



**UNIVERSITI TEKNOLOGI MARA
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MEC 299

**DEVELOPMENT AND KINEMATIC ANALYSIS OF
CRANK SLIDER MECHANISM (WITH CRANK
WHEEL)**

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ABSTRACT

Crank Slider Mechanisms is mechanical mechanisms that convert rotational motion to linear motion and vice versa Applications are widely used in most mechanical machines The aim of this study is to design and fabricate a well-functioning Crank Slider Mechanism A relative motion analysis (kinematic analysis) will be conducted to design a well-functioning mechanism. Then, the procedure of this study will be extended to experimental use once the fabrication of the mechanism is completed. As a conclusion of this study, a comparison between experimental data and calculation data will be conducted and discussed

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Crank mechanism is the process of putting together pistons, cylinders, connecting rods, and crankshafts. In general, slider cranks use hydraulic fluid to convert the linear movement of the piston into a rotational movement of the shaft. Slider cranks can be used for many things, but the engine is one of the most common. In the late 1800s, steam engines were the first of these kinds of machines to be used to make electricity. Today, diesel engines are probably the most well-known type of internal combustion engines. Models with piston engines can be used to show what a crank is and how it works. "Standby" Single-Piston Air Motor from Elmer: A "Standby" air motor with one cylinder and one piston is an example of a slider crank mechanism. This engine is like an auto engine in that it has a connecting rod and piston pins. This kind of motor shows the kinematics of the crank in a very clear way. This design works by applying pressure to one side of the piston in the cylinder. It can be powered by compressed air or steam. The fact that this engine only does one thing at a time makes it even more like an internal combustion engine. Because there is no external eccentric valve device, the design is simpler than piston air and steam engines. A crankshaft spline is used in this design to move air into and out of the cylinder at certain points when the engine is turning. By adding a pressure transducer and an accelerometer to this design, the pressure in the cylinder can be related to how the mechanism moves. The crankshaft of this design has also been slightly changed to include counterweights that can be removed to show jerk force when the engine is out of balance, too balanced, or just right. [1]

1.2 Problem Statement

The main target of the study is to learn about crank slider mechanism. the previous crank slider available in the laboratory is a bit large and difficult for students to use. In addition, the use of the crank slider is also only allowed in the laboratory and makes it difficult for students to understand the concept and how to use it.

1.3 Objective

The objectives of this project are:

- a) to design a new crank slider with crank wheel using CAD software which is Solidworks.
- b) To fabricate the crank slider with crank wheel and make kinematics analysis.

1.4 Scope of Work

The scope of work of this study is to design and fabricate based on crank slider mechanism with a crank wheel. Solidworks was used to design this project. This project's calculations were restricted to kinematic analysis. Tachometer was used to calculate the acceleration and velocity of the linear motion.