CHAPTER 1

INTRODUCTION

1.1 Introduction

Penang Second Bridge or its other name Jambatan Sultan Abdul Halim Mu’adzam Shah (JSAHMS), is a dual carriageway toll bridge in Penang connecting Batu Kawan (Penang Mainland) to Batu Maung (Penang Island). This 24-kilometer bridge was officially opened to public on 2 March 2014 by our 6th Prime Minister, Datuk Seri Najib Tun Razak and renamed after the reigning Yang di-Pertuan Agong of Malaysia, Tunku Abdul Halim Muadzam Shah.

After the bridge was fully constructed, the bridge management system play a vital role to sustain their functions to improve the safety and reliability of the bridge. The effectiveness of way of usage and budget estimation in the control of work, scheduling of work system and planning, standards used, material and cooperation of all parties are all depending on a good management system.

Inspection and observation are the most vital factor in asset management system. Inventory are the important information needed so that every maintenance works can be monitored with more efficient and well organized according to the bridge management system for every item and renewal of the item from time to time according to the requirement.

Besides that, the main objective of the bridge management system is to make sure all the maintenance activities are well planned and controlled in perfect condition so the lifespan of the bridge can be extended. By saying that, the bridge management system should be ascertained always in a good condition so the bridge built will always be safer to use.
1.2 Problem Statement

Through monitoring and scheduled inspection conducted, the early signs of damage on asset will be able to identify thus the maintenance work can be done immediately to ensure the safety of the bridge user. There a lot of bridge collapse incident that claimed innocent life consequent from the action of some parties who underestimate about maintenance of an asset.

Among the famous bridge collapse incident are a highway bridge at Seoul, South Korea which collapsed and claimed 32 lives on 21 October 1992. The tragedy happen during peak hour and on overcrowded situation on Seongsu Bridge which crossing the Han River (The New York Times, 1994). Cause of the collapse were because of rusty extension hinges and connections on steel structures causing the bridge failed to support the excessive load.

In United States, the Minneapolis I-35W Bridge which crossing the Mississippi River built on 1967 collapsed on 1 August 2007. This 579 meter and eight lanes bridge have claimed 5 lives, 111 were injured, 5 were badly injured and the other 8 civilian was missing (A. Weeks III, 2009). The investigation later showed that there are no comprehensive inspection and maintenance on the bridge even knowing that the age of the bridge has been nearly 40 years.

In our country, there is also few bridge collapse incident but only a minor incident and smaller compared to the long highway bridge such as Penang Bridge and Penang Second Bridge. Both of the superstructure were design to withstand heavy loads, earthquake and have long lifespan but still expose to other factors such as bad weather, accident and etc. The 2004 Indian Ocean earthquake affect Penang and also the first bridge. The cracks were inspected by expert consultants, T-Corp Engineer Sdn Bhd, and their report was presented to the Malaysian Highway Authority (MHA). The MHA had instructed Penang Bridge Sdn. Bhd. (PBSB) to intensify inspections on the bridge structure from time to time (The Sun Daily, 2005)
Other problems such as settlement that occurs on the embankment of the bridge, also can affect the road user and give doubts to others to use the bridge. The new Penang Second Bridge also was no exception. There is a sudden ‘dipping’ on the road surface at KM3.1 of the bridge, which may cause the undercarriage of vehicles to scrape the road surface. The road condition may also be dangerous for vehicles travelling at high speed (The Star Online, 2016).

Aware of the situation, all the incident could be avoided and prevented if the bridge were maintained by a good management system and inspection of the bridge were done from time to time.

1.3 Research Objectives

The main goals are to study the bridge maintenance management on Penang Second Bridge which linking the mainland (Prai) to the island (Pulau Pinang). The following are the objectives that have been identified as a guide to ensure the study conducted is consistent with the title of the research:

1. To study the maintenance and inspection works of the bridge.
2. To investigate the defects and damages on the bridge structure.
3. To evaluate the level of road user satisfaction on the maintenance of the bridge in Penang Second Bridge.

1.4 Research Scope

Besides achieving the objectives of the research, the scope of the study are as follows:

1. Civil works investigated in the maintenance management.
2. Main factors that cause damages on the bridge.
3. The case study is at Jambatan Kedua Sdn. Bhd since it is the concessionaire running all the maintenance work at Penang Second Bridge.