

**STUDY ON THE OPERATIONAL  
CHARACTERISTICS OF CENTRAL AREA  
TRANSIT (CAT) GEORGETOWN, PENANG**

**LOK KOK SHENG**

**B. ENG (HONS.) CIVIL ENGINEERING**

**UNIVERSITI MALAYSIA PAHANG**



## **SUPERVISOR'S DECLARATION**

I/We\* hereby declare that I/We\* have checked this thesis/project\* and in my/our\* opinion, this thesis/project\* is adequate in terms of scope and quality for the award of the Bachelor Degree of Civil Engineering

---

(Supervisor's Signature)

Full Name : DR I PUTU MANDIARTHA

Position : SENIOR LECTURER

Date : 8 JUNE 2018



## **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

---

(Student's Signature)

Full Name : LOK KOK SHENG

ID Number : AA14215

Date : 11 JUNE 2018

STUDY ON THE OPERATIONAL CHARACTERISTICS OF CENTRAL AREA  
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LOK KOK SHENG

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## ABSTRAK

Peningkatan aliran pelancong ke Georgetown berikutan pengisytiharan Tapak Warisan Dunia oleh UNESCO telah membawa kepada pengenalan bas ulang-alik percuma yang dinamakan Transit Kawasan Pusat Rapid Penang (CAT). Ini adalah antara pengangkutan alternatif yang disediakan untuk keselesaan pelancong dan masyarakat tempatan selain membantu dalam pengurangan pencemaran dan kawalan kesesakan lalu lintas. Kajian ini bertujuan untuk mengkaji demografi pengguna CAT Georgetown dan prestasi perkhidmatan dari persepsi pengguna. Selain itu, peta destinasi asal akan dibina untuk memahami pola perjalanan pengguna menggunakan perkhidmatan CAT Georgetown. Penyelidikan ini dijalankan di kawasan perkhidmatan CAT Georgetown yang terdiri daripada 19 stesen di Tapak Warisan Dunia UNESCO. Kajian ini dijalankan dengan menggunakan kaedah tinjauan soal selidik dan kajian di atas bas untuk mengumpul data yang diperlukan. Sebanyak 70 soal selidik diedarkan secara rawak kepada responden tanpa sebarang keutamaan. Soal selidik yang diselesaikan kemudian dianalisis dengan menggunakan Microsoft Excel untuk Analisis Deskriptif untuk demografi. Prestasi CAT Georgetown telah dianalisis dengan menggunakan perisian Paket Perakaunan Sains Sosial (SPSS) yang termasuk Ujian Pilot, Ujian Kebolehpercayaan dan Ujian Normal. Selain itu, sebanyak 4 destinasi peta asal (ODM) telah diambil. Peta ini terdiri dari 2 dari semua stesen ke stesen Terminal Komtar Bus dan 2 dari semua stesen ke stesen Feri. Semua ODM adalah berasaskan hari kerja dan hujung minggu masing-masing. Selain itu, satu peta destinasi asal matrik telah dilukiskan untuk menunjukkan gambaran penuh kebiasaan perjalanan responden. Kedua-dua stesen ini adalah stesen perkhidmatan CAT Georgetown yang paling tepu. Akhirnya, cadangan dan saranan diberikan berdasarkan keputusan penyelidikan untuk meningkatkan perkhidmatan CAT Georgetown pada masa akan datang. Penemuan penyelidikan membantu pihak berkuasa tempatan dan kepimpinan CAT Georgetown dalam melakukan perancangan masa depan CAT Georgetown untuk menyediakan perkhidmatan yang lebih baik dan menjadikannya sebagai pengangkutan pilihan pertama di kalangan pengguna pada masa akan datang.

## **ABSTRACT**

The increasing flow of tourists into Georgetown along with the declaration of World Heritage Site by UNESCO has led to the introduction of free shuttle bus which is Rapid Penang Central Area Transit (CAT) Georgetown. This is an alternative mode of transport provided for the convenience of tourist and local community besides helps in pollution and traffic congestion control. This research was aimed to study the demography of CAT Georgetown user and the service performance from the perception of user. Besides, origin destination map will be constructed to understand the travel pattern of the user using the CAT Georgetown service. The research was carried out within the service area of CAT Georgetown which consists of 19 stations in the UNESCO World Heritage Site. The research was conducted using questionnaire survey method and on board study to collect the required data. A total of 70 questionnaires were distributed randomly to the respondent without preference. The collected completed questionnaires were then analyzed using Microsoft Excel for the Descriptive Analysis on the demography. The performance of CAT Georgetown was analyzed using the Statistical Package for the Social Sciences (SPSS) software which including Pilot Test, Reliability Test and Normality Test. Besides, a total of 4 origin destination maps (ODM) were drawn. The maps were consisted of 2 from stations to Komtar Bus Terminal station and 2 from stations to Ferry station both on weekday and weekend respectively. An origin destination map matrix was drawn to show the full picture of travel habit of respondent. These 2 stations were the most saturated service station of CAT Georgetown. Finally, suggestions and recommendations were given based on the results of the research to improve the CAT Georgetown service in the future. The findings of the research help both the local authorities and CAT Georgetown authorities in doing future planning of CAT Georgetown to provide a better service and make it as the first choice of the transportation among the user in the future.

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## LIST OF SYMBOLS

$\alpha$  Cronbach's Alpha Coefficient

## LIST OF ABBREVIATIONS

BA	Bus Availability
BC	Bus Cleanliness
BI	Bus Information
CAT	Central Area Transit
CC	Customer Care
ODM	Origin Destination Map
N	Total Number
SC	Service Comfort
SP	Service Performance
SR	Service Reliability
SS	Safety & Security



## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

Referring to Map of Malaysia, Penang is located on the northwest coastal region of Peninsular Malaysia which is adjacent to the Malacca Strait. It consists of two regions which is Penang Island and Seberang Perai. George Town, the capital city is situated within the Penang Island. According to Department of Survey and Mapping Malaysia (JUPEM), Penang is the second smallest state in Malaysia after Perlis. Besides that, the total land mass of Penang is 1048 km<sup>2</sup> or 405 square mile. Penang is bordered by Kedah to the north and the east and Perak to the south.

According to Department of Statistics Malaysia, the total number of citizen in Penang is approximately 1.75 million as of 14 July 2017. At the same time, the population density also rose to 1,666.3/km<sup>2</sup> or 4,316/square mile. Thus, Penang is one of the highly populated states in Malaysia. Moreover, Penang has undergone massive development which makes it among the most developed state in Malaysia. Penang Island, which includes Georgetown is the second largest city in Malaysia in terms of population.

Georgetown is listed as a UNESCO World Cultural Heritage Site in 2008 which has transformed into a favourite tourist destination for both local and foreigner (Banafsheh M. Farahani, Gelareh Abooali & Badaruddin Mahamed, 2012). At the same time, the National Physical Plan of Malaysia has the main vision of making George Town as the heart of Greater Penang. This has greatly increased the number of people to come to Georgetown for its variety of culture. Hence, the development of Georgetown especially public transportation and tourism industry is revived and back on track.

The prosperity of Penang has directly help to boost the development of all sectors. Transportation is one of the sectors that are thriving after George Town is listed as a UNESCO World Cultural Heritage Site especially the public bus transportation sector. According to the statistics from Ministry of Tourism and Culture, there are thousands of people from both local and worldwide came into Georgetown especially during school holiday and public holiday every year. In order to cater for the influx of people into the Georgetown, MBPP Rapid Penang CAT was introduced. CAT, an abbreviation of Central Area Transit is a free shuttle bus service that covers all the major streets within George Town UNESCO World Heritage Site. This is an initiative of the Penang Island Municipal Council (MBPP) and Rapid Penang which was launched on Friday, 23 January, 2009. The collaboration has providing one more choices for tourists to enjoy the humanity development, heritage and cultural values of Georgetown to the greatest satisfaction. This collaboration has also help to reduce the congestion problem in Georgetown and ensure that the disturbance to the daily living of Penangite is placed to the minimum level.

## **1.2 Problem Statement**

MBPP Rapid Penang CAT was introduced with the aim to facilitate the tourism development, reduce air pollution and encourage the usage of public transport in Georgetown. It was found that not many researchers are doing the study on this free CAT shuttle bus service from professional perspective. Therefore, in order to ensure that this initiative is up to date and still workable, it is time to collect the reviews and comments of CAT user towards this free shuttle bus service in Georgetown. From this process, the problems and issues about this service can be identified directly where improvement on the quality of the bus service can be made through detailed evaluation and continuous research on the problems arise. Besides that, the results collected will be greatly helpful to the Penang Island Municipal Council (MBPP) and Rapid Penang in preparing future planning for this service. This will also help to ensure the sustainability of CAT.

One of the critical problems of CAT Georgetown is long waiting time. This is always happening during the peak and off peak hour. When the user has to wait for the

service for an unreasonably longer time, this will waste their time and reduce their confidence towards the CAT Georgetown. Therefore, this problem should be overcome in the shortest possible time and the reasons behind that can be identified through this research.

Besides that, demography of user should be identified and studied. The characteristics of the frequent user need to be identified, what are their education level and their nationality. The information will be helpful in doing future planning for the CAT service. For instance, instruction signage in mandarin can be installed to all buses if the number of user from China is many. Apart from that, if the disabled group is frequently using the service, facility for them can be improved for their convenience and safety. All the changes and improvements cannot be done if the user's demographic information detail is not identified and acknowledged by the Rapid Penang authority.

Lastly, the crowdedness and safety issue is also a problem that is concerned in this research. As CAT Georgetown is a free service and the number of user is in many, therefore this situation is always happened. Solutions must be came up to solve the problem before any unwanted incident happens.

### **1.3 Objectives**

The research has three main objectives which are:

1. To study the demography of Rapid Penang CAT user in Georgetown, Penang.
2. To find out the performance of Rapid Penang CAT Georgetown, Penang.
3. To construct the origin-destination map of Rapid Penang CAT Georgetown, Penang.

### **1.4 Scope of Studies**

The research encompasses 19 strategic location of Georgetown including the main and buffer zones of the George Town UNESCO World Heritage Site. The Bus route is from Pengkalan Weld (Ferry) to KOMTAR with a distance of 8 km which covering an area of 1 sq.km. The research is conducted for one whole week on peak and non-peak hour. This research will be focused on the demographic information of MBPP

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