



Center for Transportation Safety

Safety Research and Outreach

Neal A. Johnson

neal-johnson@tti.tamu.edu

Joan G. Hudson

j-hudson@tti.tamu.edu



Course Logistics

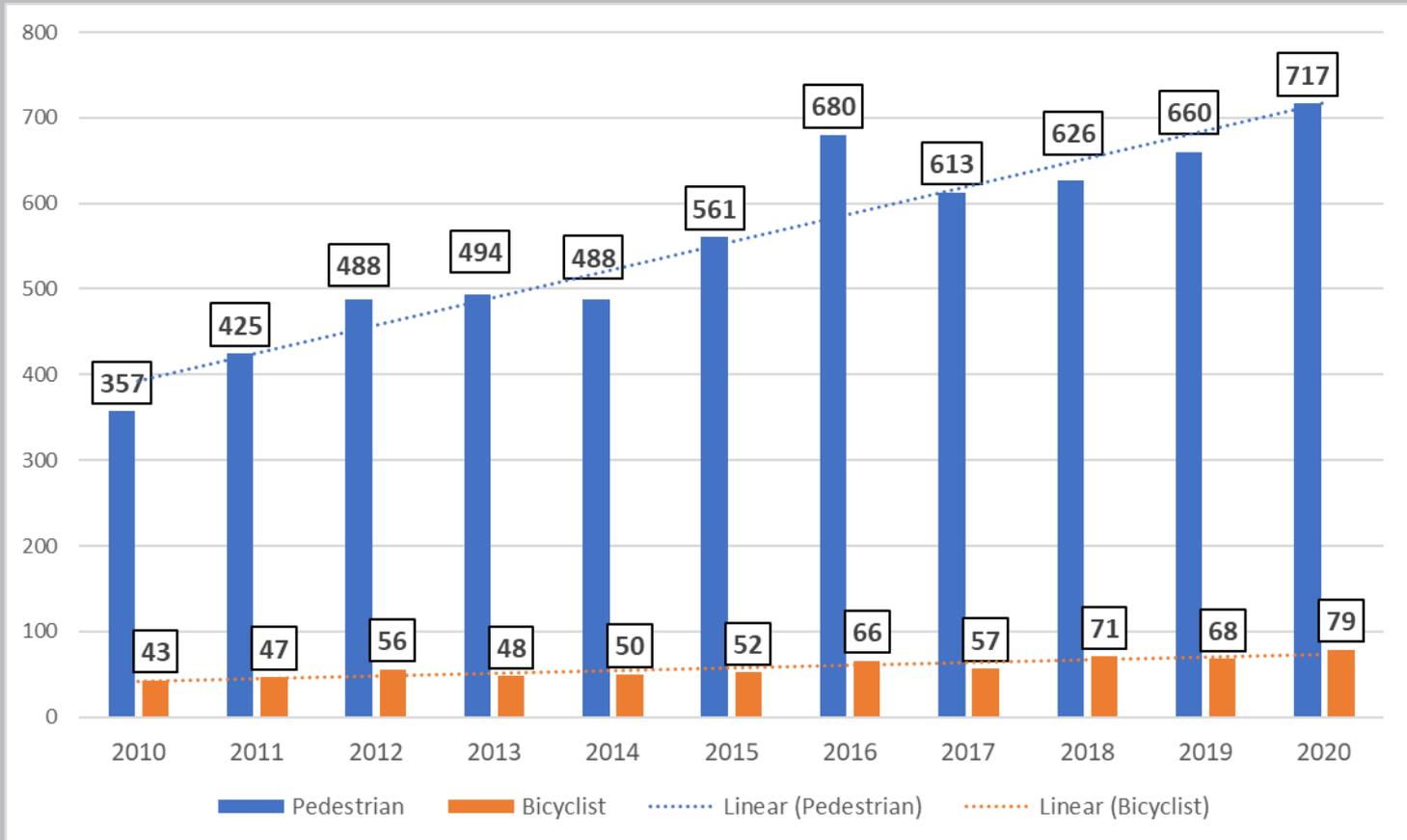
- We encourage questions and discussion
- The course is split into two main sections:
 - Section 1
 - Overview/Objectives/Laws
 - Definitions
 - Pedestrian regulations
 - Bicyclist regulations
 - Pedestrian right-of-way
 - Section 2
 - Bicyclist right-of-way
 - Common violations
 - Crash Reporting
 - Prioritizing safety risk
- Pre and post tests
- Evaluations



Pre – Test Questions



Bicycle and Pedestrian Fatal Crashes in Texas





Course Overview

During this course, we will cover:

- Texas Transportation Code definitions of the rights and responsibilities for bicyclists and pedestrians
- A review of the importance of crash data
- Different bicyclist and pedestrian crash scenarios and how they should be reported
- Importance of enforcement



Course Objectives

- Motivation to increase enforcement for bicyclist and pedestrian safety
- Knowledge, skills, and abilities to conduct enforcement for bicyclist and pedestrian safety
- Knowledge, skills, and abilities to accurately complete crash reports for bicyclist and pedestrian related crashes



What the Laws tell us...and what they don't

- There are definite “gray” areas in the law.
- The training is based on our interpretation of the laws.
- The goal of the training is to equip you with as much knowledge of the laws and what they mean.
 - Officer discretion



Sidewalk Definition

The Texas Transportation Code (Sec.541.302(16)) defines a sidewalk as the portion of a street that is:

- A. between a curb or lateral line of a roadway and the adjacent property line; and
- B. intended for pedestrian use.

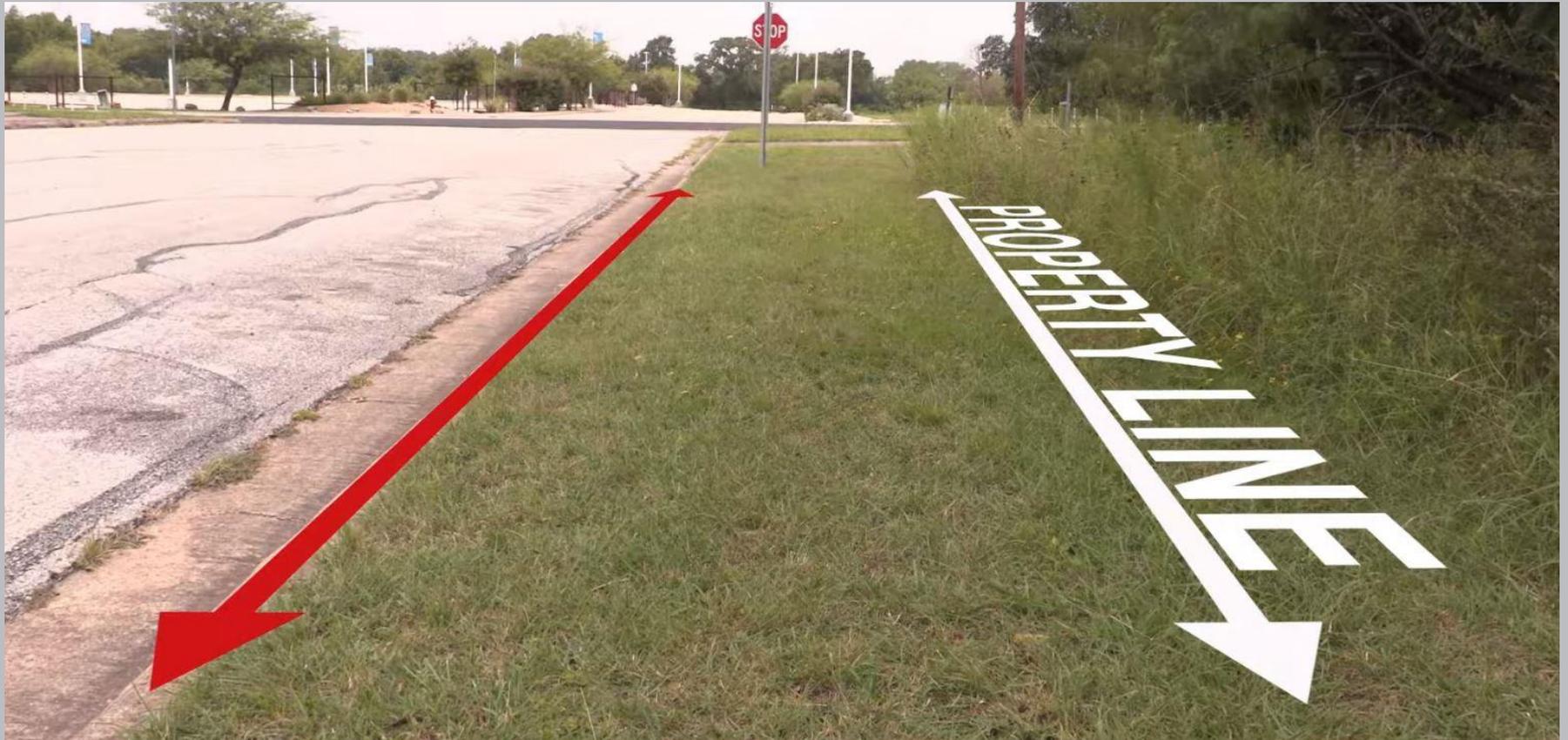
According to this definition a sidewalk is simply the area intended for pedestrians that is between the curb or lateral line of a road and the property line.

This means that sidewalks do not necessarily have to be paved to be considered a sidewalk.

However, it does need to be “accessible to the pedestrian” (Sec. 552.006)



Sidewalk Definition





Crosswalk Definition

According to the Texas Transportation Code (Sec. 541.302(2)) a crosswalk is defined as:

- A. the portion of a roadway, including an intersection, designated as a pedestrian crossing by surface markings, including lines; or
- B. the portion of a roadway at an intersection that is within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway.



Crosswalks

- **All** 4-way intersections have crosswalks on all four legs even if it is not marked with lines.





Marked Crosswalks



(Images from Google Maps)



Unmarked Crosswalks



(Image from Google Maps)



Crosswalk Video





What about 3-way Intersections?





Pedestrian Regulations

- Use of sidewalks (TTC 552.006)
 - Pedestrians must use a sidewalk if one is *available and accessible* to them.
 - If there are no sidewalks, a pedestrian shall, *if possible*, walk on the left side of the road or shoulder facing oncoming traffic.



Pedestrian Regulations

- A pedestrian may not suddenly leave a curb or other place of safety and proceed into a crosswalk in the path of a vehicle so close that it is impossible for the vehicle operator to stop and yield. (TTC 552.003b)



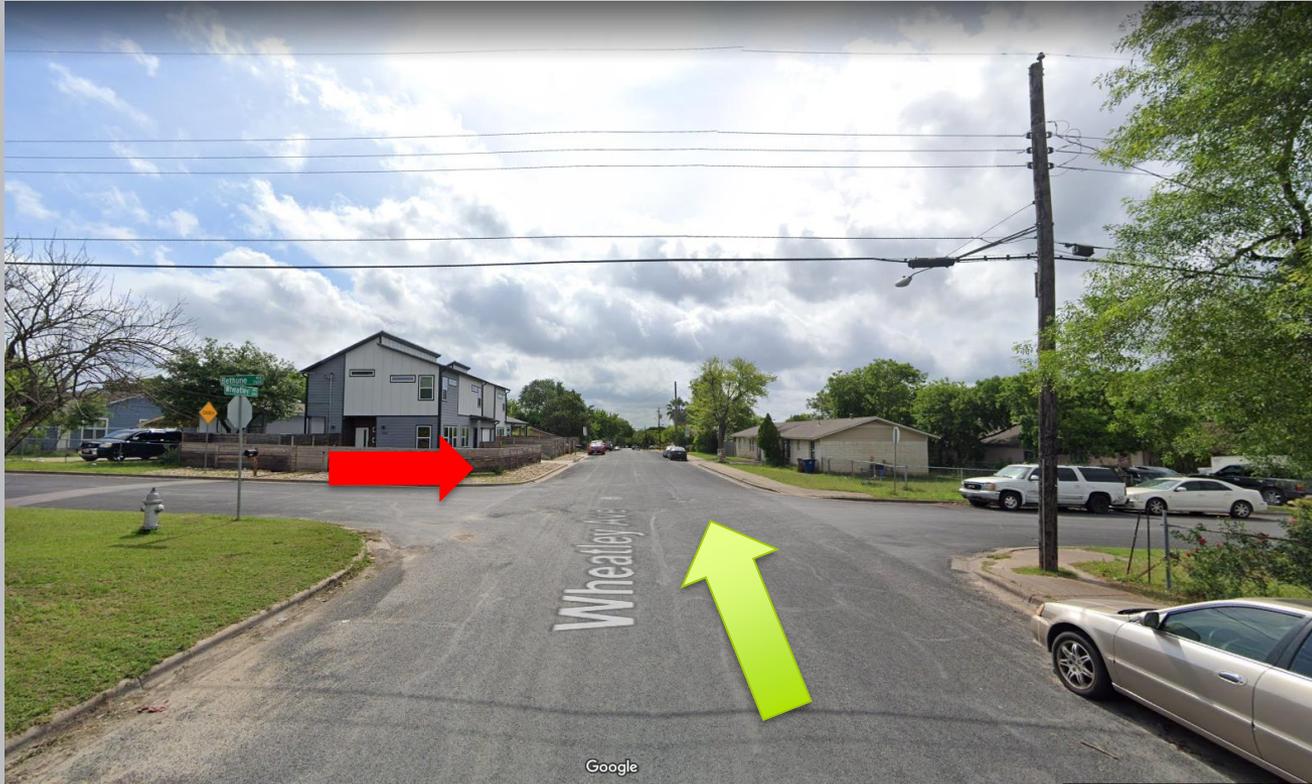
Pedestrian Regulations

- Driver to Exercise Due Care (552.008)
 - Due care to avoid collision
 - Give warning (sounding horn)
 - Proper precautions around children and confused or incapacitated persons



Crash Example #1

Unmarked Crosswalks



- Stop sign in only one direction
- No marked crosswalks

(Image from Google Maps)



Bicycle & Micro-Mobility Regulations

- The Texas Transportation Code states that bicyclists have the same rights and duties as a motor vehicle driver. (TTC, 551.101)
- The same applies to motor-assisted scooters (TTC, 551.352)
- Bicycle & motor- assisted scooter operators have the same rights and duties as drivers of vehicles. This includes...



Bicycle & Micro-Mobility Regulations

- Stop at stop signs and red lights

(TTC, 551.101)





Bicycle & Micro-Mobility Regulations



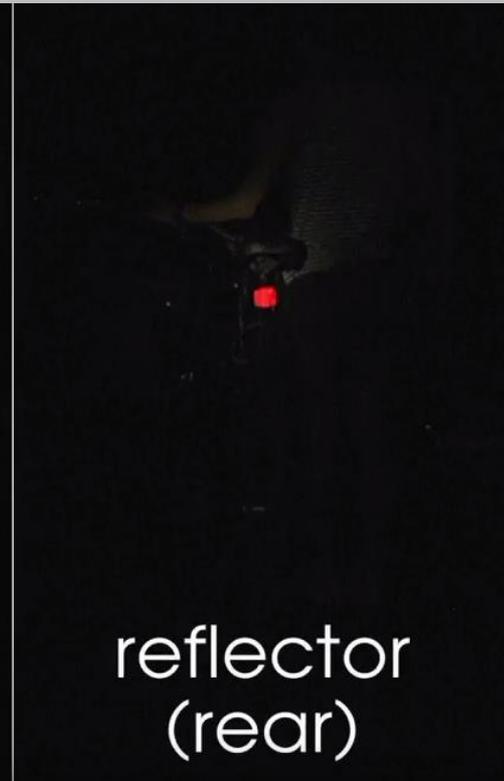
SIGNAL
WHEN TURNING
OR CHANGING LANES

TTC, 551.101, 545.104-107



Bicycle & Micro-Mobility Regulations

- Bicyclists riding at night are required to have:



TTC, 551.104



Bicycle & Micro-Mobility Regulations



RIDE WITH THE
FLOW OF TRAFFIC

TTC, 551.101



Bicycle & Micro-Mobility Regulations

- Ride as far to the right as practicable (TTC, 551.103)





Bicycle & Micro-Mobility Regulations

- Bicyclists are allowed to ride in the travel lane, even when a bike lane is present for a few reasons (TTC, 551.103):



Bicycle & Micro-Mobility Regulations

- To avoid obstructions and uneven surfaces





Bicycle & Micro-Mobility Regulations

- To make a left turn.





Bicycle & Micro-Mobility Regulations

- If the travel lane is less than 14 feet wide or if it is too narrow for a bicycle and motor vehicle to safely travel side-by-side.





Bicycle & Micro-Mobility Regulations

- A bicyclist is also allowed to travel on the **left** side of the road on a one-way street. (TTC, 551.103)





Bicycle & Micro-Mobility Regulations

- By Texas law, micro-mobility (or motor-assisted scooters) may operate on streets with speeds limit of up to 35 mph, but a local jurisdiction may prohibit use on certain roads/sidewalks.

(TTC, 551.352)



Bicycle & Micro-Mobility Regulations

- Unless prohibited by city ordinance, a bicyclist has the right to ride on the sidewalk.
- TTC 545.428 clarifies that bicyclists using the sidewalk are treated more as a pedestrian when they reach a crosswalk.





Crash Example #2

Bicyclist on the Sidewalk



- What happens when they get to an intersection or driveway?
- Do they have the rights of pedestrians if they are on the sidewalk?

(Image from Google Maps)



Bicycle & Micro-Mobility Regulations

- The Texas Transportation Code requires a vehicle to pass a bicyclist “**at a safe distance.**” However, it does not define what a safe distance is.



TTC, 545.053, 551.101



Bicycle Safe Passing Video





Additional Bicycle Regulations

- Working brakes (551.104)
- Only ride astride a permanent and regular seat attached to the bike. (551.102)
- May not carry more persons than designed to (551.102)





Additional Bicycle Regulations

- Carrying of large objects that prevent you from having at least one hand on the handlebars (551.102)
- May not attach to another vehicle (551.102)





Additional Bicycle Regulations

- May ride two abreast (551.103c)
 - In a single lane
 - May not impede normal and reasonable traffic flow
 - May not ride more than two unless on a part of the roadway set aside for bicycles.





Micro-mobility

Safety information from the provider:

- Obey traffic laws
 - o State laws
 - o Consult any local ordinances
- Where to ride
 - o Not on the sidewalk
- Age restrictions
- Helmet use (not required by law)



Pictures by: Neal Johnson





Right-of-Way Definition

- The right of one vehicle or pedestrian to **proceed** in a lawful manner **in preference to another vehicle or pedestrian** that is approaching from a direction, at a speed, and within a proximity that could cause a collision unless one grants precedence to the other.

TTC, 541.401



Right-of-Way Definition

- To yield is to give way, letting others go first.
- Traffic control devices (signals, signs and markings) tell the road user how to behave and indicate who has the right of way.
- Where no traffic control devices exist, basic rules of the road apply
- Road users include motor vehicles, bicyclists, pedestrians, and others.
- Who yields to whom may be seen as simple, but in reality, it can be quite complicated.



Pedestrian Right-of-Way

- The operator of a vehicle shall **stop and yield** the right-of-way to a pedestrian crossing a roadway in a crosswalk if:
 - (1) no traffic control signal is in place or in operation; and
 - (2) the pedestrian is:
 - (A) on the half of the roadway in which the vehicle is traveling; or
 - (B) approaching so closely from the opposite half of the roadway as to be in danger.



Pedestrian Right-of-Way

- Right-of-way at signalized intersections is dictated by:
 - A separate pedestrian signal (if equipped).
 - The signal for vehicular traffic in your direction of travel.



TTC, 552.002



Pedestrian Right-of-Way

- Pedestrians are required to follow the pedestrian signals and cross only on the walk signal.
 - A pedestrian should not enter the crosswalk when it says DON'T WALK or WAIT or when the red hand is lit or flashing.



TTC, 552.002



Pedestrian Right-of-Way

- If no pedestrian signals are installed or in operation, the pedestrian should cross a street when the signal light is green in their direction of travel.





Pedestrian Right-of-Way

- At all 4-way intersections not controlled by a traffic signal, pedestrians have the right-of-way, even at intersections with stop control only in one direction.



TTC, 552.003



Pedestrian Right-of-Way

- However, when crossing the road at a point other than a 4-way intersection or marked crosswalk a pedestrian must yield the right-of-way to all vehicles (TTC, 552.005)





Pedestrian Right-of-Way

- It is illegal for a pedestrian to cross a road between two adjacent intersections at which traffic control signals are in use (TTC, 552.005).





Pedestrian Right-of-Way

- Motorists making turns while the signal light is green or when there is a flashing yellow arrow are required to yield the right-of-way to pedestrians on their left and right



TTC, 552.002



Pedestrian Right-of-Way

Unless motorists are making a turn in accordance with a green lighted arrow.



TTC, 552.001 & 002



Pedestrian Right-of-Way

- If the intersection uses a pedestrian only phase, driver and pedestrian movements each receive a separate signal phase where pedestrians cross from all directions at the same time.





Pedestrian Right-of-Way

- Motorists are also required to yield to pedestrians who are in a marked crosswalk that is **NOT** at an intersection.



TTC, 552.003



Pedestrian Right-of-Way

- A motorist approaching another vehicle from behind may not pass that vehicle if they are stopped to allow a pedestrian to cross the roadway.



TTC, 552.003



Crash Example #3

Determining Right of Way



- Right turning vehicle (blue arrow) turned first in front of pedestrian during "WALK" signal
- Pedestrian (red arrow) began crossing after "DON'T WALK" signal had begun flashing
- Car turning left (yellow arrow) on green light, not green arrow



Bicyclist Right-of-way

- A person operating a bicycle has the same rights and responsibilities as a driver operating a vehicle (TTC, 552.101). As such,
 - The bicyclist must yield to the vehicle that arrived before them at an all-way stop.
 - The bicyclist must yield to the opposing through vehicles when turning left at an intersection.



Bicyclist Right-of-way

A person may operate a bicycle in an outside lane that is:

- Less than 14 feet in width and does not have a designated bicycle lane adjacent to that lane; or
- Too narrow for a bicycle and a motor vehicle to safely travel side by side.

(TTC, 551.103)



Crash Example #4

Bicyclist Taking the Lane

Investigator's Narrative Opinion of What Happened (Attach Additional Sheets if Necessary)

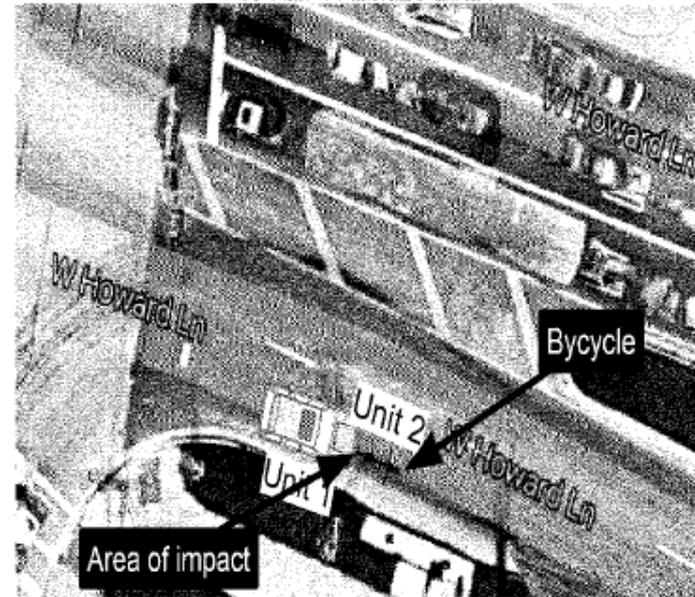
UNIT 1 & 2 WERE EAST BOUND IN THE 1200 BLK OF W HOWARD LN IN THE OUTSIDE LANE. UNIT 1 WAS TRAVELING BEHIND UNIT 2 IN LOW LIGHT. UNIT 1 DID NOT SEE UNIT 2 UNTIL IT WAS TOO LATE AND STRUCK UNIT 2'S REAR END CAUSING UNIT 2 RIDER TO FALL TO THE GROUND. UNIT 2 RIDER SUSTAINED MINOR INJURIES AND REFUSED TRANSPORT TO A HOSPITAL BY EMS. UNIT 2 WAS DAMAGED TO THE POINT WHERE IT HAD TO BE CARRIED FROM THE SCENE. UNIT 2 DISPLAYED SEVERAL ILLUMINATED FLASHING LIGHTS ON THE FRONT AND REAR OF THE BICYCLE AS WELL AS THE RIDER WAS WEARING A BRIGHT YELLOW COLORED SHIRT FOR VISIBILITY. UNIT 1 DRIVER STATED THAT HE SIMPLY DID NOT SEE UNIT 2. NOIWN4958

NARRATIVE AND DIAGRAM

Field Diagram - Not to Scale



Not To Scale





Bicyclist Right-of-way





Motorist /Bicyclist Right-of-way



TTC, 545.101, 545.103, 541.401, 551.101



Motorist /Bicyclist Right-of-way

- Motorists are also required to yield to an oncoming bicyclist when making a left turn.



TTC 545.152,
551.101



Crash Example #5

Motorist Turning Left



- Bicyclist going straight (toward camera)
- Motorist turning left on permissive (green ball) left
- Motorist failed to yield to thru bicyclist



Motorist /Bicyclist Right-of-way Shared Use Paths





Crash Example #6

Shared Use Paths



- Crosswalk for pedestrians
- Motorist has a warning sign for bike crossing. No yield or stop sign
- Yield sign for bikes crossing



Common Violations

- This section is an overview of some of the other common laws that you may see during enforcement efforts



Common Violations

- Texas has a statewide texting ban (TTC, 545.4251)





Common Violations

- Impairment

(Texas Penal Code, 49.04)





Common Violations

- Disregarding signal or stop sign – all vehicles



TTC, 545.151, 551.101, 552.001-003



Common Violations

- Door Zone Laws (TTC, 545.418)





Top Pedestrian Crash Contributing Factors

Contributing Factors of Motorists

Major Contributing Factors	Number	%
Failed to Yield Right-of-Way to Pedestrian	4,276	31.4%
Driver Inattention	2,228	16.4%
Failed to Control Speed	889	6.5%
Failed to Drive in Single Lane	440	3.2%

Contributing Factors of Pedestrians

Major Contributing Factors	Number	%
Failed to Yield Right-of-Way to Motorist	10,320	85.2%
Had Been Drinking	601	5.0%
Under the Influence	529	4.4%
Pedestrian Inattention	104	0.9%



Top Bicycle Crash Contributing Factors

Contributing Factors of Motorists

Major Contributing Factors	Number	%
Driver Inattention	1,329	24.7%
Failed to Yield Right of Way to Bicyclist	731	13.6%
Failed to Yield Right of Way at Stop Sign	473	8.8%
Failed to Yield Right of Way Turning Left	462	8.6%
Failure to Control Speed	344	6.4%

Contributing Factors of Bicyclists

Major Contributing Factors	Number	%
Failed to Yield Right of Way to Motorist	873	15.7%
Bicyclist Inattention	513	9.3%
Disregard Stop Sign or Light	363	6.5%
Failed to Yield Right of Way at Stop Sign	325	5.9%
Disregard Stop and Go Signal	303	5.5%



Importance of Crash Reporting

- Contributing Factors
 - This section of the report is designed for the investigating officer to determine which factor(s) or condition(s) contributed to the crash for each unit. **The officer may not have enough evidence to file a traffic charge, but does have enough data to render an opinion as to the contributing factors of the crash. (TxDOT CR-100)**



Contributing Factors

8 = Non-Collision: Cross Median/Centerline

16 = Collision Involving Pedalcycle

36. Factors and Conditions

- 1 = Animal on Road - Domestic
- 2 = Animal on Road - Wild
- 3 = Backed without Safety
- 4 = Changed Lane when Unsafe
- 14 = Disabled in Traffic Lane
- 15 = Disregard Stop and Go Signal
- 16 = Disregard Stop Sign or Light
- 17 = Disregard Turn Marks at Intersection
- 18 = Disregard Warning Sign at Construction
- 19 = Distraction in Vehicle
- 20 = Driver Inattention
- 21 = Drove Without Headlights
- 22 = Failed to Control Speed
- 23 = Failed to Drive in Single Lane
- 24 = Failed to Give Half of Roadway
- 25 = Failed to Heed Warning Sign
- 26 = Failed to Pass to Left Safely
- 27 = Failed to Pass to Right Safely
- 28 = Failed to Signal or Gave Wrong Signal
- 29 = Failed to Stop at Proper Place
- 30 = Failed to Stop for School Bus
- 31 = Failed to Stop for Train
- 32 = Failed to Yield ROW – Emergency Vehicle

- 33 = Failed to Yield ROW – Open Intersection
- 34 = Failed to Yield ROW – Private Drive
- 35 = Failed to Yield ROW – Stop Sign
- 36 = Failed to Yield ROW – To Pedestrian
- 37 = Failed to Yield ROW – Turning Left
- 38 = Failed to Yield ROW – Turn on Red
- 39 = Failed to Yield ROW – Yield Sign
- 40 = Fatigued or Asleep
- 41 = Faulty Evasive Action
- 42 = Fire in Vehicle
- 43 = Fleeing or Evading Police
- 44 = Followed Too Closely
- 45 = Had Been Drinking
- 46 = Handicapped Driver (Explain in Narrative)
- 47 = Ill (Explain in Narrative)
- 48 = Impaired Visibility (Explain in Narrative)
- 49 = Improper Start from Parked Position
- 50 = Load Not Secured
- 51 = Opened Door Into Traffic Lane
- 52 = Oversized Vehicle or Load
- 53 = Overtake and Pass Insufficient Clearance
- 54 = Parked and Failed to Set Brakes
- 55 = Parked in Traffic Lane

- 56 = Parked without Lights
- 57 = Passed in No Passing Lane
- 58 = Passed on Right Shoulder
- 59 = Pedestrian FTYROW to Vehicle
- 60 = Unsafe Speed
- 61 = Speeding – (Over Limit)
- 62 = Taking Medication (Explain in Narrative)
- 63 = Turned Improperly – Cut Corner on Left
- 64 = Turned Improperly – Wide Right
- 65 = Turned Improperly – Wrong Lane
- 66 = Turned when Unsafe
- 67 = Under Influence – Alcohol
- 68 = Under Influence – Drug
- 69 = Wrong Side – Approach or Intersection
- 70 = Wrong Side – Not Passing
- 71 = Wrong Way – One Way Road
- 72 = Cell/Mobile Phone Use
- 73 = Road Rage
- 98 = Other (Explain in Narrative)

AND CONDITIONS



Importance of Crash Reporting

- May Have Contributed Factors
 - It is sometimes difficult to form an **opinion** as to whether a factor or condition did or did not contribute to a crash. This section is to record the fact that the condition was present, but the investigator is unable to determine whether the factor/condition contributed. (TxDOT CR-100)



Importance of Crash Reporting

- Not all contributing factors are law violations. Law violations show a legal reference to the Texas Transportation Code or the Texas Penal Code. (TxDOT CR-100)
- All factors found must be described in the narrative, even if they have been addressed in another place on the report. (TxDOT CR-100)



Importance of Crash Reporting

- Contributing Factors referencing pedestrians should be used only for pedestrians, not bicyclists or micromobility users.
- 36 = FTYROW – To Pedestrian
- 59 = Pedestrian FTYROW to Vehicle



Importance of Crash Reporting

- Capture the code for the traffic control that is present at the location of the crash, even though it may have had no bearing on the causation of the crash. (TxDOT CR-100)
- **If more than one traffic control is present, indicate the one most affecting this crash. (TxDOT CR-100)**



Importance of Crash Reporting





Importance of Crash Reporting

- Motor Vehicle vs. Motorized Conveyance
 - Motor Vehicle
 - ATVs
 - Golf Cart
 - Moped
 - Recreational Off Highway/Utility Vehicle
 - Autocycle



Importance of Crash Reporting Motor Vehicle

ATVs



Golf Cart



Moped



Off Highway/
Utility Vehicle





Importance of Crash Reporting

- Motor Vehicle vs. Motorized Conveyance
 - Motorized Conveyance
 - Pocket Bikes
 - Go-carts
 - Riding Lawn Mowers
 - Segways
 - Motor Assisted Scooter (does not include moped, motorcycle or motor driven cycle)



Importance of Crash Reporting Motorized Conveyance

Riding Lawn Mower



Segway



Motor Assisted
Scooter





Importance of Crash Reporting

Data Driven Decision Making

- Engineering
- Education
 - Outreach
 - Training
- Enforcement
- Emergency Medical Services (EMS)



Importance of Crash Reporting Engineering Decisions

Traffic engineering departments rely on the crash data for decisions related to:

- Traffic signal, pedestrian hybrid beacon, or all-way stop installation
- Signal phasing changes like removing the permissive phase of a left turn movement
- Safety countermeasures – high crash intersections/corridors
- Vision Zero and safety action planning



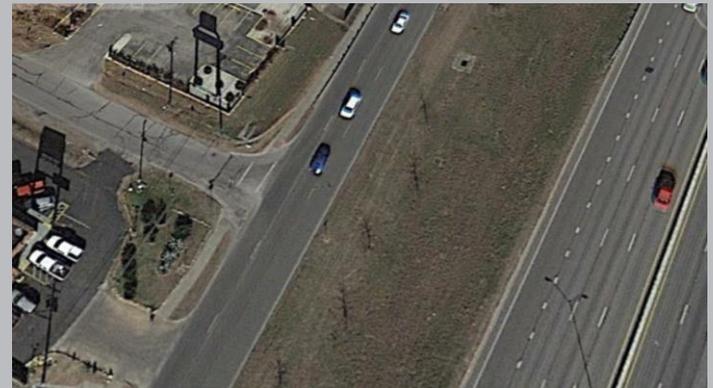
Importance of Crash Reporting Engineering Decisions

Example: I-35 at Middle
Lane

Texas Department of
Transportation

Crashes involving
pedestrians and bicyclists
crossing Middle Lane at
the I-35 West Service
Road.

2018



2019





Importance of Crash Reporting

Engineering Decisions (example continued)





Importance of Crash Reporting

- Document the details with whatever tools/technology you have available
 - Body camera
 - Dashboard camera
 - Audio recording
 - Writing equipment
- Interview witnesses as soon as possible
- Treat every crash/citation as if it will be heard in court. You may have to testify.



Prioritizing Safety Risk

- Targeting the riskier behaviors such as:
 - Pedestrians not yielding when crossing outside of an intersection or crosswalk
 - Drivers not yielding when required
 - Bicyclist riding against traffic in road
 - Bicyclist not using light at night
- Using enforcement resources to have the greatest safety benefit



Additional Stakeholders/Resources

- Engineering
 - TxDOT
 - Local Transportation Departments
- Enforcement
 - Other LEAs (such as ISD and University PD's)
 - Data (DPS, TxDOT, TTI)
- Education
 - Bicycle and Pedestrian Safety Outreach Groups
 - TxDOT
 - TTI
 - School Districts
- What additional resources does law enforcement need?



Discussion Questions

- What are some common misconceptions when it comes to where pedestrians are able to cross the roadway legally?
- Do you have ideas on ways to educate road users on the right of way laws pertaining to bicyclists, pedestrians and motorists?
- What right of way laws pertaining to pedestrian and bicyclist travel do you find confusing or do you think need clarifying?



Post – Test Questions



- **Neal Johnson** – neal-johnson@tti.tamu.edu

<https://groups.tti.tamu.edu/cts/lepedbike/>

OR

<https://www.walkbikesafetexas.org/>