A Novel Approach to Transit Level of Service: Headway Level of Service of a Bus Route

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Abstract

The ability to measure and report the level of the quality of public transport service provided is important for customers to assess the level of service they receive and for the transit agency to assess the effectiveness of the service as well as improvements made. The public transit industry, however, lacks a set of efficient, accepted, and widely applicable level of service (LOS) measures. Specifically, the ones that can assess and compare the attribute level quality of service (QoS) of transit lines and those that can compare different operational performances of the same transit line. Existing measures fall short of incorporating a combined view of both the passenger and operator. A new approach to evaluate Transit LOS is proposed that has the potential to address these drawbacks.

This study proposes an approach to measure the Headway LOS (HLOS) based on the passengers' value of ride time (VoRT) distribution. First, an analytical model of optimum operation minimizing the generalized cost of waiting of passengers and operating cost is used. Then, an implied VoRT representing the performance of headway attribute is derived from the analytical model. The implied VoRT is compared with the VoRT distribution of the passengers to obtain the HLOS. An approach to distinguish LOS grades depending on the standard deviation (SD) of the VoRT distribution is proposed. Numerical examples are presented explaining the calculation of the HLOS of a bus route under different operating conditions. Finally, the developed methodology is applied to a bus route in Calgary, Canada.

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