

The Role of the Guidelines for Packaging, Labelling and Storage of Scheduled Wastes: The Case Study at IIUM Kuantan Campus.

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ABSTRACT

This study focuses on determining the standardized guideline and its contents used for the management of scheduled wastes generated at IIUM Kuantan Campus. The rapid development of Malaysia has introduced a new threat to the environment in the form of scheduled wastes. The Department of Environment (DoE) introduced the "Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia" which covers notifying, storage, packaging and labelling. This study aims to determine the standardized guideline and its contents used for the management of scheduled wastes generated at IIUM Kuantan Campus. To accomplish this study, outlining, extracting and summarising the government-issued guideline was conducted. A survey questionnaire based on the guideline was also distributed to 13 scheduled waste handlers to assess their compliance. The result covers the summarised guideline used for this study. The guideline released by the DoE outlined the procedures for the matter of packaging, labelling and storage of generated scheduled wastes. For packaging, the guideline described methods to determine waste characteristics and appropriate container selection. For labelling, it detailed the hazard pictogram symbols, their names, symbol colour and background colour required for scheduled wastes label. For storage, it specified that containers should be placed on pallets with specific stacking limits and inventory records must be maintained. The survey results revealed that overall, 61.5% of participants scored 'Poor' while 38.5% scored 'Fair', with no participant achieving 'Good', indicating a significant gap between the established guidelines and actual practice. This study achieved its objective as the summary of the guideline was extracted and summarised to cover on the packaging, labelling and storage of the scheduled wastes, which was then used to create the survey questionnaire.

Keywords: *Scheduled wastes; hazardous waste management; DoE guidelines; packaging; labelling; storage; Environmental Quality Act*

ABSTRAK

Kajian ini memberi tumpuan untuk menentukan garis panduan piawai dan kandungannya yang digunakan untuk pengurusan sisa buangan terjadual yang dihasilkan di Kampus UIAM Kuantan. Pembangunan pesat di Malaysia telah menimbulkan ancaman baru kepada alam sekitar dalam bentuk sisa buangan terjadual. Jabatan Alam Sekitar (JAS) memperkenalkan "Garis Panduan Pembungkusan, Pelabelan dan Penyimpanan Sisa Berjadual di Malaysia" yang merangkumi pemberitahuan, penyimpanan, pembungkusan dan pelabelan. Kajian ini bertujuan untuk menentukan garis panduan piawai dan kandungannya yang digunakan untuk pengurusan sisa buangan terjadual yang dihasilkan di Kampus UIAM Kuantan. Untuk melengkapkan kajian ini, menggariskan, mengekstrak dan meringkaskan garis panduan yang dikeluarkan oleh kerajaan telah dijalankan. Tinjauan soal selidik berdasarkan garis panduan juga telah diedarkan kepada 13 pengendali sisa terjadual untuk menilai pematuhan mereka. Hasilnya merangkumi garis panduan yang diringkaskan yang digunakan untuk kajian ini. Garis panduan yang dikeluarkan oleh JAS menggariskan prosedur untuk perkara pembungkusan, pelabelan dan penyimpanan sisa buangan terjadual. Untuk pembungkusan, garis panduan menerangkan kaedah untuk menentukan ciri-ciri sisa dan pemilihan bekas yang sesuai. Untuk pelabelan, ia memperincikan simbol piktogram bahaya, nama, warna simbol dan warna latar belakang yang diperlukan untuk label sisa terjadual. Untuk penyimpanan, ia menyatakan bahawa bekas hendaklah diletakkan di atas palet dengan had susunan tertentu dan rekod inventori mesti diselenggara. Keputusan tinjauan menunjukkan bahawa secara keseluruhan, 61.5% peserta mendapat skor 'Lemah' manakala 38.5% mendapat skor 'Sederhana', dengan tiada peserta mencapai 'Baik', menunjukkan jurang yang signifikan antara garis panduan yang ditetapkan dan amalan sebenar. Kajian ini mencapai objektifnya kerana ringkasan garis panduan diekstrak dan diringkaskan untuk merangkumi pembungkusan, pelabelan dan penyimpanan sisa buangan terjadual, yang kemudian digunakan untuk menghasilkan tinjauan soal selidik. Kata kunci: Sisa buangan terjadual; pengurusan sisa berbahaya; garis panduan DOE; pembungkusan; pelabelan; penyimpanan; Akta Kualiti Alam Sekeliling

INTRODUCTION

Malaysia have achieved an excellent deal since its Independence Day. Ever more industrial activities were introduced to develop the country. While beneficial for the country, this development also introduced new styles of threat to the environment and ultimately affecting the population. This threat emerged within the variety of wastes. Therefore, within the year 1974, Environmental Quality Act (EQA) 1974 was introduced.

Beginning 1980s, the economic sector in Malaysia continued to develop even further. However, this leaves more undesirable effects to the environment within the variety of higher generations of scheduled wastes. Wastes are considered hazardous once they exhibit one or more of the properties; fire hazard, peril, harmful to the environment and infectious.

The Department of Environment (DoE) was given the authority to observe all activities associated with scheduled wastes from its generation to the disposal. To fulfil that duty, the DoE introduced the "Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia" which covers notifying, storage, packaging and labelling in addition to their management at the generated area.

International Islamic University Malaysia (IIUM) Kuantan Campus is chosen for this study for the campus housed students that took courses like Chemistry, Medicines, Pharmacy, Nursing and Allied Health Sciences. These courses are affiliated because they are the major producer of scheduled wastes within the university. As such, it is thus vital to notice how the scheduled wastes produced by these courses were handled.

PROBLEM STATEMENT

Scheduled wastes requires a proper management procedure regardless if it was produced by institutions (such as IIUM Kuantan Campus) or hospitals. Problems arise when these scheduled wastes are improperly managed.

- i. The first is lack of proper reference or guideline. A complex, incomplete or lack of proper guideline or standardised system will ensure a chaotic situation such as improper handling and storage.

Therefore, a proper and complete guideline is needed so as to ensure a standard method of handling and storage.

ii. Next is the awareness of the effectiveness of the scheduled wastes management. Being oblivious of the available guidelines will still guarantee an improper handling of schedule wastes. Thus, having employees fully aware of the proper handling methods and practicing it is important.

This research will in general determine the guideline that should be adhered to for the management of scheduled wastes. The objectives of this research is to generally determine how well scheduled wastes are managed at IIUM Kuantan Campus. A more specific objectives are as follows: To determine the standardized guideline and its contents used for the management of scheduled wastes generated at IIUM Kuantan Campus.

The following are the hypotheses of this research: The prepared Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia is adapted for the management of scheduled wastes in IIUM Kuantan Campus.

LITERATURE REVIEW

Definition of Scheduled Waste

Hazardous waste is termed as scheduled waste in the Environmental Quality (Scheduled Wastes) Regulations 2005. From the regulation, scheduled waste is defined as any waste falling within the categories of waste listed in the First Schedule. In the United States of America (USA), around mid-1970s, hazardous waste was termed as industrial waste or chemical waste before it had been called hazardous waste. By 1985, the term means wastes (solids, sludges, liquids and containerized gases) aside from radioactive (and infectious) wastes which, by reason of their chemical activity; toxicity, explosivity, or corrosivity, cause danger or likely will cause danger to health or the environment, whether on their own or when coming into contact with other waste (LaGrega, Buckingham & Evans, 2001).

Characteristics of Scheduled Waste

Pentas Flora described that hazardous waste is considered hazardous if it has one or more of the following characteristics as described below.

The first characteristic is ignitability. This characteristic is commonly attributed to oxidizers. If the waste is a liquid and has flash point less than 60°C (140°F) and if the waste is not a liquid but is capable under standard temperature and pressure, to cause fire through friction, moisture absorption or spontaneous chemical alteration and when ignited would burn so vigorously and persistently that it could create hazard, then such substances are hazardous.

Next is corrosivity. This refers to waste which has an aqueous component and has a pH of two and below, or 11.5 and higher, or if the waste has liquid component and corrodes steel at a rate greater than 6.35 mm (0.250 inch) annually at test temperature of 55°C (130°F).

The third characteristic is toxicity which is true for waste or its extract which has any of the contaminants capable of causing contamination. These contaminants are required to be inhaled or ingested for it to be harmful to humans.

The fourth characteristic is reactivity. Wastes that are unstable and readily undergoes vicious changes without exploding, reacts aggressively with water, forms potentially volatile mixtures with water or when the waste when mixed with water generates toxic gases, vapors or fumes to cause danger to human health or the environment are lumped in this group.

Finally, is infectious. Diseases or illnesses can be transmitted when making contact with organic mediums like human or animal tissues, blood and other bodily fluids, plant and animal pathogens, and recombinant DNA or through inorganic mediums such as needles, scalpels, scissors, wet bandages, gloves and syringes.

Management of Scheduled Waste

Pentas Flora briefed the history of scheduled waste management in Malaysia beginning in 1960. In 1960, Malaysia's economy continued to grow with the rapid zoom of commercial sector. In 1974, the EQA 1974 was gazetted and was enforced on 15 April 1974. Five years later, the DoE initiated guidelines to handle and dispose of toxic and hazardous waste. Regulation for the management of toxic and hazardous waste in Malaysia was drafted by the DoE in 1984. The final draft of proposed scheduled waste regulation was gazetted on 27 April 1989 and came into force the same year.

Moving to the year 2000s, specifically 2005, the revised version of the scheduled waste regulation was introduced as Environmental Quality (Scheduled Wastes) Regulations 2005.

As identified by Zulkifli Abdul Rashid et al. (2010), the key provisions that are focused on in the Environmental Quality (Scheduled Wastes) Regulations 2005 are; control of generation of waste by a notification system, avoidance or minimization of generation of waste, safe storage of wastes, licensing of scheduled wastes facilities, treatment and disposal of waste at prescribed premises, implementation of manifest system for tracking and controlling movement of wastes.

The Environmental Quality (Scheduled Wastes) Regulations 2005 gives authority to the DoE to monitor all activities associated with scheduled wastes from its generation to disposal. Under the regulation, waste generators have broad responsibilities (Mariani Ariffin et al., 2015).

The Role of the "Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia"

The guideline released by the DoE serves as a comprehensive reference that complements the Environmental Quality (Scheduled Wastes) Regulations 2005. The guideline covers definitions, legal requirements, site selection and design criteria for storage of scheduled waste, packaging and labelling of scheduled wastes containers and management of containers containing scheduled wastes and storage area inspection.

The guideline provides practical details that go beyond the legal requirements, such as:

- Types of containers suitable for different waste characteristics
- Specific dimensions and colours for hazard labels
- Detailed storage procedures including stacking limits and aisle space requirements
- Inventory record keeping requirements

This guideline is particularly important for educational institutions like IIUM Kuantan Campus. Jimmy et al. (2014) stated that educational institutions are on par with industries in regards to its impact on the environment. Ellis (2019) went as far as to call colleges and universities as "hotbeds for hazardous waste generation" albeit the ignorance of many academic leaders. From science labs to cleaning supply rooms, wastes need to be managed and disposed of properly, as inadequate waste management poses health and safety risks to students, faculty, staff, and the environment (Ellis, 2019).

METHODOLOGY

There are two major sources leading to the collection of data for this study. The first step is establishing the base or guide which acts as the base for the study. This is called the primary source of data. The primary source of data was used for the completion of the second part of the study. The secondary source is the field study. The secondary source consists of distributing survey questionnaire. Once data were obtained, the analysis of data, presentation of results, interpretation of the obtained results and discussions on the results were made.

The primary source (or desktop study) covered the extraction of points from the guidelines prepared by the DoE on packaging, labelling and storing of scheduled wastes which acted as the standard for this study.

The instrumentation of this research consists of the guideline and the survey questionnaire. The "Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia" was published by the Ministry of Environment and Water's Department of Environment Malaysia. The guideline was uploaded into their website on 2014. The guideline consists of definitions, legal requirements, site selection and design criteria for storage of scheduled waste, packaging and labelling of scheduled wastes containers and management of containers containing scheduled wastes and storage area inspection.

However, for this study, only the parts regarding packaging, labelling and storage of scheduled wastes are extracted and used to make the survey questionnaire.

The guideline was summarised by using this method (Murray & Rockowitz, n.d.); 1) outlining the text by breaking into major sections (packaging, labelling and storage of scheduled wastes) and listing out the supporting points; 2) writing a paragraph (or more) with the overall summary sentence followed by the section summary sentences; and 3) rewriting and rearranging the paragraph(s) for a clear and concise flow.

At the time of this study, there were 34 scheduled waste handlers from Kuliyyah of Science, 21 were from Kuliyyah of Pharmacy, Kuliyyah of Nursing has 7 handlers, 25 were from Kuliyyah of Allied Health Science while Kuliyyah of Dentistry has 51 scheduled wastes handlers and Kuliyyah of Medicine has 125 handlers.

The summarized contents of the guideline were then used to create the survey questionnaire used to fulfil the secondary objective of this research. Figure 1. Show the flow of framework methodology

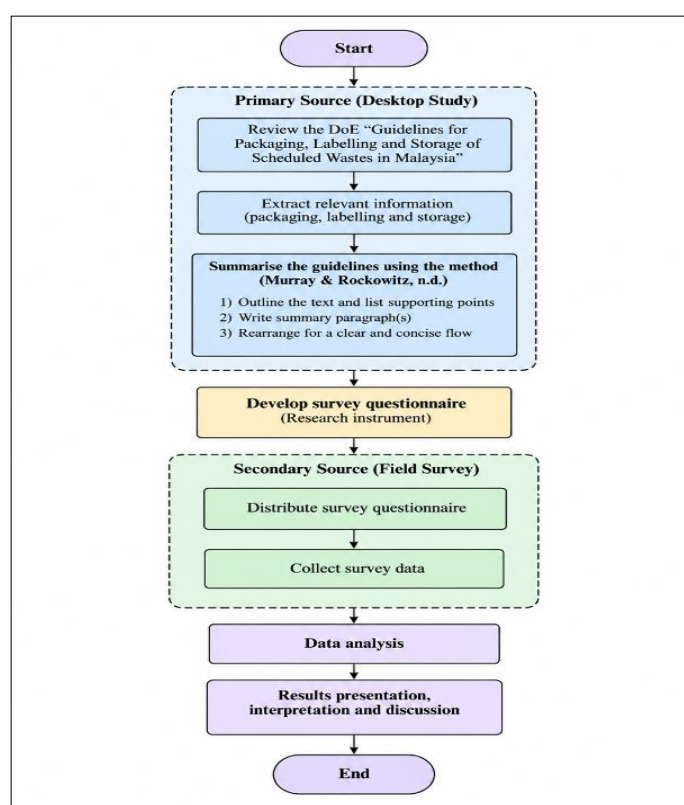


Figure 1: Framework Research Methodology

FINDINGS AND DISCUSSIONS

Packaging of Scheduled Wastes

There are two methods to determine the characteristics of scheduled wastes: (i) Sampling and analysing to determine the hazards and contaminants within the waste and through the sampling and analysis of the waste with referral to the Material Safety Data Sheet (MSDS), Safety Data Sheet (SDS) and/or waste card; and (ii) Identification supported process knowledge or history whereby wastes generated from a process may exhibit some similar hazardous characteristics of the raw materials, chemicals or substances used. Any changes in the process line or during the assembly process may result in changes and alteration of the composition of the waste generated.

In addition to the five major characteristics of hazardous wastes, the guideline even go thus far as to include infectious substances; inflammable liquids; inflammable solids; organic peroxides; oxidising substances; spontaneously combustible solid; dangerous when wet (solid); toxic substances; and mixture of varied dangerous substances.

Appropriate container should be selected and used in step with the characteristics of the scheduled wastes. The characteristic of scheduled wastes should be compatible with the type of material used for the container to put any reactions to halt which would deteriorate the container. In normal practice, scheduled wastes can be stored in bunghole drum (steel/plastic); open top drum (steel/plastic) with cover and clamp; intermediate bulk container; corrugated box / carton box; flexible intermediate bulk containers (FIBCs) or jumbo bags or bulk bags or polypropylene big bags; jerrican or carboy; and containers for clinical waste. Figure 1 illustrates the types of containers.



Figure 2: Scheduled Wastes Containers

Several important things to recollect when selecting containers is that the quantity of wastes should be taken into consideration to estimate the suitable size and strength of container to avoid over spilling or container breakage and the container used should be in good condition (free from any damage such as tear or hole). The suggested packaging according to waste types and characteristics are as shown in Table 1.

Table 1: Type of Containers and Their Characteristics

Type of Containers	Type of Scheduled Wastes	Packaging Requirement
Bunghole drum (steel/plastic)	- Inorganic or organic liquid waste - Steel drums should not be used for corrosive wastes such as acids or alkalis - Plastic drums compatible with most solvents. Solvents that are not compatible with plastic such as Diethyl Ether and	No hole, no bulge, and free of dent and corrosion.

	Chloroform should be stored in steel drums	
Open top drum with cover and clamp (steel/plastic)	• Solid waste • Steel drums should not be used for acidic or alkaline waste • Example: sludge, e-waste, pharmaceutical waste, laboratory waste, contaminated gloves etc.	• No hole, no bulge, and free of dent and corrosion.
Intermediate bulk container	• Used for a broad range of waste streams such as oils, solvents and acids	• No hole or crack
Jerrican / carboy	• Inorganic or organic liquid waste such as chemical wastes, solvents, etc.	• No hole or crack
Containers for clinical waste	• Clinical wastes / pathogenic wastes	• No hole or crack
Corrugated box / carton box	• Dry solid waste with no free-flow liquid generated in small quantity • Example: e-waste, contaminated rags, expired drugs, cosmetics, etc.	• No tear or hole
FIBCs	• Dry solid waste with no free-flow liquid • Example: dust, slag, ash, clinker, e-waste, dry sludge, contaminated rags or garnet, etc.	• Preferably FIBCs made of high-density polyethylene (HDPE). • Must be doubled lining. • Bags not to be filled more than 90% for secure packaging.

Labelling for Containers

For easy identification and for warning purposes, scheduled wastes containers should be clearly labelled and marked with the scheduled wastes code as laid out in the First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. In general, the characteristic label should be a square set at an angle of 45 degrees with the dimension being no less than 10 cm by 10 cm except where the size of the container or package requires for a label of smaller size. Examples of waste characteristic pictogram labels are as shown in Figure 2.

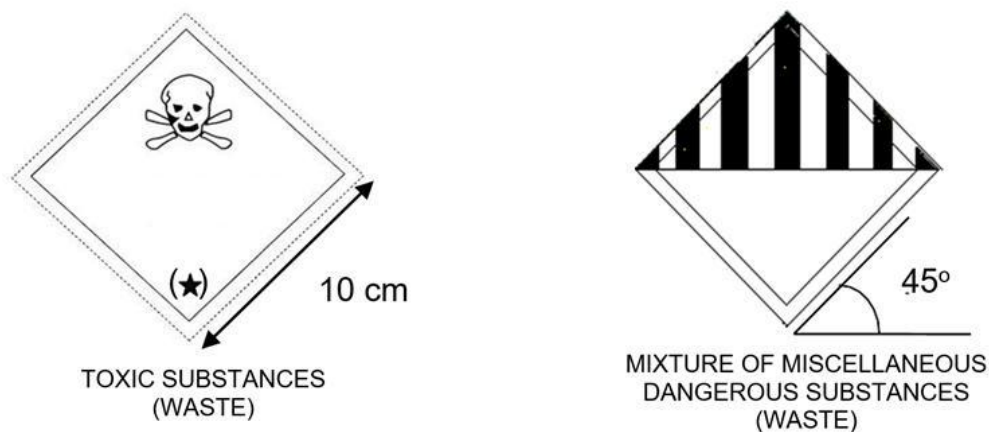


Figure 3: The Characteristics of Pictogram Label

The label of the scheduled wastes is divided into halves, the upper half of the label is for the pictorial symbol (characteristic label) while the lower half is for the text printed in block capitals containing the date when the scheduled wastes are first generated; the name, address and telephone number of the generator. Table 2 shows the hazard pictorial symbols, their names, symbol colour and background colour which is required to be used in scheduled wastes label, and this is known as the Third Schedule in the Environmental Quality (Scheduled Wastes) Regulations 2005.

Table 2: Hazard Symbol Required for Scheduled Wastes Label

Symbol	Symbol Name	Symbol representation and colour	Background
	Explosive substances (waste)	Exploding bomb (Black)	Light orange
	Inflammable liquids (waste)	Flame (Black or white)	Red
	Inflammable solids (waste)	Flame (Black)	White with vertical red stripes

	Solid: spontaneously combustible (waste)	Flame (Black)	Upper half white, lower half red
	Solid: dangerous when wet (waste)	Flame (Black or white)	Blue
	Oxidizing substances (waste)	Flame over circle (Black)	Yellow
	Toxic substances (waste)	Skull over crossbones (Black)	White
	Infectious substances (waste)	Three crescents superimposed on a circle (Black)	White
	Corrosive substances (waste)	Liquids spilling from two glass vessels and attacking a hand and a metal (Black)	Upper half white, lower half black
	Mixture of miscellaneous dangerous substances (waste)	Nil	White with upper half vertical black stripes

The label text should be printed in black on all labels except when the background of the label is black, red or blue, the text would then be white. It is forbidden for anyone to alter the identification number and the labels and markings. The types of labels can be stick on; metal plates; stenciled on the container; or printed on the container, as long as it can withstand open weather exposure without a substantial reduction in effectiveness. Label should then be placed on a background of contrasting color. It should be noted that wastes that are capable of causing two or more hazards, then all the hazards must

be clearly identified and the waste shall be labelled accordingly. Figure 3 shows an example of label for the scheduled wastes containers.

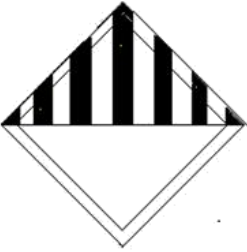
	
MIXTURE OF MISCELLANEOUS DANGEROUS SUBSTANCES (WASTE)	
Waste code	:
Waste name	:
Date generated	:
Name of waste generator	:
Address and telephone number	:

Figure 4: Example of label for scheduled wastes container

Storage of Scheduled Wastes

Containers containing scheduled wastes should always be enclosed at all-time except when filling in or removing the content. This filling of wastes into the containers should be as close to the source of waste generation as possible. Any and all spills should be contained swiftly and prevented from spreading. The scheduled wastes should then be immediately transferred to a better container.

Containers containing scheduled wastes should be placed on pallet and should be stored with a maximum of four drums or one bag per standard pallet and stacking of pallet without crate storage should not be more than two tiers but stacking with crate storage should be no more than three tiers. The storage of scheduled wastes on crate should be in rows of two pallets wide with the drums stored vertically. The use of forklift should be used to move these containers.

The storage should have an adequate aisle space between groups of containers for easy movement of the forklift and other equipment and machinery, emergency firefighting purpose, emergency escape route and for the ease of inspection of containers for leaks or spillages.

Inventory record for every scheduled wastes should be maintained, indicating the date, type and quantity of wastes brought into or removed from the storage site. A copy of this record should be made available at the storage area.

Figure 4 below provides a flowchart illustrating the key points of each topic (packaging of the scheduled wastes, labelling of the scheduled wastes container and storage of the scheduled wastes and their containers) respectively.

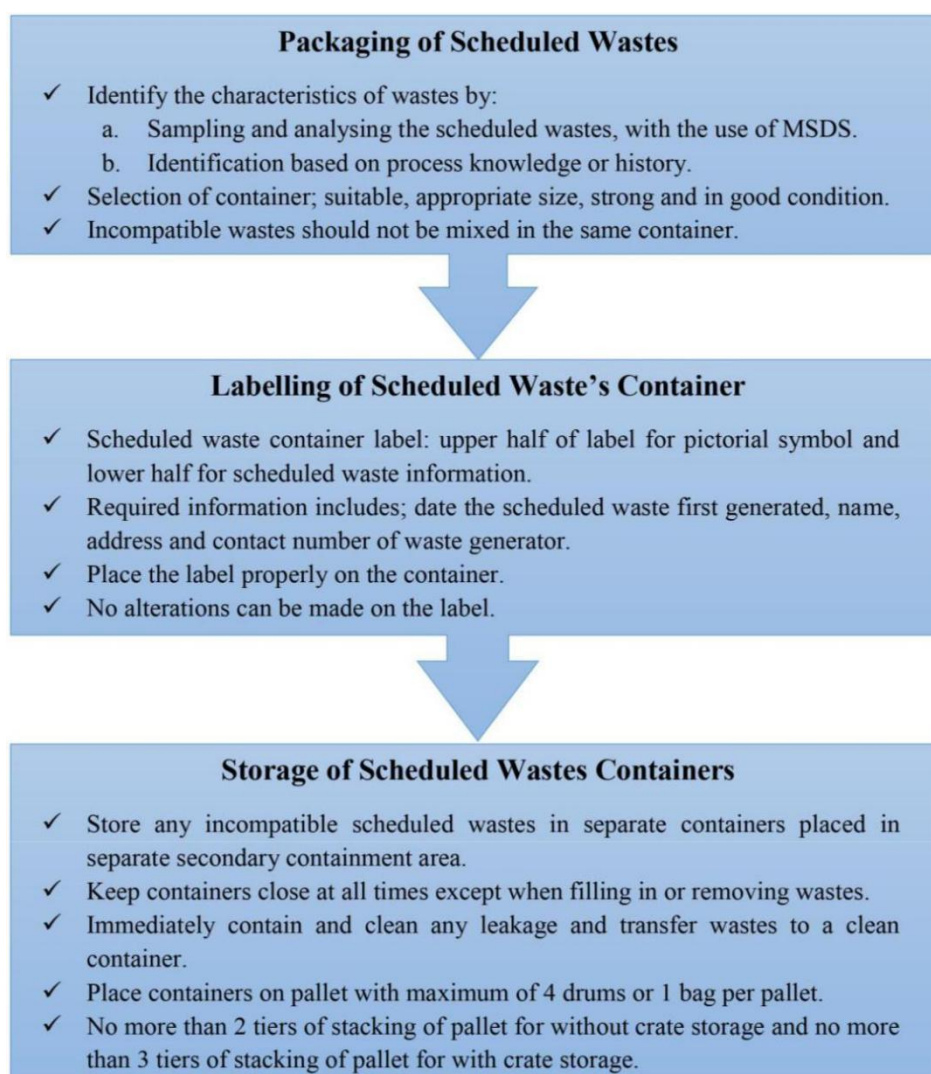


Figure 5: Flowchart of Packaging, Labelling and Storage Based on the Guideline

Demographic Profile of Survey Respondents

To assess the practical application of the guideline, a survey questionnaire was distributed to 13 scheduled waste handlers at IIUM Kuantan Campus. Table 3 presents the demographic profile of the respondents.

Table 3: The Frequency Distribution of the 13 Respondents by Demographics.

	Variable	Frequency	Percent
Gender	Male	7	53.8
	Female	6	46.3
Age	30 and below	1	7.7
	31-39	9	69.3
	40 and above	3	23.0
Race	Malay	12	92.3
	Dusun	1	7.7
Qualification/ Education	<i>Sijil Pelajaran Malaysia Vokasional</i> (SPMV)	1	7.7
	Diploma	1	7.7

Department	Degree	10	76.9
	Master	1	7.7
	Biomedical Science (BMS)	5	38.5
	Biomedical Science for Nursing (BMSN)	2	15.4
	Chemistry	2	15.4
	Engineering	1	7.7
	Lab Office	1	7.7
	Orthopaedics	1	7.7
	Polyclinic	1	7.7
Kuliyah	Kuliyah of Allied Health Sciences (KAHS)	3	23.1
	Kuliyah of Dentistry (KOD)	1	7.7
	Kuliyah of Medicine (KOM)	2	15.4
	Kuliyah of Nursing (KON)	2	15.4
	Kuliyah of Pharmacy (KOP)	2	15.4
	Kuliyah of Science (KOS)	3	23.1
Position/ Job title	Assistant science officer	1	7.7
	Dental therapist	1	7.7
	Medical Laboratory	1	7.7
	Mortuary	1	7.7
	Science Officer	5	38.5
	Senior Assistant Science Officer	1	7.7
	Senior Medical Laboratory Technologist	2	15.4
	Technician	1	7.7

Note: Percentages do not always add up to 100 because of rounding up.

The demographic data showed that 7 (53.8%) of the respondents were male and 6 (46.3%) were female. Most of the respondents were in the age range of 31 to 39, representing 69.3% of the respondents. 12 respondents (92.3%) are Malay. By the time they took the survey, 10 (76.9%) of them were degree holders. The respondents were from various kuliyahs (with Kuliyah of Allied Health Science and Kuliyah of Science contributing to the greatest number of participants, which is 3 while the least was from Kuliyah of Dentistry with only 1 participant) and held different positions, with Science Officer being the most common with 5 participants (38.5%) and second highest participants with the position of Senior Medical Laboratory Technologist with 2 participants (15.4%).

Overall Survey Findings

The survey covered the three aspects of packaging, labelling and storage of scheduled wastes, with a maximum total score of 62 points (22 for packaging, 18 for labelling, and 22 for storage). The overall results revealed significant gaps between the established guidelines and actual practice. Table 4 and Figure 5 present the overall score grouping for all participants.

Table 4: Score Grouping for the Participants' Overall Scores

Score Grouping	Packaging		Labelling		Storage		Overall	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Poor	6	46.2	3	23.1	12	7.70	8	61.5
Fair	6	46.2	8	61.5	1	92.3	5	38.5
Good	1	7.7	2	15.4	0	0	0	0

Note: Based on Bloom's cut off points; 0 to 30 = Poor, 31 to 48 = Fair and 49 to 62 = Good.

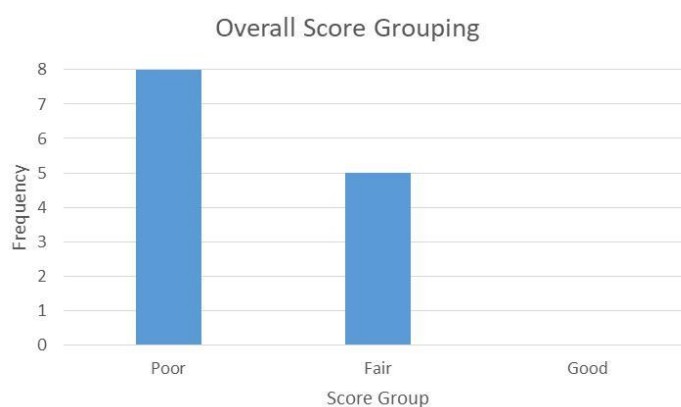


Figure 6 : Bar charts for the participants' overall score grouping

The results showed that 8 out of 13 participants (61.5%) scored in the 'Poor' category, 5 participants (38.5%) scored 'Fair', and none achieved a 'Good' score. The mean overall score was 25.92 out of a maximum 62 points, with scores ranging from 11 to 38. These findings demonstrate a significant gap between the established guidelines and actual practice at IIUM Kuantan Campus, highlighting the critical need for comprehensive training and stricter enforcement of the DoE guidelines.

CONCLUSION

The first objective of this study was successfully achieved. The "Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia" was extracted and summarised to cover the key components for the safe and compliant management of scheduled wastes. The results showed that the guideline provides a comprehensive framework that goes beyond the legal requirements of the Environmental Quality (Scheduled Wastes) Regulations 2005 by providing practical details such as the types of containers for specific wastes, the specific dimensions and colours for hazard labels, and the detailed procedures for storage such as stacking limits and inventory management.

However, the survey results obtained from the 13 scheduled waste handlers at IIUM Kuantan Campus revealed that while the guideline exists and is comprehensive, its implementation is severely lacking. Overall, 61.5% of participants scored 'Poor' while 38.5% scored 'Fair', with no participant achieving a 'Good' overall score.

Thus, in relation to the aforementioned objective of this research, this study is therefore considered successful. The first objective was accomplished by summarising the government-issued guidelines, extracting topics on packaging, labelling and storage of scheduled wastes. The findings highlight that while a robust guideline exists, there is an urgent need for comprehensive training and stricter enforcement to ensure that scheduled waste handlers are fully aware of and compliant with the established procedures.

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