



MSIAC Success Story

New Test Method Modeled for Cross-link Density of Rubber Components

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Customer:	United States Army Tank and Automotive Research, Development and Engineering Center (TARDEC).
Challenge:	TARDEC works to provide complete life-cycle support for all manned and unmanned ground vehicle systems. TARDEC confronts the difficulties involved in applying old test method standards to newer manufacturing technologies and materials, or as is often the case, attempting to test new components without the benefit of previously available standards.
Approach:	Working closely with the TARDEC, the Modeling and Simulation Information Analysis Center (MSIAC) researched, conducted computer model analysis, and created a novel computer modeling test method for determining the cross-link density for rubber components of Army tanks. The MSIAC began by modifying the American Standard Test Method (ASTM) Standard D297 for chemical computer generated model analysis, and then adapted the standard to generate a swell test. The new model test was able to quantify the rubber, determine the cross-links, and establish the level of de-vulcanization (the process chemical cross-links breaking down in cured rubber). The test results were then used to screen improved materials for the elastomeric components of the Abrams Tank track, enhancing structural integrity of the vehicle system and improving safety.
Value:	The computer modeling and analysis capability created by the MSIAC allows TARDEC to more cheaply, quickly, and accurately analyze components used to manufacture and upgrade the Abrams Tank. This effort reduces manufacturing cost, improves Warfighter's safety, and enhances operational efficiency.

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Picture Courtesy of U.S. Army, taken by Staff Sgt. Klaus Baesu