

# Evaluation of a Chromate-free Repair Coating for Magnesium

Brush TAGNITE® is a brush-application anodizing process developed by Technology Applications Group of Grand Forks, South Dakota, for use as a localized repair coating on magnesium components. The coating contains no hexavalent chromium and is compatible with a wide variety of currently used coatings, fluids, and lubricants. The inability of the DoD repair facilities to successfully repair certain types of corrosion was resulting in the scrapping of an unacceptable number of costly gearbox housings. In addition, the presence of hexavalent chromium in current repair coatings was coming to the forefront as an environmental and health issue.

TCAT was charged with the task of evaluating the new, environmentally friendly Brush TAGNITE® for the removal of corrosion contaminants, repair of localized corrosion at the depot level, and as a replacement for currently used chromium-laden coatings.

A test program developed by TCAT and representatives of the U.S. Army, U.S. Air Force, and NAVAIR engineering organizations was designed to (1) confirm that Brush TAGNITE® was equal to or better than currently used coatings and (2) was compatible with a wide range of currently-used repair coatings, common fuels, and lubricants. The team developed a joint test protocol which was then used to direct and control a variety of tests including salt fog, fatigue, fluids compatibility, and hydrogen embrittlement testing to evaluate the Brush TAGNITE® system.

The results of the test program confirmed the performance characteristics of the process. We then submitted a test report along with our recommendation to the Army and Navy that the process be considered for immediate implementation at the depots. The Brush TAGNITE® process was subsequently approved by both OEMs and the U.S. Army for implementation at the Corpus Christi Army Depot.



## TEXAS CENTER FOR APPLIED TECHNOLOGY

There are many problems that require the careful and proper integration of applied technologies to find solutions. The Texas Center for Applied Technology (TCAT) was created to focus on these specific problems and to develop effective and efficient solutions. TCAT's core competency is the innovative application of existing technologies and advanced research to solve complex real-world problems.

TCAT's primary objective is to apply and test technologies to address targeted problems and engage basic research as required. TCAT has employees in a variety of locations with the ability to perform research that cuts across multiple technologies, disciplines, and cultures. The Center's employees are knowledgeable regarding customers' requirements and are ready to respond effectively to provide the best value for the customers' needs including expertise in technology insertion, technology assessments, and test and evaluation.

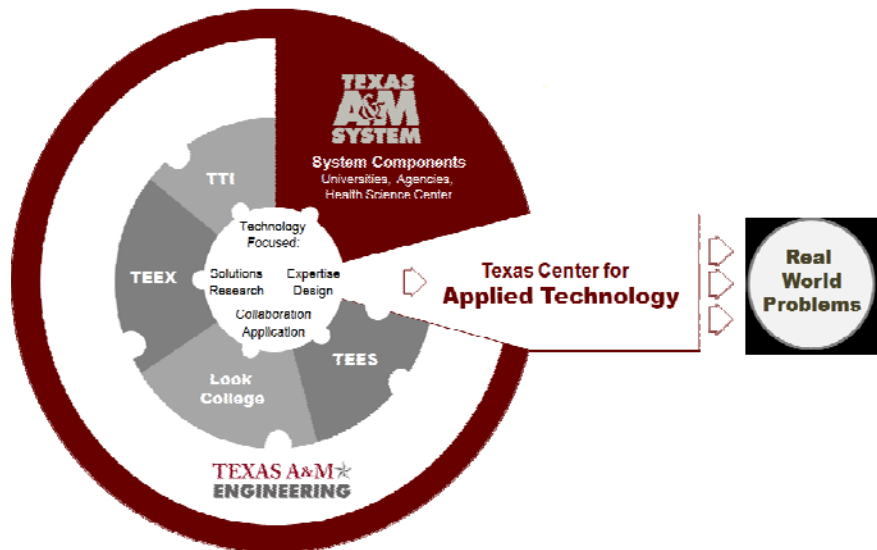
TCAT is part of the Texas A&M Engineering Experiment Station (TEES), a member of The Texas A&M University System. The A&M System is one of the largest and most comprehensive systems of higher education in the United States. Through a statewide network of eleven university campuses, seven state agencies, and a comprehensive health science center, the A&M System educates more than 120,000 students on its university campuses, conducts more than \$780 million in research, and reaches another 22 million people through service each year. TEES is an engineering research agency for the state of Texas and conducts over \$147 million in research annually. Because of the Center's position within the Texas A&M Engineering program, TCAT's expertise can easily be extended by rounding out its team with world class faculty researchers, as appropriate. TCAT is in an excellent position for collaboration not only with The Texas A&M University System components and their customers but with other universities, institutions, centers, and industry.

## TCAT'S CORE COMPETENCIES

Energy Sustainability ★ Environmental Sustainability  
Manufacturing & Systems Engineering ★ Information Technology ★ Modeling & Simulation  
Technology Insertion ★ Test & Evaluation

## TEXAS A&M ENGINEERING

Texas A&M Engineering consists of the Dwight Look College of Engineering, and three engineering agencies, including TEES: Texas A&M Transportation Institute (TTI) conducts research and professional education in all modes of transportation. The Texas A&M Engineering Extension Service (TEEX) works to develop a highly skilled and educated workforce and enhances public safety through training, continuing education, and technical assistance.



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