REPORT SUMMARY

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FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

TRANSIT BUS OPERATOR TEMPORARY BARRIER TO REDUCE COVID-19 EXPOSURE

Background

Information and prevention guidelines from the Centers for Disease Control and Prevention (CDC) show that the COVID-19 virus is transmitted from infected individuals when they exhale droplets and particles that contain the SARS CoV-2 virus. To mitigate the transmission of COVID-19 and protect transit operators, transit agencies across the U.S. have implemented temporary measures, including restricting boarding to rear doors, implementing frequent surface cleaning, issuing Personal Protective Equipment (PPE), and installing droplet barriers around the operator workstation. However, there are limitations to the effectiveness of these measures.

Objectives

The objectives of this project were to (1) demonstrate the production of a durable physical temporary barrier between the front and rear passenger compartment of a transit bus to reduce the exposure risk to COVID-19 for the operator and passengers, (2) perform an air flow test of the temporary barrier, and (3) share the results to maximize the positive impact to the public transportation system throughout the U.S.

Findings and Conclusions

Several tested considerations to limit COVID-19 exposure among bus operators and passengers proved to be successful.

The primary test buses were two 40-ft New Flyer models with different HVAC configurations. The older 40-ft New Flyer bus (2009) had a rear-mounted HVAC system with no fresh air intake, and the new 40-ft New Flyer bus (2014) had a forward roof-mounted HVAC system with a constant 20% fresh air intake. Both buses had adjustable fresh air intake and defroster at the operator workstation. Primary testing was conducted without a temporary barrier (designated baseline) and with a temporary barrier (designated barrier). In addition to the primary buses, a new model 35-ft Gillig bus (2019) was tested and was limited to the baseline configuration. The temporary barriers were composed primarily of transparent polycarbonate and PVC piping supported by attachment to stanchions near the middle of the passenger seating compartment and at the end of the ADA seating/securement area.

Results of the configurations and observations are as follows:

- **Maximize air dilution for bus operators and passengers** – set defrost vent to full fresh and defrost fan to high; open passenger windows depending on outdoor weather/ temperature; open front roof hatch depending on outdoor weather/temperature; open rear roof hatch depending on outdoor weather/ temperature; close driver window.
- **Pressure barrier near bus operator for airflow management** – install temporary barrier near bus front (behind ADA section) with minimum gaps (approx. 1 in.) to floor, walls, and ceiling to minimize cabin air mixture with bus operator workstation area; close driver window to maintain positive pressure around temporary barrier.

- **Reduce air flow from bus rear to front** – close driver window to reduce cabin air mixture (i.e., rear-to-front flow) during vehicle motion; near bus operator workstation, close front roof hatch to reduce cabin air mixture during vehicle motion.
- **Avoid impacting HVAC cabin temperature managemen**t – bus rear-mounted temporary barrier did not impact cabin temperature management; bus mid-mounted temporary barrier impacted cabin temperature management.

Benefits

Temporary bus barriers and related configurations and settings should be considered by transit bus agencies for implementation to limit exposure to COVID-19 among bus operators and passengers.

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Project Information

This research project was conducted by the USF Center for Urban Transportation Research and the Virginia Tech Transportation Institute. For more information, contact FTA Project Manager Raj Wagley at (202) 366-5386 or Raj.Wagley@dot.gov

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