OPTIMIZING THE GEOMETRY OF CUTTING TOOL

(Sientific monograph)

by

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Abstract

The scientific monograph deals with the optimization of geometry of the cutting edge in the machining of hardened materials in terms of durability of the cutting edge, its impact on the roughness of the machined surface of the work piece and the economic aspect in the selection of the inserts. The theoretical part is devoted to an overview of cutting materials and their impact on the state of the work piece machinability. The experimental part is evaluated impact of individual parts of cutting edge geometry on the roughness of machined surface and thus on the life of cutting edge from boron nitride.

Key words: *Geometry, cubic boron nitride, hard part turning*

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INTRODUCTION

Slovakia ranks among leaders in automotive industry. It means that the arrival of automobile manufacturers such as VW, KIA, GFT has brought subcontractors Sachs, ZF Sachs, INA, Schafler Group, etc. as well as the latest technologies of cutting operation. In the period of economic growth the request regarding higher number of components was raised yet nobody was concerned over the amount of costs of production and new machines and machinery were purchased in bulk. In current economic situation and between crises the people in charge started raising questions regarding the option of existence of effective production. The means of reduction of production costs related to a component are sought for and the economic market has been divided into two groups.

The first group uses current machine holding with entering technologies of minimal added value. On the one hand, the companies belonging to this group dispose of cheap inputs, however, the production time has not been shortened, vice versa, it has been prolonged and as a result the production costs are higher and the companies are not able to compete. The other group has reconsidered the machine holding with regards to assortment, type and demands related to produced components. It resulted in a change of the machine holding, of technological equipment and of technologies, i.e. the attention was paid to productivity despite worldwide crisis. The companies started to invest in increase of technological level. The procedures impossible to be applied 10 years ago such as cutting operation of materials with hardness of up to 62 HRC or replacement of grinding of rotary components or reaching the accuracy category of IT6 and quality of surface machining of Rz1 can be nowadays employed yet with higher demands imposed on the entire SPID system (a machine, a tool, a jig and a workpiece) as well as on technological level of people participating in production.

If the process is expected to be effective, the catalogue item of a cutting tool is not simple to be selected as well as the determination of recommended parameters is complicated. Nowadays, the operation strategy is also required to be changed and many times a technologist must opt for non-standards or for specials in case of micro- and macrogeometry and even in case of the cutting tool substrate itself.