of Tennessee center for industrial services, and the TTU electrical engineering department.

The TTU mechanical engineering program also received a \$5,000 donation from MAHLE in Morristown for their work on this project.

The seniors experienced real-world situations within today's manufacturing world, and saw the real-world application of classroom teachings. MAHLE associates gained valuable insight on non-contact measurement systems.

The students absorbed how to quickly overcome the steep learning curve related to the robotics and laser system, and the integration of the two. The group was able to develop a working measurement system and a valid proof of concept by the project's end.

"Engine technology is changing quickly," said Henderson. "Changes in fuel injection, head and valve design, variable valve timing and other features all have an impact on piston design. We're happy to be able to help in MAHLE's efforts to stay out in front of these changes."



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