

ECOLE DES MINES D'ALBI-CARMAUX

CROMeP

OBSERVATOIRE INTERNATIONAL DES OUTILLAGES

Veille : Outils d'Emboutissage-Découpage

Analyse bibliographique

Année : 2002

Volume : 020401

◦

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Nombre de références de la base de données : 280

Nombre de références pour l'année 2002 : 14

Une nouvelle présentation

Vous trouverez ci-dessous la présentation habituelle des références identifiées et de leur résumé issu de l'éditeur. Les nouveautés concernent :

- la présentation du bilan des journaux étudiés (quelle référence dans quel journal)
- une synthèse des références identifiées

Journaux analysés et références identifiées

International Journal of Mechanical Sciences

Volume 44, Issue 3, Pages 451-664 (March 2002)	0
Volume 44, Issue 4, Pages 665-841 (April 2002)	0

International Journal of Machine Tools and Manufacture

Volume 42, 4, April, 2002	[02-12], [02-10]
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J. of Materials Processing Technology

Volume 120, January, ,2002	[02-11]
Volume 122, Issues 2-3, March, 2002	[02-13],[02-13]

Metal Forming

January, 2002	0
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Surface and Coatings Technology:

Volume 153, Issues 2-3, Pages 107-321 (15 April 2002)	0
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Tribology International,

Volume 35, Issue 3, March 2002	0
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Wear

Volume 252, Issues 5-6, March, 2002	0
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Synthèse des travaux (4)

Découpage de tôles d'aluminium

Shuqin et al. [02-13] et Fang et al. [02-14] se sont intéressés à l'influence du jeu entre pointon et matrice dans une opération de découpage sur les tôles d'aluminium respectivement en AlMg4.5Mn0.4 de 1,2 mm d'épaisseur et en alliage 2024. Shuqin et

al. [02-14] valident le modèle de simulation tabli sous AUTOFORGE® (MARC) par comparaison des résultats d'essais. Ils utilisent un critère de rupture basé sur la déformation plastique cumulée alors que Fang et al. [02-14] s'appuient sur un critère de Latham et Cokroft. Les résultats de simulations numériques donnent une estimation acceptable (20%) de l'effort et de la gomme trié du front de coupe. Fang et al. [02-14] montrent que l'augmentation du jeu point-matrice (0-0,02 mm) peut provoquer une diminution de 10% de la valeur maximale d'effort de point mais provoque également des variations importantes sur la gomme trié en raison d'une augmentation du retour élastique.

Mise en forme de tôle par injection de polymère

Chen et al. [02-12] présentent des résultats de simulation numérique d'une opération d'injection de polymère sur la tôle. Le polymère est utilisé comme fluide presseur et permet le gonflage d'une cavité de la tôle (hydroformage de plaque). Cette méthode permet de réaliser des pièces renforcées. Suivant le niveau de pression dans le polymère, la tôle passe par différentes étapes de déformation, emboutissage (0-30 MPa), tirage (>30 MPa) et localement au contact des rayons de la cavité d'outil, amincissement.

Influence de la rugosité sur la pression de contact

Biglari et al. [02-10] ont analysé par simulation numérique l'échelle de la surface de contact l'influence de la rugosité d'une pièce revêtue sur la pression de contact. Ils observent une augmentation de la pression locale de 500-800 MPa quand la rugosité varie de 10-20 microns. Cette analyse permet de prévoir la durée de vie en fatigue des revêtements de surface.

Emboutissage de tôles prépeintes

Kim et al. [02-11] se sont intéressés à l'influence de la dureté du matériau (STD11, AMPCO25), de son revêtement et de la gomme trié d'outil sur la dégradation de la peinture. Ils ont réalisés des essais de frottement (plan/plan, sur rayon) et des essais d'emboutissage de godets sur presse. Les meilleurs résultats en terme de coefficient de frottement (0,12-0,2), effort d'emboutissage et rugosité de surface de la tôle sont obtenus avec les matériaux AMPCO25 et STD11 subissant le traitement "TD".

Références citées (5)

Brevets (0)

Nant

Publications (5)

O2-14 Fang G., Zeng P., Lou L., Finite element simulation of the effect of clearance on the forming quality in the blanking process, **J. of Materials Processing Technology**, 122, 2-3, March, 249-254, 2002

Department of Mechanical Engineering, Tsinghua University, Beijing 100084, China

The clearance between the punch and the die plays an important role in the blanking process. The selection of the clearance will influence the life of the die or punch, the blanking force, the unloading force and the dimensional precision. In this paper, the punch-die clearance values for a given sheet material and thickness are optimized,

using the finite element technique and Cockcroft and Latham fracture criterion. In the study, the shearing mechanism was studied by simulating the blanking operation of an aluminum alloy 2024. The results of the present paper agree with the previous experimental results.

Blanking; Clearance; Sheet metal; FEM

- 02-13 Shuqin X, Hoogen Michael, Pyttel Thomas, Hoffmann Hartmut, FEM simulation and experimental research on the AlMg4.5Mn0.4 sheet blanking,, **J. of Materials Processing Technology**, Issues 2-3, 122, 338-343, March, 2002

Institute of Material Engineering, Taiyuan University of Technology, Taiyuan 030024, China

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Both experiment and finite element method (FEM) simulation were done on the AlMg4.5Mn0.4 sheet blanking with 1, 10 and 20% relative clearance, respectively. The cutting force curves and the cutting surface parameters which can be used to describe the quality of the blankings were measured. Simulation was accomplished by MARC Autoforge software package. Calculated cutting forces are always bigger than measured ones. All difference between experiment and simulation is not greater than 20%. It is feasible doing virtual experiment on workstation to estimate the cutting force and to predict the quality of the workpiece for new material using certain blanking technical parameters.

Sheet blanking; Experiment; FEM simulation

- [02-12] Chen M. (a, b), Zhang X. (a), Leib Q., Fu J. (b), Finite element analysis of forming of sheet metal blank in manufacturing metal/polymer macro-composite components via injection moulding, **International Journal of Machine Tools and Manufacture**, Volume 42, Issue 3, Pages 375-383, February 2002

a Department of Materials Science and Engineering, Central South University, Changsha, Hunan 410083, PR China

b College of Materials Science and Engineering, Hunan University, Changsha, Hunan 410082, PR China

A new approach to manufacture metal/polymer macro-composite components is presented, in which the injected polymer melt from the injection machine forces the sheet metal blank to deform according to the contour of the mould and the space between the formed sheet blank acts as the moulding cavity of the polymer melt. As the melt cools down, it adheres to the surface of the formed sheet blank. The mechanism of adhesion bonding between the polymer and the surface of the formed sheet blank is discussed briefly. The deformation characteristics and evolution of plastic strains of the sheet blank during the manufacturing process, the distribution of plastic strains and thickness of the formed sheet blank, and the effects of drawing-in of the flange on these have been analysed by the finite element method and experiment. According to deformation characteristics, the formed sheet blank can be divided into five regions. It is shown that deep drawing is the dominating process when the pressure increases from 0 to about 30 MPa; after this stage, stretch forming of the sheet blank that has already been in the mould cavity is the dominating process and two highly strained zones with severe thickness reduction are developed.

Metal/polymer macro-composite component; Finite element analysis; Plastic injection moulding; Sheet metal forming

- [02-11] Kim H. Y. ,Hwang B. C. ,Bae W. B.,An experimental study on forming characteristics of pre-coated sheet metals, **J. of Mat. Proc. Technology**,120, January,290-295,2002

Pusan National University, School of Mechanical Engineering, Jangjon-dong, Keumjong-gu, Pusan 609 735, South Korea

To analyze the forming and friction characteristics of pre-coated metals (PCMs) that are widely used in household appliances, rectangular deep drawing and friction tests were performed. There were four types of die materials (STD11(TiCN), STD11(TD), STD11, AMPCO) used in the deep drawing tests, and the results show that STD11 and AMPCO are better than others in respect to forming load and surface roughness. The friction mechanism, the thickness of materials and the effect of the roller's diameter on the friction coefficient and surface roughness were examined in the friction test. The PCMs used in the tests had low friction coefficients ($=0.15\pm0.20$) in non-lubricated condition due to the coating film acting as lubrication. The friction coefficient decreased as the radius of the roller increased and the surface of product became better as the thickness of the material decreased.

Pre-coated sheet metal; Rectangular deep drawing test; Friction test

- [02-10] Biglari F.R.,Nikbin K.,O'Dowd N.P.,Busso E.P.,Numerical simulation of sliding contact during sheet metal stamping, **TBP**, January,2002,

IRA Amirkabir University of Technology, Mechanical Eng. Dep.

UK Imperial College of Science, Mechanical Engineering Departement

UK Imperial College of Science, Mechanical Engineering Departement

The results of computational study to examine the effects of design parameters on the life of a coated die used in sheet metal stamping are presented. The stress distributions within the coating by crack growth identified. The analyses indicate that there is an increase in peak stress from approximately 500 to 800 MPa when the workpiece roughness (asperity spacing) increase from 10 to 200 microns. Based on the numerical results, the life of the coating under contact fatigue conditions was determined.

sliding contact, wear resistant coating, finite element analysis, fatigue, fracture