



**AN EXPERIMENTAL INVESTIGATION OF WC-Co TOOL LIFE
AND TOOL WEAR IN TURNING OF TITANIUM**

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A thesis in partial fulfillment of the requirement for the award of Bachelor Mechanical
Engineering (Manufacturing) (Hons)

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JULY 2016

ACKNOWLEDGEMENT



‘In the name of Allah, the Most Gracious, the Most Merciful’

First and foremost, gratitude and praise be to Allah, the most merciful and most compassionate for his blessings, that I was able to complete my final year project 1 and 2 (FYP1 and FYP2). Throughout this project, I gained a lot of knowledge and experiences for completing this project report. However, I would like to record my appreciation to these outstanding individual for their great contribution. I would like to express my sincere gratitude and appreciation to my supervisor, Ir. Dr. Salina Binti Budin for her continue support, generous guidance, help, patience and encouragement in the duration of the thesis preparation until its completion. She spent to guide and provides me with beneficial knowledge from the beginning to develop an understanding of the project. Great appreciation extends to all the lab technicians involved for their kindness and cooperation in giving and sharing with me their experience and advices. Without them I would not be able to complete the project on time and achieve its objective and aims. Special appreciation dedicated to my beloved parents who always been supportive to me. They become the main reason why I’m here to face the difficulties while completing my Final Year Project 2. Lastly, I offer my regards and blessings to those who supported me directly or in directly. Thanks you so much.

ABSTRACT

Titanium alloys are widely used in many fields such as biomedical due to the strength-to-weight ratio and corrosion resistance. Although there has been a great advance in the development of machining processes, no equivalent development has been made in machining of titanium alloys due to its abnormal machining characteristics that make it difficult to cut. In this work, uncoated WC-Co cutting tool inserts has been used to study the machinability of titanium alloy, Ti-6AL-4V ELI. The surface roughness and the tool wear in relation with cutting speed are investigated. The experiments were performed under dry cutting condition at selected cutting speed which is 125 mm/min, 140 mm/min, and 185 mm/min. The feed rate and depth of cut are remain constant at 0.2 mm and 0.15 mm respectively. The wear mechanism was examined using scanning Electron Microscope (SEM) and the tool life was calculated based on V_B length. In addition, surface roughness was measured by using Portable Surface Roughness Surftest SJ-210. The result shows that the increasing in cutting speeds will increase the wear rate. Subsequently, decreases the tool life. On the other hand, the surface roughness, R_a is decreases as the cutting speed increases which indicate that high surface quality could be obtain at higher cutting speed. The observation from the SEM revealed the presence of two type of wear mechanism which flank wear and crater wear. The flank wear is seen to be more dominant as compared to crater wear.

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