

# **OPTIMIZING THE GEOMETRY OF CUTTING TOOL**

**(Scientific 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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# CONTENTS

## LIST OF ABBREVIATIONS AND SYMBOLS

	<b>INTRODUCTION</b>	<b>1</b>
<b>1</b>	<b>THE CURRENT STATE OF THE ART</b>	<b>2</b>
1.1	Lathe-Turning of Hard Materials	2
1.1.1	History of Development of Hard Lathe-Turning	6
1.2	Hardened Materials in Automotive Industry	7
1.2.1	Means of Hardness Measuring	8
1.2.1.1	<i>Brinnel Tests HB (STN EN ISO 6506-1 standard)</i>	8
1.2.1.2	<i>Hardness as per Rockwell HRA, HRB and HRC</i>	9
1.2.1.3	<i>Hardness as per Vickers HV (STN EN ISO 6507-1 standard)</i>	9
1.2.1.4	<i>Hardness as per Koop HK</i>	9
1.2.1.5	<i>Hardness as per Martens HMA</i>	9
1.2.1.6	<i>Hardness as per Shore</i>	10
1.2.2	Machined Materials in Automotive Industry	10
1.3	Materials of Cutting Tools for Hard Machining	11
1.3.1	Cutting Materials	12
1.3.1.1	<i>HSS</i>	13
1.3.1.2	<i>Cemented Carbide</i>	14
1.3.1.3	<i>Cermet</i>	14
1.3.1.4	<i>Cutting Ceramics</i>	14
1.3.1.5	<i>Cubic Boron Nitride /CBN/</i>	15
1.3.1.6	<i>Polycrystalline Diamond</i>	19
1.3.2	Deposition	20
1.3.3	Microgeometry	23
1.4	Machined Surface Quality	25
1.4.1	Surface Roughness	26
1.4.2	Hardening of Surface Layer in Machining	29
1.4.3	Annealing Stress	29
1.4.4	Thread after Lathe-Turning	32
1.5	Lathe-Turning vs. Grinding	33
<b>2</b>	<b>OBJECTIVE</b>	<b>36</b>
2.1	Definition of the Issue	36
2.2	Definition of Objectives	37

<b>3</b>	<b>METHODOLOGY</b>	<b>38</b>
3.1	Equipment Designed for Experimental Test	38
3.1.1	Experimental Cutting Tools	38
3.1.2	Workpiece Material	39
3.1.3	Machine Tool Used in Experiment	39
3.1.4	Preparation of Experimental Samples	40
3.1.5	Equipment for Measurement and Assessment of the Experiment	40
3.2	Experiment Proposal	41
<b>4</b>	<b>RESULTS</b>	<b>42</b>
4.1.1	Experiment 1: Development of Wear in case of Negative Peripheral Land and Influence of Cubic Boron Nitride Quality under the Unchanged Cutting Conditions	42
4.1.2	Assessment of Experiment 1	47
4.1.3	Experiment 2: Influence of Peripheral Land Width on the Service Life	47
4.1.4	Assessment of Experiment 2	49
4.1.5	Experiment 3: Influence of Cutting Edge Roundness ER on the Machined Surface Quality	49
4.1.6	Assessment of Experiment 3	54
4.1.7	Experiment 4: Influence of Shift $f_n$ on the Final Surface Rough-	55
4.1.8	Assessment of Experiment 4	57
4.1.9	Optimatization of the Cutting Tool Price	58
4.1.9.1	<i>Procedure of Optimization of the Cutting Tool as of the Special</i>	58
4.2	Production Experiment No. 1	61
4.2.1	Economical Assessment of Experiment No. 1	68
4.3	Production Experiment No. 2	70
4.3.1	Assessment of Experiment No. 2	79
<b>5</b>	<b>CONCLUSION</b>	<b>83</b>
	<b>REFERENCES</b>	<b>91</b>

## **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.