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North Carolina Local Technical Assistance Program (LTAP) Newsletter
FALL 2022

Coordinator's Corner

Merge Like a Zipper

By Bill Woods

As a born and raised North Carolinian, specifically New Bern, Emerald Isle has a particularly special place in my heart. As a kid and now an adult with kids, I still spend many weekends relaxing and playing at the beach. On one of my recent trips across the Intercostal Waterway from Cape Carteret to Emerald Isle, I spotted a sign that was familiar with me because it was from a project the Highways Group from my office was conducting. The sign read, "Merge Like A Zipper". Basically what was going on was a merge from two lanes into one. The idea was to have traffic utilize both lanes to their farthest point right up to the merge then take turns merging one car after another, just like a zipper. For this to work, the car in the straight through lane would have to yield to the car in the merging lane, allowing them to merge in front of them. This way all the lanes are being used to their fullest potential, and every car in both lanes continue to stay in motion. Sounds like an easy process, but we all know that some people don't like to yield, so the merging lane doesn't always get their turn, which was the case this day for us. We were in the merging lane and were skipped over a number of times, I guess for those who just could not wait to get to the beach. Folks, let's be practical, how much time are we talking being delayed by not letting someone merge in front of you? 3 seconds?

Be courteous, be smart, be nice. Being courteous is just good manners and can ease anxiety or frustration (which we can all agree we could use less of these days). Being smart is knowing that to maximize traffic movement is to maximize all your lane space. Having an entire lane of traffic sitting still just causes more problems for the traffic behind them, especially if this back up starts to reach an intersection, which just causes more delays and headaches even for traffic not on that path.

Let us consider this scenario: the right lane is the open lane and the left lane is the lane that ends. In this situation, the traffic in the left lane needs to merge into the right lane. Traffic experts agree that the best way to combine two busy lanes of traffic is for drivers to use both lanes right up to the merge

In This Issue

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Technology Transfer Newsletter

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then 'merge like a zipper', one from the right, one from the left, one from the right, one from the left, etc. With this technique, both lanes keep moving at a consistent rate and both lanes are being maximized with traffic. Maximize lanes, maximize traffic movement.

But what about when you see an opportunity to move over early? Would this not be the better option to go ahead and merge early? This practice may work with light traffic, but not so much in heavy traffic. In heavy traffic the zipper merge is the best way to merge two lanes of heavy traffic into one.

One final thought is something that is becoming quite an issue on our roadways, road rage. Something that can escalate to accidents and even violence. A serious problem that is completely avoidable and unnecessary. We have all been in a construction zone approaching a merge, we are in the right lane and cars in the left keep zipping by. How Unfair! In retaliation what do we do? We pull up tight to the car in front of us and refuse to let anyone merge over. This obviously can lead someone to lose their cool, get angry and end up with road rage. So next time you are in heavy traffic, the open lane watching the merging lane zip by you, now you know, the left laners must have read this article! Now and it is up to the rest of us to, as we say at NC-LTAP, spread the good word!

As always, Happy and Safe Travels! Zip it!

What's Wrong With This Picture?

Can you tell what's wrong with this picture? See answer on page 12.

USDOT Announces $8.4 Million in Grant Awards to Help Connect People to Health Care, Other Critical Services

USDOT announces $8.4 million in grant awards to help connect people to health care, other critical services in 16 states on 17 projects. This grant is important because transportation is a big part of helping Americans reach the hospitals, doctors, dentists, and all other healthcare locations they need to. If coordination of transportation is improved, more people will have access to the healthcare they need. To learn more about this and the projects being funded, click on the link below.

Click Here for More Information

Police in Wilmington Educate People on Driving Safety

There are constantly car crashes all around North Carolina, and the police of Wilmington, NC have decided to educate those in the community about how to remain safe on the roads. The officer discusses how when people drive 10 miles above the speed limit in order to get somewhere quicker, they actually only save a few seconds of time and all they really do is put themselves and others in danger. The officer also talks about leaving a safe following distance between yourself and the cars ahead of you and how to be safe as a pedestrian crossing the street.

Click Here for More Information

Improving Pedestrian Safety at Signalized Intersections: Impacts of Corner Radius

By Kay Fitzpatrick, Ph.D., P.E., PMP (F), Ann Do, P.E., Raul Avelar, Ph.D., P.E., PMP (M), Mike Pratt, P.E., PTOE (M), and Subasish Das, Ph.D. (M)

Reprint from: ITE Journal, June 2022

Many transportation agencies are placing greater emphasis on improving pedestrian safety and reducing the risk for a fatality or serious injury to pedestrians. Both safety and design practitioners require a methodical approach to assess pedestrian safety benefits for different countermeasure options. A crash modification factor (CMF) is a measure of the safety effectiveness of a treatment or design element. By adding to the availability of reliable CMFs and gaining an understanding of how design elements affect operating speed, agencies can aid the implementation of effective countermeasures for addressing pedestrian crashes.

A recent Federal Highway Administration (FHWA) project was established to determine the safety effectiveness of low- to medium-cost engineering countermeasures in reducing pedestrian fatalities and injuries at controlled and uncontrolled intersections.[1] The project started with FHWA researchers identifying the pedestrian treatments in use along with the preference for which treatments need a CMF. By using these findings, the FHWA stakeholder engagement working group set the research direction to investigate the relationship between intersection corner radius design with crashes and intersection corner radius with turning speed.

Pedestrian or Right-Turn Crashes Associated with Corner Radius

The researchers began the statistical evaluation of the relationship between intersection corner radii and crashes at signalized intersections by identifying potential sites. The research team selected intersections with the following characteristics:

- Movement count (vehicles and pedestrians) for at least 2 hours.
- Traffic control signal is present.
- Typical geometric intersection configurations (including three- and four-leg intersections) are present. Intersections with five legs or a large skew were removed.
- Known or visible (from aerial photos) road or sidewalk construction is not present during the years matching the crash data.

The research team obtained preexisting vehicle turning movement and pedestrian counts for signalized intersections in three U.S. cities (Richmond, VA; Bellevue, WA; and Portland, OR). The research team used expansion factors to convert the available counts, which were typically only for several hours within a day, to represent a daily, and then an annual, value for both vehicles and pedestrians. Crash data were collected in Washington between 2011 and 2017 (7 years), in Virginia between 2013 and 2018 (6 years), and in Oregon between 2012 and 2017 (6 years).

METHODOLOGY

The radius of each corner of an intersection can be unique; therefore, the research team attempted to assign crashes to an intersection corner rather than to the entire intersection by using information on the latitude and longitude of the crash, along with information on the vehicles' directions and the crash type. Because these two methods did not always lead to the assignment of the crash to the same corner, the research team included a weighting scheme in the analysis to consider the level of certainty that the crash was being assigned to the correct corner—crashes with a higher certainty level would thus influence the result more than crashes with a lower certainty level.

The research team considered the vehicle volumes on the legs (both directions of traffic) adjoining the intersection corner of interest for the pedestrian crash evaluation and on the samedi- rection lanes nearest to the corner for the right-turn analysis. The pedestrian and bicyclist (when available) volumes included the number of pedestrians and bicyclists who were on the two legs that connected the corner of interest. The research team assembled a spreadsheet with one record for each intersection corner (i.e., a fourleg intersection would be described by four records) that included the roadway characteristics that describe the approaching and receiving legs in relation to the right-turn movement at the corner. For example, the southeast corner's record would include variables to describe the south (approach) and east (receiving) legs. The research team used aerial and street-level photography sources available online to extract roadway characteristics for each corner.

For the corner analyses, the research team used generalized linear mixed-effects models to perform the safety analyses. After the research team performed exploratory and preliminary analyses, they used the Virginia dataset (1,017 corners) because its large size produced more stable coefficients and because a greater proportion of the corner crash assignments had a high level of certainty for being assigned to the correct corner.

RESULTS—PEDESTRIAN CRASHES

For signalized intersection corner-level pedestrian crashes, the following variables were found to be positively related (i.e., the number of pedestrian crashes increased as the value of the variable increased):

- Pedestrian/bicyclist volume on the approach leg
- Pedestrian/bicyclist volume on the receiving leg
- Vehicle volume on the approach leg
- Vehicle volume on the receiving leg
- Corner radius
- Shoulder width

The number of pedestrian crashes was higher when both legs at a corner were one-way streets, with traffic moving away from the corner, or when there was a mix of two- and one-way operations present at the intersection. Fewer pedestrian crashes occurred when on-street parking existed on the approach leg.

RESULTS—RIGHT-TURN CRASHES

For corner-level, right-turn vehicle crashes, including pedestrian crashes when the involved vehicle was turning right or a single-ve- hicle or multiple-vehicle crash when one of the vehicles was turning right, the following results were found:

- Pedestrian/bicyclist and vehicle volumes on the approach and receiving legs were positively related
- Number of vehicles making a right turn at the corner was positively related to the number of right-turn crashes
- Other variables that were positively related to corner-level, right-turn crashes included the presence of a median or the shoulder width on the receiving leg
- Variables that were associated with fewer right-turn crashes included one of the legs having only one lane on the approach or the intersection having four legs rather than three legs

RESULTS—CMF

The focus of the corner-level safety analysis was to investigate the relationship between the intersection corner radius and pedestrian crashes. For pedestrian crashes, the evaluation found a statistically significant relationship with corner radius. The statistical model estimate for corner radius can be used to generate a CMF. The pedestrian CMFs for the range of corner radii included in the evaluation, assuming a baseline condition of a 10-foot (3 meter [m]) radius, are shown in Figure 1. In general, the relationship between corner radii and pedestrian crashes is directly proportional: On average, larger corner radii at a signalized intersection are associated with more pedestrian crashes. For example, Figure 1 shows that with everything else being equal, 39 percent more pedestrian crashes are expected at a location with a corner radius of 40 ft. compared with a location with a corner radius of 10 feet (ft.) (3 m). The largest contrast seen in the figure is between 70-(21.3 m) and 10-ft. radii. The former is expected to experience about 59 percent as many pedestrian crashes as the latter (from a corre- sponding CMF of 1.59).

Pedestrian Crashes at Signalized Intersections

The analysis of the pedestrian crashes at signalized intersections considered data for 299 intersections in Oregon, Washington, and Virginia. Both three- and four-leg signalized intersections with streets with two-way traffic operations were represented. The best model found an increase in pedestrian crashes with increases in pedestrian and bicycle volume, major street vehicle volume, or minor street vehicle volume. These results were not surprising because it is reasonable to assume that pedestrian crash risk will grow with the increasing exposure of pedestrians to vehicles at an intersection.

Although the dataset represented several median types, only the condition of a left turn lane without a raised median (LTLwoR) remained in the statistical model. The other groups—none, raised, and mixed median types—did not remain in the model. One hypothesis for why more pedestrian crashes are occurring is a lack of pedestrian refuge areas on major streets with an LTLwoR. Major streets with no median also lack pedestrian refuge areas, yet a similar finding of greater pedestrian crashes was not found. Therefore, additional research may be needed to fully understand this relationship. The research team found that all the sites with an LTLwoR had four or more through lanes than the other intersections in the dataset,

Figure 1. Corner radius CMF for pedestrian crashed based on the Virginia model.[1]

which included intersections with only two through lanes. Although the number of through lanes was not found to be statistically significant, a larger sample size may add to the understanding of how median design is associated with pedestrian crashes. Figure 2 illustrates the findings from the prediction model for a range of major road volumes. The model is available in the research report.[1]

Right-Turn Speed

This study explored the relationship between observed right-turn vehicle speeds and roadway geometrics, especially corner radii, at signalized intersections.

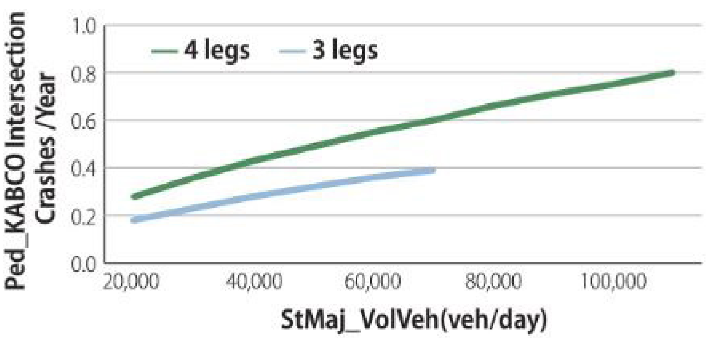

Figure 2. Pedestrian intersection crash model predictions by major vehicle volumes and number of legs.[1]

SITE SELECTION AND METHODOLOGY

The study included 31 sites, with radii varying between 15 (4.6 m) and 70 ft. The study also considered other roadway variables, including type of right-turn lane, number of right-turn lanes, length of right-turn lane, distance to nearest upstream and downstream driveways, number of lanes on the receiving leg, and speed limit. No bike or parking lanes were present on the approach or the receiving leg for any of the sites. All sites were at a signalized intersection.

The right-turn speed measurement methodology involved collecting video footage at signalized intersection approaches and postprocessing the footage to extract speed measurements, along with headway between the turning vehicle and the preceding vehicle. This study allowed the inclusion of variables that described conditions that were present when the subject vehicle was turning right, including the signal indication (steady circular green indication or steady circular yellow indication), type of turning vehicle (car or truck), and characteristics of the vehicle immediately preceding the turning vehicle (going straight or turning right).

RESULTS

The analysis found that conditions during the specific right turn (i.e., headway, signal indication) are more influential than the site characteristics (i.e., length of right-turn lane), except for corner radius. The analysis found convincing evidence that right-turn speeds are a function of corner radius. The increase in turning speed for corner radii between 15 and 70 ft. was about 4 miles per hour (mph) (2.5 kilometers per hour [km/hr]). The larger the corner radius, the higher the turning speed. The final selected model from this study can be used to predict turning speeds at different speed distribution values. For example, for the 85th percentile, the value of Z is 1.0364, which amounts to approximately 23 percent faster right-turn speeds than the median speed.

The range of speeds rather than just the average speed should be considered when evaluating how traffic is operating at an intersection, especially with respect to safety and to pedestrians. The equation, available in the final research report, can be used to calculate a range of expected speeds rather than just the average speed.1 The resulting predicted right-turn speeds were compared with the speeds that were generated by using the radius of curvature equation. The radius of curvature equation is available from several sources, including the American Association of State Highway and Transportation Officials' A Policy on Geometric Design of Highways and Streets (commonly known as the Green Book).[2] Figure 3 shows the

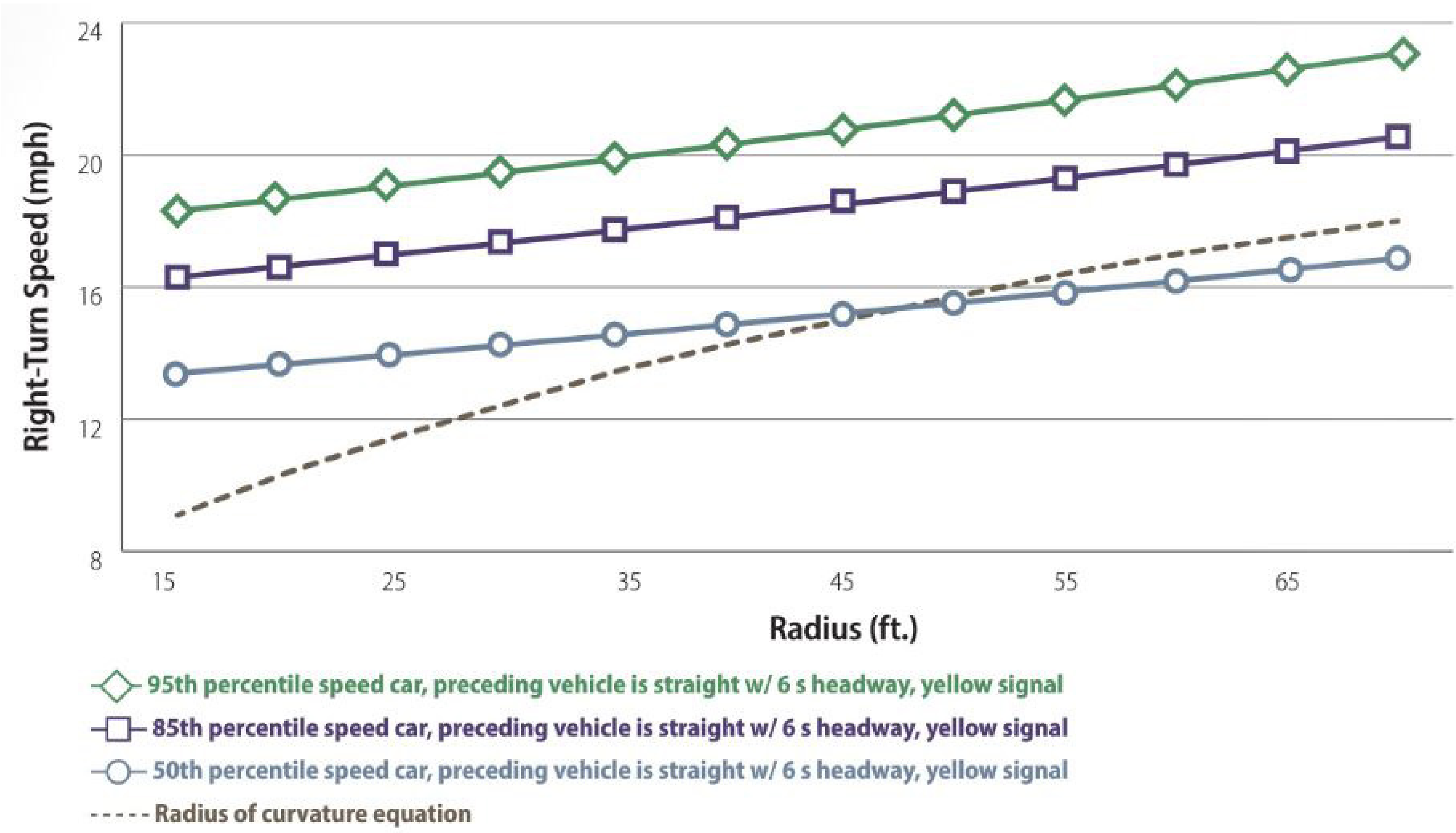

Figure 3. Comparison of predicted percentile right-turn speeds and radius of curvature equation.[1]

speeds comparison using calculated 50th, 85th, and 95th percentile right-turn speeds for a turning car (rather than a truck), on a yellow (rather than green) signal, and for when the preceding vehicle is going straight with a headway of 6 seconds. The figure demonstrates that the speed prediction, when using observed right turn vehicles, has 50th percentile (median) turning speeds higher than when the values are calculated by using the radius of curvature equation for radii up to 45 ft. (13.7 m). For radii greater than 45 ft., the 50th percentile turning speed is slightly below the radius of curvature equation. For all radii values, all the predicted 85th or 95th percentile speeds are greater than the value generated with the radius of curvature equation.

Computer simulation of vehicle operations at an intersection can consider speed distribution that may be reflective of a site or a condition. The newly developed equation can be used with the necessary assumptions to generate a distribution, or the field data can provide a general speed distribution for right-turn vehicles. Figure 4 provides the speed distribution for a sample of corner radius values by using the equation available in the research report along with the average speed observed for comparison.[1]

Conclusions

FINDINGS

This project investigated the influence of intersection corner radius on pedestrian crashes, right turn crashes, and right-turn vehicle speed. The corner radius can be unique to each corner at an inter- section; therefore, this study assigned crashes to an intersection corner rather than to the entire intersection. This study's findings support the development of a CMF for corner radius. Assuming a baseline condition of 10 ft., the pedestrian CMFs for corner radius for the range of corner radii included in the evaluation went from 1.00 for a 10-ft. radius to 1.59 for a 70-ft. radius. This study also generated a crash prediction equation for pedestrian crashes at signalized intersections.

The findings from the operational study of right-turn speeds can be used to update the discussion contained in design manuals, especially with respect to designing intersections For example, the National Association of City Transportation

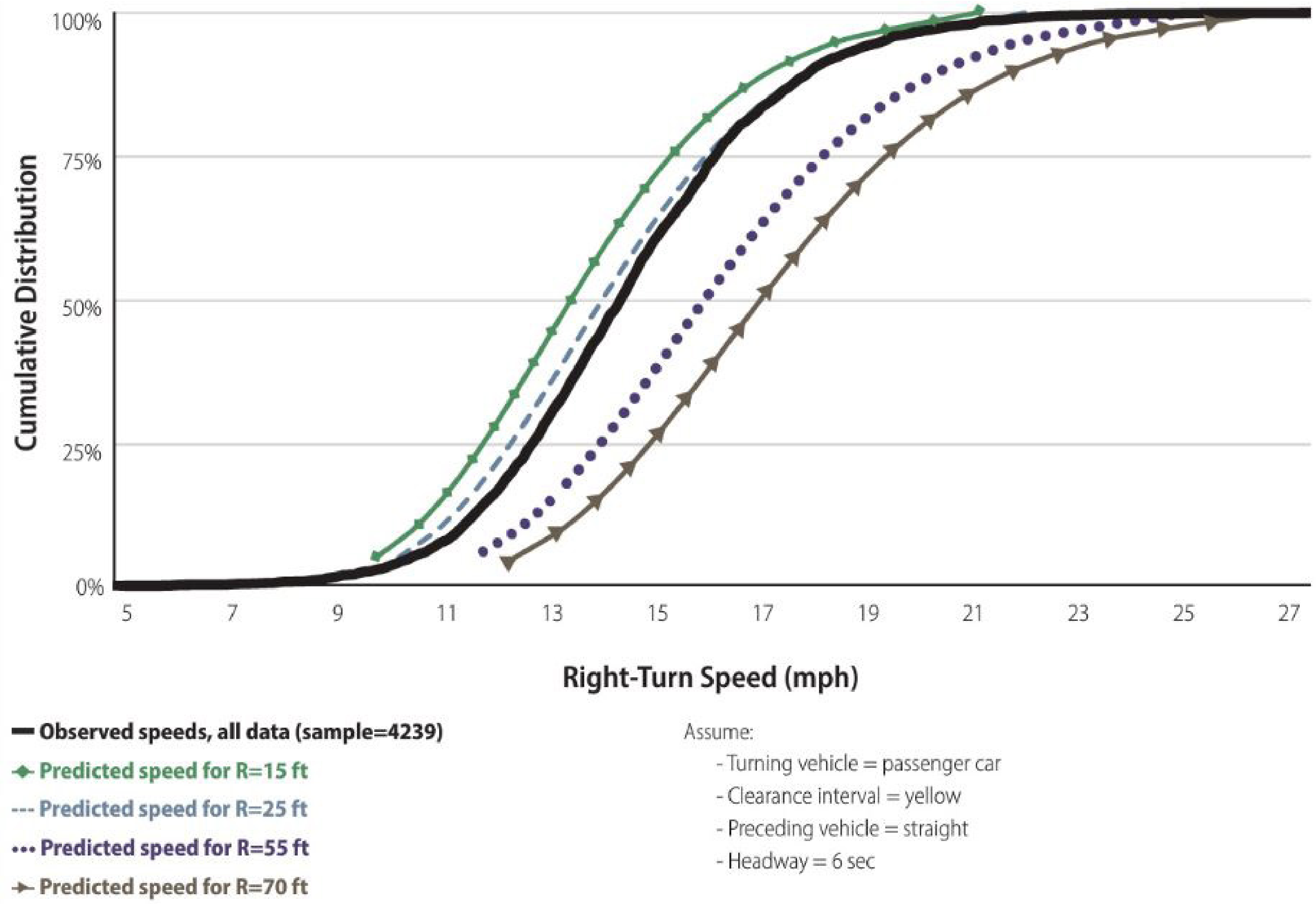

Figure 4. Predicted passenger car right-turn speed distribution.[1]

Officials recommends limiting right-turning speeds to 15 mph (9.3 km/hr) or less, and the equation provided in the research report can be used to predict the geometric influence of a corner radius design on the anticipated speed of the right-turning movement to compare with the target criteria.[1, 3]

FUTURE RESEARCH NEEDS

This research identified areas needing additional investigations. Additional research focusing on pedestrian crashes at signalized intersections could look more closely at the difference in the number of crashes with one-way and two-way traffic patterns. The statistical analysis found moderate evidence of an increase in the odds of pedestrian crashes occurring at locations where both the approach leg and the receiving leg of the intersection are one way, with traffic moving away from the corner.

Additional research could help agencies explore other variables that would affect right-turn speed, such as the presence of parking or bike lanes. The research should consider whether vehicles are present in the parking spaces to understand how the additional space, which changes the effective radius, influences turning speeds. Future research could also explore speed differences that occur when the roadway has a shoulder versus a curb and gutter. Similarly, a truck apron can be used to accommodate large trucks at an intersection corner, and research is needed on the effects of the truck apron design components on turning speed.

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Authors

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Ann Do, P.E. currently serves as research highway engineer for Turner-Fairbanks Highway Research Center, McLean, Virginia. Ms. Do has been the Program Manager for the FHWA Pedestrian and Bicycle Safety Research since 2001. Her position is in the Office of Safety Research and Development, specializing in research related to safety effectiveness evaluations, pedestrians, bicycles, human factors engineering, and geometric design. She is responsible for designing and managing the research study, providing technical assistance, guidance, and support to other FHWA offices and to state and local transportation agencies in area related to pedestrian and bicycle safety. She has a bachelor of science in Civil Engineering, from Virginia Polytechnic Institute and State University, Blacksburg, VA, USA.

Raul Avelar, Ph.D., P.E., PMP (M) is associate research engineer at the Texas A&M Transportation Institute. Raul is an ITE member, past president of the ITE Brazos Valley Section, and past Brazos Valley Section Representative for the Texas District.

Raul has degrees in Civil and Industrial Engineering. Raul's research areas include roadway safety, traffic operations, vulnerable users, and connected/automated vehicles. Raul has 16 years actively providing expertise in safety, operations, and statistical methods applied to transportation research in projects for federal and state transportation agencies. He has co-authored more than 70 technical papers and research reports, including papers for ITE Journal.

Michael P. Pratt, P.E., PTOE (M) is an assistant research engineer with the Texas A&M Transportation Institute. Mike's main areas of interest include operational effects of roadway geometry and traffic control devices, traffic signal operations, and roadway safety. He has 18 years of experience as a researcher. He has led or played a key role in a series of research projects analyzing the safety performance of highway facilities, including known trouble spots such as curves and signalized intersections, and he has assisted in the development of computational tools to aid practitioners in analyzing sites and identifying treatments to improve safety and operations.

Subasish Das, Ph.D. (M) is an associate research scientist with Texas A&M Transportation Institute in San Antonio, TX, USA. His major areas of expertise include statistical analysis and machine learning with an emphasis in transportation safety and operations, spatial analysis with web GIS tools, interactive data visualization, and deep learning for CV/AV technologies. He is the author of the book Artificial Intelligence in Highway Safety, which will be published by CRC Press in 2022.

Tailgate Safety Talk

Information You Can Use to Prevent Accidents & Injuries

"Habit is the deepest law of human nature" Most of us would probably agree with that. People are quite often influenced by habit. Habits and job safety are also closely related. If you form safe work habits, it's going to reflect positively in everyone's job safety. There are seven common "human factors" related to developing safe work habits. Let's review them.

HAZARD RECOGNITION

Recognition of hazards is an important factor. By constantly being on the lookout for hazards you enhance your own safety. In watching for hazards you must consider not just the obvious ones, but also hazards which might suddenly appear through some action of another person or a chain of unusual circumstances. Whenever a hazard is detected, report it to someone who can make the change.

AVOIDING INDIFFERENCE

Avoiding indifference on the job is important to safety. An individual might know the right way to do his or her particular job, and just ignore it. Sometimes the most experienced person who has had the safety related training might tend to avoid doing the job the right way. Or there may be the employee who does not know the safety procedures and instead of finding them out chooses to also ignore them. These kind of indifferences on the job can and do lead to trouble and accidents.

ELIMINATING "DAREDEVIL" BEHAVIOR

Ok admit it, have you ever done or known anyone who has done a daredevil stunt or taken a quick chance? How about standing on the top rung of a ladder? Everyone knows you should not do that, sometimes the ladder is even

North Carolina's Recreational Trails Program

North Carolina's Recreational Trails Program is now accepting grant applications for the 2023 cycle. The program values trail projects that are legal, safe, managed, and provide connectivity, public access, and reasonable parking. Grant candidates should be shovel-ready trail projects that enhance sustainability and provide low-infrastructure economic development opportunities through natural resource tourism. Final applications are due February 17, 2023. We strongly encourage prospective applicants to reach out to their Regional Trail Specialist to discuss their projects before applying. Please visit North Carolina's Recreational Trails Program website for more information.

NC Recreational Trails Program Website

Find Your Regional Trail Specialist Here

Safe Streets and Roads for All (SS4A) Grant Program

The Safe Streets and Roads for All (SS4A) Grant Program is open now through Sep 15, 2022 and funds regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries. Through this program, there will be $5 billion in funds appropriated throughout the next 5 years towards this goal. You may be eligible if you are a city, town, MPO, county, transit agency or other special district; Federally recognized Tribal governments; and Multijurisdictional groups composed of the above entities.

SS4A Grant Information

posted "do not stand above a certain level" but we do it anyway. Eliminating "daredevil" behavior is another human factor that can prevent injury on the job and at home.

SETTING A GOOD EXAMPLE

Setting a good example is another factor to consider. We have all heard this statement before. "If you set a good example then others will follow". Think about how your actions at work and at home may affect the attitudes of others. The actions of all of us have an influence on the safety-mindedness of others. Think of it this way, when you are in your car traveling to one place or another do you leave room between cars or do you have a tendency to tailgate? Think how the other person may feel. Probably stressed. If a veteran employee follows the safety rules then the newer employee may follow their lead but on the other hand if we condone the unsafe acts of others then that behavior may be what we now call the "culture of the company."

AVOIDING IMPULSIVENESS

Another link in the chain of job safety is avoiding impulsiveness or being in a hurry. Haste is a trait that often leads to accidents. We are using our time foolishly if we don't take the time to be safe. Many valuable timesaving suggestions are contributed by employees each year, but, these timesaving suggestions should be reviewed and approved before they are used. Haste can result in injury!

CONTROLLING IMPATIENCE

Controlling impatience and temper is equally important to job safety. If we let emotions get out of control, an accident can easily occur. Statistics prove that on the job violence is on the increase in our country. Do you have programs in place that identifies potential problems before tempers get out of control? And, what kind of programs do you have established to get help for your employees.

PROPER TRAINING AND INSTRUCTION

Finally, one of the most important human factors related to safe work habits is training. From the day we are born we are being trained. Some of this training or learning may have been good, and we probably picked up some bad habits along the way. Job training and safety go hand in hand. While the supervisor is responsible for training, each employee must be responsible to ask questions if instructions are not clear or if there are any doubts about procedures. Unfortunately, some experienced employees may be so familiar with their jobs that they become inattentive, and this too is hazardous.

Proper work habits can assure job safety. Overall, the responsibilities for developing safe work habits really belong to each of us. By being aware of the "human factors" we've just reviewed, safe work habits can be formed and job safety Assured.

Welcome Kelly!

Kelly Holsopple is the new Program Associate for the Local Technical Assistance Program (LTAP). She will be creating the LTAP training schedules, setting up agency only classes, working on financials, providing reporting, and sending out communications. Let her know if you need any help with anything! She previously worked for ITRE between 2018 and 2020, helping with the Fundamentals of Engineering Principles and Highway Engineering Concepts classes. Kelly is a graduate of Wake Technical Community College and grew up in Raleigh, NC.

***Left:** This aerial image of Detroit, OR, shows some of the damage caused by the 2020 wildfires. (Credit: ODOT)*

***Below:** UAS image captured to show rock scaling at a location closed during the 2020 wildfires. (Credit: ODOT)*

UAS Provide Visibility to Public During Emergency Response

By U.S. Department of Transportation, Federal Highway Administration

Unmanned Aerial Systems have provided an agile and effective tool for emergency response in States across the nation. In addition to providing an "additional set of eyes" for responders, the aircraft can also serve as a window into emergency situations for the public, media, and other stakeholders.

The Oregon Department of Transportation's (ODOT) UAS program has more than 20 dedicated pilots in a central office plus additional pilots across the State with Federal Aviation Administration part 107 licenses who can perform missions as needed or in an emergency situation.

In 2020, the State was faced with wildfires, and UAS served a critical communication role in the emergency response. ODOT closely worked with media organizations to provide regular UAS images and video of affected areas throughout the emergency and during recovery. This helped fulfill the public's need for transparency around conditions, response, and recovery operations; the media's need for compelling, informative footage; and ODOT's desire to reach a larger audience with communication efforts to inform motorists on the developing situation. This continued all the way through the repair and reopening of roadways. ODOT was able to show the public why certain roadways were closed and also show what the agency was doing in partnership with other emergency response agencies.

Many of the State's major passes over the Cascade Mountains were closed during these fires and without consistent communication, public sentiment could have turned for the worse. Oregon Route 224 is one such route that was closed for over a year and a half after the wildfires. Due to the large-scale devastation, over one million trees had to be removed for safety, rock scaling was necessary in many locations, and guardrails were damaged or destroyed. ODOT's ability to fly UAS missions and show the extent of the devastation and subsequent recovery efforts played a key role in effectively communicating with the public. Over one dozen missions were flown as part of this emergency response communication effort.

To learn more about the roles UAS can play in an emergency response program, contact **James Gray**, FHWA Office of Infrastructure, or **John Haynes**, FHWA Utah Division. Additionally, **watch the UAS visual storyboard** to learn more ways UAS can improve transportation systems.

What's Wrong With This Picture?

At first glance, you are probably thinking this Flagging operation looks pretty good. Slow/Stop Paddle – check, Retroreflective Vest – check, Flaggers Out of the Traffic Lane – check. I also like the nice long Buffer Area, or if it not long enough to call it a Buffer, we call it an 'extended work area' since we need to know the speed limit to know the minimum length to call it a Buffer Zone. However, with a trained eye a couple of things stand out to me. First is the number of cones in the taper. The minimum number of cones, or any channelizing device in any taper, is 6. I count only 5. Remember, the formula for figuring out the spacing of cones in this type of taper, a 'One Lane, Two Way Traffic Taper' is 50 Feet Minimum to 100 Feet Maximum (there are 5 different types of taper). In this picture, it appears that the length is sufficient but they need to add in a cone and space the cones out evenly. So for a 50 foot taper you would divide 50 feet by 6 cones, which is… hmmm… well…. Without a calculator that is not an easy calculation, so here is a way to make it easier. The first cone you place on a line call it the Zero cone and you do not count this in your calculation. It will be part of your taper, but divide 50 feet by 5 cones (not 6) which equals out to be 10 feet apart. A much easier calculation! For a 100 foot taper, 100 feet divided by 5 cones is 20 feet between cones. Again, a lot easier to figure out and you have the minimum number of cones required. Also remember, 6 cones is the minimum number of channelizing devices required in any taper so you are free to add more, but remember to have them equally spaced apart.

So what else do you see here that could be improved or corrected? Let us know. Put 'WWWTP' in the subject line and email us your thoughts.

Be Safe, Be Smart, Be Alert

NCDOT STIP Development Update

NCDOT has released their 2024-2033 STIP Development Update which includes information about 2023-2024 STIP developments. The new 2024-2033 STIP format will be in excel and much more user friendly with many ways to filter the projects. A revised Draft STIP will be released by December 2022. Outreach sessions are ongoing to talk about the challenges that NCDOT has faced over the past few years, the process of developing STIP, and to discuss specific opportunities for input. FHWA will approve the final 2024-2033 STIP in Summer 2023.

NCDOT STIP Development Update

Cybersecurity and Infrastructure Security Agency

Do you have concerns about cyber security within your agency? If so, you may want to look into CISA, which stands for Cybersecurity and Infrastructure Security Agency. This agency offers many different services in order to provide support, resilience, and security of critical infrastructure owners. They facilitate information sharing between public and private sector critical infrastructure partners (like cities and towns), and improve situational awareness of cybersecurity risks and incidents. The CISA aims to support preparation, response, and recovery efforts for hazards impacting critical infrastructure, conduct and integrate infrastructure assessments and analysis, including dependencies and cascading effects, on critical infrastructure to influence decision-making at all phases of emergency management. The regional CISA office offering support for NC is in Atlanta, GA.

Click For More Information

NC LTAP News & Updates

To update your mail information, add a colleague to the database, or obtain information about Roads Scholar Program complete the form online at **go.ncsu.edu/ncltapcontactform**.

For more special offers and news, like us on **Facebook** and follow us on **Twitter**.

Your Name ______________________________

Company/Organization ______________________________

Address ______________________________

City ____________________ **State** ____________ **Zip** ____________

Phone ______________________________

Check Appropriate Items

- ☐ Add/Update email information to NCLTAP listserv NCTROADS
- ☐ Send information about Roads Scholar program
- ☐ Send schedule of training opportunities

NCTROADS Listserv

Subscribe to the NC LTAP listserv. It is free and easy. Send a message to kbdaviso@ncsu.edu or call Kate Davison at 919-515-3983 and ask to be added to NCTROADS.

This is an informal network for the exchange of news about current research, discussion of problems and solutions, request for advice and assistance, and announcements of upcoming conferences, events and training opportunities for transportation personnel. Once you are subscribed, you can send a message all the listserv members at **NCTROADS@lists.ncsu.edu**

NC Local Technical Assistance Program October – December 2022 Schedule

For Online Registration see calendar at: https://itre.ncsu.edu/training/ltap-training/
Questions or Email Registration: wewoods@ncsu.edu or kbdaviso@ncsu.edu
Course descriptions available on website.

Date	Class Title	RS/ARS/MRS	Cost	Location	To Sign Up
October 20, 2022	Intermediate Work Zone Safety Training	RS	$175	Raleigh	Click Here
October 20, 2022	Managing Conflict with the Public and Employees	RS	$150	Hickory	Click Here
October 21, 2022	Soils Fundamentals	RS	$150	Raleigh	Click Here
October 24, 2022 9am – 4pm	Asset Management for Transportation Personnel	MRS	$150	Raleigh	Click Here
October 26-27, 2022	OSHA 10 Hour Safety Training	ARS	$175	Raleigh	Click Here
October 31, 2022	Road Safety 365: A Safety Workshop for Local Government	RS	$150	Charlotte	Click Here
November 1, 2022	How to Keep Yourself and Your Agency Out of Court	ARS	$150	Raleigh	Click Here
November 2, 2022	Road Safety 365: A Safety Workshop for Local Government	RS	$150	Raleigh	Click Here
November 3, 2022	ADA in Temporary Traffic Control	RS	$100	Raleigh	Click Here
November 4, 2022	Road Safety Fundamentals	RS	$150	Hendersonville	Click Here
November 7, 2022	Trenching Competent Person	ARS	$175	Raleigh	Click Here
November 9, 2022	Snow & Ice Control	RS	$175	Raleigh	Click Here
November 15, 2022	Concrete: What, When & How	RS	$175	Jacksonville	Click Here

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Questions or Email Registration: wewoods@ncsu.edu or kbdaviso@ncsu.edu
Course descriptions available on website.

Date	Class Title	RS/ARS/MRS	Cost	Location	To Sign Up
November 17, 2022	Fall Protection	ARS	$150	Raleigh	Click Here
November 29 – December 1, 2022	Emergency Management	MRS	$150	ONLINE	Click Here
December 7, 2022	Basic Work Zone Installer	RS	$150	Raleigh	Click Here
December 7, 2022	Confined Space Entry and Lockout/Tagout	ARS	$175	Jacksonville	Click Here
December 8, 2022	Intermediate Work Zone Installer	RS	$175	Raleigh	Click Here
December 9, 2022	Work Zone Supervisor Recertification	ARS	$175	Raleigh	Click Here
December 13, 2022	Silica New Standard: Strategies for Municipal Compliance	ARS	$175	Charlotte	Click Here
December 16, 2022	Flagger Training	RS	$100	Raleigh	Click Here

LTAP Links on the Web

Transportation Information at your fingertips!

NC LTAP	https://itre.ncsu.edu/focus/ltap/
National LTAP/TTAP	http://www.nltapa.org/
NC Department of Transportation (NCDOT)	https://www.ncdot.gov/
Rural Road Safety Center	https://ruralsafetycenter.org/
Federal Highway Administration (FHWA)	https://www.fhwa.dot.gov/
US Department of Transportation (USDOT)	https://www.transportation.gov/
UNC School of Government	https://www.sog.unc.edu/
Institute of Transportation Engineers	http://www.ite.org/
NC Section of ITE (NCSITE)	http://ncsite.org/
APWA - NC Chapter	http://northcarolina.apwa.net/
NLTAPA Tailgate Talks	https://nltapa.org/information-exchange/nltapa-tailgate-talks/

NC LTAP Advisory Board

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