

*Joint Colloquium Sponsored by the School of Materials Science & Engineering
and the Department of Mechanical Engineering*

Sheet Springback: Prediction and Design

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Abstract

Finite element modeling is well established in the automotive industry for analyzing sheet forming operations to avoid splitting failures. In contrast, springback prediction following such forming faces special challenges. These challenges were explored using carefully controlled draw-bend experiments and simulations. Excellent agreement was ultimately achieved by close attention to numerical parameters, element types, and material plasticity models. The agreement demonstrates the feasibility of practical springback control or compensation. In order to exploit this ability, a *displacement adjustment* method was developed for design of dies taking into account springback. It was compared with one of the few analytical methods appearing the literature, the *springforward* method, and was found to be more robust and general.

Biography

Robert H. Wagoner is the George R. Smith Chair at The Ohio State University. With principal appointment in the Department of Materials Science and Engineering, he is also Professor of Mechanical Engineering. He was Chairman of the MSE Department from 1992 to 1996, President of The Minerals, Metals and Materials Society 1997-98, and President of the American Institute of Mining, Metallurgical, and Petroleum Engineers 2003-04. He is currently a Trustee of the United Engineering Foundation. Professor Wagoner is a member of the National Academy of Engineering (NAE), Fellow of TMS, and Fellow of ASM International. Before joining Ohio State, he was Staff Research Scientist at the G. M. Research Laboratories, 1977-83. He received B.S., M.S., and Ph.D. degrees in Metallurgical Engineering from Ohio State in 1974, 1975, and 1976 and was NSF Postdoctoral Fellow at the University of Oxford, 1976-77. Dr. Wagoner's group develops the SHEET family of sheet forming analysis programs for use in American industry, and performs a variety of related research, experimental and analytical. He is the author of over 250 technical articles, 2 proceedings volumes, 2 combined proceedings and authored books, and 2 text books in the areas of metal forming, plasticity theory, finite element analysis, mechanical behavior of materials and micro-mechanisms of deformation. He has presented over 100 international and invited papers on these research topics, and has advised 21 masters and 16 doctoral student theses. His research has received national recognition, including the Robert Lansing Hardy Gold Medal, Rossiter W. Raymond Memorial Award (twice), Presidential Young Investigator Award, SAE Melbourne Award, and the Champion H. Mathewson Gold Medal.

Thursday, August 25, 2005
5:00 PM – Room 200 – Olin Hall
Refreshments Following Seminar