THE APPLICATION OF PACKAGE PLANT SYSTEM IN UPGRADING THE EXISTING SEWAGE TREATMENT PLANT

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ABSTRACT

A modern and efficient sewerage system is vital for the country, to ensure that waste water is treated before the effluent being discharged into the waterways (eg. Lake, river and sea). Sewage Treatment Plants (STP) is designed to collect, treat and dispose human waste and other wastewaters generated from urban dwellings and commercial facilities. Since the treatment of sewerage is a vital and continuous activity, the sewage treatment plant must be managed and functioned judiciously. Upgrading the existing wastewater treatment plant systems refers to a variety of design and operational technique to improve the performance or increase plant capacity. Thus, the aim of this study is to evaluate the workability and effectiveness of the use of Package Plant System for upgrading the conventional treatment plant in order to meet the standard requirement. This study discussed on the Sewage Treatment Plant in Malaysia and also analysed problems that often face in operating and maintaining the conventional treatment plant. The methodology adopted for this study are through literature to understand the scenario of the existing Sewage

Treatment Plant (STP), gathering information and data from questionnaire survey and case studies conducted. The result of the study shows that the upgrading of existing sewage treatment plant is recommended after considering the limitations of the performance of STPs. Apart of that, it is also important to upgrade the performance of STP to maintain their efficiency and reliability.

ABSTRAK

Kepentingan sistem kumbahan yang moden dan efisyen merupakan suatu keperluan bagi sesebuah negara untuk memastikan bahan buangan air dirawat sebelum anak sungai disalirkan ke punca- punca air seperti tasik, sungai dan laut. Loji Rawatan Kumbahan direkabentuk untuk mengumpul, merawat dan menghapuskan organik bahan buangan mahu pun bahan buangan air lain yang disumbang oleh kawasan perumahan di bandar dan juga kilang-kilang perindustrian. Memandangkan rawatan terhadap bahan kumbahan adalah satu keperluan dan merupakan akiviti yang berterusan, loji rawatan kumbahan ini haruslah diselia dan dapat berfungsi dengan sebaiknya secara bijaksana. Kajian ini membawa kepada gambaran yang lebih jelas mengenai perkembangan sistem kumbahan di Malaysia dan secara ringkas masalah yang sering dihadapi di dalam menjana dan menyelenggara loji rawatan kumbahan yang sedia ada. Pembaharuan terhadap loji rawatan kumbahan yang sediada merujuk kepada kepelbagaian rekabentuk dan teknik operasi dalam memperbaiki pencapaian atau pertambahan kepada kapasiti loji.

Oleh itu, fokus utama kajian ini adalah untuk menilai kebolehkerjaan dan keberkesanan kepada pengunaan Sistem Loji Berpakej dalam menaiktaraf loji kumbahan yang sediada dan berpandukan kepada garis panduan yang telah ditetapkan. Kajian ini membincangkan mengenai Loji Rawatan Kumbahan yang sediada terdapat di Malaysia dan menganalisis masalah-masalah yang sering dihadapi dalam kerja operasi dan penyelenggaraan loji kumbahan yang sediada. Metodologi yang digunakan bagi tujuan kajian ini adalah melalui hasil laporan bagi memahami senario sebenar mengenai Loji Rawatan Kumbahan yang sediada, mengumpul data-data daripada kajian soal selidik dan kajian kes yang pernah dijalankan. Keputusan akhir kajian ini akan menerangkan menaiktaraf Loji Rawatan Kumbahan yang sediada sangat disyorkan selepas mengambilkira faktor-faktor tertentu dalam menjalankan Loji-loji Rawatan Kumbahan. Oleh itu adalah penting unrtuk menaiktaraf kecekapan Loji-loji Rawatan Kumbahan dalam mengekalkan effisiensi dan kebolehkerjaan.

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LIST OF ABBREVIATIONS

BF	Biofilter
BOD	Biological Oxygen Demand
CST	Communal Septic Tank
DOE	Department of Environment
FRP	Fibre Reinforced Plastics
IT	Imhoff Tank
IWK	Indah Water Konsortium Sdn Bhd
MPM	Mechanical Plant With Media
MPNM	Mechanical Plant Without Media
MLSS	Mixed Liquor Suspended Solid
MLVSS	Mixed Liquor Volatile Suspended Solid
NH3	Ammonia
OP	Oxidation Ponds
RSPP	Raw Sewage Pretreatment Plant
TS	Trenching System
STP	Sewage Treatment Plant

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CHAPTER 1

INTRODUCTION TO STUDY

1.1 Introduction

Sewerage services are an important urban development and service that is crucial towards promoting sound urban health. It consists of facilities for the collection, treatment and disposal of human waste and other wastewaters generated from urban dwellings and commercial facilities. Sewage contains biological and

chemical constituents and a variety of pathogenic organisms, all of which can pose serious public health threats.

Malaysia’s sewerage system comprise of public and private on-site sewerage system such as individual septic tank. All these systems function at various degree of efficiency in removing the pollutant load due to sewage on the environment. Prior to the privatization of the sewerage services, Indah Water Konsortium (IWK) which was set up in year 1994, responsible to take over, upgrade, operate, manage and maintain existing sewerage system within Local Authority.

1.2 Problem of Study

In order to manage the Sewage Treatment Plant (STP), Indah Water Konsortium (IWK) has experienced and faced a lot of difficulties especially inefficient of operation and maintenance. Several problems were frequently encountered with the existing treatment plant system and were identified as follows:

i. Due to the inconsistent compliance of the effluent quality towards Department of Environment (DOE) Standard, some of the treatment plants are not able to comply with the effluent quality standard;
ii. Due to the increased on the construction by the developer, a large number of small scale treatment plants with various types of system and different modes resulting in operating inefficiency, problems occur in maintenance and non-compliance to the effluent standards; and
iii. Most of the Sewage Treatment Plant that have been taken over, are quite old and not functioning well or unable to operate at almost full capacities and sometimes above its capacity.

Hence, those plants are not well operated and maintained to achieve their optimum and to the satisfactory performance. It is important to identify what is the actually the major problem that encountered in process of maintaining and operating these treatment plant. Therefore, the application of the new package plant system is the other way to improve or replace the former sewerage system which has immense advantages in term of productivity, quality, durability and cost.

1.3 Aim And Objectives of Study

The aim of this study is to evaluate the performance of Package Plant as a proposed method to upgrade the conventional treatment plant in order to meet the

sewerage services standard requirement. The study had covered the choices of treatment systems to be opted, selection criteria in retrofitting and existing treatment systems that are required for upgrading. Finally, the report had identified the result, by looking into analysis of the performance from completed Package Plants System and to ensure that the initial objectives were achieved.

To achieve the above aim the following objectives were identified:

i. To study the existing of Sewerage Treatment Plant (STP) in Malaysia.
ii. To identify the problem related to the usage of existing Sewerage Treatment Plant (STP) in Malaysia.
iii. To study the basic features of Package Plant System (Hi-Kleen)
iv. To study the benefits of New Package Plant System in term of construction (time and cost), effluent quality standard, sludge disposal, level of technology, odor control, land availability, maintenance and operation and safety.

The above objectives mentioned above will be adopted with the selection of case study and survey conducted within the scope of study.

1.4 Scope Of Study

The scope of this study consists of the following aspects:

i. The research study on the present development especially related to Indah Water Konsortium (IWK) Sewage Treatment Plant.
ii. The study focus on the problem associated to the existing Indah Water Konsortium (IWK) Sewage Treatment Plant.

iii. The study was limited to Sewage Treatment Plant (STP) below 5,000 Population Equivalent (PE).

1.5 Brief Methodology

The study provides overview on sewerage development in Malaysia and also briefly describes problems that often occurred in operating and maintaining the conventional treatment plant. The literature search for the study obtained through are journal papers, conference papers, technical reports, books and websites browsing to understand and meet the objectives of the study. Besides that, the data for study has been generated using methodology such as structured interviews and case study. Figure 1.1 shows the schematic diagrams of the study.

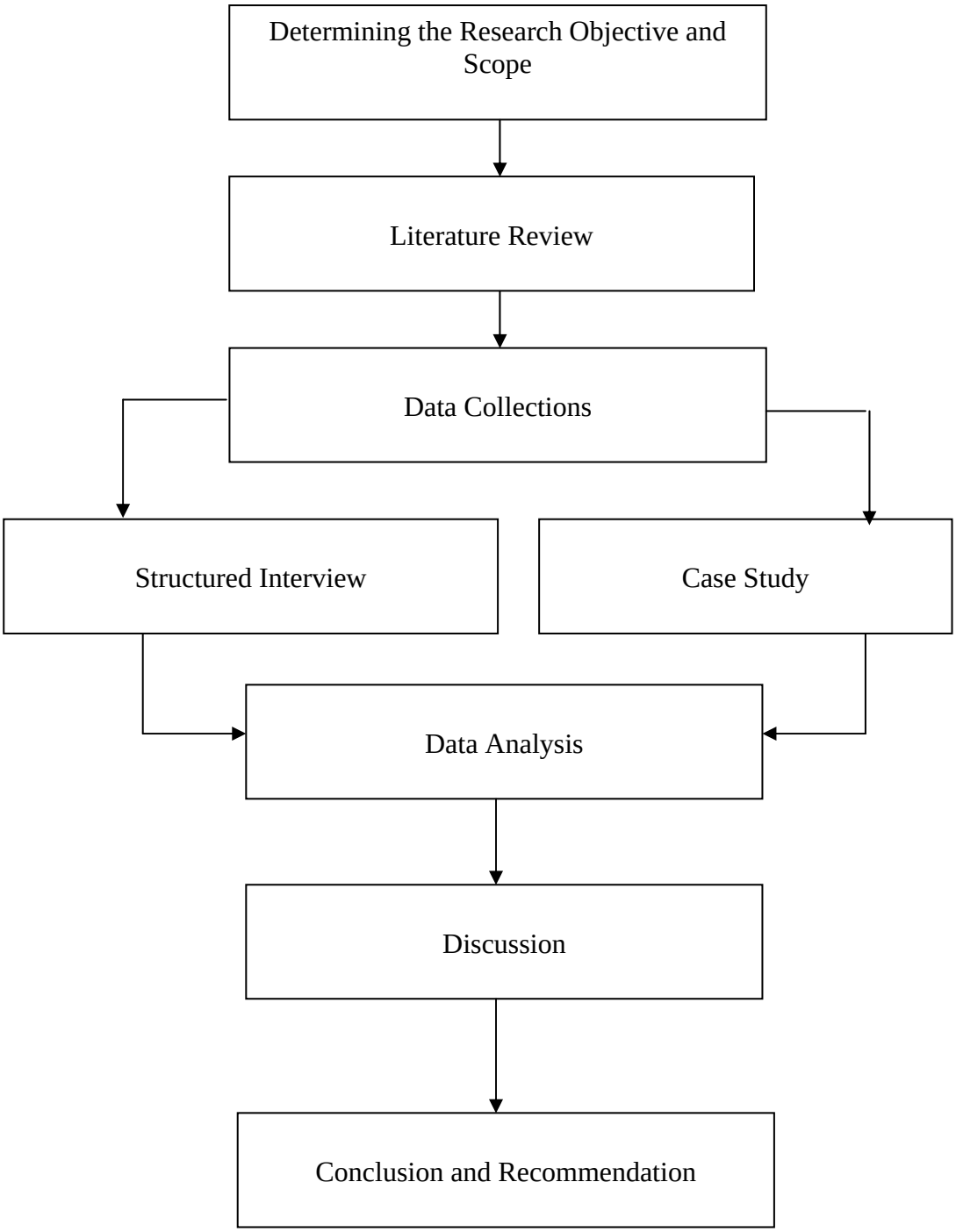

Figure 1.1 A schematic diagram of the study

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