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#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2024 SYMPOSIUM:

MATERIALS SYNTHESIS AND PROCESSING

Formability and Spring-back Issues in Ultra-High Strength Steels and High Strength Aluminum Alloys

With the dawn of the electric vehicles (EV) and more stringent emission requirements, lightweighting of automotive vehicles has become more critical. However, expensive battery systems and vehicle electronics are putting pressure on the cost of weight savings. Newer generations of ultra-high strength steels (UHSS, UTS > 1500 MPa) and high-strength aluminum alloys (HSAA, UTS > 300 MPa) are becoming available to provide weight savings at minimal or no cost. They are also recyclable and have a lower carbon footprint compared to the other lightweight material alternatives, further supporting their contribution to sustainable and lower emission transportation.

With the increasing strength, formability and springback are becoming pressing issues for component fabrication. Dimensional control and stability of the stamped part become challenging with the higher springback. In addition, lower local formability and fracture result in cracking and failure near edges, flanges, holes, and bent corners. This gathering aims to provide a venue to present, discuss and share solutions and challenges associated with addressing fracture and spring back issues in various UHSS and HSAA sheet-forming processes.

Areas of topics include, but are not limited to:

- Local thermo-mechanical and/or heating techniques to improve formability and reduce springback
- Incremental forming techniques, including roll forming, to control the stress state and improve fracture limits
- Local or global alloying methods to improve formability
- Global thermo-mechanical processing in combination with aging/tempering treatment to deliver the high strength with desired formability
- Formability near sheared edges
- Stamping in-line process control and AI/ML techniques to minimize the forming defects
- Friction control in stamping/forming processes
- Flexible forming methods and digitized dies to enable tight bend radii and complex shapes without failure during forming
- Warm and hot forming.

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