Shrinking is an incremental forming process and can be carried out using a driving machine, so called "Kraftformer". It needs an upper and a lower shrinking tool, each of which has two moveable jaws as contact and force transform units. During every forming operation the tools clamp the metal sheet, so that the vertical forces from the upper tool are switched by the leverages inside the tools into the horizontal directions. The moveable jaws are practiced by the horizontal forces to compress the metal sheet. The shrinking of the metal sheet brings out the different three-dimensional forms. As a traditional manual forming method, economical productions can't be reached for individualized sheet metal parts to achieve the customer's demands. Hence, it is proposed to automate this forming process to reduce the manual work. The production strategies are to be deduced from the manual shrinking process. A direct way to get them is to simulate the forming process in a FEM-software environment. But within such a FEM-simulation it can take about even one hour only just to finish one forming step. Furthermore, an analytical modeling of the shrinking can't be realized because of its complex
procedures such as variation of contact conditions, material hardening. However, a pure geometric model can be established to demonstrate the change of the 3D-forms of the sheet metal parts. The respective forming parameters can be identified through the experiments. The simulation can take place only in a few seconds. This paper provides general information about the application of the manufacturing method and with it the qualification of shrinking as a manufacturing concept for the production of individualized sheet metal products.

Stichworte: Driving; Geometrical modeling; Incremental; Kraftformer; Sheet metal forming; Shrinking

Herausgeber: Trans Tech Publications

Kongress- / Buchtitel: 14th International Conference on Sheet Metal, SheMet 2011

Datum der Konferenz: April 18-20 2011

Jahr: 2011

Nachgewiesen in: Scopus

E-ISBN: 978-303785083-1

Serien-ISSN: 10139826

Revied: ja

Sprache: en

Volltext / DOI: http://doi.org/10.4028/www.scientific.net/KEM.473.509

TUM Einrichtung: Lehrstuhl für Umformtechnik und Gießereiwesen

Occurences:
- Einrichtungen > Fakultäten > Fakultät für Maschinenwesen > Institut für Werkstoffe und Verarbeitung > Lehrstuhl für Umformtechnik und Gießereiwesen (Prof. Volk) > 2011