



**PROCESS MODELLING AND SIMULATION FOR PREDICTION OF CHIP
MORPHOLOGY DURING MACHINING OF STAINLESS STEEL**

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ABSTRACT

Machining process is one of the famous technique to remove material from surface workpiece that will also produce chip during machining. This process hard to understand because involved the interaction between two materials in a complicated dynamic process. There are many effort around the world to understand these complex phenomenon. In order to understand behaviour of this cutting process, too many waste was produced due to a lot of trial and error in experimental activities. Suitable selections of parameter and condition play significant role to get desire result of cutting process. One of the fastest way to understand this cutting process is by using Finite Element Method (FEM). FEM is a useful and powerful tool to predict the machining process behaviour that hard to obtain and analyse using experimental methods. In this study, the 3D model of turning process of Stainless Steel 316L (workpiece) using tungsten carbide, WC (cutting tool) was developed by FEM software ABAQUS. Three different velocity of cutting tool which are 185,415 and 660 (m/min) was carried out as manipulated variables. FEM is a reliable method for quick change of variables like in real situation without producing a physical sample. In this work, the simulation of cutting process was conducted to examine the chip morphology and their stress distribution in the workpiece. Then, chip morphology was compared with previous study and look the gap between these two techniques. From the results obtained, developed model was successfully produced similar chip morphology produced by experiments.

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CHAPTER I INTRODUCTION

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CHAPTER I

INTRODUCTION

This chapter will give a glance about this project, the objectives and goals to be achieved in the end of the study and also brief on the fundamental of machining process and the application of Finite Element Method (FEM) for simulation of turning process and their significant of the process. Few limitations have been set up to focus on the works that need to be carried so that more precise result can be achieved.

1.1 Background

Machining is one of the material removal processes in which excess material is removed from a starting work part or sometimes called as raw material to get the desire shape or final geometry. During the machining process, variety of chip have been produced and the chip formation was effected by many factors. It can be divided into two variables which are independent variable and dependent variables. In order to understand and optimize the parameters it involved the high cost and long lead time will be consumed due to many experimental needs to be done. Turning process is one of the types of machining process that are not exceptional from receiving the bad effects due to understanding on the operation. Turning process is