EDITORIAL

Special Edition on Superplasticity and Superplastic Forming

This special issue of the Journal of Materials Engineering and Performance (JME&P) is dedicated in part to topics that were presented orally at the AeroMat 2008 Conference in Austin, Texas, June 23-26, 2008. The papers were given during the International Symposium on Superplasticity and Superplastic Forming (SPF) Sessions. This is a continuation of scientific and manufacturing research related to superplasticity in material science that began in 1996 with help from the United States Air Force and has continued with yearly meetings since then. The symposia are now organized by the Materials Information Society (ASM).

In the past year, we have learned of some rather remarkable breakthroughs made in the fabrication of aluminum hot formed parts for the automotive industry. The cycle time required to “Quick Plastic Form” or “Hot Blow Form” parts has been reduced in some cases to less than a minute. That can be compared to the titanium SPF process used by the aerospace industry, in which a typical forming cycle can take between 30 and 120 min. Many auto companies now have development and/or production facilities that are producing a wide range of parts that have traditionally been made from steel using conventional stamping dies and presses. The list of parts that have been used in mass production now includes Hood Inner Frame/Outer Skin, Quarter Panel (front and rear), Trunk Lid Inner Frame/Outer Skin, Grill, Bumper, Floor Pan, and more. Some of the automotive companies that are using SPF are General Motors, Ford, Honda, Aston Martin, Panoz, Bentley, Morgan, Mitsubishi, and Rolls-Royce.

Additional progress has been realized by combining the Friction Stir Welding (FSW) method with SPF for both aluminum and titanium applications. Finite element analysis methods have been developed, which allow precise estimates for the forming of tailor-made blanks that use this combination of processes. Mathematical predictions can also be made for the fatigue life of the dies that are used to SPF form parts, and there has been incremental improvement of the roll-diffusion-bonding method used to join titanium metal matrix composites.

I want to thank the individual paper authors for contributing to this special journal venue. I owe a tremendous debt of gratitude to my assistant editors, Larry Hefti, Dr. Mamidala Ramulu, Paul Edwards, and Dr. Eric Taleff, for their outstanding individual editing contributions. I am also thankful to have been given this opportunity by Jeff Hawk, the editor of ASM’s JMEPEG and his co-workers. I look forward to carrying on with the SPF journey at the next AeroMat conference.

Guest Editor

Daniel G. Sanders

Boeing Research & Technology

Metallic Materials & Processes

The Boeing Company

P.O. Box 3707 MS 5K-63

Seattle, WA 98124-2207, USA

e-mail: daniel.g.sanders@boeing.com