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MEC 299

**THE EFFECT OF MACHINING PARAMETERS ON
SURFACE INTEGRITY OF ALUMINIUM MATERIAL
USING VERTICAL MILLING MACHINE**

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ABSTRACT

The surface integrity is defined as enhanced condition of surfaced cause by machining process. It show that surface finish is heavy influence on the mechanical properties on the part produced. The objective of this research is to study the effect of machining parameters on surface integrity of aluminium. It also to analyse the surface integrity of the milled aluminium. This research aim to identify which parameters that has heavy effect on surface integrity after machining. By using vertical milling machine, we can operate face milling process on the aluminium. The result expected is depth of cut and spindle speed heavily influence the surface integrity of the aluminium. Lower depth of cut of the material cause by milling will gave better surface finish we get from it. Same goes to spindle speed, lower speed lead to better surface integrity. While the depth of cut more influence on the surface finish. As the conclusion, certain parameters of machining process can affect the surface integrity as it can change some of properties of the surface.

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CHAPTER 1

INTRODUCTION

1.0 Background of Study

The surface integrity is defined as enhanced condition of surface that produced by machining process or other that related to surface generating operation. It has been found in many cases and cause heavy influence on the mechanical properties on the part produced. Surface integrity has great significance for the quality and performance of machined components, and has therefore been increasingly recognized by industry. Thus, obtaining updated knowledge on surface integrity is of great interest to both the academic community and industry. The machining parameters consist three element that is cutting speed, feed rate, and the depth of cut, which affected the surface roughness of machined surface.

The research is focus to result of machining on the material. By machining, we can create product that better surface finish, the product have more functions, quality goods and etc. Machining contains parameters that effect on the machined surface, which is cutting speed, feed rate, depth of cut, spindle speed, an etc. The machined surface that affected by these parameters will show different type of surface roughness, microstructure of material and etc. The research focus on what will happen on surface if certain parameters change. This also effect the surface finish as it change the mechanical properties of the surface.

1.1 Problem Statement

Aluminium is a widely popular metal due to the vast variety of uses that this malleable metal can be used for. Particularly its high strength and low weight, and it is corrosion resistant as the grey oxide-layer provides protection.

The problem is:

- Industry find that it difficult to produce better surface finish on the material.
- Need to find which parameters that mostly impact in produce better surface finish.

1.2 Objective

- To study the effect of machining parameters on surface integrity of aluminium.
- To analyse the surface integrity of the milled aluminium

1.3 Scope of Study

The purpose of study is to review the effect of machining parameters on surface integrity of aluminium using milling process.

Vertical Milling Machine

The machine suitable for the project because it can change the spindle speed, depth of cut and bed travel.



Figure 1: vertical milling machine, source: *picture was taken from the workshop*