



Pedestrian Collision Avoidance Demonstration Project



THE CHALLENGE

The transit industry has an excellent safety record, with very low fatality rates compared to other travel modes. However, analysis of data from the National Transit Database and the Fatal Analysis Reporting System suggests that pedestrians account for a higher percentage of all bus-involved fatalities as compared to auto-involved fatalities.

Transit agencies are seeking technologies to improve pedestrian safety. Most transit agencies, however, lack the time, resources, and expertise to conduct a strategic and robust evaluation of available technologies. To assist transit agencies in better understanding the potential benefits of available technologies, the Federal Transit Administration (FTA) initiated a demonstration of advanced pedestrian warning systems.

The demonstration and evaluation of these technologies helped provide much needed information for transit agencies to make informed decisions to improve pedestrian/cyclist safety. The FTA contracted with AEM Corporation to collect, analyze, and document this valuable information for use by transit agencies around the country and to support FTA in meeting its objective of reducing transit-related injuries and fatalities.



PROJECT GOALS

AEM focused on the following goals:

- Demonstrate the ability of three commercially-available bus-based warning systems to improved pedestrian/cyclist safety including an LED directional headlight system, and an innovative crosswalk warning sign to provide timely warnings to pedestrians/cyclists that a bus is about to turn, pull into a bus stop, or pull out of a bus stop
- Define the environmental parameters under which advance warning should be provided to pedestrians/cyclists at intersections and at bus stops
- Determine the effectiveness of the collision warning systems in affecting pedestrian/cyclist behaviors at intersections and bus stops
- Determine the effectiveness of the collision warning systems in reducing bus-pedestrian/cyclist conflicts



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OUR SOLUTION

The AEM Transportation Team lead this project to demonstrate, test, and evaluate technologies for improving pedestrian safety around transit buses. AEM partnered with TriMet, the public agency that operates mass transit in the Portland, Oregon metropolitan area, and Portland State University (PSU). The team demonstrated and evaluated the impacts of these systems on bus operators, pedestrians and cyclists, and the general public served by TriMet.

The team procured, installed, and tested three bus-based turn warning systems in which an auditory warning to pedestrians was activated by either the turn signal or rotation of the steering column. In addition, the team tested an LED directional (left/right) headlight system used during nighttime operations. The team also designed and deployed an electronic "BUS" turn warning sign for use in one heavily traveled crosswalk in the downtown business district of Portland.

EVALUATION EXPERIENCE & APPROACH

AEM transportation engineers leveraged their experience and expertise in conducting and managing ITS evaluations and transit research projects to deploy and evaluate the warning systems. The evaluation approach included:

- Daily surveys of bus operators
- Comprehensive survey of bus operators
- Field intercept surveys of pedestrians
- Focus groups with both bus operators and pedestrians
- Video observations of pedestrian behaviors
- Cost-benefit analysis of turn warning systems

RESULTS

The results of the demonstration and evaluation quantified the effectiveness of the systems in terms of the perceptions and acceptance by bus operators, TriMet staff and management, and the general public. The results showed positive benefit-cost ratios for three scenarios covering the maximal range of monetary outcomes that could be reasonably expected for the warning systems based on information recovered during the test and otherwise available at the time of the project.

This project benefits the transit industry by providing much needed information that will help transit agencies make informed decisions about investing in advanced pedestrian warning technologies. Ultimately, as these (and future) systems are tested, evaluated, and deployed, the transit industry could experience a decrease in bus-pedestrian/cyclist collisions, which would result in a lower cost of claims to transit agencies, fewer injuries and fatalities, and a safer environment for pedestrians and cyclists.

