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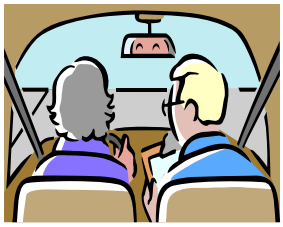
Older Drivers at a Crossroads



According to a news release by the U.S. National Institutes of Health, "35 million people, 13% of the U.S. population, are 65 and older, and more than half of them have radiological evidence of osteoarthritis (OA) in at least one joint. By 2030, an estimated 20% of Americans, about 70 million people, will have passed their 65th birthday and will be at increased risk for OA." Osteoarthritis and other arthritic and motion-hindering illnesses can inhibit the task of turning and gripping the steering wheel.

Research into the needs and capabilities of older drivers consistently reveals that visual, physical, and cognitive limitations develop with the aging of the Nation's population. Weakened vision, increased reaction times, and limited dexterity are expected for the aging population in general. Couple these vulnerabilities with expanding life expectancy and transportation researchers predict an increasing number of older people with transportation difficulties. In response to these challenges, the transportation engineering community and its road systems can address these declining abilities and ease the burden on older drivers.

Nowhere are the effects of these demographic changes, and the need for engineering assistance, more evident than at the common meeting of roads- at-grade intersections. According to the 2001 FHWA Highway Design Handbook for Older Drivers and Pedestrians, "The single greatest concern in accommodating older road users, both drivers and pedestrians, is the ability of these persons to negotiate intersections safely." Maneuvering a vehicle through an intersection requires the visual acuity, physical dexterity, and mental processing capacity to make simultaneous decisions regarding lane choice, vehicle speed and alignment, braking, acceleration, and continuous vehicle positioning relative to other vehicles in the intersection. And the most challenging aspect of intersection negotiation, the FHWA handbook continues, is performing left turns during the permitted (steady circular green) signal phase.

Because most of the driving task is visual, early efforts to improve the road system for older drivers focused on traffic control devices, such as bigger and more reflective signs, brighter markings, and better placement of signs and signals; solutions that address the visual challenges faced by many older drivers. But, there are also design and operational changes to the road system that can actually address some of the cognitive challenges faced by older drivers. Among these cognitive challenges is the need to constantly process and prioritize multiple streams of changing information at once, such as other vehicle movements, pedestrian movements, signs, pavement markings, and lane alignments.

To help motorists navigate intersections safely, transportation agencies can employ a wide range of intersection design and operational techniques, ranging from traffic signal timing and left-turn only signals to installation of roundabouts. All of these techniques have the potential to reduce crashes and improve safety for the overall driving population as well as older drivers.

A Successful Track Record

FHWA safety analysts examined the results of intersection improvements implemented in Iowa, Michigan, and in France. The analysts posed a simple thesis: Any treatment that simplifies traffic movement and driving decisions for the average driver will provide an even greater benefit for older drivers. Some of the safety measures were:

- Increase the size of the traffic signal lens.
- Add new signals and repositioning existing ones to be more in line with motorists' sight lines.
- Convert roadway corridors, under certain traffic loads, from four-lane to three-lane cross-sections.
- Modify yellow and red clearance intervals on all traffic signals.
- Direct drivers to a U-turn, either on the mainline or on a crossroad, eliminating the need of turning the face for oncoming traffic.
- Use roundabouts since it appear to pose les of a safety problem to seniors than other intersections.

According to the FHWA Older Driver Handbook some of the strategies to enhance safety at intersections are:

- **Preparing Motorists In Advance**
  Older drivers generally do not react more slowly to expected events; however, in dealing with unplanned events, such as finding one's vehicle in the wrong lane at an intersection, older drivers "take significantly longer to make decisions about the appropriate response than younger road users, and this difference becomes more exaggerated in complex situations.

- **Install advance street name signs**
  This strategy provide critical information ahead of the decision point, reducing the need for the visual searching, and freeing the driver to concentrate on both the turn mechanics and conflict avoidance with other vehicles. Stand-alone signs that show the street name in white-on-green format often are used in advance of signalized intersection.

- **Advance traffic signal warning signs with flashers**
  The strategy combines a passive sign with an active flasher connected to the traffic signal controller.
- **Advance lane signs**
  This signs indicate the mandatory or allowable use of some or all lanes when approaching an intersection. Advance lane use signs offer older drivers pertinent information at an earlier point in their approach to an intersection, giving them additional time to move their vehicles to the desired location. The earlier the information is supplied to the driver, the better, and the best location, as recommended by the MUTCD, is either in advance of the tapers or at the start of added turn lanes.

- **Advance pavement-marking messages**
  Drivers who become drowsy can develop tunnel vision, where their ability to drive is reduced to the most basic driving task- following the path of the roadway. In this condition, even though a driver's peripheral vision and sign reading skills may be restricted, he or she may still respond to messages painted on the pavement. Any regulatory, warning, or guide sign message can be supplemented by the same message in a pavement marking to provide an extra measure of communication with the driver.

- **Providing or upgrading illumination at intersections**
  Nationally, half of fatal crashes occur at night, even though people travel approximately 70% fewer miles at that time than they do during the day.
- **Simplify the Turning Mechanics**
  Engineering strategies also can be used to address some of the other physical limitations that accelerate with age. Range of motion and flexibility in the neck and shoulders typically declines with age, making it more

In This Edition…

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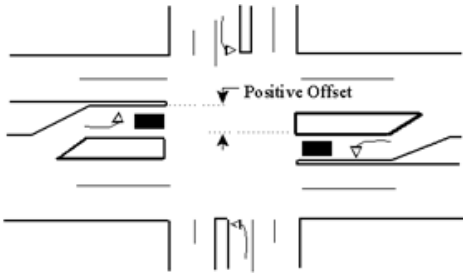
difficult physically to scan the roadway environment. Some of these strategies that might be helpful are:

- Realigning skewed intersections to the less demanding 90-degree configuration.
- A dotted line marking to delineate the turning path through the intersection.
- Providing separate left-turn lanes at intersections and major driveways.
- Providing a separate lane for right-turn traffic.

- **Improve Sight Distance for Turning Traffic**

When left turns are allowed at an intersection, and when those turns are not protected against oncoming traffic, clear sight distance to approaching vehicles is crucial. One design variable shown to improve sight distance for left-turning traffic is to move or offset the turn lane to the left, farther into the median or at least closer to the line of oncoming vehicles. Engineers create a "positive offset" by moving a left-turn lane so far to the left that left-turning drivers can see all the way past the vehicles in the opposing left-turn lane. Positive offset can be particularly helpful for older drivers who tend not to optimize their position in the turn lane, and then have difficulty judging the speed of oncoming vehicles.



Turning left safely off the main road is one challenge. Turning left safely onto the main road is quite another. Normally engineers and designers try to provide sight lines for turning vehicles by clearing brush, trees, and, to the extent possible, manmade objects that lie between the roads at each quadrant of an intersection. A problem arises, however, where a right-turn lane has been provided adjacent to the mainline through lane. In this case, the right-turn vehicle, especially if it is a large vehicle, may block the line of sight and view of any trailing mainline vehicles for the crossroad left-turn vehicle. Frequent left-turn movements from this crossroad, coupled with heavy truck or bus traffic using the mainline right turn lane, are a recipe for trouble.

Engineers and designers have at their disposal a wide array of strategies and techniques they can use to improve the safety of traveling through intersections for all motorists, and older drivers. According to FHWA Chief Highway Safety Engineer Rudy Umbs, "Intersection safety improvements as a whole, though helpful to all drivers, can be especially beneficial to our aging drivers."

London Congestion Pricing: Implications for Other Cities

The city of London has charged a fee for driving private automobiles in its central area during weekdays as a way to reduce traffic congestion and raise revenues to fund transport improvements. This has significantly reduced traffic congestion, improved bus and taxi service, and generates substantial revenues. Public acceptance has grown and there is now support to expand the program to other parts of London and other cities in the U.K. This is the first congestion pricing program in a major European city, and its success suggests that congestion pricing may become more politically feasible elsewhere.

A basic economic principle is that consumers should pay directly for the costs they impose as an incentive to use resources efficiently. Urban traffic congestion is often cited as an example: if road space is unpriced traffic volumes will increase until congestion limits further growth. For decades economists have recommended road congestion pricing as a way to encourage more efficient use of the transport system, and address congestion and pollution problems, providing net benefits to society.

Central London is particularly suitable for congestion pricing because of its limited road capacity (the streets network in the core area is hardly expanded since the medieval ages) and heavy travel demand result in severe congestion, plus relatively good travel alternatives, including walking, taxi, bus and subway services, which are used by most travelers. Only about 10% of peak-period trips were made by private automobile. For decades transport planners have recommended congestion pricing in central London. Revenues are to be used to fund public transit improvements.

How the Program Works

The motorists driving in central London on weekdays between 7:00 am and 6:30 pm are required to pay £8. There are some exemptions, including motorcycles, licensed taxis, vehicles used by disabled people, some alternative fuel vehicles, buses and emergency vehicles. Area residents receive a 90% discount for their vehicles. The charging area is indicated by roadside signs and symbols painted on the roadway.

Payments can be made at selected retail outlets, payment machines located in the area, by Internet and cellular telephone messaging, any time during that day. Motorists can purchase weekly, monthly and annual passes with modest (15%) discounts. A network of video cameras records the license plate numbers of vehicles and matches it with paid list. The owners of vehicles that have not paid as required are sent a £80 fine. This fine is reduced to £40 if paid within two weeks, and increases to £120 if not paid after a month- the same policy for parking penalties in the inner London area.

Approximately 110,000 motorists a day pay the charge (98,000 individual drivers and 12,000 fleet vehicles), increasingly by mobile phone text message. The system is not considered optimal because:

- The fee is not based on how many miles a vehicle is driven within the charging area.
- The fee is not time-variable, that is, the fee is not higher during the most congested periods and lower during less congested periods.
- The fee does not vary by location. It would be more efficient to have higher rates on more congested roads.
- The system has relatively high overhead costs.
- Transit service is crowded and unreliable, although this is changing as bus service improves and pricing revenue is used to upgrade the system.

Travel Impacts

- Transport for London and various academic organizations established a five-year monitoring program to evaluate the transport, economic, social and environmental impacts of congestion charging.
- Just over a million people enter central London during a typical weekday morning peak (7-10am). Over 85% of these trips are by public transport. Prior to the congestion pricing program about 12% of peak-period trips were by private automobile.
- During the programs first few months automobile traffic declined about 20% (a reduction of about 20,000 vehicles per day), resulting in a 10% automobile mode share.
- Most people who change their travel patterns due to the charge transfer to public transport, particularly bus.
- Some motorists who would otherwise drive through Central London during peak periods shift their route, travel time or destination. Others shift mode to taxis, motorcycles, pedal cycles, or to walking.
- Peak period congestion delays declined about 30% and bus congestion delays declined 50%.
- Bus ridership increased 14% and subway ridership about 1%.
- Taxi travel costs declined significantly (by 20-40%) due to reduced delays.

Some issues of criticism are listed below:

- **Business Activity**
  Some businesses consider themselves harmed by the program, particularly bulk good retailers that rely on customers who drive private cars.
- **System Accuracy**
  The congestion pricing system uses a network of video cameras to record license plate numbers, and optical character recognition (OCR) technology to read this information, identify "unpaid" vehicles, and generate citations for violators. During the first few weeks the rate of false positives was high due to OCR systems misinterpreting character.
- **Traffic Spillover Impacts**
  Although some diversion occurred the effect appears to be too small to measure, and may be addressed in the future by expanding the priced area and charging more variable fees (higher rates in the center and lower rates in outer zones). Although there is 10% more traffic on the peripheral roads, journey times on them have not increased, in part because traffic signal systems on these roads were adjusted in anticipation of these traffic shifts.
- **Pricing Efficiency**
  Most economists favor a variable road use fee that reflects they type vehicle, when it is driven, where and how much it is driven within the priced area, since that most accurately reflects the costs imposed by driving and gives motorists an incentive to minimize their negative impacts, for example, by shifting form peak to off-peak periods, or by minimizing their mileage. The current system uses a flat fee, so once a motorist pays the fee they have no incentive to minimize driving. The system was chosen because it was relatively fast and easy to implement, and simple to understand. A more sophisticated system that allows variable fees is planned for the future.
- **Cost Efficiency**
  About half of the program's revenues are spent on overhead costs (project development, equipment and operations). As congestion reduction strategy and a way to improve bus service it has proven to be an effective and cost efficient investment.
- **Loss of Privacy**
  There is a concern that the network of video cameras and the system for tracking vehicles within London is an invasion of privacy.

Implications for Other Cities

London's congestion pricing project is considered an important test of the political feasibility of congestion pricing in major democratic cities. London's experience shows that congestion pricing is technically feasible and effective, and that it is possible to overcome political and institutional resistance to such pricing. As a result, it will help put congestion pricing on the menu of transportation improvement options in other cities. Implementation is not easy. It requires a suitable combination of travel and political conditions, including widely dispersed benefits and the ability to overcome public skepticism.

Author: Todd Litman, Victoria Transport Policy Institute, Canada

Art as a Public Activator

"It is difficult to design space that will not attract people. What is remarkable is how often this has been accomplished." – William H. Whyte

Art and aesthetics have been integral to humanity since the dawn of time. From tribal cave paintings to Egyptian pyramids to the prodigious artwork of the Italian Renaissance and beyond, an affinity for visual art has been part of public infrastructure throughout history, allowing cultures to identify themselves through unique elements of art, design and craft.

In the United States, formal public art and urban design programs are rooted in the late nineteenth century. By 1910, almost 46% of Americans lived in cities with populations of more than 2,500 people. Cities were no longer just centers of commerce; they were becoming diverse neighborhoods and communities. To enhance urban life, city founders recognized the value of art and design. The efforts of civic leaders, in concert with citizen concern for community aesthetics, comfort, safety and the "good life," evolved into the Village Improvement and City Beautiful Movements. By 1900, there were more than 3,000 Village Improvement and City Beautiful associations across the country. Their task was to balance the weight of industrial impact in urban environments and make places more beautiful and livable.

The Tren Urbano, the largest infrastructure project build in Puerto Rico, is a new star in our urban landscape. With time, we shall become aware of its revolutionary presence, and change our conventional image of the city by gazing at it from the train cars. A different city will reveal itself to the train's passengers. Moreover, the Tren Urbano is a place, like the communities traversed by it. Passengers are using the train as an entry and exit point into daily life. To those who live in its vicinity it is a claimable landmark. Art proposed for this site must reconcile local character with the overall metropolitan scope of the route. Given the technical uniqueness of each station, proposed works were limited to the sites specifically identified, which were selected after a thorough analysis of the operation.

"Con las Cotorras"
Martínez Nadal Station

The Tren Urbano stations are intermediate points between the community and public transportation. These are entrance "doors" to the different communities surrounding Tren Urbano therefore the following elements were and should be considered in the process of incorporating public art in the stations and the surroundings:

Sperber's *Reflections* - Centro Medico Station

- The scale of the art project
- Safety
- Natural elements such as shadows and winds
- Durability
- Minimum maintenance required
- Resistance to vandalism
- Influence on the observers
- Future developments

The Tren Urbano Stations provide new public spaces along its route in the SJMA that will contribute to the quality of life in the surrounding areas and will provide new spots for social interaction. Therefore its important to view the Tren Urbano not only as a transportation engineering project but also as a urban planning project with potential of adequate development.

SUCCESS

It's in Your Hands

The responsibility of a successful project is in your hands. The decisions you make will have both an immediate and lasting impact on your community and generations of people introduced to your community. Many of these impacts center around financial obligations and public safety.

Selecting a professional to provide architectural and engineering services is essentially selecting the team leader to deliver on the promises and commitments made to your community. Often leaders are challenge to make these selections with limitations. The most significant and controversial limitation is price for professional services. Bidding services can have negative impacts on project success and the ability to organize an innovative, effective and committed team. Although professional services are a significant investment, the effect on total project costs often has a greater impact than the initial professional service itself.
Given the significant amount of trust and confidence placed on today's leaders, a reasonable request to surround yourself with a competent and trustworthy team should not be denied. A strong leader without adequate support and resources many times fails to meet goals and objectives.

It is important to realize the purchase of professional services is more than simply buying lines on paper. Best results are accomplished by adopting a procurement process that matches a consultant to a project based on:

- Qualifications
- Familiarity and experience on related works
- Capacity
- Confidence in firm and assigned staff to deliver the project goals

When these factors are the drivers for choosing a professional consulting engineer for important projects, leaders are able to surround themselves with a partner whose job consists of more than producing a certain number of plan sheets. Having a true partner in your consultant is critical to delivering safe and fiscally responsible projects to your community.

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FUTURE EVENTS

87th Transportation Research Board Annual Meeting
January 13-17, 2008
Washington, DC
Information: TRBmeeting@NAS.edu
Internet: www.trb.org/meeting/

2008 Annual Meeting del National Association of County Engineers (NACE) and National Showcase of the Corridor Safety Program
April 20-24, 2008
Portland, Oregon
Information: http://countyengineers.org
Contact: utahltap@cc.usu.edu
Phone: (435) 797-2931

2008 APWA International Congress and Showcase - The Best Show in Public Works
August, 17 - 20, 2008
New Orleans, Louisiana
Contact: Dana Priddy, dpriddy@apwa.net
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