

# A New Robot-Based Sheet Metal Forming Process

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**Abstract.** This paper describes a new sheet metal forming process for the production of sheet metal components for limited-lot productions and prototypes. The kinematic based generation of the shape is implemented by means of a new forming machine comprising of two industrial robots. Compared to conventional sheet metal forming machines this newly developed sheet metal forming process offers a high geometrical form flexibility and also shows comparatively small deformation forces for high deformation degrees. The principle of the procedure is based on flexible shaping by means of a freely programmable path-synchronous movement of the two robots. The sheet metal components manufactured in first attempts are simple geometries like truncated pyramids and cones as well as spherical cups. Among other things the forming results could be improved by an adjustment of the movement strategy, a variation of individual process parameters and geometric modifications of the tools. Apart from a measurement of the form deviations of the sheet metal with a Coordinate Measurement Machine rasterised and deformed sheet metals were used for deformation analyses. In order to be able to use the potential of this process, a goal-oriented process design is as necessary as specific process knowledge. In order to achieve process stability and safety the essential process parameters and the process boundaries have to be determined.