

Faculty of Engineering

### MANAGEMENT AND DISPOSAL OF CLINICAL WASTE IN SARAWAK GENERAL HOSPITAL

Mohammad Khalis Afham Bin Md Sahlan

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### UNIVERSITI MALAYSIA SARAWAK

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Alamat To	etap: <u>NO. 6, JLN. PE</u> <u>81930 BANDA</u>	RUMAHAN BARAT. AR PENAWAR, JOHOR.	ENCIK JETHRO HENRY ADAM Nama Penyelia	
Tarikh :	<u>15<sup>th</sup> MAY 2009</u>		Tarikh : <u>15<sup>th</sup> MAY 2009</u>	

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This project report attached here to, entitles "MANAGEMENT AND DISPOSAL OF CLINICAL WASTE IN SARAWAK GENERAL HOSPITAL" prepared and submitted by MOHAMMAD KHALIS AFHAM BIN MD SAHLAN (14516) as a partial fulfillment of the requirement for the Degree of Bachelor of Engineering with Honours in Civil Engineering is hereby read and approved by:

<u>15<sup>th</sup> MAY 2009</u>

MR. JETHRO HENRY ADAM

Date

Supervisor

### MANAGEMENT AND DISPOSAL OF CLINICAL WASTE IN SARAWAK GENERAL HOSPITAL

MOHAMMAD KHALIS AFHAM BIN MD SAHLAN

This project is submitted in partial fulfilment of the requirements for the degree of Bachelor of Engineering with Honours (Civil Engineering)

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Specially dedicated to my dearest parents, siblings, my beloved one, all my family, friends, and not forgotten to all the persons treasured to my heart

Thank you for loves and supports

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# ABSTRACT

Proper and controlled clinical waste management and disposal is one of the most important things in every places that practicing medicine. Therefore, the 'cradleto-grave' concept was used to ensure the effectiveness of the clinical waste management in this country. The routes taken by the clinical waste must be managed properly. In this report, study about the clinical waste management and disposal was made in the Sarawak General Hospital. Every stages and processes that involve in clinical waste management and disposal in Sarawak General Hospital was observed and classified. The types of clinical waste generated from this hospital was been differentiated from the observation. Besides, the sources of the clinical waste from the Sarawak General Hospital been recognized from this study. Laws and regulations regarding to the scheduled waste (clinical waste) waste were legislated by the Department of Environment and Ministry of Health also been understand. This is for ensuring the parties that involve in clinical waste management and disposal (generator and contractor) carry out the duty perfectly. Infectious diseases can be separated easily if the clinical waste management and disposal was ignored. The processes that involve in getting the study result are the site visit (Sarawak General Hospital), interview, and distribute the questionnaires. From the study result, the contractor was excellently following all the processes in clinical waste management and disposal in Sarawak General Hospital.

# ABSTRAK

Pengurusan sisa klinikal secara teratur dan terkawal adalah sesuatu yang amat penting kepada tempat-tempat yang mengamalkan perubatan. Oleh itu, konsep 'buaian ke kubur' telah digunakan untuk memastikan keberkesanan pengurusan sisa klinikal di negara ini. Laluan yang dilalui oleh sisa klinikal mestilah diuruskan dengan teratur. Dalam laporan ini, kajian tentang pengurusan dan pelupusan sisa klinikal telah dijalankan di Hospital Umum Sarawak. Setiap peringkat dan proses yang terlibat dalam pengurusan dan pelupusan sisa klinikal di Hospital Umum Sarawak diperhatikan dan dikenalpasti. Jenis-jenis sisa klinikal yang dijana daripada hospital ini dibezakan melalui pemerhatian yang telah dibuat. Selain itu, sumber-sumber sisa klinikal dari Hospital Umum Sarawak juga dapat diketahui melalui kajian ini. Undang-undang mengenai pengurusan sisa berjadual (sisa klinikal) yang telah digubal oleh Jabatan Alam Sekitar dan Kementerian Kesihatan juga telah difahami. Ini bagi memastikan pihak yang terlibat dalam pengurusan dan pelupusan sisa pepejal (penjana dan kontraktor) menjalankan tugas masing-masing dengan sempurna. Penyakit berjangkit boleh merebak dengan mudah jika pengurusan dan pelupusan sisa klinikal diabaikan. Proses-proses penyelidikan yang terlibat untuk mendapatkan keputusan kajian adalah lawatan tapak (Hospital Umum Sarawak), temubual, dan pengagihan set borang soal selidik. Hasil dari keputusan kajian, pihak kontraktor telah mengikuti dengan baik semua proses yang terlibat dalam pengurusan dan pelupusan sisa klinikal di Hospital Umum Sarawak.

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# **CHAPTER 1**

# **INTRODUCTION**

### 1.1 Introduction

Malaysia has experienced phenomenal economic growth in the last two decades. In Sarawak especially, it has undergone a major structural transformation, moving from agriculture to manufacturing-based economy, with significant social changes. Presently, Federal Government had announced the Sarawak Corridor of Renewable Energy (SCORE). This rapid development has brought about significant impacts to the natural environment.

The government has since as early as 1974 taken concrete steps by introducing an enabling legislation called the Environmental Act 1974. The main objective of this act is to prevent, abate and control pollution, and further enhancing the quality of the environment in this country. The Department of Environment has been entrusted to administer this legislation to ensure that Malaysia will continue to enjoy both industrial grow and a healthy living environment. Presently, waste management is one of the most important responsibilities of local authorities in Malaysia where much money is spent in the disposal of waste. In Kuching, Sarawak, Trienekens (Sarawak) Sdn. Bhd. had been appointed as the operating company for solid waste collection and treatment for administrative areas of the Dewan Bandar Raya Kuching Utara (DBKU) and Majlis Bandar Raya Kuching Selatan (MBKS). Growing affluence and increasing population concentration in urban area have increased the generation and types of solid waste. The figure below show the amount of waste collected by MBKS and DBKU:



Figure 1.1: Waste collected by MBKS and DBKU from 2001 to 2005

Source: Rudzaimeir bin Malek.(13 November 2007)

Clinical waste is part of waste that generates everyday in hospitals and at the places practicing medicine. Clinical waste includes a large component of general waste and small proportion of hazardous waste. Poor management of clinical waste cause serious diseases in hospital personnel, health workers, patient and public. The main source of illness from infectious waste is probably injuries with used needles, which can cause hepatitis and HIV. There are however numerous other diseases which could be transmitted by contact with clinical waste. According to Leela Anthony (2006), the hazardous nature of clinical waste may be due to one or more of following characteristic:

- 1. It contains infectious agents that can cause diseases
- 2. It is contains sharp (Figure 1.2)
- 3. It contain drug or pharmaceutical waste
- 4. It is waste from pathological department or laboratory
- 5. It is radioactive



Figure 1.2: Contaminated Sharps

This study is done basically to explain the importance of managing the clinical waste in a proper way. People who involve in clinical waste management must do their work effectively and concern about the risk to be faced.

### 1.2 Scope of Study

The scope of study in management and disposal of clinical waste in Sarawak General Hospital combined in several systems. Every system has its own scope of work beginning from Organization Structure System to Clinical waste disposal system. Organization structure divided every member with their own function. The clinical waste disposal systems are starting from segregation, documentation, storage, transportation until treatment.

Site visit had been carried out at the Sarawak General Hospital. Most of the study was dealt with the staff of the Sarawak General Hospital and the company who was given the authority to handle the clinical waste disposal.

#### **1.3 Problem Statement**

Clinical waste is a public health issue that attracts attention in developing countries. The lack of control over the handling, collection and disposal of clinical waste, which exposes the public and waste collection personnel, can bring to the potential health risks. Clinical waste in Malaysia especially in Sarawak is no longer a simple task. Proper planning and management of clinical waste generated is needed, not only in relation to waste disposal but also to various aspects of waste minimization such as environmental education and enforcement of act.

According to the Birpinar et al. (2008), generally, the most common problem face in management and disposal of hospital and clinical waste is financial problem. Just because the budget is limited, the proper and importance of management and disposal of clinical waste was taken lightly and ignored. The lack of awareness also contributes to this problem.

### 1.4 Aim and Objectives

The main aim of this project is to understand the management and disposal of clinical waste in Sarawak General Hospital (SGH) is in good condition and not bringing harm to the human health and the environment.

The objectives of this project are:

- To study the management and disposal of clinical waste at Sarawak General Hospital (SGH).
- 2. To identifies and differentiate the types, sources, and amount of clinical waste produced.

- 3. To identify the act and legislation with regard to the procedures of management and disposal of clinical waste were seriously practiced.
- 4. To examine the important elements in management and disposal of clinical waste.

# **CHAPTER 2**

## LITERATURE REVIEW

### 2.1 Solid Waste

Solid wastes are the solid materials that were threw away, discarded, or discharge by people or animal which have been assumed as a waste (Pfeffer, 1992). Solid material is material that not in liquid or gases condition. The material is in rigid state or permanent shape.

There are three type of solid waste. The wastes were differentiated by the waste properties, composition, and where it generated. The three type of the solid waste are (Peavy et al., 1985): (1) municipal waste, (2) industrial waste, and (3) hazardous waste.

Municipal wastes are the ordinary wastes were discarded by people. Municipal wastes are classified by: (1) food waste, (2) rubbish, (3) ashes and residues, (4) construction waste, (5) treatment plant waste, and (6) special waste.

Industrial wastes are those generated from the industrial activities. Usually the wastes also include ashes, rubbish, construction waste, special waste, and hazardous waste (Peavy et al., 1985).

Hazardous waste is the waste that can bring danger or hazard to the human, animal, or plant life, immediately or in the certain period of time (Peavy et al., 1985). The waste can be classified as the hazardous waste if it is has one of the characteristics: (1) ignitability, (2) corrosivity, (3) reactivity, (4) toxicity.

The clinical waste in this project was classified as a hazardous waste. The clinic waste must be dispose and manage properly. Because it is from the hazardous waste type, it can pose danger to human, animal, and plant life.

### 2.2 Definition of Clinical Waste

Clinical waste is any waste generated from hospital premises or laboratories not intended for further use in the hospital. This waste consists wholly or partly of human or animal tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings, syringes, needles or other sharp instruments, being waste which unless rendered safe may prove hazardous to any person coming into contact with it.(Leela Anthony, 2006)

It is also other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care, teaching or research,

or the collection of blood for transfusion, being waste which may cause infection to any person coming into contact with it.(Leela Anthony, 2006)

Clinical waste is segregated from other waste streams and follows a carefully controlled disposal route. Clinical waste is incinerated in a purpose-built incinerator that renders the waste safe and unrecognizable. Because of the care required in the packaging, handling and disposal of clinical waste, this disposal route is considerably more expensive than the less specialized routes such as domestic waste.

### 2.3 Types of Clinical Waste

Clinical waste arises from experiments involving biological materials or bodily fluids. Waste that *looks* as though it might have come into contact with these materials should also be disposed of as clinical waste. Thus clinical waste might contain infectious material, and so must be packaged, labeled, handled, transported and destroyed as though it does.

Due to the lack of nationally mandated definition of biohazardous waste, significant definitional changes in the waste stream occur routinely as one crosses borders between state and local jurisdictions. However termed or defined, proper and safe management of clinical waste must be an integral part of any healthcare strategy to protect the safety and health of healthcare providers and support staff, patients and their families, waste industry workers, and the general public.(Fook, 2007)