Improving Transportation for the Elderly and Disabled

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ABSTRACT

Our project focused on trying to improve the accessibility of transportation for the elderly and disabled in Hong Kong. We centered our research on public buses, taxis and pedestrian walkways. Through interviews and research, we found that these systems are improving, and in general are quite accessible. However, there are areas where changes need to be made in technology, legislation and the attitudes of citizens.

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AUTHORSHIP

We would like to state that as a group, we claim authorship of all sections of this document. We each contributed equal time and work to the outcomes of the project and each worked on the sections at various times.

EXECUTIVE SUMMARY

Developed cities such as Hong Kong have millions of citizens who rely on mass transportation to complete their daily activities. In the past thirty years many cities have tried to make public transportation as "barrier free" for the physically handicapped as possible. Despite improvements, there are many times that the elderly and disabled must rely on family members to utilize the mass transit system. The goal of this project was to analyze the public transit system of Hong Kong, particularly double-decker buses and civilian walkways, for their accessibility to these citizens and to make recommendations to improve the system.

The population of Hong Kong depends greatly on mass transportation for daily travel. The main bus providers, Kowloon Motor Bus Company (KMB) and New World First Bus (NWFB), as well as the civilian walkways provide direct travel access for millions of pedestrians each day. For the purposes of this project, we examined the accessibility of mass transit for those with a physical disability, and to some extent, those with a hearing or visual impairment. The accessibility concerns for those with a disability can be applied to the elderly who often have mobility, hearing or seeing difficulties.

To achieve the goal of this project, we performed research pertaining to the state of the current transportation system, the concerns of the disabled users, and the future direction of planning organizations. Various interviews were conducted with several different companies and organizations. During the interviews, we discovered the direction of the "Transport For All" campaign along with visions that operators had on accessible transport. Finally, disabled citizens who run various organizations for the disabled, such as Retina Hong Kong, were questioned about their difficulties with the current bus and walkway system.

Our findings revealed quite a complex problem. As part of our conclusions and recommendations it must be noted that several different government departments are often involved in transport related projects. For buildings there is the Architecture Department, for sidewalks the Highway Department, for transport there is the Transport Department, and for the

well-being of citizens there is the Health and Welfare Department. Each of these agencies plays a role in the development and implementation of accessible transport. The collaboration of departments, however, often times runs into problems because of different legislative guidelines providing direction for each department. It is our suggestion that they work together through working group meetings as well as develop one common document on accessible transport and planning.

We found that for buses in Hong Kong, many improvements for greater disabled accessibility are already in place. KMB's fleet will be completely low floor kneeling with ramps for wheelchair access by 2014. Their buses already have large stop announcement signs as well as audible announcements. By comparison, NWFB was quite far behind KMB in terms of accessibility. This company has no plans to fully implement kneeling buses in its fleet and has no internal announcement systems. Overall NWFB needs to update its buses to be more handicapped accessible and start planning for the future. A problem that both companies should be concerned about is the development of an external bus route announcement system at individual stops for those with a visual impairment. Current technologies such as Global Positioning System (GPS) and Bluetooth could be utilized in such an improvement.

Outside of these specific recommendations, a list of other suggestions was compiled. Some of these included:

- Develop a common definition for "disabled citizens"
- Consider a possible fare concession for disabled citizens
- Schedule more meetings and summits between government officials, heads of disabled/elderly organizations, and transport operators
- Develop a retrofitting plan for existing inaccessible architecture and transport
- Carry out education and training for the public

Each recommendation was based on conclusions drawn from the concerns of the government, transport operators and disabled citizens collectively. Training and education will help the general public move towards greater acceptance of assistance for the disabled and

elderly. These recommendations will help prepare Hong Kong for the estimated large increase in its elderly population in the next thirty years and help make the city as "barrier free" as possible.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

In all major cities around the world, millions of citizens rely on mass transportation to complete their daily tasks. There is no doubt that trains, subways, buses, taxis, and walkways have made cities more accessible to their citizens. In the past thirty years, many cities have tried to make all forms of public transportation as accessible to the physically handicapped as possible. Many times the elderly and disabled must rely on family members in order to get around in metropolitan areas. The transportation for disabled and elderly has evolved from a limited to a more "barrier free" environment for these citizens. The complex transportation system of Hong Kong is no exception.

As in any mass transportation system, there are several accommodations that must be implemented so the system is just as accessible for the disabled and elderly as for those without impairment. These accommodations must take form through a partnership of technological advances and policy changes. As Hong Kong entered the 21st century, its transportation system developed into one of the most efficient in any modern city. Most of the transportation in Hong Kong is provided by the Mass Transit Railway (metro system), Kowloon-Canton Railway (trains), ferries, buses, taxis, complex civilian walkways (mainly focusing on the downtown areas), and sidewalks. The transportation in the city of Hong Kong is by no means inaccessible for someone with a disability or mobility problem. Yet Hong Kong's mountainous terrain can make walking around the streets a challenging task for those citizens. The inability to be self-sufficiently mobile can create an imbalance in opportunity and a feeling of depression for such people. The project's sponsor, Civic Exchange, is an independent, non-governmental think-tank located in Hong Kong that is particularly interested in addressing transportation accessibility issues and presenting ideas to the general public and decision makers of Hong Kong so improvements can be made according to the specific needs of all citizens. Overall this is a major humanitarian issue that must be addressed in order to make Hong Kong a more inclusive society.

Previous studies have uncovered some of the shortcomings in Hong Kong's public transportation. Specifically, in the field of public busing, there are no full fleets of buses with ramps, non-slip floors and other accommodations for disabled and elderly patrons. While the New World First Bus Company (NWFB) of Hong Kong is now making all of its new buses handicapped accessible according the guidelines of the Disabled Persons Transport Advisory Committee (DPTAC) in the UK, there are outdated buses still in service (New World First Bus, 2001). A very similar problem exists for the Kowloon Motor Bus Company (KMB), the largest bus company in Hong Kong. They offer many of the same technologies as NWFB on their "Easy Access Buses", but once again, such buses are limited in number (Kowloon Motor Bus Company, 2004). The compliance with government mandates and laws is just a small portion of what needs to be considered by all transportation companies in Hong Kong.

There are many gaps in research on the importance of handicapped accessible mass transportation systems. People in Hong Kong are not aware of the benefits of having a society that is more accommodating to those with impaired mobility. More research still needs to be done regarding the innovations in transportation for increased accessibility. While the research done on the accessibility of transportation has uncovered many facts on the fleets of buses and number of accessible walkways, very few studies have focused on the difficulties faced by the elderly and disabled who use public transportation in Hong Kong from their perspective.

The goal of this project was to provide suggestions and create an action plan on how to improve the accessibility of buses, taxis, and walkways for the physically disabled in Hong Kong. To complete this task, several different methods of data collection were utilized. We interviewed members of the Hong Kong community who are disabled or elderly who have attempted to use public buses, taxis and walkways. We analyzed their responses and developed a general statement about their feelings towards transportation accessibility in the city. Governmental organizations involved with city planning and transportation as well as officials from public transportation providers were interviewed as well. We learned what changes are being planned from the administrative point of view. With these ideas and in-field observations,

we have provided Civic Exchange with a set of recommendations about possible improvements that could be made to the current transportation system in Hong Kong. Also, we have evaluated which policies and improvements, dealing with technology, could be suggested to the Transport Department of Hong Kong in hopes of making the city as a whole more available for anyone with a mobility problem.

2.0 BACKGROUND

The issue of transportation for the elderly and disabled in Hong Kong is complex. It involves accommodating different types of impairments that can limit travel, which restrict the activities of the handicapped. These impairments often prevent them from doing essential tasks, such as going grocery shopping. Cities that rely entirely on subway systems and personal automobiles are dynamically different from ones that rely more heavily on buses, trains, taxis and walkways as the main methods of travel. Coincidently, in Hong Kong, the most common methods of travel for disabled citizens are buses, trains and taxis. Therefore there are many factors that must be considered when trying to integrate handicapped accessibility into the current transportation infrastructure. Every citizen, no matter what his or her mobility status, should be entitled to similar opportunities and lifestyle.

2.1 DISABILITIES

Defining a disability is difficult considering there are thousands of different types of restrictions that may inhibit a person from his or her daily activities. For this report, we have agreed upon defining a physical disability as "a restriction of an activity caused by a contemporary social organization which takes no or little account of people who have physical impairments and thus excludes them from participation in the mainstream of social activities" (Disabled Women and the Feminist Agenda, 1992, p.74).

2.1.1 PHYSICAL DISABILITY

A physically disabled person has limits to one or more of their major life activities which includes but is not limited to: day to day transportation, mobility, recreation, entertainment and access to public locations. Most physical impairments are not obvious. Less than 4% of disabled people are born with a disability; yet overall, 18% of both men and women have a disability (Health Promotion Hertfordshire, 2004). The likelihood of being disabled increases as a person

gets older; 74% of men and women over the age of 85 suffer from a disability. Nevertheless, 20% of those with a disability are under the age of 45. For both sexes, the most commonly reported type of disability is a locomotor disability. The most common cause of such a disability is disease of the musculoskeletal system and connective tissue.

We chose to focus our project on people with physical disabilities because our findings could potentially benefit and help improve the lives of 42% (58,000 total persons) of Hong Kong's disabled population. In Table 2.1 we see that "Physical Handicap" makes up a good number of the registered disabled population in Hong Kong, keeping in mind that not all people with disabilities are registered with the government.

Table 2.1: Distribution of Registered Disabilities in Hong Kong
(Source: Estimating Population with Disabilities in Hong Kong: or What and Whose Purposes, 2002)

Distribution of Registered Disabilities in Hong Kong			
Types of Disability	**Number of Registrations**	**% of Total CRR Registrations**	**% of Hong Kong Population (6,796,700)**
Hearing Impairment	12,699	9.2	0.19
Visual Impairment	13,500	9.8	0.20
Physical Handicap	58,037	42.4	0.85
Speech Impairment	2,072	1.5	0.03
Mental Handicap	29,048	21.2	0.43
Mental Illness	15,089	11.0	0.22
Autism	1,922	1.4	0.03
Visceral Disability	4,785	3.0	0.07
Total	**137,152**	**100.0**	**2.02**

Table 2.2 is a collection of data from a census of the disabled population in Hong Kong, and it shows that "Restriction in Body Movement" makes up 25%, the highest percentage out of the categories mentioned, of Hong Kong's handicapped population which includes those with one or more impairments. When comparing the data from Table 2.1 to Table 2.2 it is obvious that a project dealing with people with limited mobility would be able to affect a large percentage of the Hong Kong disabled and elderly population. For more detailed information about the disabilities in Hong Kong and why we chose to focus on physical disability, please refer to Appendix A.

Table 2.2: Estimated Number of Persons with Disabilities
(Source: Estimating Population with Disabilities in Hong Kong: or What and Whose Purposes, 2002)

Estimated Number of Persons with Disabilities by Census and Statistics Department		
Types of Disability	**Number of persons In Hong Kong Population (includes persons with more than one disability)**	**% of total Hong Kong population (6,796,700)**
Restriction in Body Movement	103,500	1.52
Seeing Difficulty	73,900	1.09
Hearing Difficulty	69,700	1.03
Speech Difficulty	18,500	0.27
Mental Handicap	87,000	1.28
Mental Illness	50,500	0.74
Autism	3,000	0.04
Total	**406,100**	**5.98**

The most limiting constraint for people within the category of physically handicapped, hindering their use of public transportation, is the use of a wheelchair. The wheelchair is large, cumbersome and complicates the use of any type of transportation. For these reasons, our project focused mainly on making public transportation more accessible for those requiring the use of wheelchairs. If transportation is more accessible for people in wheelchairs then it will also be accessible to those with lesser disabilities. For more information on other types of disabilities see Appendix B.

WHEELCHAIR MOBILITY

With limited space in Hong Kong, it is critical to evaluate and minimize the actual space needed by wheelchairs to make it up or down a gradation. Wheelchair ramps are required by the Americans with Disabilities Act (ADA) to have a slope of no greater than 5 degrees (The United States Access Board, 2004). This means for every run of 12 inches, there can only be a rise of 1 inch. This was found to be the most acceptable for wheelchair users in the United States and Hong Kong. It is a public standard that values safety more than function. For many private residences and van applications, where size and economic restrictions apply, this standard may not be very practical. It is however, the ideal standard for those who must manually propel their own wheelchair up a ramp (Guide to Portable Ramps, 2002).

2.2 LOCAL TRANSPORTATION

Throughout Hong Kong, people use different forms of local transportation for their every day travel. The double-decker bus is one of the most popular forms of transportation. Figure 2.1 is an example of a Hong Kong double-decker bus. Taxis are more convenient for the elderly and disabled because they provide virtually door-to-door service. Sidewalks, walkways, and escalators are very convenient and are constantly being utilized, but the handicapped have a harder time accessing them.

Figure 2.1: Kowloon Motor Bus Double-Decker

2.2.1 DOUBLE DECKER BUSES

In Hong Kong, the three most popular bus companies for double-decker buses are City Bus, New World First Bus (NWFB), and the Kowloon Motor Bus Company (KMB). The three companies have made important improvements to their buses to accommodate the needs of the disabled and make travel safer and more efficient. The largest of the three companies is KMB which holds over 4,000 buses in its fleet. Roughly 94% of the fleet consists of double-decker and 6% is single-decker buses. Double-decker buses provide a much higher carrying capacity than a traditional single level bus, but they also present a range of obstacles for the physically disabled to navigate through. For more information on the two largest double-decker bus companies in Hong Kong, please refer to Appendix C.

Figure 2.2: Driver Helping a Wheelchair Passenger onto a Bus

Among the barriers the disabled have to overcome, there are several that are harder to fix than others. The newer buses of KMB's fleet are very well equipped to accommodate the physically disabled. One of the newest, most impressive and useful features is the kneeling suspension. This allows for easier access for wheelchair passengers, as seen in Figure 2.2. All the newest buses in KMB's fleet feature a manual ramp for wheelchair access. The manual ramp is preferred over the mechanized one because it does not fail in operation. Also the interaction of the driver with the wheelchair bound passenger promotes a more helpful experience for the passenger. For a full list of features of the newest buses, refer to Appendix D.

2.2.2 TAXIS

In Hong Kong one of the main methods of transportation for a portion of the people is the taxi system. There is limited accessibility to taxis for the physically handicapped and the disabled because the driver needs to help them into the taxi, potentially causing people who need this help to feel uncomfortable. The taxi drivers are educated as to how to transport a person in a wheelchair; they can put the wheelchair in the boot (trunk), and in fact have to upon request of service by a disabled person. The closest form of accessible taxis in Hong Kong is the Rehabus service. For more information about and what kinds of wheelchair accessible taxis are available around the world refer to Appendix E.

2.2.3 REHABUS

Rehabus is a specially designed bus service for the disabled. Its fleet consists of 87 minibuses of different sizes, ranging from 12 to 30 seats. These special equipped minibuses can carry non-disabled passengers as well as wheelchair bound passengers. When needed, the seats for non-wheelchair users can fold up to create room for a wheelchair bound passenger. By adding in extra wheelchair space, this eliminates two seats for non-wheelchair users. Common Rehabus models and the patronage limits are represented in Table 2.3.

Table 2.3: Rehabus Patronage Limits
(Source: Rehabus, 2005)

Total Seating	Number of Wheelchair Users	Number of Non-Wheelchair Users
12	4	6
21	8	12
30	8	20

Rehabus also has included the following features for the safety and comfort of their passengers:

- Rear power lifter
- Safety belts
- Alighting light box
- Wheelchair restraint system
- Numerous Handrails

Rehabus is widely used by people with mobility impairments. Passengers enjoy using both the scheduled services for going to work, as well as using Rehabus' Dial-A-Ride services for non routine trips such as doctor visits. To keep costs low, Rehabus uses a computer controlled route scheduling program to maximize efficiency when planning bus routes. Rehabus is affordable for many disabled people because it is subsidized through the government and very efficiently run. This affordable mode of transport has helped integrate the physically disabled back into society.

2.2.4 PEDESTRIAN TRAVEL

Pedestrian travel is one of the most overlooked areas for improvements in overall transportation. This method of travel is not only the most common, but it also offers the most

freedom and independence from others. Pedestrian travel includes sidewalks, escalators, elevators, entryways and several other common features of cities.

SIDEWALKS

Not all sidewalks are accessible to the handicapped and even if some are, they are only accessible at certain intersections. The elderly and disabled citizens need low clearance curbs or graduated ramps to access these civilian walkways because some handicapped are unable to step up onto the raised sidewalk.

In Hong Kong there are also many elevated civilian walkways. These types of walkways are often used to reduce the amount of pedestrian travel near the traffic-filled streets. Elevated walkways are often not accessible to the disabled and elderly because of the stairs used to access them. Ramps to elevated walkways are uncommon because of the space needed for them. Instead, elevators are a much more common means of transporting physically impaired people from the ground up to the elevated walkway. While these elevators are somewhat common, not all elevated walkways have an elevator at one or more places. This makes them impractical to use for the physically disabled, especially wheelchair bound people.

MIDLEVEL ESCALATORS

Figure 2.3: Midlevel Escalator
(Source: Midlevel Escalator, 2004)

Hong Kong Island's terrain is very unusual for such a densely populated city. It consists of hills and steeply sloping sections of terrain. In the Central and Western districts, there is an extensive system of escalators and moving sidewalks. The Midlevel Escalator, shown in Figure 2.3, is the world's longest outdoor covered escalator system (Midlevel Escalator, 2004). In the morning it transports people downhill from 6 A.M. – 10 A.M. and uphill from 10:20 A.M. – midnight.

The Midlevel Escalator is 800 meters long and climbs 135 vertical meters. The twenty minute climb eliminates several miles of zigzagging roads if traveled by car. On average, since its initial operation in 1993, daily traffic has exceeded 35,000 people (Transportation in Hong Kong, 2004). While this escalator is a helpful means of getting around the city for able people, it is completely inaccessible for the wheelchair bound and is difficult for the partially impaired.

ENTRYWAYS

In Hong Kong it is less common to see a building equipped with automatic doors than in the United States. It can be very difficult for the elderly and disabled to open doors manually to get into buildings. Motorized doors with electronic sensors that open automatically have proven to be great resources for the handicapped. However practical in some situations, in Hong Kong many entryways that are not already handicap accessible may be too small or cluttered to be made mechanized. But there is still room for improvement, such as clearing out the clutter around the entryways so the disabled can navigate their way through.

2.3 LEGAL FRAMEWORK

The differences in the existing laws and policies of Hong Kong compared to the United States have been examined as they apply to the transportation of the elderly and disabled. The implementation of laws regulates the aspects of accessibility as they apply to each governmental department.

2.3.1 United States Laws and Policies

The United States of America has several different laws and policies that prohibit the discrimination against the elderly and disabled. These laws and policies are at the federal level as well as at the state level.

Federal Laws and Policies

One of the United States' most comprehensive documents to prevent discrimination against the elderly and disabled is the Americans with Disabilities Act (ADA). The ADA covers all people who are disabled as defined by:

> *...anyone who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment (U.S. Department of Justice, 2002).*

This act has four major sections, but the second title is the title for Public Transportation and has the most relevance for this project (U.S. Department of Justice, 2002). The second title has forced the United States to make big steps toward total accessibility. This title says that companies providing public transportation, namely buses, subways, taxis and trains, must attempt to make their vehicles accessible to handicapped people. This applies to purchasing or renting accessible vehicles as well as retrofitting older vehicles.

In addition to the ADA, another major piece of federal legislation that affects transportation of the disabled and elderly is the ABA, or Architectural Barriers Act (United States Access Board, July 2004). This act extends and refines parts of the ADA, especially the sections dealing with building accessibility requirements. All federally funded buildings must be accessible to the physically handicapped. The ABA has clearly defined what needs to be present in walkways and entranceways as well as what is needed in terms of elevators, stairwells, and other specific details such as the slope of a wheelchair ramp.

State Laws and Policies

One state that has passed its own, more detailed, laws dealing with transportation for the elderly and disabled is Rhode Island. In Rhode Island it is mandatory for the Director of Transportation to establish standards for the maintenance of existing sidewalks so that they will be more accessible to persons with disabilities (Rhode Island Disability Rights Laws, 2005). The director must also ensure that all new sidewalks and curbs are handicapped accessible.

In New York City, much has been done to aid handicapped people in their day-to-day activities. There is a department of the local government, Department of Housing Preservation and Development (DHPD), which has done much to provide for physically handicapped people. The DHPD has provided over 850 accessible housing units in the last 8 years (City Programs to Assist People with Disabilities, October 25, 2004).

2.3.2 Important Laws in Other Countries

In England, the Transport for London (TfL) has been striving to achieve full accessibility within its transportation system and at interchanges between the tube system, similar the Hong Kong's MTR system, and buses (Transportation for London, 2004). The Disabled Persons Transportation Advisory Committee (DPTAC) in 1995 passed the Disability Discrimination Act (DDA), which created statutory rights and obligations, thus reinforcing DPTAC. Proposals through the committee and recommendations for government regulations, like the DDA, are all helping to make London a more accessible city for the elderly and disabled.

2.3.3 Existing Laws in Hong Kong

There are several existing laws and policies in Hong Kong that affect the transportation for the elderly and disabled. Among them are the White Paper of Rehabilitation, the Disability Discrimination Ordinance (DDO), and the Design Manual for Barrier Free Access (Joseph Kwan, Personal Communication, 27 January 2005). Joseph Kwan is an architect with 20 years experience in Hong Kong and 10 years experience with accessible buildings and is currently on the committee reviewing existing laws pertaining to accessibility for the disabled.

The DDO was first drafted in 1996 and focuses on the proper treatment and social well being of all citizens (The Disability Discrimination Ordinance and People with a Physical Disability, 1998). While the White Paper of Rehabilitation mainly deals with summarizing what is available and what should soon be available, the DDO states requirements for what needs to be available. After drafting the DDO, the Planning Department of the government founded the Equal Opportunities Council (EOC) to enforce this document. Other documents, such as the DDA from the UK, specifically set up all guidelines for the guaranteed rights for disabled citizens. The DDO deals mainly with regulations for what needs to be done to provide for the disabled. It does not, however, deal directly with the details of what needs to be done. It relies on other, more detailed documents, like the Design Manual for Barrier Free Access, to provide more in-depth details for what is needed.

The Design Manual for Barrier Free Access was first written in 1984 (Joseph Kwan, Personal Communication, 27 January 2005) and deals mainly with design specifications for making buildings accessible for the physically disabled. After its latest revision in 1997, the design manual became much more thorough and eliminated some previous loopholes. This document, however, is not as concise as the ABA, which thoroughly outlines what to do in most scenarios. The manual is currently up for revision and is slated for release in late 2005. Some possible revisions to be considered are building front access for wheelchair users, the accessibility of schools to wheelchair users, and improving the accessibility of private housing. These policies may not be consistent, but with revisions in the future, they will eventually meet the standards of the ADA, ABA and DDA.

The current government department structure has different subunits that branch off to projects of different departments who have different standards for accessibility. This being the case, each department follows a different set of legislative guidelines. This allows for discrepancies to occur during an interdepartmental project. The revisions of the Design Manual for Barrier Free Access should reinforce and clarify any unclear portions of the old document

and provide higher standards for accessibility for the disabled. If all documents are likewise kept up to date and clear, the goal of barrier-free access should be attainable.

WORKING GROUP MEETINGS

The Hong Kong Transport Department is aware of the concerns of the disabled and elderly through their quarterly "Working Group" meetings (Joseph Kwan, Personal Communication, 27 January 2005). These meetings are held with the leaders of disabled organizations and transport operators. Until 1997, the government of Hong Kong held much larger summit meetings on accessible transportation. Because these meetings were very large, it made it nearly impossible to discern what could be considered a public transportation problem. It is easier to distinguish the necessary changes in Hong Kong by having only key transport operators and citizens attend these meetings.

2.4 HANDICAPPED ACCESSIBILITY IN OTHER CITIES

Other cities around the world can be compared to Hong Kong to show what they have done differently to increase the accessibility for the elderly and disabled and offer new options to Hong Kong. Possible options can be found in the areas of sidewalks, crossing lights, and bus systems.

2.4.1 BUS SYSTEMS

Bus systems are prevalent in most major cities in the world and therefore the issue of the accessibility of those buses to disabled and elderly people is an issue that is common to many cities. Cities like New York City have made it mandatory that every bus in the MTA/New York City Transit fleet is lift-equipped, has kneeling features, wheelchair securing devices, public address systems, and seating spaces reserved for people with disabilities. The MTA's bus system (Metropolitan Transport Authority, 2004) also has features that improve accessibility for customers with visual, hearing, and mobility impairments, as specified by the Americans with Disabilities Act. These features include, but are not limited to, handrails on ramps and stairs,

large-print and tactile-Braille signs, accessible MetroCard® Vending Machines, telephones at a wheelchair accessible height with volume control, and text telephones (TTYs).

Both Washington, DC, and London have added accessibility for the elderly and disabled. However, not all bus companies in Washington, DC, and London offer vehicles that are fully accessible. In Washington, DC, there is a service available called the City Wheels Program (Paratransit Services, 2004). This program utilizes private taxis and specialized life-equipped buses to help the disabled who cannot use the main bus services. Most of the buses in London are wheelchair accessible and constantly improving annually.

In London kneeling suspension is a critical feature for most of London's bus fleet (Transportation for London, 2004). Newer buses are accessorized with lower kneeling suspension and a ramp to further enhance the ease with which the elderly and disabled may board. Wheelchairs and powered wheelchairs, up to a maximum width of 70cm and length of 120cm, can be accommodated on most of London's buses.

The difference between most other world cities and Hong Kong is that these upgrades are mandated by the federal governments. In Hong Kong, all new buses are required to be handicapped accessible, but this still leaves many old buses without the specific accessibility features in the current fleets. Also, these programs are subsidized by the respective government which offers a further impetus to the development of such programs.

2.4.2 WALKWAYS

The walkway is a flat clearing, allowing multiple directions of pedestrian traffic. It is a vital system providing short range transportation for its users. In a city sidewalks were developed to distinguish the pedestrian area from other avenues of transportation.

SIDEWALKS AND CURBS

Disabled people who have limited mobility, especially those in wheelchairs, sometimes have trouble using sidewalks because of the lack of ramps. Ramps allow for people who are in

wheelchairs to leave or enter a sidewalk relatively easily. New York City has been installing pedestrian ramps in sidewalks where pedestrian walkways intersect with curbs (NYCDOT Sidewalk Pedestrian Ramps, 2004). New York City has installed ramps at over 97,000 locations throughout the City. These ramps account for approximately 61.5% of the City's 158,738 corners. These simple modifications greatly improved the quality and ease of transportation for the elderly and disabled.

In China a policy was passed in 2003 that mandated that there must be numerous renovations, like adding ramps to entrance ways, with the purpose of increasing the accessibility to buildings for the elderly and disabled. In Shanghai more than 1,000 ramps are scheduled to be installed (China Internet Information Center, 2004). Once implemented, this would allow the disabled more accessibility to buildings and sidewalks all around the city.

In Hong Kong there are several different standards that apply to the physical construction of sidewalks. For more information on what is currently being implemented, refer to Appendix G. Building accessibility in Hong Kong is very limited. If some of these cities' improvements were taken on as examples, such as additions in ramp access, it would make traveling around Hong Kong much easier for the disabled.

CROSSING LIGHTS

Ways that cities around the world are dealing with pedestrian travel for the disabled and elderly is by improving their pedestrian crossing signals. Instead of the common place "Walk/Do not Walk" light up signals for pedestrians, cities have taken the creative initiative to make these crossings easier for the impaired pedestrians. The original standard for the amount of time required for crossing was set at approximately 4 ft/ per second. This has been challenged because a better time for the slower pedestrian crossers is closer to 2.25 to 3 ft/ per second (Pedestrian and Bicycle Information Center, 2004). This allows more time for the handicapped to cross the road.

Figure 2.4: Pedestrian Crosswalk Warning System

In Hong Kong all street crosswalk lights feature a standard green/red combo that shows when a person can cross. Starting in 2003, audible crossing signals have been installed on all crossing lights (Transport Department, Personal Communication, 14 January 2005). This system features two different signals, one for crossing and the other for a dangerous intersection. Also, in some places in the city, some street lights have digital countdowns on the crossing lights. Figure 2.4 is an example of one of the early warning crosswalk systems in Hong Kong. For more information about more technologies available for crosswalk street lights, see Appendix H.

3.0 METHODOLOGY

The accessibility of transportation for the elderly and disabled people of Hong Kong is in need of attention. Some of the main methods of public transportation do not currently offer barrier free transportation for all its users. The description below contains the methods of gathering information that were used to accomplish each following objective.

To aid us in our collection of data, we constructed the following model. This simple model, shown in Figure 3.1, aided us in our interviews and helped to develop the focus of the project.

Methods Model

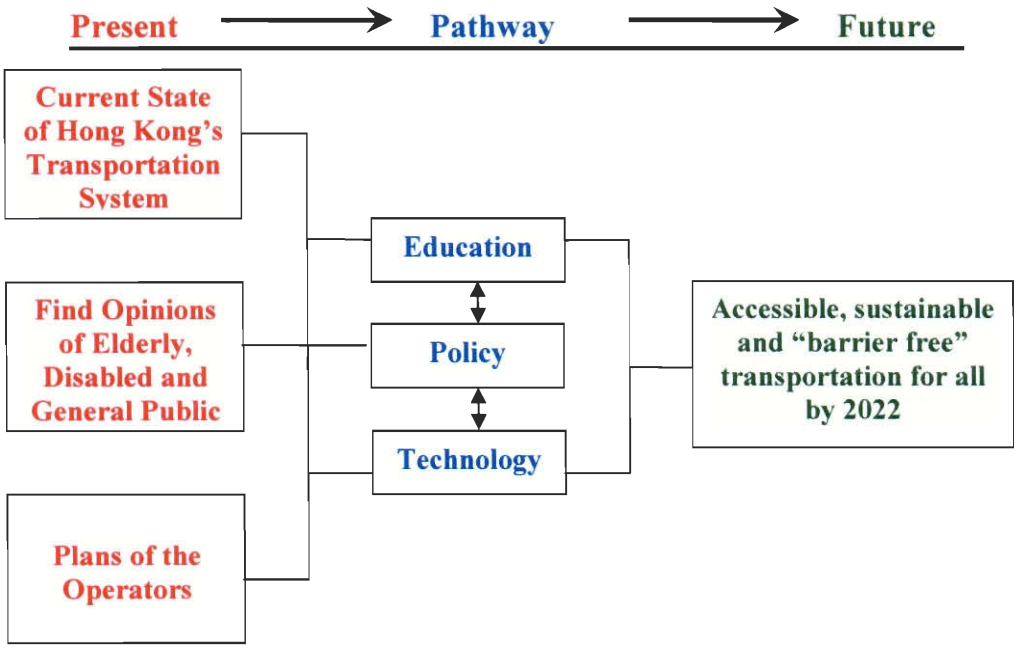

Figure 3.1: Methods Model

3.1 OPINIONS AND ATTITUDES OF ELDERLY AND DISABLED

Discovering the attitudes of the elderly and disabled towards transportation was a very important objective for this project. These opinions were based upon first hand experiences that helped us to form our conclusions and recommendations for the transportation system in Hong Kong. Semi-structured interviews were our best form of data collection for this objective. Often times these interviews led to lengthy discussions about specific strengths and weaknesses of the

transportation system. This information provided a direct link that showed how the elderly and disabled felt about the accessibility of transportation. For our interviews we questioned a group of three elderly citizens at the Evergreen College in Central and six disabled citizens at Victoria Park in Causeway Bay during Hong Kong's 28 [hour] Sharing, a disabilities fair. We utilized our contacts at Retina, Rehabus and the Hong Kong Transport Department to schedule meetings and plan interviews with citizens who were directly affected by the inaccessible parts of Hong Kong's transportation system. Through these interviews with various organizations, operators and individuals we were able to obtain a broader understanding of how transportation was different for disabled and elderly citizens.

During the discussions we had the interviewees not only answer questions about their hardship but also discuss possible solutions to these problems. We recorded their feelings about the current state of transportation and how they would like to see it improve in the future. We also questioned the interviewees on their reasons for using certain modes of transportation. The different interview protocols that were used to conduct our discussions along with the responses that we collected can be found in Appendix I and Appendix J.

3.2 Ideas and Improvements of Other Transportation Organizations

The policies implemented in other cities to help improve the quality of transportation are models from which the Hong Kong Transportation System can benefit. There are always improvements that can be made to help the disabled and elderly citizen's transportation needs. By researching what was implemented in other cities around the world we were able to not only bring new ideas to Hong Kong, but were able to compare and contrast what worked and what did not work.

For this objective archival research was the primary data collection method. The majority of information on laws from the United States and the UK came from governmental sites on the internet. These laws and mandates were compared with the current legislation in Hong Kong.

Ultimately, these organizations helped shape the viable solutions that were recommended for the Hong Kong transportation system.

3.3 Current Technologies in Transportation Systems in Hong Kong

There are different forms of technologies (such as ramps, stop buttons, larger display screens, audio announcements, etc.) installed in the public transportation systems in Hong Kong. By referencing the internet, conducting interviews with transportation operators, and performing visual observations we were able to assess the current state of Hong Kong's transportation system. Information about accessibility was gathered from the websites of the transport operators. Interviews with the Transport Department, KMB and NWFB gave us insight on the emphasis that was being placed upon accessibility by the transport operators. To view transcripts of our meetings that we held with the Transport Department and KMB, please refer to Appendix L and Appendix M. We also made visual observations of the different types of technologies by traveling on buses of both major companies to discover more about the current state of transportation.

3.4 Laws and Disabilities Acts in Hong Kong

By understanding the Equal Opportunities Commission (EOC) and the Disabilities Discrimination Ordinance (DDO) we were able to not only compare Hong Kong's disability laws to other countries but also to see how accessible transportation has progressed. We specifically looked at laws pertaining to disabled accessibility for wheelchairs in public locations. By understanding what laws were already in place for this type of situation we were able to make recommendations, suggestions and propose solutions for some aspects of the elderly and disabled citizens' transportation needs. We learned about Hong Kong's laws at the Hong Kong Polytechnic University library and through our interview with Joseph Kwan. For a summary of our interview with Joseph Kwan please refer to Appendix F. The Transport

Department of Hong Kong gave us insight to specific codes and mandates that affected the disabled and elderly.

The architectural codes and policies in Hong Kong greatly influence the accessibility to public locations and transportation of the elderly and disabled residents and visitors of the city. We compared Hong Kong's legislation with laws in the United States and the UK to come up with a list of viable additions for Hong Kong. Our main method for finding out which laws are already enacted in other cities and countries was through archival R\research. Using scholarly sources from the local library and some sources from the internet (such as the webpage from the Department of Transportation in the United States) we gathered information both about the laws enacted and their effects on their respective societies.

4.0 RESULTS AND ANALYSIS

One of the most important concepts we needed to understand for this project was the current status of the transportation system in Hong Kong. Figure 4.1 is a representation of the number of journeys made by people throughout a year by various means of transportation.

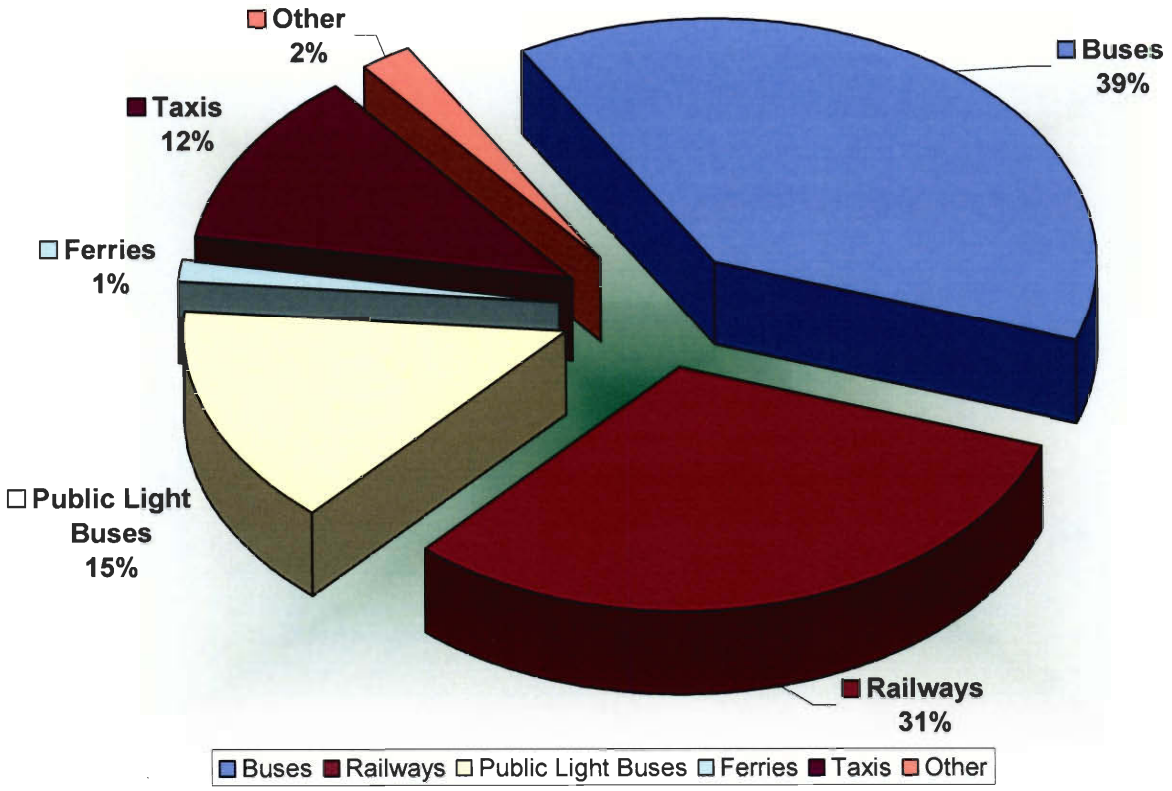

Figure 4.1: Hong Kong's Public Transportation System for Year 2002
(Source: Hong Kong Annual Transport, 2003)

It is clear in Figure 4.1 what forms of transportation were most commonly used by citizens in 2002. Buses were the most utilized method of travel with trains and the MTR. We used this data to determine what mode of transportation our suggestions would make the largest impact on. Numerical information about the use of the different modes of transportation in Hong Kong can be found in Appendix N and Appendix O.

4.1 STATUS OF TRANSPORTATION IN HONG KONG

The three modes of transportation we closely considered were the bus system, the taxi system, and the pedestrian walkway system. Each of these systems has been improved in recent years, but each still has areas that need improvement for elderly and disabled access.

4.1.1 BUSES

All buses are owned and operated by private companies and receive limited financial subsidies from the government. Taking the bus situation in stride, the Transport Department is actively trying to make the transportation system in Hong Kong "barrier free" with their "Transport for All" campaign. They have produced several videos, manuals, and pamphlets trying to increase awareness of this problem as well as identify ways to fix it.

Kowloon Motor Bus Company has taken the initiative in this campaign and decided to upgrade their fleet before being mandated by the government to do so. KMB accounts for approximately 72% of the total number of bus journeys per year, as can be seen in Figure 4.2.

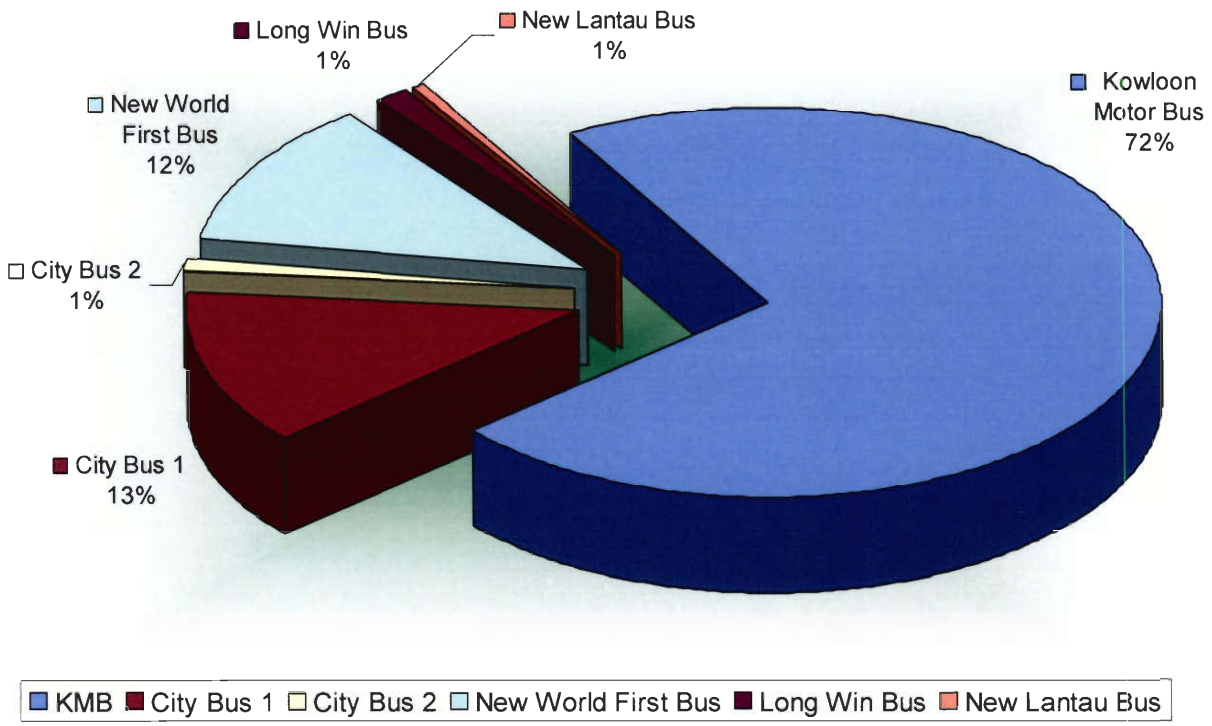

Figure 4.2: Hong Kong's Bus Company Market as of 2002
(Source: Hong Kong Annual Transport, 2003)

Based on these data we calculated that KMB made up nearly 28% of the total public transport journeys in Hong Kong in 2002. Due to KMB's sheer size and the small demand for double-decker buses world-wide, any change that KMB makes to its fleet ultimately effects the

production of double-decker buses everywhere. KMB is continuously upgrading its fleet of buses by communicating the needs of its passengers to the bus manufacturers. Most buses have an approximate life of seventeen years, and at the end of this time, the bus is sold off and a new bus is purchased. This new bus features all of the available handicapped accessibility features available at time of manufacture. As of early 2005, KMB's fleet had 39.8% of its buses wheelchair accessible. KMB's new buses are designed to meet and exceed the government standard of having all new buses that are franchised to be fully accessible for the disabled. Also, as part of drivers' training, their bus captains must complete courses to learn how to use all the handicap accessible features and make sure they know their responsibility in making a disabled or elderly person's voyage as easy and pleasant as possible. For wheelchair users the most important new features are a fold-down wheelchair ramp at the entrance of the bus and a large wheelchair parking area within the bus. For a full listing of the improvements, refer to Appendix D.

KMB's largest competitors are New World First Bus and its franchised partner City Bus. This corporation controls around 26% of the bus market and has both double-decker buses and traditional single-decker buses. New World First Bus bought around 700 new buses between 2000 and 2003 and does not plan on getting any more new buses until 2007. Currently, 71% of NWFB's fleet is wheelchair accessible. The newest buses in its fleet feature most of the same features as the KMB buses, but a significant difference is the lack of an internal stop announcement system. Even the newest fleet of NWFB buses does not offer any audio or visual stop announcements.

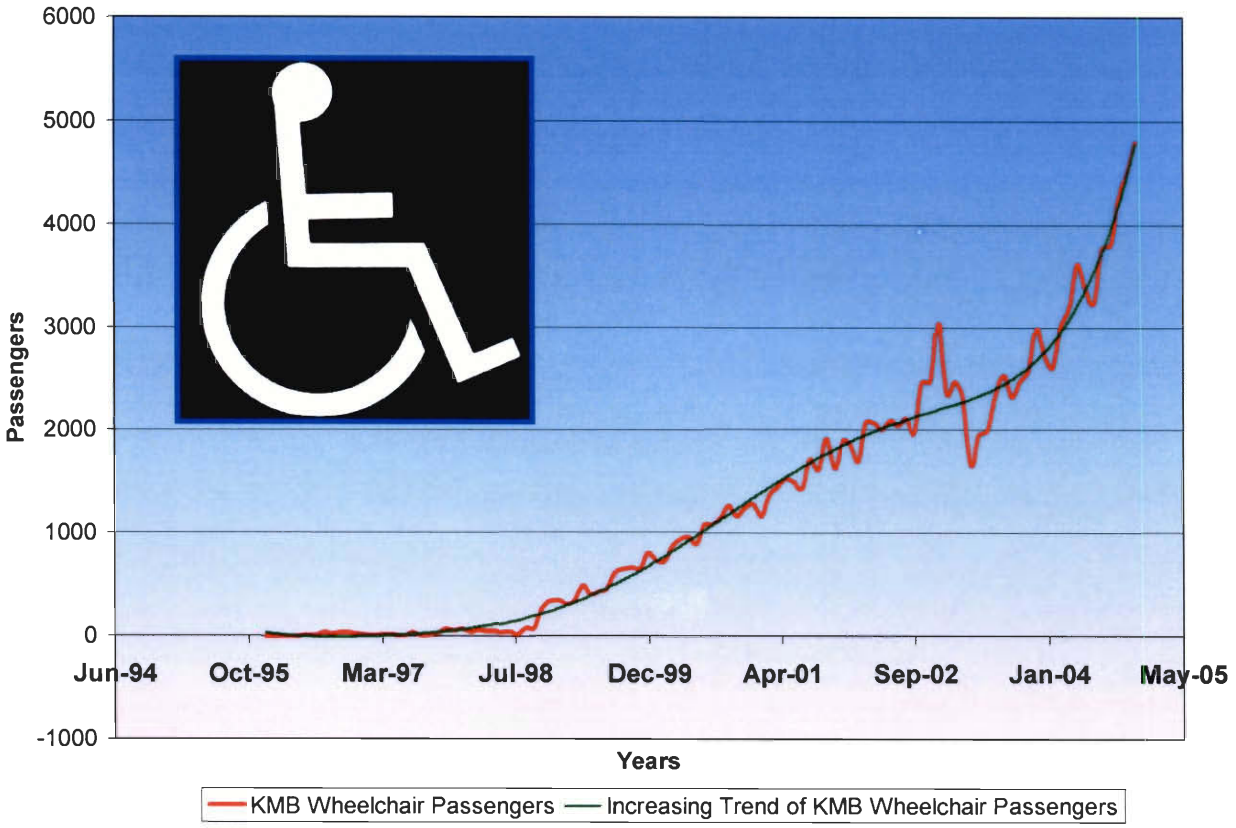

Figure 4.3: Number of Wheelchair Passengers that rode the KMB (Source: KMB Presentation)

Before 1996, there were no governmental regulations forcing public transportation providers to equip their vehicles with features for the disabled. Even though there were spaces on the buses for wheelchairs, there was no way for such disabled users to climb the two stairs necessary to board the bus. This explains why there are no wheelchair data before the year 1996 in Figure 4.3. Around 1998, KMB started integrating buses that were wheelchair accessible. Since then, all retired buses have been replaced with new, fully accessible buses. Since there are no plans of decommissioning buses early, at this rate, KMB will have fully accessorized their entire fleet by the year 2014. For a listing of the number of wheelchair passengers who use KMB, please refer to Appendix P.

KMB has been trying to shape its technical advances around the opinions of its customers, but some of the common features have been overlooked. One of the most frequently posed questions during the interviews with the visually impaired, was "How is a blind person supposed to know which bus is arriving at a bus stop." One response was to ask someone.

However, this may cause an uncomfortable feeling for the visually impaired passenger. Every passenger's journey should be as unobtrusive as possible.

Several frequently occurring problems have been discovered through interviews with the elderly and disabled. For some buses, there are plenty of accessible features within the bus, but it is difficult for the disabled to board the bus. Disabled people also have noted that the buses do not always pull up to the curb. If this happens, even if it were a new bus with a wheelchair ramp, a person in a wheelchair still could not get on or off because they could not reach the ramp. The elderly specifically, have had problems with the height of steps on the buses being too great. The new fleet of super low floor buses has been widely used and liked by the interviewed elderly. For more information on the interviews conducted, please see Appendix I and Appendix J

The current number of wheelchair accessible buses is satisfactory at best. There was some implication from interviews with each of the bus companies that some of the routes did not offer wheelchair accessible transport. We estimate however, that by 2014, approximately 90% of all franchised buses will be wheelchair accessible. By the time that KMB has completely upgraded its fleet, NWFB should have also replaced much of its fleet as well. Due to a lack of government standards there is no benchmark for what features define a bus to be accessible.

4.1.2 TAXIS

In Hong Kong, taxis only account for a small number of passenger trips mostly because of the widespread availability of other, less expensive modes of travel. The low number of passenger trips was induced by the government when it placed the cap at 18,000 for the number of taxi licenses released. This was done to try to help lower the number of vehicles on the road to reduce congestion. Taxis are less efficient than buses, because although they require less space on road, they carry many fewer passengers. Through our interviews with elderly and disabled people in Hong Kong, we found that they used taxis rarely. Most of the interviewees found taxis convenient but too expensive for daily use. For longer trips taxis can cost upwards of ten times the cost of public bus or rail.

Outside of cost there are other factors that limit the use of taxis by handicapped citizens. According to some wheelchair users, they felt uncomfortable when a driver had to assist them when getting into the cab of the taxi. Currently there is no incentive for a taxi driver to even help a disabled passenger. Also taxis cannot accommodate those citizens who use electric wheelchairs. Hong Kong does not have any wheel chair accessible taxis, but for further information on what is being implemented in other cities please see Appendix E.

4.1.3 REHABUS

An organization in Hong Kong that helps the disabled and elderly is The Hong Kong Society for Rehabilitation. This society runs the Rehabus program. This is one mode of transportation that the elderly and disabled had few complaints about. Their main concern was that the size of the fleet was not large enough to meet the demand. We learned that Rehabus is governed by the Transport Department and the Health, Welfare and Food Bureau. Rehabus is subsidized indirectly by the government through the Transport Department which distributes the money to Rehabus. Since the Transport Department governs the money, they control whether new buses are added each year. For more information on Rehabus, refer to Appendix Q.

4.1.4 WALKWAYS

Everyday most citizens use sidewalks and walkways, whether it means walking to work, to catch a bus or to ride the MTR. Walkways are the most used part of the transportation system in Hong Kong. Many of the walkways in Hong Kong need attention. In some cases the sidewalks, being old and cracked, make travel for wheelchair bound people difficult. Also, some of the corners that have gradients for wheelchair users still have a small lip at the edge, which makes it difficult for wheelchair users to cross over. Elevated walkways for the most part have lifts to make them accessible to wheelchair bound people and escalators for the elderly, but not all do. There are instances when a sky bridge (elevated walkway) connecting two buildings is accessible at one end and not at another. For a listing of our general observations and comments on parts of Hong Kong's walkway system, please refer to Appendix S.

Navigating the streets of Hong Kong is an arduous task for the handicapped. A common complaint from the visually impaired is that street furniture is poorly placed and does not have enough color contrast. Often times, entryways have unneeded steps that are unmarked and are a great challenge to visually impaired and offer no accessibility to the wheelchair bound. Excessive street clutter combined with poor public lighting can be hazardous to the safety of the visually impaired. These citizens, however, do find some of the features of Hong Kong's streets helpful such as the tactile guide paths and audible crossing signals.

4.2 TRANSPORTATION SURVEY

In April 2004 the Hong Kong Transport Department designed a questionnaire to study how wheelchair bound people felt about the transportation system. The questionnaire was distributed to 6 organizations in May 2004. The questionnaire had 5 sections:

- Personal Data
- Travel habits
- Safety Issues
- Satisfaction
- Comments.

A total of 1,295 forms were distributed to the members of 6 organizations. These organizations were:

- Hong Kong Federation of Handicapped Youth
- Rehabilitation Alliance Hong Kong
- Hong Kong Nero-muscular Disease Association
- Paraplegic and Quadriplegic Association
- Direction Association for the Handicapped
- Hong Kong Rehabilitation Power

Out of the 1,295 questionnaires, 408 were returned and out of those, 385 were analyzed. The overall response rate was 31.5%. Based on the survey's results from data provided by the Transport Department, we were able to assemble all of the following graphs in this section. Please refer to Appendix R for more detail on the data collected by the Transport Department.

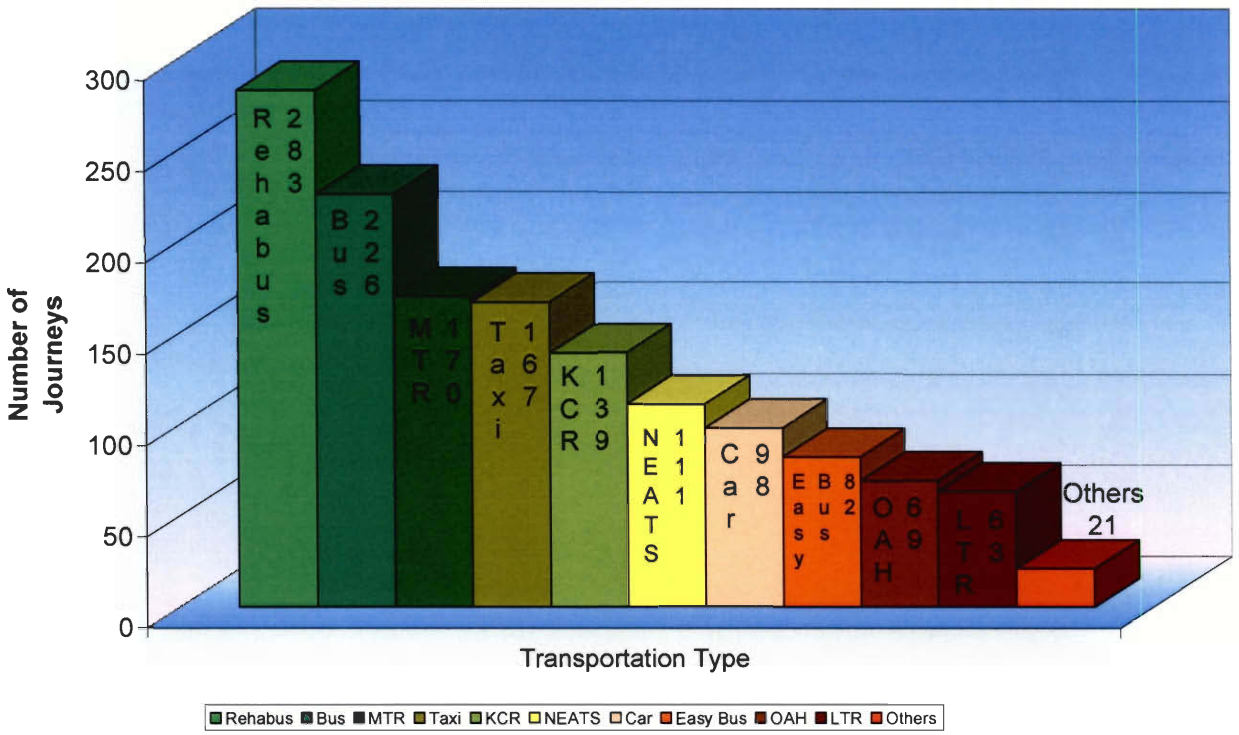

Figure 4.4: Modes of Transportation used in the Past Three Months by Disabled (Source: Transport Department Survey, 2004)

The data presented in Figure 4.4 represent the forms of transportation used most by wheelchair bound passengers in the last three months. Rehabus and public buses were the most commonly used forms of transportation for the elderly and some disabled. Rehabus only has a fleet of 87 mini-buses but is still utilized more frequently by the disabled than KMB's fleet of over 4,000. For wheelchair users, Rehabus was very popular and very well accessorized to suit their needs. Surprisingly, taxis were just as well used as the MTR. Although most of the people we have interviewed stated that taxis were too expensive, they still provide a quick solution to

traveling from point-to-point. When a Rehabus is not scheduled to pick people up, a taxi usually costs less than a short ride with Rehabus and does not need prior notice of the person's intent to travel.

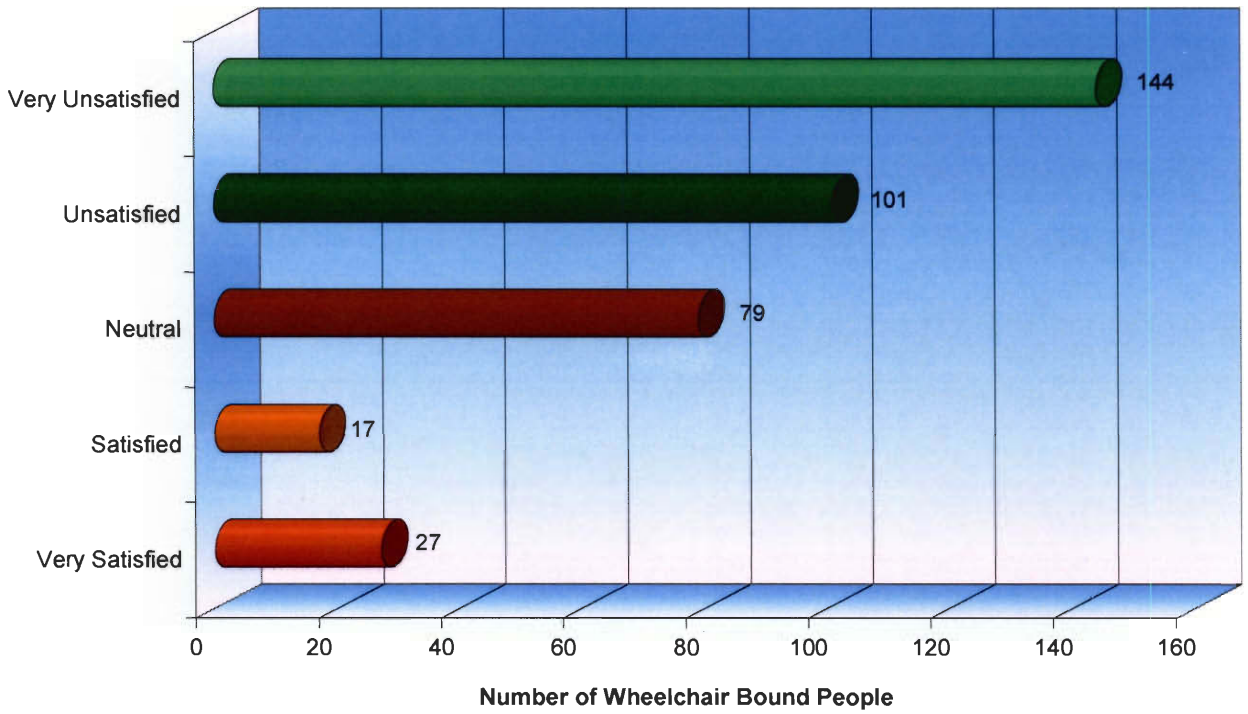

Figure 4.5: Satisfaction Level with Current Transportation in Hong Kong (Source: Transport Department Survey, 2004)

The majority of wheelchair bound users who were interviewed by the Transport Department were either very unsatisfied or unsatisfied with the transportation system in Hong Kong. Having a disability that requires the use of a wheelchair and being blind are the two most difficult disabilities to have in Hong Kong. Accessorizing the transportation system to accommodate these two disabilities is underway. However, as is clear from Figure 4.5, although the modifications may have begun to make improvements, there is much room for further development.

The survey that the Transport Department conducted in 2003 included questions concerning opinions on which mode of transportation needed the most improvement. Figure 4.6 outlines the results.

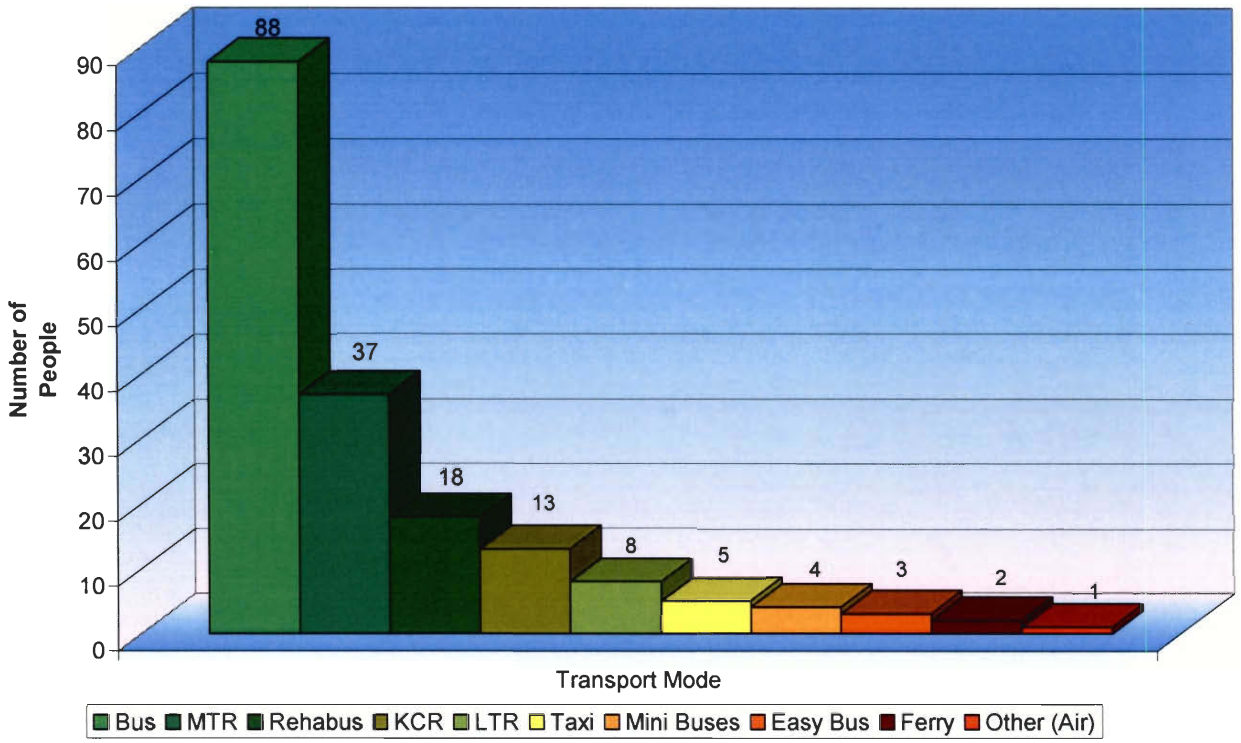

Figure 4.6: Forms of Transportation that Wheelchair Bound Passengers need Improved (Source: Transport Department Survey, 2004)

Figure 4.6, shows that buses, the MTR, and Rehabus need the most improvements. Because these three modes of transportation were used the most by the disabled, they would inherently be the three that benefit the disabled the most if their accessibility were improved. Upon further investigation into why Rehabus needed improvements, we found that it needed improvement not in the functionality of the buses, but in the size of the fleet. With only 87 buses in the fleet, the most common hope was to see the size of the fleet increased to handle the demand. Annually, Rehabus' fleet is increased by 3-7 buses, but this is not nearly enough to accommodate the 58,000 and growing number of physically disabled people in Hong Kong.

4.3 Cost Comparison

Disabled and elderly interviewees stated repeatedly that transportation in Hong Kong is too expensive, and that the fares should be lowered for both the elderly and disabled. Currently the elderly receive concessions for transportation while the disabled do not. Table 4.1 is a summary of the standard prices for different modes of transportation.

Table 4.1 Transportation Cost Comparison
(Source: Annual Transport Digest, 2003)

Transportation Cost Comparison		
Transport Mode	**Services**	**Fare (in Hong Kong dollars)**
Taxis	First 2 km	$15
	Every 0.2 km after first 2 km	$1.40
	Idle minute	$1.40
Buses	Hong Kong Island	$2.40 - $11.90
	Cross-harbor routes	$8.10 - $34.20
Rehabus	Scheduled route	$184 - $264 per month
	Feeder	$3.50 -$ 4.00
	Dial-A-Ride	Mondays to Sundays (except Sundays and public holidays)
		3 or less passengers: $24 per hour, plus $1.20 per km
		4 - 12 passengers: $38 per hour, plus $1.90 per km
		13 - 30 passengers: $8 per hour, plus $2.90 per km
		Minimum of one hour is charged plus $5 booking fee
	Pooling Dial-A-Ride	$160 per month

Taxis, if used on a regular basis, would be more expensive than the other two modes of transportation listed in Table 4.1. While convenient for point-to-point service, taxis become more expensive after the initial 2 km rate. In addition to the $1.40 for every 0.2 km after the initial 2 km; idle time spent in traffic costs $1.40 per minute. These fees may not seem too high, but when compounded over a 10-15 minute taxi trip, they can become quite expensive when compared to buses and Rehabus.

Buses are very convenient but do not provide point-to-point service. Nevertheless, with over 700 bus routes in Hong Kong there is a good chance that there will be a bus stop relatively close to a customer's final destination, but it will not be as convenient as a taxi.

Rehabus is a combination of a fully accessible taxi and a bus service at a relatively low price. Depending on the service and the number of passengers using the service at a given time, a trip can be very cheap and also point-to-point. If a bus is on a tight schedule, however, it may not be able to drop off passengers at an exact location.

5.0 CONCLUSIONS AND RECOMMENDATIONS

We have concluded that while the transportation system in Hong Kong is making important steps towards accessibility for people with handicaps, there are still many areas that require attention. These conclusions take into consideration the concerns and limitations of government organizations, transport operators, and disabled and elderly citizens. We believe that each of the recommendations we mention below will help better the quality of life for the disabled and elderly in Hong Kong, along with making transportation more accessible to all citizens.

RECOMMENDATIONS

Currently, Hong Kong does not have a universal definition for a "disabled" citizen. A single definition would eliminate the confusion of whether or not a citizen should be given the label of "disabled." It would enable the government officials to know what group of people they should be addressing in documents concerning the disabled. We recommend defining disability as something like this:

> *...anyone who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment (U.S. Department of Justice, 2002).*

This clarification would certainly assist in the drafting of sending legal documents concerning Hong Kong's polices, such as the 2005 Buildings Design Manual.

With a standard definition of disabled, the Transport Department and transportation operators should be able to come to an agreement on such things as fare reductions for those with a physical handicap. Since a reduced fare scheme is being offered to the elderly because of their lower than average income, a similar scheme could be put into effect for the disabled. Often times the disabled can only be employed part time, making it difficult for them to afford transportation on a limited income. We propose a separate category of the Octopus card that allows the disabled to travel for reduced price on all public transportation. The disabled

population represents a small portion of the society as a whole, so profits would not be reduced greatly for the transport operators if such a policy were introduced. Overall, this fare reduction might promote increased usage by the disabled and eventually further integrate them into the society of Hong Kong.

The Transport Department is aware of the concerns of the disabled and elderly through their quarterly "Working Group" meetings with the heads of disabled organizations and transport operators. Up until 1997, the government of Hong Kong held much larger conferences on accessible transportation. A larger scale meeting would allow for more feedback from both transport operators and disabled customers. This would also certainly allow for a more specific goal setting environment, which is something Hong Kong needs in the way of public transport. Larger meetings would enable the transport operators to hear more detailed comments from disabled and elderly citizens. This would give the operators new ideas on what to improve in future designs.

We have found that KMB and NWFB are both addressing specific problems for the elderly and disabled with their new buses, but not all of the problems. KMB has taken many steps towards increasing accessibility with their super low floor buses and stop announcement system. NWFB has not put much of an emphasis on putting audio/visual announcement systems in its buses. The government is in the process of mandating all new buses to have a stop announcement system. The only specific technological assistance that is lacking is an external bus route announcement system at each individual stop. This would be a very difficult system to put into operation, and we suggest that further research be done in this area.

Older buses in Hong Kong maintain their functionality but are unable to provide adequate services to the growing elderly and disabled population conveniently. We recommend that by the year 2022, all buses in Hong Kong be fully accessible to the elderly and disabled with boarding ramps, contrasting interior guide rails, internal visual and audible announcement systems and space for wheelchairs. This gives bus companies seventeen years to retire their oldest buses and

replace them with newer ones. This should be plenty of time considering the average bus life is seventeen years.

While the Transport Department is pushing for more accessible double-decker buses, they are not helping another service for the elderly and disabled Rehabus. The limited funds for Rehabus from the Heath, Welfare and Food Bureau are restricting the number of minibuses Rehabus can operate. If the number of minibuses were increased, then the Rehabus service could better meet the needs of it passengers who are continuously asking for more buses.

Along with the transportation operators, the highway department needs a retrofitting plan. Throughout the city of Hong Kong there are various inconsistencies in the civilian walkway system. In some places there are ramps or lifts to elevated walkways, but at an entryway from that same walkway, there will be two steps up to the doorway. Also, there are many curbs at crucial pedestrian junctions that do not offer a ramp for a wheelchair user. These features must be replaced by accessible curbs, ramps or lifts. Street furniture and other objects blocking the pathway of pedestrians need to be eliminated or relocated. If it cannot be eliminated, the clutter needs to stand out with contrasting colors so that the visually impaired will be able to see it. Audible cross walks signals and tactile guide paths should be implemented in all crosswalks by year 2010. This gives the Highway Department five years to coordinate and install guide paths and cross walk signals with the Transport Department. While this may be an arduous task, it is imperative that it is completed to reach a "barrier free" environment for all in Hong Kong.

The last recommendation that we have is education and training for the citizens of Hong Kong. If the mindset of the people can be shifted to feel more comfortable with the disabled, then the society can become a more accepting environment for the handicapped. To achieve this goal, education in primary schools needs to teach the idea of a disability being a normal occurrence. Also, through advertising and public announcements, adults need to be made aware of the hardships endured by the elderly and disabled in day-to-day transport. Transport operators need to increase training in how to accommodate impaired citizens in the vehicles they drive.

Hopefully through understanding this would allow for a more accepting transportation environment for the disabled and elderly.

FUTURE RESEARCH

The issue of transportation is certainly a broad one. There are several areas that we feel need to be researched further before any recommendations can be made on the specific problems. One area that needs to be researched further is the taxi system in Hong Kong. The government does not offer any encouragement for taxi drivers to help the disabled use their vehicles. Research needs to be done on implementing incentives to get taxi drivers to want to help the disabled. There needs to a study of the feasibility of adding wheelchair accessible taxis to the current transportation system.

Outside of technical problems, there are several general communication related difficulties that need to be researched further before accessible transportation can make a real advance. Different government departments do not communicate well enough among themselves as we have learned from our extensive discussions with the Transport Department. To promote this communication, legislation also could be passed. A universal mandate that tied departments together by law would help to ensure that all aspects of a project followed accessibility guidelines. These are two areas that we believe future research and projects could be done to help improve accessibility of transportation in Hong Kong.

The specific technological assistance lacking in external bus route announcement systems at each bus stop needs to be researched. This would be a very difficult system to put into operation, and we suggest that further research be done in this area. The Transport Department is putting a lot of emphasis on this specific technology, and it is one of their current projects. Overall Hong Kong is one of the leading cities in the world in terms of accessible transport for its citizens. We believe that our recommendations will help improve the lives of disabled citizens in Hong Kong. While we feel that this project has addressed many of the concerns for accessible transportation in Hong Kong, there are still various areas that require future research. The

government will be the real catalyst for the future of accessible transport, as they have the final say on most issues. We hope that these suggestions provide a vision for the possibility of a barrier free environment in Hong Kong.

Like any social change, we realize that our suggestions will take time to implement. Improving accessibility for transportation will greatly improve the lives of the elderly and disabled.

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APPENDICES

APPENDIX A – REGISTERED DISABILITIES IN HONG KONG

Number of Registrants by Types of Disability by Age Group as at 30/9/2004

Hearing Impairment	
Age Group	People
0-3	8
4--5	31
6--11	274
12--14	230
15	119
16-17	210
18-20	431
21-24	658
25-29	1146
30-34	1085
35-39	923
40-44	1060
45-49	1143
50-54	944
55-59	726
60-64	458
65-69	490
70-74	581
75-79	516
≧80	1480
Unknown	78
Sub Total	12591

Visual Impairment	
Age Group	People
0-3	8
4--5	18
6--11	114
12--14	74
15	30
16-17	75
18-20	130
21-24	254
25-29	406
30-34	315
35-39	354
40-44	545
45-49	643
50-54	713
55-59	658
60-64	610
65-69	720
70-74	800
75-79	837
≧80	4787
Unknown	730
Sub Total	12821

Physical Handicap	
Age Group	People
0-3	14
4--5	38
6--11	363
12--14	470
15	224
16-17	589
18-20	994
21-24	1753
25-29	1678
30-34	1585
35-39	1876
40-44	3198
45-49	3609
50-54	3074
55-59	2569
60-64	2154
65-69	2709
70-74	3653
75-79	3778
≧80	17269
Unknown	1633
Sub Total	53230

Speech Impairment	
Age Group	People
0-3	14
4--5	38
6--11	405
12--14	286
15	107
16-17	206
18-20	352
21-24	338
25-29	214
30-34	178
35-39	180
40-44	211
45-49	194
50-54	157
55-59	102
60-64	33
65-69	18
70-74	10
75-79	10
≧80	4
Unknown	0
Sub Total	3057

Mental Handicap	
Age Group	People
0-3	11
4--5	63
6--11	1326
12--14	1393
15	610
16-17	1501
18-20	2632
21-24	4233
25-29	4468
30-34	3682
35-39	3000
40-44	2771
45-49	2017
50-54	1195
55-59	550
60-64	188
65-69	134
70-74	78
75-79	25
≧80	50
Unknown	15
Sub Total	29942

	Disability
	Greatest Value for Disability
	Smallest Value for Disability
	Subtotal
	Grand Total

Number of Registrants by Types of Disability by Age Group as at 30/9/2004

Mental Illness	
Age Group	People
0-3	1
4--5	1
6--11	9
12--14	5
15	10
16-17	24
18-20	72
21-24	168
25-29	469
30-34	811
35-39	1346
40-44	2031
45-49	2185
50-54	2081
55-59	1514
60-64	897
65-69	914
70-74	805
75-79	543
≧80	1680
Unknown	193
Sub Total	**15759**

Autism	
Age Group	People
0-3	35
4--5	114
6--11	578
12--14	314
15	106
16-17	218
18-20	376
21-24	451
25-29	230
30-34	57
35-39	14
40-44	8
45-49	4
50-54	3
55-59	0
60-64	0
65-69	1
70-74	0
75-79	0
≧80	0
Unknown	0
Sub Total	**2509**

Chronic Illness	
Age Group	People
0-3	9
4--5	29
6--11	116
12--14	153
15	60
16-17	92
18-20	182
21-24	920
25-29	725
30-34	451
35-39	657
40-44	1346
45-49	1952
50-54	2218
55-59	1968
60-64	1173
65-69	903
70-74	639
75-79	367
≧80	233
Unknown	0
Sub Total	**14193**

Grand Total	
Age Group	People
0-3	100
4--5	332
6--11	3185
12--14	2925
15	1266
16-17	2915
18-20	5169
21-24	8775
25-29	9336
30-34	8164
35-39	8350
40-44	11170
45-49	11747
50-54	10385
55-59	8087
60-64	5513
65-69	5889
70-74	6566
75-79	6076
≧80	25503
Unknown	2649
Grand Total	**144102**

Disability
Greatest Value for Disability
Smallest Value for Disability
Subtotal
Grand Total

***Note:** Data was taken from Statistical Report of the Central Registry for Rehabilitation, September 2004.

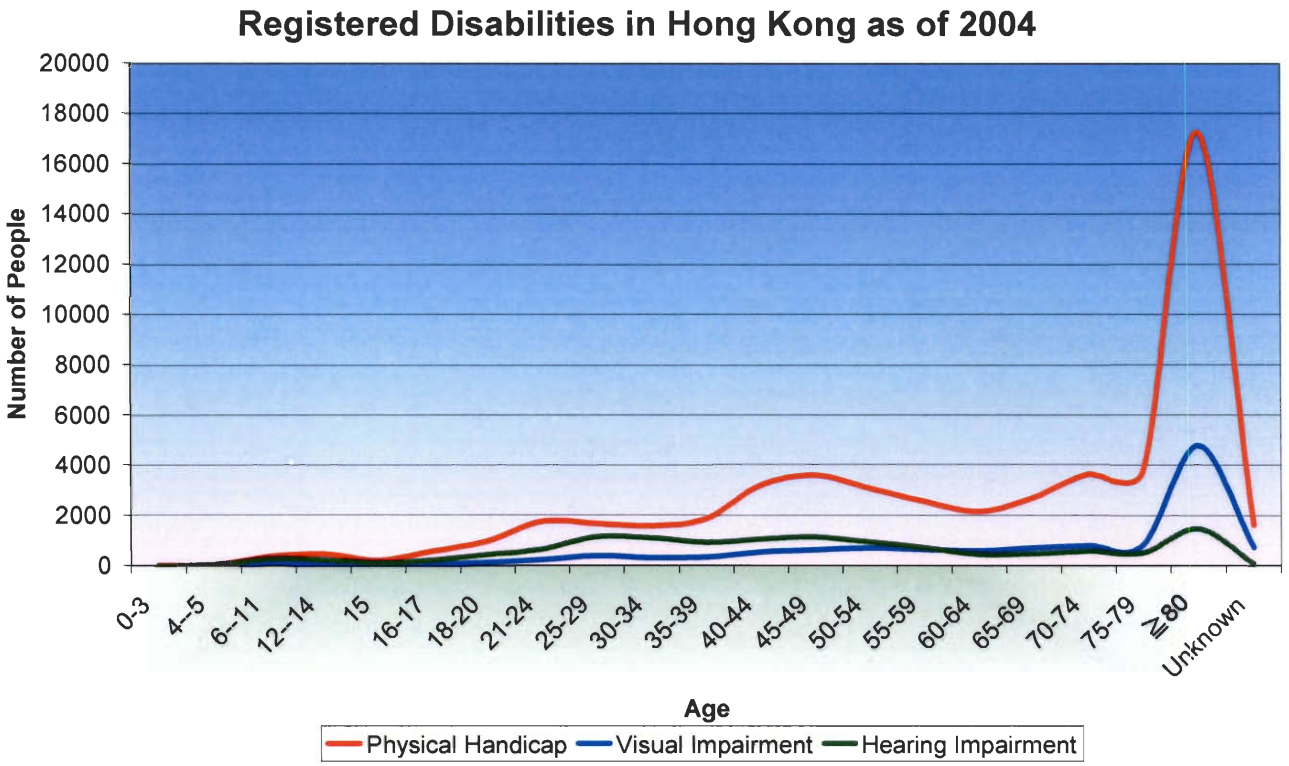


Figure 5.1: Number of People in Hong Kong who have Registered their Disability

With data collected from Retina, a visual impairment group, we were able to compile Figure 5.1 and focus in on the three main disabilities that we thought were relevant to our project. Notice that as age increases, the number of disabilities also increases. This means that as Hong Kong's elderly population continues to increase rapidly, so will the number of registered disabilities.

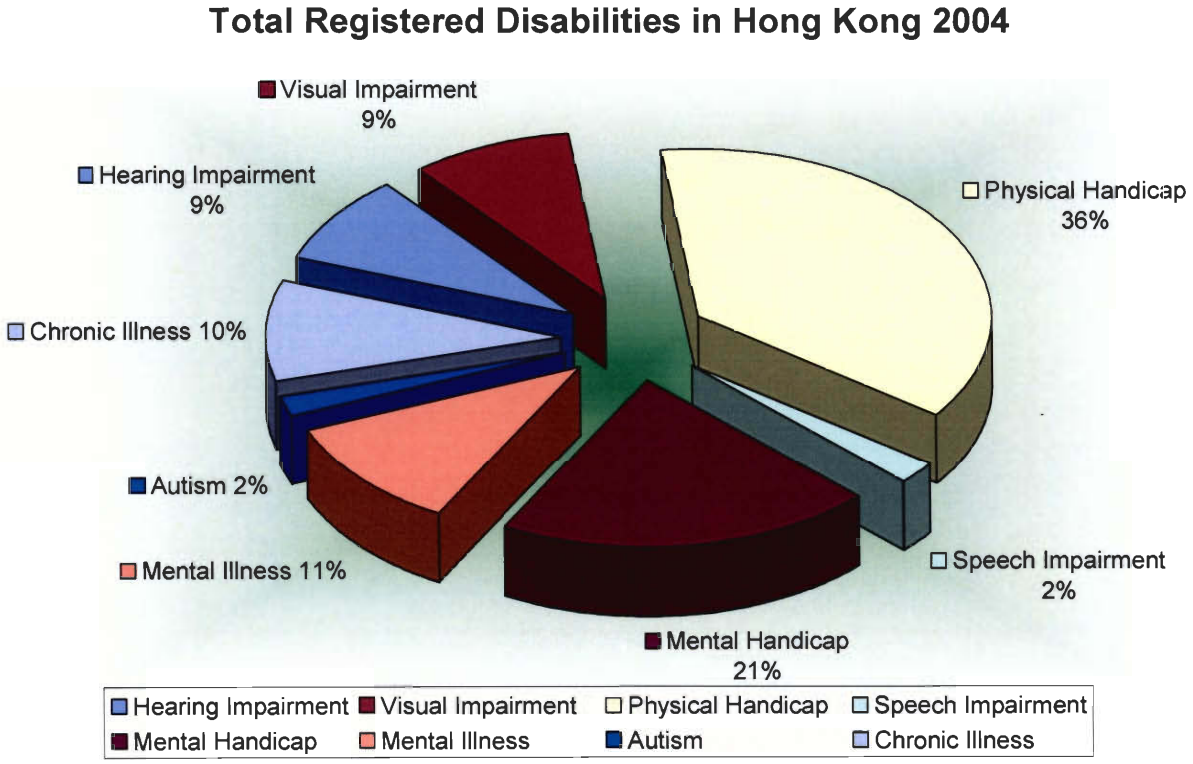


Figure 5.2: Total Number of People with Registered Disabilities in Hong Kong

The data from Figure 5.2 was compiled from the Statistical Report of the Central Registry for Rehabilitation, September 2004. This data was provided to us by Retina and The Hong Kong Society for Rehabilitation.

By focusing on physical handicap, visual impairment and hearing impairment we will be making suggestions that effect nearly 54% of people with registered disabilities. Furthermore, by addressing these impairments and accessorizing public transportation to accommodate these disabilities we will inherently improve the quality of travel for the elderly as well. If we were able to help the elderly, physically handicap, visually impaired and hearing impaired, we would be affecting roughly 11% of Hong Kong's total population (750,000 people).

APPENDIX B – FURTHER DEVELOPMENT OF DISABILITIES

VISUAL IMPAIRMENT:

Blindness is the inability to see. It is the absence or loss of perception of visual stimuli. The condition of blindness may be the result of failures in organs contributing to sight. These organs may have been damaged or injured in certain areas of the brain. Out of the entire world's population of nearly six and half billion people, there are slightly over 45 million blind people. In the world, twelve previously sighted persons, including a child, become blind every minute. Some causes of blindness are industrial and work related accidents, cataract, trachoma, onchocerchiasis, childhood blindness, refractive errors and low vision.

HEARING IMPAIRMENT:

Hearing impairment occurs when there is a problem with or damage to one or more parts of the ear. It is the absence or loss of perception of audible stimuli. Deafness is the result of failures in organs contributing to hearing. Organs such as the eardrum, cochlea, and auditory nerve, when damaged result in loss of quality of hearing or hearing impairment completely.

The most common cause of conductive hearing loss in kids and teens is otitis media, which is the medical term for an ear infection that affects the middle ear. Worldwide, nearly 560 million people suffer from some sort of hearing impairment. Otitis media an infection that causes a buildup of fluid or pus behind the eardrum, which can block the transmission of sound.

APPENDIX C – ADDITIONAL BUS COMPANY INFORMATION

KOWLOON MOTOR BUS COMPANY

Figure 5.3: Kowloon Motor Bus (Frontal View)

The Kowloon Motor Bus Company (KMB) has many buses that are highly accessible for the elderly and disabled (The Kowloon Motor Bus Co. 2004). As stated on their website, "Kowloon Motor Bus is committed to provide safe, high quality and good value services for the traveling public, including those who are less able." As seen in Figure 5.3 they have included large front destination display signs at the front and the sides and interior for easier view of what stop the bus is arriving at. Low entrances, exit steps, and ramps are included for easy access for the elderly and disabled. This innovation makes it more convenient for the disabled to get on and off the buses. When those who are wheelchair bound get onto the bus, they will always have room because there are certain chairs that will fold up to accommodate their special needs. The passengers sitting on those chairs are required to give up their seats for the disabled. The bus is also equipped with special handrail supports that assist the elderly and disabled when navigating the bus. To help their passengers with impaired eye sight, the KMB made all the handrails and chairs bright with highly contrasting colors. Stop bell buttons and lights are located all throughout the bus for the passengers with impaired hearing. These features let the bus driver know that a stop has been requested. Braille plates with the customer service information are located in the bus for the visually impaired. Kowloon Motor Bus's are also equipped with safety features include contrasting bright "Tiger Stripe" stairs so the passengers can easily see the steps and will be less likely to trip and fall.

NEW WORLD FIRST BUS

Figure 5.4: New World First Bus
(Source: New World First Bus 2001)

The New World First Bus Company has all of the same new features included to aid the disabled and elderly in their travels as the Kowloon Bus Company (New World First Bus, 2001). The only feature that is different is a button that the disabled can press to request help. This button is only on Kowloon Motor Buses. The button is low enough for the disabled to access when needed. In general, New World First Bus Company is equipping their buses with new technology, like low floors and kneeling suspension, to meet the public's demands. This is due to their distributor, which happens to be the same as Kowloon Motor Bus Company. Because the bus market is so small, when KMB upgraded the design of their buses, all other bus companies that went through this distributor were required to replace their aging fleet with these newer model buses.

APPENDIX D – KOWLOON MOTOR BUS FEATURES

BARRIER FREE FEATURES:

When KMB decided to upgrade their fleet, they made all of their new buses go above and beyond what was required of them by the government. KMB now complies with the DDA and DPTAC requirements. To meet the needs of the elderly and disabled, KMB implemented the following features in their new line of buses.

1. Large electronic destination and route number display on the front and side of bus.
2. Large electronic route number display on the side and rear of bus.
3. Super low floor configuration.
4. Front kneeling capability with wide entrance.
5. Entrance ramp with interlock system.
6. Wheelchair space with back rest and restraint lap belt.
7. Guiding handrail layout for visually impaired.
8. High contrast and textured handrail system.
9. Octopus Card System in place for quick and automatic fare collection.
10. Pre-closing warning for exit.
11. Sensitive edge placed on doors and alerts driver when something is in the way. Also, the bus will not move until all doors are securely shut.
12. Non-slippery floor.
13. Wide gangway.
14. Step-free flooring.
15. High contrast step-edge.
16. Straight staircase leading to second deck is easier to negotiate by elderly and disabled.
17. Signs indicating priority seating.
18. Public address system in visual and audio displays.
19. Continuous lighting system and better saloon illumination.
20. Sufficient easy-reach bell stop push buttons.
21. Braille registration number plates.

ERGONOMIC FEATURES:

In addition to making their new fleet handicap accessible, they also made it comfortable for their existing cliental. Here is a list of features they added to make the average customer more comfortable and safer on their new fleet of buses.

1. Wide body configuration allows for better seating layout, wider gangway and spacious bus saloon.
2. Fully integrated and ambient control air conditioning and heating system.
3. Electrostatic air cleaning system.
4. Seatbelts for exposed forward facing seats.
5. ABS and ASR braking systems.
6. Electronic tachograph for fleet management control and accident log reporting.
7. Engine compartment fire alarm.
8. Public announcement systems in visual and audible display.
9. Cushion seats with headrests.
10. Provision of breech-glass hammers.

Hong Kong is an extremely polluted city, and to help reduce smog and pollution KMB is introducing these new features in all their new buses. Here is a list of features added to make the bus more environmentally friendly.

ENVIRONMENTALLY FRIENDLY FEATURES:

1. Euro III/Euro IV environmental-friendly low emission engines.
2. Fuel-efficient driveline with active improvement in fuel economy with less total emissions without compromising drivability.
3. Automatic engine oil top-up system for efficient and economical use of engine oil. This helps minimize waste oil disposal.
4. The use of high grade lubricant such as synthetic oils. This allows extended drain intervals without compromising system protection. This further reduces the waste oil disposal.
5. Tinted window glass reduces sun heating and conserves air conditioning system power.
6. Electrostatic air cleaning system.

APPENDIX E – WHEELCHAIR ACCESSIBLE TAXIS

Wheelchair accessible taxis are very important and necessary if a physically impaired person wants to use a personal yet public type of transport. There are all types of wheelchair accessible taxis. Taxis ranging from unmodified vehicles with drivers who have to be conscious of the needs of their wheelchair customers to vehicles designed especially to be used to transport a wheelchair bound person.

In Hong Kong there are approximately 15,250 red colored urban taxis on the road, 2,383 green colored taxis in the New Territories, and 50 blue colored taxis Lantau. All three taxis systems transport approximately 1.31 million passengers daily. This makes up approximately 11.4% of all transportation in Hong Kong. Aside from an automatic door, and the hospitality of the driver, none of these taxis are equipped with any hardware necessary to transport a physically disabled person. One cheap, yet effective way of preparing a taxi for the transportation of a disabled person is to educate the driver on the needs of the disabled.

EDUCATED DRIVERS

Most major cities that are realizing that their elderly and disabled population is an untapped resource are implementing ways to help improve the transportation of these citizens. Cities are realizing that it is not a simple matter to make all vehicles fully accessible for the elderly and disabled and that there are transitional steps that need to be taken. An intermediate step that is cost effective and efficient is educating people on social awareness of the problems of the elderly and disabled. More important is the education of drivers of public transportation so they can assist the elderly and disabled more effectively.

In 1999 Singapore adopted the idea of educating all of their taxi cab drivers with the information needed to help a disabled person into their vehicle. After announcing that COMFORT, a major taxi service in Singapore, would be training those in their fleet who would like to volunteer to help people with disabilities, more than 100 drivers signed up for the test. The drivers that wanted the training underwent two days of training on helping people with disabilities to board and alight from their vehicles. No physical additions or improvements were made to the taxis to help the boarding of disabled passengers, only a volunteer program was put into effect initially. This step is typically done in instances were a short-run solution is needed for a long term problem (Disabled People's Association (DPA), 2000).

MODIFYING EXISTING VEHICLES

There are several different ways an existing vehicle can be modified to allow it to transport a person in a wheelchair. The choice of which modification can be made is based on the type of vehicle being modified as well as the social situation in which the vehicle is going to be used. The main types of modifications possible are to entrance ways and adding extra space to the cab of the vehicle.

ENTRANCE WAYS

Entrance ways can be of several different types, each possessing its own good and bad qualities. The different possibilities are a side ramp, a rear ramp, a rear hydraulic lift, and a side hydraulic lift.

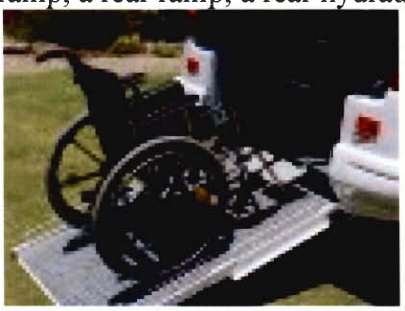


Figure 5.5: Rear Entrance Ramp
(Source: Disabled Drivers' Motor Club, 2004)

Rear ramps are normally constructed from some sturdy material such as steel. These ramps either fold down or slide out from the rear of the vehicle and allow for a wheelchair bound person to roll up into the vehicle. Figure 5.5 is a good example of a modified van with a rear fold up ramp. The problem with these vehicles is that they require the customer to enter from the back, and in Hong Kong this would require the vehicle to back up toward to person and in public streets, this is just not an option. The ramp can either be motor driven or manually operated.

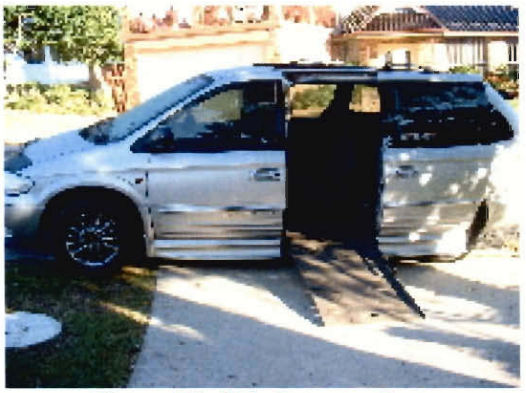


Figure 5.6: Side Entrance Ramp
(Source: Disabled Drivers' Motor Club, 2004)

Side ramps are very similar to the rear ramps, except in the case of side ramps, the ramps extend or are folded down from the side of the vehicle, thus allowing people to enter from sidewalks more easily that it would be to enter on a rear ramp. Figure 5.6 is an example of a modified van with a side entrance ramp. This is better suited for use in Hong Kong, but the problem with side ramps is that the vehicle has to have a door wide enough for the wheelchair to fit through and be tall enough so a person in a wheelchair can comfortably get into and ride in it.

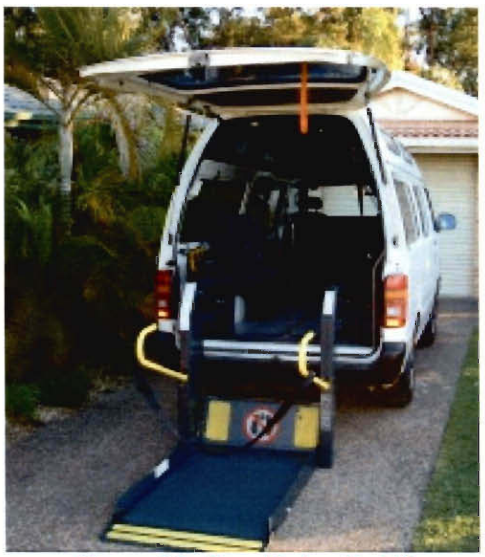


Figure 5.7: Rear Hydraulic Lift
(Source: Disabled Drivers' Motor Club, 2004)

Rear hydraulic lifts can provide fast easy ways to get a wheelchair user into a vehicle, but are not practical in Hong Kong for several reasons. The first reason is that to provide enough taxis to service the 58,000 wheelchair bound people in Hong Kong they would need a large fleet of wheelchair accessible taxis, several hundred at least; if they were equipped with hydraulic lifts, the costs for both the operator and the customer would greatly increase. Figure 5.7 shows the extensive modifications that are required to equip a vehicle with a mechanized lift in the rear.

Figure 5.8: Side Hydraulic Lift
(Source: Disabled Drivers' Motor Club, 2004)

These lifts are very similar to the rear hydraulic lifts and have several problems of their own while providing some bonuses the rear wheelchair lifts do not. Notice that in Figure 5.8 the side lift can be used on the sidewalk in a city while the rear lift would require the customer to be in the road to use it in the city. It still has the problem that it would not be as cost efficient to add this to all needed taxis in Hong Kong, and also the vehicle has to be tall enough and have a door wide enough to give access to the wheelchair.

ADDING EXTRA SPACE

Figure 5.9: Flashcab Addition
(Source: Flashcab, 2005)

Another common modification to a vehicle is the addition of extra space for the wheelchair to park. There are several different ways this has been done, and the most popular is in the addition of an extra compartment designed especially for the wheelchair user in the back of the vehicle. In Figure 5.9, the modification of a sedan, or a non-van vehicle, the flashcab is the most common way used to modify a car. For its ease of addition and its ability to provide easy access for users, this modification can be made quickly and easily. This type of modification is heavily used by Flashcab on their cabs in Australia, and is the best selling wheelchair accessible vehicle in Australia. This style of modification, while adding a compartment for the wheelchair user is not the best when it comes to safety. While this addition can include features like a comfortable and spacious interior and windows for the rider to look out through, it does not provide much protection for the wheelchair bound person in the case of a rear-end collision.

Figure 5.10: Stretched Accessible Addition
(Source: Disabled Drivers' Motor Club, 2004)

Another style of addition of space is adding it to the middle of the car so as to make it appear stretched. This is a good option because it does not take long to manufacture and is relatively cheap to modify, but it does provide poor passenger visibility and can impair the vision of the driver as well. Figure 5.10 is an example of a stretched accessible vehicle.

DESIGNED FOR WHEELCHAIRS

Figure 5.11: Fully Accessible Vehicles
(Source: Braun Corporation, 2005)

The third and final option for providing an accessible taxi is to not modify the existing vehicles at all, but to purchase new, fully accessible vehicles. As shown in Figure 5.11, these vehicles are large, cumbersome and expensive. These vehicles can be purchased to include certain features, such as side or read ramps, or side or rear lifts. Additional money might be required to ensure that the driver's seat is on the right hand side of the cab. This is because a lot of manufactures, by default provide driver's seats on the left hand side of the vehicle for countries like the US. The leading supplier in the US, of this type of vehicle is the Braun Corporation. They typically only deal with the US but would probably deal with Hong Kong if a large order was negotiated.

SAFETY CONCERNS

In the case of the addition of an extra compartment in the trunk area of a sedan, similar to what Flashcab uses, the concern of a rear end collision is great. This is a threat for wheelchair users because they are only inches away from the point of impact on a rear end collision. This alone makes Flashcabs extremely dangerous. Also, the back door is too thin, and does not absorb any impact from a collision. The use of a crumple zone could greatly improve the safety of this addition, but it would inherently extend the length of the vehicle.

An issue that may not be an immediate concern but is a very real one is the safety of some handicap accessible vehicles. According to the 2003 report published by the Department for Transport, the safety of wheelchair occupants in road passenger vehicles, wheelchair passengers traveling rear facing in a purpose built taxi were found to be greatly more at risk than forward facing. Children or larger than average people were found to be at an even greater risk if they were facing backwards. If the Hong Kong government were to mandate that a certain percent of the taxis on the road were to be handicap accessible, taxi drivers would likely pick side ramp loading vehicles because of their ease of use, convenience and price. However, side ramp loading vehicles that require wheelchairs to be rear facing are the most dangerous when an accident occurs. It is recommended that side loading front facing three point seatbelt restraint taxis be used to increase not only efficiency but safety (Disabled Drivers' Motor Club, 2004).

Flashcabs could be another choice, but Flashcabs present excess risk from a rear collision. Some more draw backs to Flashcabs are as follow:

- Are extremely uncomfortable because of the slope at the rear.
- The placement of the disability seat is poor.
- The air circulation is poor within the cab.

Securing the seat involves undignified and inappropriate contact between driver and passenger.

APPENDIX F – JOSEPH KWAN INTERVIEW

Joseph Kwan is an architect who traveled around to Australia, United Kingdom, France, and Hong Kong for education and his job. On January 27th, 2005 we went to Hong Kong Polytechnic University, to interview Joseph Kwan in his office. He started the meeting off with a brief introduction about his career background. After he finished with the introduction, he continued it with a talk about the history of the building codes and manuals. The latest Design Manual is in 1997, which is for barrier free access and it is apart of the Buildings Department. Until 1997, the disabled had accessible entrance, but only in the back of the stores. 1997's Design Manual stated that the disabled and elderly had to have initial accessibility from the front of the stores just like everybody else. It also stated that the Education Establishments had to be accessible as well. The Residential Buildings should be accessible as well, up to their front door. After they arrive to their front door, they would have to provide themselves with their own necessities. The government, disability groups, Transport Department and other services would all gather together and have discussions to express their concerns and needs. In order to make all the organizations and companies follow these laws, the Equal Opportunity Commission enforces the laws.

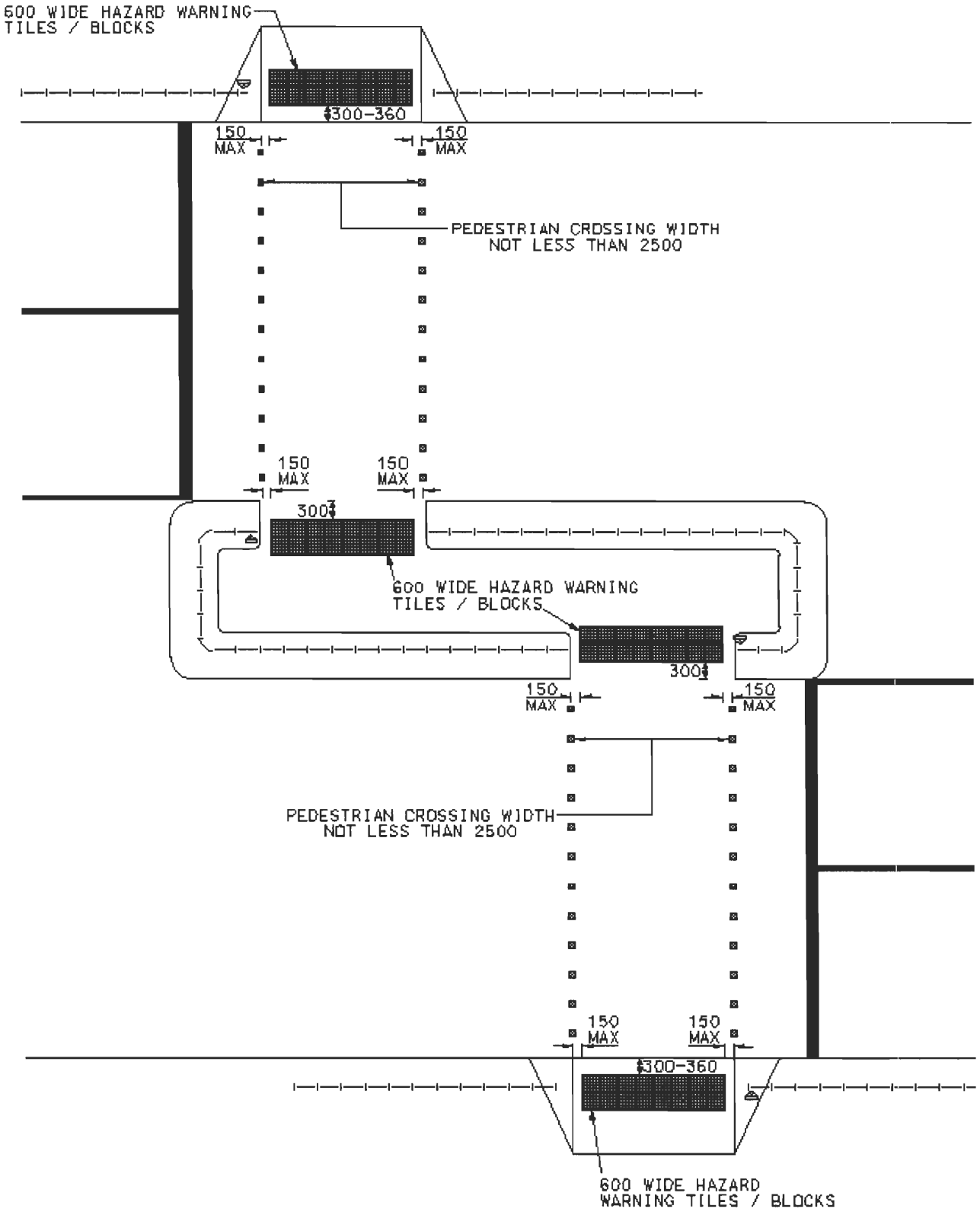
After Joseph Kwan finished giving us all the background information, we continued the meeting with a question and answering session. With building codes, all they ever talk is about getting into the buildings. They do not mention anything about safely getting out of the buildings in case of any fire or emergency. Another problem was with the walkways near the entrance of buildings and stores. There would be a few random steps going up or down into a building. The whole store could be handicapped accessible, but there would not be a way for the person to enter the store because of those two or three steps.

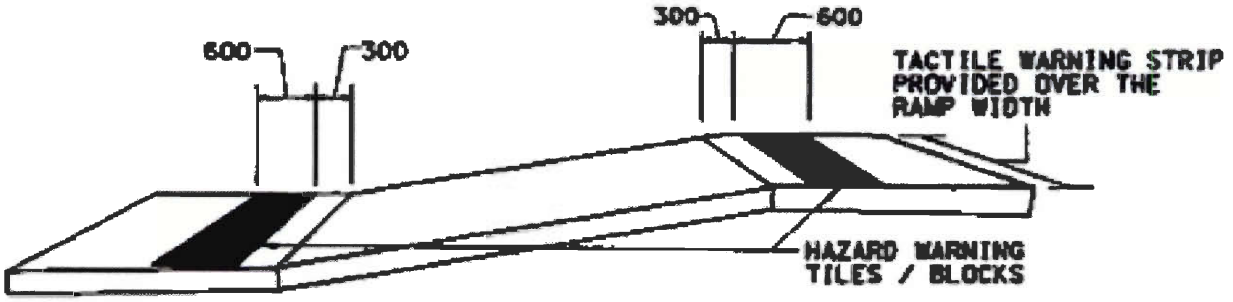
When we got to talking about someone trying to get approval to build a new store someplace, Joseph Kwan brought up another good idea. Even though someone wants to start up a new mall or building and it follows all the required laws for the disabled and elderly, they might be obsolete by the time the building is finished. A building takes about 8 - 9 years to be finished. So the person who is building the mall should be thinking way ahead into the future for other possible improvements.

About changing older buildings, that might be a big harder to do because there are physical constraints. There must be some current standards put into play and then there should be a reasonable date, probably about 25 years until these changes need to be made.

Joseph Kwan agrees that the quality of life for the elderly and disable has definitely been for the better because of these improvements made to the transportation systems. The innovations are only for the handicapped, they are also good for everybody. Within Hong Kong, the attitude towards the elderly and disabled has overall improved. There is not as much discrimination towards the handicapped for holding other people's time up on the bus. The able citizens are more willing to accept them. As long as the disabled groups come out more often, the general able public will no longer look at them unusually.

APPENDIX G – HONG KONG STANDARDS FOR PUBLIC PEDESTRIAN TRAVEL

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300
300
600
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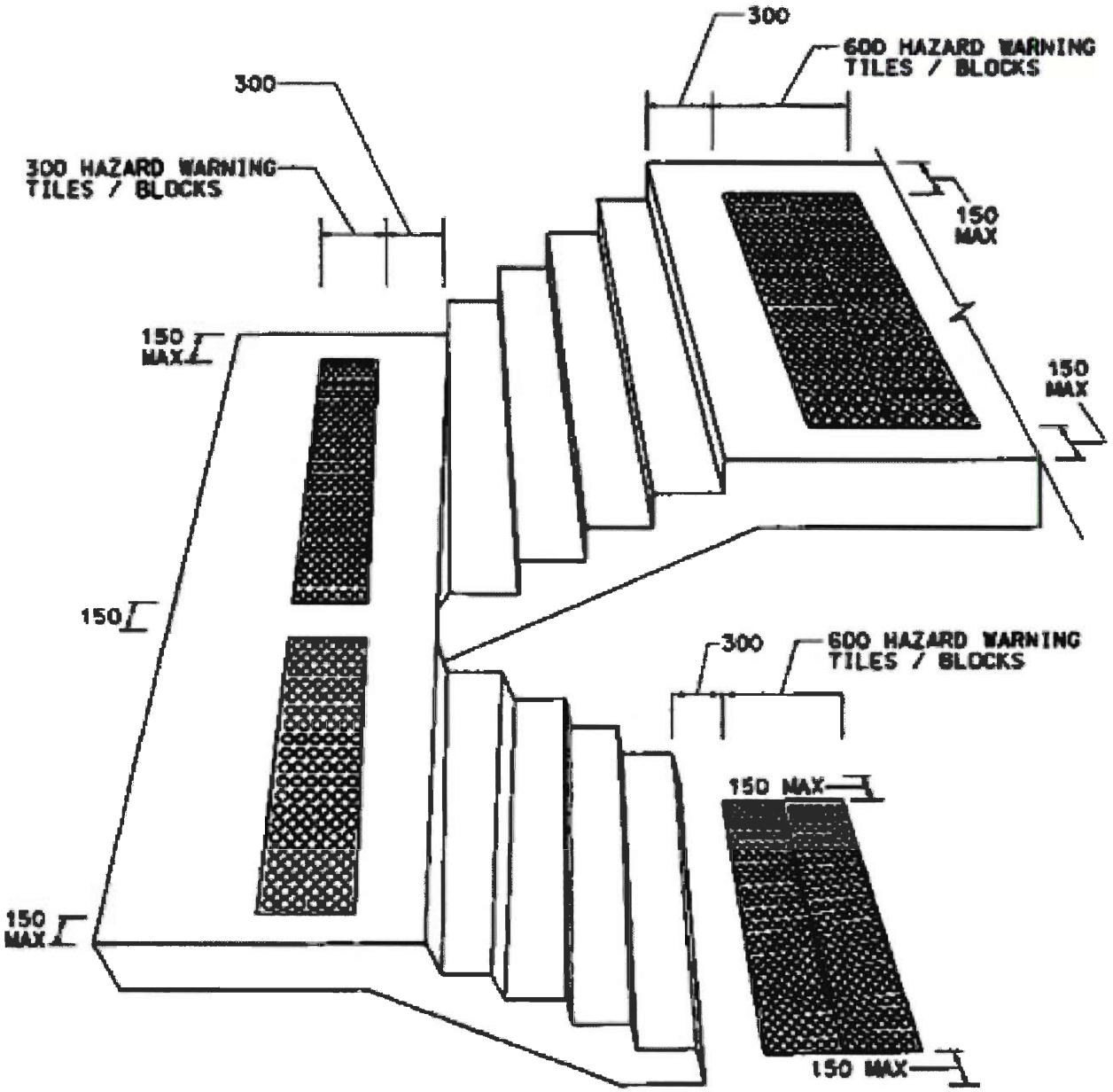
PROVIDED OVER THE
RAMP WIDTH
HAZARD WARNING
TILES / BLOCKS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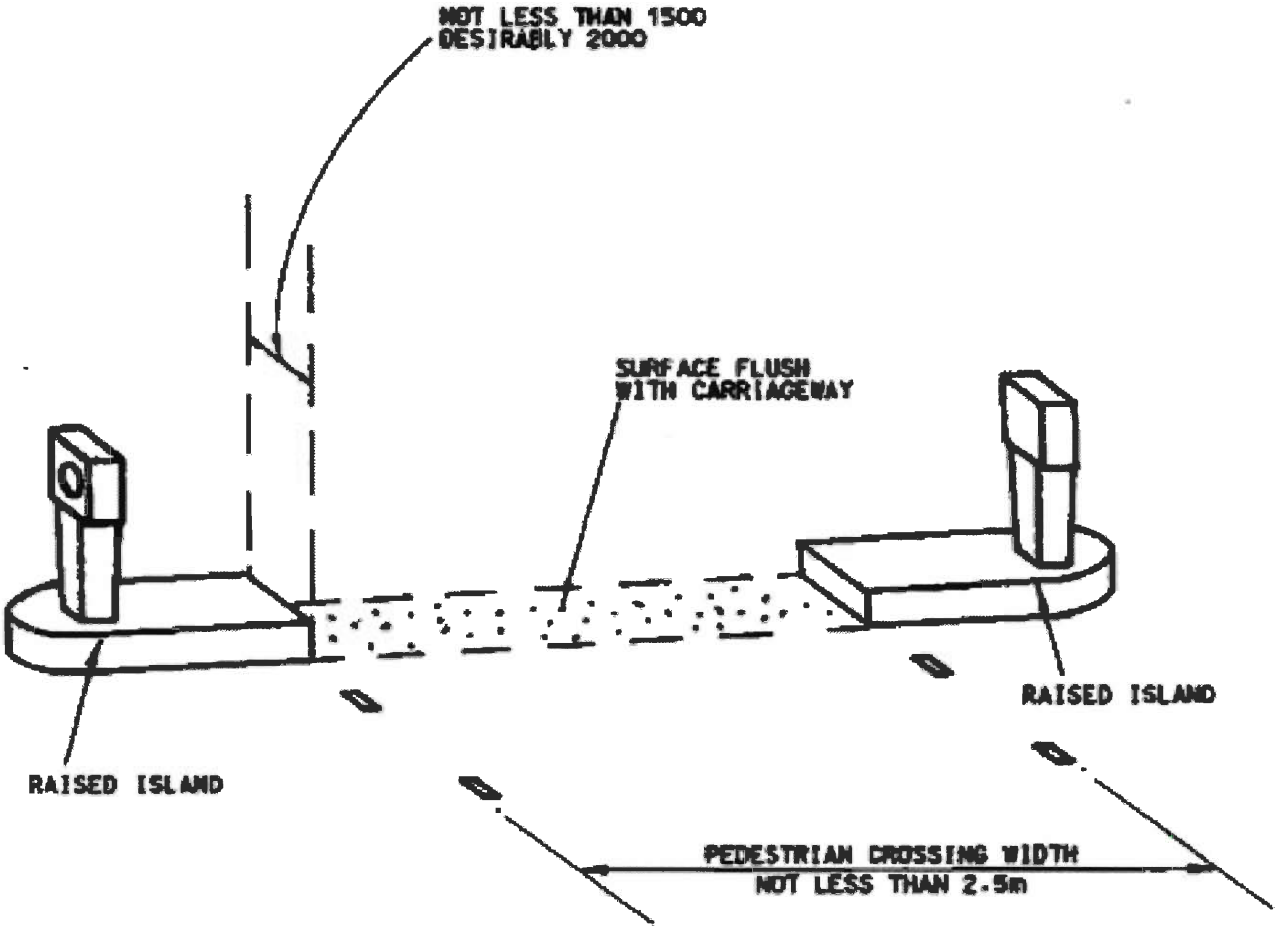
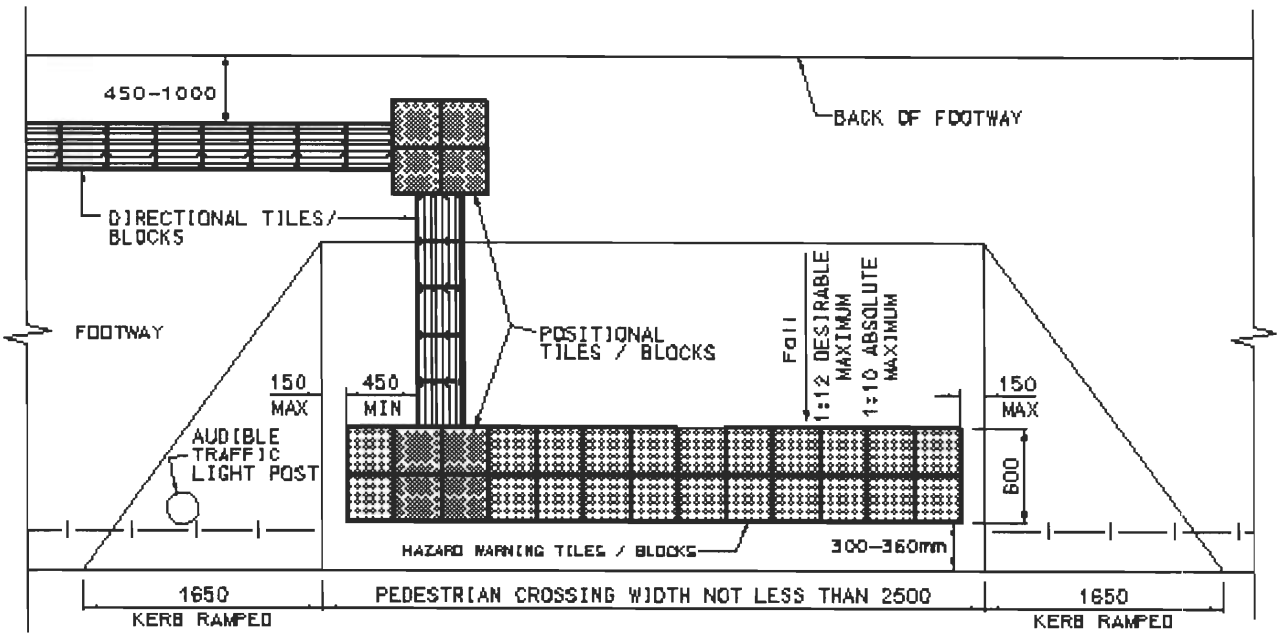

NOT LESS THAN 1500
DESIRABLY 2000
SURFACE FLUSH
WITH CARRIAGEWAY
RAISED ISLAND
RAISED ISLAND
PEDESTRIAN CROSSING WIDTH
NOT LESS THAN 2.5m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BACK OF FOOTWAY
DIRECTIONAL TILES/
BLOCKS
FOOTWAY
POSITIONAL
TILES / BLOCKS
Fall
1:12 DESIRABLE
MAXIMUM
1:10 ABSOLUTE
MAXIMUM
150
MAX
450
MIN
150
MAX
AUDIBLE
TRAFFIC
LIGHT POST
600
HAZARD WARNING TILES / BLOCKS
300-360mm
1650
KERB RAMPED
PEDESTRIAN CROSSING WIDTH NOT LESS THAN 2500
1650
KERB RAMPED

DRIVEWAY

APPENDIX H – MORE TECHNOLOGY ON STREET LIGHTS

MICROWAVE DETECTORS

Another technology that is available for street lights is the microwave detector. These small machines are mounted on top of the street lights and can be pointed down at the cross walk. Using microwaves that are sent out and bounced back, these small machines can adjust the time given for crossing for the disabled and elderly or otherwise slower pedestrians. These are in place and being used currently in both Los Angeles, CA and Portland, OR.

One model of a microwave detector is MS SEDCO SmartWalkTM 1800 Pedestrian Detector for Crosswalk Occupancy Detection. This model scans the crosswalk when the time has begun for pedestrians to cross and when it is time to stop, if someone is still in the crosswalk, it can send a signal to increase the allotted time for the pedestrian to cross. These can be purchased from MS SEDCO from their website http://www.microwavesensors.com.

INFRARED DETECTORS

These sensors are similar to the ones mentioned above except for the fact that they sense using the thermal changes due to body heat. These sensors are in use in Portland, OR and are available from companies like Sentrol and ASIM Technologies. The later of these companies offers the Dynamic PIR Detectors IR 200 Series for Pedestrians sensor.

IN-PAVEMENT LIGHTING

In some places like Kirkland, WA and Orlando, FL the cities have installed small amber lights on either side of the crosswalks. On coming cars from either direction, either during night or day, can see the lights flash, meaning someone has activated the system and therefore is most likely crossing the street. These lights are available from a number of companies such as Carmanah Technologies Inc., JSF Technologies, SPOT Devices, Inc, Silicon Constellations, Inc, Traffic Safety Corp., and LightGuard Systems, Inc. Go to this address for links to all these companies: http://www.walkinginfo.org/pedsmart/tlite.htm.

APPENDIX I – WHEELCHAIR BOUND INTERVIEWS

This semi-structured survey was intended to promote discussion between us and the interviewee. Some of the data we collected was important but does not fit the question being asked. The transcript at the end of the section provides more detail and explains the nature of our visit.

#1 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   45

3. What is the nature of your disability?
   Muscular dystrophy

4. How long have you been disabled?
   Past 25 years

5. Do you have a job that requires you to use public transportation?
   Yes, and I travel during peak hours

6. How often do you travel per day?
   2-4 trips per day

7. How often do you travel per week?
   6 days a week, 2-4 trips per day

8. Is public transportation expensive or inexpensive for you?
   Yes it is expensive, around $60 a day, which is 1/6 of my salary

9. How often would you go out if transportation were more accessible for you?
   Would go out more, yes.

10. What is the most inconvenient mode of transportation for you?
    Mini buses. Also in places where there are one or two stairs on entryways.

11. What would be the most effective improvement for you?
    Lowering the platforms on buses. Also more convenient handles.

12. What type of transportation do you use the most and why?
    Bus and minibus. They are cheaper and have many more stops. Taxis are too expensive but more convenient.

#2 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   30 something

3. What is the nature of your disability?
   Fell and damaged my legs.

4. How long have you been disabled?
   About 8 years

5. Do you have a job that requires you to use public transportation?
   No job, but I do use public transportation daily

6. How often do you travel per day?
   N/A

7. How often do you travel per week?
   3 days per week

8. Is public transportation expensive or inexpensive for you?
   Yes it is expensive, would like it better if it were half off

9. How often would you go out if transportation were more accessible for you?
   Would go out more, yes.

10. What is the most inconvenient mode of transportation for you?
    Minibuses, tram, Citybus, Sunbus

11. What would be the most effective improvement for you?
    More lowered platforms in entrances and elevators right at the exits of MTR stations

12. What type of transportation do you use the most and why?
    Bus, cheapest. I mostly go out by myself. Taxis are good but expensive.

#3 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   36

3. What is the nature of your disability?
   Cerebral palsy

4. How long have you been disabled?
   Since birth

5. Do you have a job that requires you to use public transportation?
   Yes, I drive mostly, take the MTR, bus, ferry and tram sometimes

6. How often do you travel per day?
   2-6 times per day

7. How often do you travel per week?
   7 days a week

8. Is public transportation expensive or inexpensive for you?
   Not really expensive for me (about 7% of my income).

9. How often would you go out if transportation were more accessible for you?
   I already go out quite often.

10. What is the most inconvenient mode of transportation for you?
    Driving my own car and trams because the stairs are quite tall

11. What would be the most effective improvement for you?
    More events on this subject, discussions, information and government involvement

12. What type of transportation do you use the most and why?
    MTR, because it is more accessible.

#4 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   20 something

3. What is the nature of your disability?
   Elbow broken and muscular dystrophy

4. How long have you been disabled?
   Since birth

5. Do you have a job that requires you to use public transportation?
   I did six months ago and I took the bus. I have no job now

6. How often do you travel per day?
   N/A

7. How often do you travel per week?
   3 days a week

8. Is public transportation expensive or inexpensive for you?
   Yes it is expensive. My income is very low

9. How often would you go out if transportation were more accessible for you?
   Yes of course. I would go out like a regular person

10. What is the most inconvenient mode of transportation for you?
    Mini buses because there is no lower platform. MTR also, the stations I would use do not have accessible facilities

11. What would be the most effective improvement for you?
    Lower costs, lower platforms, and handrails

12. What type of transportation do you use the most and why?
    Sometimes MTR because it lets me feel self sufficient and free from the help of others. Also buses because of their frequency and availability.

#5 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   20 something

3. What is the nature of your disability?
   SMA

4. How long have you been disabled?
   Since birth

5. Do you have a job that requires you to use public transportation?
   Yes

6. How often do you travel per day?
   Mon-Fri Rehabus 2 times a day

7. How often do you travel per week?
   1-2 times a week other than rehabus. Will avoid peak times

8. Is public transportation expensive or inexpensive for you?
   Affordable for me.

9. How often would you go out if transportation were more accessible for you?
   Yes of course. If there was a discount I would go out more

10. What is the most inconvenient mode of transportation for you?
    Mini buses because it is too elevated

11. What would be the most effective improvement for you?
    Getting rid of the one or two step platforms. Ramps in Wan Chai

12. What type of transportation do you use the most and why?
    Rehabus because it is very convenient and has a regular schedule. I go out by myself. Taxis are inconvenient for me because I use an electric wheelchair.

#6 DISABLED INTERVIEW

Date of Interview: 1/22/05
Location of Interview: Victoria Park, Hong Kong
Event Attended: Annual 28 Sharing Disabilities Fair

1. Is ok if we interview you and record what you say for a project for school? Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   30 something

3. What is the nature of your disability?
   Cannot stand stably, slide down and lose balance easily.

4. How long have you been disabled?
   Since birth, but in a wheelchair after 2003

5. Do you have a job that requires you to use public transportation?
   Yes, I take bus, MTR, tram or ferry

6. How often do you travel per day?
   2 times a day

7. How often do you travel per week?
   Around 20 trips per week

8. Is public transportation expensive or inexpensive for you?
   Inexpensive

9. How often would you go out if transportation were more accessible for you?
   Yes I would go out more

10. What is the most inconvenient mode of transportation for you?
    MTR because of the gap and trams. There is never enough staff help for me

11. What would be the most effective improvement for you?
    Making the gap on the MTR more narrow

12. What type of transportation do you use the most and why?
    A bus because it takes me directly from my home to my office. There are more routes, lower platforms and more frequent departures.

DISABLED INTERVIEW TRANSCRIPT

Being bound to a wheelchair is the most restraining forms of a disability. From the interviews we conducted, it was discovered that minibuses were the least accessible form of transportation in Hong Kong. These small buses do not feature ramps or railings that would help the disabled get onto the bus.

On the other side of the spectrum, the most accessible form of transportation was the MTR. While some stations did not have lifts, the physical train was accessible for those who were interviewed. The double-decker buses were also found to be quite accessible for the disabled. The only problem seemed to be that not all routes had the newest buses, with the newest accessibility features, in transit.

Outside of the technical data collected from these interviewed, some social implications were also uncovered. For the most part, the people interviewed believed that transportation in Hong Kong was affordable and allowed them to go out when they needed. It was almost unanimous however, that if fares were lowered for citizens with physical disabilities, then they would in fact go out more often. One citizen interviewed spent 1/6 of their income on transportation and felt that they could have a better life if fares were less strenuous on their income.

APPENDIX J – ELDERLY INTERVIEWS

This semi-structured survey was intended to promote discussion between us and the interviewee. Some of the data we collected was important but does not fit the question being asked. The transcript at the end of this appendix provides more detailed explanation the nature of our visit.

#1 ELDERLY INTERVIEW

Date of Interview: 2/03/05
Location of Interview: Evergreen College in Central, Hong Kong
Event Attended: Daily Classes

1. Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   66
3. Do you have a disability or anything that causes difficulty in your mobility?
   Leg Hurts
4. Do you have a job that requires you to use public transportation? If not, do you take public transportation frequently?
   Retired, MTR & Bus
5. Do you feel confined in your house because it is difficult for you to use public transportation?
   Everyday, go out
6. How often do you travel per day?
   4 – 6 times daily
7. How often do you travel per week?
   4-6 times daily x 7
8. Is public transportation expensive or inexpensive for you?
   Very expensive
9. What percentage of your income does public transportation take away?
   Not working
10. How often would you go out if transportation were more accessible for you?
    If more inexpensive, will go out more when convenient
11. What is the most inconvenient mode of transportation for you?
    Minibus because too long of a wait
12. Do you feel that you are discriminated against when you ride public transportation?
    None
13. What would be the most effective improvement for you?
    Too little seat space, too much open space
14. What type of transportation do you use the most and why?
    BUS – inexpensive, not as many steps

***Note:** Any form very effective, MTR → too many steps, BUS not good timing, TAXI – only stop at taxi stops (traffic)

#2 ELDERLY INTERVIEW

Date of Interview: 2/03/05
Location of Interview: Evergreen College in Central, Hong Kong
Event Attended: Daily Classes

1. Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   80
3. Do you have a disability or anything that causes difficulty in your mobility?
   Knee hurts
4. Do you have a job that requires you to use public transportation? If not, do you take public transportation frequently?
   retired, bus & taxi
5. Do you feel confined in your house because it is difficult for you to use public transportation?
   No, goes out all the time
6. How often do you travel per day?
   2 times (on public transportation)
7. How often do you travel per week?
   Everyday
8. Is public transportation expensive or inexpensive for you?
   Not very expensive
9. What percentage of your income does public transportation take away?

10. How often would you go out if transportation were more accessible for you?

11. What is the most inconvenient mode of transportation for you?
    Not too inconvenient
12. Do you feel that you are discriminated against when you ride public transportation?

13. What would be the most effective improvement for you?

14. What type of transportation do you use the most and why?
    All the same

#3 ELDERLY INTERVIEW

Date of Interview: 2/03/05
Location of Interview: Evergreen College in Central, Hong Kong
Event Attended: Daily Classes

1. Your identity will be kept confidential. We are unaffiliated with the Transport Department and are collecting information for a school project. We are attempting to be as unbiased as possible.

2. What is your age?
   66
3. Do you have a disability or anything that causes difficulty in your mobility?
   Leg Hurts
4. Do you have a job that requires you to use public transportation? If not, do you take public transportation frequently?
   Retired
5. Do you feel confined in your house because it is difficult for you to use public transportation?

6. How often do you travel per day?
   Walk to school
7. How often do you travel per week?
   Once a week
8. Is public transportation expensive or inexpensive for you?
   Not too expensive
9. What percentage of your income does public transportation take away?

10. How often would you go out if transportation were more accessible for you?

11. What is the most inconvenient mode of transportation for you?
    Bus – lower platforms
12. Do you feel that you are discriminated against when you ride public transportation?

13. What would be the most effective improvement for you?
    More handles
14. What type of transportation do you use the most and why?
    Buses more, more convenient for me.

ELDERLY INTERVIEW TRANSCRIPT

On February 3rd, 2005, in the morning, we went to the Evergreen College School in Central with the Third Age Education team from WPI. We were able to interview a few senior citizens who were there helping decorate early in the morning. Everyone that was interviewed was retired but they still were able to leave the house everyday, walk around, and frequently use the public transportation. Even though the interviewees were not completely physically disabled, they still had chronic pain in their knees which impaired their mobility. It is thought that some elderly citizens would stay home because of the inaccessibility of transportation. But in this case, these senior citizens travel everyday back and forth from their homes to the school, except for Sundays. They either used the Bus, MTR, and Taxi system twice a day. Some of them thought that the pricing was reasonable because senior citizens get ½ off of the original price. If the price for transportation went down, they would go out whenever they want to, not just whenever it was most convenient.

The minibuses were the most inconvenient form of transportation because of the high steps to get onto the buses. Since the elderly had bad knees, it is a lot harder for them to get up and down the stairs. The most popular form of transportation would be buses because it has more of a variety of which bus to take, it brings you closer from point to point transportation, and inexpensive. One person brought up a good point that there is not exactly a form a transportation that is the most effective. The MTR has too many steps leading down to the MTR System and there is not anything to help up or down from the ground floor. Buses also have flaws in which they do not have good timing. Taxis are only able to drop anyone off at a taxi stop and it is very expensive. One improvement made by one of the elderly is that the floor room in the bus systems is too open. There are not enough poles or handles for them to hold onto. Hopefully more suggestions can be made to Civic Exchange to help the elderly and their transportation accessibility.

APPENDIX K – RETINA INTERVIEW

The following sections are the interview protocol we used for our interview with Retina Hong Kong and after that is the transcript of the interview which provides a more in depth discussion of why we where there and what we learned.

RETINA INTERVIEW QUESTIONNAIRE PROTOCOL

Date of Interview: 2/01/05
Location of Interview: 101 Lai Huen House, Lai Kok Estate, Kowloon
Event Attended: Scheduled Meeting

1. What are some of the biggest problems you have noticed with buses? Taxis? Walkways?

2. What kind of feedback have you been getting about problems with visually impaired people having to use public transportation?

3. Are there some features you would like to see implemented in the future years?

4. Do you feel that the government and transportation operators are actively trying to improve transportation for the visually impaired?

5. In your experience and from what you had heard are the operators of the various types of public transportation (buses and taxis) helpful to disabled people?

6. Do you think a new law or policy concerning transportation for the disabled would increase the accessibility for the physically handicap?

RETINA INTERVIEW TRANSCRIPT

On February 1st, 2005, we went to interview Retina located at 101 Lai Huen House, Lai Kok Estate in Kowloon, Hong Kong. Retina is an organization put together to help the visually impaired citizens of Hong Kong. Kin-ping Tsang (KP for short), the president, and Henry Hung, the vice president, gave us a look around the facilities.

The meeting first started off with us introducing our project and why we are interested in Retina. After our introduction, they gave us a brief introduction of Retina and what they are all about and a little information on themselves as individuals. Retina consists of members with Retinal Degeneration. Their members are visually impaired of all fields. The organization was formed in 1995 and this year will be their 10th anniversary. They like to promote scientific research to try to find a cure for diseases.

After introductions, the meeting consisted of a question and answering session. Included in the discussion were KP, Henry, and two other members.

For the buses, they found it quite difficult to use. One of them said that they are never going to use buses every again because there is no way for the visually impaired to recognize what bus is arriving to the stop. Some of the buses do not have an audio announcement of the stops inside the bus. Even if they are able to get onto the bus, they would not know which stop to get off. They use to rely on their sense of smell from outside, but that is now taken away by the air conditioning inside the buses. KP feels that since he lost his sight, he has also lost his right to use public transportation. They also feel as if the bus drivers should receive much more education in helping the disabled on and off of the bus. They feel that the majority of the bus drivers are very inconsiderate to the disabled and it gives them the impression that the drivers do not want to help. The only bus company that they say is actually doing alright in this field would be Kowloon Motor Bus (KMB).

The walkways in Hong Kong are gradually improving. One big improvement that could be made would be a contrast in coloring for the edge of the stairs. If this was fixed, it would be easier for the visually impaired that still has some sight left, to be able to see the edge of the stairs so that they do not trip and fall off the stairs. There could also be better lighting throughout the streets because once it starts getting late; it gets harder for them to see objects outside in the dark.

The taxis are too expensive for the members to travel everyday. With the drivers, some are willing to help them get on and off, but with different drivers, there is a different attitude towards the situation. If they want easier travel from one point to another, a taxi would be a better form of transportation.

There are around 650 members. If they travel to familiar areas, they are fine. But if traveling to places that they have never been, they feel very uncomfortable. Also, some of them are not taken seriously when they ask a stranger a question about signs that they can not see because they do not look as if they are blind; they look normal.

An education program would be the best solution to all the problems. Overall, the whole situation towards the visually impaired is getting better than before. Some of the members still feel confined in their own homes but Retina encourages them to go out more.

APPENDIX L – TRANSPORT DEPARTMENT INTERVIEW

The following are the questionnaire protocol we used for interviewing the Transport Department after that is the transcript from the interview which gives an in depth description of what happened and what we learned.

TRANSPORT DEPARTMENT INTERVIEW QUESTIONNAIRE PROTOCOL

Date of Interviews 1/14/05
Location of Interview: Transport Department, Wan Chai, Hong Kong
Event Attended: Scheduled Meeting

Explain the purpose and goal of our project.

1. On average, how often will a citizen use the public transportation system within one day?
2. What is the percentage of people who use public transportation versus private transportation?
3. Why did you decide to add handicap accessible improvements to you buses when it is not required by law to have these features? Is there a cost benefit to having these features?
4. Does every bus stop have at least one bus that is handicap accessible?
5. What do you consider to be a disabled citizen?
6. What percent of Hong Kong citizens do you have on record as being disabled?
7. What do you consider to be elderly?
8. What kind of incentives have set in place for taxi drivers to want to help the disabled into their vehicles?
9. What are some suggestions for improvements on the taxi system that you have come up with and have not implemented?
10. What departments should we be looking into to find more information on taxis and buses?
11. What problems have you run into with coming up with solutions to helping the disabled's transportation, i.e. do you get sufficient monetary support from the government?
12. What do you feel your transportation system lacks that other cities around the world may do better concerning taxi and buses.
13. What roadblocks have you run into that have prevented you from implementing certain improvements.
14. What major suggestions on taxi and buses have been made in the past that have been rejected and why?

HONG KONG POLYTECHNIC STUDENT'S QUESTIONS

1. Is there one centralized stop for buses that the elderly and disabled could get to that would access all buses stops in the system.
2. Do you plan on implementing anything to help the blind access the bus system? Currently there does not appear to be any indication of bus numbers in brail for the blind.
    i. One idea we thought of was to add brail to the bus stops. Do you think this is feasible? What would you suggest?

TRANSPORT DEPARTMENT INTERVIEW TRANSCRIPT

Date of Interviews 1/14/05
Location of Interview: Transport Department, Wan Chai, Hong Kong
Event Attended: Scheduled Meeting

On January 14, 2005, we all went for a visit to Hong Kong's Transport Department in Wan Chai. Our group consisted of Stephen Bergeron, Gary Hamilton, Rhyland Klein, Sabrina Wong, Simon Ng (our Liaison), Chuck and Yan (HKPU students), and Veronica (Civic Exchange).

The visit began with an introduction to three of the top representatives of the Transport Department who included Tommy Ng (Chief Transport Officer of Planning Disabled Transport), M.K. Chan (Transport Executive I of Ferry and Paratransit Division), and Cecilia Lai (Senior Transport Officer). The meeting first started off with Stephen giving a general overview of our project to the representatives of Hong Kong's Transport Department. They presented a brief PowerPoint presentation regarding some statistical data on types of disabilities, features they are adding to the buses, government issues with transportation, and accessibility for the elderly and disabled.

Following the presentation was a Question and Answer session where a lot of information was gained. They had plenty of information regarding buses, taxis, and the Highway Department which involves the walkways. Around 4 years ago, the bus companies have started making improvements to the fleets regarding the accessibility for disabled and elderly citizens. Not all bus fleets are equipped with the certain improvements, but they are well on their way of achieving their goal. The Transport Department is hoping that within the next 10 years, the bus companies will have all their fleets up to date and handicapped accessible.

They were able to give us a good amount of information regarding taxis. Taxis are privately owned companies, which makes it difficult to make them want to spend the time and money to make their taxis handicapped accessible. There are other countries where research can be done to get better ideas on this subject such as Australia and Japan.

One problem that the Transport Department had and could not answer was regarding the visually impaired and the buses. They visually impaired citizens do not know which bus arrives to the bus stop because there is not any indication anywhere for the blind. They are still trying to figure out a way to fix this problem.

Some more issues had to deal with buildings and getting around from point A to point B. An issue was with the steps. There would be one or two steps going down and then a person would walk straight for 20 steps and then there would be one of two steps going back up. With those few steps in the way, a person in a wheelchair would not be able to travel to that certain destination.

At the end of the Question and Answer session, we were able to obtain some more possible contacts for interviews about our project. Some suggestions from Tommy included the railway systems, Equal Opportunity Commission (EOC), KMB, New World First Bus, Highways Department, Building Departments, EATC, Disability Organizations, and Rehabus. They graciously offered their help and said we could e-mail MK Chan if we had anymore questions or concerns or needed any help contacting these companies.

APPENDIX M – KOWLOON MOTOR BUS INTERVIEW

This section contains the interview protocol we used for our interview at Kowloon Motor Bus Company and the transcript from that interview.

KMB INTERVIEW QUESTIONNAIRE PROTOCOL

Date of Interviews 1/21/05
Location of Interview: Kowloon Motor Bus Company, Hong Kong
Event Attended: Scheduled Meeting

1. How many buses do you have in your fleet?
2. At what times during the day is your bus fleet most heavily used?
    a. NOTE FOR US: During this time, handicapped and elderly people will less likely use the buses because of all the people.
3. On average, how many people use the KMB daily?
    a. How many people use the KMB yearly?
4. Why do you let senior citizens and the disabled ride the bus for one dollar on Sundays?
    a. What do you stand to benefit from this?
5. We have noticed that there are a variety of buses in your fleet; some old and some new. What are your plans in terms of upgrading all of your buses?
    a. What is the timeline for completion until all buses are up to date?
6. What do you consider to be a disabled passenger?
7. Why did you decide to add handicap accessible improvements to your buses when it is not required by law to have these features?
    a. Is there a cost benefit to having these features?
8. How many disabled/wheelchair/elderly passengers use KMB?
9. Do you know how frequently the ramp is used on the bus?
10. Have you noticed an increase in the number of wheelchair users?
11. Currently there does not appear to be any indication of bus numbers in brail for the blind. Do you plan on implementing anything to help the blind access the bus system?
    a. One idea we thought of was to add brail to the bus stops. Do you think this is feasible? What would you suggest?
    b. We have heard of the implementation of a visually impaired person carrying a remote that sets off an indication of what bus has arrived when it comes in contact with a sensor on the bus. Other than this, what types of ideas have you come up with to deal with this problem?
12. Does every bus route have at least one bus that has a handicap accessible?
13. The land used for bus stops, how is this acquired? Does the government give you the land for a fee, or is it free?
14. What problems have you run into with coming up with solutions to helping the disabled's transportation, i.e. do you get sufficient monetary support from the government?
15. What do you feel the KMB system lacks that other bus companies in the area and around the world may do better?
16. What kind of feedback have you gotten from your customers?
    - What methods do you set in place to make sure you get appropriate feedback from the elderly and disabled?

KMB INTERVIEW TRANSCRIPT

On January 21, 2005, we interviewed Kowloon Motor Bus Company (KMB). Our group consisted of Stephen Bergeron, Gary Hamilton, Rhyland Klein, Sabrina Wong, Simon Ng (our Liaison), and Chuck and Yan (HKPU students).

Before the interview began, Brian Cheung (Manager, Media Relations, Corporate Communications Department) took us around for a tour of KMB's bus depot and gave us some information about the depot as well. The depot stores about 1000 buses and approximately 600 returns everyday. In order to keep the bus clean and looking presentable, every bus goes through the exterior wash daily and interior wash weekly. There is also a monthly inspection of the vehicles along with a yearly inspection including of any repairs that needs to be done. We also found out that the newer bus models are 15%-20% more expensive than older fleets. Through the improvements, they are trying to encourage more wheelchair users to use the buses. By the end of 2004, KMB consisted of 4150 buses in their fleet and 1651 of the buses are wheelchair accessible.

After the tour of their depot, the interview first started with an introduction of two top engineers of KMB who included Ir Kane Y.H. Sham (Principal Engineer, Bus Engineering) and So Hing (Henry) Shun (Assistant Principal Engineer, Operations). The interview began with a brief introduction of our project and why KMB is of an interest to us. KMB then presented us with a brief PowerPoint presentation including some statistical data on their buses and features they have implemented into their bus systems. KMB's goal is to aim to be the best public bus operator in the world. They try to set trends and standards to the buses through their improvements to the buses, improving the ease of transportation for the elderly and disabled. The majority of their buses are double-decker buses and approximately 6% is still single-decker buses, but they are also handicapped accessible. Some new features included low floor bus technology, straight staircase design, wider doors for extra clearance, wider seats, priority seating for the elderly, textured guiding handrails, doors with controlled censors, public address system, push stops, and new wheelchair space with safety features such as safety belts.

After the presentation, there was a Question and Answer session. One of our questions was regarding a problem that the Transport Department also had and could not solve was regarding the buses and the visually impaired not knowing which bus is coming. KMB also did not have an answer to this and they are still trying to find a solution using GPS. KMB attends various group meetings including the disabled and elderly organizations so they get a better feeling of what the public wants to see improved in their bus fleets.

After the Question and Answer session, the KMB representatives took us out to take some pictures of the buses for our project. They were very helpful with their information provided to us. They offered their help and time and said that if we needed more information, we could contact Brian and they would be happy to help.

APPENDIX N – HONG KONG TRANSPORTATION SYSTEM NUMERICAL

Number of Journeys Passengers made on the Following Forms of Transportation

Buses								
Year	KMB	City Bus 1	City Bus 2	New World First Bus	China Motor Bus	Long Win Bus	New Lantao Bus	Sub Total
1992	969737	0	957	0	262430	0	3989	1237113
1993	965849	0	22203	0	235665	0	4106	1227823
1994	976670	0	67703	0	196803	0	6502	1247678
1995	995997	0	87504	0	190973	0	5377	1279851
1996	1031889	0	119686	0	179212	0	5270	1336057
1997	1051102	144508	3242	0	176449	2883	5923	1384107
1998	1034351	171919	11376	46958	104920	14364	6208	1390096
1999	1060011	190700	12309	160371	0	16901	5449	1445741
2000	1089176	199856	13454	186521	0	17251	5507	1511765
2001	1111171	201725	14754	194489	0	18999	6827	1547965
2002	1134354	204445	15930	195450	0	20311	8960	1579450

Railways						
Year	MTR Local Line	MTR AEL	KCRC East Rail	KCRC Light Rail	Tramways	Sub Total
1992	751005	0	199905	92273	124087	1167270
1993	778509	0	208863	106555	125205	1219132
1994	804062	0	222290	116980	124636	1267968
1995	812519	0	233804	122651	112963	1281937
1996	816572	0	248331	125124	107816	1297843
1997	811897	0	262024	126185	101908	1302014
1998	793602	3928	269443	114474	92893	1274340
1999	779309	10396	276248	114712	87864	1268529
2000	767416	10349	289337	118104	86106	1271312
2001	758421	9022	292703	116610	87439	1264195
2002	777210	8457	296437	114465	87123	1283692

* Data in Thousands

Number of Journeys Passengers made on the Following Forms of Transportation

Public Light Buses			
Year	PLB GMB	PLB RMB	Sub Total
1992	259888	371905	631793
1993	266753	367311	634064
1994	290524	358174	648698
1995	308644	328141	636785
1996	332592	314722	647314
1997	353839	226835	580674
1998	362204	217345	579549
1999	371234	207607	578841
2000	386333	201662	587995
2001	402241	194254	596495
2002	414453	185092	599545

Ferries					
Year	New World First Ferry	Star Ferry	Licensed Ferry Services	HK & Yaumati Ferry	Sub Total
1992	0	35546	8369	44368	88283
1993	0	35723	8922	41135	85780
1994	0	36161	9539	40169	85869
1995	0	34950	9246	36916	81112
1996	0	35225	8885	34213	78323
1997	0	32477	9113	29990	71580
1998	0	30025	9959	22756	62740
1999	0	28679	13374	15195	57248
2000	13619	28579	13407	535	56140
2001	14534	28462	12436	0	55432
2002	14885	28677	11428	0	54990

* Data in Thousands

Number of Journeys Passengers made on the Following Forms of Transportation

	Taxis	Residents' Services	KCRC Light Rail	Peak Tramways	
Year	Taxi	RS	Transit Feeder Bus	PT	Sub Total
1992	463595	25832	33933	3267	526627
1993	464950	31345	32005	3416	531716
1994	465370	32779	34718	3982	536849
1995	472041	34416	35960	3985	546402
1996	473213	38790	38074	4401	554478
1997	472342	40741	39251	4246	556580
1998	475805	40019	37872	3321	557017
1999	476849	41845	22031	3277	544002
2000	478325	48194	15510	3476	545505
2001	476892	56000	20106	3504	556502
2002	476906	58897	25535	3714	565052

Number of Journeys Passengers made on the Following Forms of Transportation

		Total Calculated	Total From Book	Daily Average
Grand Total	42605858	3651086	3651383	10003
Other		3698515	3698515	10133
		3787062	3787063	10376
		3826087	3826086	10482
		3914015	3914015	10723
		3894955	3894953	10671
		3863742	3863740	10586
		3894361	3894359	10669
		3972717	3972720	10884
		4020589	4020588	11015
		4082729	4082665	11186

* Data in Thousands

APPENDIX O – HONG KONG TRANSPORTATION SYSTEM GRAPHICAL

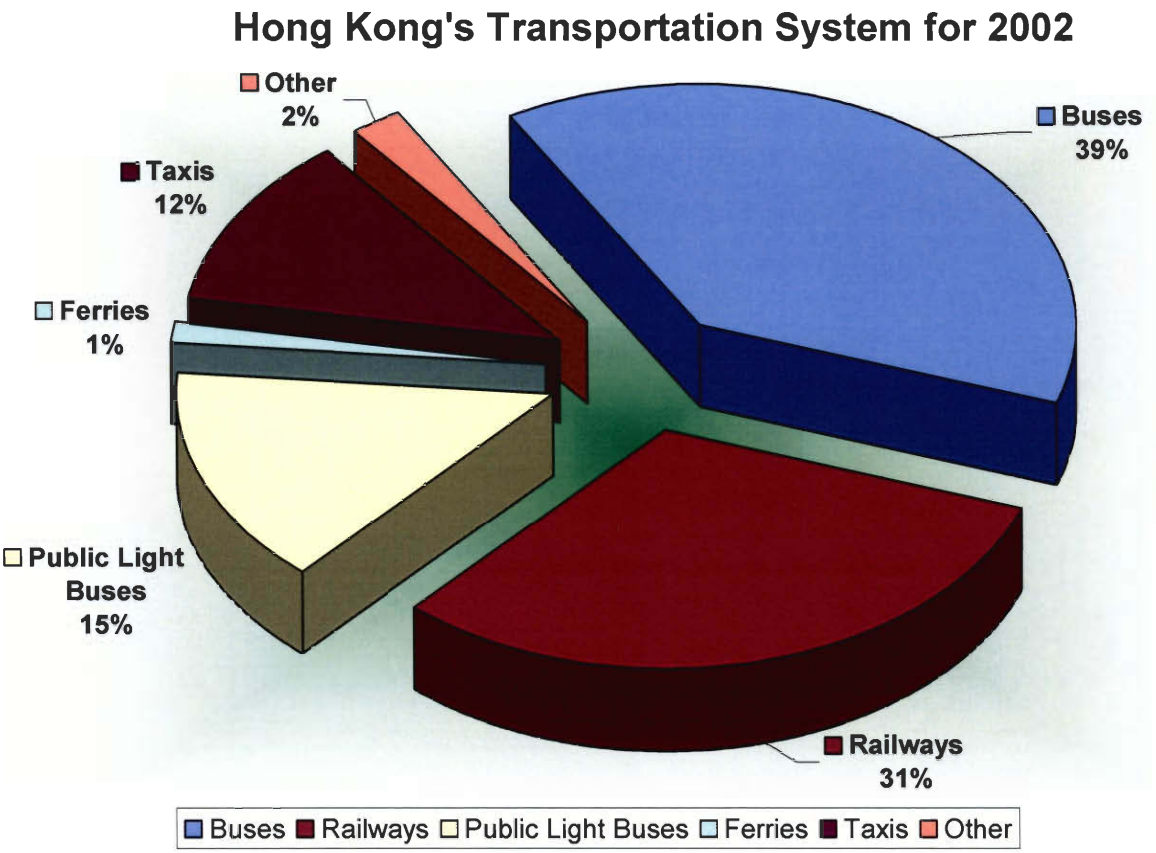

Figure 5.12: Hong Kong's Transportation System for Year 2002

From our meetings with the Transport Department we had gathered enough information to construct pie charts of all of Hong Kong's major public transportation. Figure 5.12 shows only the main modes of public transport. For a numerical listing of the data represented in Figure 5.12, refer to Appendix N – Hong Kong Transportation System Numerical. Within each category of transportation there are numerous subdivisions; for example, within the buses category, there are 7 different bus companies. The number of one way journeys made by passengers is what is represented as a percentage of the total number of journeys made in a year. As shown by the data in Figure 5.12, double decker buses made up a slim majority of the total transportation use in Hong Kong as of 2002. Railways including the MTR made up 31% of the transportation use in Hong Kong. Taxis only made up 12%, and that number is decreasing when compared to total transportation.

From Figure 5.12 it is easy to see what forms of transportation are most critical to citizens. This is important when considering what modes of transportation to upgrade to be more handicap accessible first. Buses and railways are a critical form of transportation and should be among the first things to be made handicap accessible. This is not to say that all other forms should be ignored. Public light buses, taxis, ferries and all other forms of transportation should be upgraded as well, but in the short run, buses and railways should be dealt with firstly.

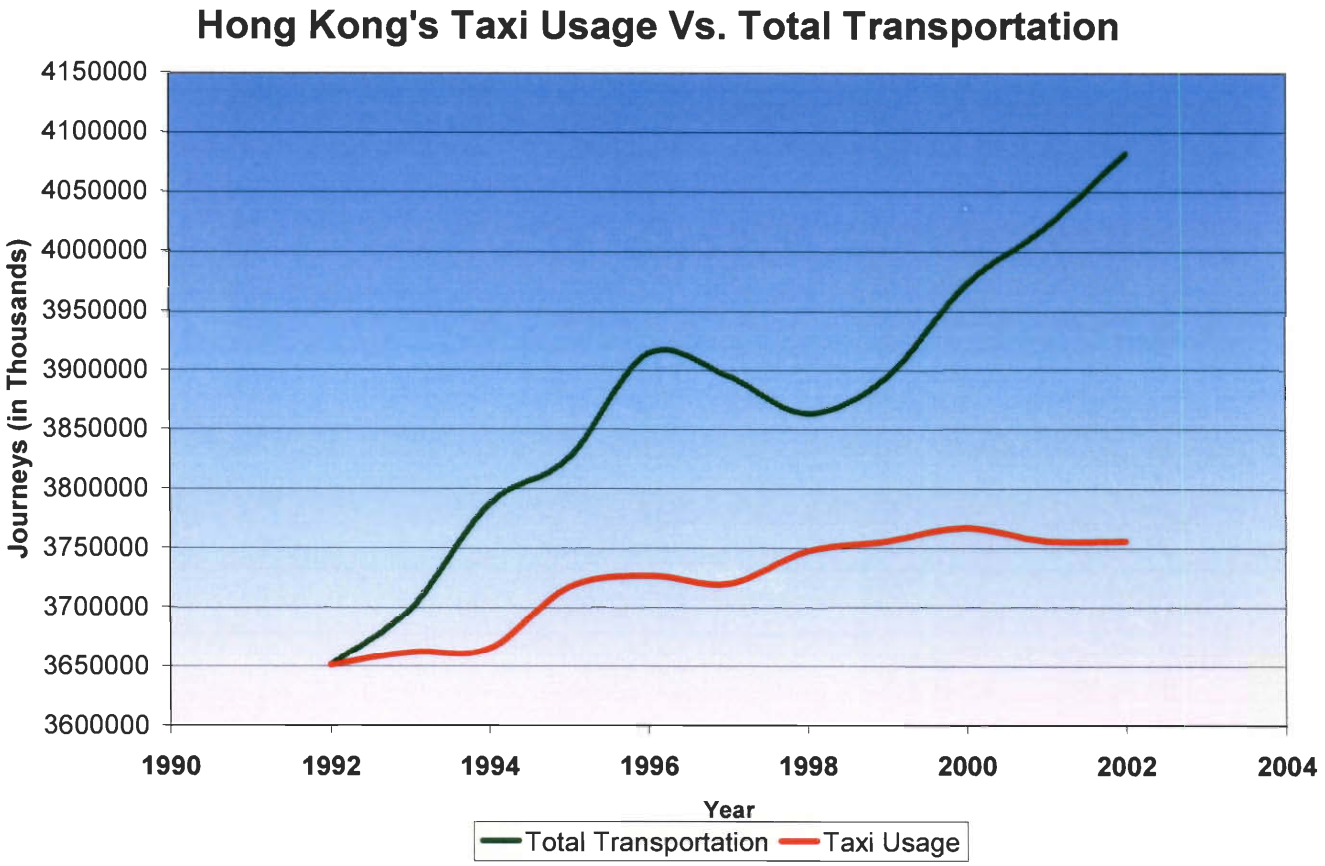

Figure 5.13: Usage of Taxis Compared to Total Transportation Usage

To more clearly illustrate the rate at which taxi usage had been changing we manipulated the data so that the "Taxi Usage" line would appear closer to the "Total Transportation" line. A reference of the original data can be found in Appendix N – Hong Kong Transportation System Numerical. As represented in Figure 5.13, the number of journeys made by taxis has been leveling out while the total number of journeys has been increasing. This is happening for a number reasons. As total transportation increases, so does the volume of transport. Taxis are very inefficient; and for the area that they take up on the roads, they do not carry nearly as many passengers as buses do. A bus may take up three times the road space of a taxi, but can provide transport for nearly 10 times as many passengers as the three taxis. The government has recognized this problem, and to prevent further growth of the taxi transport market, they have put an artificial ceiling on the number of taxi licenses issued per year.

Through our interviews with elderly and disabled people in Hong Kong we have found that taxis are very expensive. For the general public that has a continuous source of income, taxis are somewhat practical, but are not extremely efficient for the transportation system as a whole.

As of 2002, taxis made up 12% of Hong Kong's total transport. As shown in Figure 5.12, taxis were a significant portion of the transportation system. It is expected that as total road transportation increases, taxi transportation will slowly decrease as a percent of the whole. This will be because of governmental influences due to the inefficiencies of taxis. However quaint, convenient, and personal taxis may be, they are not economical for Hong Kong's growing transportation system. They may never be completely phased out, but certainly their market will be decreased through government regulations.

It is likely that more efficient modes of road transportation will replace taxis. Bus companies will surely take the place of whatever portion of the transportation market is lost.

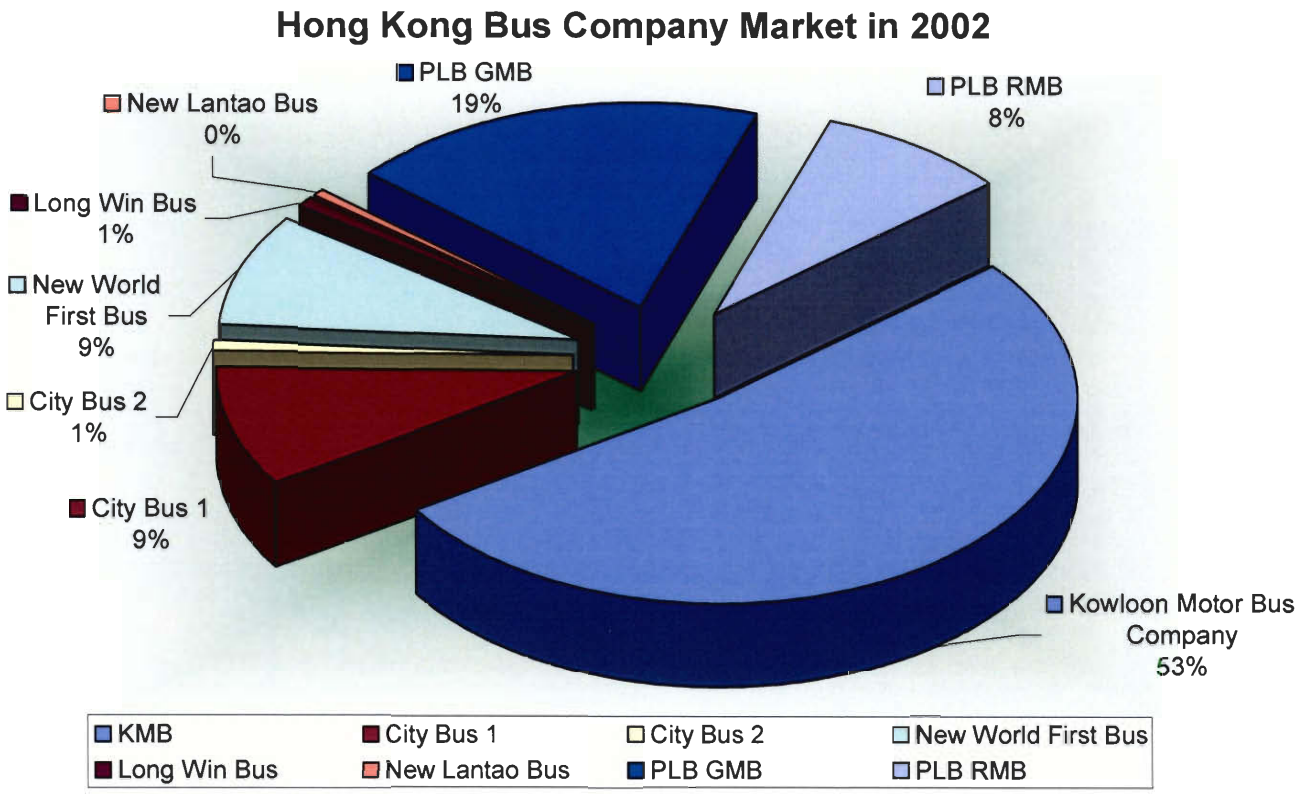

Figure 5.14: Hong Kong's Bus Company Market

Making up approximately 53% of Hong Kong's bus market, KMB in Figure 5.14 is one of the world's largest bus companies. With over 6,000 buses in their fleet, KMB made up nearly 28% of the total transportation in Hong Kong for the year 2002. The Public Light Bus GMB (PLB GMB) makes up 19% of the bus market. This was still a small fraction of the actual transportation market shown in Figure 5.12.

Due to KMB's shear size and the limited distribution market of double decker buses, any change that KMB makes to its fleet ultimately effects the production of buses nearly world wide. When KMB changed the model of their buses to meet and go above the government standard, they forced nearly all other bus companies to upgrade to their standard. For a listing of the improvements that KMB made to their buses please refer to Appendix D – Kowloon Motor Bus Features. These improvements were great for the elderly and disabled, but many problems still existed when dealing with buses.

Problems and Possible Solutions with Buses:

- How are the blind supposed to know what bus is arriving at a bus stop?
  - Possible Solution- Equipping elderly and disabled with a personal blue-tooth device that signals to the user a bus number when a bus comes in to range of them.
- In the older fleet of KMB, there is a space for a wheelchair, but no ramp for users to access.
  - Possible Solution- Upgrade fleet of buses to newer, low riding/dropped axle, kneeling buses equipped with ramps
- Some of the bus stops are not equipped with ramps. Passengers in wheelchairs cannot leave the sidewalk that they have been dropped off on because of insufficient gradation in the curb.

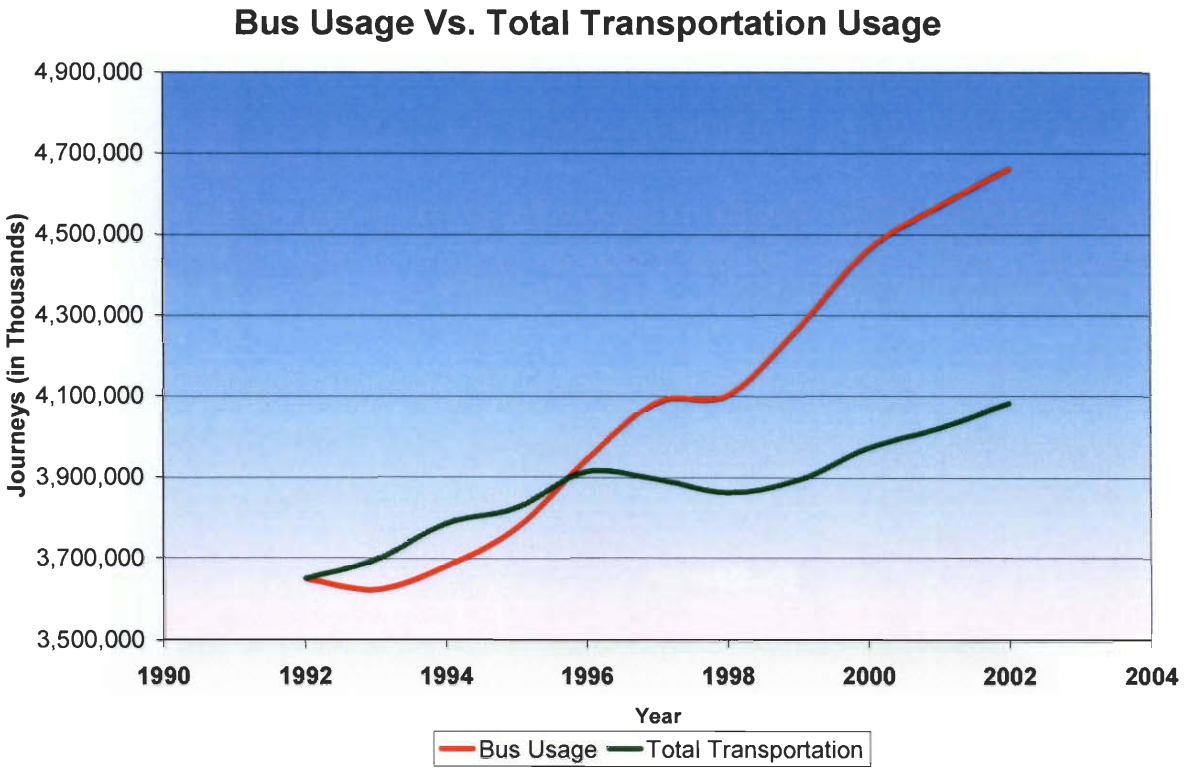

Figure 5.15: Usage of Buses is Changing as a percent of Total Transportation

In Figure 5.15, to more clearly illustrate the rate at which bus usage was changing we manipulated the data so that the "Bus Usage" line would appear closer to the "Total Transportation" line. This made it obvious that total transportation was increasing, but that bus usage was increasing at a much higher rate. There are several factors contributing to the increase usage of buses. A few reasons are:

- The ceiling cap placed on the taxi market leading to reduced competition for road space.
- Bus companies not being taxed for the type of fuel they are using, thus being able to decrease bus fares.
- An upgrade of the physical bus that is more convenient for all passengers. This upgrade was started in 1992, but was implemented in 1996.

The data in Figure 5.12, Figure 5.13, Figure 5.14 and Figure 5.15 is important because it shows just how vitally important buses are to Hong Kong's Transportation System. Making suggestions to improve buses will ultimately help both elderly and disabled. Making suggestions to improve taxis will ultimately help, but in the short run is not a cost effective means of reaching the most people. We are not concerned about the MTR because it has been addressed by a previous WPI report entitled "TRANSPORTATION FOR THE ELDERLY AND DISABLED, An Interactive Qualifying Project Report."

APPENDIX P – KMB WHEELCHAIR USAGE STATISTICS

Number of Kowloon Motor Bus Wheelchair Passengers

Year	January	February	March	April	May	June	July	August	September	October	November	December		Total
1996	0	0	0	0	0	6	7	34	22	30	30	22		**151**
1997	14	6	13	13	7	10	30	6	13	27	66	54		**259**
1998	62	37	58	47	44	38	46	22	82	85	279	341		**1141**
1999	352	310	342	487	407	430	462	615	652	669	657	805		**6188**
2000	729	731	871	936	955	892	1079	1081	1152	1270	1165	1249		**12110**
2001	1279	1165	1362	1445	1525	1499	1435	1709	1616	1911	1630	1890		**18466**
2002	1862	1698	2068	2069	2003	2091	2039	2108	1973	2458	2471	3038		**25878**
2003	2353	2462	2347	1663	1947	1997	2323	2530	2320	2462	2587	2985		**27976**
2004	2716	2608	3003	3195	3603	3383	3237	3773	3811	4258	4507	4796		**42890**

Largest Increase in Wheelchair Ridership

Grand Total 135059

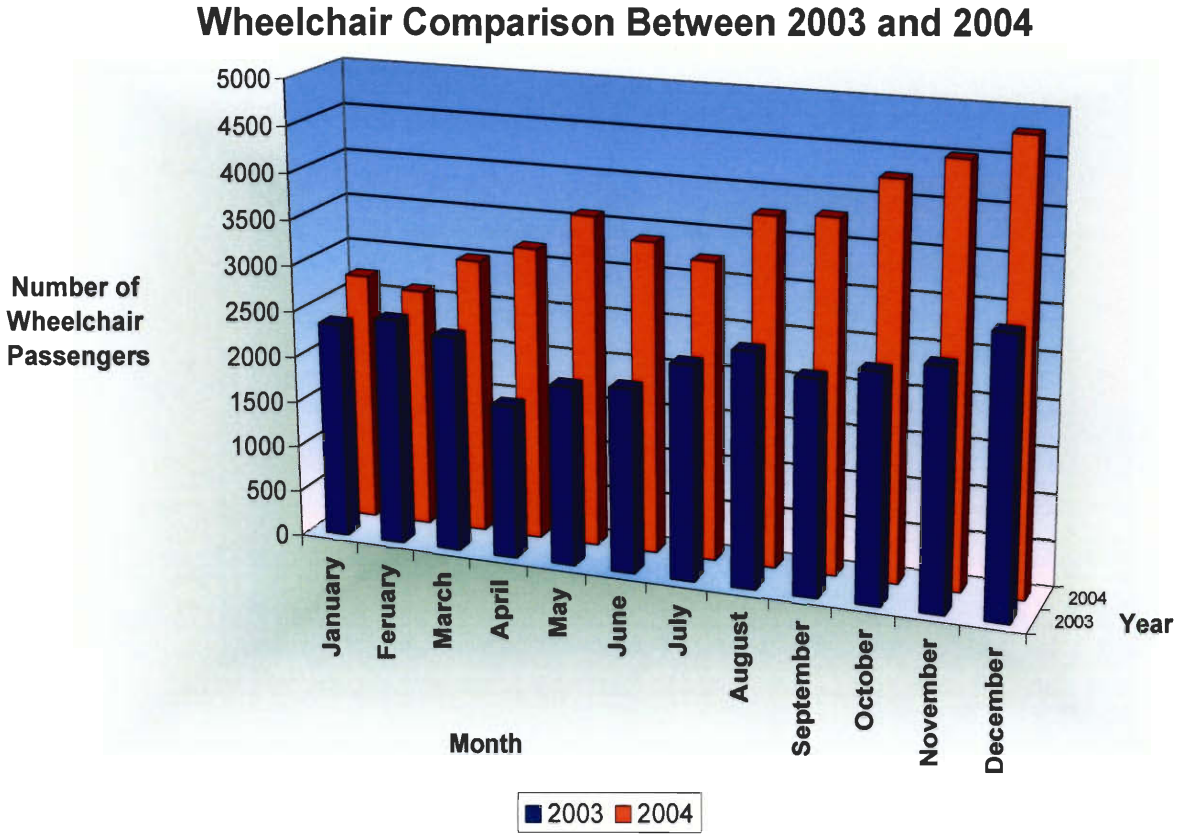

Figure 5.16: Comparison of Wheelchair usage from year 2003 to 2004

Between year 2003 and 2004 the number of wheelchair users that rode the KMB nearly doubled. This trend started in April of 2004 and probably continued to increase even more after December 2004. Figure 5.16 shows the dramatic increase in the wheelchair usage between these two years. Be careful to note that the data represented shows the number of wheelchair bound passengers who have ridden a KMB bus, and is not the summation of multiple rides per user.

APPENDIX Q – THE HONG KONG SOCIETY FOR REHABILITATION INTERVIEW

THE HONG KONG SOCIETY FOR REHABILITATION INTERVIEW QUESTIONNAIRE PROTOCOL

Date of Interviews 2/4/05
Location of Interview: The Hong Kong Society for Rehabilitation, 6/F, 7 Sha Wan Drive, Pokfulam
Event Attended: Scheduled Meeting

REHABUS QUESTIONS

1. How many disabled passengers schedule for Rehabus pick up service?
2. How many passengers ride on the scheduled Rehabus route?
3. What is the nature of the disability of the majority of your passengers?
4. What is the average age of most of Rehabus passengers?
5. How large is your transportation fleet?
6. Is your entire fleet equipped to handle every type of disability?
7. We have noticed that passengers of public transportation seem to almost look down upon/discriminate against wheelchair passengers and people with disabilities. What do you think can be done to help prevent this?

GENERAL SOCIETY OF REHABILITATION QUESTIONS

1. What is the disability that you deal with the most?
2. What do you do in terms of educating the public about people with disabilities?
3. How difficult do disabled people find it to get around Hong Kong?
    a. What problems do they run into?
4. What services do you offer to help aid them in their transportation?
5. What is the most difficult disability to have in Hong Kong and why?
6. What are some of the main complaints about pedestrian walkways, taxis and buses that disabled people have about their accessibility or convenience?
7. Physical Disabilities make up 32-38% of all registered disabilities in Hong Kong, what are some sub-categories of Physically Disabled?
    a. Wheelchair Bound
    b. Crutches Bound
    c. Broken arm etc…

THE HONG KONG SOCIETY FOR REHABILITATION INTERVIEW MINUTES

Date of Interviews 2/4/05
Location of Interview: The Hong Kong Society for Rehabilitation, 6/F, 7 Sha Wan Drive, Pokfulam
Event Attended: Scheduled Meeting

The Hong Kong Society for Rehabilitation is located 6/F, 7 Sha Wan Drive, Pokfulam, Hong Kong. We went there for an interview with Ursula Kay Kar-yan and Rex Luk Chi-keung on February

4th, 2005. The meeting started off with a brief introduction of our project and the reason for us interviewing them. After we finish, Rex and Ursula gave us an introduction of The Rehabilitation Society. The PowerPoint Presentation consisted of some statistics about the Rehabus; the amount of vehicles, number of passengers in a year, how many are wheelchair users, etc. The majority of them are wheelchair users. There is currently about 87 buses and they are 12 seated for wheelchairs . The buses abide by the ISO standards on wheelchairs. The power lifters on the buses are fitted for 300kg. The rehabus limits public buses because it brings you from a point to point service. There is a monthly fee for the services. It is not quite expensive if it is used on a regular basis.

Their only mission is to focus only on disabled transport. For the organization, disabled consists of diseased, aged, and the mentally ill. They try to target groups that have mobility difficulties.

After they finished with their presentation to us, we were going to have a question and answering session but they were on a tight schedule and they wanted to give a look around the rehabus. A set of questions were already sent to Ursula and Rex. They said that they would e-mail us back with answers to our questions.

Afterwards, Ursula and Rex brought us downstairs for some pictures and a look around the rehabus. They were also kind enough to let us borrow a wheelchair for future observations around Hong Kong. After we are done with the observations, we will return the wheelchair back to the Society of Rehabilitation.

APPENDIX R – TRANSPORT DEPARTMENT'S QUESTIONNAIRE RESULTS

Disabled Questionnaire Statistics for 2004

Responses Profile

Age Group	Male	Female
0-3	0	0
4--5	0	0
6--11	0	0
12--14	0	0
15	0	0
16-17	0	0
18-20	2	4
21-24	0	0
25-29	0	0
30-34	0	0
35-39	0	0
40-44	38	23
45-49	0	0
50-54	0	0
55-59	0	0
60-64	76	78
65-69	0	0
70-74	0	0
75-79	12	9
≧80	1	0
Unknown		
Sub Total	**129**	**114**

Wheelchair Experience

Years	People
0--2	38
3--5	62
6--9	81
≧10	198
Sub Total	**379**

Wheelchair Types

Mode	People
Transit	58
Self-Propelled	186
Powered	130
Other	4
Sub Total	**378**

Purpose of Trips (Past 3 Months)

Reason for Journey	Journeys
School	23
Work	37
Continuing Education	41
Follow-Ups	257
Social	310
Others	49
Sub Total	**717**

	Question
	Greatest Value for Disability
	Smallest Value for Disability
	Subtotal
	Grand Total

Disabled Questionnaire Statistics for 2004

Transport Mode (Past 3 Months)

Transportation Type	Journeys
Car	98
Taxi	167
Bus	226
Rehabus	283
Easy Bus	82
NEATS	111
OAH	69
MTR	170
KCR	139
LTR	63
Others	21
Subtotal	**1429**

Dependence Level

Form	Public	Private
Independent	84	23
Assisted	65	22
Dependent	153	21
Sub Total	**302**	**66**

Satisfaction Level

Satifaction	People
Very Satisfied	27
Satisfied	17
Neutral	79
Unsatisfied	101
Very Unsatisfied	144
Sub Total	**368**

Accessibility Affecting Transport

Satisfaction	People
Great Impact	172
Some Impact	127
Neutral	27
Little Impact	45
No Impact	12
Sub Total	**383**

	Question
	Greatest Value for Disability
	Smallest Value for Disability
	Subtotal
	Grand Total

In April 2004, the Hong Kong Transport Department designed a questionnaire to study how wheelchair bound persons felt about the transportation system. The questionnaire was revised and distributed to 6 organizations in May 2004. The questionnaires were returned between June and July of 2004. The data collected was analyzed quantitative and qualitatively. Table 5.1 is a brief summary of what types of questions the Transport Department asked.

Table 5.1: Transport Department Questionnaire Outline

Question No.	Questionnaire Design	Contents
1-4	Personal data	Gender, age, years of experience in using wheelchair, type of wheelchair used
5-23	Travel habits in the past 3 months	Frequencies, purpose of trips, mode of transport, level of independence
24-26	Safety issues	Perceived safety, availability of safety devices, experience of accidents
27-28	Satisfaction on public transport services	Satisfaction level, impact of public transport services on participation in the society
29	Personal comments	Open-ended questions

A total of 1,295 forms were distributed to the members of 6 organizations. These organizations were:

- Hong Kong Federation of Handicapped Youth
- Rehabilitation Alliance Hong Kong
- Hong Kong Nero-muscular Disease Association
- Paraplegic and Quadriplegic Association
- Direction Association for the Handicapped
- Hong Kong Rehabilitation Power

Out of the 1,295 questionnaires, 408 of them were returned and out of that, 385 questionnaires were analyzed. The overall response rate was 31.5%. From these questions and the resulting data provided by the Transport Department, we were able to assemble all of the following graphs in this section.

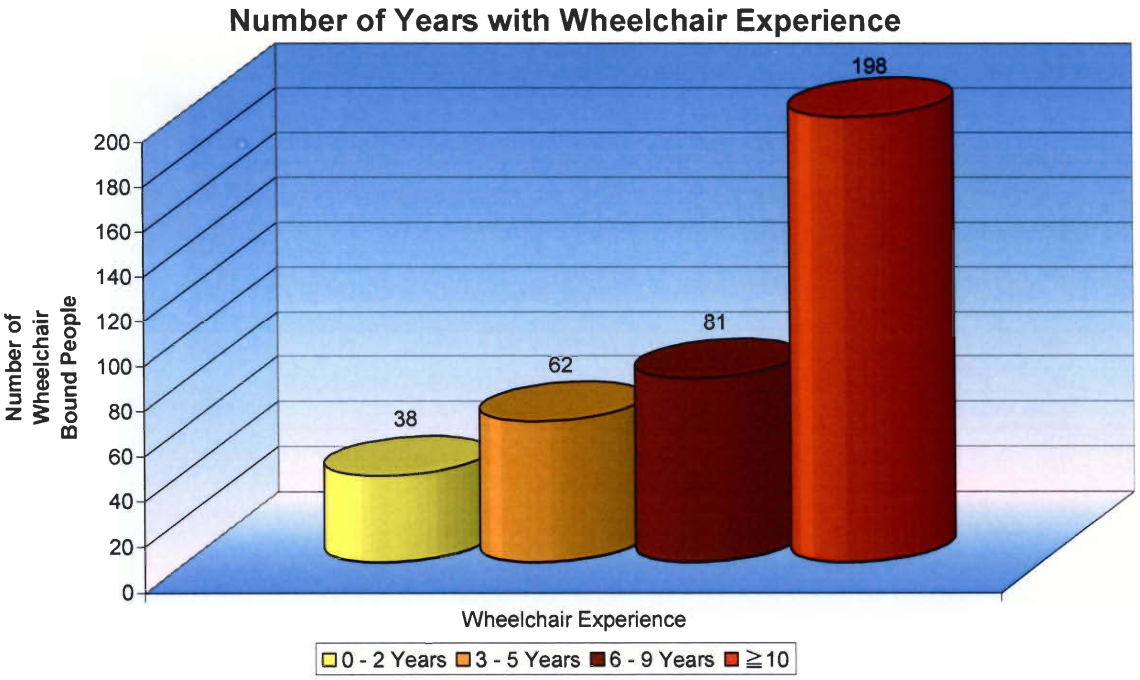

Figure 5.17: Number of Years with Wheelchair Experience

Figure 5.17 shows how many people have a certain range of wheelchair experience. This data was collected from the Transport Department's 2004 survey. This data showed that the majority of people who have been in a wheelchair have been this way for most of their life. Out of the people who participated in the survey, 198 of them had significant experience with using a wheelchair. This shows that the survey was distributed to a population that has had to deal with being disabled in the Hong Kong Transportation System for quite a while. Therefore, the collected data should reflect the opinions of experienced wheelchair users.

We placed the comments made by wheelchair bound people in higher regard because their comments would not only help out the 36% physically disabled population but will also invariably help out some of growing 11% elderly population of Hong Kong.

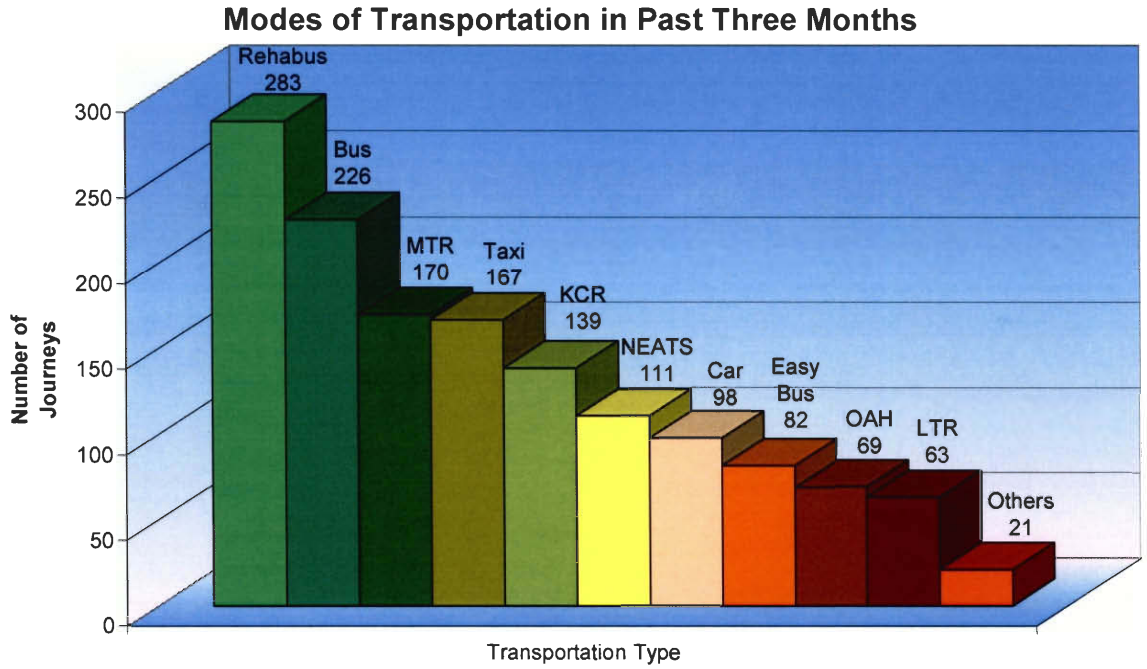

Figure 5.18: Common Modes of Transportation used in the Past Three Months

Represented in Figure 5.18 is the form of transportation used most by wheelchair bound passengers in the last three months. Rehabus and public buses are the most convenient forms of transportation for the elderly and some disabled. Rehabus only has a fleet of 87 mini-buses but is still utilized more frequently than KMB's fleet of 6,000 buses. For wheelchair users, Rehabus was very popular and very well accessorized to suit their needs. Surprisingly Taxis are just as well used as the MTR. Although most of the people we have interviewed stated that Taxis were too expensive, they still provide a quick solution to traveling from point to point when a Rehabus is not available.

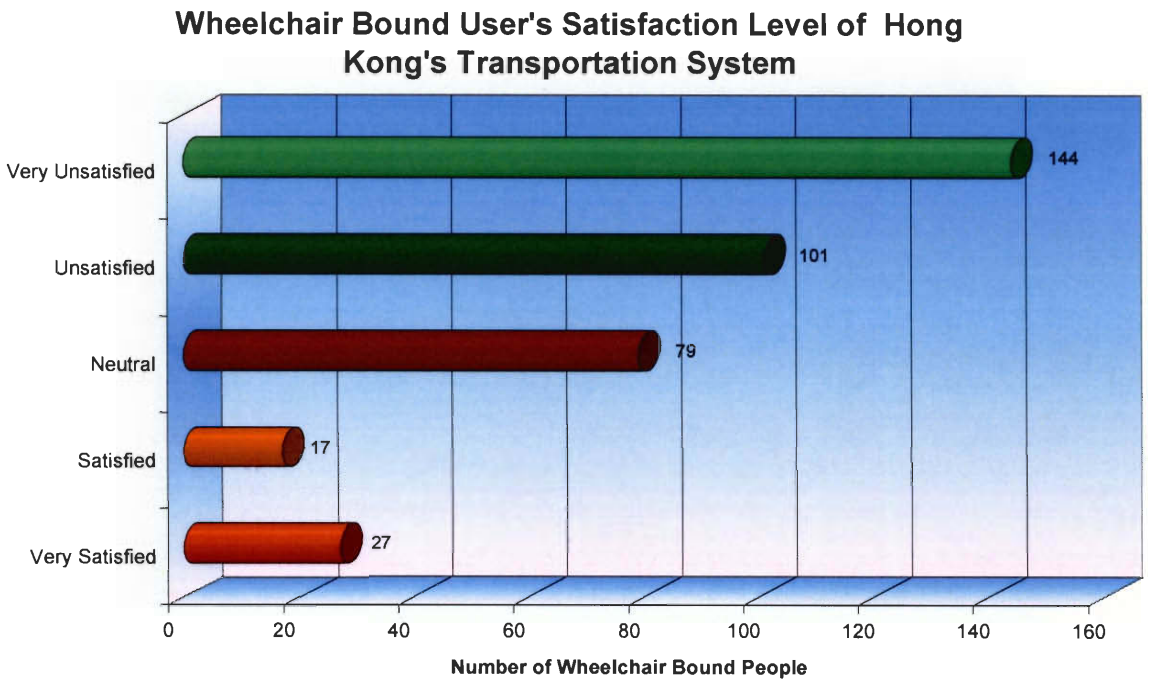

Figure 5.19: Satisfaction Level with Current Transportation in Hong Kong

For the most part, the majority of wheelchair bound users were very unsatisfied with the transportation system in Hong Kong. Having a disability that requires the use of a wheelchair and being blind are the two most difficult disabilities to have in Hong Kong. Accessorizing the transportation system to accommodate these two disabilities is underway, but as represented in the Figure 5.19, it has just begun to improve and there is much room for further development.

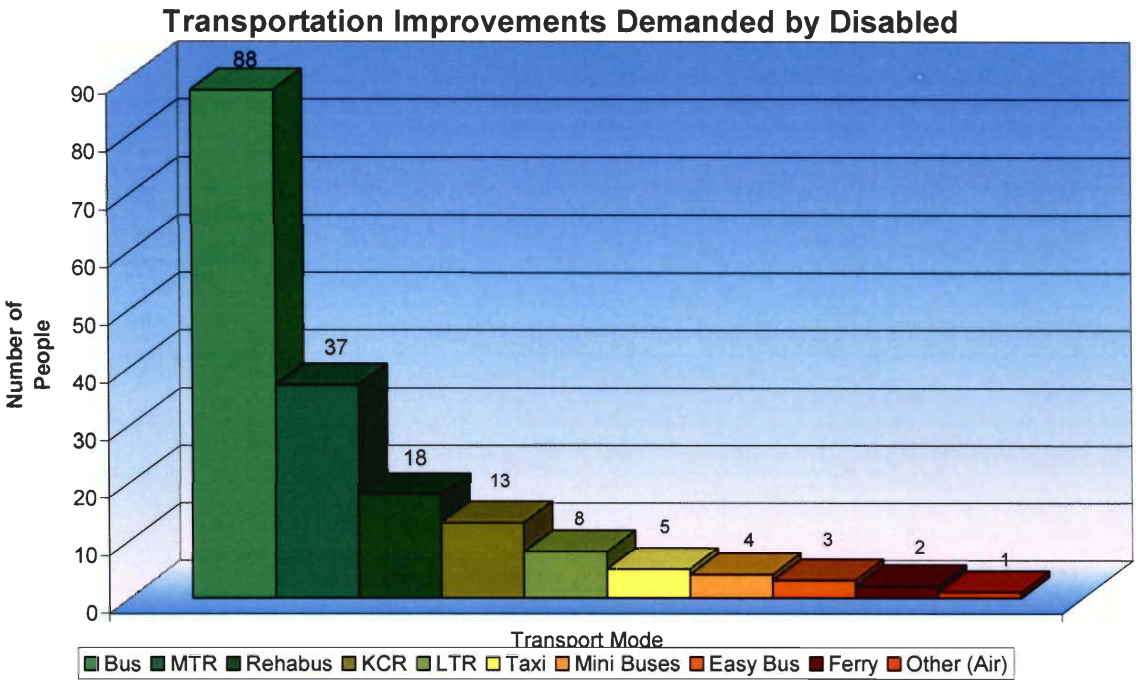

Figure 5.20: Forms of Transportation that Wheelchair Bound Passengers need Improved

Figure 5.20 shows the demand for improvement of the listed forms of transportation. As shown, buses the MTR and Rehabus needed improvements the most. Because these three modes of transportation were used the most by the disabled they were inherently the three that the disabled would like to see improved upon. Rehabus is very well accessorized to handle nearly every type of disability and we were shocked to see that they needed improvement. Upon further

investigation and interviewing we found that they needed improvement not in the functionality of their buses, but on the size of their fleet. They only have 87 buses, and the most common complaint was to see the size of their fleet increased to handle the demand. Annually, Rehabus's fleet increases by 3-7 buses, but this is no nearly enough to accommodate the 58,000 physically disabled in Hong Kong.

APPENDIX S – VISUAL OBSERVATIONS

We also made some observations on some of the older KMB buses and see a lot that has changed. These buses are made some somewhat accessible, but because they get replaced with new accessible buses, complete renovation is not done, so these buses are still on the road and are not fully accessible. These are our observations.

- Entrance to bus and main aisle need to be widened to accommodate wheelchairs

Figure 5.21: Older Bus Kowloon Motor Bus

- Aisles are too narrow for elderly; makes it hard to travel around in the bus
- Wheelchair bound people cannot get on bus
- No sectioned off area for the placement of a wheelchair
- Disabled people cannot get to the upper level of the double-decker bus
- Steps used to alight the vehicle are too high up from one another for the elderly
- The bus driver continued on route before elderly passengers could find a seat

Figure 5.22: Signage for Elderly and Disabled Seating

- Some seats raised on a platform; hard for elderly and disabled to get into the seat
- Stairs to second level narrow and small, hard for elderly and disabled to climb
- Non-disabled and non-elderly people use lower level, forcing the elderly and disabled upstairs
- Steps used to get on and off the bus are too large and far apart. This distance makes it hard for elderly and disabled to get off the bus.

We made several important observations concerning the walkways in Hong Kong, focusing on Yau Ma Tei and Hong Kong Central areas. They, in general, are pretty narrow for

the number of people who travel them, some corners need graduations for wheelchair users as well as the following observations:

- Difficult for pedestrians to cross main streets because of barriers in the road
- Low number of crosswalks causing pedestrians to travel further to cross subways (underground tunnels) would be very effective.

Figure 5.23: Wheelchair Bound Pedestrian Crossing Yau Ma Tei Crosswalk

- Figure 5.23 is a photo of a wheelchair bound pedestrian crossing Yau Ma Tei crosswalk.
- Main crosswalk contained gradations and brail floor pad for the blind.
- Visual and audible counters are present at major intersections to help all pedestrians with or without disabilities but not all side streets, see Figure 5.24.

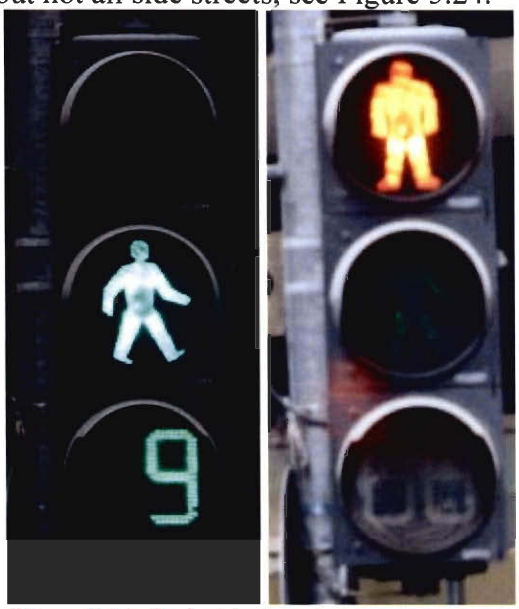

Figure 5.24: Pedestrian Cross Walk Signal

- Audible and visual signals are good for people with hearing and visual impairments.
- Hong Kong Transport Department was going around to major intersections with a visually impaired person to help them modify the volume for cross walk signals.
- Sidewalks cluttered with street furniture such as sign poles, trash cans and construction barriers are not pedestrian friendly.

We noticed that even if the transportation were perfect and the walkways were well equipped so a disabled person could get from point A to point B, that does not mean that when

they get to point B, they will be able to get into it. The entranceways in Hong Kong also need some work. Here are some of our observations:

- Some buildings have ramps but not all entrances are fully equipped with ramps
- Most entrances from sidewalks to shops and businesses require one or more steps to get into them

Figure 5.25: Stairs Equipped with Appropriate Ramp Ways

- Equipped with stairs and ramps for entrances and exit in a manner that is efficient and effective. Address: 1 Connaught Place – Jardine House (see Figure 5.25)

Figure 5.26: Wheelchair Stair Lift

- To overcome the few steps needed to get into a facility, some owners have equipped their stairs with wheelchair lifts (see Figure 5.26).
- This wheelchair lift was a great idea, but it needed a phone number for help or a buzzer button to get someone to assist them.

The most important data we collected were the views of the disabled and elderly people who use public transportation. They were vital to our project because we need to know what the people who we are concerned with have to actually deal with. Concerns were raised by them that we had not originally thought of and that the transportation operators had not brought up either. Along with their comments and the comments of the transportation operators and the research

they have done, we feel we have strong base of information that we can draw conclusions from. These conclusions will then make clear the reasons the recommendations that we make.