BAB 1

INTRODUCTION

1.1 Background

The machining process is a manufacturing process by cutting the workpiece with a tool mounted on a machine tool to produce a component. One of the machining processes used to produce cylindrical surfaces on components is the turning process. In which the workpiece is rotated then the tool is moved linearly with a certain depth to the workpiece. Machining is a procedure that is widely used to create finished or ready-to-assemble components from metal raw materials. It is believed that machining accounts for 60% to 80% of the total machine production process.

Nearly all of the cutting energy is converted to heat, with most of this heat is dissipated through the chip and the rest is distributed to the workpiece and the cutting edge of the tool so that the temperature increases.. Most of the heat distribution is wasted through the chip 75% while the heat distribution on the tool is only 20%[1]. From the above data, it is necessary to reduce concentration of heat on the tool and workpiece. The heat concentration on the tool is very need to be controlled to reduce tool wear and failure during the cutting process. While fot the workpiece to maintain the quality of product geometry so that it does not decrease. Therefore, a coolant is given to the interaction between the tool and workpiece to dissipate heat and reduce temperature.

Proper use of coolant is essential in the machining process to reduce the temperature and friction between the tool and the workpiece. Dromus is one type of coolant that is known to have good lubrication and cooling capabilities. Research shows that Dromus can produce smoother surface roughness compared to other cooling media such as water or regular oil[2]. Dromus serves not only as a coolant, but also as a lubricant that forms a protective film between the tool and the workpiece, thereby reducing friction and wear.

However, while Dromus has many advantages, challenges remain in terms of its effectiveness in reducing tool wear. One potential solution is the addition of MoS_2 (molybdenum disulfide) powder as an additive in the coolant. MoS_2 is known as a solid lubricant that can significantly reduce friction and increase cutting tool life. Previous research has shown that the addition of MoS_2 to coolants can provide significant benefits in reducing tool wear rates during the machining process [3].

This study aims to explore the effect of adding a percentage of MoS_2 powder to dromus coolant on the wear of coated carbide tools in the turning process of low carbon steel. Low carbon steel was chosen because it is frequently used in industry and has good mechanical properties for various applications. Tests with limited volume were conducted to simulate real conditions in the production process, where the use of coolant must be efficient.

By knowing the effect of the percentage of MoS_2 powder addition on tool wear, this research is expected to contribute to the development of machining technology that is more efficient and economical, and extends the life of cutting tools.

1.2 Problem Formulation

Analyzing tool wear and life tools in turning machining process by applying soluble oil cutting coolant added with *molybdenum disulfide* (MoS_2) powder.

1.3 Aim

Based on the problem formulation above, the objectives of the research conducted are as follows:

1. The aim of this project is being able to see the effect of addition *molybdenum disulfide* (MoS_2) powder in dromus coolant to the wear of coated carbide tools.

1.4 Benefits

The benefit of this research is to know the potential of addition Molybdenum Disulfide (MoS_2) powder to dromus coolant in low carbon steel turning process in reducing tool edge wear.

1.5 Problem Scope

The limitations of problems in this research are:

1. The tool used in this project is coated carbide tool.
2. The machining process conducted in this study is a turning process.
3. The workpiece used in this project is ST37 low carbon steel.
4. The quality observed is the flank wear of the tool after the turning process.

1.6 Report Outline

This final project consists of five chapters. The first chapter describes the background, problem formulation, purpose, outcome, problem scope, and report outline. The second chapter provides an overview of the literature that becomes a reference in the final project. The third chapter describes the research methodology. The fourth chapter contains the results and discussion. The last chapter is the conclusion of the final project