Carnegie Mellon
Materials Science and Engineering Seminar Series

Tim Foecke

National Institute of Standards and Technology
Center for Automotive Lightweighting

"NIST Investigation of the Collapse of the World Trade Center Towers – A Metallurgist's View"

Friday, December 3, 2010
10AM Seminar in Baker Hall 136A

On September 11, 2001, two hijacked aircraft impacted the two main towers of the World Trade Center complex in New York City. Some time after this, each tower collapsed, killing nearly 3000 people. NIST was charged 9 months later with analyzing the collapse, with the goal of determining if any improvements could be made to codes and standards pertaining to construction, emergency response and other issues. This presentation will summarize the work performed by the Metallurgy Division of NIST, analyzing recovered steel for failure mechanisms, mechanical properties, evidence of high temperature exposure and other factors that were input into the finite element model of both the impact damage to the building and the subsequent effects of fire. The process of sample recovery, identification, analysis and development of analytical techniques, as well as extensive image analysis of witness-submitted evidence, will be presented and discussed. Finally, the most plausible collapse mechanism and the proposed and adopted codes and standards changes will be summarized.

Dr. Tim Foecke received his BS (1986) and PhD (1991) in Materials Science from the University of Minnesota, his thesis work being in the area of brittle fracture. He was awarded a National Research Council Post-Doctoral Fellowship at the National Institute of Standards and Technology to work on mechanical behavior of nanomaterials. He joined the NIST staff in 1993, and is currently Director of the NIST Center for Automotive Lightweighting. He is also an Adjunct Lecturer in the Department of Materials Science and Engineering at the Johns Hopkins University and at the University of Maryland. In addition to the World Trade Center, he has worked on analysis and preservation studies of the Titanic, CSS Hunley, and the USS Arizona.