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COLLOQUIUM

The AAE Fall 2006 Colloquium Series

High Strain Rate Response of Materials at Different Temperatures

Professor Veli-Tapani Kuokkala
Institute of Materials Science, Tampere University of Technology

Wednesday, October 18, 2006
3:00 P.M.
POTR 234-Fu Room

Abstract
Mechanical response of materials to high rate loading usually differs considerably from that observed at quasi-static or intermediate loading rates, and therefore characterization of the behavior and properties of materials at high strain rates has become an important part of modern materials research. Without proper knowledge of the actual response of materials to high rate loadings, design of products or processes subject to such conditions is difficult and often based on educated guesses or highly expensive trial-and-error approaches. Also mathematical simulations of any kind routinely require experimentally determined initial values for parameters and variables and for the validation of the simulation results. There is an increasing interest and practical need to understand and model the high strain rate behavior of materials also at high and low temperatures. Both temperature and strain rate affect the strength and deformation behavior of materials, but their combined effects have not been much studied. In this presentation, the background of strain rate and temperature dependent material behavior is first discussed, followed by an introduction to high strain rate testing methods, especially the Split Hopkinson Pressure Bar technique. Finally, examples of the results of ongoing high strain rate research projects at TUT will be presented.

Biography of Veli-Tapani Kuokkala
Dr. Kuokkala is presently a Professor of Materials Science at the Tampere University of Technology in Tampere, Finland. His academic career includes teaching and research work in Finland, Switzerland, and the United States of America. He obtained his Ph.D. in Materials Science from Tampere University of Technology (TUT) in 1984. Besides his home position at TUT, he has also worked as an Academic Guest at the *Eidgenössische Technische Hochschule* in Zurich, Switzerland, and as a Long Term Visiting Staff Member at the Center for Materials Science, *Los Alamos National Laboratory*, New Mexico, USA. He has about 180 scientific and technical publications, patents and textbooks. He is currently a Member of the Governing Board of DYMAT (European association for the promotion of research of the dynamic behaviour of materials and its applications).

An informal coffee & cookie reception will be held prior to the lecture at 2:30 p.m. in GRIS 390