CHAPTER I

INTRODUCTION

During the past decade, air pollution has become one of the major problems in Thailand, especially in large cities . An increasing rate of population growth in rapidly growing cities where more and more cars are being introduce onto a limited amount of roads and freeways, has made air pollution a problem that needs urgent attention. The air quality of Bangkok in 1996 is shown in Table 1.1.

Table 1.1 Air Quality of Bangkok in 1996 (1)

Pollutants	Maximum	Average	Standard
Total Suspended Particulate (mg/m^3; 24 hr)	0.56	0.16	0.33
Lead ($\mu g/m^3$; 1 month)	0.23	0.06	1.50
Carbon monoxide (ppm; 8 hr)	18.1	10.0	9.00

Exhaust emissions from vehicles are important contributors to air pollution in urban areas. The population of vehicles and their emission in Bangkok in 1995 are shown in Table 1.2 and Table 1.3, respectively. Exhaust emissions from vehicles comprise regulated and unregulated pollutants. Emission of carbon monoxide (CO), unburned fuel hydrocarbons (HC), nitrogen oxides (NO_x), and particulate are regulated by law.

Table 1.2 Vehicle Population in Bangkok in 1995 (1)

	Unit : Thousand
Gasoline vehicles	
- cars	946
- light duty gasoline trucks	73
Motorcycles	1,162
Taxis (gasoline/LPG fuel)	65
Tuk-tuk (LPG fuel)	8
Diesel vehicles	
- light duty	654
- heavy duty	126

Table 1.3 Vehicle Emission in Bangkok in 1995 (1)

	Unit : Thousand tons
Carbon monoxide (CO)	2,914
Hydrocarbon (HC)	661
Nitrogen oxide (NO_x)	164
Particulate	63
Lead	80

Air pollutants include many kinds of gas such as carbon monoxide, oxides of nitrogen, hydrocarbons, aldehydes and ketones. Gasoline engines are an important source of air pollutants, although oxygenated compounds were added to increase the oxygen available to the fuel leading to complete combustion in the engine. In this study, an investigation was carried out on the exhaust emission from a gasoline engine. Two factors affecting the emission were studied. One is the effect of driving conditions. The other is the effect of an additive in gasoline fuel, named a dispersant, incorporated into gasoline fuel to prevent harmful carbon and sludge deposits and also used to provide fuel injector, carburetor, and valve cleanliness.

Objective and Scope of the Research.

The principle objectives of this research were to study the effect of dispersant on carbon monoxide, hydrocarbons, aldehydes, and ketones in exhaust emission from gasoline engine and comparison of efficiencies between gasoline base and blended dispersant in gasoline. We planned to study the emission at various engine speeds, and concentrations of dispersant fuel, LZ8195 dispersant was added to gasoline base, to allow in a comparison of exhaust emissions. Test were conducted using a TOYOYA engine and CO, HC, aldehydes and ketones were evaluated.