

## Measures to ease crowdedness of train compartments in overseas cities

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*Crowdedness of train compartments during peak periods has been an area of concern for many large cities of the world, including Hong Kong. Yet, Hong Kong has not fully utilized transportation management measures to address the issue.*

*There are three major areas where Hong Kong could draw reference from cities like New York, London, Singapore, Tokyo and Beijing. First is to set out a benchmark to measure the extent of crowdedness. Second is the adoption of off-peak pricing strategy to spread out peak period travel. Third is the use of transport management measures to ease crowdedness during peak periods. This Research Brief gives an account of the transport management measures employed by Singapore to deal with the issue of crowdedness during peak hours.*

*The subject of transport services falls within the policy areas of the Panel on Transport.*

### 1. Background

1.1 Mass Transit Railway ("MTR") is the most popular transport mode in Hong Kong, accounting for about half of the market share of the franchised public transport market. As one of the busiest railway systems in the world, MTR carried 1 431 million passengers in 2012. This ridership figure puts Hong Kong almost on a par with New York (1 655 million) and London (1 229 million), and well above Singapore (688 million) and Berlin (507 million).

1.2 Hong Kong's heavily patronized MTR network comes with the problem of crowdedness<sup>1</sup> in train compartments during peak hours. Faced with the same problem, many large cities have made use of travel demand management (particularly off-peak pricing) and/or transportation supply management (such as increasing train frequencies and deploying longer trains<sup>2</sup>) measures to alleviate crowdedness. Some of these cities have also created a benchmark to measure crowdedness before arriving at any transportation management initiatives to address the crowdedness problem.

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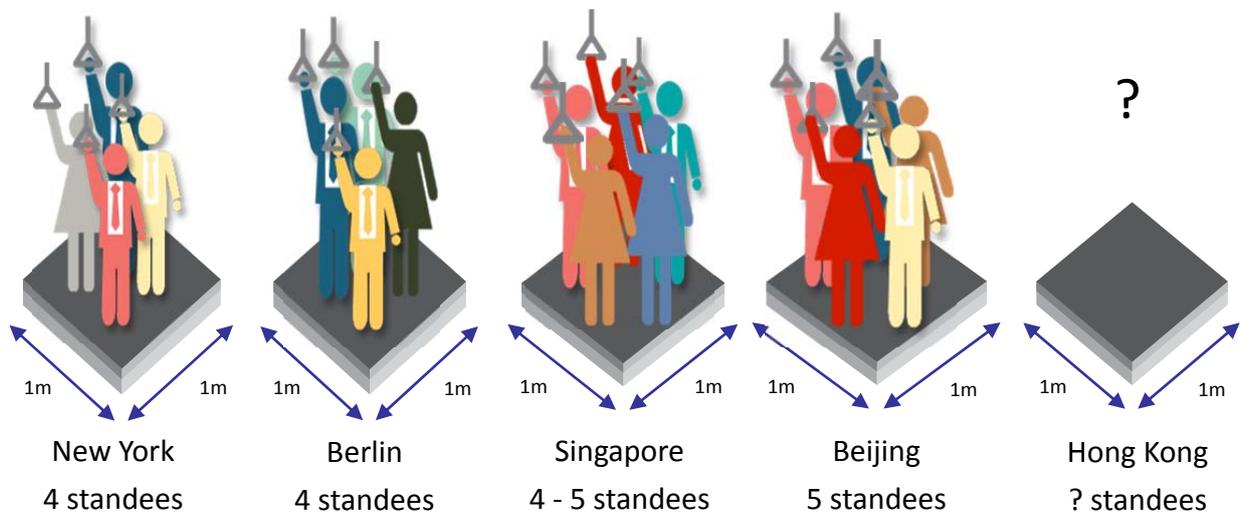
<sup>1</sup> Overcrowding may affect the health and safety of passengers in at least two ways: (a) injury and stress from overcrowding itself, and (b) the possibility of increased risks in the event of an accident.

<sup>2</sup> The length of platform may constraint the feasibility of deploying longer trains to ease crowdedness during peak hours.

## 2. Measuring crowdedness of train compartments

2.1 Cities like New York, Berlin, Singapore and Beijing have set out the number of standees per sq m as the measurement for crowdedness of train compartments. For example, New York considers four standees per sq m as crowdedness while Beijing sets the standard at five standees (see **Figure 1**).

**Figure 1 – Standard for measuring crowdedness of train compartments**



2.2 In contrast, Hong Kong does not have any specific indicator for measuring crowdedness of train compartments. There are calls from the public for the Government and the MTR operator (i.e. the MTR Corporation Limited) to measure crowdedness in order to ascertain the seriousness of the problem and the requirement for relief measures. In response, the Government has advised that the maximum railway carrying capacity per hour per direction is currently 85 000 passenger trips for the Kwun Tong Line, the Tsuen Wan Line and the Island Line of MTR, with the average occupancy rate at almost 70% for both morning and afternoon peak hours.<sup>3</sup>

<sup>3</sup> See GovHK (2013).

### 3. Off-peak pricing

3.1 Demand for train services varies throughout the day, particularly during peak and non-peak hours. As such, many cities have made use of off-peak pricing to shift some of the demand for train services during peak periods to off-peak periods, as an attempt to reduce peak period crowdedness and bring about a more efficient use of rail network capacity. Commuters benefit from off-peak pricing in terms of a more comfortable travel experience and lower fares for using the train services.

3.2 Against the above, cities such as Berlin, Tokyo and London have adopted off-peak pricing approach and put in place different incentive schemes to attract commuters travelling during non-peak hours (see **Table 1**). There has been a lack of similar schemes in Hong Kong since the implementation of "Early Bird Passes" in 1988<sup>4</sup> and "Staggered Hours Discounts" in 1990<sup>5</sup> to relieve crowdedness during peak hours.

**Table 1 – Off-peak pricing measure adopted in Berlin, London and Tokyo**

	Berlin	London	Tokyo
Railway operator	Government department or public corporation		
Discount ticket	10 a.m. monthly pass	Oyster card (a smart card for paying train fares)	Off-peak coupon ticket
Use of the ticket	Mondays to Fridays after 10 a.m., and Saturdays, Sundays and public holidays	Mondays to Fridays (excluding public holidays) from 9:30 a.m. to 3:59 p.m. and after 7 p.m., and Saturdays and Sundays	Mondays to Fridays from 10 a.m. to 4 p.m., and Saturdays, Sundays and public holidays
Rate of discount off the regular fare	About 28%	25% - 40% depending on the number of zones travelled. The more zones the commuters travel, the bigger the discount they can enjoy	About 9%

Sources: Berliner Verkehrsbetriebe (BVG) (2014), Transport for London (2014) and Tokyo Metro (2014).

<sup>4</sup> The early travel discount scheme was implemented between June 1988 and April 1990.

<sup>5</sup> The discounts were introduced in May 1990, but they were withdrawn in June 1999.

3.3 Nevertheless, there is a limit to the effectiveness of off-peak pricing in addressing peak period crowdedness as it hinges on the responsiveness (or the elasticity of demand) of commuters to the lower fares they can enjoy during non-peak hours. The elasticity of demand depends on factors such as:

- (a) percentage of income taken up by transportation costs – the higher the percentage of a commuter's income goes to transportation cost, the greater will be his or her incentive of using the cheaper train services during non-peak hours;
- (b) duration – the longer the fare discount holds, the more will be the time available for the commuters to change their travel habits; and
- (c) size of fare discounts – the bigger the fare discounts, the more willing the commuters will be to take trips during off-peak hours.

#### 4. Singapore: a case study

4.1 Singapore features an integrated approach with employing transportation management measures on both demand and supply sides to address the crowdedness of train compartments during peak hours. The aim of the transportation demand management measures is to encourage commuters to travel during non-peak hours, while the aims of the supply transportation management measures are to provide quality train services and minimize service delays that may cause unnecessary crowdedness.

##### Transportation demand management

4.2 The core programme of Singapore's transportation demand management is the implementation of a one-year travel free trial on the rail network<sup>6</sup> starting from June 2013.<sup>7</sup> Passengers who end their journey before 7:45 a.m. on weekdays (excluding public holidays) at 16 designated subway stations located at the city centre are able to travel **free of charge**. For those who miss the cut-off timing for free travel by a few minutes and exit these stations between 7:45 a.m. and 8:00 a.m., they can still enjoy up to a discount of S\$0.5 (HK\$ 3.1) off their regular train fare. The Singaporean government has earmarked a total of S\$10 million (HK\$62 million) to finance the two rail operators to conduct this one-year trial programme.

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<sup>6</sup> The mass transit railway system in Singapore is operated by two listed companies, namely SMRT Corporation Limited and SBS Transit Limited. The SMRT Corporation Limited is owned by Temasek Holdings, an investment company of the Singaporean government, with a controlling stake of 54% at end-January 2013.

<sup>7</sup> Prior to the implementation of the one-year travel free trial programme, Singapore offered up to S\$0.5 (HK\$3.1) discount for passengers who exited at 14 designated rail stations in the central business district before 7:45 a.m. However, the results were not satisfactory with a mere 3%–4% shift of commuters out of the morning peak hours.

4.3 In an effort to promote the free travel programme, the Singaporean government offers the Incentives for Singapore's Commuters programme ("INSINC programme"). Passengers automatically earn 1 point for every 1 km travelled on the train all day Monday through Friday. The INSINC points can be converted to cash rewards, which will be transferred to the commuter's Cepas card<sup>8</sup> each month. Commuters are rewarded with additional points for travelling during the period preceding or following the peak hours of 7:30 a.m.–8:30 a.m.

4.4 The Singaporean government has also worked with key stakeholders to promote the free travel programme. For example, it has requested the two rail operators to run more trains during the morning pre-peak period in order to cope with the expected increase in ridership. The government also encourages 12 private companies with a total workforce of some 25 000 employees to offer more flexible work and travel arrangements under the "Travel Smart" programme. A management consultant has been appointed by the government to help these companies identify the steps needed so that their employees can change their work commute patterns.<sup>9</sup> Apart from private companies, more than 40 public agencies located near the designated rail stations have introduced flexi-work practices for their 14 000 employees.

4.5 The Singaporean government hopes that the free travel programme plus flexi-work arrangements could divert 10%–15% of morning peak-hour commuter traffic to off-peak periods. According to the preliminary results from the first week of the trial, there was a decrease of about 7% of commuters exiting the 16 designated city stations during the peak period between 8 a.m. and 9 a.m.

### Supply travel management

4.6 While planning to expand the rail network capacity, the Singaporean government has also implemented other measures to improve train services to ease crowdedness of train compartments:

- (a) adding more trains to the rail line, so commuters can have more frequent train arrivals, and less crowding and more comfortable rides;
- (b) upgrading the signalling system to enable trains to run at shorter intervals;

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<sup>8</sup> Cepas Card is an electronic money smart card used in Singapore.

<sup>9</sup> Three of the 12 companies under the "Travel Smart" programme have already put in place flexi-work arrangements such as introducing IT facilities to enable employees to work remotely at home.

- (c) increasing train frequencies during the shoulder peak periods<sup>10</sup> to reduce waiting time;
- (d) tightening the operating performance standards that the train operators must meet in minimizing service delays,<sup>11</sup> and
- (e) enforcing stringent maintenance and service reliability requirements.

## 5. Observations

5.1 In large cities, a heavily patronized railway network usually comes with crowdedness of train compartments during peak hours. Yet Hong Kong has not fully utilized transport management measures to address the peak period crowdedness. The last time Hong Kong implemented off-peak pricing strategy was in 1988-1990 when it introduced "Early Bird Passes" in 1988 and "Staggered Hours Discounts" in 1990 to ease crowdedness during peak hours. From the experience of cities like New York, London, Singapore, Tokyo and Beijing, there are three areas which Hong Kong may draw reference when addressing the problem in crowdedness of train compartments during peak hours, namely:

- (a) measurement of crowdedness – New York, Berlin, Singapore and Beijing have measured crowdedness in terms of the number of standees per sq m. An objective benchmark enables these cities to ascertain the seriousness of crowdedness as well as identify suitable transport management measures to ease the peak period crowdedness;
- (b) off-peak pricing scheme to spread out peak period travel – Berlin, London and Tokyo all make use of financial incentive schemes to ease peak period crowdedness on their rail networks. The mass transit railway companies in these three cities are owned and managed by the government department or public corporation. This affords them to provide fare discounts during non-peak hours without facing the shareholder pressure.

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<sup>10</sup> Shoulder peak is a period precede or follows the peak period.

<sup>11</sup> For instance, financial penalties are imposed if train disruptions lasting more than 30 minutes occur more than once in any four-week period. Excessive occurrences of shorter train delays (i.e. delays of more than five minutes) that cause inconvenience to commuters will also be penalized.

In Singapore, while the mass transit railway system is operated by two listed companies, it has not prohibited the Singaporean government from pushing through an off-peak pricing system by financing the two rail operators to launch the one-year travel free trial scheme during morning pre-peak hours; and

- (c) integrated approach with transport management measures on both demand and supply sides to address peak period crowdedness. Singapore is a showcase example of employing such integrated approach, particularly its focus on demand side measures featuring the introduction of free travel trial scheme and the complementary flexi-work arrangements in both private companies and public agencies.

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