Special Session

Advanced Sheet Forming Processes of Composites: Innovation and Process Automation

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Scope and Relevance:

The manufacturing landscape is undergoing a rapid transformation due to growing demands for lightweight structures, increased energy efficiency, and enhanced sustainability. Among the pivotal technologies enabling these advancements, Advanced Sheet Forming Processes (ASFP) play a critical role. This special session is dedicated to publishing original research articles in the field of advanced and non-conventional sheet forming technologies.

The aim and objective of this special session are to highlight the scope, challenges, and opportunities in various advanced sheet forming techniques such as incremental forming, electromagnetic forming, hydroforming, contactless forming, explosive forming, and high-temperature forming, etc. The Emphasis will be placed on experimental investigations, simulation and modelling approaches, material characterisation, and industrial applications. The special session will serve as a multidisciplinary platform, encouraging the exchange of knowledge among researchers, industry experts, and practitioners to bridge the gap between theory and real-world applications.

This call for papers invites original and high-quality research contributions focusing on the numerical and experimental investigation of formability in incremental sheet forming (ISF) of composite materials. Submissions may address, but are not limited to, fiber-reinforced polymer composites, metal–polymer laminates, sandwich composites, and hybrid composite sheets. Suitable studies include experimental characterization of formability limits, failure mechanisms, thickness distribution, surface integrity, and springback behavior under ASFP technique. Numerical works involving finite element modeling, constitutive modeling of composites, damage and delamination prediction, tool–sheet interaction, and validation against experimental data are strongly encouraged. Research integrating process parameter optimization, toolpath strategies, temperature-assisted ISF, and the influence of reinforcement architecture on formability is particularly welcome. Both fundamental investigations and application-oriented studies demonstrating improved formability, accuracy, or sustainability in composite forming processes are within the scope of this special session.

Topic of interest (Not limited to):

For Composite Materials,

- Advanced, sustainable materials and multi-material concepts/solutions
- Material characterisation methods and procedures for sheet forming
- Material behaviour and modelling, and its numerical implementation
- Damage and formability limits in sheet forming
- Tribology, friction, and wear in sheet forming
- Cold, warm, and hot sheet forming processes
- Digitalisation, control, and advanced tool design
- Numerical simulation of sheet forming processes
- Advanced industrial sheet forming methods and applications
- Joining by sheets forming
- Hybridisation of additive manufacturing with sheet forming
- Artificial intelligence in sheet forming
- Process Optimisation and AI/ML applications in sheet metal

Chair for Special Session:

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