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AKM Nurul Amin  
Mohamad Yeakub Ali

# **MANUFACTURING MANAGEMENT**

From basic machining to quality product



**IIUM Press**

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# CONTENTS

## Preface

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## PART I: MACHINING

---

### Chapter 1 - Investigation of Minimum Chip Thickness in Micro End Milling of PMMA: Process development .....3

Mohammad Yeakub Ali<sup>1</sup>, Asfana Banu<sup>2</sup>, Adibah<sup>3</sup>, and Nur Atikah<sup>4</sup>  
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Faculty of Engineering – International Islamic University Malaysia  
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---

### Chapter 2 - Investigation of Minimum Chip Thickness in Micro End Milling of PMMA: Experiment and Analysis 800 µm Diameter Tool .....11

Mohammad Yeakub Ali<sup>1</sup>, Asfana Banu Mohamad Asharaf<sup>2</sup>, Adibah Abdul Wahab<sup>3</sup>, and Nur Atiqah Abdul Rahman Azmil<sup>4</sup>  
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Faculty of Engineering – International Islamic University Malaysia  
✉ : mmyali@iium.edu.my

---

### Chapter 3 - Investigation of Minimum Chip Thickness in Micro End Milling of PMMA: Experiment and Analysis 1.0 mm Diameter Tool .....18

Mohammad Yeakub Ali<sup>1</sup>, Asfana Banu Mohamad Asharaf<sup>2</sup>, Adibah Abdul Wahab<sup>3</sup> and Nur Atiqah Abdul Rahman Azmil<sup>4</sup>  
1, 2, 3, 4 Department of Manufacturing and Materials Engineering  
Faculty of Engineering – International Islamic University Malaysia  
✉ : mmyali@iium.edu.my

---

### Chapter 4 - Machining With Absent of Coolant.....26

Ummu Atiqah Khairiyah bt Mohamad  
1. Faculty of Engineering – International Islamic University Malaysia  
✉ : eika870126@gmail.com /eika\_870126@yahoo.com/ ✉ :

---

### Chapter 5 – The Effect of deep cryogenic treatment on the properties of AISI D2 .Tool steel..... 32

Erry Yulian Tribblas Adesta<sup>1</sup> and Belal Ahmed Ghazal<sup>2</sup>  
1, 2 Faculty of Engineering – International Islamic University Malaysia  
E-mail: eadesta@iium.edu.my; belalghazal88@gmail.com

---

**Chapter 6 - Characteristic of Powder Metallurgy Compacted Electrode for EDM.....40**

Ummu Atiqah Khairiyah bt Mohamad<sup>1</sup>  
1. Faculty of Engineering - International Islamic University Malaysia  
✉ : eika870126@gmail.com / eika\_870126@yahoo.com/☎ :

---

**Chapter 7 - Recent Developments in EDM.....46**

Norazah Binti Ishak<sup>1</sup> Prof. Ahsan Ali Khan<sup>2</sup>  
1, 2. Faculty of Engineering – International Islamic University Malaysia  
✉ : nurozech86@yahoo.com ; aakhan@iium.edu.my / ☎ :

---

**Chapter 8: Surface Study when Finish Grinding Silicon using Resin Bonded Diamond Cup Wheel .....53**

Mohamed Konneh<sup>1</sup> and Abdul Halim<sup>2</sup>  
Faculty of Engineering - International Islamic University Malaysia  
✉ : mkonneh@iium.edu.my

---

**Chapter 9: Surface Roughness Studies in Die-sink EDM of Tungsten Carbide using Copper Tungsten Electrode .....61**

Mohamed Konneh<sup>1</sup>, and Muhammad Mukhtar<sup>2</sup>  
Faculty of Engineering, International Islamic University Malaysia  
✉ : mkonneh@iium.edu.my

---

**Chapter 10: Study of the Effect of different Electrodes on Material Removal Rate, Electrode Wear Rate and Surface Roughness in the EDM of S-STAR .....69**

Mohamed Konneh<sup>1</sup>, Nur Jannah Shad and Noor Fazlin Saharudin<sup>2</sup>  
Faculty of Engineering, International Islamic University Malaysia  
✉ : mkonneh@iium.edu.my

---

**Chapter 11: Kerf in Micro Wire Electro Discharge Machining .....76**

Abdus Sabur<sup>1</sup> and Mohammad Yeakub Ali<sup>2</sup>  
Department of Manufacturing and Materials Engineering  
Faculty of Engineering, International Islamic University Malaysia  
✉ : asbur72@yahoo.com

---

**Chapter 12: Investigation of Corner Radius using Micro Wire Electro Discharge Machine .....82**

Abdus Sabur<sup>1</sup> and Mohammad Yeakub Ali<sup>2</sup>  
Department of Manufacturing and Materials Engineering  
Faculty of Engineering, International Islamic University Malaysia  
✉ : asbur72@yahoo.com

---

## PART II: MANAGEMENT

---

### Chapter 13 - Crashing a Project in PERT/CPM network ..... 91

Zahir Hussain<sup>1</sup> and Erry Yulian Triblas Adesta<sup>2</sup>  
1, 2. Faculty of Engineering – International Islamic University Malaysia  
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---

### Chapter 14 - Project Management with PERT and CPM .....100

Aalya Banu  
Faculty of Engineering – International Islamic University Malaysia  
✉ : aalya.banu@gmail.com / ✉ :

---

### Chapter 15 - Risk Management .....108

Siti Susilawati Kiswari  
1, 2. Faculty of Engineering – International Islamic University Malaysia  
✉ : siskiswari@iium.edu.my / ✉ :

---

### Chapter 16 – Development of Thermoselect Process in Waste Management System in Malaysia .....119

Hadi Purwanto<sup>1</sup>, Rusila Zamani bt Jusoh @ Abd Rashid<sup>2</sup>  
1,2. Faculty of Engineering – International Islamic University Malaysia  
✉ : hadi@iium.edu.my; shilarashid21@yahoo.com / ✉ :

---

### Chapter 17 - The Impacts of Using Plastic Bags .....125

Rusila Zamani bt Jusoh @ Abd Rashid<sup>1</sup>  
1. Faculty of Engineering – International Islamic University Malaysia  
✉ : shilarashid21@yahoo.com /

---

---

## PART III: MATERIALS

---

### Chapter 18 - The Use of Hydroxyapatite (Ha) For Bone Implant Application .....132

Rusila Zamani Bt Jusoh @ Abd Rashid<sup>1</sup>  
1. Faculty of Engineering – International Islamic University Malaysia  
✉ : shilarashid21@yahoo.com

---

**Chapter 19 - Materials for Advanced Bio-Applications .....139**

Abreeq Rashid Naqshbandi  
International Islamic University Malaysia  
✉ : naqshbandiabreeq@gmail.com

---

**Chapter 20 - Advanced Corrosion Detection Techniques.....148**

Abreeq Rashid Naqshbandi  
International Islamic University Malaysia  
✉ : naqshbandiabreeq@gmail.com

---

**Chapter 21 - Biosynthesis of Nanoparticles.....156**

Abreeq Rashid Naqshbandi  
International Islamic University Malaysia  
✉ : naqshbandiabreeq@gmail.com

---

**Chapter 22 - High Density Polyethylene (HDPE) as an Alternative Material in Fuel Tank Production ..... 164**

Atiqah Aldzaluddin<sup>1</sup> and M.A Maleque<sup>2</sup>  
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✉ : atiqahaldzaluddin@yahoo.com; maleq@iium.edu.my / 20

---

**Chapter 23 - In-Situ Syntheses of High Wear Resistant Coating Reinforced Ti-6Al-4V Matrix..... 173**

Belal Ahmed Ghazal<sup>1</sup> and Erry Yulian Triblas Adesta<sup>2</sup>  
1, 2, Faculty of Engineering – International Islamic University Malaysia  
✉ : belalghazal88@gmail.com ; eadesta@iium.edu.my / 20

---

**Chapter 24 - Effects of HA Loading of Porous Alumina-Hydroxyapatite Biocomposite Scaffolds..... 181**

Nur Izzati Zulkifli  
Faculty of Engineering – International Islamic University Malaysia  
✉ : n.izzati86@gmail.com

---

**Chapter 25 - Natural Fiber Reinforced Polymer Composites..... 189**

Mohd Romainor Manshor<sup>1</sup>  
1, Faculty of Engineering – International Islamic University Malaysia  
✉ : romainor@gmail.com

**Chapter 26 - Study of Zinc Corrosion Behavior in Various Potassium Hydroxide Electrolyte Concentrations..... 195**

Zul Hafiz Husni<sup>1</sup> and Noraini Mohamed Noor<sup>2</sup>  
1, 2. Faculty of Engineering – International Islamic University Malaysia  
✉ : myside86@yahoo.com; norainimnoor@gmail.com

---

**Chapter 27 Mechanical and Morphological Characterization of Porous Alumina-Hydroxyapatite Composite: Effects of Sintering Temperature.....202**

Nur Izzati Zulkifli  
Faculty of Engineering – International Islamic University Malaysia  
✉ : n.izzati86@gmail.com

---

**Chapter 28 - Study of Starch Addition on Porous Bioceramics Scaffolds: Effects on Strength and Porosity..... 212**

Nur Izzati Zulkifli  
Faculty of Engineering – International Islamic University Malaysia  
✉ : n.izzati86@gmail.com

---

**Chapter 29 - SEM Analysis of Coir Fiber and Coir Fiber-Albumen-Concrete Before and After Surface Treatments..... 220**

Nurizan Omar<sup>1</sup> and Zuraida Ahmad<sup>2</sup>  
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---

**Chapter 30 - Powder Coating Has Potential In Developing Several Industries..... 230**

Suryanto<sup>1</sup> and Nurul Azhani Yunus<sup>2</sup>  
1,2. Faculty of Engineering – International Islamic University Malaysia  
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---

**Chapter 31 - Ultrasonic for Non-Destructive Testing of Materials..... 237**

Siti Susilawati Kiswari  
Faculty of Engineering – International Islamic University Malaysia  
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---

---

**PART IV: QUALITY**

---

**Chapter 32 - Quality Management System: In light of Project Management..... 251**

Erry Yulian Triblas Adesta<sup>1</sup> and Sharmila Fathima<sup>2</sup>  
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---

**Chapter 33 - Quality Management System.....259**

Siti Susilawati Kiswari  
Faculty of Engineering – International Islamic University Malaysia  
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---

**Chapter 34 - The Implementation of Total Quality Management (TQM) In Kuliyyah of Engineering, International Islamic University Of Malaysia..... 269**

Mohd Radzi Haji Che Daud<sup>1</sup>, Khairul Adzha Bin Abu Tahar<sup>2</sup>, Mohd Rujhan B Sulaiman  
1, 2,3. Faculty of Engineering - International Islamic University Malaysia

---

**Chapter 35 - Culture Assessment on Value Based Total Performance Assessment in Kulliyah of Engineering of International Islamic University Malaysia.....275**

Mohd Radzi Haji Che Daud<sup>1</sup>, Umami Huraizah Binti Ramin<sup>2</sup>  
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---

## High Density Polyethylene (HDPE) as an Alternative Material in Fuel Tank Production

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### 1. Introduction

Towards development of automotive industrial, the weight and cost are the criteria performance for automotive material. Some automotive parts are made by material that has properties such as lighter weight as it reduces the cost of automotive manufacturing. When the part of vehicle is made with lighter material, this will improve the vehicle itself. According to Alvarado, conventionally, metallic fuel tanks were used as fuel tanks for motor vehicles [1]. In recent years, however, fuel tanks made from thermoplastic synthetic resins have been in use due to thermoplastic resin materials being light in weight to satisfy increasing demands for vehicles that are light in weight, being free from rust, being easy to be molded into desired shapes.

In general, fuel tank is safe container for flammable. Fuel tanks are the ones who hold and transfers fuel from which the whole machine generates its energy. It acts as an integral part of the vehicle's fuel system [2]. Since the fuel cost increases the automakers are taking a harder look to replace new material in part of automotive car. According to Alvarado, the usage of plastic fuel tank in automotive industry has been increased from year by year. In 1993, the market represents 70-90 % in Europe and 5 % in Japan compared to in 1990 which only 22.25% in market [1]. The replacement of steel tank with plastic tank is still keeps on increasing due to its durability toward vehicle efficiency this is because The European Plastic Fuel Tanks and Systems Manufacturers Association has claimed that "More than 95% of fuel tanks produced in Europe are made of plastics! .This high penetration rate is explained by the strong benefits brought by plastic solutions in this application" [3]. Seeing, as the material for fuel tank is needs to be replaced with lighter material, High Density Polyethylene (HDPE) has been the resin of choice for plastic gas tanks because of its physical and chemical properties such as withstand aggressive fuel, impact resistance, reduce vehicle weight and high temperature as well.