

**STUDIES ON BUS SERVICES AND PASSENGER DEMAND
SUSTAINABILITY**

MUHAMMAD ADIB BIN MAHMUD

**A thesis submitted in fulfillment of the
requirements for the award of the degree of
Bachelor of Civil Engineering**

**Faculty of Civil Engineering & Earth Resources
University Malaysia Pahang**

DECEMBER 2010

ABSTRACT

People along Kuantan – Gambang road always have a problem to get bus transportation. They need to wait for a long time to get a bus service. Sometimes, the bus that pass by the Kuantan – Gambang road is always late to arrive at a certain destination. This will make many of people would use personal transport rather than using the bus transportation. Extension from this, the rate of congestion along Kuantan – Gambang road will keep increasing causing by the personal transport such as car, motorcycle, van and Lorries. Beside, the facilities for the bus such as bus stop, is not enough. Certain place did not have a bus stop although the passenger always waits for bus at that place. The comfortable of bus passenger must be maintained so that the quality of bus service could be enhanced and this will attract more passengers to use the bus. This study is to identify the time for bus journey for bus that pass by the Kuantan – Gambang road in certain time, the total passenger use the bus, and identify a suitable location to place a bus stop and the frequency of bus stop use by the passenger. A special table has been made to collect the data such as time, total passenger, type of bus, list of bus stop along Kuantan – Gambang road and bus schedule for arrive and depart to Kuantan town. Passenger calculation for on or off from the bus is already use in developed countries to measure the rate of bus usage as well as enhanced the management of bus staff from time to time. This calculation is use in building such as library, the supermarket, commuter station, and airport. The result of studies show that the rate of bus usage in Gambang area is not encouraging because of lack in bus facilities and the time for bus journey is not suitable. From this studies, the bus schedule could be identify, total passenger use the bus and bus stop can be provide in a strategic location can be identify. Thus, i would like to proposed so that this studies is applies for each transport services such as train, airport, and bus especially to increase the rate of bus usage in Malaysia.

ABSTRAK

Penduduk di sepanjang jalan kuantan – gambang sering mengalami masalah untuk mendapatkan pengangkutan awam. mereka perlu menunggu lama untuk menaiki bas awam. kadang kala, bas yang melalui jalan gambang – kuantan ini tiba lewat di destinasi tertentu. ini membuatkan ramai memilih untuk mempunyai kenderaan sendiri sebagai pengangkutan mereka. Lanjutan daripada itu, kadar kesesakan lalu lintas di sepanjang jalan kuantan – gambang akan terus meningkat akibat penggunaan kenderaan peribadi ini. Selain itu, kemudahan untuk bas seperti perhentian bas didapati tidak mencukupi. Sesetengah tempat tidak mempunyai perhentian bas walhal tempat tersebut mempunyai ramai penumpang bas. Keselesaan pengguna bas ini perlu dijaga supaya kualiti perkhidmatan bas dapat dipertingkatkan seterusnya dapat menarik lebih ramai penumpang untuk menggunakan bas. tujuan kajian ini adalah untuk meneliti waktu perjalanan bas yang melalui Jalan Kuantan – Gambang pada sesuatu masa, jumlah penumpang yang menggunakan bas untuk pergi ke sesuatu tempat dan tempat yang sesuai untuk disediakan perhentian bas dan kekerapan perhentian bas itu digunakan oleh penumpang. Jadual yang khas dibuat untuk mengutip data seperti masa, jumlah penumpang, jenis bas, senarai perhentian bas sepanjang jalan Kuantan – Gambang, dan jadual bas bertolak dan sampai ke Bandar Kuantan. Pengiraan penumpang didalam bas yang menaiki bas dan turun bas sudah digunakan di Negara maju untuk mengukur tahap penggunaan bas selain meningkatkan kecekapan pengurusan bas dari semasa ke semasa. Pengiraan ini juga banyak digunakan di bangunan seperti perpustakaan, pasaraya besar dan di stesen komuter. Hasil kajian mendapati bahawa kadar penggunaan bas di kawasan Gambang adalah tidak memberangsangkan kerana kekurangan kemudahan pengangkutan bas dan waktu pergerakan bas yang tidak sesuai. Melalui kajian ini, waktu bas perjalanan bas dapat dikenalpasti, jumlah penumpang yang memerlukan bas dan penyediaan perhentian bas di tempat yang sesuai dapat dikenalpasti. Justeru itu, adalah dicadangkan agar kajian ini digunapakai di setiap pengangkutan awam seperti bas khususnya untuk meningkatkan tahap penggunaan bas di seluruh Malaysia.

TABLE OF CONTENT

	Page
SUPERVISOR DECLARATION	I
STUDENTS DECLARATION	II
ACKNOWLEDGEMENT	III
ABSTRACTS	IV
ABSTRAK	V
TABLE OF CONTENT	VII
LIST OF FIGURES	XI
CHAPTER 1: INTRODUCTION	1
1.1 Background Study	1
1.2 Problem Statement	3
1.3 Objective	3
1.4 Scope of Study	3
1.5 Significant of Study	4
CHAPTER 2: LITERATURE REVIEW	5
2.1 Introduction	5
2.2 Public Transport	5
2.3 Element of bus transportation	6
2.4 Bus station	6
2.5 Vehicle	6
2.6 Reliability	7

CHAPTER 3: METHODOLOGY	8
3.1 Introduction	8
3.2 Outline Methodology	9
3.3 Data Methodology	10
3.3.1 Site visit to Jalan Kuantan – Gambang to verify initial opinion and assumption and to collect data services and passenger demand	10
3.3.2 Proper data methodology as to carry out the systematic data collection	10
3.3.2.1 Route and bus facilities identifying	11
3.3.2.2 Survey 1: Quantity of bus and frequency of buses, passenger on bus	11
3.3.3.3 Survey 2: Quantity of passenger in Rahmat Alam bus for one day	11
3.3.4 Data Analysis	12
3.3.5 Balance of Bus Service and Passenger Demand	12
3.3.6 Evaluation of passenger demand	13
3.3.7 Proposal for improvement of bus service and sustainability of passenger demand	13
CHAPTER 4: RESULTS AND ANALYSIS	14
4.1 Introduction	14
4.2 Survey 1: Quantity of buses and frequency of buses, passenger on bus	15
4.2.1 Time versus number of buses	15
4.2.2 Time versus passenger	17
4.3 Survey 2: Quantity of passenger in Rahmat Alam bus for one day	18
4.3.1 Number of passenger on/off at morning, afternoon and evening at different bus stop	18
4.3.2 Graph of passenger by gender	23

4.3.3 Chart of percentage of passenger by time	28
4.3.4 Graph of passenger versus time	29
CHAPTER 5: CONCLUSION AND RECOMMENDATION	32
5.1 Introduction	32
5.2 Conclusion	32
5.3 Recommendation	34
REFERENCES	35
APPENDIX A	37
APPENDIX B	39
APPENDIX C	52
APPENDIX D	54

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 1.1	Indicate the Study location	4
Figure 2.1	Bus company	7
Figure 3.1	Outline Methodology	9
Figure 4.1a	Time versus number of buses (Kuantan to Gambang)	15
Figure 4.1b	Time versus number of bus (Gambang to Kuantan)	15
Figure 4.2a	Time versus passenger (Kuantan to Gambang)	17
Figure 4.2b	Time versus passenger (Gambang to Kuantan)	17
Figure 4.3a	No of passenger on/off (morning) from Kuantan to Gambang	19
Figure 4.3b	No of passenger on/off (morning) from Gambang to Kuantan	19
Figure 4.4a	No of passenger on/off (afternoon) from Kuantan to Gambang	20
Figure 4.4b	No of passenger on/off (afternoon) from Gambang to Kuantan	21
Figure 4.5a	No of passenger on/off (evening) from Kuantan to Gambang	22
Figure 4.5b	No of passenger on/off (evening) from Gambang to Kuantan	22
Figure 4.6a	Percentage of passenger by gender at morning from Kuantan to Gambang	24
Figure 4.6b	Percentage of passenger by gender at morning from Gambang to Kuantan	24

Figure 4.7a	Percentage of passenger by gender at afternoon from Kuantan to Gambang	25
Figure 4.7b	Percentage of passenger by gender at afternoon from Gambang to Kuantan	26
Figure 4.8a	Percentage of passenger by gender at evening from Kuantan to Gambang	26
Figure 4.8b	Percentage of passenger by gender at evening from Gambang to Kuantan	27
Figure 4.9a	Percentage of passenger by time from Kuantan to Gambang	28
Figure 4.9b	Percentage of passenger by time from Gambang to Kuantan	28
Figure 4.10a	Graph of passenger versus time (Kuantan to Gambang)	29
Figure 4.10b	Graph of passenger versus time (Gambang to Kuantan)	30

CHAPTER 1

INTRODUCTION

1.1 Background study

Public transport is a shared passenger transportation service which is available for use by the general public, as distinct from modes such as Taxicab and car pooling which are not shared by strangers without private arrangement.

Public transport modes include buses, trolleybuses, trams and trains, 'rapid transit' (metro/subways/undergrounds etc) and ferries. Intercity public transport is dominated by airlines, coaches, and intercity rail. High-speed rail networks are being developed in many parts of the world. Bus travel in the UK has been in decline since 1950, when it was the dominant mode of transport (G. Wall, M. McDonald; 2007).

Most public transport runs to a scheduled timetable with the most frequent services running to headway. Share taxi offers on-demand services in many parts of the world and some services will wait until the vehicle is full before it starts.

Paratransit is sometimes used in areas of low-demand and for people who need a door-to-door service.

In Malaysia, the public transportation especially bus is a one of a good transportation that is use as a second transport. It is commonly use by the moderate and poor community. The local bus can be a high potential transport that can lead to the development of the economy, society and tourist if the bus service is excellent in terms of condition, time schedule, and bus route. In addition, the public transport can reduce the number of vehicle in Kuantan and avoid the traffic jam.

The usage of private car in Malaysia has increased by about 40% as evidenced from the 2002 vehicle registrations in the country (PDRM 2002). The rapid increase in the use of personal transportation has its roots in the weak Malaysian public transport system. As a result, traffic congestion, accidents, air pollution and need for parking space, among others, have escalated.

As we can see in paper or news, the issue about the bus service always appear. The issue is still cannot be solve due to the economy and environmental surrounding. As an example, the safety of bus cannot be sure because the bus driver drive at over limit speed that recommended by Jabatan Pengangkutan Jalan (JPJ). Therefore, the research about the bus services and passenger demand is made to solve and improve the problem.

1.2 Problem statement

The issue that faced by is when the bus is in excess capacity when the certain time, but in another time is partially full or empty for 2 ways route. Correct timing for passenger to use the bus is not known and realise and in addition, the bus service has not received the good response from the passenger. The bus stop location also not too strategic, mean that there is no passenger use the bus stop and passenger would like to depart at certain location.

1.3 Project objectives

- a) This study is made to identify the bus stop that is often use, are not always use and the location that usually passenger off but the bus stop doesn't provided.
- b) Identify the route of bus that use Gambang- Kuantan road as a bus route, the number of passenger in a bus and time for bus arrived in Gambang.
- c) To identify the time for Rahmat Alam bus begin to departing, total passenger to on or off from the Rahmat Alam bus by gender.

1.4 Scope of study

The research will be focused on the studies of bus service and passenger demand sustainability conditions. Identifying the problems and issue will be made for evaluation, continuous research and improve the quality of the bus services in Kuantan, Pahang. The scope of work also includes about the total of bus stop along the Kuantan – Gambang road and the type of road.

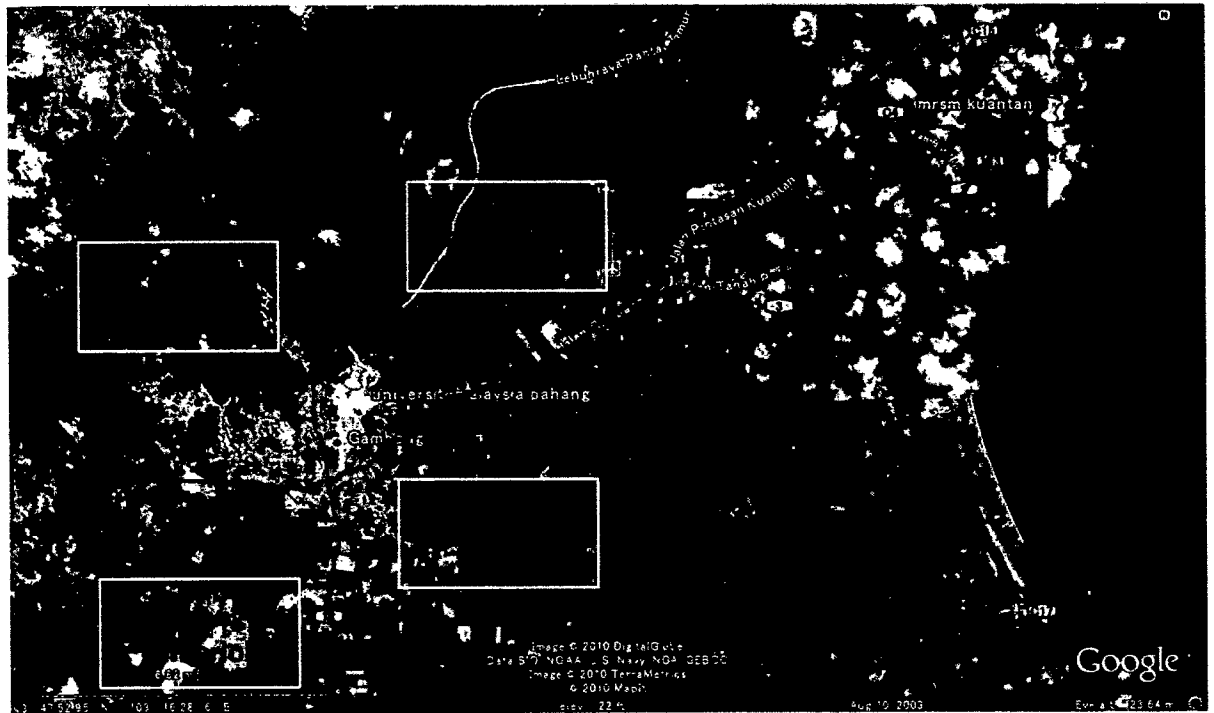


Figure 1: Indicate the Study Location

1.5 Significant of studies:

From the study, we can learn and know the situation of the bus services in Kuantan, Pahang. Furthermore, the most important thing is that we can provide and improve the quality of bus services and supply while make a local bus is the first choices that passenger use. This is because that, most of the citizen use a car as a primary transportation. Other than that, we can avoid the high congestion in the road and reduce the accident from the car.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is discussing about the literature review on the important of public transportation in urban area and sub urban area. It will include about the facilities for bus, bus services, bus route, and passenger of bus.

2.2 Public Transport

Transport services are one sector that contributes to the variety of economic development in our country. A similar situation also occurs in developed countries and other developing countries. Thus, development and research on public transport, particularly bus services should be given priority and attention. Nowadays, John Disney (1998) said that the public transport industry is one of the most complete sectors in the UK with airlines, rail and bus operators all facing stiff competition not only from their direct rivals but also from other modes and private transport.

Supply bus is a bus service used to send passengers to the intended destination. Total supply buses are provided depending on the amount and rate of requests from residents in the vicinity of Kuantan. bus transit is the most efficient form of urban transportation in terms of cost per passenger trips (Keeler et al., 1975)

2.3 Element of bus transportation

Element of bus transportation is route of buses, bus stop, bus station, vehicles, passengers, and service. This element will affect the quantity and quality of bus service.

2.4 Bus station

A bus station is a structure where city or intercity buses stop to pick up and drop off passengers. It is larger than a bus stop, which is usually simply a place on the sidewalk, where buses can stop. It may be intended as a terminal station for a number of routes, or as a transfer station where the routes continue (Wiki, 2010). A list of bus station along Jalan Kuantan – Gambang can be viewed on appendix D

2.5 Vehicle

Vehicle especially is a machine that uses to transport human from place to other place in a short time. Vehicle is consisting of bus, car, motorcycle, Lorries, airplane and others. A bus (archaically also omnibus, multibus, or autobus) is a road vehicle designed to carry passengers. Buses have a capacity as high as 300 passengers. Buses are widely used to operate scheduled bus transport services.

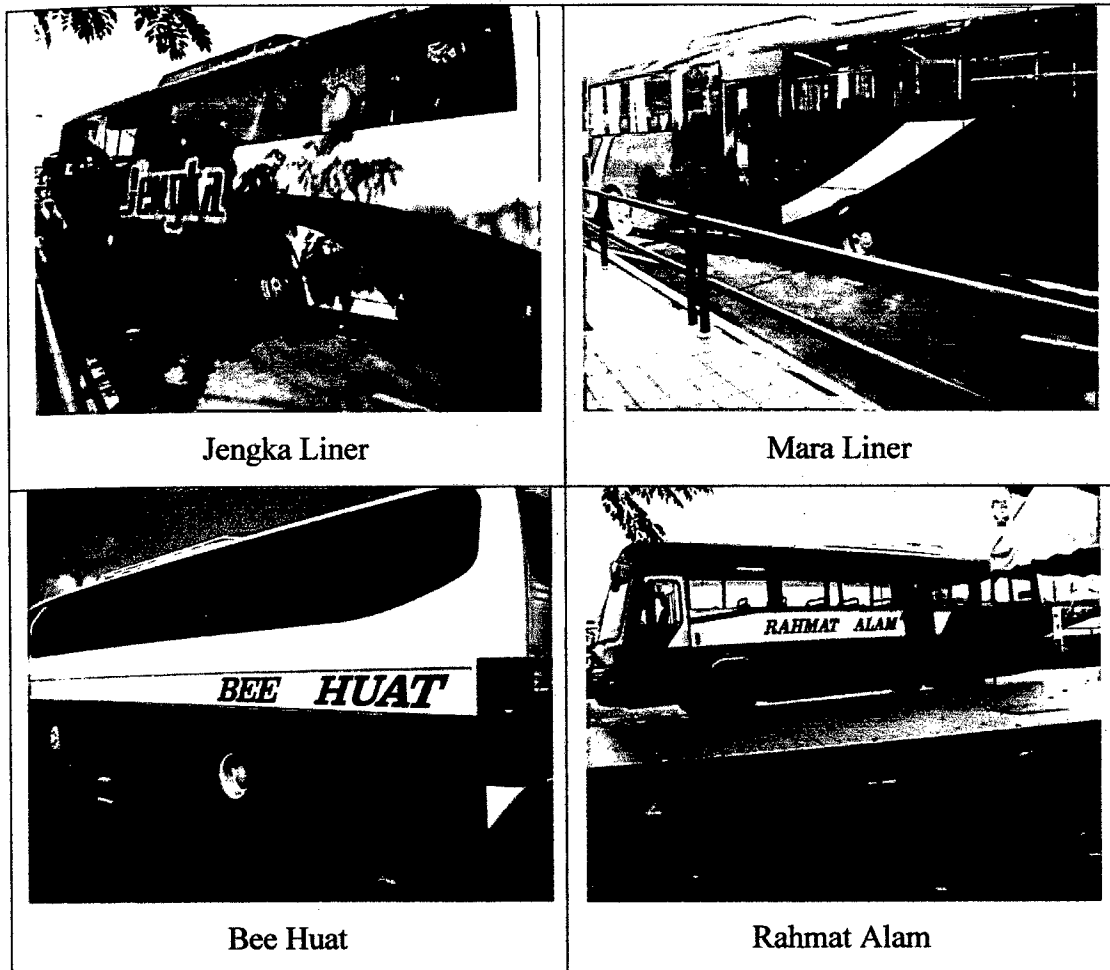


Figure 2.1: Bus Company

2.6 Reliability

Reliability of public transport systems has been considered critically important by most public transport users because passengers are adversely affected by the consequences associated with unreliability such as additional waiting time, late or early arrival at destinations and missed connections, which increases their anxiety and discomfort (Bates et al., 2001; Reitveld et al., 2001). Reliability has also been identified as important in determining the mode choice (Turnquist and Bowman, 1980). Therefore, it may be stated that unreliability in public transport drives away existing and prospective passengers.

CHAPTER 3

STUDY METHODOLOGY

3.1 Introduction

Methodology is a method, or guide line to the research or investigation. It acts as a procedure to achieve the objective of the research. Methodology is important to this research to avoid any delay or wastage and focus on the objective that has been set. With the methodology the flow of this research can be planned. The methodology for this studies is to find out about the buses, bus facilities and passenger of buses along Kuantan – Gambang road and how it is recorded in a data during the observation and identifying process. Besides that, it will also explain how the data can be implementing into the sustainability on a bus management.

3.2 Outline Methodology

Figure 3.1 below indicate the outline methodology for the project

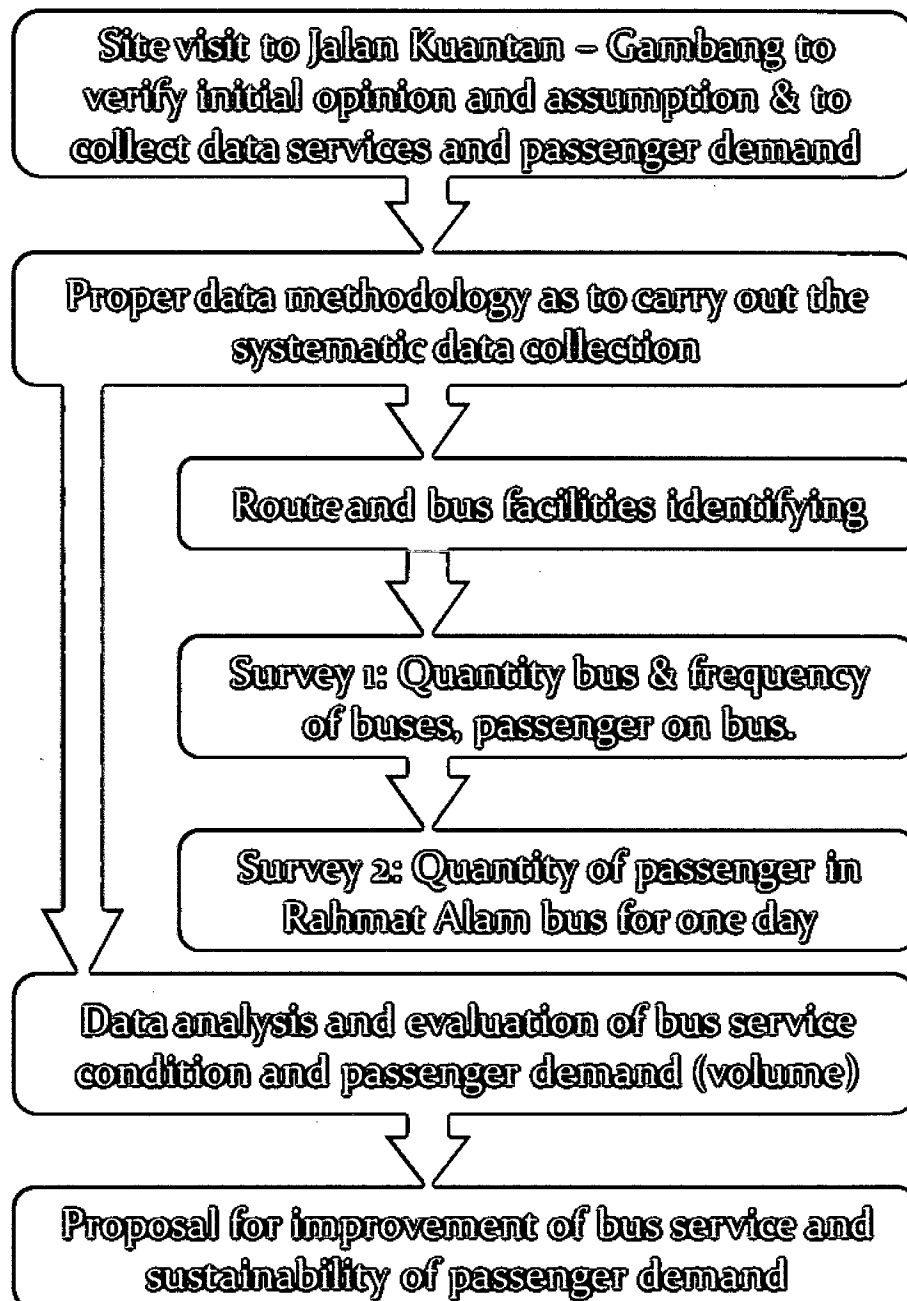


Figure 3.1 outline methodology

3.3 Data Methodology

3.3.1 Site visit to Jalan Kuantan – Gambang to verify initial opinion and assumption and to collect data services and passenger demand.

Early observations made to assess the situation and identify problems that may arise during the waiting bus, and when the bus arrived in Kuantan. Initial data collected to make further observations. Initial data was collected as the time waiting for the bus, the bus arrived at the Gambang, the type of bus Gambang-Kuantan route, the number of passengers who boarded the bus and the bus trip for a day.

In addition, preliminary data were also collected bus stop. All aspects of the bus stop as the bus stop location, the bus arrived at the bus stop to pick up passengers, the number of bus stop and location that doesn't have a bus stop is taken into account.

3.3.2 Proper data methodology as to carry out the systematic data collection

Systematic data collection will be initiated by creating and distributing a questionnaire to bus passengers in bus stops have been selected, namely, Taman Tas, at the Gambang – Segamat – Temerloh – Kuantan junction, UMP, and Pahang matriculation college.

After that, the questionnaire will be analyzed and calculated the percentage by region, according to people, according to the type of bus is selected and others. Next, the number of bus passengers will be calculated when the bus began its

journey along the way Kuantan - Gambang and data collected will be analysis by type and place of the bus route.

3.3.2.1 Route and bus facilities identifying

The route is located along Kuantan – Gambang road generally, but we choose the certain area as example, the bus stop at SEMSAS and Bus stop in Jalan Gambang is use for the bus that travel from Kuantan to Gambang, and also the bus stop at Taman Tas and bus stop in Gambang is use for the bus that travel from Gambang to Kuantan. The type of road and total volume also is take note.

3.3.2.2 Survey 1: Quantity bus & frequency of buses, passenger on bus.

The useful of a bus stop in some area will be observed and evaluate either this bus stop have much user or not. Some area that has a lot of passenger, but the bus stop facilities doesn't provide. This factor also causes the percentage user of bus is reduce.

3.3.3.3 Survey 2: Quantity of passenger in Rahmat Alam bus for one day

The first observation is seen in Taman Tas bus stop found that almost all the bus passengers had to wait for 1 hour until 2 hour to get a bus either from the Gambang, or from Kuantan. Average bus passenger is come from people in middle class and poor. Some were forced to come to the bus stop as far from their home areas. Thus, a questionnaire will be issued to obtain more information from the bus passengers. The questionnaire will be distributed to all the bus stop user and record the data in video record or voice record as a sample.

3.3.4 Data Analysis

The data is analyzed according to the total of responder and the observation from the bus and at the bus stop. The weakness of bus service will be identified through these respondents that have answered the survey question that is given to them. Observation method will show the quantity of bus user in the bus company that has choose and the total of bus user will be calculate when the bus is travel along Kuantan – Gambang road. This observation is use when on boarding bus. The system and suitable software is use to calculate and analysis the data as example, the Google Earth is needed to indentified the location of study, the Microsoft Excel is use to calculate and make a chart and GPS system is use to located the bus and recorded the bus travel time.

3.3.5 Balance of Bus Service and Passenger Demand

The study also investigated the total of bus service and passenger demand. Balance between the convenience of buses and bus passengers will be taken into account by the data taken from observations. Inadequate bus service would be identified if the buses are overloaded. In addition, if the bus is in an area that has no passengers, the factors involved are not suitable route, no bus facilities, lack of population of the area and local residents are not aware of bus services provided in their area.

3.3.6 Evaluation of passenger demand

Passenger demand will be evaluate through the respondent that has been made. The survey question is consisting of the condition of bus, what they want and the improvement that bus passenger think need to take note. Evaluation of user requests the bus in an area will be identified if percentage of the number of bus users and users of other vehicles can be identified. Moreover, the quality of bus services is also a measure of the customer needs the bus. This is because of poor bus service will lead to a lack of interest in the community to use the bus service.

3.3.7 Proposal for improvement of bus service and sustainability of passenger demand

For improvement of the bus, the further studies need to make so that the continuous bus quality improvement can be done. The bus service can be improved if the problems that state above is resolve though this study. Passenger demand and the route bus can be change due to time because the situation if affected by the growth of the town and changes according to the government plan and marketing plan.

CHAPTER 4

RESULTS AND ANALYSIS

4.1 Introduction

In this chapter, the result from the observation will be discuss and analysis. To determine the result, the observation Survey 1 and survey 2 has been done. The number of passenger, time for the bus arrived/depart, type of buses and passenger on/off at each bus stop was being determined. the bus stop at Kuantan, Gambang and muadzam junction is choose as a location to collect a data. For survey 2, the Rahmat Alam bus is choose to collect a data when passenger on/off from the bus according to the time. Each of the survey is conducted in one day at weekdays. The data is taken from 5 August 2010 until 21 October 2010.

The data that has been collected is time for passenger on/ off at each bus stop, number of passenger, type of buses, gender of passenger, type of stop either road side or bus stop and number of buses. Then, all the data is then analysis by plotted the graph and charts. A distance from Gambang to Kuantan is about 33km and Kuantan population including Gambang is 507,778 (Wiki, 2009).

4.2 Survey 1: Quantity of buses and frequency of buses, passenger on bus

4.2.1 Time versus number of buses.

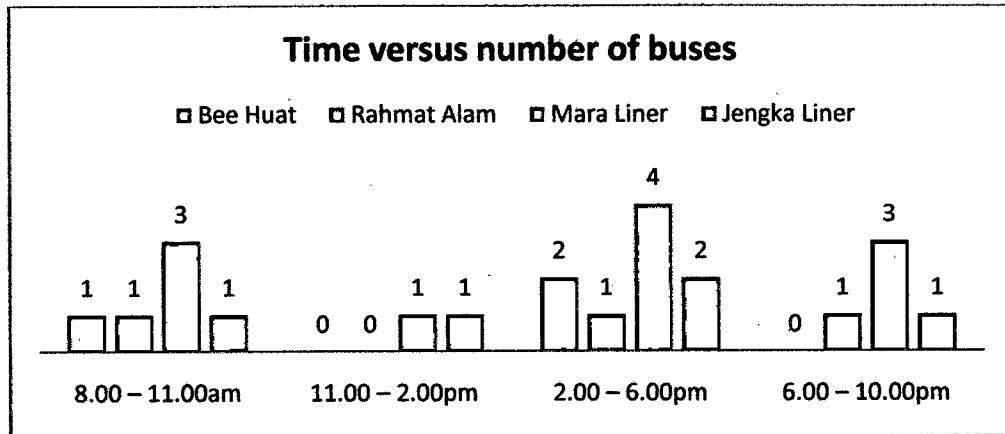


Figure 4.1a: Time versus no of buses (Kuantan to Gambang)

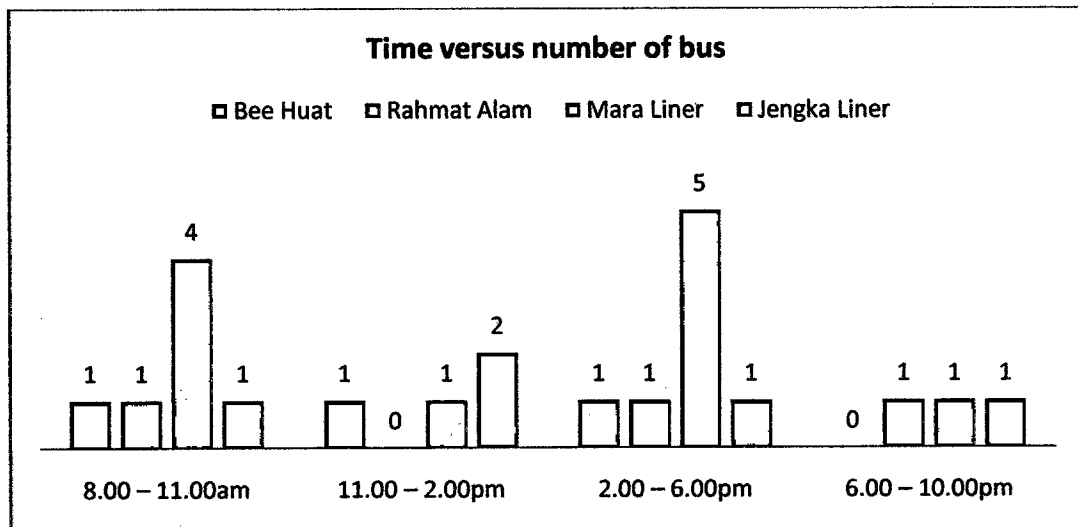


Figure4.1b: Time versus no of bus (Gambang to Kuantan)

Figure 4.1a and 4.1b show that the time versus number of buses. The buses is categories into 4 different companies, Bee Huat, Rahmat Alam, Mara Liner, and Jengka Liner. Figure 4.1a show that the number of buses uses by time gap 8.00am until 11.00am, 11.00am until 2.00pm, 2.00pm until 6.00pm, and 6.00pm until

10.00pm. Mara Liner bus provide 7 buses for each day, therefore at any time gap, it is the highest rank. For Rahmat Alam and Bee Huat, the companies only provide 1 bus per day and it is the lowest rank in the chart. At 11.00am until 2.00pm, there is only two bus pass over Jalan Kuantan – Gambang because there is no demand to use the bus at 11.00am – 2.00pm.

Figure 4.1b show that the maximum number of bus use is 5 namely Mara Liner at 2 until 6pm. The total bus trips from figure 4.1a is same as total bus trips that is 22 bus trips but the time for total bus trip per time is different. As example, the bus trips for 8.00am until 11.00am for figure 4.1a is 6 trips while the bus trips for figure 4.1b is 7 trips. The bus trips for 11.00am until 2.00pm are only a few which 2 trips for figure 4.1a are and 4 trips for figure 4.1b. In addition, the bus trip at 2.00pm until 6.00pm is the highest in a day which is 9 trips for 4.1a and 8 trips for 4.1b. This is because; most passengers are come from the student who has finished their daily school. Lastly, at 6.00pm until 10.00pm, the bus trip for figure 4.1a is 5 trips and figure 4.1b is 3 trips.