Entwicklung einer thermomechanischen Simulation der Warmumformung von Aluminiumblechen mit gradierten Eigenschaften

Developing a thermo-mechanical simulation of hot forming for aluminum sheet with graded properties

TECHNISCHE UNIVERSITÄT DARMSTADT

PtU FORMING EXCELLENCE

- ☑ **Masterthesis**
- ☑ **Bachelorthesis**
- ☐ **ADP**
- ☐ **ARP**

- ☐ **Theoretisch**
- ☐ **Experimentell**
- ☐ **Konstruktiv**
- ☑ **Numerisch**

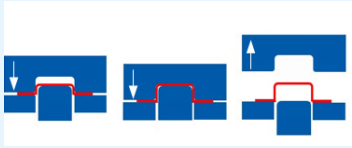
- ☐ **HiWi-Stelle**
- ☐ **WiMi-Stelle**

The increasing demand for lightweight and high-strength aluminum alloys in the automotive industry creates new challenges like crash-performance having high energy absorption and structural integrity at the same time. However, a novel hot stamping method allows a considerable improvement in formability with limited spring back. The idea of the process is to control cooling conditions during the quenching and forming operation by actively heating and cooling the tool, separately. In this study, a finite element model will be developed to predict the process parameters during the hot stamping and to estimate the final mechanical properties of the hat profile.

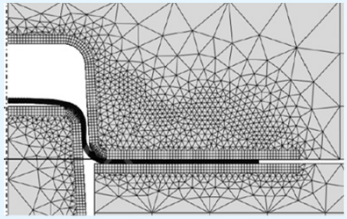
This study will contain the following work packages that can be discussed in a personal meeting:

- ✓ Research on the State of the Art in thermomechanical simulation,
- ✓ Setting up and development of the thermomechanical simulation for graded properties in Abaqus,
- ✓ Determination of optimum forming process parameters by simulation

**English is required for this position*



Schematic representation of hot forming process



Bearbeitung	immediately	**Kontakt**	Ezgi Bütev Öcal, Ph.D.	**Telefon**	06151/16-23185
Voraussetzungen	none	**E-Mail**	ezgi.oecal@ptu.tu-darmstadt.de	**Büro**	L1|01 147

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