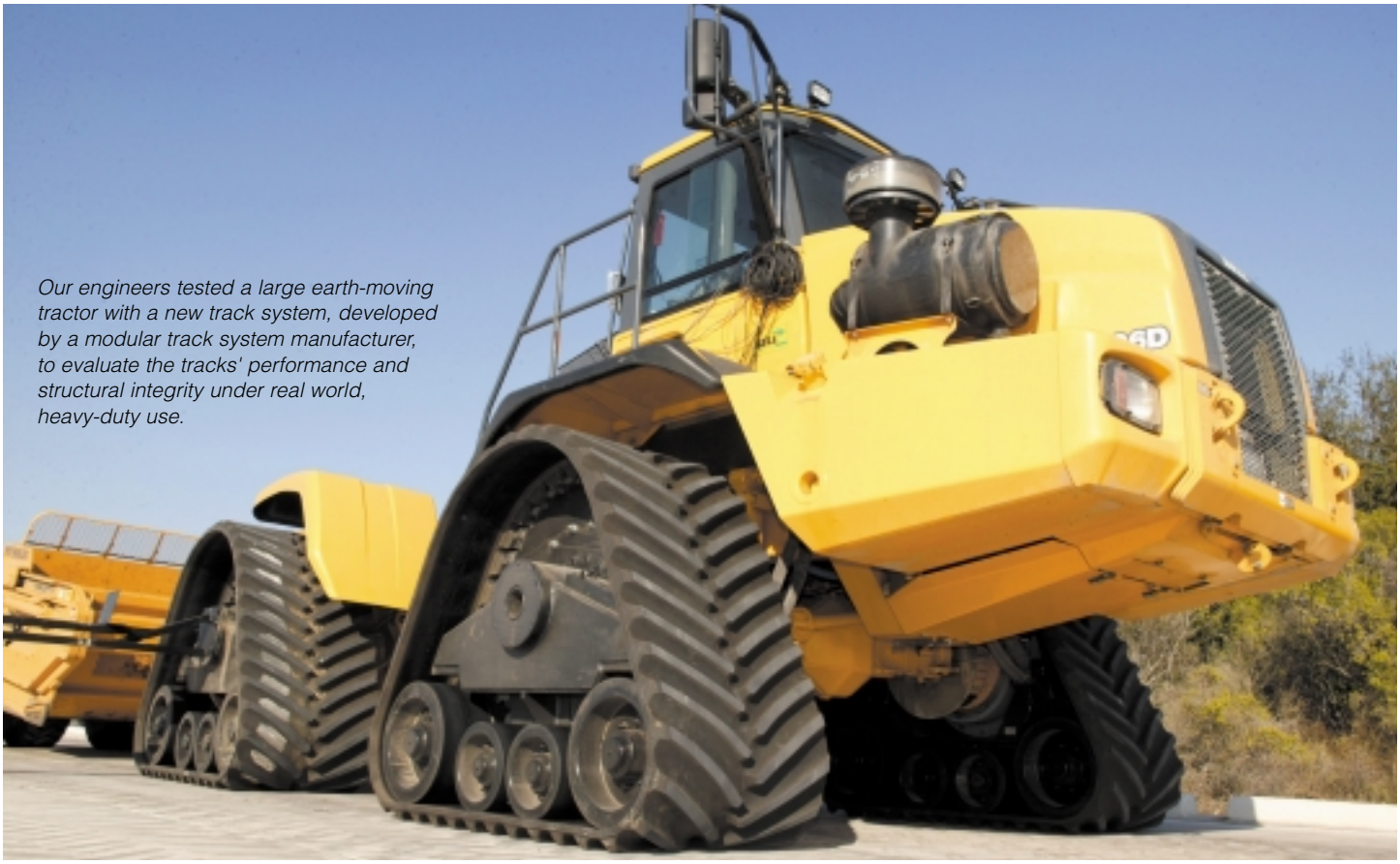
Fuels & Lubricants Research



Our engineers tested a large earth-moving tractor with a new track system, developed by a modular track system manufacturer, to evaluate the tracks' performance and structural integrity under real world, heavy-duty use.

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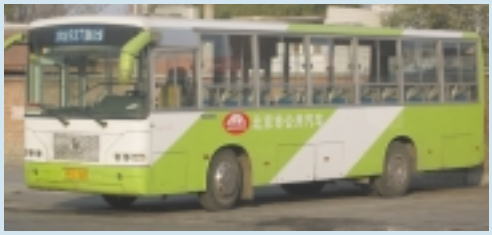
Office of Automotive Engineering Highlights

In 2005, SwRI formed a joint venture in China to provide research, development and testing services for automotive products, components and systems. The SwARC Automotive Research Laboratory Co., Ltd., is located in Tianjin City. The OAE also maintains an international office in Beijing to facilitate business opportunities throughout Asia.



In cooperation with the U.S. EPA, the Chinese government and industry partners, SwRI leads a pilot program to retrofit 25 Beijing diesel buses with state-of-the-art emissions control technologies to reduce black-smoke exhaust particulates in China's major cities.

An OAE office in Ann Arbor, Michigan, opened this spring to provide automotive technical support to clients in southeast Michigan and Canada.

OAE services are certified to ISO 9001:2000 and ISO 14001:1996, and accredited to ISO/IEC 17025:1999. The OAE has achieved Ford Tier 1 status for providing engineering services and has earned the Ford Q1 Quality Award.

Southwest Research Institute plays a crucial role in the improvement, evaluation and verification of products used in air, land, rail and water transportation vehicles.

With fuel costs rising, fuel economy has moved to the forefront of automotive issues. Vehicle manufacturers often make improvements in components that produce small, but important, gains in economy. We measure those gains using the FTP-75 city cycle and the highway cycle fuel economy tests (fueleconomytesting.swri.org).

We also offer extensive services in fuel sampling and recently made substantial improvements to a polycyclic aromatic hydrocarbons analysis method and sampling device. SwRI has a contract with the South Coast Air Quality Management District to analyze ambient PAHs using the improved technology.

In the 21st century, biodiesel has become one of America's fastest growing alternative fuels, in part because it is renewable and burns cleaner.

gasoline & diesel engine lubricant evaluations • driveline fluids evaluations • fuels performance & qualifications • analytical support services • fuel economy evaluations •

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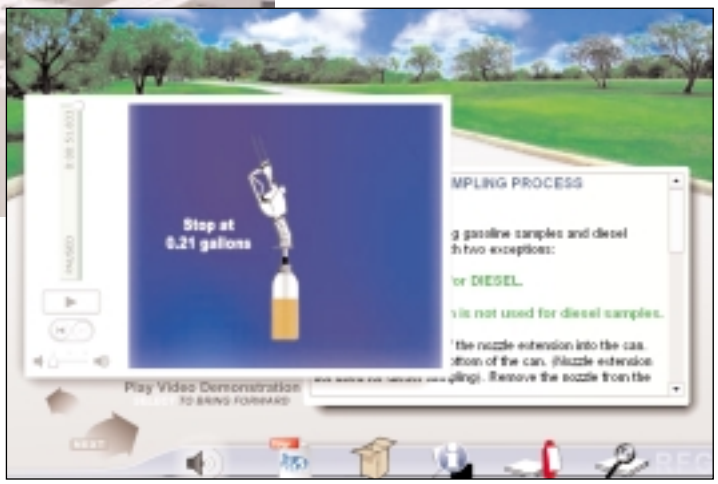
SwRI uses independent contractors to collect and ship fuel samples from service stations across the country for evaluating fuel quality and compliance with governmental requirements. Gas chromatography autosamplers enhance processing speed and accuracy, while our online training program (inset) ensures proper sample collection and handling techniques are employed.



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Because biodiesel fuels vary greatly around the world, we established a cooperative research program to investigate various fuel constituents. We can also evaluate a variety of filtration technologies to identify the best options for biodiesel-fueled automobiles.

SwRI has conducted a major program evaluating gasoline and gasoline additives for their effects throughout the fuel, induction, combustion and exhaust systems. For instance, using a General Motors test, we measure the tendency for gasolines and gasoline deposit-control additives to cause sticking in fuel injector poppet nozzles. Similarly, a procedure, which had historically been conducted at SwRI to evaluate the tendency for fuel blends to cause intake valves to stick at a cold temperature, was adopted as a requirement for the Top Tier gasoline specification.

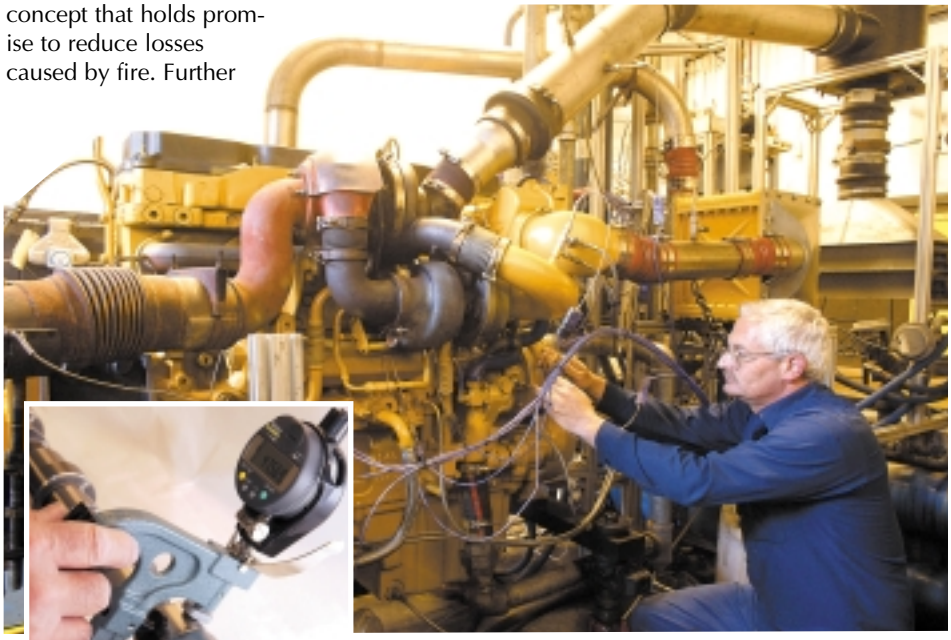
SwRI is playing a significant role in the development of PC-10, the next category of heavy-duty lubricant evaluation methods for modern and future diesel engines. This effort involves stationary engine test stands as well as various chemical and bench tests (enginelubes.swri.org).

We recently developed a heavy-duty diesel engine lubricant certification test to help manufacturers meet the Environmental Protection Agency's stringent 2007 emission standards. We are also helping Caterpillar, Cummins and VolvoMack develop new engine oil certification tests.

For almost 60 years, SwRI has operated the TARDEC Fuels and Lubricants Research Facility, or TFLRF, a government-owned laboratory. This facility helps the military meet its operational and readiness requirements by investigating and solving problems with fuels, lubricants and other vehicle fluids (fuelsandlubestech.swri.org).

For example, the TFLRF is conducting elastomer compatibility and diesel engine cold-start investigations to help the U.S. Army evaluate synthetic fuels produced by the Fischer-Tropsch process for use by the military. TARDEC also has more than 20 years of experience with fire-resistant fuels. One project led to a self-extinguishing diesel fuel concept that holds promise to reduce losses caused by fire. Further evaluation by the Army under the "single fuel in the battlefield" policy is required. ❖

Visit fuelsandlubricants.swri.org for more information or contact Senior Vice President Walter P. Groff at (210) 522-2823 or wgroff@swri.org.



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We offer an array of services that support the next generation of heavy-duty lubricant methods, called PC-10. We operate stationary engine test stands, as well as various chemical and bench tests. Following engine testing, our metrology staff evaluates the effects of lubricants on engine components, such as this camshaft (inset).