BY *TOLLWAYS* EDITORS

WHAT CAN WE DO TO IMPROVE ROAD SAFETY?

Tolling Points
The official blog of IBTTA

IBTTA recently took up the issue of road safety on its blog "Tolling Points." Below is the question as it originally appeared in the blog and excerpts from several individuals who responded. To view the comments from everyone who responded to this question, visit http://ibtta.blogspot.com/.

In January 2010, U.S. Transportation Secretary Ray LaHood announced new distracted driving restrictions on commercial truck and bus drivers. Every Transportation Secretary puts safety at the top of his or her agenda, and the distracted driving initiative seems to be the latest version of that tendency. Yet, no matter what people say or do, the number of fatalities on American highways stays about the same every year.

Recent studies demonstrate that the toll industry has a better record for safety and fatalities than non-tolled facilities. (See the article "Toll vs. Non Toll: Toll Facilities are Safer" in the winter 2008 issue of Tollways). While this may be comforting to some, it is still not sufficient cause for rejoicing when we know that more than 40,000 people die on U.S. highways every year and a comparable number die each year on roads in the European Union.

What can we do to significantly improve safety and reduce fatalities on highways around the world? What strategies and techniques will help us continue to eek out incremental improvements? And what changes (in mindset, psychology, operator behavior, roadway design, vehicle design, communications, etc.) will help us make one giant leap for humankind?

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Motorists are familiar with the safety features found within their vehicles, such as air bags and anti-lock brakes. In fact, the number of on-board safety features in one vehicle makes it more attractive on an auto dealer's showroom floor than the vehicle with fewer safety features.

But how about the safety features on roadways? What many motorists take for granted — and should recognize — are the hundreds of roadway safety features found on our nation's roadways that make our roadways safer and save lives every day. These lifesaving devices include:

- guardrails and cable barriers that prevent median crossovers and run-off-the-road accidents and bring the vehicle to a safe stop following an accident;
- bright, reflective, easy-to-read signage that provides excellent, clear-to-read guidance and information day or night;
- glass-bead technology found in bright roadway striping that guides motorists and keeps them on course in even the most adverse weather conditions;
- rumble strips that alert motorists when they are drifting off the roadway or are beginning to cross the centerline;
- and hundreds of other traffic control and roadway safety devices found in work zones and elsewhere.

Surprisingly, many of these roadway safety features can be installed at a relatively low-cost to begin saving lives immediately, especially on our nation's rural roads which are two and a half times as dangerous as our urban roadways. For example, a simple sequence of reflective chevron signs in a curve can immediately improve roadway safety, yielding a high return at very low cost.

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I agree with all of the other posts regarding tollway safety improvements, ITS and vehicle safety improvements, but let's face it, the driver is in control of his/her safety along with everyone else using the roadway/bridge/tunnel. So maybe the solution is psychological.

Remember the slogans "Watch out for the other guy" and "Drive defensively"? I rarely hear these anymore, in public service announcements, print advertising and message boards. Maybe we as road operators need to re-energize these slogans for our own facilities.

Distractions such as the latest gadgets installed in the vehicle along with smart phones, MP3 players and iPods, GPS, coffee cup warmers and every other imaginable contraption only compounds the problem. Just thinking about how someone could possibly use all of these gadgets and still drive safety reminds me of the Ed Sullivan act in which the man keeps all of the plates spinning on the poles while singing a song. It is only a matter of time before something has to give.

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We have all seen near misses and in some cases much worse due to a distracted driver. The real question is how do we change driver behavior in a sea of distractions in the vehicle? Is it our function? Are we part of a solution? We have a responsibility as facility owners and operators. But we can only do so much to reinforce responsible driving on our facilities.

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Note: The views expressed are my own and not necessarily shared by my agency.

The measures suggested thus far, including improved roadway design, better messaging, targeted bans on smart phone use, and consistent enforcement of DUI and speed laws,

OVER TIME, YOU AND I WILL CEDE MORE DIRECT CONTROL OVER OUR VEHICLES, JUST AS CONTROL OF COMMERCIAL AIRCRAFT HAS BEEN GRADUALLY SHIFTED FROM THE PILOTS.

are all laudable, effective to some degree and deserving of investment. They are all insufficient, however, to make auto travel as safe as air travel, which should be our industry's goal.

What will be needed to reach that goal is game changing technology that addresses the limitations of the human body and brain that make us ill-suited to adequately control vehicles at high speed in a highly dynamic environment with an often overwhelming amount of visual and other stimuli. Roadway and vehicle design improvements can only do so much to reduce the frequency and severity of accidents. Until we address the human factor directly, safety gains will be incremental at best.

I expect that the vehicle manufacturers will take the lead here and we will see a gradual implementation of collision avoidance technology. At some point highway authorities will realize that such technology, if supplemented by data streams generated by highway authorities (e.g., information about traffic speeds), can increase the carrying capacity of highways without having to add lanes and other hard and expensive infrastructure.

Over time, you and I and our descendants will cede more direct control over our vehicles, just as control of commercial aircraft has been gradually shifted from the pilots. Ultimately, travel in personal vehicles will become a time for distractions — e.g., movies, reading — and work, just as is possible now on commercial aircraft or railways.

The notion that there will be smart roads and smart vehicles that will do much of the driving for us may seem incredible, a quaint science fiction notion that should hardly be taken seriously. Yet, such a notion is no more quaint or technologically implausible than similar notions that people would one day carry computers in their pockets and have easy, fingertip access to the accumulated world knowledge; notions that have been realized

already in the form of the iPhone and the Internet.

The scale of this transition dwarfs the toll road industry. Nevertheless, to the extent that IBTTA advocates for game-changing technological advances in this area, it will be playing to a strength of the toll road industry, namely, a relatively good safety record. Who better to advocate for smart vehicles/smart roads than an industry that has demonstrated already that good design and smart deployment of technology can reduce the accident rates and the terrible human price paid in those accidents?

It is certainly important to focus on the immediate technological challenges facing the toll road industry, such as interoperability, improved toll collection devices and methods, and various safety initiatives. A significant share of our energy and creativity should also be devoted, however, to helping assist the birth of game changing smart vehicle/smart road technology that could realistically double the capacity and halve the accident rate on our existing toll roads. Such technology could support a major new industry, with associated jobs and economic benefits, for the regions or countries that are prescient enough to work to realize its potential.

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What I find interesting about the responses so far is that they reflect a lot of deep thinking that existed (I suspect) prior to the question being asked. Toll agencies are particularly interested in the topic for both utilitarian and humanitarian reasons — accidents block traffic flow as well as injure people. While this may be a less lofty motive than concern about people (not to suggest it is a greater concern) it also highlights one of the major distinctions I see between toll roads and "free" roads — i.e. only tolled roads, bridges and tunnels really care about maintenance of traffic flow.

On "free" roads everyone from fire companies, emergency medical technicians, and the police can shut down a road for an "investigation" and cleanup and it's the priority of virtually no one to think about the traffic backup and greater impact of a stoppage on tens of thousands of other people (and the

potential for follow-on accidents in such backups).

Another writer referenced the FHWA toll facility safety study in which IBTTA and our members played a major part to document best practices for both employee and traffic safety. The origin of the study was partly triggered by an NTSB accident report of a toll road accident that the media parlayed into a racy headline suggesting toll plazas to be the "most" dangerous driving environment on any road. Yet even the NTSB's statistics, which are arguable, suggested that something like 30–45% of accidents on the road being investigated occurred in the toll plaza. What is notable here to me is that the toll plaza is the main thing that distinguishes a tolled road from any other road, yet the greater percentage of accidents occurred on the mainline outside of the plazas which are little different from any other road. As noted elsewhere, with the advent of open road tolling the toll plaza will be an increasingly rare environment, which

should help improve toll road safety even further.

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As Congress moves toward more accountability by making the next transportation reauthorization legislation more performance driven, they would do well to take a lesson from what several toll agencies have already done to make their roads safer. Utilizing a performance contracting approach requires tighter deadlines for certain repairs, from more immediate response to guardrail end treatment damage to installing tape with rumble strips. These higher levels of service have created measurable improvements for many agencies that could be expanded on more highways to save lives. Other examples include the following projects:

- **Lighting.** ICA worked with the Orlando-Orange Country Expressway Authority (OOCEA) to refurbish all toll plazas with the new LED lights. We replaced toll lane indicator lights — green arrow open light and red cross closed light; and also the yellow blinking warning lights between each toll lane. The results of these replacements were a win-win for everyone, especially for safety. Maintenance and utility costs both declined and the new lights are probably twice as bright as the original incandescent lights, thereby providing better visibility and navigation through the toll lanes. There has been a noticed decrease in toll booth hits and attenuator hits due to better navigation through the tolls.
- **Rapid Incident Scene Clearance.** This is a performance driven way of clearing incident scenes that has proven effective with Florida Turnpike Enterprise. A contractor is paid a bonus for clearing scenes within a specified timeframe. Why is this an improvement? Because you get traffic back to normal operating conditions more quickly, which lessens the chance for secondary accidents from the restricted driving conditions.
- **Median Barriers.** The increased use of median barriers to prevent crossover accidents has reduced both the incidence and severity of high speed, head-on accidents.

THE MOST IMPORTANT THING WE CAN DO TO CONTINUE TO REDUCE ACCIDENTS AND FATALITIES IS TO CONVERT BARRIER/CASH COLLECTION TOLL ROADS TO ALL ELECTRONIC TOLL ROADS.

This is especially true with the use of cable guardrail, which captures the errant vehicle and prevents it from being redirected into the path of other vehicles. While property damage may be as severe for the single vehicle, it prevents others in adjacent lanes from being involved. High performance levels for repair of these barriers are essential.

These are just a few examples of the safety improvements that can result from using a performance based maintenance approach.

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Facts show that limited access facilities are some of the safest roadways in the nation. The latest trends in accidents and fatalities on U.S. roads show that both the number and frequency of fatalities are going down. While many say this is directly related to the economy, the frequency rates show otherwise since they exceed past rates, which is a good thing.

As toll road owners and operators, the most important thing we can do to continue to reduce accidents and fatalities is to convert barrier/cash collection toll roads to all electronic toll roads. Recent studies have shown that accidents were reduced by over 60% on toll roads that went from barrier/cash collection configurations to open-road tolling (ORT). While ORT is not a complete all electronic configuration, it does introduce the high-speed electronic option to drivers, which removes the opportunity for impacts with objects such as attenuators, delineators, raised medians, toll booths, etc.

As tolling agencies, we also have the obligation of not sitting on the successes we have had in the past, but instead, look for ways to continue to be safer in the future. One way this could be done is to introduce the road safety audit (RSA) process into the planning

and design stages of project development. Many times we wait until after the fact to address a dangerous location when we have the tools in place to address these locations before they are built or reconfigured. By introducing RSAs into the early stages of a project, we allow engineers, maintenance personnel, highway patrol and other parties the opportunity to identify safety concerns before construction and to recommend alternatives to mitigate these concerns. We do so by not looking at "standards" or "policies" on design, but by evaluating based upon driver perspectives and operator understanding.

Finally, the tolling industry has the opportunity to lead the charge in the U.S. by getting on board with the smart highway concept. We have all heard that both infrastructure and vehicle safety has improved and that a majority of the issues around accidents and fatalities is with the drivers. Yet it is virtually impossible to cure this cause without having a smart highway concept that helps the driver know what issues lie ahead. The European Union has been charging forward with this initiative, and with the technology we use on our toll roads today, we too could be charging forward.

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Transportation professionals have been working to improve road safety for about as long as we've had roads. But a distracted, aggressive, impaired or inexperienced driver can still manage to crash a vehicle on the safest road. So, we should focus more on driver safety. Does this mean we should stop trying to make our roads

WE CAN EXPAND AND IMPROVE INTELLIGENT TRANSPORTATION SYSTEMS TO MONITOR BUSY ROADWAYS AND PROVIDE MOTORISTS WITH BETTER, REAL-TIME INFORMATION

safer? Certainly not. Can we do more to improve driver behavior? We need to try, and we all need to face the reality that we're not perfect drivers.

We have to continue building and operating the safest roads possible by identifying and treating known hazards. This can include both routine construction and maintenance as well as targeted safety construction projects designed to treat either a specific high-crash location or make general improvements. But that's only one side of the equation. We also need to work harder to eliminate dangerous driving behaviors through education and we should promote targeted traffic law enforcement. New legislation designed to further discourage negative driving behaviors such as texting while driving, etc., could also help. Previous public education efforts have worked well to increase seat belt use, reduce DUIs, etc. In addition, we must not forget that ongoing education and enforcement are key elements in raising and maintaining compliance.

Technology has to be part of the solution. We can expand and improve intelligent transportation systems to monitor busy roadways and provide motorists with better, real-time information. We expect to see continued improvements in vehicle construction to assist in crash avoidance and survivability, such as blind spot warning devices and automated braking systems when vehicles come too close to obstructions. At some point, fully automated vehicles integrated with "smart" roadways should be possible. But until we truly have an "auto-pilot" feature on our vehicles, we will have to tackle the safety issue from all fronts.

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On the issue of toll roads being safer, I offer the following observations based on my own experience:

Toll highways are "statistically" safer than non toll highways of similar geometric characteristics. When we compare roads that have the same geometric conditions where vehicles and drivers operate in a similar way, this is what makes the difference for safety:

- First, the physical condition of the road is better on toll facilities. Since the monitoring and preventive maintenance is available continuously on toll roads — 24/7/365 — there is much less chance of having an accident resulting from the appearance of debris on the roadway
- Second, the behavior of the drivers is better on tolled facilities. I believe drivers behave better when they get the feeling that someone is watching them.
- Finally, the liability of the toll road operator is the force behind active monitoring and preventive maintenance activities.