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Comparison Study of Cycling in Tampines New Town

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Abstract - This study was designed to evaluate the impact of the cycling infrastructure implementation in Tampines New Town. Cycling being a form of non-motorised transport (NMT) can be introduced to mitigate issues like traffic congestion and air pollution. This study ran for years during 2009 and 2013. Gender, race and approximate age of the participants were categorised during the observation. Data were collected during peak hours from 5.30pm to 7.30pm on weekdays for each selected location which covered the residential area and the public transit station. Since the number of road users decreased during heavy rainy days, there were no data collections on those days. A total of 202 road users were selected randomly for a perception survey which included both cyclists and pedestrians. The data collected were used to understand the actual ground situation based on respondents’ immediate experience of the upgrading of cycling infrastructure network. Upon completion of the study, the t-test results indicated that increased number of road users felt more comfortable with the road conditions after the establishment of a better environment for both cyclists and pedestrians.

Keywords – Cycle; Infrastructure, Traffic Count; Perception Survey

1 INTRODUCTION

1.1 BACKGROUND

Regarding traffic congestion issues in Singapore, non-motorised transport (NMT) such as cycling can be introduced to the residents to replace the motorised vehicles to overcome the problem as well as to reduce air pollution. Tampines is the first residential town in Singapore with well-developed cycling infrastructure that allows pedestrians and cyclists to share the footways [1]. This has created a new image of Singapore city, as in Singapore cities are well known as crowded cities with limited spaces, but, however, this residential town has been selected to implement the bicycle facilities and infrastructure that emphasises on the NMT especially the usage of bicycles in a tropical country. There have been 2 types of upgrading in the cycling infrastructure- a small-scale upgrading followed by an area-wide upgrading.

1.2 OBJECTIVES

The main objective of this research is to investigate how area-wide upgrading of NMT infrastructure has impacted on walking and cycling activities on the footways. Besides, the attitudes of residents towards the improvement of cycling network were also studied.

1.3 SCOPE

This study comprises two parts namely, Part 1: Road user count (to measure walking and cycling activities) and Part 2: Perception survey (to understand road user behaviour).

2 LITERATURE REVIEW

Tampines had been declared as Singapore’s first cycling town since 2010 [2], and much improvements have been done such as widened footways and clearly-marked cyclists’ and pedestrians’ paths. This encourages more residents to cycle to and from school or work, or for leisure trips to nearby shops or parks. Besides, safety issues are the main barrier from having shared pathways. Therefore, by-laws are introduced to haul up errant cyclists [3]. This study is to investigate the effectiveness of these upgrading and safety measures on affecting the number of users in 2011 and 2013, as well as to understand road user behaviour from the perception survey.

3 METHODOLOGY

3.1 DATA COLLECTION

3.1.1 Road User Count

Since the research is to investigate how the area-wide upgrading affects the number of walking and cycling activities on the footways, Tampines was chosen as the site for such measurements. First of all, pedestrians and cyclists were counted by observers in 2009, which was right after the small-scale upgrading of the some segments. Then, a second round of data collection was done in 2013, which was after the announcement of comprehensive cycling network completion in Tampines (see Figure 1). Both cyclists and pedestrians were counted (both at cyclist paths and footways) by directions, before and after the widening and separation of cyclist paths and footways. Data were collected during evening peak hours (5.30pm to 7.30pm) on
weekdays for each location which covers the residential area and the public transit station. Data collections were cancelled during rainy days as the number of road users would greatly decline. Besides, type of segments, which consists of normal sidewalk, widened sidewalk, demarcated footway and segregated footway were recorded on each of the segments.

2009
2013
Small-Scale Upgrading (17 segments) Data Collection
Area-Wide Upgrading (23 segments) Data Collection

Figure 1 Timeline of the Segments’ Upgrading and Data Collection

3.1.2 Perception Survey
Furthermore, perception surveys were carried out on 200 road users including cyclists and pedestrians regardless of gender, age and type of cyclist in order to understand the actual ground situation based on respondents’ immediate experience of the upgrading of cycling infrastructure network.

3.2 DATA EXTRACTION & ANALYSIS
The data collected were entered into GIS-based programme for subsequent data analysis. Microsoft Excel was used to perform a series of statistical tests to identify the difference of the traffic flow before and after the improvement in cycling infrastructure. Besides, graphs and charts were constructed to illustrate the demographic and other factors that affect the traffic volume.

4 RESULTS & DISCUSSIONS
4.1 ROAD USER COUNTS
Counting was made on a total of 90 footways and traffic light crossings in Tampines town. The number of cyclists and pedestrians (to and from) MRT station on both cyclists’ and pedestrians’ paths were noted. The width of each cyclist and pedestrian path was measured to calculate the traffic flow (number of pedestrians/cyclists per hour per metre width) of each segment. The type of each segment was also identified to find out the relationship between the change in number of road users and the type of segment. T-test was then carried out on the counts and the results (see Table 1) show that the 17 segments in the small scale upgrading experienced significant increase on cyclist count between 2009 and 2013 (at 95% confidence level), while the rest of the segments show insignificant difference (see Tables 2 and 3).

Table 1 T-test results for segments first improved in small-scale upgrading (17 Segments)

<table>
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<tr>
<th>Cyclist Count / Hour</th>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>Mean</td>
<td>30.35</td>
<td>43.06</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>25.50</td>
<td>33.89</td>
</tr>
<tr>
<td>t-test</td>
<td></td>
<td>Significant Difference</td>
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Table 2 T-test results for segments then improved in area-wide upgrading (23 Segments)

<table>
<thead>
<tr>
<th>Cyclist Count / Hour</th>
<th>Before</th>
<th>After</th>
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<tbody>
<tr>
<td>Mean</td>
<td>42.78</td>
<td>50.35</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>26.11</td>
<td>35.58</td>
</tr>
<tr>
<td>t-test</td>
<td></td>
<td>Insignificant Difference</td>
</tr>
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Table 3 T-test results for the rest segments with no improvement (50 Segments)

<table>
<thead>
<tr>
<th>Cyclist Count / Hour</th>
<th>Before</th>
<th>After</th>
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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>31.24</td>
<td>25.86</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>24.12</td>
<td>25.66</td>
</tr>
<tr>
<td>t-test</td>
<td></td>
<td>Insignificant Difference</td>
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Analysing pedestrian and cyclist counts separately (see Figure 2), 71% of the 17 segments showed that cyclist counts had remained the same or increased; whereas only 53% of the same segments showed same/increase in pedestrian count. This suggests that area-wide upgrading has some effects on stretches improved during the small-scale upgrading (increase in cyclist number).

Figure 2 Before and after pedestrian and cyclist counts
On the other hand, there is no or little change of number of cyclist on the segments which does not have improvement. Figure 3 shows the segments with the change of the cyclist count in Tampines new town.
4.2 PERCEPTION SURVEY

A total of 202 non-motorised transport (NMT) users, including 101 pedestrians and 101 cyclists, were interviewed in the perception survey. About 89% of them were staying in Tampines and 53% of them owned at least one bicycle in their households. The numbers of male and female interviewed were about the same. 2% of the respondents were children (age 0-14 years), 81% were adults (age 15-49), 12% were pre-elderly (age 50-64) while 5% were elderly (age 65 and above). Figure 4 shows the demographic spread of the sampled respondents.

On the other hand, among the 101 cyclists, 52% of them did not change their cycling behaviour and 27% of them agreed that they would like to cycle more after the upgrading whereas the remaining minority would like to cycle less, start cycling regularly, not start cycling regularly but same, not start cycling regularly but planned to become regular cyclists and not intend to become regular cyclists at all. The observation that more than a quarter of the cyclists would like to cycle more signifies that they appreciate the improvement of the infrastructure and hence this indicates success of the comprehensive network of Tampines cycling town.

Moreover, the survey identified residents’ attitudes on the area-wide upgrading. About one in three (35%) felt being proud that Tampines is the first cycling town, 36% of them felt pleased but suggested more cycling facilities, 4% of them were not happy that Tampines is a cycling town while 25% of them had no comments. Regarding the cycling facilities, most of the respondents would like the town to have more public education about the safety issues especially the cyclists. Obviously, the small-scale upgrading did promote cycling activities in Tampines new town yet the bylaw as implemented has not yet achieved its original intention which is to put emphasis on safety measures for the benefit of residents’ wellbeing.

From 84 respondents who did not intend to become regular cyclists, they were 35 males and 49 females.
Two respondents were children (age 0-14 years), 71 were adults (age 15-49), 6 were pre-elderly (age 50-64) while 5 were elderly (age 65 and above). In addition, these respondents consisted of 1 Chinese, 2 Indians, 3 Philippines, 8 Permanent Residents and 70 Singaporeans.

5 CONCLUSIONS

After the area-wide upgrading, cycling activities on segments first improved in small-scale upgrading has increased significantly.

Majority of the respondents are happy with status of Tampines being a cycling town but half of them think that Tampines should set up more cycling facilities as well as educate road users about the safety issues of sharing footpaths.

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REFERENCES

