Design, control and maintenance of sheet metal forming processes (Editorial)

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The present Special Issue of the *International Journal of Materials and Product Technology* presents an interesting selection of papers on aspects of Sheet Metal Forming technology. Most of the papers use numerical modelling techniques.

In 1992, a dedicated forum for reporting the trends in sheet metal technologies and new developments for industries was founded through the International Conference on Sheet Metal. This was realised through a pan-European collaboration between The University of Central England, The University of Ulster, The University of Twente (The Netherlands) and The University of Erlangen (Germany) as organising members of this conference-cycle. The Catholic University of Leuven (Belgium) and The University of Palermo (Italy) have recently joined as organising members. The conferences are held bi-annually. We were privileged to be able to contribute to research in sheet metal forming through the Shemet conferences and through journal publications, including this Special Issue of the *International Journal of Materials and Product Technology*. We are grateful to Dr. M. Dorgham for granting us the possibility to edit the current issue. We are pleased with the quality and subject coverage of the papers submitted to this Special Issue, and we wish to thank the authors and congratulate them with their contributions.

P.P. Date presents methods of analysing the strain distribution profiles to carry out a process design for a drawn product and explore the possibility of predicting the strain distribution of a full-scale product based on a geometrically scaled down model. Geiger et al. present theoretical considerations on the leakage problem in hydroforming. To illustrate the problem an existing process chain is presented and subsequently theoretical considerations are discussed. Also a new strategy for defusing the leakage problem by changing the hydroforming media is presented.

Ham et al. present the process of Single Point Incremental Forming (SPIF), in which parts can be formed without the use of dedicated dies. The ability to form parts using Asymmetric Incremental Sheet Forming (AISF) is based on various forming parameters. These forming parameters are defined and discussed. This paper partially reviews the genesis of AISF and discusses experimental results.

Peng et al. introduce results of cage roll forming simulations. The effective plastic strain and deformed geometries are predicted during steel strip passing through the different forming stages. The key characteristics of deformation configurations, such as the opening value of strip edges and circumferential length are calculated and compared with empirical measurements, and good agreement is shown. In a second paper, a 3D elastic-plastic numerical model of the rotary draw bending is established. Experiments were carried out to verify the model. Results indicate that wall thinning and sectional degradation can be controlled.

Schulze Niehoff et al. describe that microforming presses are barely found on the machine tool market, in particular if a combination of high precision, high dynamic and free stroke and force control is required. This paper describes that The Bremer Institut für angewandte Strahltechnik (BIAS) has developed and built such a press, which is additionally featured with a double axis design.

Barata da Rocha et al. present a code, which has been developed for the theoretical determination of Forming Limit Diagrams. A characteristic of the code is its capability of simulating several strain paths changes, which allows its use as a postprocessor for Finite Element (FE) simulations, thus increasing the flexibility between the necking

criterion and FE programmes. Numerical results are compared with experimental results for a selected benchmark and necking is evaluated in accordance to experimental behaviour.

De Boer and Klingenberg describe an architectural proposal for a hybrid system to monitor and control a sheet metal blanking application.

Duflou et al. claim that a trend towards thicker and larger sheet metal parts can be observed, particularly in heavy duty application domains and have proposed improvements to forming processes for this reason. For example, a method to reduce the bending force is to locally preheat the bending area of the thick steel plate.

Manabe and Koyama present the application of a developed database and FEM-assisted system for intelligent control of press systems to the divided and variable blank-holding pressure control. Among other results, the study proves that an enhancement of the maximum forming height of more than 40% can be achieved.

We hope that we have been successful in bringing Sheet Metal Forming to your attention in an appropriate manner and that you will appreciate this Special Issue of the *International Journal of Materials and Product Technology*.