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Tech Brief

Pedestrian Safety and Mobility Aids for Crossings at Bus Stops

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SUMMARY

The New Jersey Department of Transportation (NJDOT) and New Jersey Transit Corporation (NJ TRANSIT) have initiated a project to investigate solutions that would benefit pedestrian accessibility to bus stop locations. Several measures have either been proposed or are under evaluation for enhancing pedestrian safety at signalized intersections. However, uncontrolled locations pose significantly more challenges in terms of safely accommodating pedestrians. Furthermore, the need for bus transit users to coordinate crossing movements with bus arrival times can often exacerbate these challenges.

The study, entitled Pedestrian Safety and Mobility Aids for Access to Bus Stops identifies and examines problems associated with safety and mobility for transit users accessing bus stops and provides recommendations for measures that should be implemented on both a short term and long-term basis.

INTRODUCTION/BACKGROUND

Pedestrian safety is a serious concern both nationally and in New Jersey. According to the National Highway Traffic Safety Administration (NHTSA), nearly five thousand pedestrians are killed and nearly eight thousand injured annually as a result of pedestrian-motor vehicle collisions.

While NHTSA statistics indicate that the annual number of pedestrian related fatalities has decreased nationally, New Jersey is experiencing a vastly different trend. Preliminary statistics show that 182 pedestrians were killed on New Jersey roads in 2002, the highest since 1996 when 183 pedestrians died in traffic crashes. Moreover, pedestrian fatalities in 2002 are also up a whopping 26 percent over the number of pedestrians killed in traffic crashes last year. Recognizing the need to improve safety and accessibility for its bus transit users on state highways, New Jersey Transit Corporation, Inc. (NJ TRANSIT), through New Jersey Department of Transportation (NJDOT) Office of Research and Technology, has initiated a study entitled "Pedestrian Safety and Mobility Aids for Access to Bus Stops" to examine pedestrian safety and mobility issues related to bus transit stops.

RESEARCH APPROACH

At the onset of the project, a research team was assembled and included representatives from NJDOT and NJ TRANSIT. NJIT worked collaboratively to identify candidate study sites, administer a user survey, and develop recommendations to improving pedestrian safety.

Research was conducted in two phases. The first phase of this study included a comprehensive literature review of research conducted or sponsored by transportation agencies and professional organizations. The second phase of the study consisted of selecting specific case study locations, identifying safety deficiencies and developing recommendations for implementing pedestrian safety and mobility measures.

FINDINGS

As a part of the research project, the research team conducted an in-depth literature review. There are a number of interesting findings that are applicable to our study, including the influence of traffic volumes and roadway geometric conditions on pedestrian crashes. The literature review also examined the effect of traffic safety devices and pedestrian overpasses and underpasses. Overall, the results of the literature search and studies verify that there needs to be more focus on pedestrian safety and mobility and that appropriate design and proper implementation of apt safety control devices is an important step towards successively fulfilling this objective.

Selection of study sites was also an important aspect of the study. US Route 9 in Monmouth and Middlesex Counties was selected as the primary study corridor from which candidate sites would be chosen. This was principally due the corridor's heavy transit usage and the roadway being a high volume principal multi-lane arterial, with a traversable median. Furthermore, the selected study section of US Route 9, having a traversable median, has a number of bus stops that are located at either stop street intersections or uncontrolled midblock locations, one of the principal criteria that was used for site selection. We found that the overwhelming majority of bus stops on other multi-lane state highways, most of which have non-traversable median barriers, are located at signalized intersections.

Pedestrian crash data was collected and evaluated for the study corridor to help identify potential candidate study locations. While the research team agreed that the frequency of pedestrian-motor vehicle crashes should be an important criteria in selecting sites, many of the potential candidate sites that would have been considered using pedestrian crash data were either located at signalized intersections, or simply did not have an adequate pedestrian activity for which data could be collected. Ultimately, the selection of park and ride lots near Texas Road and Strickland Road was based on heavy pedestrian use and crossing behaviors.

The research team conducted a number of field observations both under favorable and inclement weather conditions. A number of interesting crossing behaviors were observed and are documented in the report, but overall we found that pedestrians crossing the highway to access bus stops paid little of no heed to existing traffic control devices. Even the presence of a high chain link fence installed in the median

at one location was ineffective in forcing pedestrians to cross at the appropriate crossing location.



Existing chain link fence in the median.



Pedestrians walking along fence in the median waiting to cross northbound Route 9.

On-site surveys were also conducted at each location and we found that respondents were quite willing to share their experiences and concerns, which are documented in detail in the report. In addition, a laboratory study was conducted and revealed that the presence of crosswalks traffic signals and pedestrian crossing signs were an effective means of alerting drivers of pedestrian crossing activity.

CONCLUSIONS

Overall, we have found that while pedestrian features are designed in accordance with applicable standards they do not realistically go far enough to accommodate pedestrians. For example, pedestrian push buttons and pedestrian signal indications installed at key crossing locations are consistent with proper standards. However, **no one** was observed using these devices in the manner in which they were intended. The research findings also suggest that the presence of pedestrian crossing signs would increase driver alertness in areas where pedestrians may cross at any section of the highway.

A large percentage of survey respondents indicated that additional measures including separate pedestrian phasing and crosswalks located more in line with the current walking path would encourage use of the traffic signal for crossing the highway. However, an exclusive pedestrian phase may have serious impacts to traffic operations on US Route 9 and relocation of crosswalk to better align with the actual walking path would require reconstruction of signal indications and may substantially increase vehicle clearance intervals and hence impair traffic operations on US Route 9.

As indicated in the survey, the majority of transit users drive to the bus stop location. Therefore, the proximity of the bus pick up and drop off area are critical in determining pedestrian crossing behavior. For both locations, however, pedestrians are required to go out of their way in order to walk from the bus drop off to the parking area. Once at the traffic signal, pedestrians must contend with vehicles turning at the intersection.

It is not surprising, therefore, that crossing movements are not made at the traffic signal and when they are, are made improperly.

RECOMMENDATIONS

Recommendations were developed for both short term and long term measures. Short term improvements include improving pedestrian accommodations such as sidewalks, more accessible push buttons, enhanced crosswalks; and further investigating enhanced illumination. Additional efforts to educate transit users as well as drivers and relocation of bus stops to encourage use of locations that are more suitable for pedestrian crossing movements are some of the long term recommendations .

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<p>A final report is available online at http://www.state.nj.us/transportation/research/research.html</p> <p>If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to Research.Bureau@dot.state.nj.us and ask for:</p> <p>Report Title: Pedestrian Safety and Mobility Aids for Crossings at Bus Stops</p> <p>NJDOT Research Report No: FHWA-NJ-2003-013</p>	