CHAPTER 1

INTRODUCTION

1.1 Introduction

It is generally accepted today that the internal combustion engine represents a main source of power production. The most common mechanical configuration of an internal combustion engine is represented by the traditional slider-crank mechanism, which permits the conversion of the reciprocal linear motion of the piston to the rotational motion of the crankshaft. Another mechanical configuration of an internal combustion engine is represented by the rotary engine known as the “Wankel” engine. This engine offers a more compact size than the reciprocating engines and multifuel capability. Having fewer moving parts than reciprocating engines, they have a lower weight and therefore high specific power density. However these engines have their own weaknesses and these is represented by the leakage encountered at the interface between the rotor apex seals and housing. Most piston engines are of the slider-crank mechanism type, but there is a second class of piston engines, termed free-piston or linear engines, in which the engine's pistons reciprocate freely without the use of a rotating crankshaft or flywheel.

1.2 Problem Definition

A large amount of literature discusses the problem of friction in internal combustion engines in conventional rotating engines. In a linear engine, the situation is already simplified compared to a rotating engine, because there is no crankshaft. Except for the effect of gravity (which is negligible compared to the side thrust in a slider-crank engine), there is no side thrust on the piston, therefore the piston does not move in the cylinder in radial direction. The sources of friction force in a linear engine are friction between the piston rings and the cylinder liner and friction between the piston skirt and the cylinder liner. This phenomenon makes the linear engine having more advantage than rotating engine because less force needed to against the friction and make it fuel economic.

1.3 Objective

i. Modify the design of conventional diesel engine become linear engine.
ii. Study the simulation of linear engine through GT power software.
iii. Compare the performance between the linear engine and conventional engine.

1.4 Scope

i. Literature review about linear engine.
ii. Modify and sketching the linear engine using Computer Aided Design (CAD).
iii. Analysis the linear engine using GT power software.
iv. Analysis and documentation.