

# ADVANCED MACHINING TOWARDS IMPROVED MACHINABILITY OF DIFFICULT-TO-CUT MATERIALS

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Edited by:

A.K.M. Nurul Amin (Chief Editor)

Dr. Erry Yulian Triblas Adesta

Dr. Mohammad Yeakub Ali



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<b>SECTION A: HEAT ASSISTED MACHINING</b>	<b>1</b>
1. CHAPTER 1: INFLUENCE OF WORKPIECE PREHEATING ON CHATTER AND MACHINABILITY OF TITANIUM LOY - TI6AL4V	1
2. CHAPTER 2: MACHINABILITY IMPROVEMENT IN END OF MILLING TITANIUM ALLOY TI-6AL-4V THROUGH PREHEATING	9
3. CHAPTER 3: SOME ASPECTS OF IMPROVED MACHINABILITY IN PREHEATED MACHINING OF TITANIUM ALLOY TI-6AL-4V	19
4. CHAPTER 4: MACHINABILITY ASPECTS IN HEAT ASSISTED MACHINING OF HARDENED STEEL AISI H13 USING COATED CARBIDE TOOL	27
5. CHAPTER 5: TOOL WEAR AND SURFACE ROUGHNESS ASPECTS IN HEAT ASSISTED END MILLING OF AISI D2 HARDENED STEEL	35
6. CHAPTER 6: MODELING IN PREHEATED MACHINING OF AISI D2 HARDENED STEEL	43
7. CHAPTER 7: RELATIVE PERFORMANCES OF PREHEATING, CRYOGENIC COOLING AND HYBRID TURNING OF STAINLESS STEEL AISI 304	49
<b>SECTION B: CHATTER AND SELECTED METHODS OF CHATTER SUPPRESSION</b>	<b>57</b>
8. CHAPTER 8: ROLE OF THE FREQUENCY OF SECONDARY SERRATED TEETH IN CHATTER FORMATION DURING TURNING OF CARBON STEEL AISI 1040 AND STAINLESS STEEL	57
9. CHAPTER 9: INFLUENCE OF THE ELASTIC SYSTEM AND CUTTING PARAMETERS ON CHATTER DURING MACHINING OF MILD STEEL	65
10. CHAPTER 10: INFLUENCE OF CHATTER ON TOOL LIFE DURING END MILLING OF ALUMINIUM AND ALUMINIUM ALLOY ON VMC	75

<b>11</b>	<b>CHAPTER 11: A NEW METHOD FOR CHATTER SUPPRESSION AND IMPROVEMENT OF SURFACE ROUGHNESS IN END MILLING OF MILD STEEL</b>	<b>83</b>
<b>12</b>	<b>CHAPTER 12: APPLICATION OF PERMANENT ELECTROMAGNET FOR CHATTER CONTROL IN END MILLING OF MEDIUM CARBON STEEL</b>	<b>91</b>
<b>13</b>	<b>CHAPTER 13: APPLICATION OF PERMANENT ELECTROMAGNET FOR CHATTER CONTROL IN END MILLING OF TITANIUM ALLOY - Ti6Al4V</b>	<b>99</b>
<b>14</b>	<b>CHAPTER 14: CHATTER SUPPRESSION IN END MILLING OF TITANIUM ALLOY Ti6Al4V APPLYING PERMANENT MAGNET CLAMPED ADJACENT TO THE WORKPIECE</b>	<b>107</b>
	<b>SECTION C: MODELING AND OPTIMIZATION IN MACHINING</b>	<b>117</b>
<b>15</b>	<b>CHAPTER 15: A COUPLED ARTIFICIAL NEURAL NETWORK AND RSM MODEL FOR THE PREDICTION OF CHIP SERRATION FREQUENCY IN END MILLING OF INCONEL 718</b>	<b>117</b>
<b>16</b>	<b>CHAPTER 16: APPLICATION OF RESPONSE SURFACE METHODOLOGY COUPLED WITH GENETIC ALGORITHM FOR SURFACE ROUGHNESS OF INCONEL 718</b>	<b>123</b>
<b>17</b>	<b>CHAPTER 17: DEVELOPMENT OF A MATHEMATICAL MODEL FOR THE PREDICTION OF SURFACE ROUGHNESS IN END MILLING OF STAINLESS STEEL SS 304</b>	<b>133</b>
<b>18</b>	<b>CHAPTER 18: DEVELOPMENT OF AN ARTIFICIAL NEURAL NETWORK ALGORITHM FOR PREDICTING THE CUTTING FORCE IN END MILLING OF INCONEL 718 ALLOY</b>	<b>143</b>
<b>19</b>	<b>CHAPTER 19: DEVELOPMENT OF AN ARTIFICIAL NEURAL NETWORK ALGORITHM FOR PREDICTING THE SURFACE</b>	<b>149</b>
<b>20</b>	<b>CHAPTER 20: DEVELOPMENT OF TOOL LIFE PREDICTION MODEL OF TiAlN COATED TOOLS DURING PART C: HIGH SPEED HARD MILLING OF AISI H13 STEEL</b>	<b>155</b>
<b>21</b>	<b>CHAPTER 21: MODELING FOR SURFACE ROUGHNESS IN END-MILLING OF TITANIUM ALLOY Ti-6Al-4V USING UNCOATED WC INSERTS</b>	<b>161</b>

22	CHAPTER 22: MODELING OF SURFACE ROUGHNESS DURING END MILLING OF AISI H13 HARDENED TOOL STEEL	167
23	CHAPTER 23: MODELING OF TOOL LIFE USING RESPONSE SURFACE METHODOLOGY IN HARD MILLING OF AISI D2 TOOL STEEL	175
24	CHAPTER 24: OPTIMIZATION OF SURFACE ROUGHNESS IN HIGH SPEED END MILLING OF TITANIUM ALLOY Ti-6Al-4V UNDER DRY CONDITION	181
25	CHAPTER 25: COMPARISON OF SURFACE ROUGHNESS IN END-MILLING OF TITANIUM ALLOY Ti-6Al-4V USING UNCOATED WC-CO AND PCD INSERTS THROUGH GENERATION OF MODELS	189
26	CHAPTER 26: ASSESSMENT OF PERFORMANCE OF UNCOATED AND COATED CARBIDE INSERTS IN END MILLING OF Ti-6Al-4V THROUGH MODELLING	195
	SECTION D: CRYOGENIC AND HIGH SPEED MACHINING OF METALS AND NON METALS	203
27	CHAPTER 27: THE EFFECT OF CRYOGENIC COOLING ON MACHINABILITY OF STAINLESS STEEL DURING TURNING	203
28	CHAPTER 28: COMPARISON OF MACHINABILITY OF CERAMIC INSERT IN ROOM TEMPERATURE AND CRYOGENIC COOLING CONDITIONS DURING END MILLING INCONEL 718	209
29	CHAPTER 29: HIGH SPEED END MILLING OF SINGLE CRYSTAL SILICON SING DIAMOND COATED TOOL	217
30	CHAPTER 30: IMPLEMENTATION OF HIGH SPEED OF SILICON USING DIAMOND COATED TOOLS WITH AIR BLOWING	225
31	CHAPTER 31: ELIMINATION OF BURR FORMATION DURING END MILLING OF POLYMETHYL METHACRYLATE (PMMA) THROUGH HIGH SPEED MACHINING	233
32	CHAPTER 32: WEAR MECHANISMS IN END MILLING OF INCONEL 718	239

33	CHAPTER 33: PERFORMANCE OF UNCOATED WC-CO INSERTS IN END MILLING OF ALUMINUM SILICON CARBIDE (ALSiC)	247
34	CHAPTER 34: APPLICATION OF PCD INSERTS IN END MILLING OF ALUMINUM SILICON CARBIDE (ALSIC)	253
35	CHAPTER 35: EFFECTS OF SCRIBING WHEEL DIMENSIONS ON LCD GLASS CUTTING	259

## Effects of Scribing Wheel Dimensions on LCD Glass Cutting

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### 1.0 INTRODUCTION

Nowadays, LCD is present everywhere in man-machine interfaces. It is used on various kind of instrument, such as Personal Digital Assistant (PDA), mobile phone, digital clock due to the superiority of display quality, relatively lower power consumption, small size, low weight, and also to its dimensional flexibility from less than one inch to as large as forty inch diagonal in flat television screen currently, Funaki [1]. Glass cutting is one of the important processes in LCD manufacturing. It has significant impact on the manufacturing yield. In the actual glass cutting process in LCD manufacturing plant, faulty cutting, which is commonly called “misbreaking”, always happens. It is a serious problem that reduces LCD production yield. In 1947, Taylor [2] studied the crack mechanism of glass by point indentation through the making of first Vickers hardness measurement. He observed some cracks at corners of diagonals impression. Holland and Turner [3] investigated strength degradation by scratching with worn and new diamond chips. They found that scratching creates two types of cracks, median and lateral. However, they did not correlate these cracks to material strength. John and Blair [4] conducted similar experiments to investigate the influence of interval time between scratching and breaking on strength. They found that the required breaking load was increased when the interval time was long. Muir [5] explained that there are 28 parameters in the scribing process that need to be considered in meeting the quality requirement of glass cutting. Laser splitting of glass has been demonstrated to be effective and economical. Swain [6] discovered that laser splitting of glass necessitates the development of a sub-microscopic crack within the body of the glass by controlling the generation of stress. Veldkamp et al [7] observed cracking during the scratching of several brittle materials including glass. They reported the creation of several types of cracks such as median crack, lateral crack and surface cracks as a function of scratching load or speed. This present work focus on the study of the crack creation and propagation mechanism when apply scribe/break method on ITO coated soda lime glass using Tungsten Carbide scribing wheel. Focus is put at improvement of LCD glass cutting quality and its economic value.