

UNIVERSITI TEKNOLOGI MARA

**A COMPARATIVE STUDY BETWEEN THE
EFFECTS OF ADDING DOLOMITE AS ADDITIVE
AGAINST THERMAL TREATMENT ON
SOLIDIFICATION OF MUNICIPAL SOLID WASTE
BOTTOM ASH CONCRETE**

MOHD SYAZWAN B MOHD GHAZALI

MSc

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Candidate's Declaration


I declare that work in this thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any academic institution or non-academic institution for any degree or qualification.

In the event that my thesis be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree to subjected to the disciplinary rules and regulations of Univeristy Teknologi MARA.

Name of Candidate	<u>Mohd Syazwan bin Mohd Ghazali</u>
Candidate's ID NO.	<u>2006138383</u>
Programme	<u>Master of Science in Chemical Engineering</u>
Faculty	<u>Faculty of Chemical Engineering</u>
Thesis Title	<u>A Comparative Study between The Effects of Adding Dolomite as Additive against Thermal Treatment on Solidification of Municipal Solid Waste Bottom Ash Concrete</u>

Signature of Candidate

Date


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August 2010

ABSTRACT

Incineration bottom ash (IBA) may pollute soil, surface water or underground water if it contains toxic substances such as heavy metals. If this pollution is not appropriately managed, it can cause serious health risks and problem to the surrounding environment. In this study, incineration bottom ash from municipal solid waste (MSW) was used as a substitute to sand to form concrete-like material in a process known as solidification. Two methods of solidification were tested and examined. Four different composition of ash: sand ratio were used, i.e. (30:70), (50:0), (70:30) and (100:0). The solidification processes were evaluated by carrying out compressive strength and leaching tests. Results show that; of four different concrete produce, the (30:70) concrete was found to be best in term of strength and produced a lighter density material compare to normal concrete. Of the two solidification processes; thermally treatment performed better than addition dolomite as additive.

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

The development of Malaysia as an industrialized nation results the growth of population and increase of industrial activities. The generation of solid waste increase rapidly due to this situation. This situation creates problem for the waste disposal, which need to be treated. Consequence from this phenomenon, consist of the problem where the generation of solid waste arise. Solid waste is defined as waste resulting from human and animal activities that is normally solid or semisolid, or hazardous, useless and unwanted [1]. Solid waste can be classified as Municipal Solid Waste (MSW), agricultural waste, industrial waste and hazardous waste. In this study, the waste concerned MSW; that is domestic and some commercial activities. Industrial waste comprises rubbish, food waste, residue, garden waste and etc.

Landfill is the common method used in disposal of municipal solid waste in Malaysia Based on previous study, MSW in Malaysia involves the disposal of approximately 98% of the total waste to landfills [2]. However, the rapid increase of waste and the scarcer source of land demand a more advanced technique of disposal. Rotary kiln incinerator is one of the techniques proposed to manage the waste more efficient. A rotary kiln pilot plant situated in Universiti Teknologi MARA Malaysia, UiTM Shah Alam, established by collaboration with UiTM and XCNT-Technology Sdn Bhd was set up to combust wastes such as municipal solid waste, paper waste and palm oil fresh fruit bunch (FFB). MSW which was fed in rotary kiln incinerator undergoes incineration process and