CHAPTER I
INTRODUCTION

1.1 Background

Internal combustion engines with hydrocarbon fuel are produced in a large numbers and have been become subject of intensive research over many years. There are many fields of engines that can be modified to decrease its fuel consumption. One of the modifications that can be done is air-fuel mixture in fuel system. Air-fuel mixture in a low air-fuel ratio is the main factor that can be manipulated to decrease fuel consumption but it is difficult to do. One difficulty derived from the fact that if the air-fuel ratio is lowered to the point where the entire fuel charge is consumed during idle rotation, it is difficult to sustain reliable ignition of the charge. So, this research wants to investigate that Hydrocarbon Treating System (HTS) able to maintain the engine performance in lean condition.

Treating fuel can sustain reliable ignition in lean mixture because has a good quality in both homogenous mixture and reactivity with oxygen. The liquid hydrocarbon, typically gasoline, is not itself explosive. Rather, only the vapor derived from the liquid is explosive. So the mechanism to make fuel into vapor is needed to fulfill that condition and make the mixture more homogenous. Furthermore, the reactivity of hydrocarbon can be increased by heating the hydrocarbon. According to Dr. M. Nasikin, Head of Gas and Chemistry Department, Mechanical Engineering in University of Indonesia, gasoline that has been treated will broke its molecule binding, so it will easy to bind with oxygen. In line with those
argument Ir. Harjono, Lecturer of Chemistry Engineering in Gajahmada University argued that octane number deficiency is caused by the existence of merkaptan and trisulfid when gasoline in cold condition.

Engine that is fueled by vapor formed in accordance with the present invention attain higher fuel efficiencies and emit lower proportions of noxious combustion products than do conventionally fueled engines. A prototype vehicle embodying the present invention obtained more miles per gallon using the water-fuel emulsion of the present invention than it did employing the same quantities of plain gasoline. The inventor of this device stated that HTS can reduce the fuel consumption up to 50 percent.

Through this research, the writer wants to analyze the effect of HTS installation to the engine performance and fuel consumption. The result of this research will give us brief explanation whether this device works or not.

1.2 Problem Statement

Problems statement that can be drawn from the problem above is how does the effect of HTS to the four-stroke engines in the field of engine performance and fuel consumption.

1.3 Objectives

The objectives of the research are as follow:

a. To investigate the torque that resulted by the engine in standard condition with the torque that resulted by the engine with HTS in various conditions.
b. To investigate the power that resulted by the engine in standard condition with the power that resulted by the engine with HTS in various conditions.

c. To investigate the Specific Fuel Consumption (SFC) that resulted by the engine in standard condition with the torque that resulted by the engine with HTS in various conditions.

1.4 Problem Limitations

Problem limitation on the research is used to adjust the tools which available and also for issues to be discussed or analyzed is not too widespread. Limitations are as follows:

a. The fuel which is used in the experiment is gasoline with the number octane of 88.

b. Machine that used is Honda Revo 2008, 97.1 cc.

c. The discussion is about the torque, power and fuel consumption. before and after the use of Hydrocarbon Treating System.

d. Research is done only on the 3rd gear.

e. Calculation of heat transfer that occurs in the catalyst was not discussed. The heat transfer process that occurs only discuss in the fundamental theory.