

CHAPTER 1

INTRODUCTION



1.1 Statement of the problems

Metal casting foundries in Thailand dispose of about 3.4 million tons of spent sand in landfill per year (Department of Industrial Works, 1995). A typical foundry waste can be generated from 8 to 40 individual waste processes, including: spent molding sand, core sand waste, cupola slag, baghouse dusts and others. Environmental constraints on the foundries' operations and handling of waste products are becoming increasingly more costly to the industry. This economic burden may in turn encourages industries to move toward beneficial reuse as an alternative to disposal of spent sand. There is also concern over the environmental ramifications of using process wastes that may contain contaminants in applications where it may be exposed to people or the environment. A previous study on the reuse of spent foundry sand provides an overview of several beneficial reuse options. Some recycling options are asphalt concrete, compost additive, concrete, portland cement, flowable fill, ground and site barriers and others. In Thailand, several issues limiting beneficial use of waste sand. Some of those include lack of understanding in the properties of spent foundry sand, life cycle issues, waste management practices, and lack of clear regulatory guidance in reuse waste from industries. This study focuses on the properties of spent foundry sand and identify the potential reuse as hydraulic barrier layers in landfill.

1.2 Objectives of the study

The main objective of this study is to identify the potential reuse for spent foundry sand as hydraulic barrier layers in landfill. The specific objectives are:

1. To characterize the chemical contaminants of spent foundry sand

2. To characterize the properties of spent foundry sand that are important for reuse option as hydraulic barrier layers in landfill

3. To study the relationship between minimum bentonite content can be molded to achieve hydraulic conductivities

1.3 Hypotheses

1. Spent foundry sand will be considered as non-hazardous.
2. Spent foundry sand have potential reuse as hydraulic barrier layer in landfill by considering hydraulic conductivity and moldable.

1.4 Scopes of study

1. Typical materials such as foundry sand and spent foundry sand from Siam Nawaloha Foundry and Siam Magotteaux Foundry were selected for this study.

2. Assessment for the degree of toxicity outlined in the 6th Notification of the Ministry of Industry (1997).

3. Study the properties of raw materials and spent foundry waste such as particle size, chemical oxide composition, etc.

4. Study the properties of spent foundry sand that are important for reuse option as hydraulic barrier layers in landfill such as hydraulic conductivity.

5. Determine the minimum bentonite content that can be compacted to achieve hydraulic conductivities.