

UNH Materials Science Seminar

11:10-12:00, Thursday, October 30, 2008

DeMeritt Hall 238

University of New Hampshire

Improving Deformation and Sheet Metal Processing Using Electrically-Assisted Manufacturing (EAM)

Prof. John T. Roth

Mechanical Engineering, Penn State Erie

Research conducted by Dr. John T. Roth, Associate Professor of Mechanical Engineering at Penn State Erie, has focused on developing Electrically-Assisted Manufacturing (EAM) techniques. These techniques evolved from the concept of replacing thermal energy (heat) with electrical energy (current) as the means of improving the manufacturability of metals. Dr. Roth's work has shown that the application of an electrical current during fabrication reduces the metal's flow stress, while simultaneously increasing the material's maximum achievable elongation. Using theoretical, experimental, and simulation techniques, the electricity's effects has been shown to far exceed that accounted for via thermal softening from Joule heating.

In addition to reducing the flow stress and improving elongation, material springback can be completely eliminated, along with the residual stresses within the part. Moreover, the overall energy expended during the production of parts is dramatically reduced when using these techniques. Dr. Roth's on-going research in this field focuses on the application of EAM to the bulk deformation processes of upsetting, forging, rolling and extrusion, as well as, to the sheet metal processes of shearing, punching, bending, deep drawing, and incremental forming.

John T. Roth is an Associate Professor of Mechanical Engineering at Penn State Erie. He received his Bachelor's and Doctoral degrees from Michigan Technological University in 1993 and 1998 respectively, in Mechanical Engineering. His research awards include the SME Outstanding Young Manufacturing Engineer Award in 2006, the Sigma Xi Faculty Research Award in 2007, and the Council of Fellows Faculty Research Award in 2007.

Host: Professor Brad Kinsey x1811