

Lone Star Roads™

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**Traffic Safety on
County Roads**



Backhoe Safety



TEEX Safety Rodeo

Traffic Safety on Texas County Roads

William Lowery, P.E., TEEX Adjunct Instructor

Traffic crashes certainly happen on county roads. In fact, TxDOT's 2013 state-wide crash statistics report that 272 fatalities occurred in traffic crashes on county roads. This is only about eight percent of total traffic fatalities across the state, but it does not relieve county officials of their responsibility for providing reasonably safe roadways. Officials in most counties can improve the safety of their roads and fulfill this responsibility with a safety improvement program using low cost safety measures.

Different Safety Solutions for Different Roads

For decades the Federal Highway Administration has partnered with state DOTs to research and deploy improved safety designs and practices. These efforts have been well-suited to "on-system" roadways, Federal and State routes operated by state DOTs. These safety practices have application on some "off-system" roadways (those under local jurisdiction), particularly where roadways have physical and traffic characteristics similar to "on-system" highways. However, techniques tailored to state highways may offer little help where roadways with limited geometry and low traffic volumes are operated by low-budget jurisdictions. This raises a question: What might be done differently for low-end roadways?

There is great diversity in the characteristics of roadways operated by Texas' 254 counties; ranging from 6-lane urban-type arterials with medians, to routes that are barely more than muddy wagon trails; altogether, more than 147,000 miles of roadway per US DOT data.

In limited instances rural county roads are built nearly to standards of rural FM (Farm-To-Market) highways maintained by TxDOT. Where these and higher-type county facilities are similar to "on-system" highways, safety features like those used by TxDOT may well have direct application. One example is use of sloped treatments on culvert ends exposed to traffic; others might be center-line stripping, or multi-lane approaches to major intersections.

Difficult Roadway Characteristics

Most county roads don't have characteristics nearly as good as state highway routes. Many are unpaved or only gravel. Many that offer a fairly good riding surface have seldom had vertical and horizontal alignments (hills and curves) prepared for the higher speeds encouraged by better surfaces. In combination, these circumstances can surprise drivers, particularly those unfamiliar with the road. Also, safety solutions are usually more limited. For example: center-line and edge-line pavement markings help drivers safely negotiate curves at night, but these are not practical on unpaved roads.

Traffic Variability

Traffic volume and driver characteristics can vary widely. Drivers become more varied, and volume grows as land uses change and increase. Rural-oriented drivers primarily work and live in low-density communities of farming

By comparison to state-maintained highways, county road circumstances can easily result in common safety weaknesses.

Narrow Right of Way:

Can yield steep, hazardous side slopes or ditches; can force drainage features too close to travelway; can limit roadside "clear zone", often resulting in trees or power poles too close to travelway; can limit safe sight distances at intersections.



Sight distance over hill may be incompatible with speed accommodated by surface.



Narrow ROW – Trees very near roadway edge

Sharp 90-degree Bends:

Often approached by straight sections of road allowing speed incompatible with the turns; often allow very limited sight distances of oncoming traffic around bend.

or ranching. On the other hand, urban-oriented drivers generally commute between some type of subdivision and most of their activities (work, shopping, school, recreation). Counties of urban areas such as Dallas, Houston, and others often have high-type facilities that carry much urban-oriented traffic. Most other counties have roadways that fall in two categories: those serving fringe areas of urban-like places (whether very large or smaller), and those serving only small towns and mostly rural-oriented drivers.

Approaches to Safety Improvements

Two basic approaches can be taken to traffic safety improvement: traditional and systemic (not to be confused with the term "systematic"). The fundamental

Lone Star Roads

The Local Technical Assistance Program (LTAP) is a nationwide effort financed by the Federal Highway Administration and individual state departments of transportation. Its purpose is to translate into understandable terms the best available technology for roadways, bridges, bicycle and pedestrian facilities, and public transportation for city and county roadway and transportation personnel.

The Lone Star LTAP center, operated by the Texas A&M Engineering Extension Service, is sponsored by the Texas Department of Transportation (TxDOT) and the Federal Highway Administration. This newsletter is designed to keep you informed about new publications, techniques, and training opportunities that may be helpful to you and your community.

Lone Star LTAP Staff: Tony Alotto, Program Director Kathy Stone, LTAP Training Manager Guy Benson, Editor Lisa Cumby, Customer Care Center Martha Malone, Graphic Designer

For Information: Phone: 800-SAFE-811 (800-723-3811) Fax: 979-458-1426 Website: www.teex.org/ltap E-mail: itsi@teex.tamu.edu

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Hazards at Water

Crossings: Low-water crossings or bridges/culverts may restrict travelway width; may lack safety side rails due to need to accommodate wide, low farm equipment; may have inadequate approaches needing guard rail or other treatments.



Drainage structure on curve at edge of unpaved road

Missing or Obscured Signs: Locations that are very remote present high incidences of theft and vandalism of safety devices, reducing information so important to drivers.



No warning or marking of sharp turn

Limited Funding:

Most Texas counties have very limited funds for roadways. This can result in things such as short culverts that present hazards very near the travelway; the absence of guardrail in situations where needed; undersized culverts resulting in sporadic un-expected water depth over the road.



Very limited sight distance around sharp turns



Drainage structure very near roadway edge

difference between these approaches is outlined as follows.

Traditional: This works on the premise that traffic crash history will be able to inform analysts about specific countermeasures that should be considered for reducing crashes at a specific location (or along a specific roadway section). For example, if traffic crashes involved left turning traffic along a multi-block section of urban arterial, a jurisdiction might decide to install raised medians to better manage left turns. The countermeasure chosen would be specific to the crash history at that specific location.

Systemic: This is a very different approach. It deploys proven safety features at applicable locations independent of any crash history at those specific locations. TxDOT's use of break-a-way sign supports is a good example. These devices dramatically reduce the chance that an errant driver will have a sign crash through his/her windshield. These are used system-wide, not only where there is a history of drivers hitting sign supports; thus, they are systemic in nature, making the at-large system safer. The same could be said of sloped end treatments on culverts and other safety design practices.

The traditional approach involves sophisticated traffic safety studies, and is data intensive. Analysts use crash data that includes detailed information about a specific location and the circumstance of each crash to look for patterns among many crashes at the study location. The idea is to see if a crash pattern

would suggest use of specific countermeasures at that location. Next, they consider alternative measures to assess which might be most cost-effective at the study location. This process establishes the basis for funding of "solutions" at target locations, and helps assess which locations most warrant use of limited safety improvement funds. The objective is to improve crash-prone locations as much as practical with limited highway safety funding.

By comparison, the systemic approach is not dependent on crash data about specific locations. Rather, it deploys known safety countermeasures system-wide through design; possibly in remedial projects; and often through low-cost actions.

Road Safety Reviews

In most counties the number of crashes of any one type at any one location are usually so few as to render the traditional approach unworkable. This is because there are so many variables involved in crashes, that only one or two crashes at any one location are not likely to offer reliable evidence about causal factors. Moreover, in many cases the exact location of crashes is not reported in the data about crashes on county roads.

The Road Safety Review process can overcome these shortcomings. It offers a way to improve safety with low-cost measures. The process takes a

Traffic Safety on Texas County Roads continued

Improving Traffic Safety On County Roads

Assess Your County Situation

- Is your county experiencing considerable population growth, perhaps due to its proximity to urban-like places (places with a population of 25,000 or more)?
- Is your county situated in a major Texas growth region such as the IH35 corridor or some other sector, or where oil/gas production activity is high?
- Are your county roads experiencing significant changes in the volume and type of traffic using them?
- Is subdivision activity (planned or constructed) growing in your county?
- Has your county experienced or been threatened with a lawsuit due to a traffic crash?

Assess Crash Experience

- Has your county experienced a noticeable increase in the number and/or severity of traffic crashes in recent months/years?
- Are citizens raising vocal concerns about traffic and safety conditions?

Determine Capabilities & Limitations

- Can county staff gather crash records from TxDOT's records and use them to prioritize county roads based on crash histories?
- Does your county have the means to track the time, date, and location of actions on traffic control devices (both for installation and maintenance)?
- Does your county face serious dollar limitations for improving traffic safety?
- Can county officials agree on the value of a simple, county-wide traffic safety improvement program?

Establish a Written Plan

- Are you prepared to answer the question of whether your county has a plan for treating problem areas on your roads?
- Can your county prepare and commit to a simple plan for development of a safety improvement program?

Get Help

- Your Lone Star LTAP Center at TEEX can help you get started with a road safety review process that is especially suited to your circumstances.
- The Center can also help you formulate a traffic safety improvement program that will guide use of existing limited resources to get the most out of low-cost actions.
- Contact your Lone Star LTAP Center (Technical Assistance Program) to learn how we might help.

systemic (system-wide) approach that is guided by limited crash data. Taking roadway departures as an example, instead of examining crash data to determine how to improve safety at a particular curve (the traditional approach), it determines which roadway routes have the most road departure crashes during a 2-3 year period, and ranks the routes accordingly. Beginning with one of the routes having high numbers of crashes, the correct warning signs are installed at just the right places on approaches to all the suspect curves/turns along that route. Attention can then be directed to the next "most severe" route. This allows officials to work down the list of routes as funds can be made available, and helps justify treating one route before others. It addresses safety route-by-route, in order to apply low-cost applications that are known to improve safety.

A Safety Improvement Program

To the question of whether a county has a safety improvement program, the best answer is "yes". A "no" answer can be very troubling in court and with county residents. For the answer to be "yes", officials must have a documented

process by which improvements are made and maintained. It should outline how priorities are established, and should provide guidelines for needed actions.

The Road Safety Review process outlined above can be used to establish and maintain a good safety improvement program. It could focus first on curve warning signs, then on roadside object markers, then on retro-reflective treatment of bridge rails, or on whatever priorities might be suggested by the county-wide crash information. However, all actions need to be intentional and well documented, with year-to-year targets for accomplishment and annual or other routine progress reporting. Good records are essential to any safety program.

Safety Fundamentals to Know

Traffic safety is dependent on four elements that work together: driver, vehicle, roadway, and environment. Officials have no control over the vehicle or environment, and only little influence over drivers. However, they do have responsibility for the roadway. As to traffic safety, the "roadway" consists of the travel way, side road/driveway connections therewith, and everything in roadside areas, including drainage features. The geometric shape of the travelway (width, hills, curves) is very expensive to alter; roadside clear zones are generally limited by the availability of ROW; and drainage features occur at fixed locations and are often very expensive to adjust. This means that for most counties, officials have limited options for improving traffic safety. However, proper use of traffic control devices can make a difference.

Drivers depend on queues from the driving environment in order to make good decisions and avoid crashes. At night informal information from the road and the roadside (power lines for example) is obscured, making retro-reflective traffic control devices especially important. Signs, delineators, and object markers can do much to help drivers avoid mistakes, if properly used and adequately maintained. Otherwise, traffic safety may be compromised.

Properly informing drivers about roadway characteristics is important to providing reasonably safe county roads. This is especially true where unfamiliar drivers use county roads in fringe areas of urban-like places. Urban-oriented drivers operate with different expectations than rural-oriented drivers, so

roadways serving them may warrant extra attention to traffic safety features. Fundamentally, the less familiar a driver is with a route, the more dependent he/she is on traffic control devices, especially at night.

Actions to Consider

A defined safety improvement program can be a valuable asset, assuring that existing county resources are directed to traffic safety as much as practical. And, in the event of a lawsuit involving a serious crash, officials would do well to be able to point to their efforts to make their roads reasonably safe. The potential for crashes is generally higher where county officials face challenges resulting from changing land uses and suburban growth in fringe areas of urban-like places. In such areas, growing urban-oriented traffic must often travel roadways having serious safety limitations. Here are some questions to ask to help launch efforts for safer roads in your county. ★

Backhoe Safety



Backhoes are one of the most used equipment by city and county jurisdictions throughout Texas. To help remind operators on the safe operation of backhoes, Lone Star LTAP offers the following reminders:

Pre-Use Activities

- Review and understand information provided in the backhoe operator's manual with particular attention given to descriptions of safety procedures.
- Perform an equipment inspection, including checking fluid levels, lights and signals, tires, hydraulic cylinders/lines, loader bucket/excavator connections, guards and shields. Inspect backhoe for worn or loose parts such as lynch/cotter pins or lug nuts.
- If a backhoe fails the inspection, notify your supervisor and have the appropriate repairs made before putting into operation.
- Annual backhoe training should incorporate general backhoe training and specific training on the backhoe that crews may use.

Operation Precautions

- Before starting and while operating a backhoe, look for people or obstructions in the vicinity of the backhoe.
- Never carry passengers on a backhoe

- Learn the locations of underground and overhead utility lines, ditches, stumps, and other hazards or obstructions in the work area.
- Extend the backhoe stabilizers prior to starting an excavation.
- Never exceed the engine, excavator, or lift capacities of the backhoe.
- Swing the backhoe arm uphill when excavating on a hillside. Place excavated material in a location that will prevent it from falling back into the excavation.
- When transporting material in a loader bucket, keep the bucket as low to the ground as possible to maintain backhoe stability.
- Only raise the loader bucket for the purpose of dumping material.
- Reduce speed when turning, crossing slopes, or driving on rough, slick, or muddy surfaces.
- Dismount (or mount) a backhoe when the engine is shut off.
- Never adjust or work on the backhoe unless the engine is shut off and hydraulic pressure has been de-energized.
- In order, backhoe shutdown procedures are:
 - (1) turn off the engine;
 - (2) lower the loader bucket and backhoe arm;
 - (3) and set the parking brake. ★

Thanks to the West Virginia University-Environmental Health and Safety for the content of this article

TEEX LTAP Safety & Equipment Rodeo Roundup a Success!

After the dust settled in Aggieland, the inaugural TEEX Lone Star LTAP Safety & Equipment Rodeo Roundup hosted in Bryan/College Station June 11-12, 2015, was deemed a great success! During what will most certainly become an annual event with Texas811, over 300 participants enjoyed not only a great opportunity to network with other industry professionals, they attended scheduled training coordinated by LTAP coordinator, Kathy Stone, participated in several competitive field exercise orchestrated by TEEX heavy equipment instructors, visited with local equipment vendors and work zone safety manufactures, and attempted to consume the largest custom made pizza anyone has ever seen, courtesy of Dirt Road Cookers! In addition to these events, LTAP also hosted the Texas Chapter

SAFETY & EQUIPMENT RODEO ROUNDUP



of American Traffic Safety Services Association, quarterly meeting. The agenda included demonstrations of the latest work zone safety equipment and presentations of technology-driven ITS Work Zone Management solutions by Dr. Gerald Ullman, P.E. During the event on day-two Atmos conducted a mock gas line strike response complete with follow on scenario-driven safety procedures.

Guest speakers included Deputy Executive Director John Barton with the Texas Department of Transportation; David Ferguson with the Pipeline Safety Division of the Texas Railroad Commission; TEEX Director Gary Sera; Dr. Gerald Ullman of the Texas A&M Transportation Institute and Damage Prevention Manager, Doug Meeks, Texas 811.



Our special thanks to John Barton, TxDOT Deputy Executive Director and Gary Sera, TEEX Director for helping kick off the event. TEEX, Lone Star LTAP, and Texas811 look forward to another successful event next year in 2016. ★

Hot Weather Safety Tips for Road Workers

After a wet, cool spring and early summer, the Texas heat is making its return. Keeping a crew cool and safe is a challenge when the temperature approaches 100 degrees. Heat stress is increasingly being recognized for contributing to the rapid onset of fatigue, mental distractions, inattention to details and other job quality deficiencies.

Here are a few tips share with your crews and coworkers.

Stay Hydrated. We all know that water is the best hydrating beverage, but for many, especially younger crew members, it is tasteless and boring. Try adding a slice of lemon to the cooler to add some taste. Remember, cool water, not ice water, is the best. Avoid carbonated sodas and sugary, caffeine containing beverages.

Select your lunch carefully. Burgers and fries are high in fat. When working in hot temperatures, the calories will stress your body. Try eating a bigger breakfast and light lunches, such as fruit and vegetables and salads.

Schedule for cooler work times. When possible, consider scheduling strenuous work for the cooler parts of the day. Supervisors should watch more closely for indicators of fatigue and call for breaks more frequently.

Bring Shade. Have a shaded area to take breaks. Bring heavy duty sun-block for crew members. Switch to wide-brim hard hats. Wear full sleeve, light colored cotton or engineered fabric shirts. Nape protectors, vented hard hats and cooling bandanas are a good choice.

Keep an eye on one another. Be alert for signs of heat exhaustion. Early symptoms include lethargy, disorientation, stumbling,

dropping tools, and slurred speech. You can't have this happening around moving equipment.

Basic First Aid for Heat Exposure.

Have the person lie down in the shade preferably in a breezy area with feet elevated above the heart. Remove work boots.

In a severe case, call 911.

Progression of Heat

Related Illness. Typically, heat exhaustion starts with cramps followed by heat stroke. Heat stroke can be deadly for some people, particularly when already dehydrated.

By following these few steps, we can have a safe and productive summer work season.



Center for Disease Control (CDC) and OSHA- Preventing Occupational Heat Exposure ★

Senseless Deaths on the Rise Due to Distracted Driving



With more people dying senselessly on Texas roads due to distracted driving, TxDOT has kicked off its annual "Talk, Text, Crash" campaign to urge drivers to give their full attention to the road.

"Nearly 1 in 5 traffic crashes is caused by a distracted driver," said TxDOT Deputy Executive Director John Barton. "Last year, 468 people were killed because someone took their attention off the road."

Distracted driving-related crashes in Texas are highest among 16-24-year olds. In 2014, there was 100,825 crashes in Texas involving distracted driving-up 6 percent from the previous year.

According to the Insurance Institute for Highway Safety, drivers using a mobile phone are four times more likely to cause serious injury in a crash. Text messaging is particularly dangerous. New research conducted last year by the Texas A&M Transportation Institute showed it takes a driver double the amount of time to react when they are distracted by text messaging. Additionally, sending or receiving a text takes a driver's eye away from the road for an average of 4.6 seconds. At 55 mph, that's equivalent of driving the length of a football field while blindfolded.

While mobile phone use is the most recognizable driving distraction, any type of behavior that draws a motorist's attention away from driving is dangerous. TxDOT urges drivers to refrain from:

- Texting
- Checking Email
- Eating and drinking
- Grooming
- Reading
- Programming a navigation system
- Adjusting music or other audio device

If a distraction absolutely requires immediate attention, TxDOT reminds drivers to pull over to a safe location and come to a complete stop before diverting their attention. ★

Article Courtesy of the Texas Department of Transportation





Lone Star Local Technical Assistance Program

Infrastructure Training & Safety Institute
Texas A&M Engineering Extension Service
PO Box 40006
College Station, Texas 77842-4006

www.teex.org/ltap
800-SAFE-811 (800-723-3811)

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Click It OR Ticket



“Click It or Ticket” Campaign Warns Texans of Deadly Consequences of Not Buckling Up

The simple, law-abiding habit of wearing a seat belt can protect thousands of Texans from serious injury or death. Yet, many people still refuse.

“It’s heartbreaking to know lives are being lost on Texas roadways because people are still not buckling up,” said John Barton, TxDOT deputy executive director. “These motorists have friends and families who will never get over the loss of their loved one. It’s really simple. Seat belts save lives. Every single individual in a vehicle needs to be buckled up.”

If the deadly consequences aren’t enough to motivate seat belt use, fines and court cost can total up to \$200. In Texas, the law requires everyone in a vehicle to be buckled up, including back seat passengers.

In 2014, 2,587 motor vehicle traffic crashes occurred in Texas in which unrestrained vehicle occupants sustained fatal or serious injuries. Wearing

a seat belt helps keep occupants from being ejected in a crash and increases the chance of surviving by 45 percent. In pickup trucks, that number jumps to 60 percent, as those vehicles are twice as likely as cars to roll over in a crash.

The “Click It or Ticket” campaign, combined with enforcement, is credited with motivating millions of motorists to always use their seat belts. Only 76 percent of Texans used seat belts when the campaign started in 2002. Today, 9 out of 10 Texans buckle up. The National Highway Traffic Safety Administration estimates that since its inception, the “Click It or Ticket” campaign in Texas has resulted in 4,319 fewer traffic fatalities while preventing 72,926 serious injuries and saving more than \$16.7 billion in related economic costs.

To learn more about “Click It or Ticket,” visit texasclickitorticket.com