



RESEARCH REPORT AND FINDINGS: LIGHT RAIL TECHNOLOGY SCAN AND CASE STUDIES

Background

Light rail and streetcar rail transit present transit safety risks, specifically pedestrian/bicyclist and motor vehicle collisions. The operation of these systems, often within shared corridors, presents high probabilities for collision events, as reported to the National Transit Database (NTD). In response to this identified area of safety risk, research was conducted under the leadership and direction of FTA's Research, Demonstration and Innovation and Transit Safety Oversight offices and included stakeholder input from CUTR's FTA Transit Standards Working Group.

Objectives

Project objectives included the following:

- Background research/literature review and analysis on mitigation measures that have proven effective in improving light rail safety as reflected in research studies and in case study locations
- Scan of existing and emerging technology applications that have proven/may provide improved transit safety
- Case study research on existing light rail systems to include collection of safety data for injuries and fatalities associated with light rail collisions and examination of operating conditions, trends, challenges, and successes
- Recommendations related to technologies that may be demonstrated to establish their efficacy to improve transit safety, including the reduction of injuries and fatalities

Findings and Conclusions

This research identified measures reported as successful at reducing collision or other incidents or those being tested that show promise to increase safety for light rail and streetcar rail transit.

Light rail and streetcar rail transit present transit safety risks, specifically transit collisions with pedestrians/ bicyclists and motor vehicles. The operations of these systems, often within shared corridors, establish a high probability of vehicle and/or pedestrian bicycle collision events.

The research team performed extensive background research and relevant literature reviews to identify the effective measures that have proven successful in improving the safety of light rail operations.

Innovative collision avoidance technologies are being tested or piloted at agencies, including Protran's Blind Spot Awareness System®, Mobileye Shield+ Collision Avoidance System®, and TCT's Train Intelligent Detection System (TIDS). The literature review identified products and systems being testing in Europe that show potential, including SIL4, Bombardier's DAS with 3D Stereovision, Bombardier's BodyGuard, Alstom's Pegasus 101, Bosch's Tram Forward Collision Warning System, and the multilayer laser scanner collision avoidance system applied to Durmazlar Machine's Silkworm tram.

Case studies identified onboard technologies that agencies deployed that resulted in improved safety. Innovative solutions such as left-turn gates, parking lot-style gates, pedestrian gates and channelized crossings, and quad gates at vehicular intersections also were successful in reducing risk and improving system safety. Fencing placed along the rail line was described as effective in deterring unwanted pedestrian crossings. Successful modifications to operational practices and public outreach campaigns that improved safety on light rail systems are also reflected in the case study summaries.

Benefits

Report findings can support future FTA efforts in providing guidance to the industry on methods that can be used to mitigate injuries and fatalities associated with light rail vehicle collisions, including the use of various technologies such as collision avoidance and warning applications.

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This project was performed by the Center for Urban Transportation Research and the Transportation Technology Center, Inc., a subsidiary of the Association of American Railroads, in support of FTA's Standards Development Program. For more information, contact FTA Project Manager Raj Wagley at (202) 366-5386 or Raj.Wagley@dot.gov.

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