ASSESSMENT OF INDIVIDUAL SEPTIC TANK EFFLUENT QUALITY IN KOTA BHARU

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DEDICATION

I would like to dedicate this to my beloved mother and late father, Mek Nab Bt Deris and Mohd Arifin Bin Awang, my lovely wife, Latifah bt Md Zain, my childrens, Irfan Danish, Iman Danial, Izzul Darwish and Izzara Nuraisyah, my family, friends and lecturers

Thanks for everything

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ABSTRACT

Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking. . Disposal of domestic sewage and industrial effluents into the environment without proper treatment process is a major contributor to deterioration in water quality. Currently, less than 10 percent of the 1.3 million individual septic tanks in Malaysia were emptied. All tanks should be emptied every two years according to the size of the tank and the size of the household to avoid polluting the environment and water sources.This study is intended to identify the premises that carried out the desludging individual septic tank, to check the quality of water effluent from desludged and non-desludged individual septic tank according to the following parameters Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS) and Ammoniacal Nitrogen (NH_3), to compare the effluent quality from desludging and non-desludging septic tank and also to discuss sustainability management and sewage treatment systems at Kota Bharu, in addition to discussing problems and related issues. The total number of desludged individual septic tank in Kota Bharu still low compared to total number of septic tank. The percentage in 2017 is 2.1%, 2018 is 2.1% and 2019 is 2.2%. The increment only 0.1% shows that the awareness of Kota Bharu residents is still low. Based on the results of laboratory tests performed, the content of three parameters tested from individual septic tanks that have emptied the tank, which is Biological Oxygen Demand (BOD), Total Suspended Solid (TSS) and Ammoniacal Nitrogen (NH_3), it is found that the content of the content is below the standard level A and B stated in environmental quality (sewage) regulation 2009 except Total Suspended Solid (TSS) content. The content of Total Suspended Solid (TSS) for D-2 and D-3 premises is still below standard B, only the content for D-1 premises is quite high at 139 mg / L above standards A (50 mg / L) and B (100 mg / L). The Total Suspended Solid (TSS) content in the D-1 premises is quite high as the owner of the permit combines a sink and shower system with a toilet sewage system. Premises D-2 and D-3 use separate systems. Overall, the effluent quality of desludged individual septic tanks is better and safer for the environment.

ABSTRAK

Air buangan adalah air yang sifat fizikal, kimia atau biologinya telah berubah akibat pengenalan kepada bahan-bahan tertentu yang menjadikannya tidak selamat untuk beberapa tujuan seperti minum. . Pada masa ini, kurang daripada 10 peratus daripada 1.3 juta tangki septik individu di Malaysia dikosongkan. Semua tangki harus dikosongkan setiap dua tahun mengikut ukuran tangki dan saiz isi rumah untuk mengelakkan pencemaran alam sekitar dan sumber air. Kajian ini bertujuan untuk mengenal pasti premis yang mengosongkan dan tidak mengosongan tangki septik individu, untuk memeriksa kualiti efluen air dari kedua-dua tangki septik individu bagi parameter berikut seperti Biological Oxygen Demand (BOD5), Jumlah Pepejal Terampai (TSS) dan Ammoniacal Nitrogen (NH_3), untuk membandingkan kualiti efluen dari tangki septik yang dikongkan dan tidak dikosongkan dan juga untuk membincangkan pengurusan kelestarian dan sistem rawatan kumbahan di Kota Bharu, selain membincangkan masalah dan masalah yang berkaitan. Jumlah tangki septik yang dikosongkan di Kota Bharu masih rendah berbanding dengan jumlah tangki septik. Peratusan pada tahun 2017 adalah 2.1%, 2018 adalah 2.1% dan 2019 adalah 2.2%. Kenaikan hanya 0.1% menunjukkan bahawa kesedaran penduduk Kota Bharu masih rendah. Berdasarkan hasil ujian makmal yang dilakukan, kandungan tiga parameter yang diuji dari tangki septik individu yang telah dikosongkan, iaitu Biological Oksigen Demand (BOD), Pepejal Terampai (TSS) dan Nitrogen Amonia (NH_3), didapati bahawa kandungan berada di bawah paras standard A dan B yang dinyatakan dalam peraturan kualiti alam sekitar (kumbahan) 2009 kecuali kandungan pepejal terampai (TSS). Kandungan Pepejal Terampai (TSS) untuk premis D-2 dan D-3 masih di bawah standard B, hanya kandungan untuk premis D-1 agak tinggi iaitu 139 mg / L di atas standard A (50 mg / L) dan B (100 mg / L). Kandungan Pepejal Terampai (TSS) di premis D-1 tinggi kerana pemilik premis menggabungkan sistem sink dan pancuran dengan sistem kumbahan tandas. Premis D-2 dan D-3 menggunakan sistem yang berasingan. Kualiti efluen tangki septik individu yang dikosongkan lebih baik dan lebih selamat untuk alam sekitar.

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LIST OF ABBREVIATIONS

UTM	-	Universiti Teknologi Malaysia
IWK	-	Indah Water Konsortium
WICAM	-	Water and Energy Consumer Association of Malaysia
BOD	-	Biological Oxygen Demand
COD	-	Chemical Oxygen Demand
TSS	-	Total Suspended Solid
NH_3	-	Ammoniacal Nitrogen
MS	-	Malaysia Standard
D	-	Desludged
ND	-	Non-desludged
IST	-	Individual Septic Tank
IT	-	Imhoff Tank
STP	-	Sewerage Treatment Plant
WSIA	-	Water Services Industry Act
EA OD	-	Extended Aeration
RBCSBR	-	Oxidation Ditch
PE	-	Rotating Biological Contactors
DOE	-	Sequenced Batch Reactors
EQA	-	Population Equivalent
FOG	-	Department of Environment Environmental Quality Act Fat, Oil & Grease

CHAPTER 1

INTRODUCTION

1.1 Background of study

Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking. The day to day activities of man is mainly water dependent and therefore discharge ‘waste’ into water. Some of the substances include body wastes (faeces and urine), hair shampoo, hair, food scraps, fat, laundry powder, fabric conditioners, toilet paper, chemicals, detergent, household cleaners, dirt, micro-organisms (germs) which can make people ill and damage the environment. It is known that much of water supplied ends up as wastewater which makes its treatment very important. Wastewater treatment is the process and technology that is used to remove most of the contaminants that are found in wastewater to ensure a sound environment and good public health. Wastewater Management therefore means handling wastewater to protect the environment to ensure public health, economic, social and political soundness (Metcalf and Eddy, 1991).

As a general rule, septic tank should ideally empty once every three to five years. However, the actual frequency will vary depending on usage and how many people live in household. The septic tank may need to pump out more frequently in larger households, for instance, while a single person living alone in a house may be able to go ten years without having the tank pumped out but a family of seven might have to pump every two years. Occasionally pumping out the septic tank is essential for its reliable operation. A septic tank that isn't working can pose problems for any household, such as sewage backing up into household drains or sewage bubbling up from the ground around the septic tank and lateral field. The quality of the effluent from the septic tank may be harm to the human being and environment.

Without scheduled desludging, untreated sewage and sludge solids will be released into rivers. This will cause depletion of dissolved oxygen in these rivers, resulting in the death of aquatic life. The large quantities of sludge that settle to the bottom of rivers will also kill off any aquatic plants that contribute oxygen to the rivers. This will cause our rivers to eventually 'die'. In addition, untreated sewage also poses a threat to public health since it may contain pathogenic bacteria and viruses that cause deadly diseases such as cholera, typhoid and hepatitis A. All septic tanks need to be desludged on a regular basis that is once in two years.

1.2 Problem Statement

Septic tanks are an important part of some residential sewage systems. These tanks are usually constructed from concrete or plastic and collect sewage and wastewater from the house. Septic tanks are usually installed where municipal sewer lines are not available, which means they most often serve rural homeowners or homes that were built before city sewer lines were laid in the area. The level of awareness among the public in the country to clear septic tanks is still low. Currently, less than 10 percent of the 1.3 million individual septic tanks in Malaysia were emptied (IWK, 2019). All tanks should be emptied every two years according to the size of the tank and the size of the household to avoid polluting the environment and water sources. Pursuant to the Water Services Industry Act 2006 (Act 655) under Section 65 (1) (c), it states that the owner of an individual septic tank is required to clear and maintain the septic tank. The quality of effluent from septic tank may be harm to human being and environment.

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APPENDICES

Appendix A Suplimentary figures

Figure A1: Selecting Location and Collecting Sample

Appendix B Desludged and Blokage of Individual Septic Tank Report 2017

Table B1: Desludged and Blokage of Individual Septic Tank Report 2017

TRIP BY LOCATION/DISTRICT	MONTH												
	Jan	**Feb**	**Mac**	**April**	**May**	**June**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**TOTAL**
MPKB-BANDARAYA ISLAM	124	184	238	165	232	165	256	200	205	279	188	119	2355
MP-TUMPAT	32	29	24	23	36	36	44	38	32	40	27	23	384
MP-PASIR MAS	15	18	21	13	24	17	32	22	22	16	15	14	229
MP-GUA MUSANG	6	4	0	21	5	1	5	8	32	8	7	12	109
MP-PASIR PUTEH	10	8	14	9	35	13	17	12	10	14	7	15	164
MP-BACHOK	14	13	15	11	15	10	21	23	10	12	17	13	174
MP-JELI	1	1	3	0	1	1	3	4	3	5	0	0	22
MP-TANAH MERAH	11	4	7	0	8	9	5	6	3	15	1	2	71
MP-KETEREH	2	13	16	9	11	9	13	13	7	8	7	7	115
MP-KUALA KRAI	7	2	7	0	5	4	6	11	5	7	1	4	59
MP-MACHANG	14	12	8	13	16	10	16	14	3	15	8	7	136
MP-DABONG										3	2	0	5
SUB TOTAL TRIP													**3,823**