

Experimental and numerical investigation of the cutting force during the angle shearing of several steels

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Abstract. Stamping and deep drawing precuts are normally produced using cut to length and blanking lines. Within these process chains, the shearing process represents an essential process operation that controls the final quality of the cutting edge and the precision and flatness of the precut sheet. Since the use of high strength steels is continuously increasing in the automotive industry, the tool and machine builders need to consider more aggressive processes and higher shearing forces. In this paper, the cutting force of several steels has been experimentally measured using different shearing angles. For that, a new tool has been constructed where the shearing force and stroke can be monitored using a mechanical press. These measurements have been used to calculate the specific cutting coefficient for the different alloys and angles. Finally, finite element modelling of the process is used to understand the abrupt evolution of this coefficient with the material properties.