



SJSU Research Center
210 N. Fourth St., 4th Fl.
San José, CA 95112

Tel // 408.924.7560
Fax // 408.924.7565
transweb.sjsu.edu

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Evaluation of Bus Transit Reliability in the District of Columbia

Stephen Arhin, Ph.D. and Errol Noel, Ph.D.

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One of several performance measures used to evaluate the reliability of a transit system is on-time arrivals at stations, terminals and bus stops. On-time arrival is a measure that passengers generally understand. The Washington Metropolitan Transit Authority (WMATA) has established a service performance goal of 78% for on-time transit bus arrivals at bus stops. WMATA considers a bus to be on time if it arrives within two minutes earlier or seven minutes later than the advertised scheduled arrivals. Most regional transit agencies, however, advertise an on-time threshold of one minute early and five minutes late. This research determined the extent to which WMATA's individual and grouped bus lines satisfy its on-time arrival criterion.

WMATA's bus lines meet an average of 75% of its on-time criterion.

Study Methods

The research team conducted manual onboard data collection for peak morning and afternoon travel on 15 bus routes during which the actual arrival times at bus stops were recorded. The data collection was conducted from summer 2012 through summer 2013 by students from Howard University and universities in the metropolitan region. The routes varied from 6-15 miles and involved 125 bus stops. The actual arrival times obtained from the data collection were compared with the published schedules obtained from WMATA. The deviations of the actual arrival times from the scheduled arrival times were computed and compared with WMATA's on-time arrival threshold of two minutes early and seven minutes late and with the one minute early and five minutes late arrival threshold used by several regional transit agencies across the United States. Statistical significance of the mean arrival deviations from the scheduled arrival times was also obtained using a two-tailed test at 5% level of significance.

Findings

WMATA's bus lines meet an average of 75% of its on-time criterion

Overall, an average of 75% of the buses surveyed on the selected routes met WMATA's on-time criterion. Thus, from a systems perspective and based on the 15 bus lines studied, WMATA missed its on-time performance goal by only 3%. The results, however, showed that WMATA exceeded its on-time bus arrival criterion by 4% during morning trips, but it fell 10% below the performance goal during evening service. Using the on-time arrival standard adopted by most bus transit agencies across the United States, the overall arrival performance for WMATA's buses was 17% lower than expected.

WMATA's bus system is close to meeting the industry on-time arrival criterion

The study also assessed the average arrival deviations using the industrial on-time threshold of one minute early and five minutes late. From the results, the average deviations for early and late arrivals were determined to be approximately 2.2 and 4.5 minutes respectively, which were close to the industry standard.

Policy Recommendations

To improve the on-time arrival performance of WMATA's bus lines (and to exceed its goal of 78%), scheduled arrivals for evening bus service must be improved. This may include a revision of the bus stop schedules, taking into consideration current traffic volumes, new traffic patterns, corridor signal timings and headway adjustments.



About the Authors

Stephen Arhin, Ph.D. is assistant professor of transportation engineering at Howard University.
Errol Noel, Ph.D. is a professor of transportation engineering at Howard University.

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For more details about the study, download the full report at transweb.sjsu.edu/project/1139.html