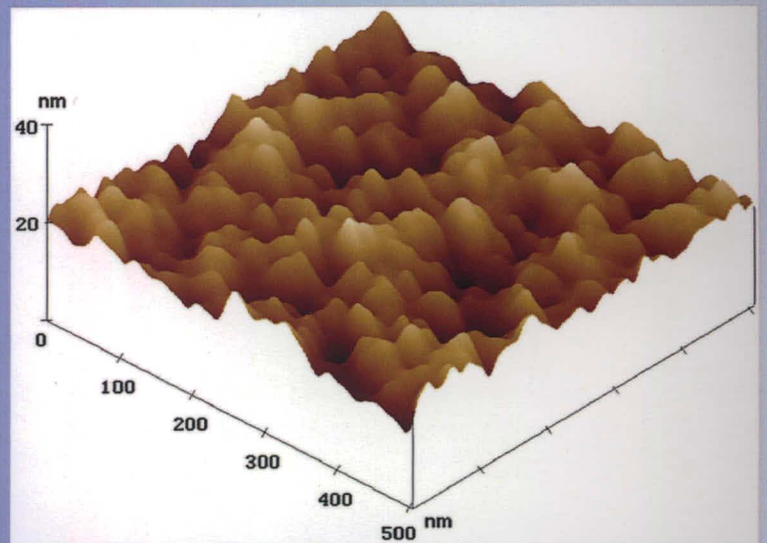
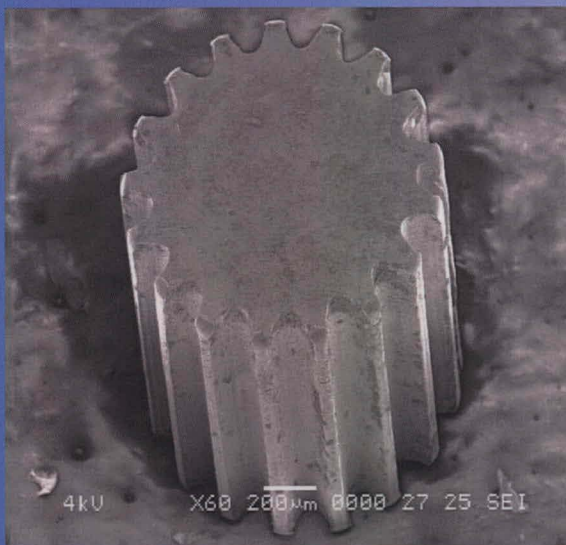
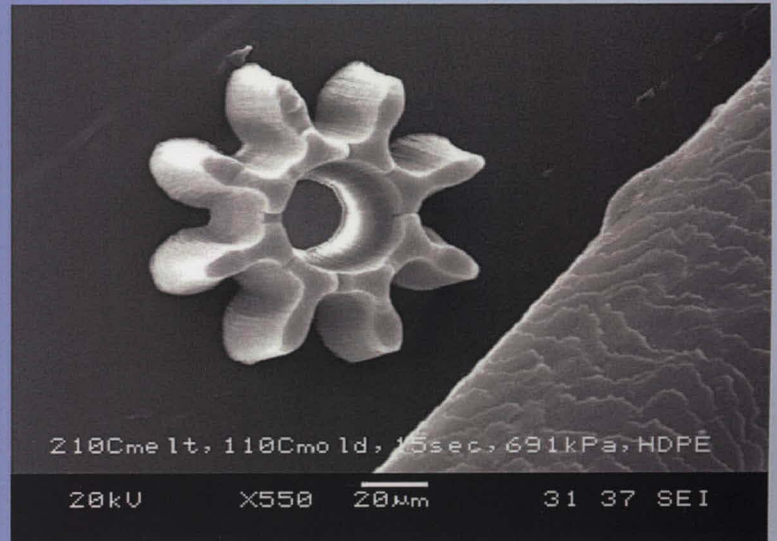
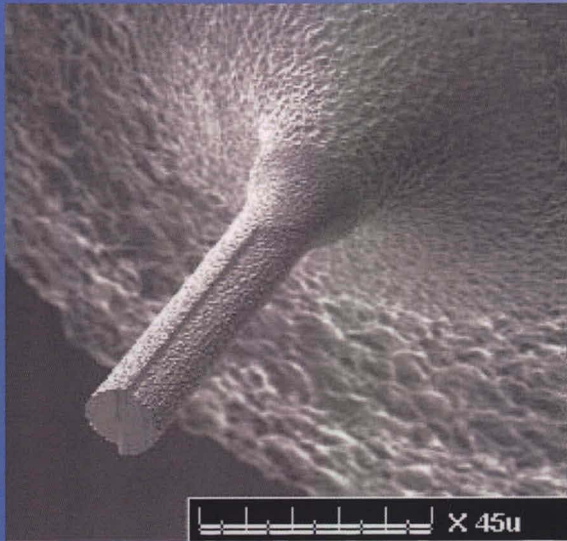


Advanced Machining Process



Editors

Mohammad Yeakub Ali

AKM Nurul Amin

Erry Yulian Triblas Adesta

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Editors

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AKM Nurul Amin
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Table of Contents

<i>Preface</i>	<i>ii</i>
<i>Acknowledgement</i>	<i>iii</i>
<i>Copyright</i>	<i>iv</i>
PART 1: ELECTRO DISCHARGE MACHINING	1
Chapter 1	2
Tool Wear rate during Electrical Discharge Machining (EDM) with Eccentric Electrode <i>Ahsan Ali Khan, Affendi Bin Saad and Mohd Zulfadli Isma Bin Mohd Isa</i>	
Chapter 2	7
Wear Ratio and Work Surface Finish during Electrical Discharge Machining (EDM) with Eccentric Electrode <i>Ahsan Ali Khan, Affendi Bin Saad and Mohd Zulfadli Isma Bin Mohd Isa</i>	
Chapter 3	12
Role of Current, Voltage and Spark on-time on Electrode Material Migration during EDM <i>Ahsan Ali Khan, Nurul Shima Mohd Noh</i>	
Chapter 4	18
A Study on Material Removal Rate during EDM with Tantalum Carbide-Copper Compacted Electrode <i>Ahsan Ali Khan, Mohammad Azhadi Bin Mohammad Hambiyah and Mohd Faiz Bin Nazi Nadin</i>	
Chapter 5	23
Features of EDM of Mild Steel with Ta-Cu Powder Compacted Electrodes <i>Ahsan Ali Khan, Mohammad Azhadi Bin Mohammad Hambiyah and Mohd Faiz Bin Nazi Nadin</i>	
Chapter 6	28
Relationship between Machining Variables and Process Characteristics during Wire EDM <i>Ahsan Ali Khan, M. B. M. Ali and N. B. M. Shaffiar</i>	

Chapter 7		33
	Influence of Machining Parameters on Surface Roughness during EDM of Mild Steel	
	<i>Ahsan Ali Khan, Erry Y.T. Adesta and Mohammad Yeakub Ali</i>	
Chapter 8		38
	Machining of Ceramic Materials: A Review	
	<i>Abdus Sabur, Md. Abdul Maleque and Mohammad Yeakub Ali</i>	
Chapter 9		44
	Formation of Micro-cracks and Recast Layer during EDM of Mild Steel using Copper Electrodes	
	<i>Ahsan Ali Khan, Erry Y.T. Adesta and Mohammad Yeakub Ali</i>	
Chapter 10		49
	Features of Electrode Wear during EDM of Mild Steel with TaC-Cu Powder Compacted Electrodes	
	<i>Ahsan Ali Khan, Mohd Faiz Bin Nazi Nadin and Mohammad Azhadi Bin Mohammad Hambiyah</i>	
Chapter 11		54
	Influence of Current, Spark On-time and Off-time on Electrode Wear during EDM of Mild Steel	
	<i>Ahsan Ali Khan, Mohd Faiz Bin Nazi Nadin and Mohammad Azhadi Bin Mohammad Hambiyah</i>	
Chapter 12		59
	A Comparative study on Work Surface Hardness EDMed by Ta-C Powder Compacted and Copper Electrodes	
	<i>Ahsan Ali Khan, Mohd Faiz Bin Nazi Nadin and Mohammad Azhadi Bin Mohammad Hambiyah</i>	
Chapter 13		65
	An Introduction to Electrical Discharge Machining	
	<i>Ahsan Ali Khan and Mohammed Baba Ndaliman</i>	
Chapter 14		70
	Developments in EDM Process Variables	
	<i>Ahsan Ali Khan, Mohammed Baba Ndaliman and Mohammad Yeakub Ali</i>	

PART 2: MICROMACHINING	76
Chapter 15	77
Focused Ion Beam Micromachining: Technology and Application <i>Israd Hakim Jaafar, Nur Atiqah, Asfana Banu, Mohammad Yeakub Ali</i>	
Chapter 16	83
Finish Cut of Titanium Alloy using Micro Electro Discharge Milling for Nano Surface Finish <i>Mohammad Yeakub Ali, Muhamad Faizal, Asfana Banu, and Nur Atiqah</i>	
Chapter 17	89
Investigation of MRR for Finish Cut of Titanium Alloy using Micro Electro Discharge Milling <i>Mohammad Yeakub Ali, Mohd Saifuddin, Nur Atiqah, and Asfana Banu</i>	
Chapter 18	95
Investigation of TWR for Finish Cut of Titanium Alloy using Micro Electro Discharge Milling <i>Mohammad Yeakub Ali, Mohd Saifuddin, Nur Atiqah, and Asfana Banu</i>	
Chapter 19	101
Investigation of Chip Formation and Minimum Chip Thickness in Micro/Meso Milling: Methodology and Design of Experiment <i>Mohammad Yeakub Ali, Noor Adila Mansor and Siti Hamizah Mass Duki</i>	
Chapter 20	107
Micro/Meso Milling of Aluminium Alloy 1100: Analysis and Modelling of Minimum Chip Thickness <i>Mohammad Yeakub Ali, Noor Adila Mansor and Siti Hamizah Mass Duki</i>	
Chapter 21	113
Effect of Micro End Milling Tool Diameter on Minimum Chip Thickness <i>Mohammad Yeakub Ali, Noor Adila Mansor and Siti Hamizah Mass Duki</i>	
Chapter 22	119
Micro Wire Electrical Discharge Machining of Tungsten Carbide: Methodology and Procedure <i>Mohammad Yeakub Ali, Ahmad Chaaban Elabtah and Musab Jamal Alrefaie</i>	
Chapter 23	124
Micro Wire Electrical Discharge Machining of Tungsten Carbide: Analysis of Surface Roughness <i>Mohammad Yeakub Ali, Ahmad Chaaban Elabtah and Musab Jamal Alrefaie</i>	
Chapter 24	130
Micro Wire Electrical Discharge Machining of Tungsten Carbide: Analysis of Material Removal Rate <i>Mohammad Yeakub Ali, Musab Jamal Alrefaie and Ahmad Chaaban Elabtah</i>	
Chapter 25	136
Micro Electro Discharge Machining of Micro Pillar Array: Process	

Chapter 25		136
	Micro Electro Discharge Machining of Micro Pillar Array: Process Development	
	<i>Mohammad Yeakub Ali, Wan Emira Azaty and Nor Suriza</i>	
Chapter 26		142
	Micro Electro Discharge Machining of Micro Pillar Array: Analysis of Surface Finish	
	<i>Mohammad Yeakub Ali, Wan Emira Azaty and Nor Suriza</i>	
Chapter 27		148
	Micro Electro Discharge Machining of Micropillar Array: Analysis of Material Removal Rate	
	<i>Mohammad Yeakub Ali, Nor Suriza and Wan Emira Azaty</i>	
Chapter 28		154
	Vibration Issue in Micro End Milling	
	<i>Mohammad Yeakub Ali, Muhamad Lutfi and Mohamad Ismail Fahmi</i>	
Chapter 29		159
	Fabrication of Micro Filter by Electro Discharge Machining	
	<i>Abdus Sabur and Mohammad Yeakub Ali</i>	

PART 3: PRECISION MACHINING 165

Chapter 30 166
High Speed Milling of Mould Steel using 1.5mm-diameter End-mills
Mohamed Konneh, Khairunnisa Ahmad and Rose Fazleen

Chapter 31 172
Precision Grinding of Silicon Carbide using 46 µm Grain Diamond
Cup Wheel
Mohamed Konneh and Ahmad Fauzan

Chapter 32 178
Precision Grinding of Silicon Carbide using 76 µm Grain Diamond
Cup Wheel
Mohamed Konneh and Mohd Shukur Zawawi

Chapter 33 184
Precision Grinding of Silicon Carbide using 107 µm Grain Diamond
Cup Wheel
Mohamed Konneh and Mohd Fadzil

Chapter 34 190
Investigation of Surface Integrity during Precision Grinding of
Silicon Carbide using Diamond Grinding Pins
Mohamed Konneh, Mohamad Lutfi and Mohamad Shahrilnizam

Chapter 35 196
A Comparative Study on Flank Wear and Work Surface Finish during
High Speed Milling of Cast Iron with Different Carbide Tools
Ahsan Ali Khan, Zuraida Aman Nor Rasid and Izausmawati Yusof

Investigation of Chip Formation and Minimum Chip Thickness in Micro/Meso Milling: Methodology and Design of Experiment

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Keywords: Micromilling, Chip formation, minimum chip thickness, Design of experiment

Abstract. This chapter discusses the methodology and design of experiment for the investigation of chip formation and minimum chip thickness in micro/meso milling for the development of relationship of feed rate, cutting speed and depth of cut with the minimum chip thickness. Literature related to micromilling chip formation and minimum chip thickness is briefly discussed. Experimental procedure is presented for experiment and data collection for modelling the relationship.

Introduction

In the recent years, the production of miniaturized components becomes very important due to increasing demand of microcomponents. Although the sizes are reducing, the performances of the components must be exactly the same or even better from its initial sizes. Micro/meso mechanical manufacturing (M4) can be defined as the production of three-dimensional products that scaled ranging from tens of micrometers to a few millimetres in various types of materials. The major role of M4 is to relate the conventional manufacturing which is macromanufacturing with nanomanufacturing. Nowadays, there are many products that apply M4 in their fabrication such as in automotive, aerospace, biomedical, telecommunications and military industry. Micromilling is one type of direct micromachining processes which means that the structure can be shaped directly and fabricated without molding process. It is also classified as a removing process where it is destroying cohesion among particles to produce desired shape [1]. In addition, micromilling has its own characteristics such as size effect, tool edge radius and minimum chip thickness. The minimum chip thickness has significant impact on the micromilling operation, especially when the uncut chip thickness is closed to micro tool edge radius. So the micromilling process can be divided into two situations which are chip forms and no chip form [2].

Objectives

The objectives of the chapter are as listed below:

1. To study the mechanism of chip formation in micromilling.
2. To study the parameters that affects the formation of minimum chip thickness in micromilling.