ANALYSIS OF CAPACITY AND LEVEL OF SERVICE OF MEDAN KIDD, IPOH

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ANALYSIS OF CAPACITY AND LEVEL OF SERVICE OF MEDAN KIDD, IPOH

by

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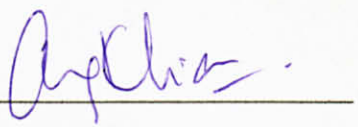
CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



Tang Ang Khian

ABSTRACT

Bus terminals are the point where the transport route starts and ends therefore it is important that the passengers feel safe and comfortable while waiting for their destined buses. Medan KIDD has been built since 25 years ago and has been serving the needs of the public since then. The total population in Ipoh has increased to 702464 in 2009 and would still be increasing in years to come. The question arises whether the current bus station is able to sustain the current capacity of the population now. This project also includes the analysis of level of service of Medan KIDD which involves the people's perspective and point of view. The level of service analyzed here is not based on the transportation's level of service which usually ranges from Level of Service A-F. The current condition of the bus station is also studied to determine the changes that could be done to improve its current condition.

A survey questionnaire of 22 questions is conducted throughout the 7 days among 100 randomly selected respondents in the bus station. The results obtained are projected in pie charts and bar charts to observe the significant values. Based on the observation done, the writer is able to come up with criteria that need to be fulfilled by the management of the bus station to ensure comfort and safety of their passengers in the bus station. A new bus station design with a new traffic flow is also proposed by the writer.

The survey results and findings are useful in getting the feedback from the public regarding their views on the bus station. This would be a guideline for the management to incorporate safety, comfort and accessibility in Medan KIDD for the needs of the public.

ACKNOWLEDGEMENT

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I would also like to thank Harpreet Kaur, Cheng Jo-Ann, Lim Hsin Yee and Teoh Mei Ling for their supports throughout the entire final year project. Not forgetting the rest of my course mates who gave me numerous advises in doing a better research for my project.

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CHAPTER 1
INTRODUCTION

1.1 Background

Public transportation plays a vital role in a development of a country, especially in a developing country like Malaysia. Buses and trains are one of the earliest public transports in Malaysia, dated back to 1885. During the mid 80s to mid 90s, mini buses were popular in Kuala Lumpur because of the cheap fee and the easy availability. However, statistic shows that only 20% of the population utilizes the public transports for mobility. Populations in the country are increasing much faster than private transport ownership levels, and thus, an increasing proportion of the population is still dependent on public transport. Most cities in developing countries will require approximately one full sized conventional bus per two thousand populations as a general rule. However, the exact rule will vary substantially according to the geographical size of city, income and car ownership levels, levels of traffic congestion and hence, the operating speeds. (Iles, 2005)

A bus terminal is the point at which a bus transport route starts or ends where the buses stop and wait before departing on their return journeys and where passengers board and alight from buses. A transit station's objective is to provide adequate space and appropriate facilities to accommodate projected peak pedestrian demands while ensuring pedestrian safety and convenience. (TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMICS, 2003). The capacity of a bus terminal can be determined by certain standards set by the manual. However, the level of service is a measure used to determine the effectiveness of elements of transport infrastructure, in this case, the bus station. There is no fixed standard for level of service as it varies with

different countries' standard. Level of service depends on a certain standard by a country, with subjective perception, varies from different individuals.

This study is based on the site in Medan KIDD in Ipoh. This bus terminal is located in Old town of Ipoh, in a 2-acres land area. Medan KIDD has been operating for more than 25 years and also acts a terminal for express buses and urban buses. The operating hours of Medan KIDD is from 6am – 10pm daily. In the year of 2004, the bus services were asked to shift to Medan Gopeng but many bus operators protested due to the non-strategic location and the bus routes were not conformed then. Hence, the local bus companies were given a choice to shift their operation back to Medan KIDD. Currently there are 4 bus companies operating in Medan KIDD with different management operating independently. However, by the end of October, these independent managements would merge to form a sole management to oversee the bus station.

1.2 Objective

The main objective of this final year project is to analyze the capacity and to determine the level of service of the bus station in Medan KIDD, Ipoh.

- To study the current condition of the bus station and to come up with suggestions for improvement if it is needed.
- To determine whether the capacity of the bus station has reached its limit and its level of service.
- To study the problems faced by the bus station.
- To come up with solutions to improve the capacity of the bus station, if needed and to improve its level of service.

1.3 Problem Statement

A visit to the site of the project showed that the bus station is poorly maintained. The interior and the exterior of the bus station are run-down *(Figure 1)*. This can be seen by the ceiling paint peeling off due to lack of maintenance by the management *(Figure 2)*. The platforms where the passengers await for the buses were seen covered with dirt and rubbish even though rubbish bins are provided at their dispense. The benches provided for the passengers are not properly cleaned and their paint has been peeled off. Many were seen standing waiting for the buses instead of utilizing the benches provided *(Figure 3)*. The depot/workshop of the bus station is located at one of the platforms, is poorly maintained, with the tires of buses lying everywhere, unclean *(Figure 4)*. This affects the aesthetic value of the bus station and might tarnish the reputation of the city for being one of the premier cities in the country.

The covered bus bays were not fully utilized as it was observed that some cars were parked in the bays supposedly located for the buses. What was supposed to act as platforms were not used for parking for the public and working staffs there. This can be explained that there is insufficient parking space provided for the public and the working staff; hence the usage of the bus bays *(Figure 5)*. Some even double parked their cars causing congestion inside the bus station. At the bus station, the space is not fully used because of the ample space wasted. Unused lockers are being abandoned causing the wasted amount of space to be taken up unnecessarily *(Figure 6)*. The distribution of the crowd at the bus station is also imbalance. At one end of the bus station, the platform can be seen with a dense crowd. On the other end, the area can be seen to be deserted *(Figure 7)*. Therefore, this cause wastage of area and resources because no one utilizes the area and benches provided. Wastage of area can also be seen where the abandoned buses are being parked. It was either the buses are too wrecked to be used or the buses are not being able to be used at all *(Figure 8)*. The location of the public toilets provided at the bus station is not strategic and away from the crowd.

There is also no proper drop-off point for the passengers. Taxis and private cars were observed having to drop passengers off anywhere they prefer and even more

dangerously, at the entrance of the bus station *(Figure 9)*. This would cause potential accidents to happen because buses would need a bigger turning radius to enter or exit the bus station. Not to mention the congestion caused for having the passengers dropped off anywhere they like. Signboards by the bus companies are misleading and faulty because of the inaccuracy of schedules of buses *(Figure 10)*. This could be because the bus companies never changed their signboards ever since they operated in Medan KIDD, causing confusion to those who do not take the buses frequently. Signboards are also seen to be looking old and not appealing at all, giving an impression that the bus services cannot be trusted at all *(Figure 11)*.

Medan KIDD is situated near the town area, where it is located nearby a school (S.M.K ACS, Ipoh) and the KTM Train Station. During the peak hours, there would be traffic congestions leading into and out of the bus station causing the buses schedules to run from the actual schedule *(Figure 12)*. Roads of Jalan Leong Boon Swee, Jalan Tun Abdul Razak and Jalan Panglima Bukit Gantang are known for its traffic congestion especially during peak hours (12pm-1pm) and after-office hours. This would affect the level of service of the bus station as this would give a negative perception towards the public transportation which in this case, is the buses.

It was observed that the Medan KIDD functions as a one-loop system, which means there is only one entrance and exit. The flow of the traffic is shown *(Figure 13)*. From the figure shown, the layout of the bus station can be seen. The amenities such as the newspaper stand, toilets and coffee shops are located at another different building from the bus station. This would cause traffic disruptions towards the flow because the users of the bus station would have to cross from the main building to the next building. As it was mentioned earlier, the traffic flow in the bus station is depicted by the arrows on the figure. The black dot is the intersection point of the vehicles turning into the bus station and the vehicles leaving the bus station. This would cause potential accidents to occur.

The traffic coming from Jalan Tun Abdul Razak's direction is also disrupted by the incoming vehicles into the bus station from the opposite direction as the vehicles would

have to give way to the vehicles upon entering the bus station. This would eventually lead to more traffic disruptions which would affect the traffic flow.

According to sources from the internet (Wikipedia-the free encyclopedia), the total population of Ipoh in 2009 is 702464. Ipoh is the fourth largest city in Malaysia. Medan KIDD was built 25 years ago, which means the population has increased since the construction. The question would be whether Medan KIDD is able to sustain the growing capacity of the bus station.

Figure 1: Exterior of the project site

Figure 2: Peeled off ceiling paint

Figure 3: Benches provided for the passengers who wait for the buses.

Figure 4: Workshop/Depot

Figure 5: Bus bays being occupied with other vehicles

Figure 6: Abandoned worn out locker

Figure 7: Deserted area

Figure 8: Abundant buses parked not being used

Figure 9: Taxis dropping off passengers anywhere and everywhere

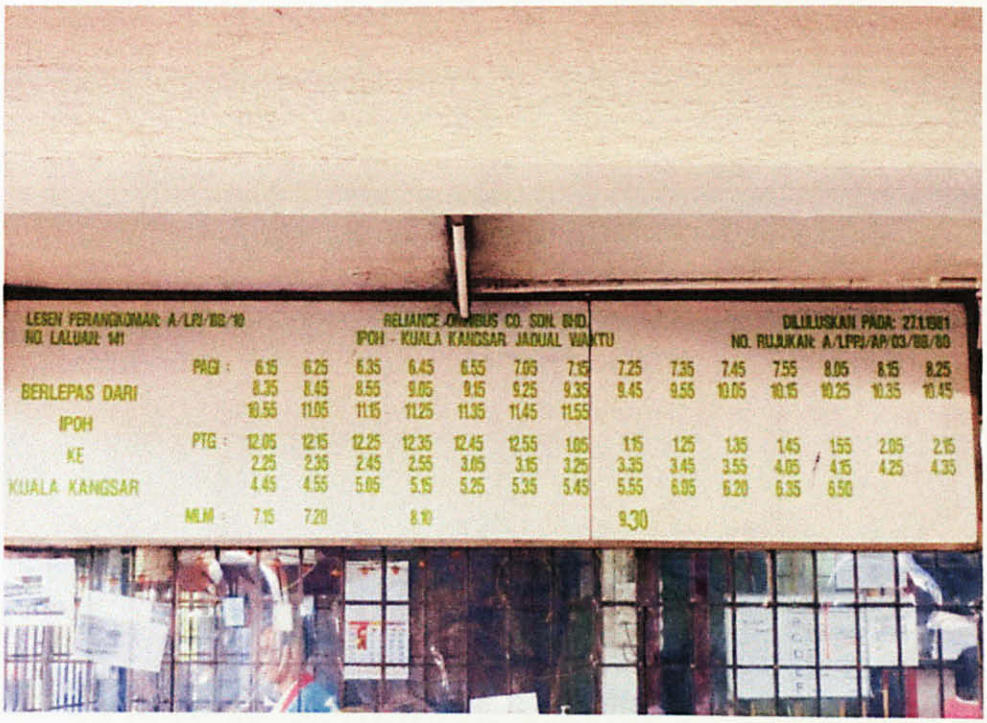

Figure 10: Misleading schedules on signboards

Figure 11: Old and Confusing signboards

Figure 12: Aerial photo of the location of Medan KIDD

Figure 13: The traffic flow of the bus station

1.4 Scope of Study

The site of study of this project is in Medan KIDD, Ipoh. The scope of study for this project is to analyze the capacity of the bus station without having to rearrange the bus routes and then to determine the level of service of the bus station based on several criteria discussed later in the report. This project also takes into account the users' perception about the mentioned site.

CHAPTER 2
LITERATURE REVIEW

Civilized life depends on transport, for the movement of goods from where they are produced to where they are needed, and for the movement of people from their places of residence to where they must go to pursue all the activities of life, such as work, education, shopping and leisure activities. A good transport system is important to a country's development; at the same time the factors affecting the development of a country play a significant part in determining the way in which its transport system evolves. Population in most developing countries, such as Malaysia is increasing much faster than car ownership levels, and hence an increasing proportion of the population is dependent on public transport (Iles, 2005). Thus, it can be said that the vast majority needs the public transport to move about.

Despite the public transportation available, yet not many would choose to take the public transportation if not necessary. People who want hassle-free transport should drive cars (Public Transport Users Association, 2008). This applies to users especially in Malaysia where people would often use their personal transportation to get around places. This would only increase the level of congestion in the country and to have excess capacity of the bus services.

One of the factors contributing to the development of public transportation would be its terminal. A bus terminal is the point at which a transport route starts or ends, where buses stop and wait before departing on their return journeys and where passengers board and alight from vehicles (Iles, 2005). Some terminals act as a garage to park the buses when not used and as a depot to do maintenance for the buses. Bus terminals are a

significant element for operations of bus services. Their design and location affect the efficiency of a transport system, and its impact on other road user (Iles, 2005). It is vital for the management of a bus terminal to provide good amenities for the users to ensure their safety and comfort. The bus terminals should be designed with practicality besides adding aesthetic value to the particular country or state.

The location of the bus terminals is also important to ensure the practicality of the bus terminal. Terminals should be located at strategic location for passengers' accessibility and to smoothen the interchange between different bus routes. It is important to select such a location where a bus terminal would be able to fulfill the functions of a passenger hub of logistics (Gromule & Yatskiv, 2007). Many agree that the terminal plays an important role to determine the excellent services of the bus services. It is important that stations are suitably located where routes should logically connect or terminate, as determined by passenger demand patterns (Iles, 2005).

Bus terminals do not only act as a platform for passengers to wait for their buses, but may also be used for parking between journeys for buses (Iles, 2005). However, buses should not be parked for long because the capacity of the buses would not be fully maximized. This would reflect the inefficiency of the particular bus company and the excess capacity for the bus routes available.

In other resources, the objective of a transit station is to provide adequate space and appropriate facilities to accommodate projected peak pedestrian demands while ensuring pedestrian safety and convenience (TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMICS, 2003). Even though the definition given by the book and the manual seems to be different, but the basic principle is still the same. It is difficult to design a bus terminal with an exact capacity level in mind. Thus early efforts involved designing transit stations based on maximum pedestrian capacity without consideration of pedestrian comfort and convenience. Based on researches conducted, it is shown that the capacity is reached when there is a dense crowding of pedestrians, causing restricted and uncomfortable movement (TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMICS, 2003). Hence, to estimate the capacity is based on a relative scale of pedestrian comfort and convenience.

In a recent study on the Palmerston North Bus Terminal in New Zealand, the council reviewed the existing Urban Services Terminal while evaluating the size facility required accommodating possible future service growth (Campbell & Smith, 2008). During the designing of a bus terminal, the design capacity taken is based on a fraction of the population at that time. However, the capacity limit might differ as the population increases. This is also dependent on the demand by the users and the level of service provided by the bus terminal. Therefore, in order to determine whether the capacity and level of service of the bus terminal, it is best to review the existing terminal while evaluating whether its size can accommodate future service growth.

Bus stations are designed to cater for the maximum predicted number of vehicle arrivals and departures, with consideration of safety for passengers and other users of the station (Iles, 2005). In very broad terms, a well laid out terminal of 10,000 square metres, handling short-distance urban services with minimal passenger facilities and no provision for parking buses other than on the departure stands will be able to accommodate approximately 50 departure stands. This is the rough estimation done by Iles of to determine the capacity of a bus station. The length of time each bus should spend on the stands is necessary to be determined, by plotting the scheduled arrivals and departures. From that, we would know the number of vehicles in the station at different times during the day. Buses that spend more time in the station should be parked in a separate area. More than one stand to a route should be allocated where service frequencies are high. (Iles, 2005)

The layout of the bus station affects its capacity. One important element would be the configuration of buses being parked (Iles, 2005). "Saw-tooth" parking is where buses are park at an angle. The number of bays which may be accommodated in a given length is greater if the angle is less acute. However, for "saw-tooth" parking, buses may require great amount of space for maneuvering in and out. A "saw-tooth" layout is suitable for buses with their entrance doors at the extreme front. One advantage of "saw-tooth" layout is that it allows segregation of arrival and departure stands are located around a central island so that the passengers have access to all stands without having to walk in the roadway. (Iles, 2005)

There are many ways to maximize the capacity of a terminal. The need for buses to park at the terminal between journeys should be minimized or eliminated. Besides that, more flexible allocation of departure stands so that any bus from any route may use any vacant stand. Unfortunately this would require a robust system of control and passenger information. The amount of passengers can also be increased by restricting the use of the terminal to maximum-sized buses that would make more efficient use of road space (Iles, 2005).

Bus terminals do not only cater for passenger to board and alight the buses, but also be able to provide facilities to cater the needs of the users. The extent of the facilities required will depends on the number of passengers at the station. The most minimum requirement is the provision of shelters, for protection from the weather and to control the queues (Iles, 2005). Facilities such as the toilet, waiting rooms, prayer rooms, refreshment kiosks and ticket counters can be useful for the benefits of the passengers. Information regarding the services using the bus station and also other relevant matters such as local transport and accommodation is equally important. Special facilities for disabled passengers should also be taken into consideration. However, there is a limit to what can be provided, practically and at reasonable cost. The principal requirement is for toilets which are accessible by disabled people and the elimination of unnecessary obstacles which may create difficulties for disabled people. High-visibility barriers and signs and textured surfaces for the benefit of blind or partially sighted people are also one of the other measures (Iles, 2005).

Although it is essential to provide shelters for waiting passengers, it is relatively unusual for bus stations to be entirely under cover (Iles, 2005). Measures must be taken to ensure the ventilation is adequate, temperatures are maintained at an acceptable level and the accumulation of dangerous levels of toxic fumes is prevented. An extractor fan can be provided to remove vehicle exhaust gases. It is also necessary to provide parking facilities for passengers' and staffs cars. Details are important in the design of station buildings must be given full attention as failure to do so can create problems. Example of this error is the roofs of some of the passenger shelters in the bus station in Ratnapura,

Sri Lanka are too low and project over the roadway, causing the buses being stuck, damaging both the structure and the vehicles.

The proportion of public transport trips – both for all purposes, and work falls gradually with the urban area's size, associated with absence of rail services, lower levels of bus service, higher car ownership and less constraint on car use (White). Medan KIDD is located the city centre and there has been talks to shift the entire bus station to somewhere in the outskirt. With reference to that, there has been a growing tendency for city's local government the intercity bus terminal from city center to urban areas (WICAKSONO, MUROMACHI, HARATA, & OHTA, 1998). Such relocation is able to increase the bus terminal's capacity and also to reduce the traffic congestion in the streets nearby the bus terminal. However, with such relocation, this would increase the inconvenience for the passengers thus reducing the usage of bus services (WICAKSONO, MUROMACHI, HARATA, & OHTA, 1998).

CHAPTER 3
METHODOLOGY

The purpose of the analyzing the project site is to find out the capacity and the level of service of Medan KIDD. In this analysis, quantitative research method will be used. There are 4 types of research methods: i) Experiments, ii) Surveys, iii) Observation, iv) Existing Data (Steve Sherlock's Home Page). To execute this study, analytical survey research method will be used. Analytical survey is used because it is able to explain why certain situations exist (Wimmer & Dominick, 2000).This survey research method will also be able to explain the relationship between the bus s and the level of services of the public buses. This study will also find out whether the passengers are satisfied with the current location and facilities provided in the bus terminal.

Quantitative research is an objective research method and variables can be identified and relationships can be measured. This research method investigates the relationship between the properties and phenomena and their relationship scientifically. Quantitative researches emphasize precisely measuring variables and testing hypothesis that are linked to general causal explanations (Neuman, 1999). In quantitative research, the literature review must be done in the early stage. According to (Malhotra, 2007), quantitative method is a research methodology that seeks to quantify the data and typically applied some form of statistical analysis. Data must be in numerical form from an exact measurement. Quantitative method uses the principle of replication, adhere to standardized methodological procedures, measure with numbers and then analyze the data with statistics (Neuman, 1999). At the end of a quantitative research, collected data are analyzed using statistics, tables or charts discussing how the data are related to the hypothesis.

Qualitative research is the opposite of quantitative research. Qualitative research is defined as an unstructured, exploratory research methodology based on small samples intended to provide insight and understanding of the problem setting (Malhotra, 2007) and it is more subjective oriented. Qualitative research is about collecting, analyzing and interpreting data by observing what people do or say. In this research method, data are in words and images form from documents, observations and transcripts. Qualitative research methods include focus groups, in-depth interviews, observations and case studies. Data collected will be extracted according to themes or generalizations based on evidence and organizing data to present a consistent result.

In this analysis of capacity and level of service of bus station, survey research is used to gather needed data from the selected respondents. Survey research is a structured questionnaire given to a sample of a population and designed to find out specific feedback from respondents. Survey methods are often referred to as quantitative survey methods because they imply that a number of answers to questions are collected from a large sample of population of interest (Malhotra, 2007). In survey research, many respondents will be surveyed and they will answer the same question and measures many variables, test multiple hypotheses and conclude the results about past behavior, experiences or characteristics about the respondents (Neuman, 1999). Normally, most questions require respondents to choose from a set of predetermined set of responses. In survey research, the respondents are asked to answer numerous questions in a short period of time. Then, the respondents' feedback will be summarized in percentages, tables or graphs. A survey researcher uses a sample or a smaller group was chosen. (Neuman, 1999). Survey research has two types; descriptive and analytical survey. Analytical survey method is chosen in this analysis because it attempt to describe and explain why certain situation exists. Wimmer and Dominick (2000) stated that in analytical survey research, two or more variables are usually examined to test research hypotheses and the results are able to examine the interrelationships among variables and explain the phenomena.

Regardless what methods that are used to evaluate a study, the existence of each method's advantages and disadvantages are an unavoidable matter. The method which

will be used to analyze this study is survey research. One of the advantages of survey research is data collected are reliable because the responses are limited to the alternatives stated (Malhotra, 2007). Hence, feedbacks from the respondents are limited to choose from the few responses given in the questionnaire. Another advantage of survey research is they can be used to investigate problems in realistic settings rather than in a laboratory or screening room under man-made conditions. The cost for doing a survey research is reasonable because expenses can be controlled by selecting how large the sample group will be. One of the advantages of survey research is that a large amount of data can be collected easily from a variety of people coming from different backgrounds. Survey research is able to examine many variables like demographic and psychographic information, attitudes, motives, intentions and many more. Besides that, survey research is able to explain why the situation existed and it is also able to link the variables to the hypothesis at the end result. Lastly, the last advantage of survey research is the availability of existing data collected from studies done by other scholars. Data can be obtained easily from data archives, government documents, census materials, radio and television rating books and voter registration list. These can be used as either primary sources or as secondary sources. With the existence of these data, the survey can even be conducted without developing any questionnaire or approaching any respondents (Wimmer & Dominick, 2000).

One of the disadvantages of survey research is that the respondents are unable to provide desired feedback or they are unwilling to cooperate with the survey procedures (Malhotra, 2007). Wimmer and Dominick (2000) stated that the most important disadvantages of survey research are that independent variables cannot be manipulated as in the laboratory experiments. Therefore, without the control of variables, it is difficult to predict whether the relationships between the independent and dependent variables are causal or non-causal. Another disadvantage of survey research is technical features like unsuitable wordings, wrong placements of questions, misleading questions and no suitable choices of feedback may cause the result of the survey to be very unsatisfying. In addition to that, another negative factor of survey research is the presence of untargeted respondents. Some respondents claim to be genuine when they are not who they claim to be. The result of this matter may influence the overall outcome

of the survey. The last disadvantage of the survey research is that some methods are much more difficult to carry out (Wimmer & Dominick, 2000). One of it is telephone survey. Respondents may not be willing to give information via phone calls as they may think that the research is a scam.

3.1 Research Approach

A standard questionnaire is used for this study. The questionnaire is consists of 22 questions. The survey questionnaire also includes 12 questions which uses the Likert scale. Likert scale is a rating scale that requires the respondents to indicate a degree of agreement or disagreement with each of a series of statements (Malhotra, 2007). In the questionnaire, there are 10 close-ended questions. Close-ended questions require the respondents to choose a suitable answer from a list of provided answers by the researcher. Close-ended questions are used because it provides greater uniformity of response and the answers are easily quantified (Wimmer & Dominick, 2000). The questionnaire also includes a space for the respondents to leave their comments on improving the bus condition. The questionnaire is separated to 2 sections: demographic, the respondents are questioned about their background such as race, monthly income, marital status, age and so on. In the following section, in the level of service of the bus station; respondents are required to rate the conditions of the bus station and its facilities in a Likert scale. Lastly, the respondents are required to give suggestion about the bus terminal.

3.2 Sampling

Sampling is referred as a subgroup of the population selected for participation in the analysis (Malhotra, 2007). The sample size for this analysis is random. The survey is conducted among 100 passengers spread out throughout 7 days in the bus terminal Convenience sampling technique will be used. According to Malhotra (2007), convenience sampling is a non-probability sampling technique that attempts to obtain a sample of convenient elements. The selection of sampling units is left primarily to the researcher. This would mean, respondents will be picked because they happen to be in the right place at the right time.

CHAPTER 4
SURVEY RESULTS AND DISCUSSIONS

Section A: Demographic

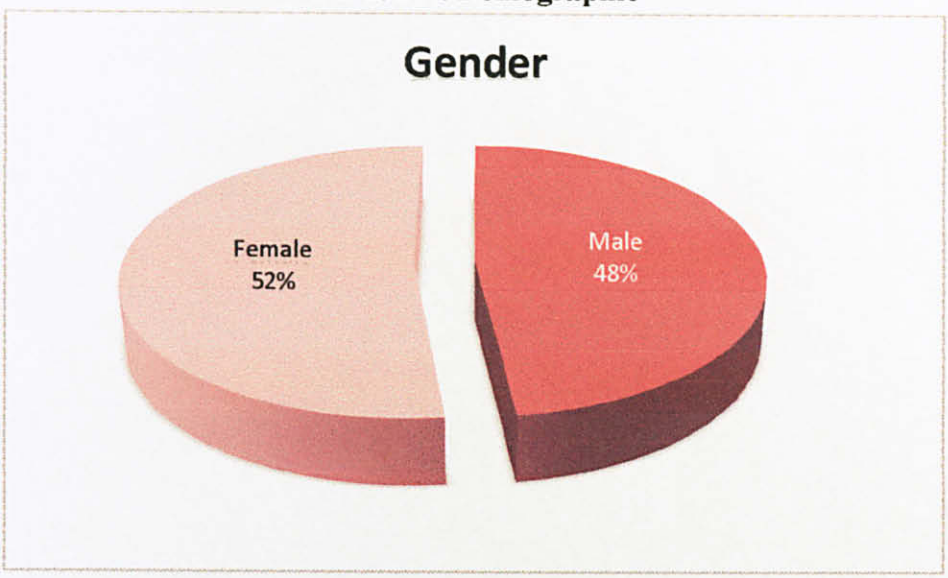

Figure 14: Gender of the respondents

According to Figure 14, a total of 100 respondents have participated in this survey. The respondents were randomly selected, consisting of 52% female and 48% male. The percentage difference of the gender is low, with only 4% in difference. By sex, females tend to make greater use of public transport than males, with a similar distribution by age category (White). This could be because females tend to rely on the public buses to get around places because it is dangerous to drive alone in the city. Besides that, females who want to go to the other town areas would opt to take the bus because it is relatively safer than driving.

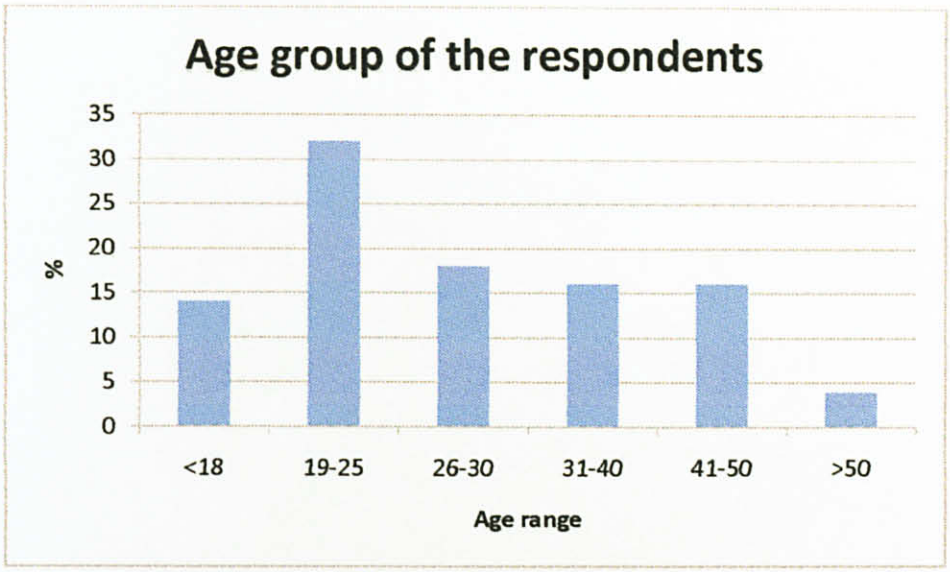

Figure 15: Age group of the respondents

With reference to Figure 15, the age group of respondents is shown. As the selection of respondents is random, the age group varies. However, the respondents in the age range of between 19 to 25 is easier to be approached by the researcher, thus the percentage of this age range is relatively higher if compared to other age groups. Medan KIDD caters bus trips around Ipoh town as well as to other suburbs nearby such as Taiping, Kampar, Lumut, etc. Therefore, during the survey was done, the researcher managed to find out that some of the students who study in Universiti Tunku Abdul Rahman (UTAR), Kampar, travel to and fro by the buses. This explains why the age group ranger of 19 to 25, is relatively higher. Besides that, the public also use the bus services to get around the Ipoh city as it is an affordable mode of transportation. This could also be because the youngest groups not being able to own cars, and the oldest group never having done so (White). According to (White), the trip rates and distances travelled are highest in the 'working age' groups, from 18 to 59, averaging around 1,200 trips and 15,000 km per year.

Figure 16: Employment Status of the respondents

Figure 16 shows the employment status of the respondents. From the 100 participants of the survey, 41% of them are students, 36% of them are employed, which means they are attached to an organization, followed by 14% are homemakers, and 6% are retired. This could be affected by the age group of the respondents as they are mostly in the range of 19-25 of age. This could be because most of them take the bus to school or to places around town as they have yet to possess their own transportation. It is common for students to take the bus to travel around places as it is the most affordable transportation available in Ipoh. And because there are bus services to Cameron Highlands, Kampar and to nearby towns, many would opt to travel to and fro.

The second highest percentage of the respondents is employed. This could be because they would take the bus to work. This is possible because the Omnibus offers bus services to any major spots in the town, hence it is convenient for them to just leave their cars in the bus station and take the bus to their working place. This could also be because of the high parking fee rate, especially in the business centers in the city, thus the only affordable option is to take the bus to their working place. Homemakers are also seen to utilize the bus services. This could be because they might want to go to the market, or to shopping malls to fill in the time while waiting for their husbands to come back from work. This is of course an assumption made solely based on the numbers

obtained. Retirees are also seen taking the buses, because some of them may not be in the condition to drive due to the old age.

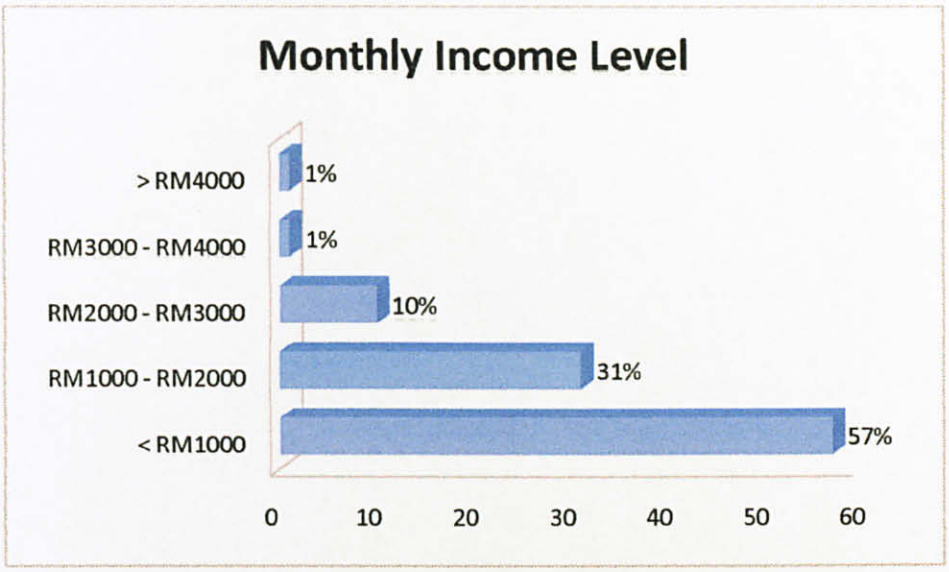

Figure 17: Monthly income level of respondents

Figure 17 shows the monthly income level of the respondents. The income level varies from a minimum of RM1000 and below, to the maximum of RM4000, and above. Based on the results from the survey, out of 100 respondents that have participated in the survey, a total of 57% have a monthly income of RM1000 and below. 31% of the 100 respondents earn RM1000 to RM2000 and 10% earn RM2000 to RM3000. There are only 1% of the 100 respondents who earn from RM3000 to RM4000 and 1% who earn RM4000 and above. The results shows that the highest percentage of monthly income level is RM1000 and below. Thus, this result explains that the majority of the respondents would take the bus services daily. This could be due to the affordability of the bus services and the level of car ownerships is low. This is because not many could afford to purchase private cars with such a low monthly income in Malaysia.

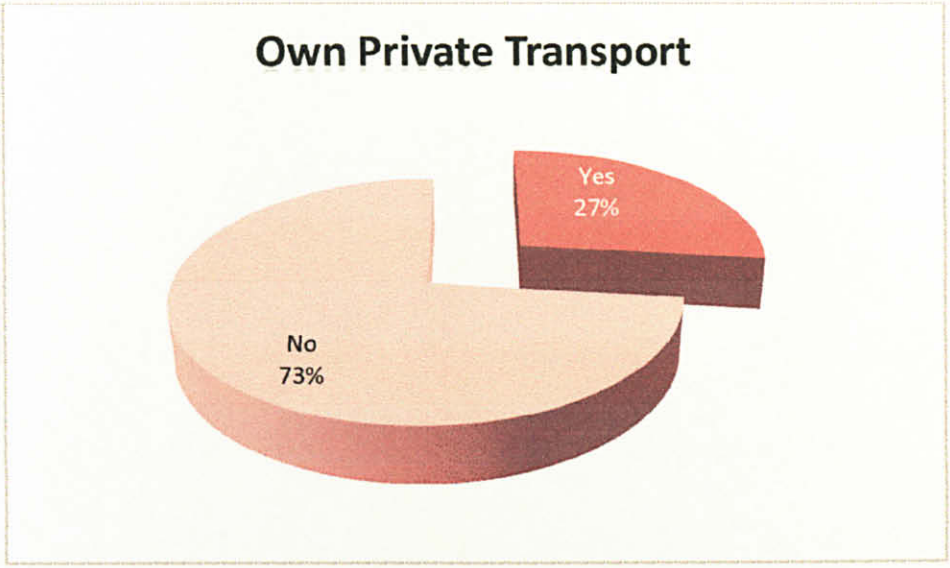

Figure 18: Whether the respondents possess their own private transport

According to Figure 18, it is shown that a big majority of the 100 respondents do not possess their own private transport. 73% of the 100 respondents are found not to have their own private transport. On the other hand, there are 27% of the 100 respondents do have their own private transport. This could be easily explained that most of the respondents are within the age range from 19 to 25 years old. This is associated with car availability because the youngest groups are not able to own cars yet (White). A vast majority of the respondents do not own private transports which mean that they could be highly dependent on the buses to get to their destination. Only 27% has their own private transport which means they may practice the "park-and-ride" system, which is to drive to the bus station and hop onto a bus to their destination.

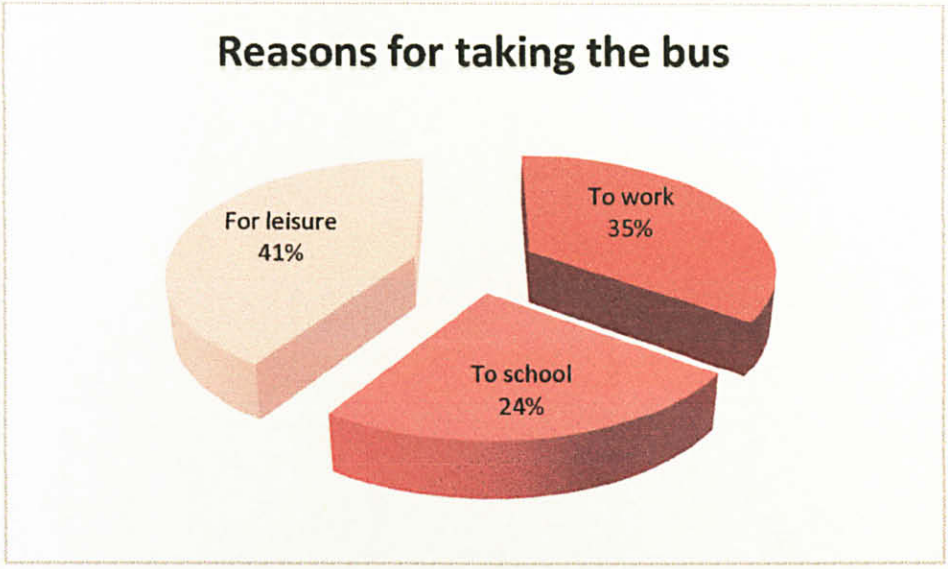

Figure 19: Reasons why the respondents take the public buses

Figure 19 shows the reasons why the 100 respondents would utilize the public buses from Medan KIDD. It was found that 41% of the 100 respondents take the bus services for leisure and 35% of them take the bus to work. This is followed by 24% of the 100 respondents take the bus to school. As mentioned earlier in the report, Medan KIDD offers bus services to the nearby towns such as Cameron Highlands, Lumut, Taiping and etc. Places of such are considered as local tourist spots and often, the people would take the buses to reach those places. This could be because of the affordability of the public bus services and frequent travel periods in a day. 35% of the 100 respondents take the bus to work, as not many can afford to drive to work. This is possible as mentioned earlier that 57% of the 100 respondents earn a minimum of RM1000 and below. The parking rates in the city have also been increased thus the best option to get to work is to take the public bus services into the city. It was found that some of the people who live in Ipoh city would also take the bus to their work place such as Cameron Highlands and Lumut daily. With that, they could travel to their workplace and come home every day. There are also 24% of the 100 respondents who take the bus to school. This can be explained that the Omnibus can bring the students to their respective school spots safely because there is a bus stand in every front gate of the schools in Ipoh. Many are also college students who would take the buses to their universities such as Universiti Tunku Abdul Rahman in Kampar, Universiti Teknologi Petronas in Tronoh,

Universiti Teknologi Mara in Bandar Seri Iskandar and so on.

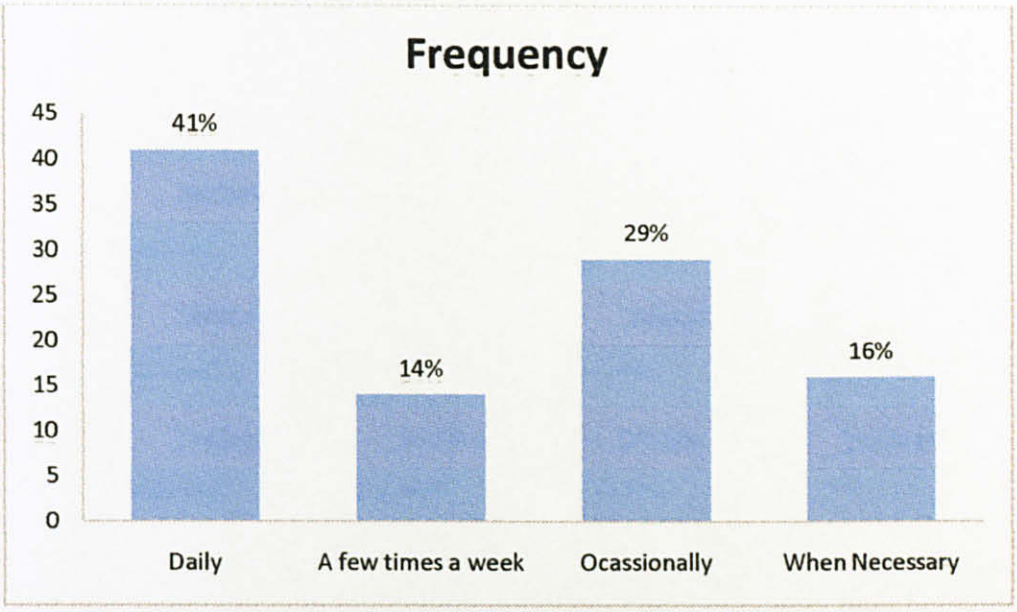

Figure 20: Frequency of respondents taking the bus from Medan KIDD.

Figure 20 shows the respondents' frequency of taking buses from Medan KIDD. The results show that out of 100 respondents, 41% take the bus daily from the bus station. 29% of the 100 respondents take the bus occasionally, whereas 16% of them take the bus from Medan KIDD when it is necessary. Another 14% reveal that they take the bus from the bus station a few times a week. From the results obtained, all the respondents above are most likely to spend more time in the bus station; especially 41% of them take the bus from Medan KIDD daily. This concludes that the condition of the bus station would affect the frequency of the passengers taking the bus from Medan KIDD.

Section B: Level of Service of the bus station

The level of service mentioned in this project is not based on the conventional method of measurement for level of service in Transportation Engineering (Level Service A-F). Level of service in the case study is based on the individual's preference and perspective and may be subjective.

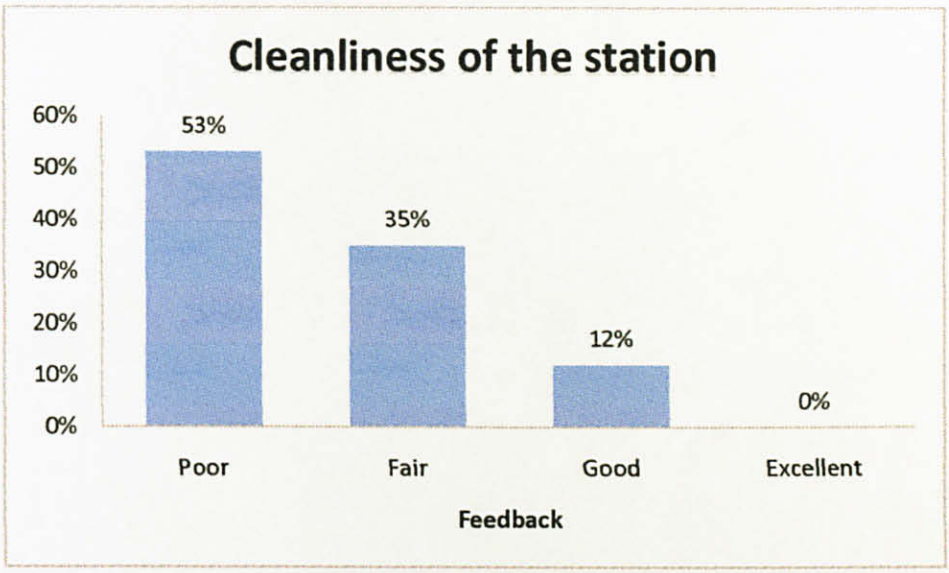

Figure 21: Respondents' feedback on the cleanliness of Medan KIDD

Figure 21 shows the respondents' feedback on the cleanliness of Medan KIDD. The results show that 53% of the 100 respondents rated "Poor" for the station's cleanliness, followed by 35% of them think that the station's cleanliness is "Fair" and the remaining 12% rated the cleanliness as "Good". Based on the observation made by the writer, even though there were many dustbins provided in the vicinity, it was still seen that clusters of rubbish were found in different corners and nooks of the bus station. During the 7 days of survey conducted, it was observed that one or two workers were seen sweeping the grounds of the vicinity. Other than that, nothing was done. It is also perhaps why many of the passengers chose not to use the benches in fear of dirt and germs on them. The bus station's cleanliness could also be because of the outlook of the whole structure

as it was build 25 years ago, thus looks a little run-down. As mentioned earlier, the bus depot is also located at one side of the bus waiting area, thus the ground is smeared with the buses engine oil and grease. All these awful sight could be one of the reasons why more than half of the 100 respondents rated "Poor" for its cleanliness.

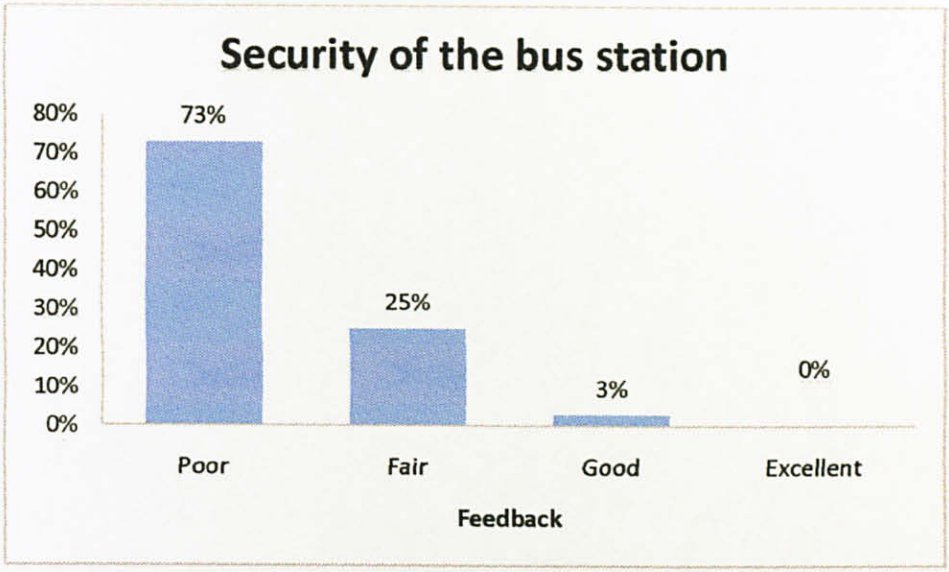

Figure 22: Respondents' feedback on the security level of Medan KIDD

Figure 22 shows the respondents' feedback on the security level of Medan KIDD. The results clearly show a majority of the respondents rated "Poor" for the bus station's security aspect. 73% of the 100 respondents think that the security of the bus station is poor, with only 25% of them rated "Fair" for the bus station's security. However, surprisingly, 3% of the 100 respondents think that the security is good. For as long as the writer was there throughout the 7 days, there was no incident on crime. The writer tried searching for information of crime in Medan KIDD but there was nothing reported. It could be because there might be small crimes, such as pick-pocket, gang fights, etc in the bus station area, but perhaps none of these incidents was reported to the authorities. There is a security guard hired to guard the place, but maybe because the vicinity is too big, perhaps the security guard is not able to guard the place thoroughly. Hobos are sometimes seen sleeping on the benches. To improve the security of the bus station, the

main gates are locked every night to prevent illegal admission into the vicinity.

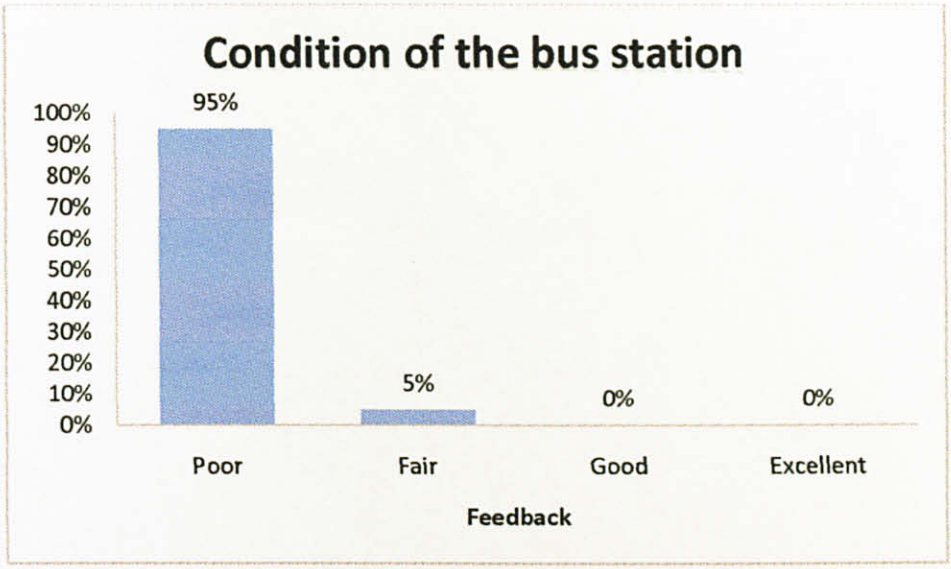

Figure 23: Respondents' feedback on the condition of Medan KIDD

Figure 23 shows the respondents' feedback on the condition of Medan KIDD. According to Figure 23, 95% of the 100 respondents rated "Poor" for the condition of the bus station whereas 5% of them rated the condition as "Fair". The concept of the bus station is condition is the outlook of the exterior and interior of Medan KIDD. This is solely based on the respondents' perspective in analyzing the condition of the bus station. Based on this result, it can be concluded that a majority of them thinks that the bus station should have a new outlook to attract more users of this mode of public transportation. This could be achieved by giving a new facelift for the bus station, such as a new set of paint, or renovation works for the bus station.

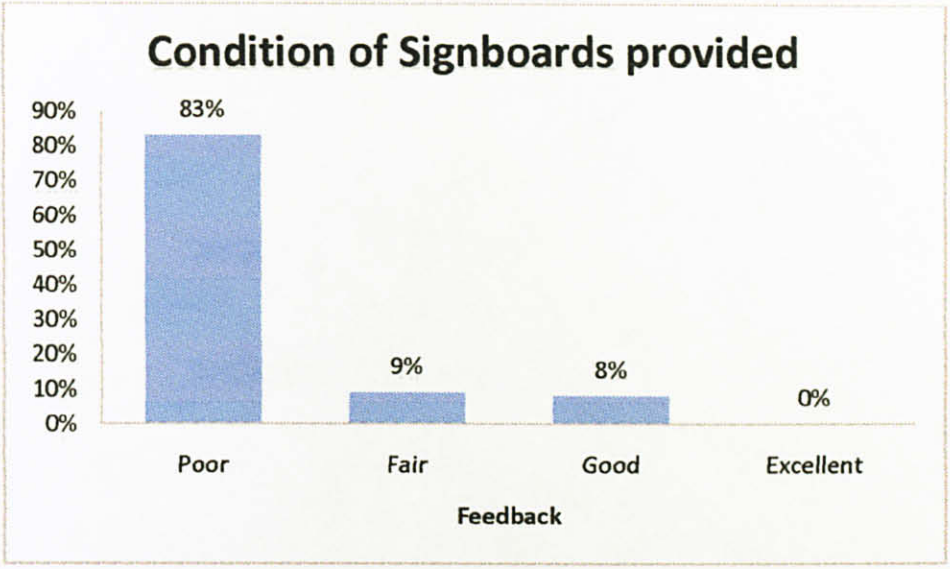

Figure 24: Respondents' feedback on the condition of signboards provided in Medan KIDD

Figure 24 states the respondents' feedback on the condition of signboards provided in Medan KIDD. Based on the results shown, 83% of the total respondents rated the condition of the signboards provided as "Poor", and with 9% of them rated the condition as "Fair" and followed closely by 8% rated "Good" for the signboards' condition. As mentioned in the problem statement, most of the signboards provided have been outdated for a very long time because those were displayed the same day as the opening of the bus station, which was 25 years ago. Not only the information of the signboards is wrong and misleading, the wordings of the signboards are faded, causing confusion towards the passengers, especially the non-locals who only take the bus ride once in a while. As Ipoh is one of the main tourist spots of Malaysia, many of the tourists would like to pay visit to Medan KIDD and perhaps use the buses as one of the mode of transportation, especially those who came to Malaysia as a backpacker. This would give a negative impression towards the city, as they would have a difficult time trying to comprehend outdated and misleading signboards which would leave them frustrated and not being able to get to their destinations. Also it was mentioned earlier that the poor condition of the signboards could directly lead to a negative perception towards the bus services by the passengers.

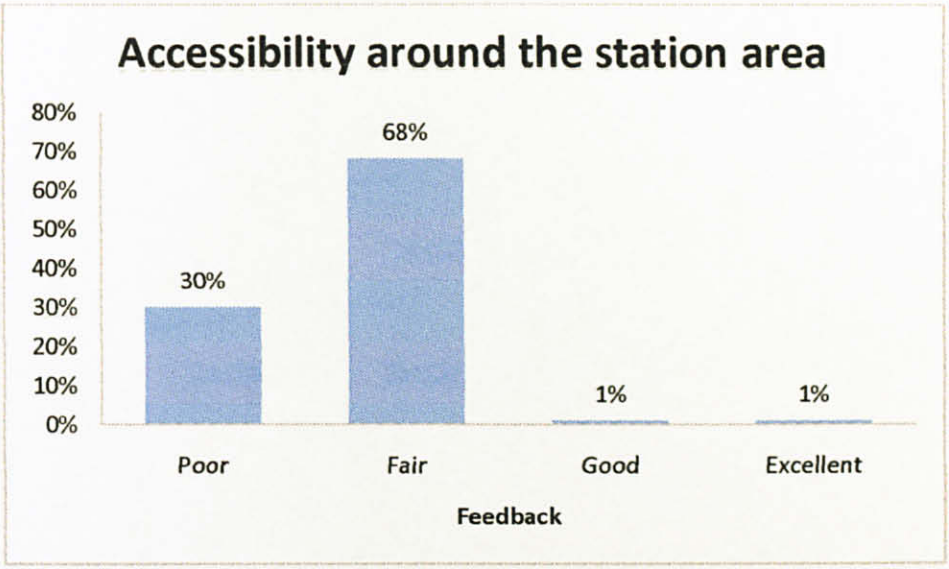

Figure 25: Respondents' feedback on the accessibility around Medan KIDD

Figure 25 shows the respondents' feedback on the accessibility around Medan KIDD. The results show that almost half of the 100 respondents rated "Fair" for its accessibility which brings a total of 68%. 30% of the total sample thinks that the accessibility around the station area is poor. An equal total of 1% rated the accessibility "Good" and "Excellent" each. The waiting platforms for the passengers are detached from the other facilities of the bus station such as the toilets and coffee shops. Thus, when the passengers or the staffs need to utilize the washrooms, they would have to cross over to the next building which would disrupt the current traffic flow and not to forget the safety of the pedestrians. The staffs who would like to have their tea breaks or lunch would have to cross over to another building (which is a different building entirely from the toilet) to the eateries as well. Based on this point, many would still prefer that all these could be located in the same main building to allow only movement within the building. However, 68% of the respondents think it is fairly accessible since the vicinity is not that big thus it is not really that difficult to move about in the vicinity. It is of course solely based on each individual's preferences.

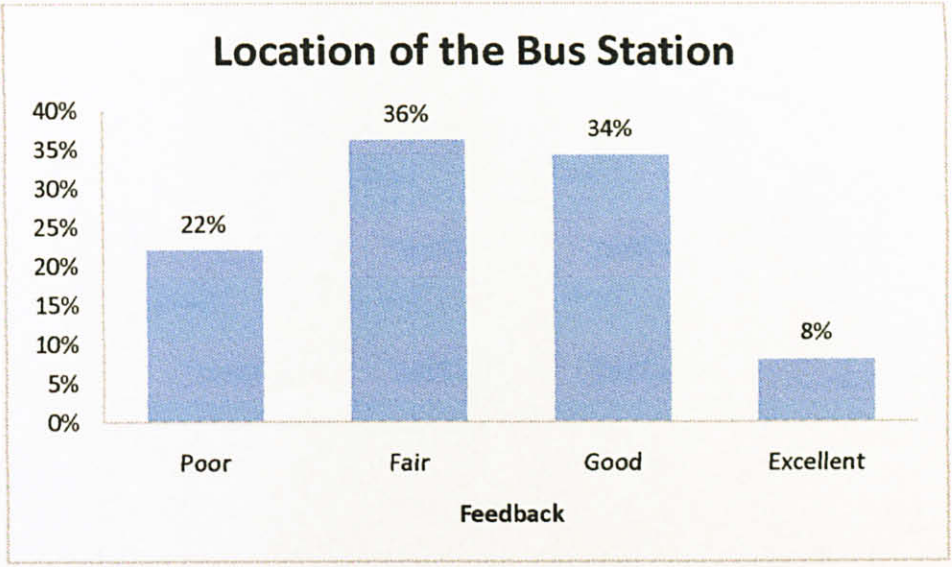

Figure 26: Respondents' feedback on the location of Medan KIDD

Figure 26 shows the respondents' feedback on the location of Medan KIDD. From the results obtained, 22% of the 100 respondents rated "Poor" for its location, followed by 36% of them rated "Fair" and 34% of them rated "Good". A small percentage of the respondents rated "Excellent" for Medan KIDD's location. Medan KIDD is located near the old town of Ipoh, with a school (SMK ACS Ipoh) located nearby and the KTM station which is just a stone's throw away. Medan KIDD serves a good transportation mode for the students who would take the public bus to and fro from the schools, as well as those who intend to take the KTM train to the intercity of the country. The bus station is not too far away from town, thus making the journey to various parts of Ipoh as short as possible. As all public buses are connected to Medan KIDD, the public can hop onto any omnibuses which would eventually bring them to the bus station itself. 22% of the 100 respondents rated the location of the bus station to be poor could be because of the location of the bus station which might be the cause of the congestion around the area especially during peak hours.

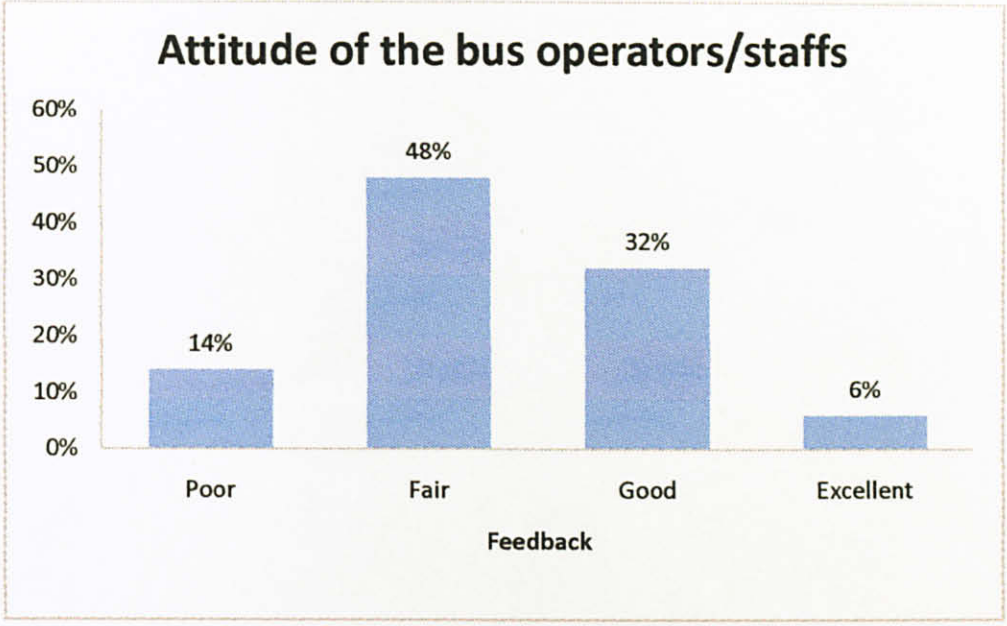

Figure 27: Respondents' feedback on the attitude of the bus operators/staff in Medan KIDD

Figure 27 shows the respondents' feedback on the attitude of the bus operators and staffs in Medan KIDD. 48% of the total respondents rated the attitude of the bus operators/staffs as "Fair" and 32% of them rated "Good". However, 14% of the 100 respondents had a negative feedback on the attitudes of the bus operators/staffs, which was rated "Poor" but on the other hand, 6% of them rated "Excellent" for this criteria. The correct attitude is needed for everyone who either plays a major role or a minor role in this bus station which would affect the performance of the bus services and the bus station. Bad attitude would be a turn-off for the passengers to utilize the bus services as because they would feel insecure with such treatment from the drivers or staffs. Generally, it is not too bad as observed throughout the 7 days of survey done, as we are brought up with Asian culture, thus people are generally more polite towards one another. Bus drivers or staffs have the responsibility to treat each and every customer of theirs in a polite and humble manner, as it plays a role in maintaining more people to use the bus services. Sometimes, tourists would decide to hop onto the public buses to get to the cities nearby, and with such polite and friendly treatment from the staffs and drivers, would create a harmonious and happy environment in line with Malaysia's culture.

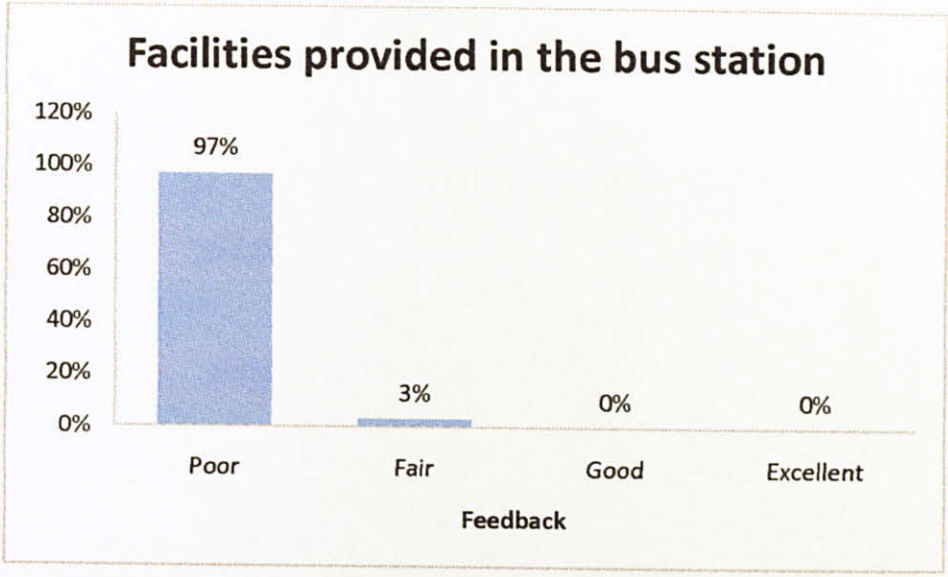

Figure 28: Respondents' feedback on the Facilities provided in Medan KIDD

Figure 28 states the respondents' feedback on the facilities provided in Medan KIDD. A vast majority of the survey rated "Poor" for the bus station's facilities which bring to a total of 97% of the total samples. 3% of the 100 respondents rated the facilities provided to be fair. Facilities here are meant to be the washrooms, the eateries provided, the amenities such as the public phones, dustbins, benches, etc in the bus station. One of the reasons of dissatisfaction is because the toilet looks rundown and creepy from the outside thus people become repulsive and not use the toilet instead. There are numerous public phones provided for the passengers' perusal, but because some of them are redundant as most of them use their cellular phones now. As compared to other bus stations, Medan KIDD needs a revamp in most criteria, which one includes the facilities provided at the station. The bus station is also not disabled-friendly as the waiting platforms are a curb high. This would cause difficulties to those who are on a wheel-chair and might face difficulties in walking around. Facilities here also include the parking spaces available for the public. At a current design, there is only a limited space for parking available in the bus station area.

To make a clearer comparison, all the charts from Section B are combined. Section B questions use a Likert scale to determine the responses from the respondents, with common factors such as "Poor", "Fair", "Good" and "Excellent". From the chart shown in Figure 29, a strong difference can be observed in all different criteria and the feedback from the 100 respondents.

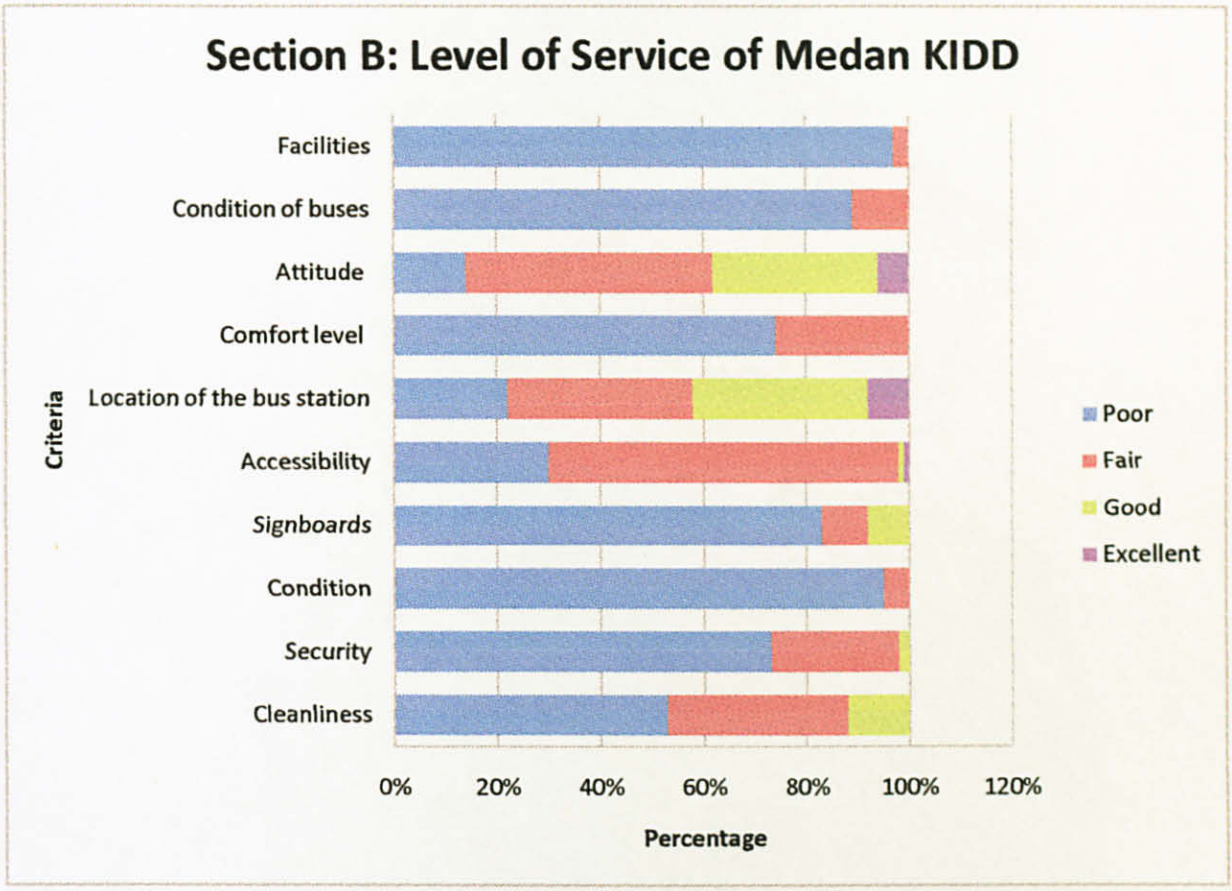

Figure 29: Comparison chart for level of service of Medan KIDD

It is undeniable that the majority of the respondents think poorly of the bus station in criteria such as the cleanliness, security, condition, signboards, and comfort level, condition of the buses and the facilities of Medan KIDD. It can be said that the people's perception and expectation of Medan KIDD has greatly increased since 25 years ago, as they now expect something more than a bus station which provides a waiting platform

for their bus services. Now, they expect a bus station with complete facilities provided, together with comfort and safety. Other aspects that can be improved are such as the accessibility of the bus station, and the attitude of the bus drivers and staffs. . However, it can be said that the responses obtained from the 100 respondents of Medan KIDD clearly shows that the bus station needs a certain level of revamp in order to meet the extending needs of the public.

As mentioned in the early part of the report, the 4 bus operators with independent management would merge together to form one management. Therefore, the changes which would incur also includes the schedules of the buses, the new routes, the way the staffs/drivers clock in would also be revised. However, for reference purposes, the author was able to obtain information of a bus operation.

The tables below would show the schedules of the buses and also the time in and out of the buses. The name of the bus company, the route and the bus plate number would be kept anonymous for confidential purposes.

Route A

Bus 1

Table 1: Day Schedule for Bus 1

In		645	800	914			1254	203	322	429	538
Schedule	600	710	820	930	1040	1150	100	210	320	430	550
Out	600	700	823	930		1200	100	218	330	443	554

Bus 2

Table 2: Day Schedule for Bus 2

In		718	845	945	1100	1215	134	244	355	456	615
Schedule	630	740	850	1000	1110	1220	130	240	350	500	625
Out	625	737	852	1005	1115	1225	137	248	356	507	620

Bus 3

Table 3: Day Schedule for Bus 3

In		750	900	1015	1130	1255		302		518	638
Schedule	645	800	910	1020	1130	1240	150	300	410	520	640
Out	642	801	911	1125	1145		157		414	522	640

It can be said that "Route A" is a popular route because 4 buses are allocated for this route. However, for this particular day, only 3 buses were being operated. It could be because the bus assigned to this route has broken down. This is not impossible because the condition of the buses from Medan KIDD is not up to standard yet. Besides that, this could also be because that the demand for this route has decreased thus the company decided to cut down the number of buses allocated for this route. It is observed that almost all the time, the buses leave on time. However, there are some times when the bus leaves the station a few minutes off the schedule. Reason for this being that some buses might wait longer to fill up the bus before moving out from the bus station. In addition to that, drivers might have taken a longer dwell time, for example, going to the toilet, having meals which could be the cause of the delay. During peak hours, for instance, in the afternoon and after-work hours (5-6pm), buses might sway from the scheduled time, due to unforeseen circumstances such as the traffic.

Based on the studies, it was observed that the maximum number of buses in the bus station at one time is 12. This is the maximum capacity for the buses in Medan KIDD.

CHAPTER 5
RECOMMENDATION AND CONCLUSION

5.1 Recommendation

The survey results show majority dissatisfaction among the public regarding the current bus station. The current bus station has been build to accommodate the capacity of people 25 years ago, with minimal design level for comfort, safety and accessibility. From the survey results obtained, it is concluded that people now put great emphasis on comfort, safety and accessibility in their structural buildings, which includes Medan KIDD.

To overcome the problem in hand, the writer has proposed a new bus station design, with a new traffic flow to fulfill the needs of the people. The current traffic flow in Medan KIDD is uni-flow which has only one opening, which means only one exit and one entrance for the vicinity. The new bus station design would have two openings; one for exit and another one used for entrance into the bus station. This can be seen clearly in Figure 30.

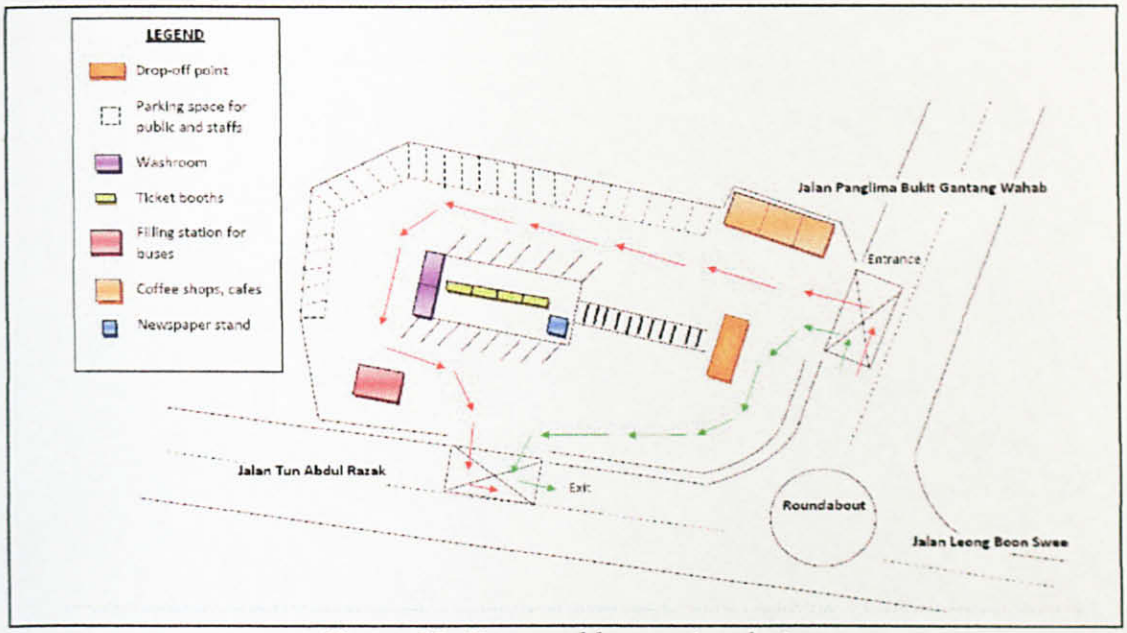

Figure 30: Proposed bus station design

The proposed bus station design has a new traffic flow. With this new traffic flow, there would be no intersection point between the vehicles thus minimizing the accident rates in front of the bus station's entrance. The red arrows represent the traffic flow of the buses into the bus station area. The green arrows represent the traffic flow of the public vehicles, taxis, etc. With an entrance, all vehicles are expected to enter one way and come out from the other exit. In this proposed design, there are 12 bus berths which are allocated to accommodate the maximum capacity of the bus station. A proper drop-off point is also included in this proposed design, to ensure that the passengers can be dropped off safely. A zebra crossing would be allocated to ensure the safety of the passengers who would be crossing to and fro from the waiting platform to the drop-off point.

At the present situation, the passengers have to walk across the main street to get a taxi or to wait at the entrance for a taxi. However, with the drop-off point, there would be space allocation for the taxis to wait to pick up potential passengers without having the passengers to leave the vicinity. Compared to the present design where the washrooms are located away from the main building, the proposed design would have the washrooms build at the main building so that the passengers and staffs would not have to leave the main building to walk across to the washrooms. This would not disrupt the traffic flow of the buses and would increase the efficiency of the bus services. The eateries are still located away from the main building though due to limited spaces available on the land area. However, the frequency of people eating at the bus station is lesser compared to the frequency of people using the washrooms, thus the traffic flow would not be greatly affected.

In the proposed design, there would also be more parking spaces allocated for the staffs or the passengers. This would eliminate the need for them to park on unused bus berths which is the case now for the current bus station design. For the benefit of this project, the writer only takes account the traffic flow of the bus station which would directly affect the capacity and the level of service of the bus station. However for further studies, more facilities could be added into the proposed design such as facilities for the disabled and so on.

5.2 Conclusion

The current condition of Medan KIDD is studied to determine its current capacity and level of service. The problems faced by the bus station are also studied. Based on the survey conducted, it can be concluded that the majority of the respondents shared the same views that Medan KIDD needs a certain level of revamp in order to meet the current present needs of the people. The proposed bus station design with a new traffic flow could possibly incorporate the accessibility, safety and comfort for the needs of the public.

CHAPTER 6
ECONOMIC BENEFITS

Project Cost

The project cost is low as only survey is conducted throughout the analysis of the bus station. A total of 100 pieces of survey forms are printed out with the cost price of RM0.10 per piece. This brings to a total of RM10.00 for a 7-day survey.

Business Element

After the survey is conducted and the results collected, the analysis of the capacity and level of service of Medan KIDD can be determined. Based on the analysis obtained, many thinks that the bus station needs to undergo a certain amount of revamp to meet the needs of the current population of the city. With reference to the recommendation given by the writer, the whole layout of the bus station has to be changed to come up with a new bus design and a new traffic flow. Such construction cost cannot be estimated here.

However, after the new bus station is built, more buses can be in the bus station at one time to carry more passengers at one time. Traffic would be minimized as the new bus station design has more space for the parking of passengers' cars as well as the bus waiting to pick up the passengers. The new bus station has 12 berths which bring to a maximum capacity of 12 buses in the station at one time. This would mean that more passengers would be picked up at one time, and there will be minimal waiting time for the passengers. This would encourage the usage of the buses as public transports in the city as the passengers no longer have to wait at a long time.

The buses companies would benefit from this change of bus station design as more trips can be conducted if more people were to utilize the buses. The people of the Ipoh city would also be able to benefit from the newly built bus station with the efficient bus system.

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APPENDIX A

I am a Final Year student from Universiti Teknologi Petronas, Tronoh, who is pursuing a Bachelor of (Hons) Civil Engineering. I am conducting a research regarding the level of service of the bus station (Medan KIDD, Ipoh).

Your responses are strictly **PRIVATE AND CONFIDENTIAL** and are only used specifically for academic purposes only. Thank you for your time and your kind cooperation.

Section A: Demographic

1. Gender:
    - Male
    - Female
2. Marital status:
    - Single
    - Married
    - Divorced
    - Widow/Widower
3. Age:
    - 18 and younger
    - 19 – 25
    - 26 – 30
    - 31 – 40
    - 41 – 50
    - Above 50
4. Race:
    - Malay
    - Chinese
    - Indian
    - Others: _____
5. Which of the following describes you best?
    - Employed
    - Homemaker
    - Retired
    - Student
    - Others: _____
6. Monthly income level
    - RM 1000 below
    - RM 1000 – RM 2000
    - RM 2000 – RM 3000
    - RM 3000 – RM 4000
    - Above RM 4000

7. Do you have your own private transport?
    - Yes
    - No
8. Reason why you take the bus from Medan KIDD?
    - To work
    - To school
    - For leisure
9. How often do you take the bus from Medan KIDD?
    - Daily
    - A few times a week
    - Occasionally
    - When necessary
10. Do you think Medan KIDD is accessible?
    - Yes
    - No

Section B: Level of Service of the bus station

Please rate the level of service of the following:-

11. Cleanliness of the station	Poor	Fair	Good	Excellent
12. Security of the station	Poor	Fair	Good	Excellent
13. Safety in the station	Poor	Fair	Good	Excellent
14. Condition of the station	Poor	Fair	Good	Excellent
15. Signboards provided regarding the bus schedules	Poor	Fair	Good	Excellent
16. Amount of benches provided	Poor	Fair	Good	Excellent
17. Accessibility around the station area	Poor	Fair	Good	Excellent
18. Location of the bus station	Poor	Fair	Good	Excellent
19. Comfort level at arriving/departing plaforms	Poor	Fair	Good	Excellent
20. Attitude of the bus operators/staffs	Poor	Fair	Good	Excellent
21. Exterior / Interior of the buses	Poor	Fair	Good	Excellent
22. Facilities provided e.g, toilet, cafe	Poor	Fair	Good	Excellent

Please leave any suggestions to help improve the condition of the bus terminal.

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