

Project Title:

Evaluation and Application of Super-Tough Steel for Use in Tank Cars Transporting Cryogenic Liquids

Principal Investigator:

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Co-PIs:

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Center Project Number: Y3-01

Award Amount: \$ 65,821

Start Date: June 1, 2010

End Date: April 31, 2011

Project Summary

The goal of the proposed project is to further develop and market advanced 60-ksi yield strength super-tough cryogenic steel (designated as NUCu60ST in the text) for use in tank cars transporting cryogenic liquids. This is a joint project with Union Tank Car Company (UTLX). Developed at Northwestern University, this super-tough cryogenic steel was included into the "Next-Generation Rail Tank Car Project", an innovative joint initiative of the three companies (Dow, Union Pacific and UTLX), Association of American Railroads (AAR), and US and Canada Departments of Transportation focused on the design and implementation of a next-generation rail tank car with enhanced ability to safely transport hazardous chemicals. In preliminary mechanical and fracture studies, NUCu60ST was shown to significantly outperform all other steels tested, including steels currently used in tank-cars as well as some high-performance steels.

During FY 2010, we will continue our collaboration with UTLX in their mechanical and fracture testing program and interpretation of the results. In addition, welding studies of these super-tough steels will be conducted. UTLX intends to purchase more experimental heats of NUCU60ST for further tests. There is a good chance that UTLX will build one or more experimental tank cars with our NUCu60ST steels. When this occurs, we will play a major role in advising UTLX on all steel issues including production, fabrication, and testing. We have already established contacts with NUCOR Steel Company regarding the steel production. NUCOR agreed to produce a heat of steel at reduced cost if steel is ordered by UTLX.