Hot Forming and Formability of Light Alloys for Vehicle Components
Eric M. Taleff
Department of Mechanical Engineering
University of Texas at Austin

Abstract

Vehicle light-weighting is critical to achieving improved performance from future vehicle platforms. This is especially true in the automotive industry for improving fuel economy from traditional drive trains and accommodating the heavier drive trains associated with hybrid and electric vehicles. Aluminum and magnesium alloys are two groups of light alloys particularly promising for economically reducing the mass of vehicle structures. However, formabilities of both alloy groups have limitations, from mild to severe, that have created significant barriers to production of complex structural components. Industry has begun to surmount these barriers by using hot-forming technologies. We will examine the recent rise of hot-forming technologies in the automotive industry through understanding the increases in formability possible in specific light alloys at elevated temperature. We will focus on the mechanical and microstructural sources of improved formability at elevated temperatures, relate these to current industrial practice, and then explore the future potential for forming complex components in light alloys. We will discuss the interrelation of mechanics and materials necessary to advance the technologies needed to create the next generation of green, efficient, light-weight vehicles.

Biosketch

Prof. Eric M. Taleff graduated cum laude from Rice University, Houston, Texas, with a B.S. in Mechanical Engineering and a B.S. in Materials Science. He earned an M.S. in Materials Science and Engineering and a Ph.D. in Mechanical Engineering from Stanford University, Stanford, California. Prof. Taleff joined the faculty of The University of Texas at Austin in 1995. He is a Professor in the Department of Mechanical Engineering, a member of the Materials Science and Engineering Program, and the Charlotte Maer Patton Centennial Fellow in Engineering. His honors include a National Science Foundation CAREER Award, the Texas Excellence Teaching Award in Engineering from the Texas Exes Association and the Lockheed-Martin Award for Outstanding Engineering Teaching by an Assistant Professor. Prof. Taleff's research interests are in processing, microstructural characterization, and mechanical properties of structural materials, including steels, aluminum alloys, magnesium alloys and refractory metals.

April 29, 2011, 10:40 AM,
Goldwater Center (GWC) 535

For additional information, please contact Durella O'Donnell at Durella.Odonnell@asu.edu