PROCEEDINGS OF THE 9TH INTERNATIONAL COLD FORGING CONGRESS

22nd to 24th May 1995, Solihull, UK

Edited by Dr. Peter Standring

Paper 1

Keynote Paper "A profile of the market for cold forging" - T.A. Dean - School of Manufacturing and Mechanical Engineering and Interdisciplinary Research Centre in Materials for High Performance Applications, University of Birmingham, UK

Paper 2

"Cost savings by combining the latest technologies in cold forging" F. Kersten, Nedschroef, Herentals, Belgium

Paper 3

"Modern tool design" - H. Schmidt, Karl SieberGmbH & Co. KG, Henstedt-Ulzburg, Germany

Paper 4

"Improved service life conditions for cold-forging die inserts through the use of high-stiffness stripwound containers" - E. B. Nielsen and J. Groenbaek - Danfoss A/S, Denmark

Paper 5

Keynote Paper "From near-net to net-shape cold forging" - R. Geiger - Krupp Hoesch Automotive GmbH, Germany and M. Hansel, Presta, Liechtenstein

Paper 6

"Wall ironing of extruded aluminium parts" - W.C. Emmens, Hoogovens Groep BV, Corporate Research Laboratory, Ijmuiden, Netherlands

Paper 7

"Production sequence forming - hardening - hard finishing for the manufacture of ready-to-install gearing" - F. Dohmann and T. Meier, University of Paderborn, Germany

Paper 8

"Die geometry, stress components and material behaviour in cold forging" - V. Vujovic, D. Vilotic and M. Plancak, Laboratory for Technology of Plasticity, Faculty of Technical Sciences, University of Novi-Sad, Yugoslavia

Paper 9

"Reliability analysis of cold forging tools" - U. Engel, Institute of Manufacturing Science, University of Erlangen-Nurnberg, Germany

Paper 10 "Precision embossing - alternative method of forming flat parts" W. Beisel and I. Oberste-Dommes, Grabener Pressensysteme GmbH & Co.KG, Netphen-Werthenbach, Germany

Paper 11

"Total process control - a precondition for net shape forming implementation" - K. Kuzman, The Slovenian Tool and Die Development Centre, Celje, Slovenia & B. Stok, Faculty of Mechanical Engineering, University of Ljubljana, Slovenia

Paper 12

"A study on mechanism of plastic cropping for production of flat parts" Chen Ming-an, Yu Jueqi and Le Qiuling, Dept. of Mechanical Engineering, Hunan University, China & Chen Jinde, Dept. of Mechanical Engineering, Xian Jiaotong University, China

Paper 13

Keynote Paper "Aspects of lubrication in cold forging of aluminium and steel" - N. Bay, Institute of Manufacturing Engineering, Technical University of Denmark

Paper 14

"General characterisation of phosphate/stearate coatings: seizure resistance and conductivity measurements" - J-P. Bricout, S. Adjerid, P. Hivart and J Oudin, Mechanical Engineering Laboratory, University of Valenciennes and Hainaut-Cambresis, France

Paper 15

"Design of micro-forming processes - fundamentals, material data and friction behaviour" - M. Geiger, A. Messner, U. Engel, R. Kals and F. Vollersten - Universitat-Erlangen-Nurnberg, Erlangen, Germany

Paper 16

Keynote Paper "Forging modelling" - A. N. Bramley, School of Mechanical Engineering, University of Bath, UK

Paper 17

"Cold forging of complex shaped parts to close tolerances - application of metal flow simulation to process and tool design" - T. Altan, K. Sweeney, V. Vazquez, H. Kim, and M. Knoerr, Engineering Research Centre for Net Shape Manufacturing, The Ohio State University, Columbus, Ohio, USA

Paper 18

"A tool for metal forming simulation in cold forging and fasteners industry" - G Arfmann and M. Twickler, CPM Gesellschaft fur Computeranwendung Prozess-und Materialtechnik mbH, Herzogenrath, Germany

Paper 19

"On the determination of friction in the cold forging of coated steel workpieces" - P Picart, J Oudin and A Dubois, Industrial and Human Automatic Control and Mechanical Engineering Laboratory, University of Valenciennes and Hainaut-Cambresis, France

Paper 20

"Friction in cold forging of steel" - H.W. Wagener and J. Wolf, Metal Forming Laboratory, University of Kassel, Germany

Paper 21

"Computer-aided planning in the cold forging of steel" - B. Lengyel and I. Chaudhry, Department of Mechanical Engineering, Imperial College, London, UK.

Paper 22

"Prediction of internal defects by finite element analysis" A. Hingwe, R. Greczanik and M. Knoerr - MascoTech Forming Technologies, Michigan, USA

Paper 23

"Simulation of the effect of tool geometry changes on blanking operations" - C. Choy and R. Balendra - Design, Manufacture and Engineering Management, University of Strathclyde, Glasgow, UK

Paper 24

"Basic test for investigation of wear processes of cold forging" - D. Schmoeckel and M. Rupp, Institute for Production Technology and Forming Machines, Technical University of Darmstadt, Germany

Paper 25

"Effects of mechanical and geometrical features of workpiece on friction behaviour on double cup extrusion" - A. Barcellona, F. Micari - Dept. of Technology and Mechanical Production, University of Palermo, Italy & A. Forcellese and F. Gabrielli - Department of Mechanics, University of Ancona, Italy

Paper 26

"The study of frictional resistance in forming" - G. Borowski and K. Lenik, Dept. of Technology Foundations, Technical University of Lublin, Poland

Paper 27

"Cold forging process design based on induction of analytical knowledge" - Q-C. Hsu and J-T. Tsai - Metal Industries Research & Development Centre, Kaohsiung, Taiwan & R-S. Lee - National Cheng Kung University, Tainan, Taiwan

Paper 28

"Simulation of non-static press forming process by rigid plastic FEM" - Y. Peng, F. Wang and X. Ruan, Shanghai Research Institute of Tool and Die Technology, Shanghai Jiao Tong University, China

Paper 28 a

"Limiting phenomena in cold forging" - B. Dodd, Dept. of Engineering, University of Reading, UK & A. Konieczny Institute of Metalforming, Welding and Casting, Warsaw University of Technology, Poland

Paper 29

"Environmental musings on cold and warm forging lubrication for the nineties" -A.W. Cooper, Acheson Industries International, Port Huron, Mi, USA - A.P. Hancox, A.V. Parry and I. Trundley - Acheson Colloids co., Plymouth, UK & H. Vetter - Acheson Industries Deutschland, Dornstadt, FRG

Paper 30

"Requirements of lubricants for cold forging" - J. Burke, Chemetall, Aylesbury, UK

Paper 31

Keynote Paper "Incremental Forming" - P.M. Standring, Dept. of Manufacturing Engineering, University of Nottingham, UK & C. Tintelecan, Dept. of Plastic Deformation, University of Cluj-Napoca, Romania

Paper 32

"Optimised cold forging of helical gears by FEM simulation" - K. Lange , Institute for Metalforming Technology, University of Stuttgart, Germany & V. Szentmihalyi, Erich Neumayer GmbH, Hausach, Germany

Paper 33

"Cold and warm rolling of pitch profiles as an example for applied research" - R. Umbach and W. Altmann, Fraunhofer-Institut fur Umformtechnik und Werkzeugmaschinen, Chemnitz, Germany

Paper 34

Keynote Paper "Current and future developments in workpiece materials for cold forging" - H. Yaguchi, T. Hasegawa, M. Nakamura and T. Inoue, Kobe Steel Ltd., Kobe, Japan

Paper 35

"Cold forging high strength lower cost, steel fasteners" - W.T. Cook and R.G. Williams, British Steel Technical, Swinden Laboratories, Rotherham, UK

Paper 36

"Formability of dispersion strengthened P/M aluminium alloys" - K. Siegert and D Ringhand, Institute for Metalforming Technology, University of Stuttgart, Germany

Paper 37

"Steel wire heat treatment for the future" - D. Brandstatter, EBNER, Linz/D, Austria

Paper 38

"New quenched and tempered steel wire rod for high strength rods" - C. Bertrand, P. Mateos, Sidenor I+D, Basauri, Spain

Paper 39

"Applications of rotary swaging for the economical production of lightweight components mainly for the car industry" - B. Muller, Pforzheim, Germany

Paper 40

"Near-net-shape precision rotary swaging of tubular automotive components" - P. Isaak and C. Kienhofer, FELSS GmbH + Co. KG, Germany & S. Panke, Pearson Panke Ltd. UK

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"Application potential of axial-radial forming for the production of transmission shafts in lightweight production" D. Schmoeckel, R. Gartner and F-D. Speck, Institute for Production Technology and Forming Machines, Technical University of Darmstadt, Germany

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"Ductile failure in cold forging" - A. Turner, British Steel plc, Rotherham, UK"

Paper 43

"Effect of ausforming on warm forging of SUS630 precipitation hardening steel" S. Isogawa, H. Yoshida, K. Sakoda and S Isobe, Daido Steel Co. Ltd, Nagoya, Japan

Paper 44

"Calculation of surface expansion and recrystallised grain size by using the finite element method" - H. Berg and G. Jensen, Materials Technology Department, Raufoss Technology A/S, Norway

Paper 45

"Orbital Cold Forging Applied to the Manufacture of Complex Automotive Transmission Components" - J. Larsen, Borg Warner Automotive, Margam, Wales, UK

Paper 46

"An investigation into the rotary forging process capabilities and load estimation" - M. Nategh, Technology Development Plan, Ministry of Industries, Tehran & M. Mehdi Nejhad, Mechanical Engineering Department, Amir-Kabir University of Technology, Tehran, Iran

Paper 47

"Transmission Shaft Forgings - Technical and Economical Aspects of New Developments" - M. Hirschvogel, Hirschvogel Umformtechnik GmbH, Denklingen, Germany

Paper 48

"Metallurgical solutions for non heat treated cold heading parts" - G. Pierson, CREAS, Ascometal Unimetal, France

Paper 49

"Stainless steels with good cold heading ability and improved machinability" - J. Bayol, J. Levigoureux and M. Cauvet, Imphy s.a., France

Paper 50

"Cold Face Rotary Forging" L. Aksenov and N. Elkin - St. Petersburg Technical University, Russia