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Abstract: Transit oriented development (TOD) has been promoted as a concept to promote green city development, which is able to reduce carbon emission and improve environmental quality. However, based on the perception of residents, it was found that the mass rapid transit (MRT) development causes negative impacts to the surrounding environment. The trains caused noise pollution and vibration. Furthermore, the MRT also created higher traffic volume and caused congestion at the transit station. The increased traffic has led to higher air pollution. To conclude, the MRT design should be reviewed for the purpose of reducing traffic congestion in the transit station. Otherwise, the purpose of TOD to reduce traffic volume and air pollution will not be achieved.

Keywords: Noise, pollution, traffic congestion, transit.


INTRODUCTION

One of the rail systems being used for transporting passengers in urban areas is the Mass Rapid Transit (MRT) system. Its main characteristic is the ability to carry large numbers of people efficiently and forms the backbone of a city’s public transportation network. Public transportation is a measure to reduce carbon emission and protect environmental quality, especially in the cities. However, the construction and operation of MRT might have an impact on the surrounding physical environment, such as air pollution, water pollution, vibration, and traffic congestion. Based on the literature review, physical environmental impacts of railway development may include land use, hydrology and drainage, ecology, air quality, noise level, vibration, traffic congestion, safety, surface water quality, and groundwater quality (KS Consultants Ltd and EQMS Consulting Limited, 2017; Mayer, et al., 2012; Plakhotnik, et al., 2005). For the purpose of this study, physical environmental impacts from the MRT development were limited to the aspects as shown in Figure 1.
CASE STUDY AND METHODOLOGY

The Sungai Buloh MRT station and the surrounding area were chosen as the case study area. The impact of MRT development on the surrounding physical environment was measured based on the perception of the community. The surrounding residents had observed the whole process of MRT development from the construction stage until the operational stage. Thus, the surrounding residents are suitable to identify the impact of MRT on the physical environment. For that purpose, a questionnaire survey was carried out by choosing 118 residents living within the distance of 500 metres from the Sungai Buloh MRT station, as samples.

The Sungai Buloh MRT station is part of the MRT Sungai Buloh – Kajang line. The construction of the station started around 2012 and has been operating since 16 December 2016. The land uses within the 500 metres distance from Sungai Buloh MRT station were mostly high cost and medium cost housing areas, commercial units, a higher educational institution, and an international school (Figure 2).
ANALYSIS AND DISCUSSION

Based on the result of the questionnaire survey, majority of the respondents felt that there were negative impacts on physical environment i.e. in terms of noise, air pollution, water pollution, traffic congestion, vibration and solid waste generation due to the MRT development (refer to Table 1). For all the aspects except noise, more than 79 percent of respondents felt that there were negative impacts on the physical environment during the construction stage. Only 54 percent felt that there was noise pollution during construction. After the construction works were completed, most of the respondents felt that the negative impacts were reduced for most of the aspects of the physical environment, except for noise pollution. However, in general, more than 59 percent of the respondents still feeling negative environmental impact during the operational stage, i.e. noise pollution, air pollution, traffic congestion and vibration.

Table 1: Respondents’ perception of negative impacts on the physical environment

<table>
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<th>Environmental aspects</th>
<th>Construction stage</th>
<th>Operational stage</th>
<th>Changes</th>
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<tr>
<td>Noise pollution</td>
<td>54.2%</td>
<td>61.7%</td>
<td></td>
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<tr>
<td>Air pollution</td>
<td>85.8%</td>
<td>59.1%</td>
<td></td>
</tr>
<tr>
<td>Water pollution</td>
<td>79.1%</td>
<td>-</td>
<td></td>
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<tr>
<td>Traffic congestion</td>
<td>98.3%</td>
<td>67.5%</td>
<td></td>
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<tr>
<td>Vibration</td>
<td>81.7%</td>
<td>77.5%</td>
<td></td>
</tr>
<tr>
<td>Solid waste</td>
<td>84.2%</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

Based on the perception of nearby residents, MRT development caused negative environmental impacts. The negative impacts were higher during the construction stage as compared to the operational stage. The data also showed that noise pollution has increased during the operational stage as compared to the construction stage. Thus, for the purpose of improving the environmental quality of the surrounding areas to the MRT station, the design and operation of transit i.e. MRT should be improved.

REFERENCES

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