

Design study of the geometry of a punching/blanking tool

U.P. Singh

Department of Mechanical and Industrial Engineering, University of Ulster, Jordanstown, UK

A.H. Streppel and H.J.J. Kals

Department of Mechanical Engineering, Twente University, Enschede, Netherlands

Industrial Summary

The cost of tooling in sheet metal industries contributes a considerable part to the overall cost of manufacturing a component. It is therefore imperative to keep down this cost by ensuring that the tool works for a long period in production without interruption. One way of achieving this objective is to reduce the stress on the tool during punching/blanking.

This paper deals with the study of this problem by using the finite-element technique. 3-D finite-element models of various type of punching/blanking tools have been developed, these models enabling the analysis of the effects of variations in tool geometry on the punching/blanking force and on the deformation of the punch, a parameter highly relevant to the assessment of tool performance in terms of the accuracy of the manufactured components. The model caters also for variation in the characteristics of the tool material, in the sense that a highly wear-resistant tool is normally composed of carbide tips around its cutting profile. Computed results by FE models are checked against design standards by American Society of Manufacturing Engineers (SME). Some suggestions are offered as to how the efficiency of a punching/blanking tool can be improved.

1. Introduction

Experience shows that cost of tooling in sheet metal industries contributes a substantial part to the overall cost of manufacturing a component, so that it is essential to keep down this cost by ensuring that the tool works for a long period without interruption. To achieve this objective a production engineer has the following options: (i) to minimize the deflection of a forming machine tool to be employed in the punching/blanking operation; or (ii) to minimize the deflection of the die-set to be employed on the forming machine; or (iii) to reduce the stress on the punching/blanking tool; or (iv) to effect a combination of the foregoing three options. The options in items (i) and (ii) have been

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Conference International Machine Tool Design and Research Conference, 1972 Proceedings of the 2022 Annual Technology, Applied Science and Engineering Conference (ATASEC 2022) Rosa Andrie Asmara, Arie Rachmad Syulistyo, Muhmmad Shulhan Khairy, Vivi Nur Wijayaningrum, Indrazno Siradjuddin, Septian Enggar Sukmana, 2023-02-10 This is an open access book The 4th Annual Technology Applied Science and Engineering Conference ATASEC 2022 is an annual reputable event organized with a motivation to provide an excellent international platform for the academicians researchers engineers industrial participants and research students around the world to share their research findings ATASEC 2022 was performed online using Zoom platform on September 15th 16th 2022 ATASEC 2022 theme is Science Technology Innovative

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European Journal of Mechanical Engineering, 1991 [International Conference on Manufacturing Engineering](#), Melbourne, 25-27 August 1980, 1980 **Sheet Metal Forming** Taylan Altan, A. Erman Tekkaya, 2012 This practical and comprehensive reference gives the latest developments on the design of sheet forming operations equipment tooling and process modeling Individual chapters cover all major sheet forming processes such as blanking bending deep drawing and more Process modeling using finite element analysis is described in one chapter and discussed in all appropriate chapters Other chapters cover sensors and die materials which are critical for practical sheet forming applications Other topics include relatively new technologies such as warm forming of magnesium and aluminum alloys forming of advanced high strength steels AHSS and hot stamping Chapters also address special sheet forming operations like spinning incremental forming and mechanical joining and processes related to sheet forming such as sheet and tube hydroforming roll forming and high velocity forming **Advances in Production Management Systems. Competitive Manufacturing for Innovative Products and Services** Christos Emmanouilidis, Marco Taisch, Dimitris Kiritsis, 2013-08-13 The two volumes IFIP AICT 397 and 398 constitute the thoroughly refereed post conference proceedings of the International IFIP WG 5.7 Conference on Advances in Production Management Systems APMS 2012 held in Rhodes Greece in September 2012 The 182 revised full papers were carefully reviewed and selected for inclusion in the two volumes They are organized in 6 parts sustainability design manufacturing and production management human factors learning and innovation ICT and emerging technologies in production management product and asset lifecycle management and services supply chains and operations

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