IMPROVED SAFETY SURFACE ACCESS AT LOW COST AIRPORTS: KUALA LUMPUR INTERNATIONAL AIRPORT, MALAYSIA CASE STUDY

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Abstract

The purpose of this Paper is to evaluate the importance of airport access pedestrian safety based on the specific experiences, supported by an extensive survey, of passengers at Kuala Lumpur International Airport (Malaysia) Low Cost Airport Terminal (KLIA LCT). The survey will allow a ranking and prioritisation to be made, supported by the selected safety preferences of business and leisure passengers, of the most important pedestrian facilities that should be provided for future airport surface access development. To allow a meaningful interpretation of the survey results, the ANOVA (Analyses of Variance) Test to compare the mean of variances or differences between the factors was used to evaluate the relative safety importance of different pedestrian access facilities according to the varying viewpoints of low cost passengers. It is hoped that the results of this Paper will useful both as theoretical guidelines and also as an example of best practise for airport planners who are engaged in the design of safety airport access pedestrian facilities.

Keywords: *LCT, Pedestrian, facilities, safety, planners and airport designs*

1 Introduction

Pedestrian defines as people who walk, sit, stand, or use a wheelchair in public spaces. The examples of pedestrian are children, teens, adults, elderly, and people with disabilities. In addition, pedestrian facilities could be identified as walkways such as sidewalks, walking and hiking trails, shared-use paths, pedestrian grade separations, crosswalks, and other improvements provided for the benefit of pedestrian travel (FHWA in Kar, 2009). Even though to have a proper or better pedestrian facilities is been an important aspect, the safety of pedestrian much more important in the transportation field (Sisiopiku and Akin, 2003).

Based on Malaysia scenario, the Malaysian authorities (i.e. MIROS, MOT and Royal Malaysian Police) are responsible to provide funds, system, planners, installing, retrofitting sidewalks, and other tools in order to ensure people who walk receive adequate facilities for their comfort and safety. The Malaysian authorities are aggressively promoted the safety campaign and awareness at Malaysia (i.e. safety education and speeding limit). However, based on MIROS statistics in 2009, pedestrian fatalities by mode of transport has contributes 589 cases or 9% of total road accidents and the highest rate of accident are in Johor which contributed 1,060 cases.

The preferred facilities of pedestrians area in Malaysia is highly recommended as the country is developed with high volume of vehicles on the road daily. Based on Malaysia experiences, the transport system was rapidly developed especially in land transport along with developing

of highway system, increasing of car users, type of vehicles, diversity of driver's age, and road technology. The airport planner should taking consideration the differences of user levels which include normal, disabilities, children and group of age. Sisiopiku and Akin (2003) stated that the airport planners and traffic engineers should consider the importance of pedestrian preferences and perceptions when designing efficient and pedestrian friendly facilities. In addition, initiative should be taken to promote pedestrian travel (e.g. appropriate pedestrian facilities) which offers potential users an assured level of convenience, efficiency, comfort, and security for successful applications.

2 Research Methodology

The theoretical framework has been established in view of the relationship of current and future provision of pedestrian facilities. It represents the process within the development of the methodology and the concept of basic pedestrian facilities provision. The development of the conceptual framework has also considered the roles of participants, users' expectations, time, strategic processes and adaptation of the research structures into a research context. The discussion about the success factors of the proposed methodology is necessary in order to achieve the aims and objectives of the research. The primary source of data consisted of feedback from 180 respondents of pedestrian users. A questionnaire was developing to collect and support research frameworks were completed by them to determine their viewpoints on the provision of pedestrian facilities to be included in pedestrian design. The survey was conducted at Kuala Lumpur International Airport, Malaysia. The results were processed by SPSS (Statistical Package for Social Sciences) and the data was coded, counted and presented. Quantitative data was used in order to evaluate the relationship of the current, future and business and leisure travelers' expectation and pedestrian facilities.

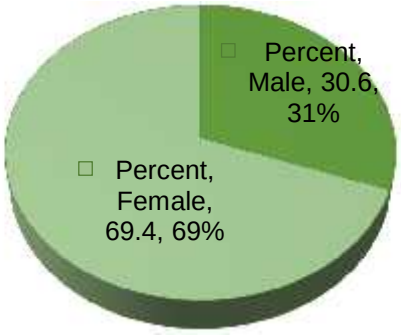
The ANOVA (Analyses of Variance) Test to compare the mean of variances or differences between the factors was continued to measure the provision of pedestrian facilities linked to user' current provision of pedestrian facilities and ideal facilities as a result of the importance of users' needs and safety, and a significant relationship between the importance of future provision of pedestrian facilities.

3 Discussion

3.1 Demographic background

Figure 1 shows the proportion of respondents by two gender groups: Male and female. In the survey, 30.6% (55) out of 180 of respondents is male and 69.4% (125) is female. The survey was randomly distributed among the users and showed that the highest response rates are from female walkers, which indicated that they have their own purpose and preference to travel along the pedestrian walkway.

Figure 1: Proportion of pedestrian users by gender



3.2 Perception of pedestrians on the usage of pedestrian facilities

Table 1 shows the differences in significant values for purpose of travel (business and leisure) in pedestrian users' preferences for pedestrian facilities in pedestrian pathway, in significant order: Lighting (0.012), hump (0.016), air conditioning (0.019), bollard (0.024), and disabled facilities (0.025). Therefore, the hypothesis alternative is accepted as these facilities have been highly significance to the business and leisure users. Table 1 also shows that specific pedestrian facilities are rated as not being significance to the purpose of travel, as shown by high ρ values (0.05), by both business and leisure pedestrian users [for example, children facilities (0.882), median (0.546), internal use of plants and trees (0.453), information board (0.306), and bicycle lane (0.093).

Table 1: Perception of pedestrian users on the usage of pedestrian facilities

Pedestrian Facilities	F Value	Significant Value (ρ)
Air Conditioning	3.045	.019
Bicycle Lane	2.022	.093
Bollard	2.893	.024
Children Facilities	.293	.882
Disabled Facilities	2.864	.025
Hump	3.133	.016
Internal Use of Plants and Trees	.922	.453
Information Board	1.208	.309
Lighting	3.328	.012
Median	.771	.546
Advertising Board	1.655	.163
Pavement	3.869	.005
Physically Separated Walkway	3.132	.016

Public Phone	.277	.893
The View of Outside	1.829	.125
Seating Availability	1.374	.245
Self-service Vending Machine	3.862	.005
Spatially Separated Walkway	3.970	.004
Speed Breaker	.266	.900
Stroller Ramp	.774	.543
Way Finding	2.286	.062
Zebra Crossing	1.064	.376
CCTV	1.297	.273

The differences in significant values for purpose of travel in pedestrian users' preferences for pedestrian facilities in pedestrian pathway, has shown in significant order: Spatially separated walkway (0.004), pavement (0.005), self-service vending machine (0.005), and physically separated walkway (0.016). Specific pedestrian facilities are rated as not being significant to the purpose of travel, as shown by higher ρ values (0.05), by both business and leisure pedestrian users [for example, speed breaker (0.900), stroller ramp (0.543), zebra crossing (0.376), CCTV (0.273), seating availability (0.245), the view of outside (0.125), advertising board (0.163), public telephone (0.093), and way finding (0.062).

The significant test values (ρ) representing the ranking of pedestrian facilities by purpose of travel; business and leisure. The Table 1 also shows the statistical significant test of the pedestrian users' type of travel at 5% sensitivity level. There is strong significance between the rankings of the pedestrian facilities, regardless of the purpose of travel. From the Table 1, all facilities are significant to the type of travel, as important as an ideal pedestrian facilities; bollard (0.024), hump (0.016), pavement (0.005), physical separated walkway (0.016), and spatial separated walkway (0.004). These pedestrian facilities are needed and applied to the safety of pedestrian users. However, although, median (0.546), speed breaker (0.900), and stroller ramp (0.543) not significant to the purpose of travels, users were strongly agreed these facilities are more important.

3.3 Perception of pedestrians on the comfort levels of pedestrian facilities

Table 2 shows the differences in significant values for purpose of travel on the comfort levels in pedestrian users' preferences for pedestrian facilities in pedestrian pathway. By ANOVA test to compare with ρ values, it is more significant to walk on the pathway less than 5 minutes (0.024). Walking with bags to 1.8sq.m space is more significant for only one person (0.044) compare to two persons (0.057) and more than 2 persons (0.187). While without bags to 1.4sg.m is comfort to walk for more than 2 persons (0.035). For elderly or disabled person, facilities such separated pathway especially for them was highly important as significant by 0.003. From analysis also shows there is significant to reduce in access to natural environment (0.026) such as restriction to step on grass (as spatially separated walkway) or to access to trees (physically separated walkway). More likely, CCTV or security booth nearest to pedestrian pathway is compulsory as analysis is significant by 0.016 to increase the safety aspect.

Table 2 : Perception of pedestrian users on the comfort levels of pedestrian facilities

Pedestrian Facilities	F Value	Significant Value (ρ)
Walking Distance Less Than 5 mins	2.893	.024
Walking Distance 5-10 mins	.771	.546
Walking Distance More Than 10 mins	1.374	.245
Standing Space With Bags to 1.8 sqm for 1 person	2.508	.044
Standing Space With Bags to 1.8 sqm for 2 persons	2.335	.057
Standing Space With Bags to 1.8 sqm for more than 2 persons	1.582	.181
Standing Space Without Bags to 1.4 sqm for 1 person	1.103	.357
Standing Space Without Bags to 1.4 sqm for 2 persons	1.265	.286
Standing Space Without Bags to 1.4 sqm for more than 2 persons	2.655	.035
Separated Queuing Lines Between Users With Family/Elderly/Disable People	4.194	.003
Separated Queuing Lines Between Users Without Family/Elderly/Disable People	1.057	.380
Reduced in Access to Natural Environment	2.830	.026
Increased of Safety Concern	3.132	.016

4 Conclusion

The research shows the negative responses of pedestrian users which many pedestrian facilities has been designed are not provided. Examples include pedestrian facilities where access to destinations is difficult, and strip development along high-speed roads where no sidewalks or pedestrian crossings exist. When streets and roads are evaluated for improvements, it is helpful to consider whether the design effectively meets all the desired functions of the roadway. This may help proactively identify locations for pedestrian safety improvements in the process of improving safety and mobility in the airport area.

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