

## **Advanced Experimental and Numerical investigation of blanking for monolithic sheet metals – COMPLAS XIII**

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### **ABSTRACT**

The endurance of a punch in shear cutting processes is of particular interest for both manufacturers and users. As wear is strongly affected by its environmental conditions at the different stages of a shear cutting process a better prediction of material behaviour will lead to a more precise endurance estimation of the tool. Furthermore abrasive wear results in a geometry change of the punch, which in turn influences the quality of the cutting surface.

A finite-element simulation of the shear cutting process is used to predict the process forces and the geometry of the cutting surface. A fully-coupled Lemaitre model is used in the process model for the description of the material behaviour. The extended Lemaitre model considers the influence of shear and compression-dominated stress states on the propagation of damage.

Different experimental tests such as tensile tests with and without notches as well as shear tests are used for the identification of material parameters. These methods are advantageous for the analysis of different blanking processes.

Since process parameters (e.g. clearance, tool radii and cutting geometry) have a strong influence on the cutting surface quality, numerical studies are conducted to analyse their influence. The results of the simulations are compared with experimental data. This serves the purpose to comment on the effect of different set-ups on wear.