



TRUCK SMART

DRIVER EDUCATION LESSON PLAN







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INTRODUCTION

Thank you for taking the time to help new drivers become safe drivers. There is a lot to learn about the rules of the road and how to drive safely with other motorists. This includes safely interacting with commercial vehicles on Utah's roads and highways. Nearly twenty-five percent of all vehicles on Utah's roads are large trucks and that number is increasing.

The Motor Carrier Division of UDOT recognizes that your role as an instructor is vital to the success and safety of each student. There is so much for drivers to learn and remember. The goal of this lesson plan is to help you teach new drivers some key points about how to share the road safely with large trucks, become "Truck Smart" and help Utah drivers reach a goal of Zero Fatalities.

The lesson plan is broken down into four modules: No-Zones, Stopping Distances, Don't Cut Off Trucks, and Wide Turns, with a crash case study (provided courtesy of Arizona Department of Public Safety) to help new drivers assess the scenario and evaluate what could have been done to avoid a fatal crash with a commercial vehicle. These modules can be taught together in one class period or spread across different class sessions.

Video segments for each lesson module are provided to help reinforce the discussion. A Truck Smart Quiz is also provided to be used at your discretion.

Comments pertaining to the lesson material should be directed to UDOT's Motor Carrier Division at:

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Salt Lake City, UT 84114
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NO-ZONES

MODULE 1

What are “No-Zones” and why should they be avoided?

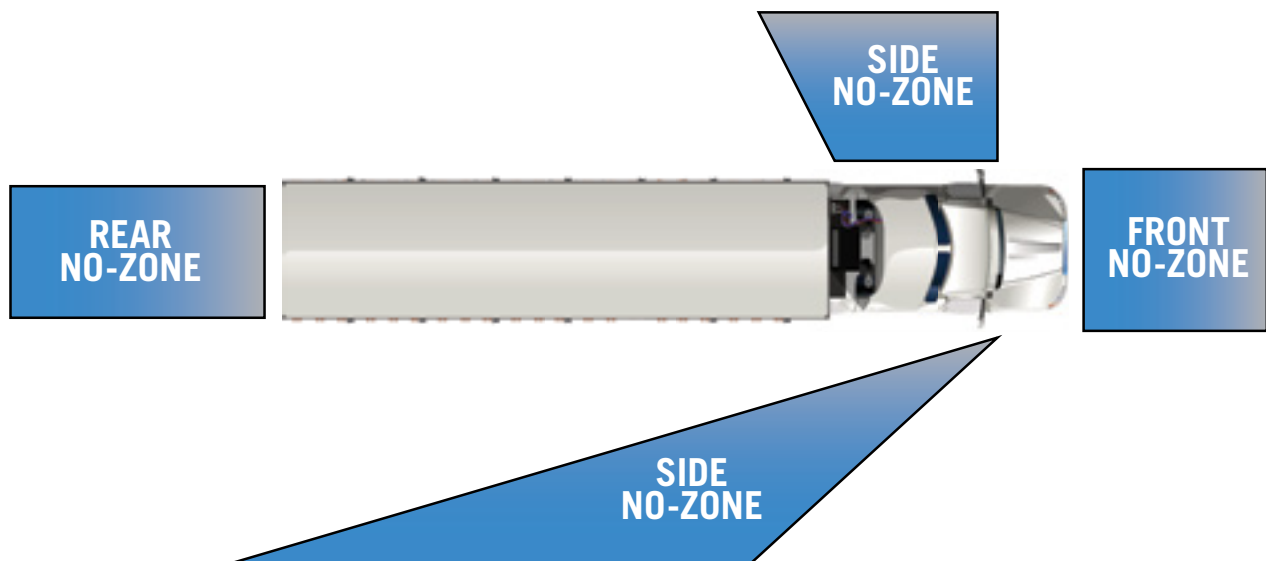
Learning Objective: Students should understand that semi trucks and buses have very large blind spots, recognize where they are located and avoid traveling in them.

Question 1: Do truck drivers have a better view of the road because they sit up higher than other cars?

Answer: No. In fact, semi trucks create numerous blind spots due to their size and height called “No-Zones.” There are four main areas around trucks that drivers should avoid.

Question 2: What are the main areas of a truck that you should avoid?

Students should draw and label these areas in their workbooks.



SIDE NO-ZONES

Trucks have extremely large blind spots on both sides of the tractor and the front part of the trailer. These blind spots then angle out from the truck. Driving your vehicle in these blind areas can put you into a dangerous situation where you can be sideswiped by a truck that can't see you.

REAR NO-ZONES

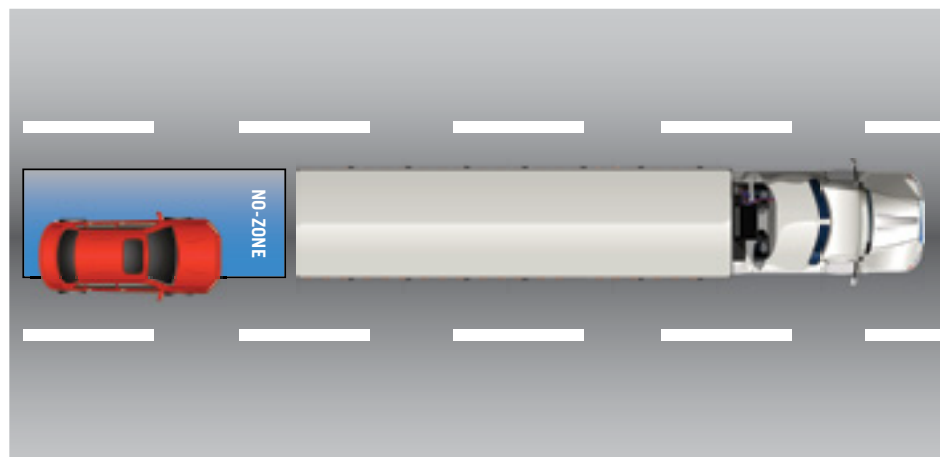
Truck drivers have no rear-view mirror to look through, so they have to rely heavily on their side-view mirrors. This blind spot extends nearly 200 feet from the back of the truck. Driving in this area also blocks your vision of what's ahead and decreases your reaction time if a truck stops suddenly.

FRONT NO-ZONES

Cutting in front of a truck as you would a car may be the last mistake you ever make. The front No-Zone area extends nearly 20 feet ahead of the truck. It's even safer if a driver is farther away from the front.

Question 3: Can drafting a truck either from the side or from behind help me save gas?

No. Drafting or tailgating a truck is never a good idea. If you tailgate a truck, your vision is limited, the truck driver can't see what's behind him and the chance of rear-ending a truck or running under the trailer is increased. Never draft a truck because the wind turbulence created by the truck can push you into another lane. You can also be sideswiped if the truck changes lanes.



If you follow too closely, the truck's size will also prevent you from viewing much of the road ahead. This can force you to depend on the truck's brake lights for a signal that something is going on or there is a hazard ahead. The few cents you may save on gas isn't worth the cost of your life or others' lives.

Question 4: Trucks' mirrors seem big enough, so shouldn't they be able to see me without a problem?

No. Truck mirrors can be as tall as 25 inches. They can also have cameras and additional mirrors installed but it doesn't mean the driver can see everything around them, especially if you are driving in a No-Zone area.

RULE OF THUMB

When driving around a truck, if you can see the truck driver's face in their side mirror, then the driver can see you.

Question 5: What should I do if I'm traveling behind a truck that's losing debris?

Following too closely in the rear No-Zone can put you in danger of any debris that may come off the back of a truck, or that is kicked up off of the roadway by the truck's motion. If you see that a truck is losing part of its load, back off and notify law enforcement at the next chance you have to pull over and call.

Play "No-Zone" (Blind Spot) video here



How well can you see what's on the other side of these trailers?

DON'T CUT OFF TRUCKS

MODULE 2

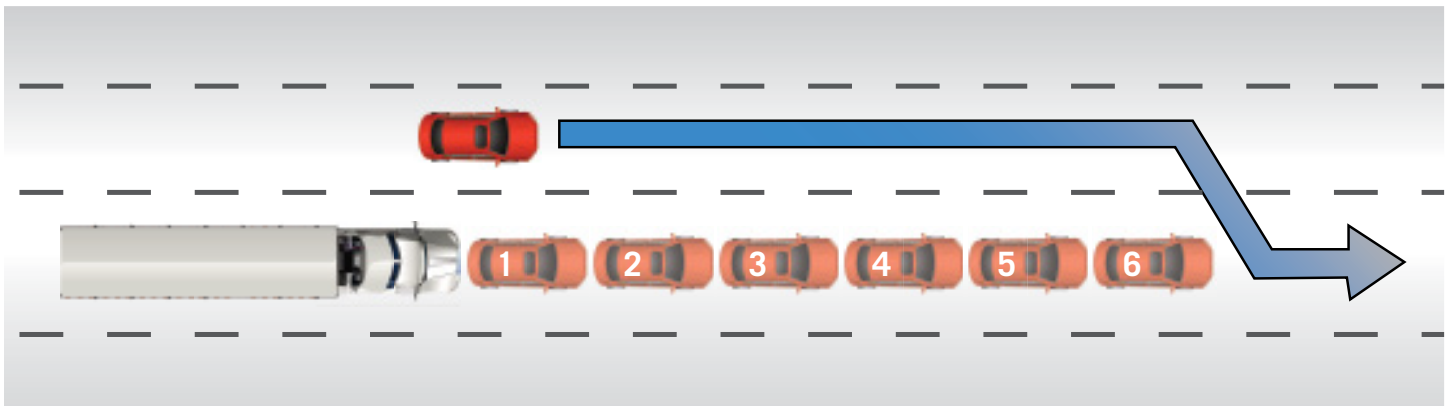
Learning Objective: Help students understand how to pass a truck safely and learn to respect them.

Question 1: When is it okay to pull in front of a truck?

When passing a truck, be sure there is at least one car length for every 10 miles per hour you are traveling between you and the truck you are passing before pulling in front of the truck. For example, if traveling 60 mph, have at least six car lengths between the front of the truck and your vehicle before merging into the same lane.

RULE OF THUMB

If you can see the truck in your rear-view mirror, then you can move over in front of the truck.



Question 2: Trucks have large braking systems, so is it okay to slow back down once you move over?

No. Even though trucks have large braking systems, they are substantially heavier than autos, so they require more time to slow down. Maintain your speed and develop a safe space between the truck and your car. Remember, trucks also take longer to regain their speed after being slowed down and may slow the other traffic behind them. Avoid creating a chain reaction and keep up your speed when passing a truck.

Question 3: Passing trucks is scary; should I always be concerned?

No. Passing a truck is only scary if you're not aware of your surroundings and how a truck behaves. It's okay to pass multiple-trailer combinations as well as single-trailer trucks. However, whether you're passing on a two-lane road or an eight-lane freeway, make sure you have extra time to get around these larger vehicles. On a level highway, it takes about three to five seconds longer to pass a truck than to pass a car.

Play *Passing Trucks Safely* video here

STOPPING DISTANCES

MODULE 3

Learning Objective: Students should understand that it takes trucks almost twice the distance as a car to come to a stop.

MOTOR VEHICLES

Width: 5' – 6' wide
Height: 4'6" – 5' high
(for passenger vehicle) or 6'6" high
(for SUVs and some pickup trucks)
Length: 12' – 18' long
Weight: 3,000 – 4,000 lbs.

12-18 Ft. Length



SEMI TRUCKS

Width: 8'6" wide
Height: 14' high (measured from level ground to top of load or vehicle)
Length: Lengths vary from 45' for a single motor vehicle to 65' for a truck-trailer combination
Weight: 80,000 lbs. gross weight

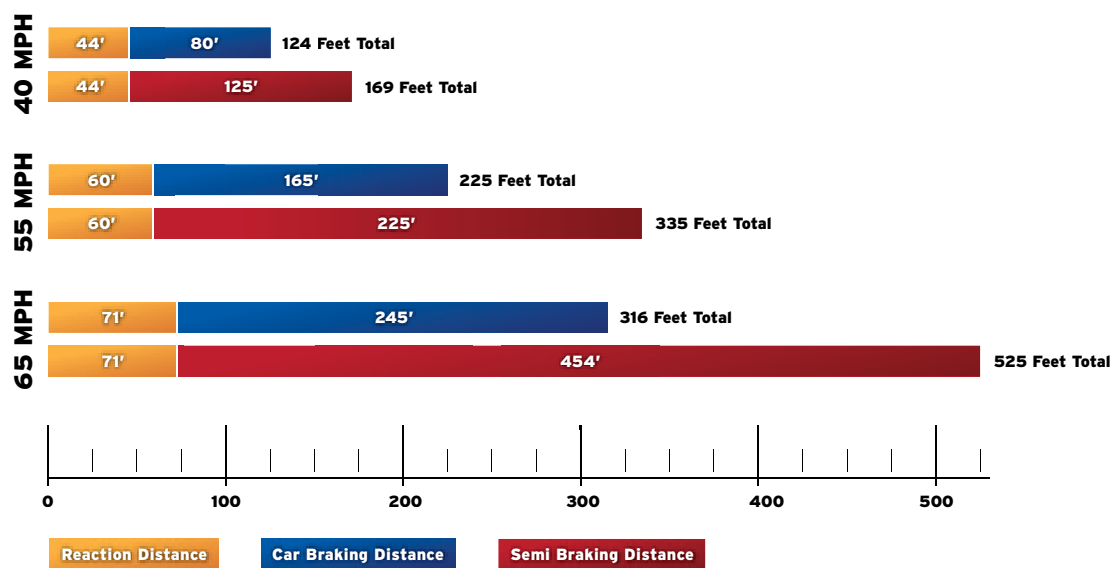
65 Ft. Maximum Overall Length Limit



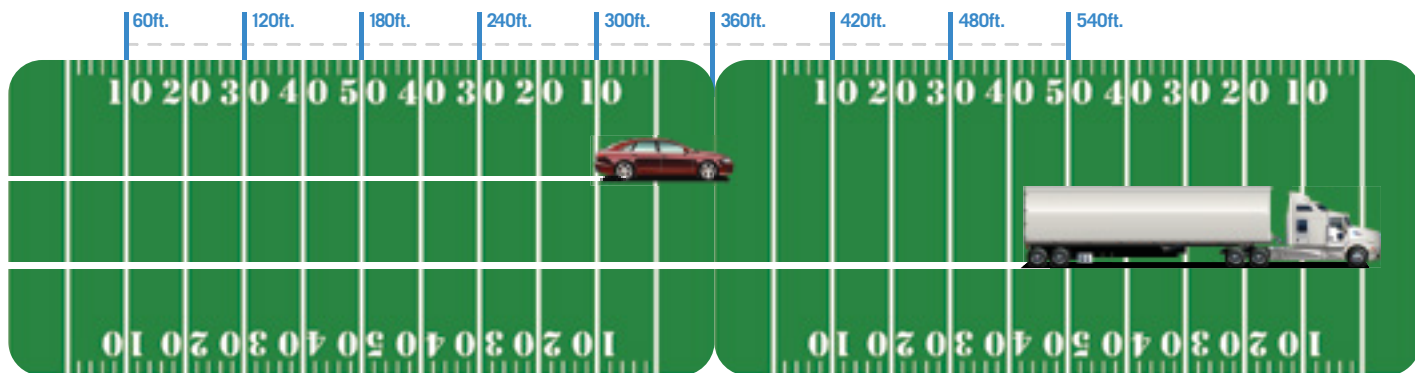
Question 1: How is weight a factor in determining the length of time it takes for a truck to come to a stop?

Trucks and buses are substantially larger than passenger vehicles and therefore require longer stopping and maneuvering distances. A typical tractor-trailer or other large truck can weigh as much as 80,000 pounds by law. Most passenger vehicles are about 3,000 – 4,000 pounds. A passenger vehicle weighing 4,000 pounds, traveling under ideal conditions at a speed of 65 miles per hour would take 316 feet to stop (nearly the length of a football field). In comparison, a fully-loaded tractor-trailer weighing 80,000 pounds traveling under ideal conditions at a speed of 65 miles per hour will take 525 feet to stop (almost the length of two football fields).

Total Stopping Distances



Comparison of Stopping Distances at 65 mph





Question 2: How do you figure stopping distance?

Total stopping distance is the distance your vehicle travels from the time you see a hazard and press on the brake until the vehicle stops. Total stopping distance is made up of three parts:

1. **Perception Distance** – The distance a vehicle travels while a driver is identifying, predicting and deciding to slow down for a hazard.
2. **Reaction Time** – The time it takes for a driver to execute a decision once a danger is recognized. The distance your vehicle travels while you react is called a reaction distance.
3. **Braking Distance** – The distance a vehicle travels from the time a driver begins pressing on the brake pedal until the vehicle comes to a stop.

For trucks, you must also factor in the **brake lag distance** in the stopping distance. Brake lag is the time it takes for a brake signal to travel to all the wheels on the tractor-trailer (about $\frac{3}{4}$ of a second). Brake lag distance is the distance the truck travels before the brakes on the trailer are fully engaged.

Play Stopping Distance video here

Question 3: How much space should I leave in front of my car if I'm stopped behind a truck on the road?

When you stop behind a truck, always leave plenty of room between your vehicle and the truck (at least one car length is a good rule). Also, move your vehicle slightly to the left side of your lane so that the driver can see you in his/her side mirror.

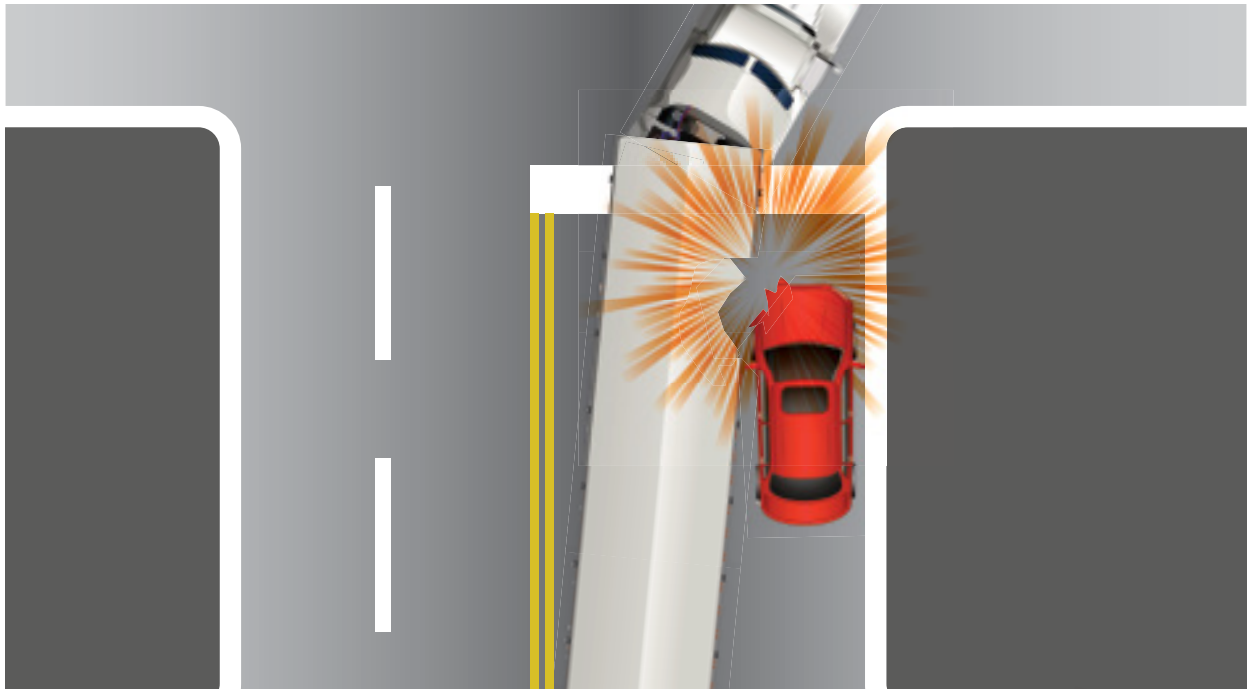
WIDE TURNS

MODULE 4

Learning Objective: Students should become more aware of how trucks maneuver at intersections and drive defensively around them.

Question 1: Why do trucks need to make wide turns?

Because of their overall length, large trucks have a wider turning radius. They will often move into adjacent lanes prior to and after a turning maneuver to avoid driving over a curb or sidewalk. When turning right, trucks must swing wide to the left to keep clear of the curb. Truck drivers turning left may also first swing wide to the right to enter a cross street.

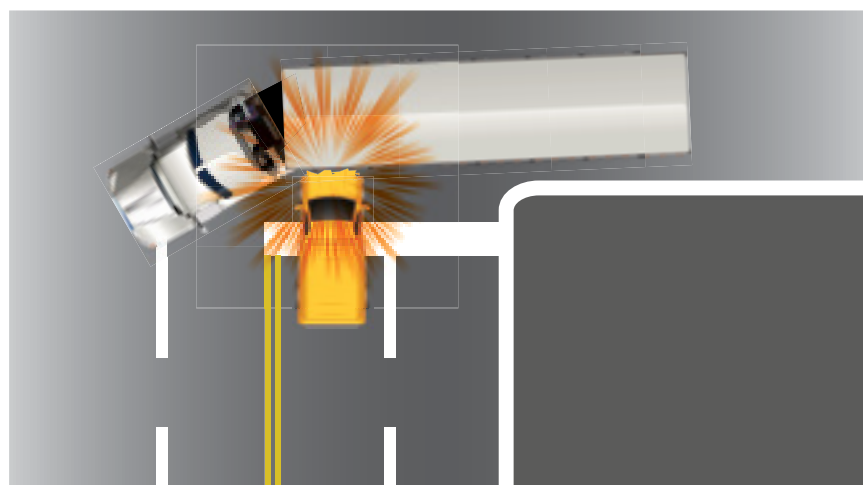
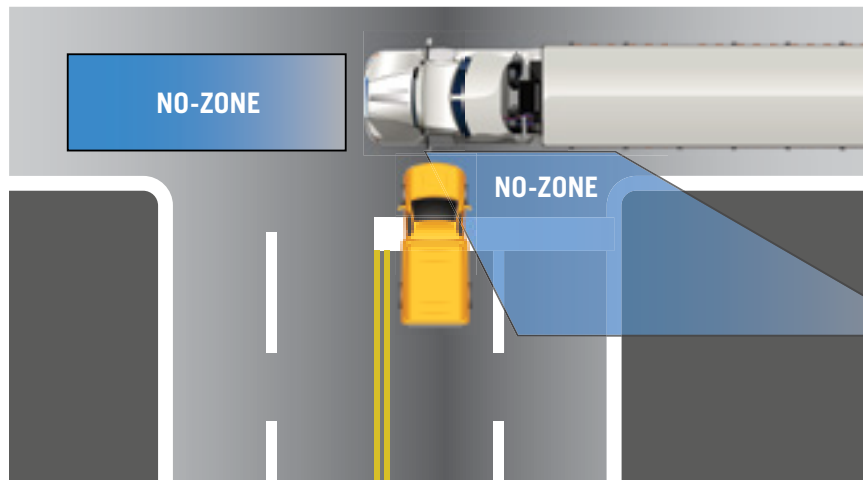


Question 2: How should I drive around a truck turning right or left?

To avoid a collision, only pass a truck on the left, especially if there is a possibility that it will turn right. Watch for the truck's turn signal to see what the driver intends to do. Occasionally truck drivers will fail to signal or the trailer signal light may be inoperative. Never attempt to cut in along the right side as the driver maneuvers left or you may become sandwiched between the turning truck and the curb. Safe drivers will avoid the truck's No-Zones and wait to assess the truck driver's intent before passing. As a general rule, avoid passing trucks while they are turning.

Question 3: What does it mean to crowd an intersection? Why can't I do it?

Many intersections are marked with stop lines, indicating where a driver must come to a complete stop. Crowding an intersection means to stop beyond the stop lines, leaving your vehicle exposed to trucks attempting to turn, as well as other vehicles and pedestrians. Crowding an intersection is illegal as it not only endangers you, but also puts you in the path of turning traffic and crossing pedestrians.



Question 4: If trucks are so heavy, shouldn't they be sturdier when turning?

With a height up of up to 14 feet, fully-loaded trucks have a much higher center of gravity than typical passenger vehicles, or even SUVs (4.5 feet - 5 feet and 6.5 feet high, respectively). High centers of gravity make it easier for trucks to tip over. Keep this in mind the next time you find yourself cutting too close in front a truck and thinking they won't be affected.

Play Trucks Make Wide Turns video here

REMEMBER

Remember, trucks don't operate like regular vehicles. Drivers who understand this basic concept and give enough room for a semi truck or a large bus to maneuver safely will stay safe themselves.



CRASH CASE STUDY

Part 1: News Article Sky County Daily News Dispatch

Local Teen Killed In Wreck!

By: John Rowski

A 16-year-old local teenager was killed this morning in a crash at Deep Creek Parkway and Ivanhoe Boulevard in town. The identity of that victim is being withheld until all of the family is notified. The crash was reported shortly after 8:30 a.m. on July 31.

The crash occurred in the 900 block of Southwest Ivanhoe Boulevard at the intersection with the Deep Creek Parkway access ramp. Southwest Ivanhoe Boulevard is a two-lane, one-way road at that point. It is part of a four-lane divided highway.

According to the on-scene police sergeant, the 18-wheeler was in the right lane on Southwest Ivanhoe Boulevard attempting to exit on to Deep Creek Parkway. The 18-wheeler made a wide right turn, and as it did, the pickup attempted to pass the 18-wheeler on the right side.

The pickup made glancing contact with the 18-wheeler. The pickup then veered to the right, went off the road and rolled. The sergeant said witnesses reported that the pickup driver was traveling at a high rate of speed.

A representative from the Sky County Medical Examiners Office pronounced the driver of the pickup dead at the scene. A passenger (16 years old) in the pickup did not suffer any major injuries. The driver of the 18-wheeler was not injured.

The identity of the passenger of the pickup and the driver of the 18-wheeler are not available yet.

The Police Department, Fire Department and Department of Public Safety worked the crash. The incident is still under investigation.



Photo Not of Actual Crash

Part 2: Filed Police Report

Facts of the Crash

Two large commercial motor vehicles (CMV's) were traveling south on Ivanhoe Boulevard in the #1 lane (left lane). The teenager driving the pickup truck came up in the #2 lane (right lane) at a minimum of 65 mph (speed limit is 55 mph), and was passing the commercial motor vehicle (truck) just as the CMV was starting to make a right turn into the #2 lane. The pickup truck glanced off the tractor-trailer and left the roadway to the right, rolled, and the driver was crushed as the cab of the pickup truck collapsed. This driver was wearing a seat belt, but his upper body came out of the window area. The truck driver was driving the speed limit, used his turn signal, but apparently did not see the pickup truck.

The investigating officer revealed that the pickup was being followed by another vehicle (his friends) and they had been playing a game of "cat and mouse." While they were not racing, the car had passed the pickup and was now passing to the right of the two tractor-trailers when the crash occurred. The investigating officer further revealed that the teenager driving the pickup was driving at a minimum of 60 – 65 miles per hour, but the damage suggested he may have been driving faster. The teenager probably didn't see the turn signal because it was on the lead vehicle of the two CMV trucks. The investigating officer indicated that evidence showed had the teenager been driving at the speed limit, he could have avoided the crash.

Although the trucker is being charged, the teen contributed significantly to the outcome of the crash. Furthermore, the teen's actions not only cost him his life, but will forever change the life of the truck driver.

The weather was clear and dry, and the sun was not a factor.



Photo Not of Actual Crash

CASE FACTS

The teenager probably didn't see the turn signal because it was on the lead vehicle of the two CMV trucks.

Crash Case Study

Local Teen Killed in Wreck

(Answer Key)

1. *Who was involved?*

The 16-year-old driver, the 16-year-old passenger and the truck driver.

2. *What happened?*

Two tractor-trailers following each other, one was swinging wide left to make a right turn. A speeding pickup truck was attempting to pass them on the right.

3. *What time of the day did the crash happen?*

In the morning, shortly after 8:30 a.m.

4. *Where did the crash happen, what type of road?*

The crash occurred on a one-way, two-lane road at an intersection with another two-lane road.

5. *Why did the crash happen?*

The teenager was passing and being passed by a friend in another vehicle in a game of “cat and mouse.” They had been speeding and kept passing each other as they were driving down the road. The crash occurred when the 16-year-old driver failed to observe the truck making a right turn shortly after passing the other vehicle.

6. *How could the crash have been avoided?*

According to the investigating officer, the teen had just passed a friend in another vehicle, pulled back into the right lane and was passing the two CMV trucks traveling in the left lane. The teen was passing the trucks at a minimum of 60 – 65 mph in a 55 mph zone. The investigating officer indicated the teen did not have time to react to the CMV truck making the right turn due to excessive speed. Had the driver been traveling at or near the speed limit, the crash would not have occurred.

7. *What were the road conditions?*

Clear and dry. There were no visual obstructions to either driver and the sun was not a factor as it was to the east.

8. *Were there any driver errors?*

The truck driver attempted to make a right turn from the left lane (swinging wide) and initiated the turn in front of a pickup truck passing him on the right. A contributing factor was the teen driver playing “cat and mouse” with a friend in another vehicle and driving at a high rate of speed. The investigating officer concluded the crash could have been avoided if the teen was not speeding and had his full attention on the road ahead and not the vehicle following him.

9. What were the speed conditions?

The exact speed is unknown; however, the investigating officer indicated the minimum speed of the pickup was 60 – 65 mph. Furthermore, he believed the speed was a bit higher than the minimum indicated due to the type and nature of damage to the pickup.

10. What Truck Smart principles could have been applied to avoid this crash and needless death?

- Stay out of the blind spots or No-Zones
- Following too closely (possibly)
- Not allowing the CMV truck enough room to turn safely

Crash Case Study

Local Teen Killed in Wreck

(Student Worksheet)

STUDENT NAME:
INSTRUCTOR:
DATE:

1. Who was involved?

2. What happened?

3. What time of the day did the crash happen?

4. Where did the crash happen, what type of road?

5. Why did the crash happen?

6. How could the crash have been avoided?

7. What were the road conditions?

8. Were there any driver errors?

9. What were the speed conditions?

10. What Truck Smart principles could have been applied to avoid this crash and needless death?

Truck Smart Quiz

(Answer Key)

1. *The typical passenger vehicle weighs:*
 - a. 1,000 to 2,000 pounds
 - b. 3,000 to 4,000 pounds**
 - c. 6,000 to 8,000 pounds
 - d. 10,000 to 12,000 pounds

 2. *A typical fully loaded tractor-trailer weighs:*
 - a. 80,000 pounds**
 - b. 70,000 pounds
 - c. 60,000 pounds
 - d. 50,000 pounds

 3. *A typical passenger vehicle traveling at 65 mph under ideal conditions takes:*
 - a. 102 feet to stop
 - b. 240 feet to stop
 - c. 316 feet to stop**
 - d. 525 feet to stop

 4. *A fully loaded tractor-trailer traveling at 65 mph under ideal conditions takes a minimum of:*
 - a. 102 feet to stop
 - b. 240 feet to stop
 - c. 316 feet to stop
 - d. 525 feet to stop**

 5. *Total stopping distance for a passenger vehicle is a combination of what three things?*
 - a. Perception time, braking distance and stopping distance
 - b. Perception time, reaction time and braking distance**
 - c. Braking distance, brake lag time and vehicle speed
 - d. Vehicle speed, braking distance and condition of the road

 6. *It is okay to pass a snowplow pushing snow, as long as you have four-wheel drive.*
 - a. True
 - b. False**
-

7. *The rear blind spot behind a semi-truck extends approximately 200 feet.*
- a. **True**
 - b. False
8. *You know you are not in a blind spot if you can see a truck's side mirrors.*
- a. True
 - b. **False**
9. *What should you do when you are merging on the freeway?*
- a. Accelerate to legal speed
 - b. Look for upcoming trucks and cars in neighboring lane
 - c. Responsibly and safely merge into the flow of traffic
 - d. **All the above**
10. *How many car lengths should you allow before pulling in front of a truck?*
- a. Two car lengths for every 10 mph
 - b. **Two lights in the rearview mirror or steer clear**
 - c. One car length for every 5 mph
11. *It is illegal to pass a truck pulling multiple trailers.*
- a. True
 - b. **False**
12. *Trucks often pull into the left lane to let traffic pass on the right when making right turns.*
- a. True
 - b. **False**
13. *Trucks and buses require more distance and time to stop and maneuver than cars do.*
- a. **True**
 - b. False
14. *Truck drivers have better visibility because they sit up so high.*
- a. True
 - b. **False**

15. *The no zones, or blind spots, of a semi-truck are:*
- a. On the right and left side of the semi
 - b. Directly in front of the semi
 - c. Directly in back of the semi
 - d. All of the above**
16. *It is safe to draft or tailgate large trucks or buses to save gas.*
- a. True
 - b. False**
17. *After passing a truck and returning to the lane in front of the truck, do not slow down.*
- a. True**
 - b. False
18. *A semi has more brakes so it can stop faster than a car.*
- a. True
 - b. False**
19. *Following a semi too closely can result in:*
- a. Crashing into the back of the semi when it makes a sudden stop
 - b. Debris being kicked up off of the roadway by the semi and striking your car
 - c. Debris or objects falling off of the semi when it makes a sudden stop
 - d. All of the above**
20. *It is legal to stop beyond the white stop line at an intersection as long as you watch for traffic and pedestrians.*
- a. True
 - b. False**

Truck Smart Quiz

(Student Version)

1. *The typical passenger vehicle weighs:*
 - a. 1,000 to 2,000 pounds
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 - c. 6,000 to 8,000 pounds
 - d. 10,000 to 12,000 pounds

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 - a. 80,000 pounds
 - b. 70,000 pounds
 - c. 60,000 pounds
 - d. 50,000 pounds

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6. *It is okay to pass a snowplow pushing snow, as long as you have four-wheel drive.*
 - a. True
 - b. False

7. *The rear blind spot behind a semi-truck extends approximately 200 feet.*
- True
 - False
8. *You know you are not in a blind spot if you can see a truck's side mirrors.*
- True
 - False
9. *What should you do when you are merging on the freeway?*
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- True
 - False

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 - c. Debris or objects falling off of the semi when it makes a sudden stop
 - d. All of the above
20. *It is legal to stop beyond the white stop line at an intersection as long as you watch for traffic and pedestrians.*
- a. True
 - b. False



Information provided courtesy of Arizona Dept. of Public Safety, Arizona Trucking Assoc. and CVSA

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