

Kentucky Injury Prevention and Research Center
Bona fide agent for Kentucky Department for Public Health
333 Waller Avenue, Suite 242 • Lexington, KY 40504 • 859-257-5839

REPORT#: 23KY127

REPORT DATE: February 15, 2024

INCIDENT HIGHLIGHTS



DATE:

December 7, 2023



TIME:

7:00 a.m.



VICTIM:

19-year-old Non-Hispanic
Truck Driver



INDUSTRY/NAICS CODE:

Trucking / 484110



EMPLOYER:

Trucking Company



SAFETY & TRAINING:

No Formal Program



SCENE:

State Highway



LOCATION:

Kentucky



EVENT TYPE:

Motor Vehicle Crash



Teen Truck Driver Dies in Single Vehicle Semi-Truck Rollover

SUMMARY

On December 7, 2023, a 19-year-old commercial truck driver (victim) was traveling on a rural Kentucky highway when the vehicle she was operating left the roadway and overturned. The victim succumbed to the injuries she sustained in the crash.

[READ THE FULL REPORT>](#) (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Overcorrection
- Lack of formal safety program
- Limited driver experience
- Lane width

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RECOMMENDATIONS

Kentucky investigators concluded that, to help prevent similar occurrences, employers should:

- Require all drivers to complete a defensive driving course,
- Implement formal health and safety programs.

Kentucky investigators concluded that, to help prevent similar occurrences, Kentucky should:

- Adopt the Federal Motor Carrier Safety Administration's Safe Driver Apprenticeship Program.
- Increase lane widths on highways with substantial truck volumes and/or that are frequently used by agricultural equipment.

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KENTUCKY

State **FACE** Program

Fatality Assessment & Control Evaluation

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Fatality Assessment and Control Evaluation Program

This case report was developed to draw the attention of employers and employees to a serious safety hazard and is based on preliminary data only. This publication does not represent final determinations regarding the nature of the incident, cause of the injury, or fault of employer, employee, or any party involved.

This case report was developed by the Kentucky Fatality Assessment and Control Evaluation (FACE) Program. Kentucky FACE is a National Institute for Occupational Safety and Health-funded occupational fatality surveillance program with the goal of preventing fatal work injuries by studying the worker, the work environment, and the role of management, engineering, and behavioral changes in preventing future injuries. The FACE program is located in the Kentucky Injury Prevention and Research Center (KIPRC). KIPRC is a bona fide agent for the Kentucky Department for Public Health.

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INTRODUCTION

On December 7, 2023, a 19-year-old female truck driver (victim) departed a Kentucky-based lumber yard en route to an in-state destination. Shortly after departing, the semi-truck and trailer exited the travel portion of the roadway and entered a ditch situated on the right shoulder of the road. In an attempt to steer the vehicle back onto the road, the driver overcorrected, which resulted in the vehicle overturning. The victim succumbed to the injuries she sustained in the crash. On December 8, 2023, the Kentucky Labor Cabinet informed the Kentucky Fatality Assessment and Control Evaluation Program (FACE) of the incident. On December 9, 2023, the Kentucky FACE investigator conducted a site visit, at which time photographs of the scene were taken.

EMPLOYER

The employer is a for-hire, Kentucky-based interstate truckload commercial carrier. The company was established in 2020 and employs six drivers, one of which is the owner of the company. According to the Federal Motor Carrier Safety Administration (FMCSA), the company operates six trucks and travels nearly 300,000 miles annually. The company transports machinery, grain, feed, hay, fencing, and lumber.

WRITTEN SAFETY PROGRAMS and TRAINING

According to the involved company, no formal training program or written safety program was currently in place. However, the owner, a 10-year commercial driver, personally trains each driver. The training was described as hands-on; the length of training depends on the skill set and experience of each new driver. The company stated that the victim received approximately six weeks of hands-on training that covered all aspects of driving.

WORKER INFORMATION

The victim was a 19-year-old non-Hispanic female. She had worked for the involved trucking company for less than one year. Prior to working with the involved company, the victim attended an independently owned truck driving school. The victim successfully graduated from the five-week program in January 2023, earning her class-A commercial driver's license (CDL), which was restricted to intrastate travel only (in-state travel).

INCIDENT SCENE

The incident occurred on a rural two-lane state highway with a posted speed limit of 55 mph. The highway runs north and south; travel lanes are separated by a double yellow line. The northbound lane measures 9 feet, 8 inches, while the southbound lane (victim's lane of travel) measures only 8 feet, 4 inches. The character of highway where the incident occurred is flat and straight. An earth embankment meets the edge of the northbound travel lane. A ditch sits to the right of the southbound travel lane and leads to an electric fence that surrounds farmland (photos 1 and 2).

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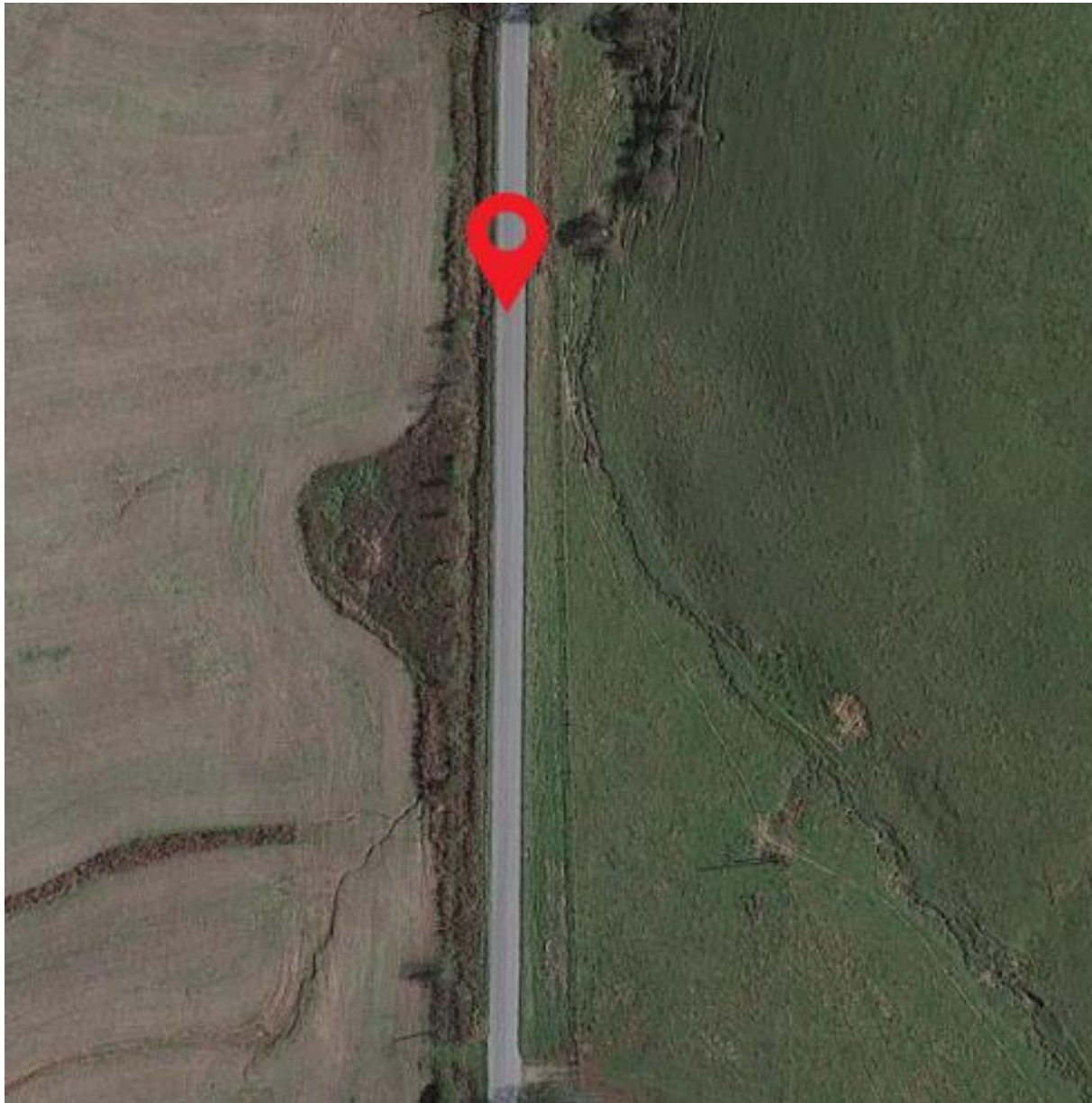


Photo 1. Overhead Google Earth image showing the state highway where the incident occurred. The red location marker represents the final resting spot of the involved vehicle.

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Photo 2. Photo showing the two-lane state highway where the motor vehicle crash occurred. Photo property of Kentucky FACE.

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WEATHER

The weather on the day of the incident was approximately 33 degrees Fahrenheit, 82% humidity, with a 9-mph average south wind speed. The weather is not believed to have been a factor in this incident.¹

INVESTIGATION

On December 7, 2023, a 19-year-old female truck driver (victim) departed a Kentucky-based trucking company at approximately 5:30 a.m., en route to a lumber yard located 20 miles away. The teen driver was operating a 2005 Freightliner Columbia semi-truck (photo 3) with a 2023 Dorsey flatbed trailer in tow (photo 4). The driver's assignment was to pick up a load of lumber and deliver it to an in-state destination that was located 58 miles from the lumber yard, a route the driver had taken multiple times in the past. After arriving at the lumber yard, the trailer was loaded with an estimated 20,000 pounds of lumber and secured with straps to prevent the load from shifting. The driver departed the lumber yard approximately one hour after arriving at 6:55 a.m. The driver had traveled less than two miles after departing the lumber yard when the truck drifted slightly right. This resulted in the front passenger's side steer tire dropping off the paved surface of the roadway and onto a soft shoulder (photo 5). At the point of drop off, the truck traveled 164 feet, 2 inches on the shoulder before the driver made an evasive maneuver to attempt to steer left, back onto the highway. The overcorrection resulted in a weight shift that drew the trailer into the ditch as the semi-truck reentered the roadway (photo 6). From the point of overcorrection, the truck traveled 91 feet, reentering the roadway and crossing north and south bound lanes of travel (photos 7 and 8). After crossing both lanes of travel, the semi-truck exited the highway to the left, striking an earth embankment (photo 9). The force of the strike resulted in the semi-truck and trailer rolling over, first onto the passenger's side and then onto the truck's top. The semi-truck and trailer came to rest on its top, across both lanes of traffic, at approximately 7:00 a.m. (photo 10). A witness contacted 911; emergency services (EMS) arrived on scene 10 minutes later at 7:10 a.m. The driver (victim) was trapped in the vehicle, wearing a seatbelt, unresponsive, and was presumed deceased upon their arrival and evaluation. EMS contacted the county coroner, who arrived shortly after and pronounced the victim deceased at 7:45 a.m. Emergency services worked with a local towing company to free the victim. The scene and roadway were cleared 5 hours and 55 minutes after the crash occurred, at 12:50 p.m.

On December 8, 2023, the Kentucky Labor Cabinet informed the Kentucky Fatality Assessment and Control Evaluation Program of the incident. On December 9, 2023, the Kentucky FACE investigator conducted a site visit, at which time photographs of the scene were taken.

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Photo 3. Google image depicting make/model of the semi-truck involved in crash.



Photo 4. Google image depicting make/model of trailer involved in crash.

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Photo 5. Photo indicating the point where the front passenger side steer tire dropped off the travel portion of the highway onto the shoulder. Photo property of Kentucky FACE.

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Photo 6. The red location marker indicates the point where the driver attempted to steer the truck back onto the highway. The blue arrow indicates the path made by the passenger side trailer tires as they were drawn into the ditch from the overcorrection and weight shift. Photo property of Kentucky FACE.

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Photo 7. Photo indicating the path the semi-truck traveled as it reentered the roadway and crossed both north and southbound lanes of travel. Photo property of Kentucky FACE.

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Photo 8. Photo showing yaw marks created by the semi-truck's tires as the truck crossed the north and south bound lanes of travel. Photo property of Kentucky.

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Photo 9. Photo showing the earth embankment struck by the involved semi-truck. Photo property of Kentucky FACE.

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Photo 10. Photo showing the final resting location of the semi-truck and trailer. The **red** line indicates the front of semi-truck. The **yellow** line represents the rear of the trailer. Photo property of Kentucky FACE.



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CAUSE OF DEATH

According to the death certificate, the cause of death was blunt force trauma.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Kentucky investigators identified the following unrecognized hazards as key contributing factors in this incident:

- Narrow roadway
- Overcorrection
- Lack of experience
- Lack of formal safety program.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Commercial carriers should require drivers to complete defensive driver training prior to driving company-owned vehicles.

Discussion: Defensive driver training focuses on the preventative role: what a driver can do to prevent a collision rather than focusing on fault. Defensive driving is an intentional act—driving in such a manner to think in a preventive mindset, constantly. According to Safemotorist.com, a defensive driver-training provider, defensive driving is driving in a manner that utilizes safe driving strategies and enables motorists to address identified hazards in a predictable manner. Additionally, the key to any good defensive driving strategy is knowing how to avoid traffic crashes and recognize potential hazards before it is too late. In a typical defensive driving course, students learn crucial crash prevention techniques that include:

- Scanning the roadway and adapting to surroundings
- Employing the two-second rule for following distances
- Knowing your vehicle's stopping distance
- Being aware of reaction distance
- Environment hazards
- Vehicle emergencies
- Sharing the road
- Passing and necessary clear distance
- Right of way
- Speed adjustments and railroad crossings.²

Although the victim's level of awareness just prior to the collision cannot be accurately determined, commercial carriers should require drivers to complete defensive driver training prior to driving company-owned vehicles to lessen the probability of crashes occurring.



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Recommendation #2: Commercial carriers should implement formal health and safety programs.

Discussion: Health and safety programs play a critical role in worker safety. The Occupational Safety and Health Administration states that the main goal of safety and health programs is to prevent workplace injuries, illnesses, and deaths, as well as the suffering and financial hardship these events can cause for workers, their families, and employers. The recommended practices use a proactive approach to managing workplace safety and health. Traditional approaches are often reactive—that is, problems are addressed only after a worker is injured or becomes sick, a new standard or regulation is published, or an outside inspection finds a problem that must be fixed. These recommended practices recognize that finding and fixing hazards before they cause injury or illness is a far more effective approach. The idea is to begin with a basic program and simple goals and grow from there. By focusing on achieving goals, monitoring performance, and evaluating outcomes, workplaces can progress to higher levels of safety and health achievement. Employers will find that implementing these recommended practices also brings other benefits.

Safety and health programs help businesses:

- Prevent workplace injuries and illnesses
- Improve compliance with laws and regulations
- Reduce costs, including significant reductions in workers' compensation premiums
- Engage workers
- Enhance social responsibility goals
- Increase productivity and enhance overall business operations.³

A helpful addition to a commercial carrier's health and safety program may include instructions on how to safely navigate narrow roadways, conduct proper trip planning, and access roadways to determine adequacy for commercial truck traffic and offers guidance on proper techniques should a vehicle leave the roadway.

Developing and implementing a formal health and safety program can better prepare workers for hazards in the workplace and reduce on-the-job injuries.

Recommendation #3: The state of Kentucky should adopt the Federal Motor Carrier Safety Administration's Safe Driver Apprenticeship Program in lieu of the current Kentucky Entry-Level Driver Training Requirements for all 18–20-year-old CDL drivers, regardless of interstate vs. intrastate travel.

Discussion: The driver (victim) operating the involved semi-truck and trailer was 19 years old; she had held a commercial driver's license for less than one year. The Centers for Disease Control and Prevention (CDC) states that the risk of motor vehicle crashes is higher among teens than any other age group. Teen drivers aged 16–19 have a fatal crash rate nearly three times as high as drivers aged 20 and older per mile driven. The CDC further states that teens are more likely than older drivers to underestimate and/or not be able to recognize dangerous situations and are more likely than adults to make critical errors that can lead to serious crashes.⁴

Commercial motor vehicles (CMV) are typically much larger in size and weight than a passenger vehicle and require a specialized license to operate. The FMCSA requires all drivers to be a minimum of 21 years of age to obtain a CDL and operate in interstate commerce (multi-state travel). However, there are exceptions. Each state can lower the minimum



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age requirement to 18 years of age if the driver remains within the state that he/she is licensed in. This is known as intrastate commerce. Both regulations have been long-standing, but much has changed over the last 18 months. FMCSA has now implemented two new initiatives:

1. Entry-Level Driver Training Regulations (ELDT) and
2. The Safe Driver Apprenticeship Program (SDAP).

[Entry-Level Driver Training](#)⁵ (ELDT) — ELDT, which went into effect on February 7, 2022, sets forth training standards each state must now follow for individuals seeking to obtain a CDL for the first time, regardless of age. Prior to ELDT, no standard training was required. The CDL candidate would take a written and practical examination; if both were passed successfully, the candidate would be awarded a CDL. ELDT now requires these individuals to attend and successfully pass a training course that covers a curriculum set forth by the regulation. Although this regulatory change was a step in the right direction, the regulations do not establish minimum hours or length of training, only the curriculum that must be taught. Upon successful completion of the training program, the candidate can test to obtain a CDL. Once the CDL is obtained, there are no further mandated training requirements, which potentially results in a newly licensed CDL driver with little on-road experience.

[Safe Driver Apprenticeship Program](#)⁶ (SDAP) — SDAP is a federal program that would allow drivers 18 to 20 years of age to operate commercial motor vehicles in interstate commerce, something that was not possible prior to the program's implementation in July of 2022. The SDAP is a very detailed program that focuses not only on the driver but on the trucking company, the safety equipment in the truck that's being operated, training after the CDL is obtained, and the qualifications of the individual training the newly licensed driver. Companies wishing to employ an 18- to 20-year-old CDL driver must apply and meet rigorous safety standards. New drivers must undergo 400 hours of monitored training in two stages by a trainer meeting strict regulatory requirements. The semi-truck being operated by the new driver must be equipped with forward-facing video camera systems, automatic emergency braking capabilities, and a governed speed of 65 mph.

As the regulations currently stand, a Kentucky teen who obtains a CDL and does not wish to travel outside the state of Kentucky, like the victim in this incident, is required to complete only an ELDT program. As stated above, this leaves 18- to 20-year-old drivers with no regulatory requirement for time spent training and obtaining real world experience. Currently, the only differential separating the requirements for an ELDT program vs. an SDAP is whether the 18–20-year-old CDL driver travels across state lines. As with this incident, fatal and serious injury crashes can occur anywhere, in or out of the operator's state of residence. State lines should bear no weight on regulatory requirements for training.

Drivers aged 18–20 operating commercial vehicles should be required to successfully complete the most regulated training program available, which for now is the SDAP. The Kentucky FACE program recommends that Kentucky adopt the Federal Motor Carrier Safety Administration's Safe Driver Apprenticeship Program in lieu of the current Kentucky Entry-Level Driver Training Requirements for all new drivers, regardless of interstate vs. intrastate travel.



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Recommendation #4: The state of Kentucky should consider increasing lane widths on highways with substantial truck volumes and/or frequent use by agricultural equipment.

Discussion: Evaluations of the scene determined that the width of the southbound lane where the involved semi-truck dropped off the travel portion of the roadway measured 8 feet, 4 inches (diagram 1). The semi-truck being operated, a 2004 Freightliner Columbia, has a width of approximately 8 feet, leaving a very small margin for error. [The Kentucky Highway Design Guidance Manual](#) lists design criteria for Kentucky highways based on design speed of the road. The manual was adopted from the Federal Highway Administration and was intended for the national highway system. However, Kentucky adopted the criteria and applies it to high-speed roadways, which are defined as interstates, other freeways, and roadways with a design speed greater than 50 mph. The manual lists the following criteria as design considerations: design speed for the highway, lane width, shoulder width, horizontal curve radius, superelevation rate, stopping distance, maximum grade, cross-slope, vertical clearance, and design loading structural capacity.⁷

The speed limit on the road where the crash occurred was 55 mph. According to the manual, the ideal lane width for a road with a speed limit of 55 mph is 11 feet (chart 1). However, the manual lists further consideration for roadways with substantial truck volumes or frequently used by agricultural equipment. In these situations, a lane width of 12 feet is recommended.⁶ According to local officials, the roadway where the crash occurred sees a lot of semi-truck and trailer traffic. The rural Kentucky highway is primarily surrounded by farmland and is utilized daily by farms to transport agricultural products and equipment.

It should be noted that the manual does not establish minimums and maximums but offers guidance. However, based on the high volume of semi-truck traffic on the involved highway, the Kentucky FACE program recommends that the state evaluate and consider increasing lane widths on highways where substantial truck volumes are present and/or agricultural equipment frequently uses the roadway when possible.

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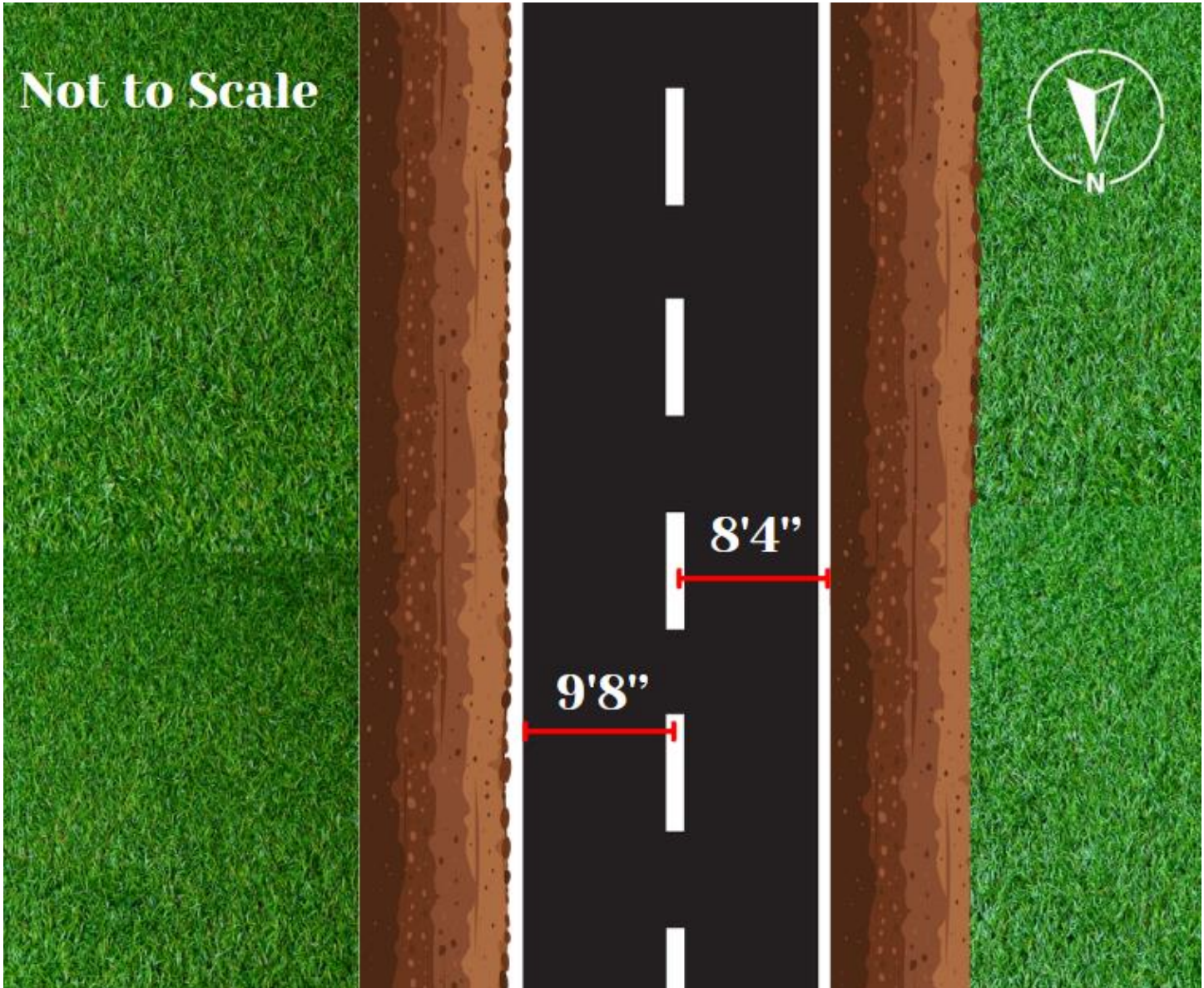


Diagram 1. Diagram indicating lane measurements on the highway where the crash occurred. Diagram property of Kentucky FACE.

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COMMON GEOMETRIC PRACTICES RURAL LOCAL ROADS												
		TRAFFIC VOLUME										
TERRIAN		UNDER 50 A.D.T.	50-250 A.D.T.	250-400 A.D.T.	400-2000 A.D.T.	OVER 2000 A.D.T.						
MINIMUM DESIGN SPEED (M.P.H.)	⑥ LEVEL	30			40			50				
	⑦ ROLLING	20	30			40						
	MOUNTAIN	20			30							
LANE WIDTH (FEET) ④ ⑧	DESIGN SPEED	UNDER 400 A.D.T.			400-2000 A.D.T.			OVER 2000 A.D.T.				
	15 MPH	9			10 ⑨			11				
	20 MPH											
	25 MPH											
	30 MPH											
	40 MPH	10			11			11 ⑩				
	45 MPH											
	50 MPH	11										
55 MPH												
60 MPH												
MIN. USABLE SHOULDER WIDTH (FEET) ⑤	ALL SPEEDS	2			3 ⑨			6				
MIN. CLEAR ROADWAY WIDTH OF NEW AND RECONSTRUCTED BRIDGES	ALL SPEEDS	TOTAL WIDTH OF LANES +2' (EACH SIDE)			TOTAL WIDTH OF LANES +3' (EACH SIDE)			TOTAL WIDTH OF LANE + USABLE SHOULDER WIDTHS ⑪				
MINIMUM RADIUS (FEET)	DESIGN SPEED	eMAX. 4%			eMAX. 6%			eMAX. 8%				
	20 MPH	86			81			78				
	25 MPH	154			144			134				
	30 MPH	250			231			214				
	35 MPH	371			340			314				
	40 MPH	533			485			444				
	45 MPH	711			643			587				
50 MPH	926			833			758					
NORMAL PAVEMENT CROSS SLOPES ③	RATE OF CROSS SLOPE = 2%											
NORMAL SHOULDER CROSS SLOPES	EARTH = 8% PAVED = 4%											
MAXIMUM GRADE (PERCENT)	M.P.H.	15	20	25	30	35	40	45	50	55	60	
	LEVEL	9	8			7			6	5	5	
	ROLLING	12	11			10			9	8	7	
MINIMUM STOPPING SIGHT DISTANCE ①	(FEET)	80	115	155	200	250	305	360	425	485	570	
	MINIMUM PASSING SIGHT DISTANCE ②	(FEET)	—	400	450	500	550	600	700	800	900	1000

- ① MINIMUM STOPPING SIGHT DISTANCE BASED ON AN EYE HEIGHT OF 3.5 FT AND AN OBJECT HEIGHT OF 2.0 FT. CONSIDER BOTH HORIZONTAL AND VERTICAL ALIGNMENTS.
- ② MINIMUM PASSING SIGHT DISTANCE BASED ON AN EYE HEIGHT OF 3.5 FT AND AN OBJECT HEIGHT OF 3.5 FT. CONSIDER BOTH HORIZONTAL AND VERTICAL ALIGNMENTS.
- ③ NORMAL PAVEMENT CROSS SLOPES ON BRIDGES IS 2%.
- ④ CONSIDER CURVE WIDENING ON PROJECT WHEN TRUCKS AND/OR HORIZONTAL CURVATURE INDICATE A NEED.
- ⑤ FOR SLOPES 4:1 OR FLATTER, USABLE WIDTH IS GRADED WIDTH, FOR SLOPES STEEPER THAN 4:1, USABLE WIDTH TERMINATES AT THE SLOPE ROUNDING.
- ⑥ WHERE SELECTED DESIGN SPEED IS > 50 MPH, USE COMMON GEOMETRIC PRACTICES EXHIBIT 700-02 FOR RURAL COLLECTOR ROADS.
- ⑦ JUSTIFICATION FOR THE CHOSEN DESIGN SPEED SHOULD BE DOCUMENTED IN THE DESIGN EXECUTIVE SUMMARY.
- ⑧ FOR ROADS ≤ 2000 ADT, REFER TO AASHTO'S "GUIDELINES FOR GEOMETRIC DESIGN OF LOW-VOLUME ROADS.
- ⑨ FOR ROADS IN MOUNTAINOUS TERRAIN WITH DESIGN VOLUME OF 400 TO 600 VEH/DAY, 9 FT LANE WIDTH MAY BE USED.
- ⑩ CONSIDER USING A LANE WIDTH OF 12 FT WHERE SUBSTANTIAL TRUCK VOLUMES ARE PRESENT OR AGRICULTURAL EQUIPMENT FREQUENTLY USES THE ROAD.
- ⑪ FOR BRIDGES IN EXCESS OF 100 FT IN LENGTH, THE MINIMUM WIDTH OF LANES + 3 FT (ON EACH SIDE) MAY BE ACCEPTABLE.

Chart 1. Chart sourced from the Kentucky Highway Design Guidance Manual indicating lane width guidance based on highway design speed. Highlighted consideration 10 at the bottom refers to consideration referenced in recommendation #1. The full manual can be reviewed by clicking [here](#).



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- [5] Entry-Level Driver Training Program. <https://www.fmcsa.dot.gov/registration/commercial-drivers-license/entry-level-driver-training-eldt>
- [6] Safe Driver Apprenticeship Pilot Program. <https://www.fmcsa.dot.gov/sdap>
- [7] Kentucky Highway Design Guidance Manual. <https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf>

INVESTIGATOR INFORMATION

This investigation was conducted by Beau Mosley, Fatality Investigator, Fatality Assessment and Control Evaluation, Kentucky Injury Prevention and Research Center, University of Kentucky College of Public Health.

ACKNOWLEDGMENTS

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