



3<sup>rd</sup> EUROFORGE

Milan, Italy / 22-23 Oct 2024

conFAIR 2024  
the future of forging

## Abstract

*Digitalisation and Artificial Intelligence in Forging*

### **The development and practical implementation of the automated preform design method and software for closed die forging technology.**

***N. Biba\*, H.-W. Raedt, A. Vlasov, S. Stebunov***

***\*Presenter, MICAS Simulations Ltd, Oxford, UK***

Producing complex forging parts requires multiple operations depending on the initial billet size, the desired final forging shape, required tolerances and the material's deformability. The intermediate preforming impressions are used to achieve a complete finish die fill with the following additional objective: minimal flash, reduced forming load and no flow defects such as laps and flow-through. The optimal preform design should also minimise the die wear by reducing metal sliding over the tool surface during forging blow from one zone of the deformed part to another. In this paper we present a breakthrough in the automatic design of forging stages.. Based on utilising equipotential surfaces our method generates pre-forging stages with minimal user interaction. The results can be exported as a clean .STEP-file. This presentation extends the author's previous works towards automating the die geometry creation routine and extending the method to a broader variety of product shapes and different materials including steels and alloys based on titanium, aluminium, nickel and copper. In order to make the developed approach applicable in the industry by practical engineers, a specialised CAD program was developed and tested in real-life developments . The method has proven success in many cases and is ready for broad application.