

Researchers add unique, efficient engine wear testing rig

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SwRI tribologist Carlos Sanchez observes a test in progress on the single cam rig, a device designed by Institute engineers to investigate wear mechanisms in an engine's valvetrain components. Credit: Southwest Research Institute

Southwest Research Institute recently added an additional single cam rig



(SCR) to its considerable array of tribology testing equipment. The rig, which investigates wear mechanisms in engine valvetrain components, was designed and created by SwRI staff led by Staff Engineer Dr. Peter Lee.

Tribology is the science and engineering of interacting surfaces in relative motion, focusing heavily on friction, wear and lubrication. Though it's most often applied to the <u>automotive industry</u>, Lee and his fellow engineers have worked to solve problems in every arena from aerospace to cosmetics to manufacturing.

"We don't just answer a question," Lee said. "We offer the entire package. We address the problem, provide answers and find a solution. If there isn't a device to help us do that, we create it ourselves."

Lee and his group created the first SCR in 2014 with the goal of making a common wear mechanism test ASTM D7484 Cummins ISB Engine Test for <u>engine oil</u> more efficient and cost-effective.

The SCRs are custom-designed to fit the <u>engine</u> architecture for specific testing needs and serve as platforms for detailed lubricant research. The use of actual engine components in the rig reduces cost while providing more detailed understanding of wear mechanisms over standard tribology equipment.

"In the years since we created the first single cam rig, the demand for tests has become so high that it became necessary for us to build a second one," Lee said.

Both rigs have the unique capability to measure a lubricant's effect on the rotation of the lifter, a vital engine <u>component</u> that actuates the intake and exhaust valves, without interfering with the natural motion of the other valvetrain components. The interaction between the lifter and



other components such as the cam, which is key to rotary motion in an engine, can also be measured. These results help to understand properties such as wear and film formation. The rigs' oiling systems and input shafts are also fully computer controlled, which allows for replication of any engine test cycle.

The new SCR began running tests in the tribology laboratory at SwRI's San Antonio campus in July.

"The fun of tribology is that it enables us to tackle so many unique challenges with a great deal of ingenuity and creativity," Lee said. "Tribology feeds into practically every industry there is."

Provided by Southwest Research Institute

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