REPORT SUMMARY

FTA Report No. 0219
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FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

TRANSIT BUS MIRROR CONFIGURATION PILOT PROJECT

FINAL REPORT

Background

Standardization of transit bus mirrors is not typically found across transit agencies in the U.S. Sizes, mounting placement, and addition of convex mirrors all vary widely from agency to agency. Understanding these differences is critical in developing a set of mirror guidelines that can help all transit agencies reduce the number of incidents as well as in showing an optimized street-side mirror in a field demonstration.

Objectives

The project goal was to advance the development of standards and safer designs of bus transit mirrors to reduce the number of collisions and fatalities and mitigate the severity of transit-bus-related injuries

Findings and Conclusions

Bus operators rated the field-of-view provided by an optimized semi-curved mirror to be significantly better than the current flat mirror and indicated no difference in image quality or visibility obstruction.

The project team, composed of New York City Transit (NYCT), Virginia Tech Transportation Institute, New Flyer of America, Safe Fleet Mirrors, and Recaro North America, gathered feedback via focus groups consisting of bus operators, trainers, and NYCT management.

Data were collected and analyzed on transit bus mirror configurations and incidents, and bus operator visibility was researched. Based on focus group feedback, engineering data from scanning and modeling of four transit bus models and analysis of 2019 NYCT bus incidents, an optimized prototype mirror was modeled, and the mirror development partner built pre-production models to use in the pilot testing. A 30-month field demonstration of 30 transit buses equipped with the optimized semi-curved mirror and evenly divided across the bus depots was conducted, and NYCT provided a full year of 2019 incident data for evaluation. Researchers focused on left-side preventable (i.e., bus operator at fault) incidents.

Findings revealed that 40-ft transit buses with a flat/convex mirror combination had significantly fewer street-side incidents than flat-mirror-only buses. However, the opposite was true for 60-ft articulated buses, which had significantly fewer street-side incidents

Overall, results showed that bus operators rated the field-of-view provided by the optimized semi-curved mirror to be significantly better than the current flat mirror and indicated no difference in image quality or visibility obstruction. These findings support consideration of the optimized semi-curved mirror to minimize visibility obstructions and maximize field-of-view. The need to minimize visibility obstructions may vary by transit agency based on the traffic and roadway environment.

Benefits

Transit bus agencies, standards organizations, and government entities should consider FMVSS No. 111 regulations for heavy vehicle mirrors based on these findings. Organizations should also consider these findings when developing and implementing mirror–camera systems that hold great promise to increase field of view, reduce visibility obstructions, and improve visibility even in low-light and bad weather conditions.

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Project Information

This research project was conducted by the New York City Transit Authority and Virginia Tech Transportation Institute. For more information, contact FTA Project Manager Roy Chen at (202) 366-0462 or RoyWei-Shun.Chen@dot.gov.

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