

# THE ACCESSIBILITY OF BUS TERMINAL DESIGN

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# **CONTENTS**

Title	i
Acknowledgement	ii
Table of Contents	
Abstract	
List of figures	

## **CHAPTER 1**

### **Introduction**

<b>1.1 RESEARCH BACKGROUND</b>	<b>1</b>
<b>1.2 GOALS</b>	<b>2</b>
<b>1.3 OBJECTIVES</b>	<b>2</b>
<b>1.4 PROBLEM STATEMENT</b>	<b>3</b>
<b>1.5 SCOPE OF STUDY</b>	<b>4 -7</b>
<b>1.6 METHODOLOGY</b>	<b>8 - 9</b>
1.6.1 Literature Reviews	10 -12
1.6.2 Case Studies	13 -14
1.6.3 Data Analysis	15

## **CHAPTER 2**

### **Research Topic**

<b>2.1 INTRODUCTION</b>	<b>16</b>
<b>2.2 LITERATURE REVIEW</b>	
2.2.1 Accessibility Design Guideline	17-31
2.2.2 Standard Layout of Bus Terminal Design	32 - 33
2.2.3 Bus Terminal Design Standard	34 - 42

## **2.3 REFERENCE STUDIES**

2.3.1	George Washington Bridge Bus Station	43 - 44
2.3.2	Don Mills Station	45 - 46
2.3.3	Sheppard-Young Station	47 - 49

## **CHAPTER 3**

### **Case Study and Data Analysis**

<b>3.1</b>	<b>INTRODUCTION</b>	<b>51</b>
<b>3.2</b>	<b>CASE STUDY 1 (Hentian Duta Bus Terminal, Kuala Lumpur)</b>	
3.2.1	Introduction	52 - 54
3.2.2	Space Arrangement of Bus Terminal	55
3.2.3	Spaces Provided at the Terminal	56 - 61
<b>3.2.4</b>	<b>Landscape Element as Accessible features</b>	<b>62 - 64</b>
<b>3.3</b>	<b>CASE STUDY 2 (Larkin Bus Terminal, Johor Bahru, Johor)</b>	
3.3.1	Introduction	65 - 66
3.3.2	Space Arrangement of Bus Terminal	67
3.3.3	Spaces Provided at the Terminal	68 - 75
3.3.4	Landscape Element as Accessible features	76 - 80
<b>3.4</b>	<b>DATA ANALYSIS AND ASSESSMENT</b>	
3.4.1	Hentian Duta Bus Terminal, Kuala Lumpur	81 - 85
3.4.2	Larkin Bus Terminal, Johor Bahru, Johor	86 - 92
<b>3.5</b>	<b>CONCLUSION</b>	<b>93</b>

**CHAPTER 4**  
**Result and Findings**

<b>4.1</b>	<b>INTRODUCTION</b>	<b>95</b>
<b>4.2</b>	<b>CONTENTS AND CRITICS</b>	
4.2.1	Accessibility Design Guideline	96
4.2.2	Bus Terminal Design Standard	96 - 98
<b>4.2.3</b>	<b>Bus Circulation</b>	<b>99 -100</b>
<b>4.3</b>	<b>FINDINGS</b>	
4.3.1	Human Accessibility	101 - 114
4.3.2	Vehicular Accessibility	115 - 117
<b>4.4</b>	<b>CONCLUSION</b>	<b>118</b>

**CHAPTER 5**  
**Conclusion**

<b>5.1</b>	<b>INTRODUCTION</b>	<b>119</b>
<b>5.2</b>	<b>RECOMMENDATIONS</b>	
5.2.1	Human Accessibility	120 - 123
5.2.2	Vehicular Accessibility	124 - 125
<b>5.3</b>	<b>CONCLUSION</b>	<b>126</b>

## ***ABSTRACT***

Terminals are end stations of one or more bus routes often used for any large station with facilities, such as waiting rooms, ticket offices, and so on. Bus terminal, on the other hand are off-street areas or buildings with stops point for several bus routes. The arrangement of the spaces provided at the terminal must also take into consideration, which will determine the accessibility of the bus terminal layout.

“Accessibility should be coordinated not only by analysing and responding to the context of the site but coordination should exist between parking areas, curb ramps, paved areas, rest areas with adequate seatings, lighting signages, building entries, and interiors. Continuous accessibility is also needed between building and within building, between parking areas, corresponding destinations and native destinations.” (Charles and Nicholas, 1998).

There are some problems being identified, as an obstacle to make bus terminals accessible. There is no suitable measurement and scale provided for bus circulation and movement and no accessible facility for pedestrian especially for disabled person implemented in bus terminal design such as ramp, signage and hand railings. The existing guidelines provided by local authority and Public Transportation Department should be the reference in designing bus terminal. As a conclusion, to ensure the accessibility of bus terminals, it is not only the satisfaction of the users that matters but also the planning for circulation of the buses itself.

## ***LIST OF FIGURES***

### **Chapter 1**

Figure 1.1: Design dimensions for island bus stops

Figure 1.2: Bus-rail transfer station with island stops

Figure 1.3: Central Island station in quadrant of an intersection

Figure 1.4: Parallel station between a pair of one-way streets

Figure 1.5: Parallel station on the side of a two-way street

### **Chapter 2**

Figure 2.1: Unexpected level changes are hazardous and should not occur in the main line of pedestrian walkways. Existing situations can be modified to forewarn unsuspecting pedestrians.

Figure 2.2: Stairway landings. Vertical height between stairways landings should be minimized to accommodate individuals with limited strength.

Figure 2.3: Step should be designed to safely accommodate those who will use them. Careful attention to nosing and shadow line details is especially important.

Figure 2.4: Spacing of handrails and grab bars.

Figure 2.5: Typical bench requirements. Benches should be design to facilitate individuals with limited strength. Armrest and adequate heel space are especially important details.

Figure 2.6: Wheelchair dimensions.

Figure 2.7: A 60-in diameter space is needed for wheelchair turning. T shaped space for 180<sup>o</sup> turns.

Figure 2.8: Symbol of Accessibility

Figure 2.9: Layout for a large size town.

Figure 2.10: Layout for a bus terminal in a medium sized new town with terminal and in transit services.

Figure 2.11: Accommodation layout for a bus terminal in a small town.

Figure 2.12: Design Criteria for a lay-by with one bus stop.

Figure 2.13: Vehicles manoeuvres used 'drive through' layout in approaching parking bays.

Figure 2.14: Vehicles manoeuvres used 'shunting' layout in approaching parking bays.

Figure 2.15: Vehicles manoeuvres used 'saw tooth' layout in approaching parking bays.

Figure 2.16: As the angle of pitch in saw-tooth bays increases so does the distance between each bay.

Figure 2.17: Passenger safety and control are particularly important when detailing saw-toothed bays.

Figure 2.18: 90° turning pattern for rigid 12 m rigid vehicles

Figure 2.19: 180° turning pattern for rigid 12 m vehicles

Figure 2.20: Coach park for random arrival and departure of vehicles. The larger bay size (4m) is necessary if coach parties enter and leave the coaches in the park.

Figure 2.21: Bus garaging layout for where the buses are parked in a pre-determined order to get the maximum number of buses in the space available subject to limitations imposed by the fire officer.

### **Chapter 3**

Figure 3.1: Key Plan of Hentian Duta Bus Terminal, Kuala Lumpur.

Figure 3.2: Location Plan Hentian Duta Bus Terminal, Kuala Lumpur.

Figure 3.3: layout of vehicles circulation.

Figure 3.4: View towards the entrance.



**Figure 3.5: View towards the parking area.**

**Figure 3.6: View towards the ticket counter area.**

**Figure 3.7: View towards café area.**

**Figure 3.8: View towards café area.**

**Figure 3.9: View towards main building**

**Figure 3.10: View towards Airport Coach Area**

**Figure 3.11: View towards Platform area.**

**Figure 3.12: View towards covered walkway.**

**Figure 3.13: The picture shows outdoor ramps provided at ticket counter area**

**Figure 3.14: The picture shows pavement design and pattern.**

**Figure 3.15: The picture shows the design of signage**

**Figure 3.16: Key Plan of Larkin Bus Terminal, Johor Bahru, Johor.**

**Figure 3.17: Location Plan of Larkin Bus Terminal, Johor Bahru, Johor.**

**Figure 3.18: layout of vehicles circulation**

**Figure 3.19: General overview towards the entrance.**

**Figure 3.20: General overview towards the platform area.**

**Figure 3.21: General overview towards the parking area.**

**Figure 3.22: General overview towards the main building.**

**Figure 3.23: General overview towards the taxi terminal area.**

**Figure 3.24: General overview towards the exit.**

**Figure 3.25: General overview towards the ticket counter area.**

**Figure 3.26: General overview towards the shop lot area.**

**Figure 3.27: General overview towards the covered walkway.**

**Figure 3.28: Design and pattern of the pavement.**

**Figure 3.29: Picture shows the design of the signage.**

Figure 3.30: Picture shows the design of indoor ramps.

Figure 3.31: Picture shows the handrailing inside the terminal.

Figure 3.32: the picture shows the design of the stairs.

Figure 3.33: the picture shows the outdoor seating being utilized by the user.

## **Chapter 4**

Figure 4.1: Dimensions of parking spaces.

Figure 4.2: Access isle at passenger loading zones.

Figure 4.3: Maximum allowable camber fro pathways and ramps.

Figure 4.4: Profile of ramp

Figure 4.5: Step ramp.

Figure 4.6: Size of symbol for access for varying viewing distances.

Figure 4.7: Stairs design for disabled.

Figure 4.8: Configuration of steps.

Figure 4.9: Lift car requirement.

## **Chapter 5**

Figure 5.1: Examples of moveable platform bridge.

# CHAPTER 1

## **Introduction**

## 1.1 RESEARCH BACKGROUND

Bus terminal is one of public terminal provided. It is created mainly to provide facilities for users as a transit places from one place to another. The other meaning of bus terminals is, off-street areas or buildings with stops for several bus routes (Vuchan, 1981).

This research paper is mainly to investigate the most accessible of bus terminal design. In order to have the accessible design of bus terminal, this research paper will focusing on the study of design guideline and standard of bus terminal.

The accessibility of bus terminals is not only for human accessibility only. But it is also including its planning and circulation of the bus itself. The circulation of bus itself will ensure the accessibility of the bus terminal.

In order to facilitate the bus terminals, it's also being supported by other function such as restaurants, shops and so on. By that this research paper also will investigate the function of spaces that include in bus terminal design. So, it is important to have best design and layout of bus terminal in order to make it accessible.

Since bus terminals consist of various types of users, so that the design should be accessible and user friendly. The facilities of bus terminal such as ticket counters, signages, and ramp for disabled users should be considered it terms of its location. This research paper will study on the design that can cater various types of user and also the accessible facilities that should been provided at bus terminal.

Hopefully this research paper will come out the best design and solution of bus terminal design and guidelines. It is to improve bus terminal facilities that mainly to provide ease for bus terminal users by having accessible bus terminal.



## **1.2 GOALS**

The goal of this research paper is to study the accessibility of bus terminal design in terms of its design and layout. This research paper mainly to improve the accessibility of bus terminal design so that, it can upgrade the quality of services at bus terminals, since bus terminals have various types of users.

## **1.3 OBJECTIVES**

There are several objectives need to be achieves in the process of completing this research paper.

- i) To study design guidelines and standards of bus terminal design.
- ii) To study accessible planning design for accessible bus circulation.
- iii) To identify landscape element that functions as accessible features in bus terminal design.
- iv) To study and highlight the function of space and its accessibility between each other.





## **1.4 PROBLEM STATEMENT**

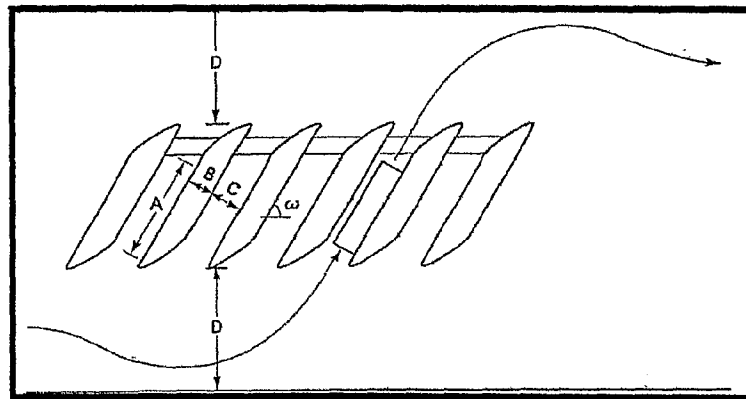
- 1) The design of bus terminal, which is not considering about user movement, is one factor in causing inaccessibility in bus terminal design. So that, the guidelines for access to public transport need to be implemented in designing accessible bus terminal.**
  
- 2) The lack of awareness of the access need of persons with disabilities in public transportation was identified as a cause of inaccessible public transportation systems. The situation had been compounded with the negative attitude towards disabled persons and ignorance of the abilities and aspirations of persons with disabilities.**
  
- 3) In bus terminal design there is no specific design of facilities that can be accessible for disabled person. The design only considers about the comfort ness of normal people. In order to have accessible bus terminal design, the facilities of bus terminal must be barrier – free designs, so that they can be used by disabled people.**



### 1.5 SCOPE OF STUDY

There are several types of bus terminal layout currently being used. Each of its layouts has its own advantages and disadvantages. In designing bus terminals, the trade – off between operating flexibility and curb length required must be evaluated. Independent arrivals and departures are always desirable for flexible operation. The greater length involves walking distances and requires more shelters and more elaborate passenger information. (Vuchan, 1981)

One layout of bus terminal was, bus terminal with “Parallel Island”. It is the terminal which having series of parallel island separated by single-lane roadways. This layout is efficient for major terminals with many routes. The common design of island is at angles of  $45^{\circ}$ ,  $60^{\circ}$  and  $90^{\circ}$  to access the roadways. The sharper the angle, the larger the dimensions are, because of sharper turning angles. (Vuchan, 1981)



	A	B*	C	D
$45^{\circ}$	$L'$ or $2L + 1.00$	1.50-3.00	3.25	8.00-10.00
$60^{\circ}$	$L'$ or $2L + 1.00$	1.50-3.00	3.50	10.00-12.00
$90^{\circ}$	$L'$ or $2L + 1.00$	1.50-3.00	3.75	12.00-14.00

\* For stairs or escalators leading to pedestrian mezzanine 1.50-2.50 m should be added

Figure 1.1: Design dimensions for island bus stops

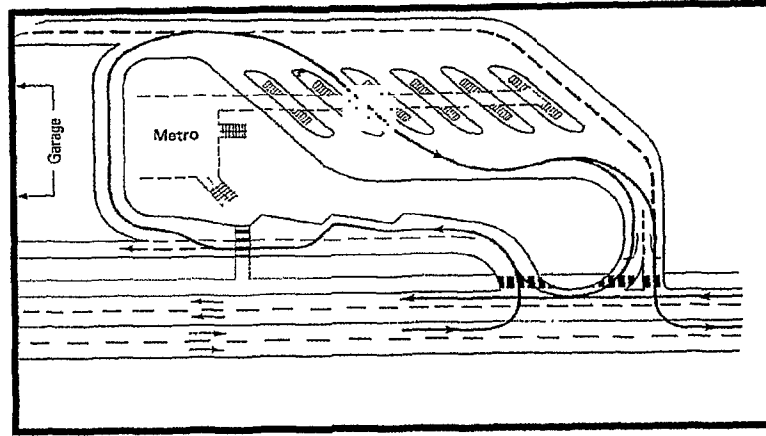


Figure 1.2: Bus-rail transfer station with island stops

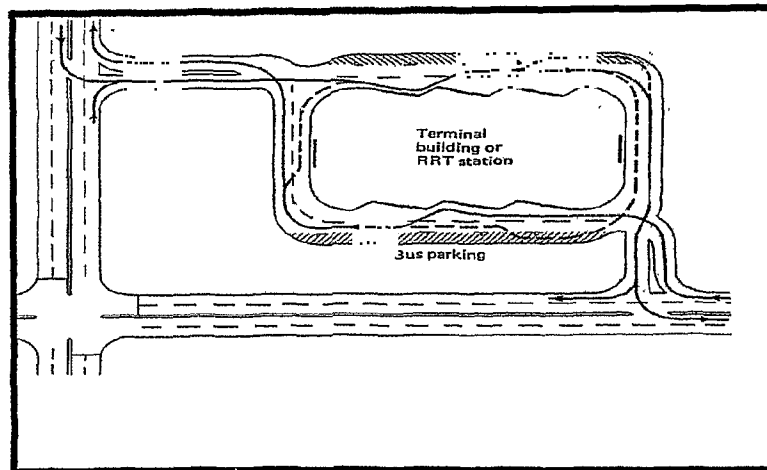


Figure 1.3: Central Island station in quadrant of an intersection

Another types of bus terminal layout were called “Central Island”. It is the best layout for pedestrian safety, comfort and convenience. This layout of this bus terminal was, terminal around a major rectangular or oval shape. This arrangement allows passengers transfer among all bus routes or between buses without crossing a roadway. The station is thus a complete “pedestrian zone”. The pedestrian crossing provides connections with adjacent streets. However, the crossings may be omitted and pedestrian access even prohibited in order to make the island a “ticketed area” (area restricted to passengers who have paid fares). They then can transfer between buses and trains without fare payments and controls. (Vuchan, 1981).



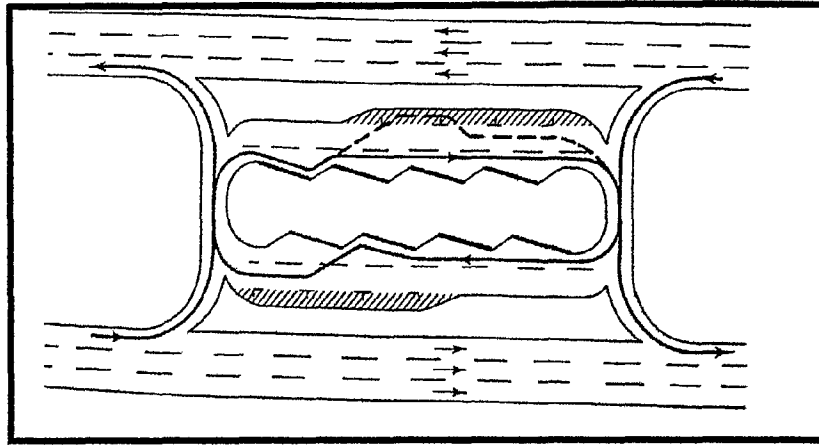


Figure 1.4: Parallel station between a pair of one-way streets

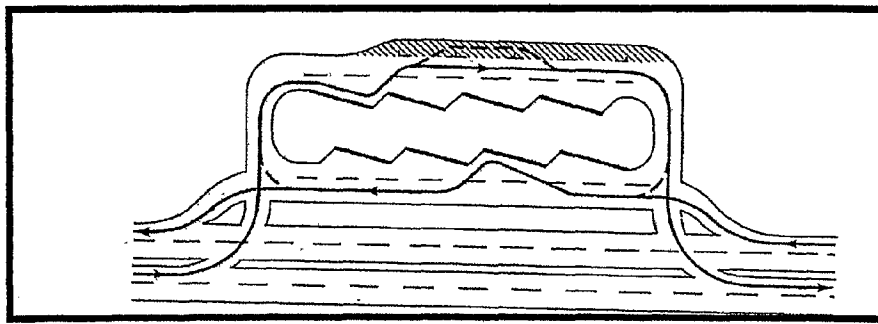


Figure 1.5: Parallel station on the side of a two-way street

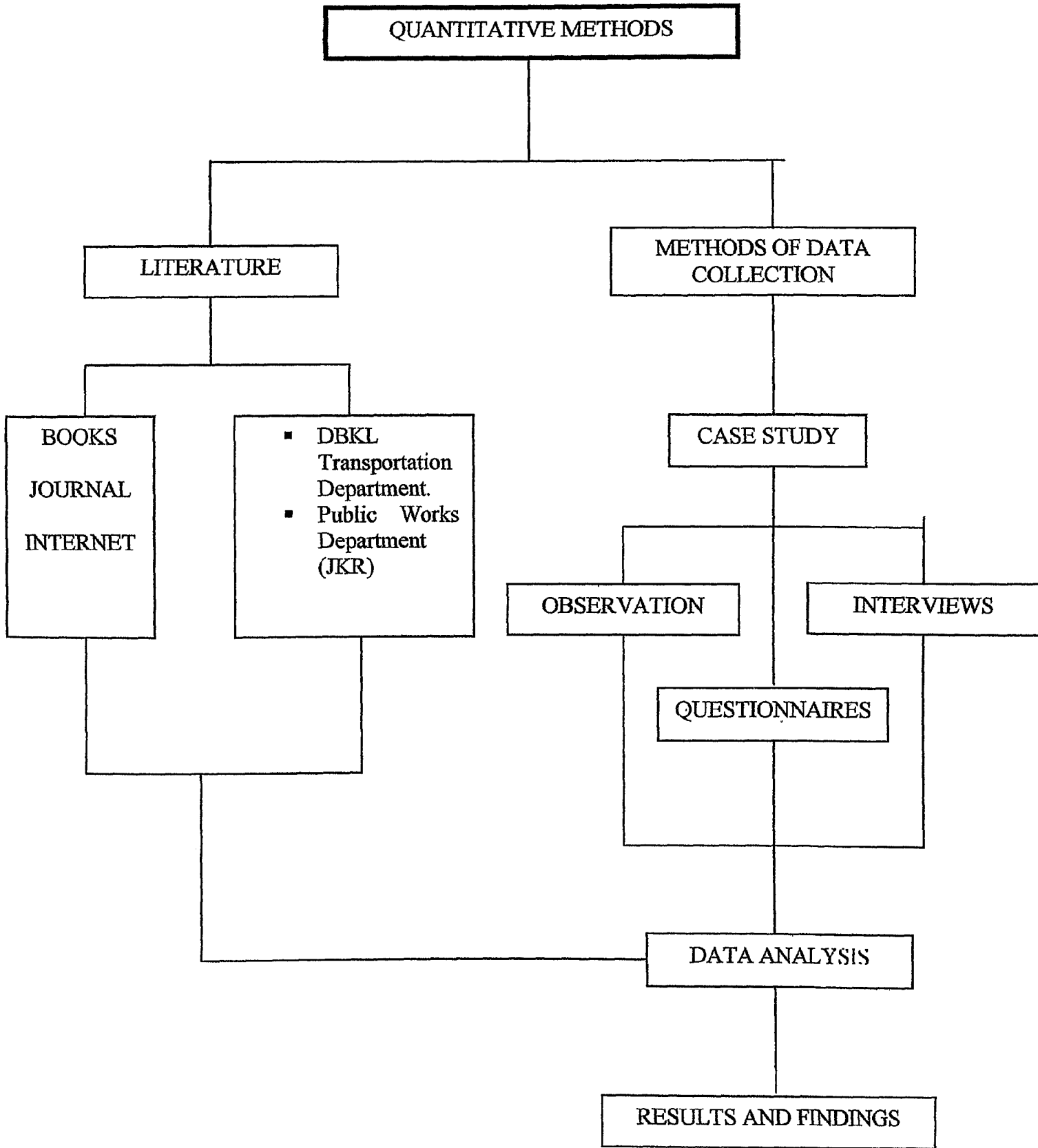
The central island also has excellent operating features. The circular roadway allows buses to unload passengers at one location, move to a waiting area, then return to the same, or to another stop location for boarding. Moreover, these stations can be used by routes passing through, as well as for the terminating ones with buses simply “looping” around the island and returning to the same direction. (Vuchan, 1981)

For this research paper the study of bus terminal will focusing on outdoor layout of bus terminal. For this types of layout, the layout of bus terminal will be different from the other layout that been mention before. This is because the building area that is accommodate ticketing area and other facilities will be located separately.

For the departure and arrival areas will be at outdoor area an. This area will be covered with structures to give comforts to users. The selection of this bus terminal layout is because of to concentrate in landscape design at outdoor bus terminal. A part of it, it is also to study the accessibility of bus itself in terms of its circulation.

By having outdoor landscape for bus terminal it is hope that this research paper will help in upgrading outdoor bus terminal services. It is mainly to provide better facilities of bus terminal for user convenience.

**1.6 METHODOLOGY**



This research aims to achieve several goals and objectives as been stated. In this topic there will be an explanation about the main methods that being used in this research paper. Different methods will be employed in exploring a problem situation, helping solve a problem, or establishing acceptability or otherwise of a hypothesis. Some of these methods can complement each other. (Roger, 1981). The methods being used for this research paper is quantitative methods.

### 1.6.1 Literature reviews

In order to do research, the understanding of the topic of should be the first. To understand the topic several types of gathering information had been done through literature study that related to this topic. There were various references such as books, journals, Internet and magazines being used as a literature study in this research.

#### a) Books

There are numbers of books being used during completing this research paper. All books that related with bus terminal design and guidelines being used as a references. In order to make this research paper complete, any kind of books that related with accessible design and study also being used as a guidelines. It is to get the exact accessible design guideline to be implement in designing bus terminal.

#### b) Journals

A part of using books as a reference, some journals that related with this research paper also being user in collecting data and information. I is to search the design that been implemented in bus terminal and to get the information on it accessibility.

#### c) Internet

In completing this research paper, method of using internet being used in collecting information as reference study. It is mainly to get the information and design of bus terminal from the overseas. This is to explore the variety of design from overseas that been implement successfully in making bus terminal more accessible. It is also being

used in collecting literature reviews of the accessibility of bus terminal design.

d) Magazines

To make this research paper complete, the overview of some issues and problems need to be compiled to strengthen the problem statement. It will be the base and foundation to solve the problem that related in bus terminal.

Apart of it, the information also gathered by collecting information from any department that related with this topic. From here, the selection departments were, Malaysia Transportation Department and Public Works Department (JKR) Malaysia. On this stage there will be interview session in completing data collection. The respondents of interview session consist of the person which expert in this field. The intention is to get exact layout and design of bus terminal from those of the department, at the same time to get their opinion and suggestion about this research topic.

a) DBKL Transportation Department

From the DBKL Transportation Department the information related on, management and services would be collected. The information being collected through interviews method and data analysis.

b) Public Works Department (JKR)

There are also the collections of information from this department. The purpose is mainly to get the information on layout and design of bus terminal.

The information gathered will cover all topics in this research paper. It contains the information about bus terminals design and guidelines. The literature review will cover about accessible design of bus terminal. It is to investigate what is landscape element that function as accessible features in bus terminal and function of each space in bus terminal. A part of it, it is also to collect information about design that related with disable person and facilities that can be accessible by them.

### 1.6.2 Case studies

The observation of several case studies will be conducted in order to collect information about bus terminal. There are several considerations taken through the observation on the case study. The considerations based on its design and layout, the spaces provided in bus terminal and also accessible features that play a role in making bus terminal more accessible, covering user accessibility and vehicles accessibility aspect.

There were two bus terminals selected to be as case study. The selection of case study is based on the design and layout of the bus terminal. A part of it, it is also based on the circulation pattern of the bus terminal which can be considered as quite successful in its accessibility. The selected bus terminals were, Larkin Bus Terminal, Johore Bahru and Hentian Duta bus Terminal Kuala Lumpur.

Through this case study there are several methods being used in collecting data. It is to make the collection of data more effective and useful. The methods being used were, observation, interviews and questionnaires distribution.

#### a) Observation

The observation on the case study will be based on to study what is happening in bus terminal. It is mainly to observe users' activity and to get the layout of the bus terminal. The observation also will cover on the circulation of user movements on each every space in bus terminals. The methods of observation will be from photograph and