PEAT

To Study on Scheduled Waste Management Awareness Among Community at UTHM, Parit Raja

Muhammad Aydeed Abdul Karim[1], Shafawi Ismail[1*]

[1]Department of Mechanical Engineering Technology, Faculty of Engineering Technology,
Universiti Tun Hussein Onn Malaysia, Pagoh Higher Education HUB, KM1, Jalan Panchor, 84600 Pagoh, Johor, MALAYSIA

*Corresponding Author Designation

Abstract: Scheduled Waste Management issues being highlighted in a higher educational institute for 20 years ago in developing countries. Previous studies shown, there are many discrepancies during managing scheduled wasted especially during segregation, transportation, storage, labelling and disposal. Thus, common poor practiced being captured are contaminated containers not properly labelled, expired chemical stored incorrectly, normal wastes contaminated with scheduled waste and laboratory wastes not properly managed. Even though, various initiatives have been carried out by Environmental Unit of OSHE Department, but non-compliance issues keep recurring year by year. Therefore, this paper aims to examine on non-compliance practices during managing the scheduled waste and to propose recovery plans to mitigate or reduce the non-compliance issues. The outcomes of the study will help UTHM management especially OSHE department to review the existing procedures and practices toward reducing schedule waste generated at campus. Also, to conduct an awareness program to all communities regards the process of managing the schedule wastes in UTHM Parit Raja. SPSS software used for data analysis to obtain descriptive statistics of the respondents' demographic. The results from ANOVA showed there was a statistically significant different at the $p < .05$ for $n = 53$ to demographics of Positions but depicted no significant different for Gender, Age and Educational Background in their perceptions to the Scheduled Waste Management. Some intervention was proposed to mitigate non-compliance issue of the scheduled waste management. The plan was to make scheduled waste one of the mandatory subjects, provide training for all staff regarding scheduled waste and increase the temporary storage to each generator of the scheduled waste.

Keywords: Scheduled Waste, Managing, Laboratory Waste, OSHE, Awareness

1. Introduction

Wastes can be defined as unusable or unwanted material that been produced by any source. Waste also can be defined as any substance which are dumped after primary use, or is worthless, defective and of no use. In general, wastes can be classified as three categories which are, municipal waste, hazardous waste, and biomedical waste.

Scheduled waste, or commonly known as hazardous waste also is one of the waste categories that been produced from many resources. Scheduled wastes can be defined as any waste falling within the categories of waste listed in the First Schedule of the Environment Quality (Scheduled Wastes) Regulations 2005 [1]. Scheduled wastes are any unwanted materials which are include solid, semi-solid, liquid, or gases which can be a potential hazard to human and the environment if emitted, released, deposited or discharged to environment.

From 77 types of scheduled wastes in Malaysia, UTHM generated 10 of the scheduled wastes that have been listed in the Environmental Quality (Scheduled Waste) Regulations 2005. The particular scheduled wastes generated mainly comes from activities being carried out at Research Centre, laboratory area, workshops and others.

The person or place that generate the waste called as "waste generator" [2]. Before the disposal process, the scheduled waste will be classified by the category and accumulate the scheduled waste at the storage yard of the scheduled waste. Scheduled wastes can be stored for 180 days or less depending on the waste amount that cannot be exceed 20 metric tonnes. The permission from Director General of Department of Environment Malaysia required if the generator wished to keep longer [3].

1.1 Problem Statement

Illegal dumping of scheduled wastes on land and in water has negative consequences for the environment, human and animals [4]. Paints, used solvents, motor oil, and other dangerous items have been thrown into forests and state parks carelessly other than household garbage.

According to the findings, the temporary storage area that is located at the biodiesel pilot plant is not in the proper condition in terms of safety. This is due to the fact that this location held scheduled waste as well as material that is utilized on a daily basis.

1.2 Objectives

The objectives of this research are:

I. To identify the knowledge level of the community about the scheduled waste.
II. To examine the practices of management towards scheduled waste.
III. To propose recovery plans to mitigate or reduce non-compliance while managing scheduled waste among community.

2. Materials and Methods

This section describes the research methodology to ensure the validity and reliability of the results. Research methodology is defined as the method used to collect accurate and useful data and information to enable researchers to make a concrete judgment. References may be through journal research, observation, interviews, surveys, and other research methods and may contain both current and historical information. Somehow, rather, a researcher could use other criteria to solve the given research problem. This is due to different sources and methods of collecting data used to solve the problem.

2.1 Materials

The survey questionnaires and interview method will be used to further analyse and explore knowledge about scheduled waste management. Plans were made to create a set of questionnaires and survey forms to be distributed to the community of UTHM concerned

The qualitative method used to gain an understanding of underlying reasons, opinions and motivations. It provides information about the problem or helps generate ideas or hypotheses for possible quantitative research

2.2 Methods

The data collected from the survey questionnaires is analysed using the SPSS system, either t-Test, One-way ANOVA, or correlation Pearson's. The results of the performed statistical analysis are interpreted in the results and the discussion process

propose new plans before submitting the complete report. Following the steps of the investigation flowchart means that the researcher has completed the entire research progression process.

2.3 Operational Framework

Gathering information is the crucial part of this investigative activity. Information can be obtained from various sources such as books, journals, articles, online, interviews, questionnaires, surveys, case studies and others. However, the literature review is the most useful method to obtain information from previous studies or research about the similarity of the case study conducted.

2.4 Research Approach

The researcher follows the inductive agreed upon to achieve the goals of the research. For each investigation progress, the investigators go through the monitoring process to get comprehensive theories and conclusions to prepare the investigations. This is because, following the inductive approach, researchers explore the details of what they want to generate qualitative data. However, the inductive approach has the limitation that it can generate a total of theories and the results are only based on a smaller set of observations. Therefore, the reliability of the research results will be questionable

3. Results and Discussion

Results obtained were analysed thoroughly based on findings from the collected data and presented for better understanding. The data was collected through the distribution of questionnaire to academic staff, non-academic staff and students spreading to selected faculty area which included FTK, FKMP and FKAAB communities to achieve 70 respondents. Nevertheless, only 53 respondents responded to the questionnaire.

The analysis of data was using Statistical Package of Social Science (SPSS) to measure the reliability test, ANOVA, and Pearson's Correlation of the data collection from the survey questionnaires. However, the qualitative measure using interview and observations also applied for this study to support the study

3.1 Results

Based on the reliability statistics that generated from SPSS software, the data collection was positive and acceptable for the Cronbach's Alpha where the result was 0.85. Refer to [5], the author that shows the alpha greater than 0.70 is sufficient to consider no further scale development is required, leading to the statistics only presented in the study without further interpretation. **Table 3.1: Reliability Statistic for Cronbach's Alpha** below shows the reliability statistics that can be assume as in acceptable scale for the data analysis;

Table 3.1: Reliability Statistic for Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.855	.841	15

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3.1.1 One-way ANOVA Test

Analysis of Variance (ANOVA) is a statistical analysis Procedures related to the comparison of means of several samples, it can be viewed as an extension of the t-test for two independent samples to more than two groups. The purpose is to test for significant differences between class means, and this is done by analysis of variance

Table 3.2: One-Way ANOVA Test for Position Categories

ANOVA					
POSITION					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21.126	25	.845	2.360	.016
Within Groups	9.667	27	.358		
Total	30.792	52			

The data shown that the position categories which are consist academic staff, non-academic staff and student have different level of the knowledge about the scheduled waste

The **Table 3.3** below showed that the F for gender categories is 1.56 and the significant value is 0.13. Since significant value is larger than 0.05, null hypothesis is accepted. It is found that for gender category, it did not give any impact or change for the result that influence for the scheduled waste management.

Table 3.3: One-way ANOVA Test for Gender Categories

ANOVA

GENDER

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.483	25	.219	1.558	.131
Within Groups	3.800	27	.141		
Total	9.283	52			

Table 3.4 showed that the F for age categories is 1.60 and the significant value is 0.12. Since significant value is larger than 0.05, null hypothesis is accepted. It is found that for age category, it did not give any impact or change for the result that influence for the awareness of the scheduled waste among the community in UTHM Parit Raja.

Table 3.4: One-way ANOVA Test for Age Categories Demographic

ANOVA

AGE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.778	25	.711	1.596	.119
Within Groups	12.033	27	.446		
Total	29.811	52			

Table 3.5 showed that the F for education background categories is 1.52 and the significant value is 0.14. Since significant value is larger than 0.05, null hypothesis is accepted. It is found that for education background category, it did not give any impact or change for the result that influence for the awareness of the scheduled waste among the community in UTHM Parit Raja.

Table 3.5: One-way ANOVA Test for Education Background Categories

ANOVA

EDUCATION BACKGROUND

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	25.013	25	1.001	1.529	.141
Within Groups	17.667	27	.654		
Total	42.679	52			

3.2 Discussions

The analysis being done according to the survey questionnaires that have been conducted at the UTHM Parit Raja about the awareness of the scheduled waste among the community of UTHM. The particular survey questionnaires are divided into 3 sections as shown in **Figure 3.** which are, Basic Knowledge on the Scheduled Waste, Scheduled Waste Management at Workstation and Scheduled Waste Management Improvement
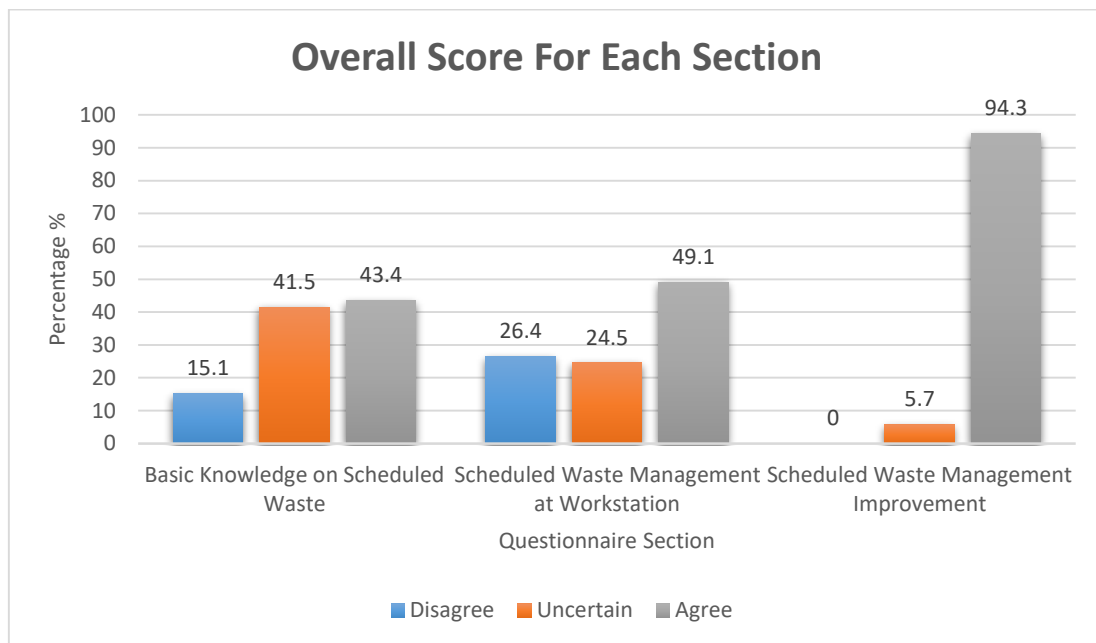

Figure 3.1: Overall Score from Survey Questionnaire for Each Sections of the Scheduled Waste Management Awareness Among Community at UTHM
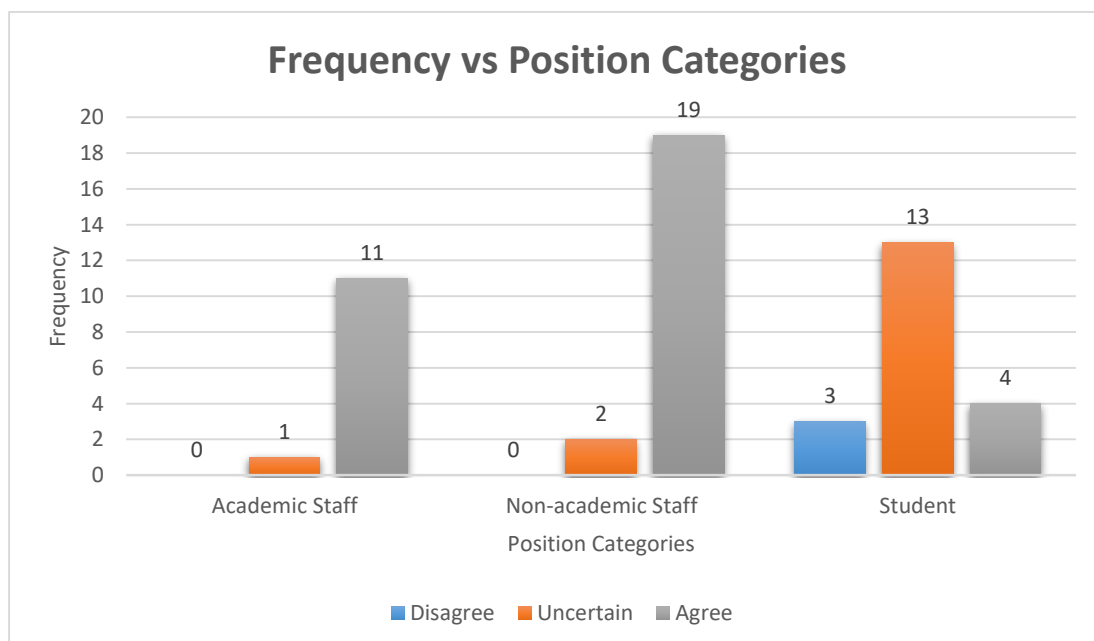
Figure 3.2: Tabulation of Response for Each Position Categories Regarding Scheduled Waste Management in UTHM
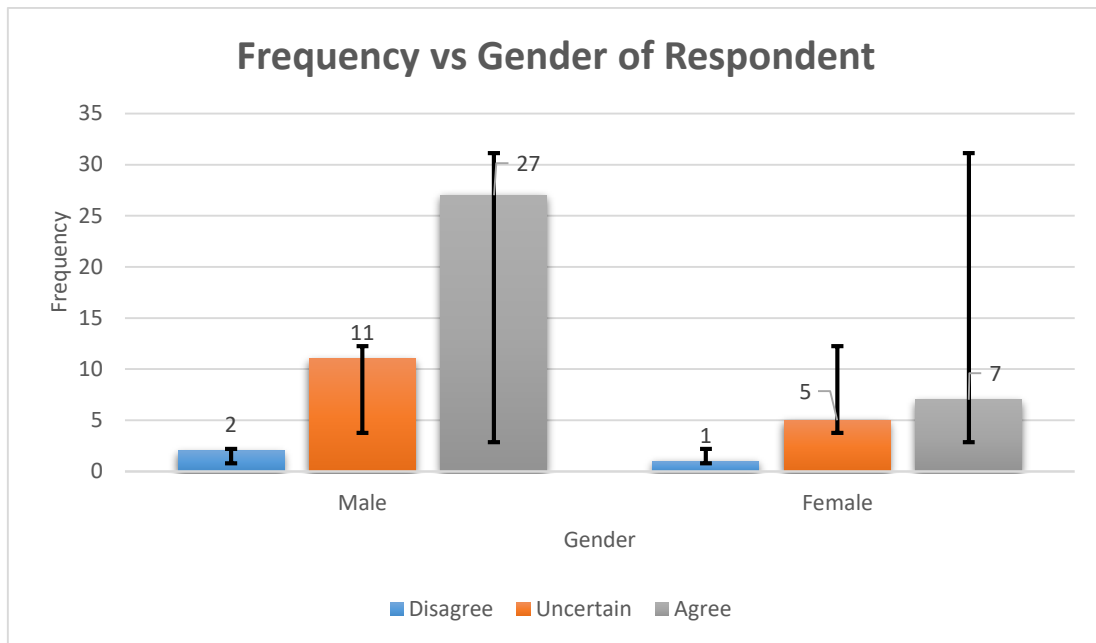
Figure 3.3: Tabulation of Response for Gender Categories Regarding Scheduled Waste Management in UTHM
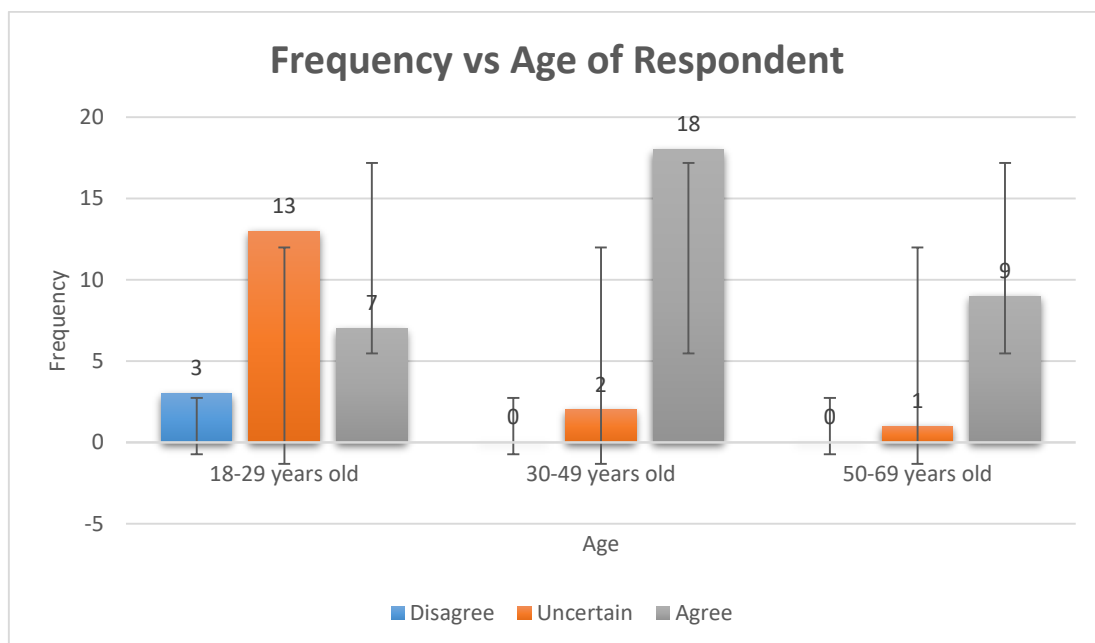

Figure 3.4: Tabulation of Response for Age Categories Regarding Scheduled Waste Management in UTHM
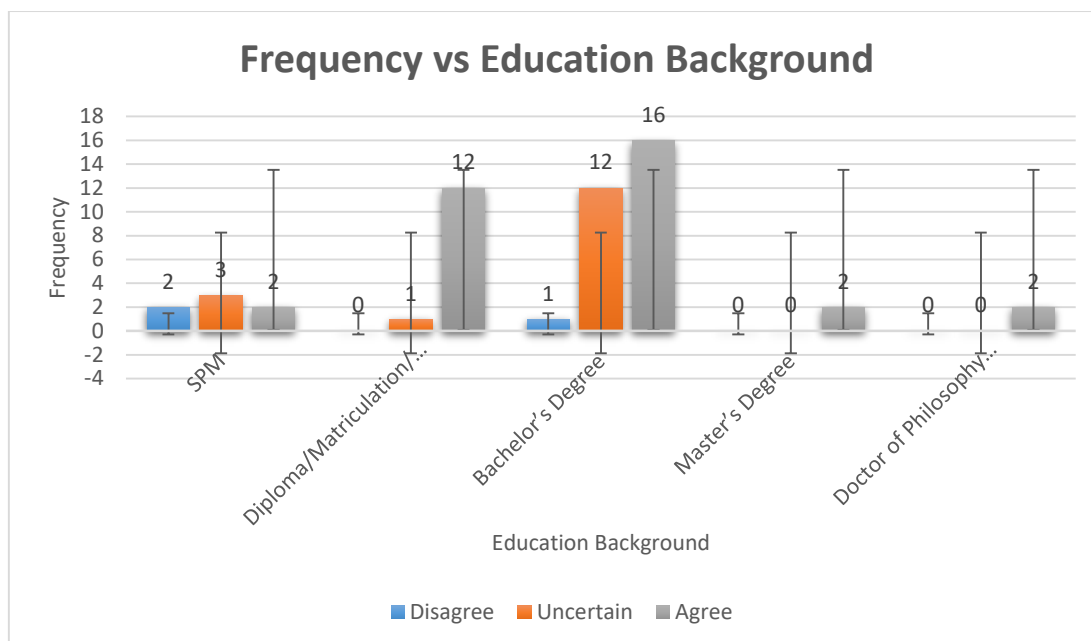
Figure 3.5: Tabulation of Response for Education Background Categories Regarding Scheduled Waste Management in UTHM

3.3 Proposed New Intervention

This study can be used as guidance toward the management of the scheduled waste with proper procedure that can avoid or decrease any harm toward environment and community. As the low awareness level among the students, it is the best to make the subject as mandatory for all students that included knowledge of the scheduled waste to improvise the awareness of the scheduled waste among the students.

Moreover, to mitigate non-compliance among the person that managing the scheduled waste, management must provide a training to all the staff including academic and non-academic staff. So, the result of the training of the scheduled waste, it can make a higher chance to avoid any non-compliance among the community that managing the scheduled waste.

Lastly, OSHE committee or university management must provide more facilities to store the scheduled waste as current temporary store did not have for each generator of the scheduled waste. If the temporary store exists for each generator of the scheduled waste, it will reduce the amount of the mixing scheduled waste with other waste that primarily it cannot be in one place

4. Conclusion

A study on scheduled waste at the laboratory of UTHM main campus was carried out in order to answer the objectives which are to quantify the Scheduled Waste generated in laboratory of the selected faculty which are biodiesel pilot plant, FKMP laboratory and FKAAB laboratory. Next, to examine non-compliance practices during management of scheduled waste. Lastly, to propose recovery plans to mitigate or reduce non-compliance while managing scheduled waste among community.

The objective 1 have been achieve which to identify the knowledge level of the community about the scheduled waste. The result shown that among the students, there were quite low knowledge about the hazardous of the scheduled waste. However, for other categories which included staff academic and non-staff academic, the scheduled waste was not something unfamiliar matter to them. The knowledge

of each staff about the scheduled waste gives a good impact that can reduce the hazard of the scheduled waste towards the community and nature of UTHM.

For the objective 2, To examine the practices of management towards scheduled waste. From the result of the questionnaire survey and observation, it can be concluded that there are in low level of the non-compliance practices for the scheduled waste management within the person that managing the scheduled waste. The practices management was supported with the interviewing the person in-charge of the scheduled waste at the themselves workstation.

In the laboratory of FKAAB, which consists of 6 type of scheduled waste category. The 6 categories of the scheduled waste are SW305, SW306, SW311, SW315, SW429 and SW430. For the laboratory in FKMP, it consists 4 types of the category of scheduled waste which include SW305, SW307, SW429 and SW430. Lastly, for the biodiesel pilot plant, there was only 1 type of scheduled waste category which is SW430.

Result from analyses indicates that the waste which may contain either inorganic or organic constituents are the major scheduled waste generated in the laboratory of UTHM followed by waste containing principally organic constituents which may contain metal and inorganic materials. In additional, metal and metal-bearing waste, waste containing principally inorganic constituents which may contain metal and organic materials and other waste was recognized as the least classification that contribute to the scheduled waste in laboratory.

In relation to objective 3, it can be concluded that the suggestion to propose recovery plans to mitigate or reduce non-compliance while managing scheduled waste among community has been achieve through the intervention that explain and recommending some plan to reduce the non-compliance issue in UTHM. Based on the questionnaire given to the community for improvement section, it also can be concluded that all community including staff and students were ready to approach the new knowledge about the scheduled waste to make sure community and the environment were always in maximum condition.

Acknowledgement

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