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"I hereby declare that I have read this thesis and my opinion this thesis is sufficient in terms of scope and quality for the award of the degree

Bachelor of Mechanical Engineering (Plant and Maintenance)"

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Date : JUNE 2015

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AREA SOURCE OF EMISSION INVENTORY FOR RESTAURANT AND NIGHT MARKET IN MBMB AREA

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This thesis submitted in partial
fulfillment of the requirement for award of a
Bachelor of Mechanical Engineering (Plant and Maintenance)

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DECLARATION

"I hereby declared that this thesis entitled "area source of emission inventory for restaurant and night market in MBMB area" is written all by me and it is my own effort except the summary and each quotation that I have mentioned their resources"

Signature : ……

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Special thanks to my

Beloved Mom and Dad

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ABSTRACT

The purposes of this study are to identify the type of gases that released from identified region and to investigate the effects of emission inventory on the environment. The study was conducted by doing survey in four sub-districts in MBMB region, which is Cheng, Peringgit, Bachang, and city area at Melaka. The four sub-district were chosen based on the type of population. Besides that, this study was conducted by conducting survey in the restaurant and night market in those area. Usually the types of pollutant that emit from the source of emission are NO_x, NMVOC,SO_2, CO, NH_3, TSP,PM_{10}, and $PM_{2.5}$. The survey is also conducted to obtain an activity data which consists of information on the fuel consumption. To estimate the total of emission of an area source, emission factor are determined from the Tier 1. From the Tier 1 also, the algorithm for calculation of total emission also was determined. Moreover, estimated emission rate of all sub-district in MBMB area also were calculated. By plotting the emission rate in mapinfo software, visual image data of emission inventory was obtained. There are numerous of disadvantage of excessive of emission inventory to the human and also to the environment. By the restaurant, carbon monoxide has the highest emission which is 95.658 (ton/year) and sulphur dioxide has the lowest emission in the restaurant as it emitted 1.922 (ton/year) into the surrounding. The higher emission of pollutant in the restaurant is influenced by the population of the area. Moreover, present of high emission rate of NO_X show high consumption of LPG while if high present of CO show high consumption of charcoal in that area.

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ABSTRAK

Tujuan kajian ini adalah untuk mengenal pasti jenis gas yang dikeluarkan dari kawasan yang dikenal pasti dan untuk menyiasat kesan inventori pelepasan ke atas alam sekitar. Kajian ini dijalankan dengan melakukan kaji selidik dalam empat sub-daerah di kawasan MBMB, iaitu Cheng, Peringgit, Bachang, dan kawasan bandar di Melaka. Selain itu, kajian ini telah dijalankan dengan menjalankan kaji selidik di restoran dan pasar malam Di kawasan tersebut. sumber pelepasan dari restoran dan pasar malam biasanya dari penggunaan Gas Cecair Petroleum dan arang. Biasanya jenis pencemar yang mengeluarkan dari sumber pancaran adalah NOx, NMVOC,SO_2, CO,NH_3, TSP, PM_{10}dan $PM_{2.5}$.Untuk menganggarkan jumlah pelepasan sumber kawasan, faktor pelepasan ditentukan dari Tahap 1. Selain itu, anggaran kadar pelepasan semua sub-daerah di kawasan MBMB juga dikira dan data imej visual inventori pelepasan juga telah diperolehi. Bagi restoran,pelepasan karbon monoksia adalah tertinggi dengan nilai 95.658(tan/tahun) dan perlepasan sulphur dioksida adalah terendah dengan jumlah sebanyak 1.922 (tan/tahun). Perlepasan yg banyak ini dipengaruhi oleh kepadatan disesuatu tempat. Selain itu tinggi perlepasan nitrogen okside menunjukkan banyak pengunaan LPG dan tinggi pelepasan karbon monoksida menunjukkan banyak penggunaan arang di tempat yg tertentu.

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LIST OF ABBREVIATION AND SYMBOLS

AR	= Activity Rate
CO	= Carbon Monoxides
EF	= Emission Factor
EI	= Emission Inventory
ER	= Emission Rate
LPG	= Liquefied Petroleum Gas
MBMB	= Malacca Historic City Council
NH_3	= Ammonia
NMVOC	= Non-methane Volatile Organic Compounds
NO_X	= Nitrogen Oxides
PM	= Particulate Matter
PM_{10}	= Particulate Matter with Diameter of 10 Micrometers
$PM_{2.5}$	= Particulate Matter with Diameter of 2.5 Micrometers
SO_2	= Sulfur Dioxides
TSP	=Total Suspended Particulate

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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter may cover the explanations about the project background, problem statement, objectives and scope of project.

1.1 Project background

This project is aim to investigate the emission inventory in MBMB region especially in the Cheng, Melaka. Moreover, the quality of air is affected by many sources. The main sources of air pollution in Malaysia are from industries, development activities, motor vehicles, power generation, land-clearing and lastly open burnings and forest fires. Besides that, this project is focused for

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restaurant and night market. Restaurant and night market are also one of the contributor of pollution of air as it released dangerous gas if excessive. The source of emission from restaurant and night market is normally from usage of LPG and biomass (charcoal).

Living organisms especially human depends on water for live in this world. It is even more important than water, without water human can survive for days, but without air human cannot live no more than a couple of minutes (UNEP, 2001).

Air pollution is one of the most challenging problems facing by the international community is widespread and growing in importance and has clear and known impacts on health and the environment. The human need for transport, manufactured goods and services brings with it impacts on the atmospheric environment at scales from the local to the global. The rate of development of the global economy brings new pressures and the willingness of governments to regulate air pollution is often balanced by concerns over the economic impact of such regulation. Science is the key to identifying the nature and scale of air pollution impacts and is essential in the formulation of policies for regulatory decision-making. Continuous improvements in our knowledge of the fundamental science of air pollution and its application are necessary if we are to predict, assess and mitigate the air pollution implications to local, regional, national and international economic systems (Brebbia &Longhurst, 2010).

1.2 Problem statement

Nowadays people not aware what happened to condition of air. They do not realize they also contributed to air pollution. Usually numerous sources emit only small quantities of air pollutants but, collectively they can release significant quantities of pollutants. Especially in smaller cities without big industries, area sources may play a considerable role. Besides that, government also less control the organization of restaurant and night market. This survey is

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conducted to exposed people how they can affect the quality of air and show them how to improve. To prevent excessive emission of inventory, several ways can be done such as by installing air filter in each restaurant so that the gas that emitted would be clean and good for the environment

1.3 Objectives

The aims of this project are:

1) To identify types of gases that released from identified region.
2) To investigate the effects of emission inventory on the environment

1.4 Scope of study

The scopes that covered in this project are:

1) Identify source of emission existing in the emission inventory area.
2) Determine the quantities of total emission in each grid cell.
3) Use emission factors found in the CORINAIR guidebook
4) Conduct survey for identified area source.
5) The survey only covered for night market and restaurant in Cheng.

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CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter explained briefly about the area source of emission inventory for restaurant and night market. This chapter also explained briefly about type of pollutant, the effect of pollutant, and also how to improve air quality. On top of that, there is also method to determine emission factor and total of emission factor.

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2.1 Emission Inventory

An emissions inventory is a database that lists for a certain source, the amount of air pollutants discharged into the atmosphere for a given time period. For this project, the area source of emission inventory is at the restaurant and night market at MBMB area, specifically at Cheng, Peringgit, Bachang, and area city of Melaka.

2.2 Emission sources of air pollutants in inventories

The emission sources of air pollutant are divided into two which is anthropogenic and natural sources. Anthropogenic is the environmental pollution and pollutant that produced by human activity. However, natural source is meant by environmental pollution that produced by nature itself. From the table 2.1 below, it shows that restaurant and night market are from the anthropogenic sources.

Table 2.1: Emission sources of air pollutant

ANTHROPOGENIC SOURCES	NATURAL SOURCES
INDUSTRIAL	OCEAN
VEHICLES	LIGHTNING
RESIDENTIAL	VOLCANIC ATIVITIES
COMERCIAL	
AGRICULTURE	
WASTE	
OPEN BURNING	

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2.3 Sources of emission air pollutant

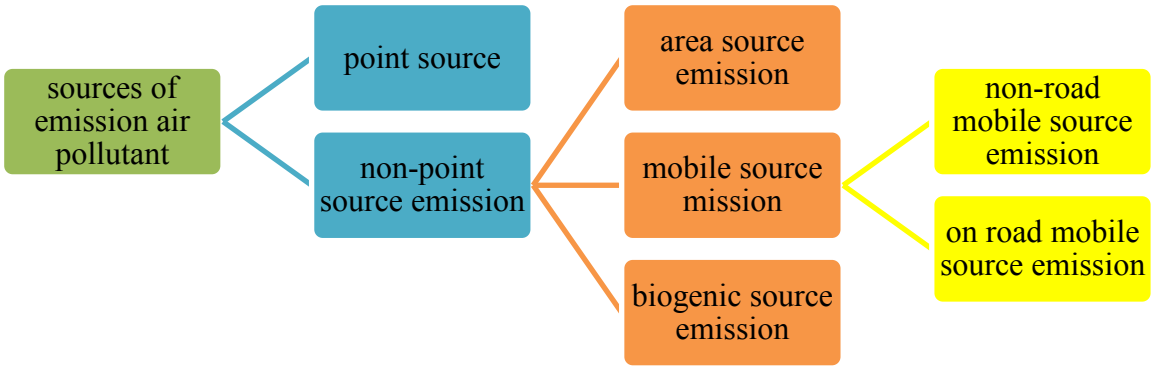

Figure 2.1: Sources of emission air pollutant

2.3.1 Point source

Point sources are large, stationary, identifiable sources of emissions that release pollutants into the atmosphere. Sources are often defined by state or local air regulatory agencies as point sources when they annually emit more than a specified amount of a given pollutant, and how state and local agencies define point sources can vary. Point sources are typically large manufacturing or production plants. They typically include both confined "stack" emission points as well as individual unconfined "fugitive" emission sources. Within a given point source, there may be several emission points that make up the point source. Emissions point refers to a specific stack, vent, or other discrete point of pollution release. This term should not be confused with non-point source, which is a regulatory distinction from area and mobile sources. The

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