

A STUDY OF H  
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POSITION AND  
PAHANG

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## ABSTRACT

The issues regarding the solid waste management is widely discussed, due to the increasing of waste generation, some problem related on insufficient of disposal landfill become government concern. Proper management need to implement in the future. Therefore, this research is undertaken to overview the management of solid waste at selected study area. The main objective listed by identifying the composition and generation of solid waste of populations. The research is covers on residential waste source at Taman Tas, Kuantan Pahang. There were two types of residential being study, Low Cost Housing Area and High Cost Housing Area. Survey study is conducted in order to determine the factors affecting the solid waste generation. The factors affecting waste generation can be identified by comparing both types of residential waste production. By calculation, the generation rate per person at High Cost Housing Area is 0.21 kg/day, which is higher compared to Low Cost Housing Area 0.18 kg/day. The analysis results suggested that, mainly the size of family was the factor influence the rate of solid waste generation and the socio-economic classification also influence the household waste generation. Food waste composition is found to be the most waste generated. In other hand, this paper briefly discuss the solid waste management at residential and the level of awareness among the respondents. Some suggestions are made to enhance the solid waste management at study area such as by providing facilities for waste segregation, the waste collector follow the schedule of waste collection route and conducted the awareness campaign at the residential area. Overall, there are no crucial problem arise at the study area.

## ABSTRAK

Isu berkaitan dengan pengurusan sisa pepejal telah dibincangkan secara meluas, disebabkan oleh peningkatan penjanaaan sisa pepejal, beberapa masalah berkaitan tapak pelupusan tidak mencukupi menjadi kebimbangan pihak kerajaan. Pengurusan yang baik haruslah dilaksanakan di masa hadapan. Dengan itu, kajian ini dijalankan untuk meninjau secara kesuluruhannya pengurusan sisa pepejal di tempat yang dipilih. Objektif utama yang digariskan ialah dengan mengenalpasti komposisi dan penjanaaan sisa pepejal populasi. Kajian ini meliputi sumber sisa di kediaman Taman Tas, Kuantan, Pahang. Terdapat dua jenis kediaman menjadi kajian, Kawasan Perumahan Kos Rendah dan Kawasan Perumahan Kos Tinggi. Kajian tinjauan dijalankan untuk menentukan faktor-faktor yang mempengaruhi penjanaaan sisa pepejal. Dengan membandingkan pengeluaran sisa kedua-dua jenis kediaman, faktor-faktor yang mempengaruhi penjanaaan sisa boleh dikenal pasti. Berdasarkan pengiraan, kadar penjanaaan setiap orang di Kawasan Perumahan Kos Tinggi adalah 0.21 kg / hari yang lebih tinggi berbanding dengan Kawasan Perumahan Kos Rendah iaitu 0.18 kg / hari. Hasil analisis mencadangkan bahawa, saiz keluarga adalah faktor utama yang mempengaruhi kadar penjanaaan sisa pepejal dan klasifikasi sosio-ekonomi juga mempengaruhi penjanaaan buangan isi rumah. Komposisi sisa makanan didapati menjadi sisa yang banyak dijana. Selain daripada itu, kertas kerja ini secara ringkas membincangkan mengenai pengurusan sisa pepejal di kediaman dan tahap kesedaran di kalangan responden. Beberapa cadangan dibuat bagi meningkatkan pengurusan sisa pepejal di kawasan kajian seperti menyediakan kemudahan untuk pengasingan sisa, pengumpul sisa mengikut jadual laluan kutipan sisa dan menjalankan kempen kesedaran di kawasan kediaman. Secara keseluruhan, tidak ada masalah genting yang timbul di kawasan kajian.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

Nowadays, solid waste management becomes the biggest issues to be discussed. This is due to the increasing of population and economic activities that generates the quantity of municipal solid waste increase rapidly. Latifah *et al.* (2009) noted that, the management of solid waste continues to be a major challenge in urban areas throughout the world, but particularly in the rapidly growing cities and towns of the developing countries.

In Malaysia, the populations are likely to increase parallel with time. The statistic shows that the rate of increasing is 2.4% per annum or about 600,000 per annum since 1994. The growing of population will also cause the increasing of solid waste generation. This makes the management of solid waste under critical situation (Mohd Armi, 2009)

Mahmud (2008) pointed out that, the overall solid waste generated per day is 18000 tons in Malaysia as cited in Saidatul (2009). By the year 2020, the quantity of

Municipal Solid Waste (MSW) generated was expected to have increased to 31,000 tons.

The National Solid Waste Management Department state, in the Ninth Malaysia Plan, it is predicted about 45% of the waste is made up of food waste, 24% of plastic, 7% is paper, 6% of iron and glass and others made of the rest. The composition percentage will tend to increase due to the urbanization, population growth and industrialization process.

The National Strategic Plan for Solid Waste Management (NSP) was formulated the following service targets to focus plans to improve SWM and the monitor the efficiency of its implementation.

**Table 1.1** Reduction target for 2020 was revised by the Government of Malaysia

| <b>Level of Service</b>   | <b>Present</b> | <b>2003-2009</b> | <b>2010-2014</b> | <b>2015-2020</b> |
|---------------------------|----------------|------------------|------------------|------------------|
| Extend collection service | 75%            | 80%              | 85%              | 90%              |
| Reduction & Recovery      | 3-4%           | 10%              | 15%              | 17%*             |
| Closure of dump sites     | 112 sites      | 50%              | 70%              | 100%             |
| Source Separation (Urban) | None           | 20%              | 80%              | 100%             |

This target can be achieved within the range until 2020. Therefore, to ensure that the target is remaining relevant with the respect to the current situation, it should be review and study during the planning period to accomplish the goal of zero waste (National Strategic Plan for Solid Waste Management in Malaysia, 2005). In Malaysia, the Housing and Local Government Ministry are responsible in planning and managing the solid waste that deal with private sector (Manaf *et al.*, 2009)

## 1.2 Problem Statement

Waste is one of the consequence products of daily life activities from human. It continuously rises every year if there is no control of consumption and due to increasing of population. The generation of waste is typically from the residential, institutional, commercial, street cleaning and non-process waste from industries.

The rising up of quantity solid waste surely cause serious concern by the Government of Malaysia especially in improper management and insufficient of disposal site. Large amount of waste will cause some disposal landfill area polluted the environment and need to immediate safe closure for that are in critical area. Almost 95% of the collected wastes are taken to about 120 treatment disposal facilities that are distributed throughout the Peninsula (National Strategic Plan for Solid Waste Management in Malaysia, 2005). The problem occurs when the wastes produced can no longer be accommodating by the existing landfill. Therefore, other initiatives need to be taken in order to solve the problem.

Before that, the studies should investigate further detail on factor contributed to the waste generation. The basic problem is when there is lack of education and awareness in society on how to manage and handling the solid waste. The individual attitude plays an important role in order to help the government efforts to control the problem regarding the solid waste management.

Therefore, this study is conducted to find out the reason affecting the waste generation before solid waste is becoming a major issue. How well the solid waste being handling and manage in Malaysia will be explored. Solid waste management needs to be updated to suit the waste quality, quantity and composition.

### 1.3 Research Objectives

In order to realize the purpose of this study, the objectives to be discussed were:

- i. To identify the household solid waste composition and generation at Taman Tas, Kuantan, Pahang.
- ii. To study the factor effecting waste generation among residents at Taman Tas, Kuantan, Pahang.
- iii. To review the solid waste management at Taman Tas, Kuantan, Pahang.

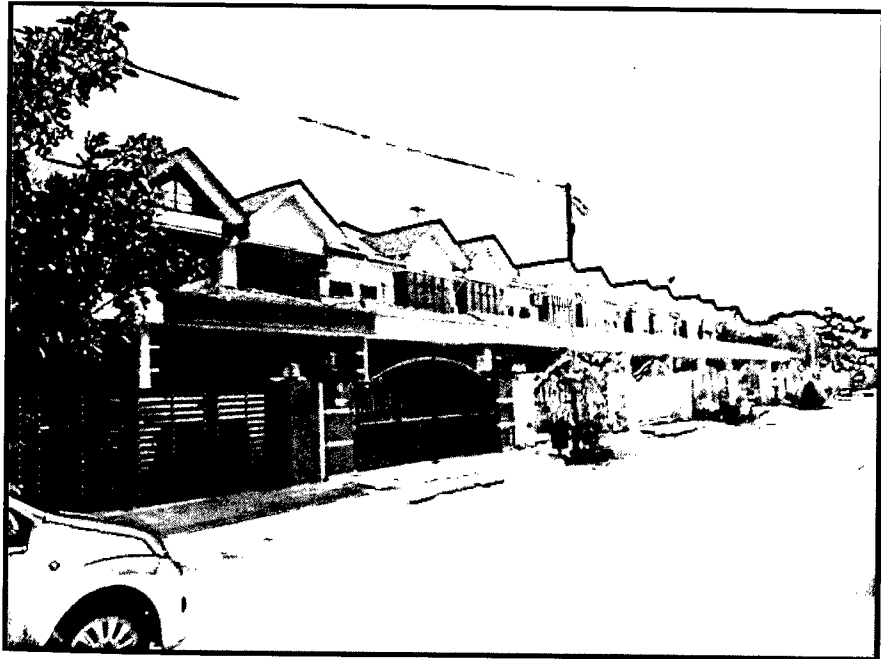
### 1.4 Scope of Study

These studies cover the managing of the solid waste by identifying the composition of the waste produce at Taman Tas, Kuantan, Pahang residential area. The study area chosen based on the population density on that area. There were two types of residential investigated which were Low Cost (LC) Housing Area and High Cost (HC) Housing Area, ten houses randomly chosen for each residential. **Figure 1.1** and **Figure 1.2** show the residential type at study area.

For this study, the residential solid waste composition was classified into six classes according to National Solid Waste Management Department of Malaysia, namely food waste, organic waste, plastic, paper, glass, and others waste. The study was conducted by weighted the waste generated of the household in a day within 28 days continuously in a month. The targeted timeline was from March to April 2012. Then, Comparative study conducted in order to identify the factor affecting the generation of solid waste through survey analysis. The research also focusing on the solid waste management at the residential and awareness among the residents about the waste matter by distributed some questionnaire.



**Figure 1.1** Low Cost Housing Area



**Figure 1.2** High Cost Housing Area

## **1.5 Expected Outcome**

The study will show different types of composition waste produced by the household. It is expected that the types of residential, LC housing area and HC housing area, will produced diverse amount of solid waste. Some factors predicted to become the source of this difference. Therefore, survey questionnaire was conducted to identify the parameter affecting the solid waste generation for both residential. The survey questions include the demographic factor such as status, education level, age, family size, occupation and income, waste management and respondent's awareness. At the same time, the solid waste management at the residential area can be establishing. Indirectly, it is more likely nourish awareness among residential area about the importance of proper handling and management of solid waste.

## **1.6 Significance of Proposed Research**

Waste that is not properly managed can create public health or social problems in a community. Therefore, type of waste and the volume generated have to be identified in order to handle the solid waste.

From this study, the data acquired will be very useful in helping the estimating, purchasing, storage and other activities for future managing of solid waste. The results of different composition and quantity of solid waste generate by the residential can be used as technical support during the decision-making processes by the local and private authorities, in order to justify the selection of the best alternative waste management system. The management of solid waste can only be done effectively if data and information on the amount of solid waste generated is available (Ahmad, 2010)



Indirectly, it can protect the environment health by controlling the pollution due to proper managing of solid waste and achieving the policies, reduce, re-use, recover reusable waste implement by the government. At the same time, it is cost effective. If waste is managed well, the cost of fixing problems does not become a burden on council finances. Therefore, this study is important to improve the lankness in managing of solid waste.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Problems associate about the management of solid waste is widely discussed in this global. The issues regarding the increasing of generation of solid waste become a concern by all administration around the world. These dilemma if not properly manage can cause some harms to the environment and community.

A study regarding the solid waste was conducted in order to study the parameter related to the solid waste. Therefore, a study on the physical composition of solid waste in research area, Taman Tas, Pahamg will reveal the quantity and type of solid waste. A survey also conducted to define the factors that contribute to the waste generation. Thus, the further study about the managing of solid waste can be review. The way in handling the solid waste is very important in managing the solid waste.

The keywords of this study include solid waste composition materials and element in solid waste. A better understanding on the study can be achieved then. Therefore, objective of this study can be reached.

## **2.2 Solid Waste**

Solid waste is a material which is not in the form of liquid and commonly the synonyms terms use to describe the solid waste such as garbage, trash and rubbish. Basically, solid waste has no value to person who is responsible for it (Chris, 2003). While Abdul Nasir (2007) indicates that, solid waste is any scrap material and unwanted substance or rejected goods consequently from any process undergo and need to be disposed. In other word, solid wastes are unwanted material and require method to manage it to keep the safe and clean environment.

## **2.3 Solid Waste Composition**

There are variations in the composition of waste among the different area. Based on the Malaysian Standard, waste materials were classified into six categories specifically food waste, plastic, paper, glass, aluminium and others types of waste. The purpose of waste classification is as a uniform system to country to develop any research relating to solid waste or whenever any parties desire to collect data. Thus, the solid waste classes are similar for all state. Following define the waste classes;

### **2.3.1 Food Waste**

Food waste means food material resulting from the processing, storage, preparation, cooking, handling, or consumption of food. This type includes material from industrial, commercial, or residential sources. Example include discarded meat scraps, dairy products, egg shells, fruit or vegetable peels, and other food items from homes, stores, and restaurants.

### **2.3.2 Plastic**

Plastic contain of major chemical type. Majority plastic is used in the production of plastic packaging, household and domestic products. Plastic can be both recyclable and non-recyclable materials. The classification of plastics is based on their chemical structures. Examples of plastic waste include trash bags, rubber, shampoo container, detergent bottles and others.

### **2.3.3 Paper**

Paper material is highly known as one of the recyclable waste. It is contain most of the degradable organic carbon (DOC). Examples of recyclable paper include newspaper, magazine, book and cardboard. The major use for recycled paper is in the packaging sector. However, there are also non-recycling paper such as milk container and waxed paper.

### **2.3.4 Glass**

Glass is made of silica sand, limestone and sodium carbonate, which are relatively cheap raw material. However, glass can be described as a highly recyclable material. Glass mainly produced by municipal and in form of packaging. The example of recyclable glass, for instance bottles, jars, other products including glass, such as televisions and computer monitors.

### 2.3.5 Aluminium

It is used to store food, beverages, paint, and a variety of other household and consumer products. Examples include canned food and beverage containers, empty metal paint cans, empty spray paint and other aerosol containers, and bimetal containers with steel sides and aluminum ends. Because there is no loss of quality of aluminium during the recycling and re-melting process, thus, it can be continuously recycle.

### 2.3.6 Others Waste

Others waste is waste excluded from five types waste above (plastic, paper, food waste and aluminium). Some example of waste comprise of plant material, textiles, and agricultural waste.

## 2.4 Sources and Types of Waste

The generation of waste is basically from human and animals. The sources of waste generally classify into its classes based on the premises types, its function and nature of activities. The sources or sector involve in generating solid waste is generally from the residential, commercial, institutional including hospital, market waste, yard waste and street sweepings ( Zamali *et al.*, 2009). **Table 2.1** shows the sources of waste according to Mohd Razman (2007).

**Table 2.1** Types of sources of non-schedule solid waste

| <b>Sources of waste</b>           | <b>Facilities or activities wastes are generated</b>     | <b>Waste generated</b>   |
|-----------------------------------|--|--|
| Municipal/<br>household waste     | Settlement: bungalow, terraces, high-rise and apartments | Food, paper and paper packaging, plastic, metals and hazardous household waste |
| Commercial waste                  | Shop houses, restaurants, stalls, night markets, hotels  | Food, paper and paper packaging, plastic and metals                            |
| Institutional waste               | Office buildings, schools, hospitals                     | Mostly paper and paper packaging and metals                                    |
| Industrial non-toxic waste        | Light and medium industries                              | Mostly paper and paper packaging, plastic and metals                           |
| Market waste                      | Wet market   | Putrescible waste  |
| Green waste                       | Grass trimming, parks maintenance                        | Leaves, twigs and wood chips   |
| Construction and demolition waste | Housing renovation and related work                      | Concrete, wood, steel, glass and soil  |

## 2.5 Overview of Solid Waste Generation in Malaysia

Many studies had been done by researcher regarding the solid waste generation in Malaysia. Overall, the studies give a conclusion that the generation of solid waste in Malaysia is increase directly especially with population growth and rapid urbanization.

The National Strategic Plan on Solid Waste Management outlines the estimation about the solid waste generation. The information and data estimation as below:

- i. The average of solid waste generation per day is approximately about 0.85 kg per capital per day. Table 2.2 shows the generation of municipal solid waste in various states in Malaysia.
- ii. In the range year of 2002-2020, the waste generation increase by 3.5% per year due to the population growth.
- iii. The review show that, in Peninsular Malaysia, the total waste generates is 23 000 and 25 000 ton per day based on year 2010 and 2012. Therefore, in year 2020, there are about 31 000 ton waste expected will generate per day.

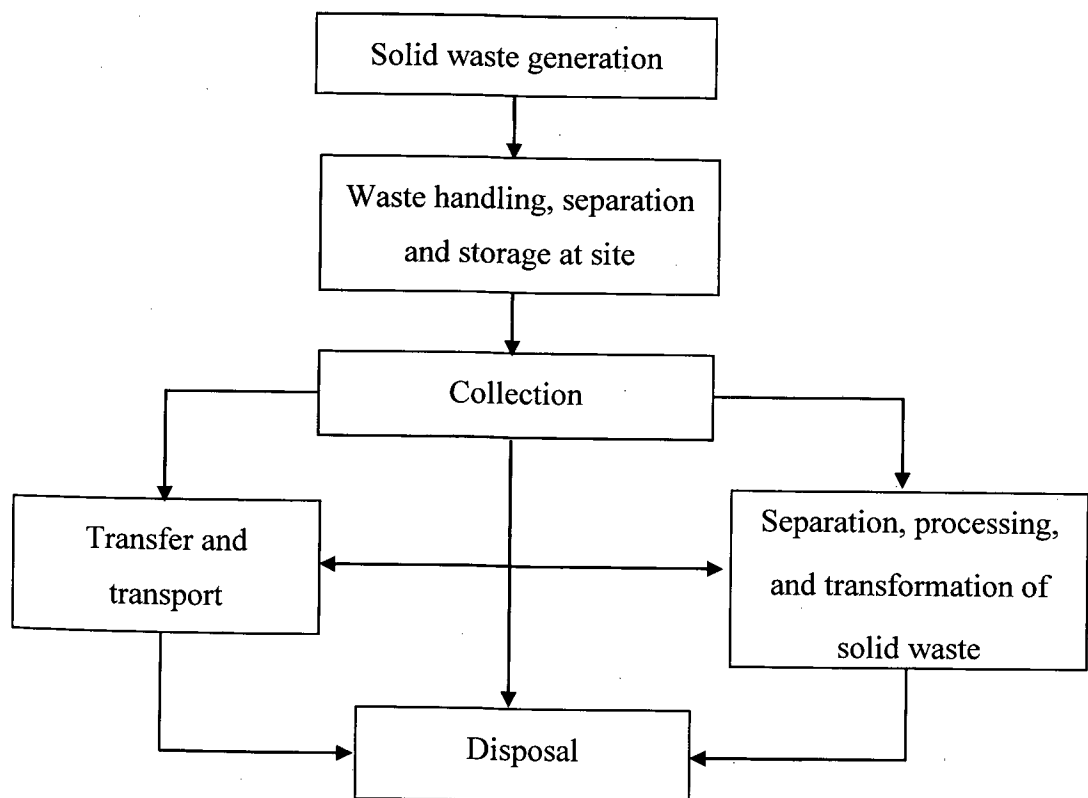
**Table 2.2** Municipal solid waste generation in Peninsular Malaysia  
(Source: Ministry of Housing and Local Government, statistic Report,  
edited by Mohd Razman (2007))

| <b>States in Malaysia</b>        | <b>Estimated MSW generation<br/>(tones/day)</b> |
|----------------------------------|---|
| Johor                            | 2 093.17  |
| Kedah                            | 1 446.86  |
| Kelantan                         | 1 130.51  |
| Melaka                           | 562.45  |
| Negeri Sembilan                  | 827.46  |
| Pahang                           | 1 046.18  |
| perak                            | 213.70  |
| Pulau pinang                     | 1 188.77  |
| Selangor                         | 3 089.53  |
| Terengganu                       | 964.82  |
| Wilayah Persekutuan Kuala Lumpur | 2 754.54  |
| <b>Total</b>                     | <b>16 987.21≈17 000</b>                         |

## 2.6 Solid Waste Management

Solid waste management includes all the phases of storage, collection, transfer and transport, processing and disposal of solid wastes constant with the best practice of public health, economics, and financial, engineering, administrative, legal and environmental considerations (Jamal, 2002).

To manage the solid waste effectively, there are few elements taking into consideration and need to perform well before the final disposal decision is made. The elements include waste generation, waste handling and separation, storage and processing at the source, collection and transport, finally disposal. Zamali *et al.*, (2009) indicate the following diagram showed the sequence in solid waste management.



**Figure 2.1** Basic solid waste management systems