IMPROVING PEDESTRIAN SIGNAL TIMING CLEARANCE INTERVALS

While the AASHTO Green Book, Pedestrian Guide, and federal/state MUTCD guidance gives designers the “option” of using slower walking speeds; engineers often assume that the 1.2 m/s “normal” design speed for the “pedestrian clearance interval” should be applied by default. Without due consideration of the user population, using 1.2 m/s can result in “up to half of pedestrians still being in the street when conflicting traffic is free to proceed” (Source: The Continuing Evolution of Pedestrian Walking Speed Assumptions, ITE Journal/September 2004).

Crossing Distances, Speeds and Time

<table>
<thead>
<tr>
<th>Crossing Distance</th>
<th>MUTCD Normal Crossing Time at 1.2 m/s</th>
<th>Older Adult Crossing Time at 0.9 m/s</th>
<th>Mobility Impaired Crossing Time at 0.8 m/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2 m (2 lanes*)</td>
<td>6 seconds</td>
<td>8 seconds</td>
<td>9.6 seconds</td>
</tr>
<tr>
<td>10.4 m (2 lanes with bicycle lanes)</td>
<td>8.5 seconds</td>
<td>11.3 seconds</td>
<td>13.6 seconds</td>
</tr>
<tr>
<td>14.0 m (3 lanes with bicycle lanes)</td>
<td>11.5 seconds</td>
<td>15.3 seconds</td>
<td>18.4 seconds</td>
</tr>
<tr>
<td>17.7 m (4 lanes with bicycle lanes)</td>
<td>14.4 seconds</td>
<td>19.3 seconds</td>
<td>23.2 seconds</td>
</tr>
<tr>
<td>21.3 m (5 lanes with bicycle lanes)</td>
<td>17.5 seconds</td>
<td>23.3 seconds</td>
<td>28 seconds</td>
</tr>
</tbody>
</table>

* Assumes a 3.7 m vehicular lane width, and a 1.5 meter bicycle lane width. Source: Pedestrian Facilities Guidebook, Washington State Dept. of Transportation, 1997.

Engineers should consider user populations such as the percentages of people who are disabled, over 65 year's old, and 14 years old and under, hand-held and head-set cell-phone use, accident history, and roadway changes resulting from the project (such as longer crossing distances, the addition of turning lanes, and complex signal phasing). For example, the 2004 NYS Statistical Year

(Continued on Page 2.)
Book shows that on a county-wide basis; many crossing locations in New York State would likely exceed the 20% Highway Capacity Manual guideline for the percentage of crossing pedestrians over age 65. If we add people with disabilities, the percentage of the population 14 years of age and under, and pedestrians using cell-phones; there remains ample sufficient justification to warrant using pedestrian walking speeds below 1.2 m/s for timing purposes.

While an average walking rate of 1.2 m/s is typically considered normal walking speed for design purposes, and is consistent with the guidance in the federal and state MUTCD; some states have MUTCD guidance that notably varies from the latter documents by providing designers with the option of using a “higher” or lower walking speed depending upon “what may be more appropriate at particular locations”. Respected and credible engineering documents that recommend walking speeds below 1.2 m/s, under certain circumstances, include the following:

- Chapter 2, page 97 of the 2001 AASHTO Green Book

Finally, pedestrian cell-phone (hand-held and head-set) use is a recent phenomena that is contributing (along with an aging, less physically fit, and more obese population) to a trend toward “slower” pedestrian walking speeds, and queuing. An ongoing joint ITE/AAA study mentioned below may provide more information on how the above trends are impacting subgroups (seniors, teens, kids, etc…) and overall walking speeds.

Engineers should be aware that “best practice” guidelines would apply a 1.1 m/s minimum walking speed across the street itself (curb to curb) for determining the pedestrian clearance interval; and a 0.9 m/s walking speed across the total crossing distance (top of ramp to far curb) for the entire walk plus pedestrian clearance signal phasing (with the minimum walk signal indication remaining at 4 seconds).

For more information, in addition to the three documents cited above, contact Jim Ercolano, Passenger Transportation Division at jercolano@dot.state.ny.us

NYSDOT LIBRARY NOW A PART OF TLCAT

The NYSDOT Library is pleased to announce that their catalog of Transportation resources has been added to TLCAT. TLCAT stands for Transportation Libraries Catalog and is a cooperative catalog of transportation libraries throughout the country and Canada. All of the holdings of participating libraries are searchable through the TLCAT database at a link from the National Transportation Library at: http://ntl.bts.gov/link.html.

What does this mean for you? It means that in addition to searching the NYSDOT Library’s catalog you can now search over 25 library collections via TLCAT for transportation resources on your specific topic. Users can limit searches to a specific group of transportation libraries such as government libraries or university libraries. TLCAT libraries also hold special collections of rare and unique items that otherwise would not be searchable.

If you currently use TRIS (Transportation Research Information Services) for finding information you may be wondering what the difference is between TRIS and TLCAT. TRIS is the
world’s largest and most comprehensive bibliographic resource on transportation information and is produced and maintained by the Transportation Research Board. The TRIS database currently contains over 600,000 records of references to books, technical reports, conference proceedings, journal articles and on-going research in the field of transportation. However, TRIS does not provide substantial information on which specific libraries contain the literature that is identified. TLCAT plays a useful role in identifying where the information is held. Knowing where the information is located makes it much easier to obtain. As a general rule it is best to search both databases to achieve the most comprehensive results.

If you have any questions or would like a demonstration of how TLCAT works please contact Lynne Webb at the NYSDOT library for further information.

**ASTM A588 “WEATHERING STEEL” BOX BEAM GUIDE RAIL CORROSION MITIGATION FIELD TRIALS**

“Rustic” box beam guide rail fabricated from ASTM A588 “weathering steel” (Fig. 1) has been used for approximately thirty years in a variety of park settings, including the Adirondack Park, the Catskill Park, and along a variety of parkways in many NYSDOT regions. During that time, it has become apparent that the rail does not meet the initial expectations for longevity in New York State -- expectations based on the formation of a surface patina anticipated to retard further rusting. Unfortunately, the open-ended box structures allow moisture access to the inside of the guide rails, often with road salts, and this corrosive medium breaks down the patina and rusts the structure from the inside out (Fig. 2). While galvanized ASTM A500 guide rail will usually provide good service after 40 years of exposure to weathering, rustic rail can exhibit internal corrosion after a few seasons, and severe deterioration in a fraction of 40 years. Some locations contribute to significantly faster deterioration than others. Rusting is accelerated where the rail is shaded, protected from the wind, salting is frequent, and plowed snow often buries the rail.

![Fig. 1. Rustic Box Beam Guide Rail in the Adirondak Park](image1)

![Fig. 2. A588 Rail Rust Through Caused by internal Corrosion](image2)

The obvious solution is to eliminate A588 weathering steel from this application and to use hot dip galvanized guide rail. In the interest of safety and economy, several states (Michigan, New
Hampshire, and California) with environments similar to New York, after having experienced this premature deterioration, did just that. However, New York park agencies and parkway authorities would like to maintain the distinctively colored brown guide rail to help distinguish parkways and roads in certain park areas from other state highways. At this point, NYSDOT policy is to continue using weathering steel in this application, with an increased replacement frequency, until a feasible alternative is found. In the interim, the Materials Bureau is conducting field trials of corrosion mitigation techniques recommended by the Brown Rail Team and funded by the Transportation Research and Development Bureau.

The Brown Rail Team, a cross functional committee of NYSDOT central office and regional engineering and maintenance personnel, examined the dynamics and extent of the problem and recommended field trials of several mitigation techniques focused on preventing or slowing down corrosion on the inside of the box beam structures. The techniques included the following:

- Drilling \( \frac{3}{8} \)" diameter holes in the bottom face of the box beams to allow ventilation and drainage to prevent internal moisture retention.
  - One 18’ rail with holes spaced every 4.5’ and one 18’ rail with holes spaced every 2’ were installed among recently installed, untreated rustic rail near mile marker 1035 and 1038 respectively on US44/SR55 in the Minnewaska State Park on 2/14/06.

- “Tarring” the inside of box beams by brushing with heated asphalt roof cement to provide some level of internal waterproofing.
  - Five 18’ “tarred” box beams were alternated with untreated recently installed rustic rail on SR9N near mile marker 1246 just north of Bolton Landing, NY on 3/7/06.

- Providing galvanic protection by hot dip galvanizing the inside surfaces while masking the outer surfaces to maintain its rustic appearance.
  - Three 18’ internally-galvanized box beams were alternated with untreated recently installed rustic rail on SR9N near mile marker 1246 just north of Bolton Landing, NY on 3/7/06.

Baseline internal photographs and steel thickness measurements were made on the treated rustic box beams and the adjacent untreated control beams using a rigid probe borescope with digital video camera (Fig. 3 & 5) and an ultrasonic thickness gauge with 7.5MHz transducer. These measuring methods will be repeated at least yearly to document and report on the relative corrosion rates of the various treatments in comparison to untreated weathering steel guide rail.

For further information on borescope or ultrasonic testing capabilities contact Raymond White, Materials Bureau, rwhite@dot.state.ny.us. For questions on brown rail, contact Terry Hale, Design Quality Assurance Bureau, thale@dot.state.ny.us.
ADVANCED VEHICLE COMPONENTS: TRANSPORTATION R&D AT NYSERDA

The Transportation Research and Development Program at NYSERDA seeks to develop and demonstrate, and then assist in the successful commercialization of advanced transportation products, systems, and services in New York State. Proposals for funding are sought twice each year, through a series of Program Opportunity Notices.

Submitted proposals are typically directed at enhancing mobility and improving transportation energy efficiency with advanced vehicles and vehicle components, as well as innovative infrastructure. Currently, the NYSERDA program is funding and actively supporting over 80 innovative transportation research projects. NYSERDA is contributing in excess of 16 million dollars to projects costing a total of 38 million dollars, the balance provided by industry partners and other co-funders.

Efficient AC Propulsion Gearbox for Subway Cars (Figure 1): Alstom Transportation, in Hornell, NY, is a world leader in the development and manufacture of transit equipment, including AC propulsion systems for subway transit cars. To assure the ability of systems such as the NYC Metropolitan Transit Authority to procure domestically-produced high efficiency AC propulsion systems, advanced elements, including the transmission gearboxes, require sophisticated design and development. NYSERDA funded Alstom to design, develop, and perform a one-year performance test of a made-in-NY gearbox for MTA’s new R160 subway cars. This successful project incorporated design and manufacturing subcontractors from across New York State.

High Performance Ceramic Brakes for the Automotive Industry (Figure 2): NYSERDA has traditionally been supportive of new technologies that promise to increase vehicle efficiency and performance in the automotive industry. One such technology, ceramic brake components, is being funded by NYSERDA and developed by Starfire Systems, Inc. of Malta, NY. Starfire’s technology has significant potential in providing superior braking performance, lower maintenance costs, as well as increased fuel economy and decreasing emissions, due to lower weight braking systems. This is true for light duty passenger vehicles and particularly true for fleet vehicles subject to frequent stop and go duty cycles, such as transit buses. Both applications will be developed and demonstrated in this project.

For more information, contact: Frank Ralbovsky 862-1090 ext 3260  fsr@nyserda.org
RESEARCH PROJECTS SELECTED FROM THE 2005 CALL FOR RESEARCH

The research proposals that were submitted as part of last fall’s call for research were scored and then ranked by the Research Advisory Committee (RAC) which consisted of representatives of each Division and our Federation partners. The results of the RAC ranking were presented to the Research Investment Committee in June. The committee selected twenty three research projects for funding. A list of these projects, including a brief summary on each project can be found at the link below. Requests-For-Proposals are currently being prepared by the project managers for these projects. http://dot.state.ny.us/tech_serv/trdb/rnd.html

If you would like any additional information on the project selection process, or have any questions on the Department’s research program please contact Gary Frederick, Director, Transportation Research and Development Bureau, gfrederick@dot.state.ny.us

RECENT SPECIAL REPORTS

Listed below are recent special research reports published by the Transportation Research and Development Bureau. Reports are available without charge on the Research Library’s web site http://www.dot.state.ny.us/tech_serv/trdb/r_reports.html and may be obtained by clicking on the link on the report number. The reports were created using Adobe Acrobat.

SR 143 Court Street Bridge Monitoring and Load Testing
SR 144 Load Testing for Bridge Rating: Route 22 over Swamp River
SR 145 Load Testing for Bridge Rating: Route 82 over Sprout Creek
SR 146 Load Testing for Bridge Rating: Route 32 over Plattekill Creek
SR 147 Load Testing for Bridge Rating: Dean’s Mill over Hannacrois Creek.

Are you working on something new and innovative that could be included in the next newsletter? Please contact Ossama Elrahman or Colin Campbell, Transportation Research and Development, or send us an e-mail trdb@dot.state.ny.us

Technology Transfer News is published by the Transportation Research and Development Bureau, New York State Department of Transportation, which is solely responsible for its content, in cooperation with the Federal Highway Administration, U.S. Department of Transportation. Requests for addition to its mailing list and inquiries concerning its contents should be addressed to Gary Frederick, Director of Transportation Research and Development Bureau, New York State Department of Transportation, 50 Wolf Road, Mail Pod 3-4, Albany, NY 12232. Ossama Elrahman and Colin Campbell are responsible for the coordination and publication of the Technology Transfer News. Newsletter layout by Colin Campbell and Jeff Kerner.

NOTICE – Starting with Vol. 1 Issue No. 01 this newsletter is available on line at: www.dot.state.ny.us/tech_serv/trdb/rnd.html . If you require a printed copy of the newsletter please contact us at: trdb@dot.state.ny.us , otherwise check our web site for future publications.