Abstract:
The required number of punched and blanked parts in the electronic industry, such as leadframes, contact pins or plugs often reach several million pieces. According to this, the production process has been sped up to frequencies up to 2000 parts per minute. At this production rate parts of thin steel or copper sheets are produced with high-speed stamping presses and blanking tools. Because of the high gating velocities in the blanking tool there is a recurring acceleration at the moment, when the blank holder contacts the sheet metal. A second shock in the blanking tool arises, when the sheet cracks. This is also known as the impact shock during the blanking process. Through these two impulses and through the cycle of the plunger movement a periodic oscillation arises in the tool. Horizontal vibrations can lead to an undefined position between punches and die-plate, while vertical movement leads to increased wear because of friction forces between the blanked surface and the lateral area of the punches. The goal of this project was to minimize these oscillations in cutting tools by the usage of lightweight materials in the flux of forces. An experimental cutting tool was designed with alternative top and bottom plates for the
comparison of the oscillation status in the cutting process when using plates of steel, aluminium or magnesium. The centre plate of the tool remains constant. Experiments were accomplished for several velocities and tool setups with different plate materials. To determine the influence of the materials with different density and elasticity acceleration, force and acoustic emission sensors were integrated in the tool. The set of problems was investigated by analyzing the measured data and by determining the wear in practical tests.

Stichworte:
Blanking; Stamping; Wear; Oscillation; damping; eigenmode

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