Effects of the Traffic System Management of the Tokyo 2020 Olympic games on the Tokyo Metropolitan Expressways

TOKYO2020における首都高速道路の交通マネジメント効果

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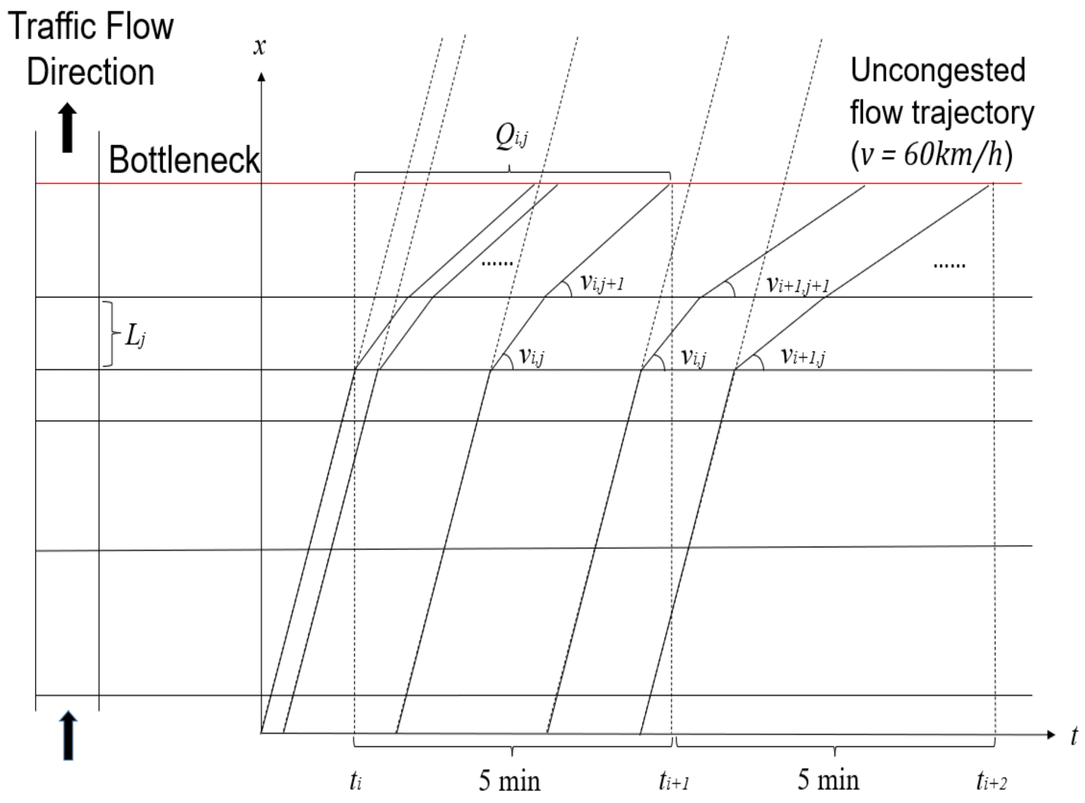
1. Introduction

- Traffic system management (TSM) are the initiatives to maintain smooth traffic flow and alleviate the temporal and spatial concentration of traffic demand according to the road situation.
- Detailed TSM measures on expressways are summarized as follows (Tokyo 2020 Traffic and Transport Technical Consideration Meeting, 2019):
  - Entrance closure according to traffic conditions.
  - Restriction of opened lanes at the main line toll gates.
- Objectives: To evaluate the effects of the TSM implemented at the Tokyo metropolitan expressway during the Tokyo 2020 Olympic games based on vehicle delays and traffic demands.

2. Methodologies: Total delay and traffic demand estimation

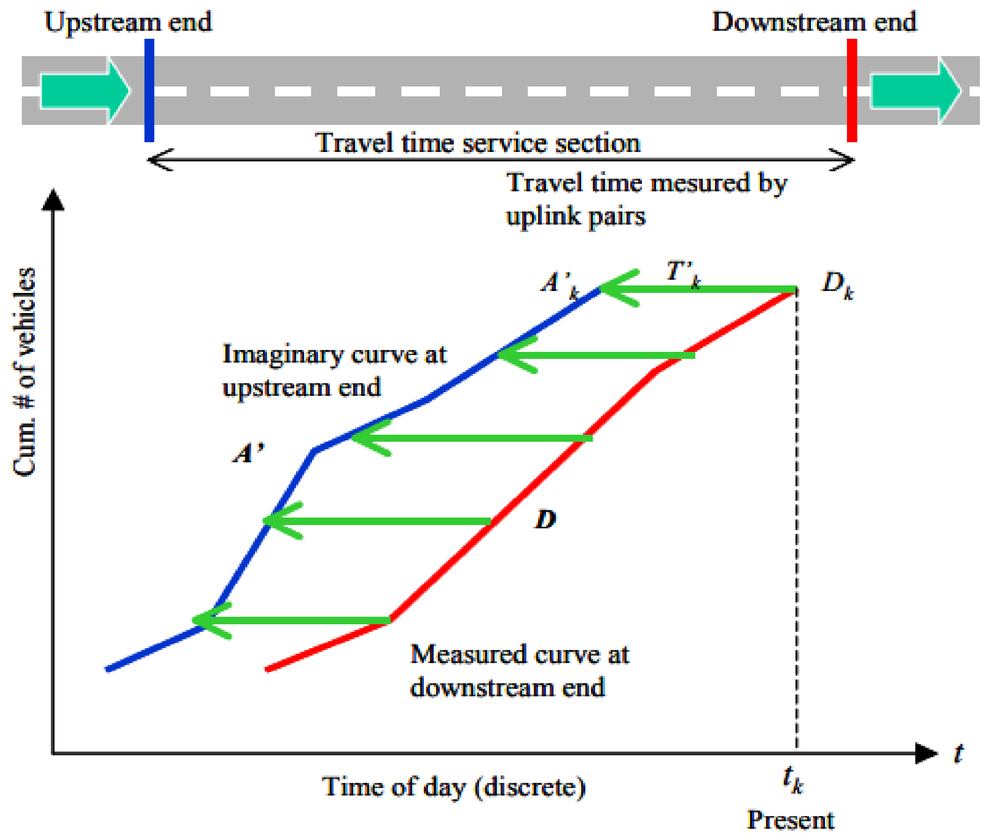


Total delay calculation using time-space diagram

$$Total\ Delay = \max\left(\sum_j \sum_i \left(\frac{L_j}{v_{ij}} - \frac{L_j}{60}\right) \times Q_{ij}, 0\right)$$

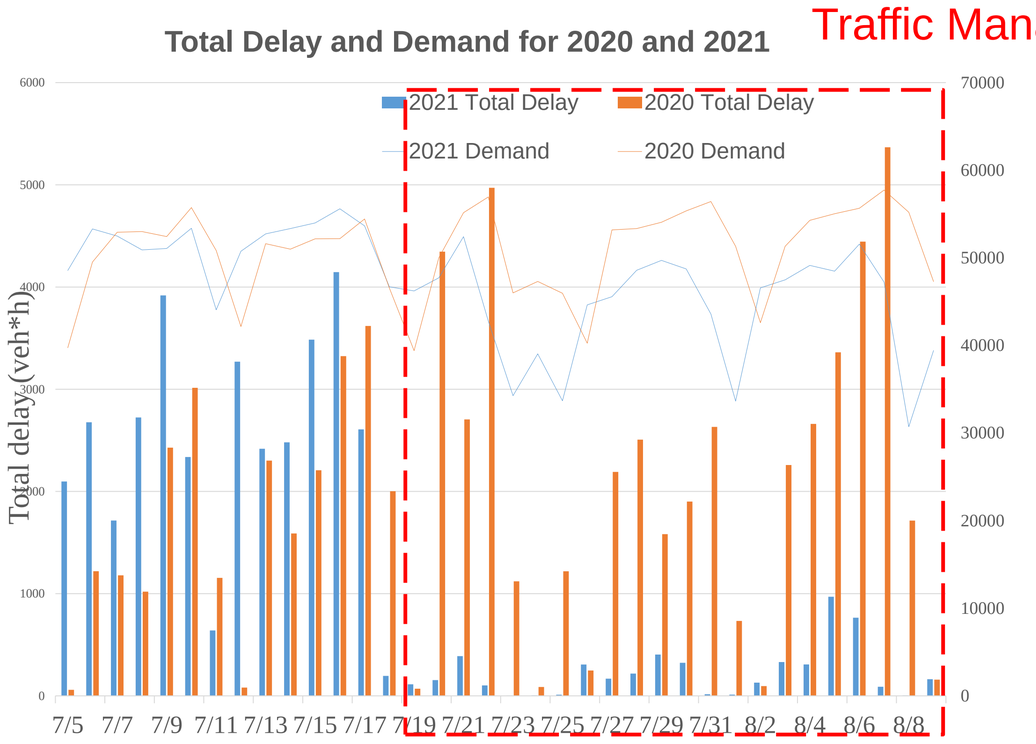
Upstream end is located at where traffic congestion does not occur.

Traffic demands were estimated using the slope of imaginary cumulative arrival curve.
(Otaka *et al*., 2004)

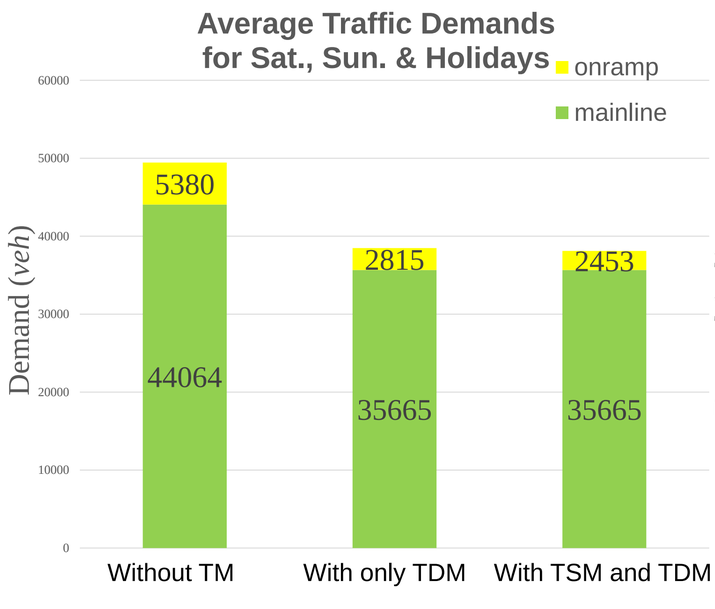


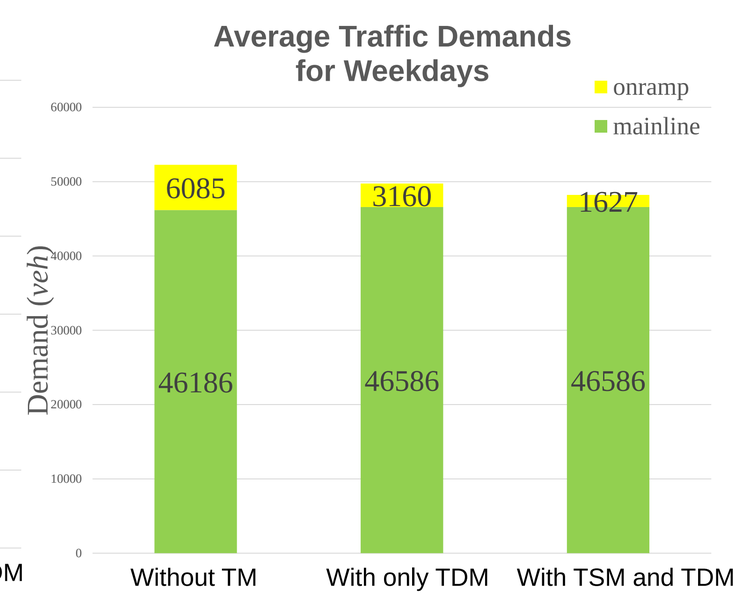
4. Case study for Route 3 Shibuya Line Outbound

Traffic Management (TM) Period: 2021/7/19- 2021/8/9



The total vehicle delay during the TM period reduces about **90%** compared to the cases without TM in 2021 and 2020.





The effect of TSM for reducing onramp traffic demands compared to without TM for Sat., Sun. and holidays were about **18%**, and for weekdays were about **27%**.

4. Conclusion and future works

- During TM period, the total vehicle delays were notably reduced; even if no substantial decrease has been observed in the traffic demands.
- Network-wide analyses will be conducted in the future.