



COMPUTER CONTROLLED EXPERIMENTAL DEVICE FOR INVESTIGATIONS OF TRIBOLOGICAL INFLUENCES IN SHEET METAL FORMING

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Summary: Sheet metal forming, especially deep drawing process, is influenced by many factors. Blank holding force and drawbead displacement are two of them that can be controlled during the forming process.

For this purpose, electro-hydraulic computerized sheet-metal strip sliding device has been constructed. Basic characteristic of this device is realization of variable contact pressure and drawbead height as functions of time or stripe displacement. There are both, pressure and drawbead, ten linear and nonlinear functions. Additional features consist of the ability to measure drawing force, contact pressure, drawbead displacement etc.

Presented in the paper are the device overview and the first results of steel sheet stripe sliding tribological physical model.

Key words: deep drawing, drawbead, variable contact conditions, tribology

1. INTRODUCTION

Technology of deep drawing of thin sheet metals is extremely important in modern industry. Due to the development of new materials of more complex formability and raising of the technological requirements to the higher level, the need for realisation of complete control of forming process increases. In order to succeed in that, it is necessary to identify, out of a large number of influential factors, the ones which can be influenced throughout the forming process. It was determined that there are only two such factors: contact pressure on flange and drawbead height [1].

Process control through active complex (closed-loop) systems requires constant dynamic feedback between the given function of the objective, controlled and controlling variables [2]. The functions of the objective and controlled variable can be different: wrinkle height, thinning in critical zone, flange motion, flange thickness change, friction force, forming force, stress in work piece wall etc. The given objective

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