

ADVANCED TANK CAR COLLABORATIVE RESEARCH PROGRAM

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BACKGROUND

Over the last decade, there has been significant ongoing research to develop strategies for improving railroad tank cars so they can maintain tank integrity for more severe accident conditions. Beginning in 2006 and continuing through 2009, Dow Chemical Company, Union Pacific Railroad, and Union Tank Car Company assembled a joint project team to drive forward a holistic process for the development of a next generation rail tank car. This work was performed under the Next Generation Railroad Tank Car (NGRTC) Program and completed in cooperation with Federal Railroad Administration (FRA), Transport Canada, and the Transportation Security Administration (TSA). The NGRTC program developed a database of both full-scale impact testing on tank cars and tank heads as well as a significant database on characterization of tank car materials and laboratory scale component tests. An additional effort in the NGRTC Program was the development and validation of detailed finite element tank impact models and tank car steel constitutive and failure models which can be used to accurately predict the puncture resistance under different impact conditions. During this same time period, the Chlorine Institute commissioned a series of investigations to quantify and enhance the puncture resistance of tank cars carrying hazardous materials.

Subsequent to these initiatives, the Advanced Tank Car Collaborative Research Program (ATCCRP) was initiated to coordinate research efforts to enhance the safety and security of rail tank car shipments of toxic inhalation hazard (TIH) materials. The ATCCRP builds on the prior and ongoing research conducted by the NGRTC Project and the Chlorine Institute tank car safety research, and the RSI-AAR Tank Car Safety Research and Test Project. The ATCCRP is a joint effort comprised of the following groups: shippers of tank cars carrying toxic inhalation hazard (TIH) materials [represented by the American Chemistry Council (ACC), CI, and the Fertilizer Institute (TFI)]; railroads that transport hazardous materials [represented by the Association of American Railroads (AAR)]; and rail tank car builders and lessors [represented by the Railway Supply Institute (RSI)]. The latter two groups constitute the RSI-AAR Safety Project. In addition, Memoranda of Cooperation were developed to formalize cooperation agreements between ATCCRP participants and the FRA, TSA, and Transport Canada.

Simulation of Coupler-on-Head Impact

