

SFB805 | T3

The 3D servo press – from research version to industrial standard machine

Editor Julian Sinz M. Sc.
Duration January 2013 – December 2016
Department Process Chains and Forming Units
Funded by DFG

Abstract

Due to rigid process chains with pre-defined product ranges, fluctuations in the quality of semi-finished products and in the demand for components lead to uncertainty in the processes with direct economic and technological consequences. One measure to control this uncertainty is to increase the flexibility of processes and machines. One approach to this is the 3D servo press (3DSP) developed within the framework of subproject B2.

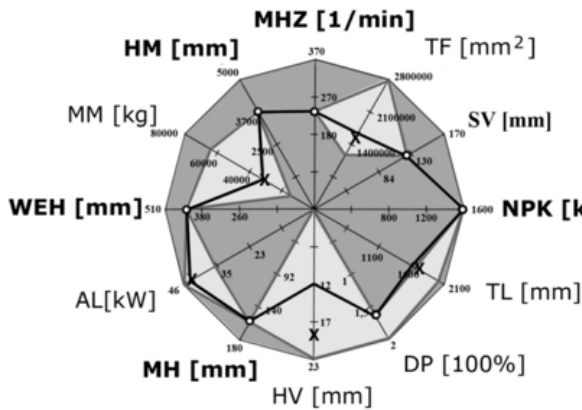
Project description

The aim of the project was to integrate the industrial requirements into the research progress and to test the methods for

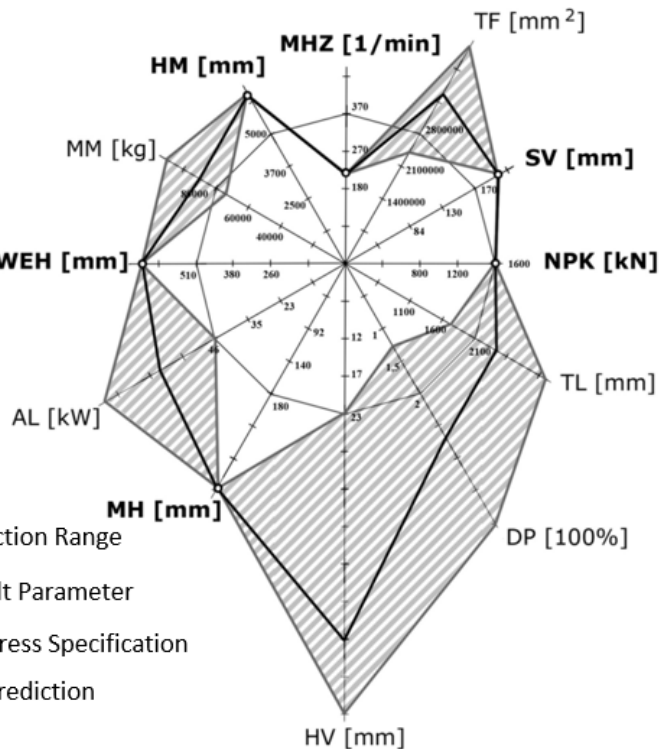
uncertainty control developed in subproject B2 under real requirements and to adapt them to the conditions of industrial series production in order to validate the concept of 3DSP on the basis of industrial application scenarios.

In cooperation with a press manufacturer, a configurator was developed for this purpose. Based on the requirements provided by the user, the configurator calculates the necessary machine parameters, which are adapted to the conditions of the respective application area, and displays them in the form of a graphic output. Furthermore, three flexible processes from the solid and sheet metal forming as well as the sintering technology were designed and realized.

Example of Industry Partner



3D-Servo-Press



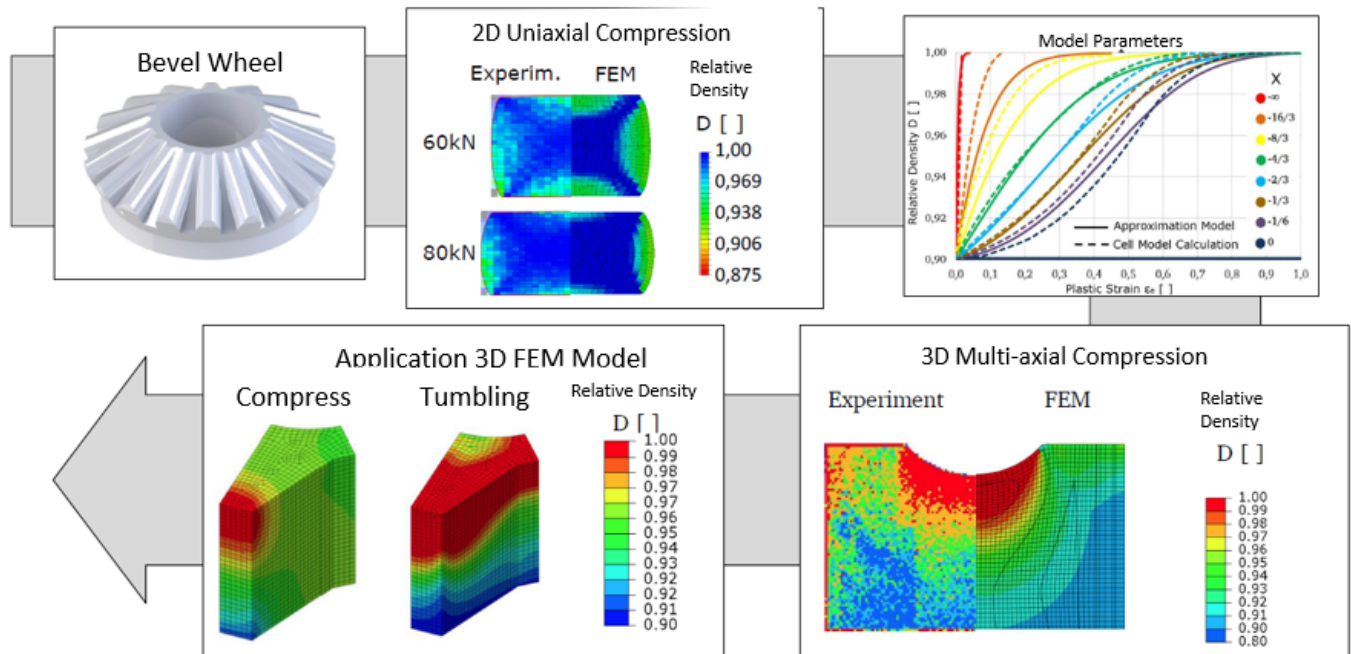
- Area of Standard Machines
- Special Machines
- Prediction Range
- Default Parameter
- Parameter Prediction
- Real Press Specification
- Boundary Ranges Standard Machines/ Prediction

12 Press Parameters

MHZ → Maximum Stroke Rate
 TF → Table Area
 SV → Ram Adjustment
 NPK → Nominal Press Force
 TL → Table Length
 DP → Average Price

HV → Stroke Adjustment
 MH → Maximum Stroke
 AL → Drive Power
 WEH → Tool Mounting Height
 MM → Machine Mass
 HM → Machine Height

[1] spider net chart for an example of the industrial partner and the 3D Servo Press



[2] Partial post-compaction of porous components using the additional ram degrees of freedom of the 3DSP

Results

It has been shown that flexible processes made possible by the use of the 3D servo press have a high potential for various areas of industrial practice. The benefit of this technology is therefore high, but the implementation of the processes is currently very costly. The industrial applicability as well as the implementation of new processes currently still have to be customized and adapted to the respective requirements of the company. A methodology for this was provided in the form of the press configurator.

Acknowledgement

The results of this research project were achieved within the framework of the Collaborative Research Center 805 „Control of Uncertainty in Load-bearing Systems in Mechanical Engineering“ funded by the German Research Foundation (DFG). Special thanks go to the companies Andritz Kaiser GmbH, Heraeus Holding GmbH, ThyssenKrupp Presta AG and Schunk GmbH & Co. KG for their support.

Funded by



Project partners

