

Design study of the geometry of a punching/blanking tool

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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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Journal of Engineering for Industry ,1994 *Metals Abstracts* ,1993 **Proceedings** ,1993 **International Journal of Vehicle Design** ,2005 *Sheet Metal ...* ,2007 **Manufacturing Processes for Design Professionals** Rob Thompson,2007-11-30 An encyclopaedic guide to production techniques and materials for product and industrial designers engineers and architects Today s product designers are presented with a myriad of choices when creating their work and preparing it for manufacture They have to be knowledgeable about a vast repertoire of processes ranging from what used to be known as traditional crafts to the latest technology to enable their designs to be manufactured effectively and efficiently Information on the internet about such processes is often unreliable and search engines do not usefully organize material for designers This fundamental new resource explores innovative production techniques and materials that are having an impact on the design industry worldwide Organized into four easily referenced parts Forming Cutting Joining and Finishing over seventy manufacturing processes are explained in depth with full technical descriptions analyses of the typical applications design opportunities and considerations each process offers and information on cost speed and environmental impact The accompanying step by step case studies look at a product or component being manufactured at a leading international supplier A directory of more than fifty materials includes a detailed technical profile images of typical applications and finishes and an overview of each material s design characteristics With some 1 200 color photographs and technical illustrations specially commissioned for this book this is the definitive reference for product designers 3D designers engineers and architects who need a convenient highly accessible and practical reference *Proceedings of the Twenty-eighth International MATADOR Conference* B. J. Davies,1990 **Proceedings of the CIRP Seminars on Manufacturing Systems** ,1993 *Material Forming* Lukasz Madej,Mateusz Sitko,Konrad Perzynski,2023-04-25 These proceedings present papers on Additive Manufacturing Composites Forming Processes Extrusion and Drawing Forging and Rolling Formability of Metallic Materials Friction and Wear in Metal Forming Incremental and Sheet Metal Forming Innovative Joining by Forming Technologies Lionel Fourment MS on Optimization and Inverse Analysis in Forming Machining and Cutting Material Behavior Modelling New and Advanced Numerical Strategies for Material Forming Non Conventional Processes Polymer Processing and Thermomechanical Properties Sustainability on Material Forming and Property Controlled Forming *Proceedings of the 34th International MATADOR Conference* Srichand Hinduja,2012-12-06 Presented here are 73 refereed papers given at the 34th MATADOR Conference held at UMIST in July 2004 The MATADOR series of conferences covers the topics of Manufacturing Automation and Systems Technology Applications Design Organisation and Management and Research The 34th proceedings contains original papers contributed by researchers from many countries on different continents The papers cover both the technological aspect of manufacturing processes and the systems business and management features of manufacturing enterprise The papers in this volume reflect the importance of manufacturing to

international wealth creation the necessity of responsiveness and agility of manufacturing companies to meet market led requirements and international change the role of information technology and electronic communications in the growth of global manufacturing enterprises the impact of new technologies new materials and processes on the ability to produce goods of higher quality more quickly to meet markets needs at a lower cost Some of the major generic developments which have taken place in these areas since the 33rd MATADOR conference was held in 2000 are reported in this volume 30th International Conference on Organization and Technology of Maintenance (OTO 2021) Hrvoje Glavaš, Marijana Hadzima-Nyarko, Mirko Karakašić, Naida Ademović, Samir Avdaković, 2021-12-07 This book promotes an interdisciplinary approach to maintenance through the presentation of practical and theoretical research in the field of electrical civil and mechanical engineering The goal is to raise the level of maintenance knowledge taking into account the continuous advancement of engineering and technology in all spheres of economy infrastructure and public services This book contains papers presented at the 30th International Conference on Organization and Technology of Maintenance OTO 2021 and the conference was held on Josip Juraj Strossmayer University of Osijek Faculty of Electrical Engineering Computer Science and Information Technology Osijek on 10 11 December 2021 The book brings 36 original papers written by authors from ten countries that underwent a blind review process by the international review board members The conference covers the topics as organization and management of maintenance maintenance technologies quality management in system maintenance information systems in maintenance product lifecycle management design for maintainability material and structure properties reliability of technical systems and environmental safety diagnosis and prognosis of failures and operational malfunctions design optimization for maintenance maintenance in technical systems analysis of efficiency and cost effectiveness of maintenance influence of maintenance on the environment and employee safety maintenance legislation and education for maintenance The papers presented in the book reflect the current state of approach to maintenance as an interdisciplinary field The OTO conference proved itself as an ideal opportunity for communication between scientists and experts in maintenance practice with the aim to raise the level of expertise and introduce new methods and maintenance procedures into everyday practice **Proceedings of the International Machine Tool Design and Research**

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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