NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C.

SURVIVAL FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

A. CRASH INFORMATION

Location:	4600 block North State Route 25 in Rochester, Fulton County, Indiana
Vehicle:	2017 Toyota Tacoma pick-up truck
Operator:	Private Operator
Pedestrian #1:	6-year-old male
Pedestrian #2:	9-year-old female
Pedestrian #3:	6-year-old male
Pedestrian #4:	11-year-old male
Date:	October 30, 2018
Time:	Approximately 7:12 a.m. EDT
NTSB#:	**HWY19MH003**

B. SURVIVAL FACTORS GROUP

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C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Summary Report* in the docket for this investigation.

D. DETAILS OF THE SURVIVAL FACTORS INVESTIGATION

The Survival Factors investigation focused on the safety issues related to student transportation to included designated student pick-up locations, the safe boarding and disembarking of students from school buses and the state, federal and industry guidelines regarding safe student transportation. The investigation examined local, state and national response to near miss[1] incidents and the effectiveness of enforcement and prevention activities. The investigation also examined issues related to the accurate reporting and documenting of near miss incidents both locally and nationwide. Lastly, the investigation examined the emergency response to the incident.

1. Tippecanoe Valley School Corporation

The Tippecanoe Valley School Corporation (TVSC) is one of the largest public-school districts in the city of Akron, Indiana. The school district covers two counties and twelve cities, to include Rochester. TVSC services 190 square miles and has a student population of approximately 1,783. Within the school district; there are two elementary schools, one middle school, one high school and one educational center. TVSC operates its own student transportation system. TVSC uses an app that allows select users to sync with the school bus's GPS to provide real-time access to the bus's location through an online portal. This app provides school officials with information related to anticipated pick-up or drop off delays, the direction and location of the bus and provides notification when the bus has reached its destination at school. Though this app could be beneficial to parents by providing access to the same information that could be used to enhance student transportation safety; such as preventing students from standing out in inclement weather for long periods of time waiting for the arrival of the bus, TVSC does not provide access to this app to the parents. **Figure #1** is map showing the boundaries of the Tippecanoe Valley School Corporation.

[1] The term "near miss" is used to define those incidents where a vehicle illegally passes a stopped school bus that has its warning lights activated, and the stop arm deployed.

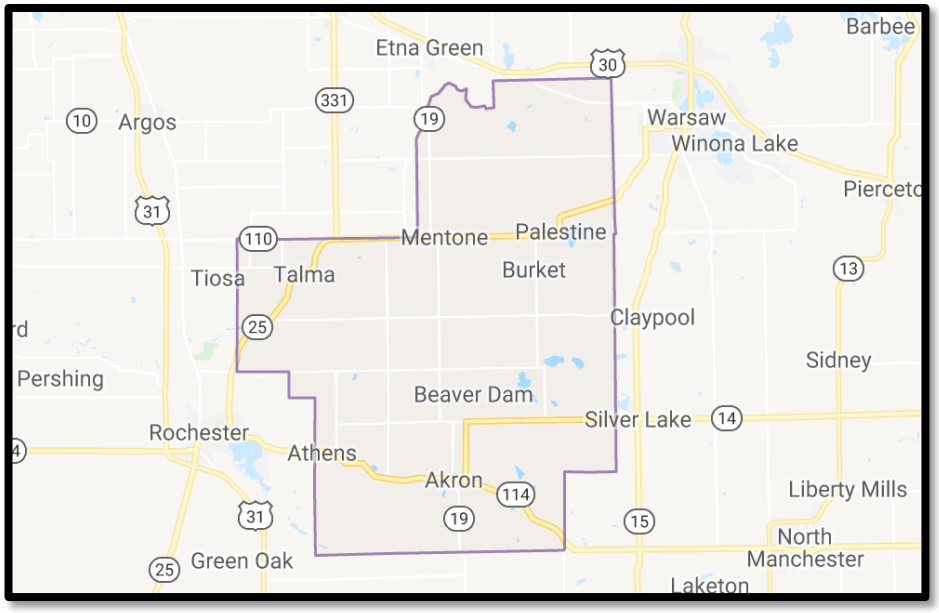

Figure 1: Google Map image of the Tippecanoe Valley School Corporation Boundaries

1.1. TVSC SR-25 School Bus Route

The bus route assigned to the incident bus encompasses both rural farm roads and larger state roads like State Route 25 (SR-25). SR-25 is a major highway that runs through seven counties and 17 cities and townships. In Rochester, Fulton County, SR- 25 is a two-lane roadway divided by a double yellow line that traverses the county in a curving north, north-east and southerly direction. The highway runs through smaller towns and cities and adjacent to rural farm areas. The speed limit for this roadway at the crash location is 55 miles per hour. The incident school bus departed the garage located to the rear of the high school and traveled to the first bus stop located within minutes of the school. In the morning, the school bus route winds through rural farm roads before traveling in a northerly direction on SR-25. Approximately 28 students are picked up along the SR-25 corridor at 7 different designated student pick-up bus locations. **Figure 2** shows the school bus route along SR-25. The arrow indicates the location where the crash occurred.

Figure 2 Google Map image of State Route 25 showing the location of school bus stop.

A survey of the route assigned to the incident bus driver was conducted with representatives from TVSC. During the survey it was noted that stop #4, located in the 4400 block of SR-25 was located a short distance from the southbound lane's exit from a curve and adjacent to a large wooded area that blocked drivers view of the upcoming private driveways on the west side of the roadway. At this location, the school bus driver stops on the opposite side of the roadway and the child is required to cross in order to board the bus. The geometry of the road would likely prevent a small child from being able to see an approaching vehicle. Drivers traveling in the southbound direction are warned of the approaching school bus stop by an advisory warning sign posted prior to the entrance to the curve that warns "School Bus Stop ahead, 700 feet". However, the actual bus stop isn't marked, the place where the child would begin to cross is dark or in the shadows and no highway safety lighting is provided. Traveling at the posted speed limit, drivers would have a limited amount of time to observe and react to the child crossing the roadway in front of them.[2]

In the southbound direction, approaching the designated student pick-up location at stop #5, the crash scene, the roadway exits the last curve at a point that provides approximately 890 feet of sight distance to the crash location. An advisory warning sign, "Watch for School Bus", is located approximately 868 feet north of the crash site. **Figure 3** shows the designated school bus stop location (Stop #5) across from the mobile home park on SR-25. The photograph shows the location where the school bus stopped to pick up the students on the day of the crash.

[2] See Survival Factors Attachment- TVSC Designated Student Pick-up Locations for incident bus along SR-25

Figure 3: Incident school bus on the scene of the crash at the designated student pick-up location across from the mobile home park. (Photo provided by the Fulton County Sheriff's Office)

An interview was conducted with a recently retired bus driver who had been servicing the incident bus route for approximately 20 years. The driver advised that she knew the route and most of the children at the mobile home park bus stop. The driver advised that the children were well behaved and never crossed the roadway without receiving permission from her. The driver confirmed that this included pedestrian #1, #2, and #3. The retired driver advised that she did not know pedestrian #4. This student started to use school transportation after the driver's retirement. The driver advised that at the beginning of the school year, each driver presented the school corporation with a map of their route. This route map was devised by the drivers alone and the school corporation was not involved in the route planning or the pick-up schedule. Alterations, to the route, were based on the students and their need for school transportation.

The driver advised that prior to her retirement in April 2018, the incident driver rode with her 3 or 4 times to familiarize himself with the route. Prior to her retirement, the driver voiced her concern that the next driver to service her route must be conscientious and alert due to the hazards associated with the route. The driver noted that her route was not the most dangerous route serviced by TVSC. Despite believing that her route was dangerous, the driver believed that a good driver could "mitigate" any safety risks, though this same risk mitigation assessment was not used to determine the appropriateness of the devised route. The retired driver provided an anecdote regarding the hazard risk associated with her route. She noted that at stop, the residents had been denied a mailbox because the US Postal Service deemed that it was too dangerous for a postal worker to stop at that location to deliver the mail. The bus stop in question is also along the same SR-25 route.

1.2.1. TVSC Driver Safety Procedure

TVSC drivers provide instruction and discipline for the children on their respective buses. The drivers are permitted to set rules as they saw fit. On the incident school bus, the driver had assigned each child a seat. Seat assignments were based on age; the younger children usually sat upfront, and on behavior. Disruptive students sat closest to the driver. The older students were usually located towards the rear. Each TVSC school bus is divided into an "A" side and a "B" side. The "A" side is located behind the driver and the "B" side is the right passenger side of the bus

To service the stops on the route, the driver would activate his "amber" lights well ahead of the stop. The bus would come to a stop at the predetermined location and before the deployment of the stop-arm; the driver would check to see that no traffic was moving in the area and that it was safe to do so. The location of the stop bus was always behind the location of the students to ensure that the students crossed in front of the bus. Once the driver has determined that it is safe for the students to cross, he turns on the interior light and motions to the students to cross, using a standard hand gesture.

At the mobile home park, there are no lights on the property. The mobile home park was described by the retired driver as extremely dark. The students stand at or just behind the chain link fence which is well away from the roadway. Usually, a parent would be present to ensure that the children board the bus safely. The driver advised that for years, it had been the same mother that was present on the day of the crash. Due to the location where the students were standing, the driver advised that she could not see them until they started across the roadway. It was incumbent on the child to see the driver and not the other way around. The driver advised that she had made several complaints about the lack of lighting in the trailer park. Ultimately, she was advised by the transportation director that the mobile home park was private property and that the school couldn't install lights on the property. In an interview with the transportation director, he advised that no further action was taken on his part or that of the school corporation.[3]

1.2.2. Student Safety Training

The retired driver advised that twice a year, once in the fall and again in the spring; each driver was supposed to conduct an evacuation drill with the students assigned to their individual bus. After the drill was completed; the driver would submit a form to the school corporation certifying that the drill had been conducted. The second type of safety training provided by the drivers was specifically earmarked for newer bus users, the kindergarten students. A driver and bus would go to the school and the kids were provided instruction about the rules of conduct on the bus, how and when to safely cross the roadway and participate in the mandatory evacuation drill. Every student is trained to respond to the standardized hand signal by the driver. Students were instructed not to cross the roadway without the driver's permission. Another safety measure reportedly used by the school bus drivers involved the sounding of the bus horn to warn students of approaching hazards and inform them to "Go Back". However, none of the interviewed students or the parent that was present at the scene during the crash were aware of this procedure. The

[3] See Motor Carrier Factors Attachment-Interview with TVSC Transportation Director

parent noted that the sound of vehicle horns was typically heard at that location due to the number of motorists trying to get the school bus driver to load the students more rapidly.

An interview conducted with the surviving victim and another student revealed that most of the training the students received involved their conduct while aboard the school bus. Only one student acknowledged that crossing the roadway required permission from the driver. The other student advised that he rarely took notice of the driver and crossed the roadway whenever he saw the other students crossing. This student was pedestrian #4, who reportedly started riding Bus #36 for the first time, at the beginning of the current school year.

1.2.3. Crash Event

On the day of the crash, the incident school bus was scheduled to make four stops prior to the accident scene. The student that usually boards the bus at the first stop was absent that day. At each of the next three stops, a single student boarded the bus. The children sat in their assigned seats located at Seat 6, Side A and in Seats 12, Side A and Side B. Due to the height of the seatbacks, it is believed that none of the children would have had a view of the initial impact. Attempts were made to interview the students without success. The driver of the incident bus reported that when he saw that the approaching vehicle was not going to stop, he began honking the horn. The use of the horn as a warning device is not mandated in TVSC's procedures and students are not trained to react to it use. (For additional information, see the Human Performance Attachment- School Bus Driver interview) [4]

1.2.4. Prior Safety Related Incidents at the Bus Stop

The retired driver confirmed that she had been the driver involved in the traffic collision while picking up the students at the mobile home park a couple of years before. The driver advised that the route had contained additional stops that year. She had made several stops prior to arriving at the crash location. She advised that the same vehicles were behind her bus at each of the previous stops. Due to the number of stops and their proximity to each other, the driver advised that she was not going very fast and the vehicles behind her had followed without incident. That year, an additional stop was added just prior to the entrance to the mobile home park. This new stop was so close to the previous stop that after picking up the student, the driver had not been able to get back up to speed before she arrived at the next stop. When she stopped at the designated location to pick up the students at the mobile home park; the student that had boarded the bus at the previous stop was still walking towards the rear of the bus. The driver advised that she felt the impact but didn't know what had happened. She looked in all her mirrors and couldn't see anything. She asked the older student at the rear of the bus what had happened, and the student looked out the rear window and informed the driver that they had been rear-ended. The striking vehicle, which hadn't been traveling very fast, had under-rode the rear bumper of the school bus.

The second incident occurred early in 2018 and involved the mother of the three deceased pedestrians. The bus driver advised that a complaint was received by the transportation director stemming from an incident involving a commercial truck that had passed the school bus after it stopped to pick-up the students at the trailer park. The driver advised that she arrived at the bus

[4] See Human Performance Factual Attachment-School bus driver interview

stop and when she looked around, she saw the truck approaching the bus from the opposite direction. It was apparent to the bus driver that the driver of the truck was not going to stop. The vehicle, a "Millie's Bread" truck, never slowed down and passed the school bus. The bus driver advised that she sounded her horn as the truck passed the bus. The driver continued blowing the horn for some time. The mother of the three pedestrians had been home that day but was not present at the bus stop. None of the students were in the roadway at the time because the driver had not signaled to them to cross. The mother had assumed that because of the long duration of the horn sounding, it had been an indication that the children had been in the roadway at the time of the incident. The driver noted that another parent had been present and identified her as the same mother who had been present on the day of the current crash. The driver never spoke to either mother or knew how, the mother of the three children, had become aware of the incident. The first time the driver became aware of the complaint was when the transportation director called her and asked her to confirm the occurrence of the incident. The driver, who hadn't reported the incident to anyone, provided the transportation director with the facts. Her next contact with the transportation director was when she dropped off the students at the bus stop later that afternoon. The transportation director had been sitting in his privately-owned vehicle (POV) at the trailer park when the school bus arrived. In the afternoon, the students are dropped off on the near side or at the right-side curb of the roadway. The third interaction she had with the director, regarding this incident, was several weeks later when he called to say that "Millie's" had identified the driver and would pursue their own disciplinary action against him. The driver believed the case was closed and never filed a report of the incident with the police. To the driver's knowledge, no other report was filed by TVSC. The transportation director that handled the incident is the current director. The director advised that he did not notify the school corporation's School Resource Officer (SRO), whose job it was to liaison with the local law enforcement or file a police report. In addition, the transportation director did not document the incident.

The driver reported that TVSC had no policy regarding when or how to report these types of incidents. The school corporation did not provide guidance for reporting these incidents or the appropriate form to use. Most drivers talk amongst themselves. A few had taken to calling out incidents over the radio, but no action was taken regarding these occurrences.[5]

2. Pedestrians

On the day of the crash, a parent waited with the students for the school bus to arrive. The parent instructed all the students to remain behind the fence that bordered the front side of the mobile home park. The parent advised that she observed the white flashing light on top of the school bus from a distance. When she saw the bus approaching; she attempted to gather the children together into one group to cross and board the bus. As the school bus approached, she saw the driver activate all the warning lights, turn on the interior light and deployed the stop arm. The school bus stopped, and the driver waited before signaling the children to cross. At that time, all the children were still standing in the mobile home park driveway, set back from the roadway **(See Position 1 in Figure #4).** In preparation to cross and board the bus, pedestrian #2 took hold of the hand of pedestrian #1, positioned on her left side and pedestrian #3, standing to her right as

[5] See Survival Factors Attachment-Interview with former TVSC driver

she faced the roadway. Pedestrian #4 was observed standing to the right of pedestrian #3. When the driver signaled the children to cross, the four victims started across the roadway together. Two other students were walking directly behind the four victims with another student directly behind them. From their position in the driveway, the approaching pick-up truck was to the students' left and their view was obstructed by several mobile homes, foliage and the curvature of the roadway. The first opportunity for the students to observe the pick-up truck would have occurred either when they were in the middle of the southbound lane of the roadway or when the truck was directly in front of the trailer adjacent to the driveway. The parent, that was present at the time of the crash, advised that the pick-up truck appeared "out of no-where". The parent had been trying to round up the remaining three children when the crash occurred. The last student, that had been attempting to cross, was walking behind the lone female student. She was able to pull this female, walking directly behind the four victims, to safety. This fifth, female student reported that she felt the truck as it passed her but sustained no injury. All four of the victims that were struck were in the southbound travel lane. **(See Position 2 in Figure #4).** Three of the students sustained fatal injuries and were pronounced on the scene. The fourth student was flown by air ambulance to the trauma center in Fort Wayne, Indiana where he was admitted with serious injuries.

2.1. Pedestrian Injury Analysis

2.2.1. Pedestrian #1

The 6-year-old male was positioned the farthest north of the four pedestrians when the group started walking cross the roadway. He was the first to be struck by the pick-up truck. Pedestrian #1 came to final rest in the southbound lane adjacent to the double yellow line approximately 45.6 feet south of the front bumper of the school bus. The victim was lying beside pedestrian #3 **(Position #3)**. The pedestrian sustained fatal blunt force trauma to the head.

2.2.2. Pedestrian #2

The 9-year old female was the second in the line of pedestrians. She came to final rest in the grassy area on the west side of the roadway approximately 78.8 feet south of the front bumper of the school bus. **(Position #4)**. The victim sustained fatal multiple blunt force trauma to the head, torso, and extremities. Injuries sustained by the child were consistent with being run over by the striking vehicle.

2.2.3. Pedestrian #3

The second 6-year-old male was found lying next to pedestrian #1 in the center of the southbound lane, 45.6 feet south of the front bumper of the bus. **(Position #3)**. The victim had sustained fatal multiple blunt impact trauma to the head, torso and lower extremities and sustained a fractured neck.

2.2.4. Pedestrian #4

The 11-year-old male was the last to be struck by the truck. He was positioned the farthest south as the pedestrians crossed the roadway. He sustained serious multiple blunt impact trauma to the torso and extremities. After being struck by the pick-up truck, the victim came to final rest lying in the grass adjacent to the roadway, behind the striking the vehicle, 130 feet south of the

front of the bus. **(Position #5)**. The victim was conscious and communicating with first responders immediately following the crash. He was flown by air ambulance to a hospital in Fort Wayne Indiana.

Figure 4: Aerial photograph of post-crash scene showing position of victims during crash sequence. (Photo provided by the Indiana State Police)

3. Mechanism of Injury

At the time of the crash, the 2017 Toyota Tacoma pick-up truck was occupied by the driver and three minor children. All the children were properly restrained in car seats in the rear seat of the truck and sustained no injury. The pick-up truck sustained extensive damage to the hood, front bumper, and radiator. A closer inspection of the truck's damage by the investigating officers revealed evidence that the 11-year-old male and the 9-year-old female, impacted the truck hood. The speed of the pick-up truck was approximately 41 miles per hour at impact. (See Vehicle Factors Group Chairman's report for additional information) **Figure 5** is a photograph of the damage to the striking vehicle caused by the impact with the victims.

Figure 5: Photograph of damage to striking pick-up truck (FCSO)

4. Indiana Department of Transportation (INDOT)

The NTSB examined the student transportation system in the adjacent school district. In the state of Indiana, parents are permitted to select which school district their child attends, regardless of the county they reside in, for no additional cost. This results in students living in one county and attending school in another county. As a result, multiple school districts can provide transportation services in the same area. Each school district determines the appropriate location to pick-up their students.

The Indiana Department of Transportation (INDOT) has jurisdiction over SR-25. There is no standardization regarding school bus signage in Fulton County. In Rochester, INDOT has installed advisory warning signs indicating "Warning School Buses" along SR-25. SR-25 cuts through the center of Talma, Indiana; a small unincorporated community just north of Rochester in Fulton County. Within that unincorporated community, regulatory signs are present that mandate drivers "Stop for stopped school buses". In addition, the speed limit on SR-25 has been lowered to 35 miles per hour.

Dynamic Message Signs (DMS) are utilized by communities nationwide to increase the effectiveness of notifications to drivers by providing messaging with greater visibility than standard signage. These large electronic message signs provide drivers with additional information about unique driving challenges such as construction zones and special conditions that may impact traffic movement.

Dynamic Message Signs are not used by INDOT as an enhanced notification system to drivers on school bus routes.

4.1. Local School Corporations

In addition to TVSC, the Rochester Community Schools (RCS) operates school bus routes in Fulton County. RCS has 1800 students and operates 16 school buses daily. The school district also provides two bus routes for special needs students when requested. The school district encompasses several miles within Fulton County, mostly on rural roadways. Most of the school bus routes crossover major state roads and at least four routes are on a state road with associated highway speeds much of the time. Most of the routes encompass rural areas and some bus route take 75 minutes to service each day. The Rochester School Corporation is comprised of 4 schools; to include two elementary schools, one middle school and one high school.

An interview was conducted with the school superintendent of RCS and the School Resource Officer (SRO) to discuss school bus routing and near miss incidents. Initial route planning is done by using software that is linked to the school management site and tied into the school transportation division which identified the number of students, their location and need for school transportation services. The routing decision is not left solely up to a computer program. Parental concerns and input from drivers that service the routes are an integral part of the decision-making process when determining the bus route. Periodic re-assessments of their school bus routes are performed by RCS. These re-assessments can be expedited by the receipt of complaints or when new students are added to the route.

The school representative advised that they encounter 3-5 near miss incidents each month and the number of these occurrences seem to remain constant. The SRO stated that most of the near miss incidents seem to involve distracted drivers rather than individuals who are deliberately passing the school bus stop arm. In many cases, the offending drivers were observed not sitting upright and were obviously not focused on the task of driving. The SRO noted that current enforcement activities have included the prosecutor's office issuing warning letters to suspected owner/drivers and law enforcement interviewing the registered owner in hopes of identifying and citing the offending driver.

The representatives of RCS advised that their review of near miss incidents also found several other issues. The SRO identified the phenomenon as school buses being "outshined or "out sparkled" by other types of large vehicles or equipment found on the roadway. In Rochester, farm equipment, trash trucks, construction equipment, etc. seem to compete with school buses in visibility and in design. Frequent complaints that have been received by the school district include the difficulty in distinguishing a school bus from any other type of heavy vehicle on the roadway. Many individuals have reported that to determine whether the vehicle they are looking at is a school bus, they had to be very close to the vehicle to identify it. In addition, it has become a common occurrence for larger vehicles to place lights in the same location that once was unique to the school bus industry, to increase conspicuity.

Another issue discussed by the representatives was the frequency of incidents involving "young drivers". In the state of Indiana, new drivers can participate in an on-line course that is designed to educate them and certify them as qualified to obtain a learner's permit. The course is very limited in scope on the topic of school bus regulations and safety.

The school representatives' final conclusions were that (1) school bus design and lighting needed to be revamped so that the vehicle was once again, unique in appear to motorists and (2) better training for young drivers that focuses more on school bus safety.[6]

The third school district within Fulton County is the Caston School Corporation (CSC). CSC is comprised of one junior-senior high school for middle and high school students and one elementary school. No interviews were conducted with school officials. The Fulton County Sheriff's Office advised that their agency was working with CSC regarding near miss incidents.

4.2. Post-crash Activity

4.2.1. Local Response

In response to this and other similar crashes occurring nationwide; a Transportation Safety Committee was formed with the three local school corporations, the Fulton County Sheriff's Department, the Kosciusko County Sheriff's Office, a representative from the Kosciusko County schools, and a representative from the Kosciusko County Highway Department to discuss the safety issues regarding student transportation in the respective counties. The committee reviews all proposed school bus routes and implements new safety standards established as a result of the Rochester crash.

TVSC altered the school bus route along the SR-25 corridor to facilitate the loading and disembarking of students on the right or near-side of the bus, closest to the curb. The transportation director of TVSC advised that the re-evaluation of all school bus routes along state roads has been conducted by the school corporation. All near miss incidents are now being documented and the records retained by the school corporation. TVSC began to install stop arm cameras in all their buses. Currently, half of the corporation's buses are equipped with the cameras and the remaining fleet will be completed by the next school year, (September 2019).

Local civic organizations donated money to help equip Rochester Community Schools buses with stop arm cameras. The cameras, that are being installed, cost $2,400.00 per school bus. Following the crash; RCS also revamped their school bus routes so that currently 90% of their routes allow for "near side" boarding. The school district is still working on the remaining routes.

4.2.2. Statewide Response

In May 2019, the governor of Indiana signed into law Senate Bill 2 (SB-2) which addressed many school safety related issues. SB-2 increased the penalty for drivers passing a deployed stop arm, directs school districts to minimize crossing of students in high-speed areas and authorizes school districts to install stop arm cameras. In addition, the new law requires *school corporations, charter school and accredited nonpublic schools that provide student transportation to review their school bus routes and safety policies annually by September 1st. The first review is required to be conducted on or before September 1, 2019.* The state school bus committee in consultation with the Indiana Department of Education (IDOE) is tasked with providing, on their public website, an outline of safety guidelines and industry best practices regarding school transportation. IDOE will consult with the Indiana Department of Transportation (INDOT) regarding school bus

[6] See Survival Factors Attachment- Rochester Community Schools Interview

safety issues. The new law mandates that on U.S. or State Routes, loading or unloading of students would not be allowed unless no other safe alternative existed. Loading and unloading of students on streets, highways, U.S. and state route, would be conducted as close as possible to the right-hand curb or road edge (also referred to as near-side boarding).

Whereas SB-2 calls for increases the penalties for violating deployed stop arms, the law fails to address the issue of enforcement when the identity of the offending driver is unknown. Unlike in many states that have stop arm laws, the state of Indiana does not permit the citing of the registered owner of the vehicle involved in an offense when the driver's identity can't be determined. This minimizes the effectiveness of the enforcement portion of the legislation. In many cases, the identity of the driver is unknown and enforcement options are limited to verbal and written warnings to the registered owner of the vehicle without any penalty.

4.2.3. National Legislative Response

Currently, a bill is being co-sponsored by members of the U.S. House of Representative, House bill, H.R. 2218, and members of the U.S. Senate, Senate bill, S. 1254, to address safety issues related to student transportation on a national level. The "School Bus Act" of 2019, also known as the "STOP" Act calls for the Secretary of the Department of Transportation (DOT) to undertake a comprehensive review of all issues involved with illegal passing of school buses and to make recommendations to Congress on the best practices to deal with this national safety problem. The bill directs DOT to review state laws, enforcement and penalties, technology, driver education and distraction. The bill also calls upon DOT to create a public safety messaging campaign and to compel NHTSA to study illegal passing and develop safety countermeasures. The bill is supported by three of largest school transportation industry organizations. The organizations include the National School Transportation Association (NSTA), the National Association for Pupil Transportation (NAPT) and the National Association of State Directors of Pupil Transportation Services (NASDPTS).[7]

5. School Transportation Related Incidents Nationally

5.1. Fatal Near-miss Incidents

In October 2016, the NTSB investigated the fatal school transportation related collision that occurred in Thief River Falls, Minnesota. On October 6, 2016 at approximately 7:00 a.m.; three students attempted to cross State Highway 59 in Thief River Falls, Minnesota, to board the school bus which was located on the opposite side of the highway. A 7-year-old male was struck and killed by a minivan traveling in the opposite direction. State Highway 59 is a two-lane asphalt roadway with farms and agricultural fields adjacent to the roadway. There is not supplemental lighting available. The crash occurred before sun rise and the area was dark. The posted speed limit is 60 miles per hour.[8]

The NTSB investigated the fatal student pedestrian collision that occurred in Hartsfield, Georgia on Thursday, October 25, 2018. In that crash, two students attempted to cross a state road to board the school bus that was stopped on the opposite side of the roadway from their residence.

[7] See Survival Factors Attachment- Industry Response Letter to Congress
[8] www.ntsb.gov See report Thief River Falls MN

The school bus warning lights were activated, and the stop arm was deployed. Both students were struck by a passenger car that was traveling in the opposite direction. The 10-year-old male student was killed, and the 7-year old male sustained serious injuries. The 25-year-old female driver of the passenger car stated that she saw the warning lights but not the deployed stop arm. She advised that she did not recognize the school bus as a bus and did not see the students attempting to cross the roadway. The roadway is a two-lane rural major arterial state road with farms and agricultural fields on either side. No supplemental roadway lighting is present. At the time of the crash, the sun had not risen, and it was still dark. The posted speed is 55 miles per hour.[9]

Another NTSB investigation involved the fatal school bus transportation crash that occurred on Wednesday, October 31, 2018 at about 6:36 am. in Baldwyn, Mississippi. On that day, a student attempted to cross a state road to board the school bus that was stopped on the opposite side of the roadway with its warning lights activated and the stop arm deployed. The student was struck by a pick-up truck traveling in the opposite direction. The 9-year-old-male student was killed. The 22-year-old driver stated that he saw the warning lights on the school bus but didn't recognize the vehicle as a school bus. The state road is a two-lane rural roadway with farms and agricultural fields on either side of the roadway. At the time of the crash, the sun had not risen, and it was still dark. There is no additional lighting provided except from the headlights of the vehicles. The posted speed limit for the roadway is 55 miles per hour.[10]

Another fatal student transportation collision that came to the attention of investigators with the NTSB occurred on December 20, 2011 at about 6:55 p.m. in Crowheart, Wyoming. An 11-year-old female disembarked a school bus, following an after-school event, and was struck while crossing US Highway 26. The 11-year-old female was killed. As in the Rochester crash, the student had received permission to cross the highway from the school bus driver. The striking vehicle was traveling in the opposite direction and had struck the pedestrian without slowing. As in the Rochester and other crashes investigated by the NTSB, the driver of the striking vehicle reported that he saw the bus with its warning lights activated but did not recognize it as a school bus. In addition, the crash occurred in rural areas, on a high-speed roadway without supplemental lighting. As a result of the Wyoming crash, the school district revised its school bus routes to facilitate "near side" student pick-up and drop offs and several years later, the state of Wyoming passed legislation to mandate the installation of stop arm cameras for every school bus in the state.[11]

5.2. NHTSA and Industry Guidelines

In 1998 The National Association of State Directors Pupil Transportation Services received funding through NHTSA and published a report titled *"School Bus Routes and Hazard Marking Systems"*. The report outlined how to conduct on-site review of designated school bus routes, hazard assessments, the effective dissemination of information to school bus drivers and minimum driver training standards.

[9] www.ntsb.gov See report Hartsfield, GA
[10] www.ntsb.gov See report Baldwyn, MS
[11] See Survival Factors Attachment- Crowheart, WY.

The Safe Routes Guide to Determining School Bus Stop location provides recommendations regarding the selection of safe locations for school bus stops. These recommendations include:

- "Near side" pick-ups and drop offs
- Discourages the need for students to cross roadway especially multilane roadways
- Recommends that adequate light be available at designated student pick-up locations[12]

5.3. School Bus Safety Research

5.3.1. Safety Studies

In 1992, The Great Britain Department of Transport published a safety study that found that on roadways with a posted speed limit of 64 kph (kilometers per hours) or 40 miles per hour, 90% of all pedestrian collisions were fatal.[13] In Rochester, as well as in each of the crashes in the appendix, the posted roadway speed was significantly higher increasing the likelihood of death for the student pedestrian in the event of a collision.

In 2014, Donoughe and Katz published the "Evaluation of Fatal School Bus Related Crashes and Mitigation Strategies". The research found that though school bus transportation was generally found to be a safe mode of transportation; there was a significant increase in crash risk during the loading and disembarking of students from the buses. Collisions involving pedestrians were more likely to result in serious or fatal injury. More than half of the crashes studied were fatal. Most of these crashes occurred on rural roadways and half occurred on two-lane roads with the striking vehicle traveling in the opposite direction of the stopped bus. The number of fatal school transportation related collisions has remained constant over the last ten years despite federal and state mandated warning devices such as lights, stop arms and legislation regarding violations of these warning devices. However, it is believed that these incidents are underreported. The researchers noted that "it is important to recognize that the coding of non-contact cases is subject to whether the reporting police officer recognizes the event as a school transportation related crash". A "non-contact crash" is a collision where the student is struck by a vehicle other than the school bus and where the school bus is not an involved vehicle in the crash sequence. Vehicles not involved in the physical crash are included in the report at the discretion of the report writer. Even if the police officer makes note of the relationship within the narrative; it is more likely to be missed and not coded as a school transportation related crash.

5.3.2. School Bus Safety Statistics

The 2014 Donoughe and Katz report noted the study conducted by the state of Florida that concluded that 10,590 near misses (vehicles passing warning lights/deployed stop arms on school buses) occurred in the three school districts that were examined, on a single day. The report

[12] www.saferoutes.org See "Determining School Bus Stop Locations"
[13] "Killing Speed and Saving Lives", Great Britain DOT 1992

emphasized that each of these occurrences represents an increase risk and a potential crash hazard to the students utilizing school transportation.[14]

In 2018, The National Association of State Directors of Pupil Transportation Services (NADSPT) conducted a survey of 38 states plus the District of Columbia regarding the illegal passing of school buses. The report showed that over the course of one day, 83,944 vehicles illegally passed school buses in the jurisdictions surveyed. Over half of these occurrences involved vehicles passing the school bus from the front, by an approaching vehicle traveling in the opposite direction.[15]

In 2019, the Indiana State Department of Education published its statistics on the vehicles illegally passing school buses in the state. The study looked at a one-day snapshot of in-state student transportation. The data included the number of school buses passed, the number of vehicles involved, the time of day, how the violation occurred, whether the vehicle passed in the front or the back and on which side the vehicle passed the bus (street or door side). The data revealed that in one day, 3,082 vehicles illegally passed school buses. Most of the violations occurred by vehicles approaching the school bus (passing from the front). IDOE found that the total number of near incidents in 2018 was 10,620.

5.4. Safety Device Technology

5.4.1. School Bus Safety Lighting

School Districts nationwide have had to deal with the issue of picking up students during hours of darkness. Daylight Saving Time causes most student transportation activity, especially morning pick-ups to occur when there is little or no ambient light. In many of the fatal school transportation related crashes, the striking driver sees the school bus but can't identify it and fails to see the students crossing the roadway to board or after disembarking the school bus.

One solution is adding a supplemental lighting system to the school bus that would illuminate the students as they traverse the roadway. The Gardian Angel Lighting System is one such example of a supplemental lighting system. The school bus lighting system, which is comprised of three lights that include two red high intensity flashing strobe lights mounted on the hood of the bus which is in the line of sight of an approaching vehicle driver, two white lights at the bumper level and a 4" square light containing a 6 diode LED, white flood light which is mounted to the left corner of the bus's front bumper that provides 1000 lumens of light. The LED light is mounted at a 45-degree downward angle to prevent blinding the students as they approach the bus. The light creates a beam that extends beyond the 10-foot danger zone around the bus. The system is intended to provide three benefits.

- It illuminates the location and the path of the students for the school bus driver. The light extends to 18-20 feet out past the bus.
- It keeps the students 10 feet in front of the bus. The students are trained to stay within the projected beam of light.

[14] http://dx.doi.org/10.1016/j.iassr.2014.12.003
[15] www.nasdpts.org

- Motorist can see the students as they cross the roadway without any visual obstruction caused by the other lights on the bus.

Figure 6 shows the Gardian Angel School Bus Lighting System in operation in a real-life dark environment. The photograph shows the beam of light extending across the opposing travel lane and illuminating the students standing at the edge of the roadway, across from the school bus.

Figure 6: Photograph of the Gardian Angel bus lighting system in operation (Photo provided by Gardian Angel LLC)

The Gardian Angel School Bus Lighting System can be installed on Type A, C and D school buses. The lighting system is available in kits to facilitate installation by transportation maintenance personnel and available for purchase from a major school bus parts distributor. Typically, installation takes under 30 minutes to complete. The system is connected to the existing wiring harness so that activation occurs simultaneously with the activation of the bus warning lights. This alleviates the need for additional training for the bus driver or the possibility of a driver forgetting to use the system. The lights have a 52,000-hour life expectancy. At the time of this investigation, the cost of the Gardian Angel Lighting System ranged from $119.00 to $379.00, dependent upon a school district's requirement for additional equipment; such as an additional LED light to illuminate both sides of the bus. This allows the system to be used regardless of which side of the roadway the student is on to await boarding. The Gardian Angel Lighting System has met the current federal standards and complies with Society of Automotive Engineers (SAE) and U.S. Department of Transportation (DOT) guidelines. Currently, the lighting system has been approved for use in 22 states.[16]

[16] https://www.gardianangelllc.com

In 2013, Marion Community Schools in Marion, Indiana received approval from the State of Indiana School Bus Committee and the Director of School Transportation, Indiana Department of Education to field test the Gardian Angel School Bus Lighting System. The test occurred over the course of one year. Both the committee and IDOE received positive feedback from the Transportation Coordinator for Marion Community Schools regarding the safety benefits of the system. The Director of School Transportation, IDOE sought to incorporate the system on school buses to provide additional lighting for students crossing state roadways. In April 2014, the Transportation Director of Tippecanoe Valley School Corporation, also reached out to the company and expressed interest in acquiring the system. TVSC's acquisition of the lighting system was contingent on the system being approved by the State School Bus Committee. Despite the successful testing of the system in Marion County, the system was not approved by the State School Bus Committee which prevented the system from being placed on school buses in the state of Indiana. An interview with a representative of the Gardian Angel company advised that the transportation director for IDOE told the company that the decision was based on a disagreement between committee members whether the system should wired into the current system or put on a "separate switch" which would require the driver to remember to complete an additional step in order to activate the system. The system designer advised that the system was intended to be automatic and designed to be incorporated into the current warning light system without any negative repercussions. No additional training or steps are required by the driver to activate the system when it is incorporated into the current warning light system. The company representative advised that requiring drivers to remember to activate an additional switch could lead to the failure to activate the system due to human error. The requirement to activate an additional switch would create a need for additional training for bus drivers and add to their workload. Currently, the state of Indiana has not approved the use of the Gardian Angel Lighting System or any other supplemental school bus lighting system. [17]

An interview was conducted by an NTSB investigator with the Director of Student Transportation for IDOE. The director confirmed that at least one school district had pilot tested the lighting system for a year starting in 2013. A recommendation was brought to the State School Bus Committee to implement the use of the system on all state school buses. The director advised that the committee failed to reach a consensus about the system due to a disagreement over whether the system should be automatic, tied into the current warning system (stop arm) or manually operated, requiring the driver to activate a separate switch. No decision was reached, and the issue was dropped. The director confirmed that no other system was looked at nor were any other options or mitigation strategies explored at that time. Since the Rochester crash, the State School Bus Committee is conducting a comprehensive review of all safety procedures, to include a re-evaluation of the use of supplemental lighting on the school bus. The findings of the committee are due to be published by the end of 2019.[18]

5.4.2. Stop Arm Cameras

By definition, a "near miss" incident occurs whenever a vehicle illegally passes a school bus that has stopped to pick-up or off-load students and at the time has its warning lights activated and the stop arm deployed. The reporting and documenting of these incidents provide school

[17] See Survival Factors Attachment- IDOE Pilot Program- Gardian Angel Lighting System
[18] See Survival Factors Attachment- Interview with Director of Student Transportation-IDOE

districts, local governments, communities and law enforcement agencies with the ability to assess the hazard that exist along a school bus route or at a specific designated student pick-up location. Many school districts equip their school buses with stop arm cameras which permit a more accurate accounting of these incidents and provide information to law enforcement agencies for targeted enforcement action. Nationally, seventeen states currently have stop arm cameras laws in place and many require the installation of the cameras on all school buses. In addition; to help facilitate enforcement of stop arm camera violations; many of these states permit the owner of the violating vehicle to be cited when the driver cannot be identified.[19]

At the time of the crash, Tippecanoe Valley School Corporation school buses did not possess stop arm cameras. The use of stop arm cameras is not mandated in the state of Indiana and at the time of the crash, few school districts use them. Currently, Indiana state law requires that the driver of a vehicle that commits the violation of passing a school bus; must be identified prior to the issuance of a citation. The law does not permit the issuance of a citation to the registered owner of the vehicle. This requires the school bus driver or witness to be able to provide enough information to law enforcement for identification and enforcement action. The Fulton County Sheriff's Office (FCSO) is responsible for investigating all near miss incidents within the county. The sheriff's office receives few reports of these incidents from TVSC. All near miss incidents that are witnessed by FCSO deputies result in immediate enforcement action. However, few incidents occur within sight of the sheriff deputies. School bus drivers are reluctant to report these incidents because of the inability to obtain enough information for identification. As a result, many of these incidents go unreported. The transportation director of TVSC advised that on previous occasions, he had been informed that without significant information, an official report could not be filed. TVSC had no written policy, nor did it provide forms that could facilitate driver reporting. The bus drivers were free to report these occurrences to the bus garage; however, the school corporation did not document nor maintained a file on these occurrences and did not use them in their re-evaluation and hazard assessment of a designated student pick-up location. The lack of reporting also prevents law enforcement agencies from identifying and targeting potential enforcement needs and locations to combat the problem. Despite having a School Resource Officer (SRO) assigned to the school corporation, TVSC did not utilize the officer to assist in documenting incidents or reporting these incidents to local law enforcement.

6. Interviews

An interview was conducted with the parent that was present at the time of the crash. The mother advised that she frequently waited at the bus stop with the children because of her concerns about the safety of the bus stop and the students crossing the state roadway. She advised that on multiple occasions she observed drivers passing the stopped school bus as students attempted to board the bus. Approximately three years prior, the driver of a northbound vehicle failed to see the stopped school bus and rear-ended the bus as the students were attempting to board. No one was injured in that incident. The parent advised that she had petitioned the school on several occasions, starting approximately four years earlier, asking to have the bus pick up the students inside of the mobile home park instead on the state roadway. She advised that there are several access roads

[19] http://www.ncsl.org

that would allow the bus to pull in and to drive out of the park without much difficulty. The parent noted that TVSC also provides transportation to a "special needs" child in the same mobile home park. A "full size" school bus pulls into the location to pick up this child daily. Despite the complaints, TVSC would not alter the school bus route to facilitate the boarding and disembarking of the other students within the mobile home park.

On the day of the crash, the parent advised that the bus driver attempted to warn the driver of the pick-up truck by "honking his horn". She noted that the honking of the horn would have meant nothing to her or the students because it was not unusual for impatient drivers to honk at the school bus to force the driver to load the students more rapidly. [20]

7. Emergency Response

Fulton County is approximately 400 square miles. The primary law enforcement agency for the county is the Fulton County Sheriff's Office. The sheriff office is comprised of 13 sworn deputies. In addition to conventional law enforcement duties; the sheriff office operates the jail and the Emergency 911 Communications Center for the county. The Fulton County 911 Emergency Communications Center dispatches law enforcement, fire and EMS services for the county.

During subsequent interviews, it was determined that several individuals attempted to call 911 by utilizing cellphones. Cellular telephone reception in the area is unreliable and one of the witnesses had to return to her home to call 911 on her landline. This individual noted that she was one of only a few residents living in the area that maintained a landline.

7.1. Law Enforcement Response

On the day of crash, the Fulton County 911 Emergency Communications Center dispatched every available sheriff's deputy to the scene. Additional assistance was provided by law enforcement officers from neighboring jurisdictions. The Indiana State Police provides additional law enforcement support in the area; operating out of the Peru District post located in Peru Indiana, approximately 25 miles from the crash scene. The investigation into the crash was conducted by the Indiana State Police.[21]

7.2. Fire/EMS Response

The Rochester Fire Department (RFD) provides fire and rescue services for Fulton County, the city of Rochester, the townships within Rochester, and a portion of New Castle and Richland townships. The 8 full time and 31 volunteer member department provide round the clock services to the approximate 110 square mile area. Housed within the same station as the Rochester Fire Department is the medical ambulance service operated by Lutheran EMS. Lutheran EMS Services

[20] See Survival Factor Attachment- Witness Interviews
[21] See Survival Factors Attachment- Indiana State Police Incident reports

is a private contractor that provides Emergency Medical Services to the state of Indiana by staffing around the clock, medic ambulances in various locations and fire stations throughout the state.

Parkview Samaritan Medical Transport provides medical flights and ground transportation within a 100-mile radius of its two air stations located in Fort Wayne and Rochester, Indiana. Samaritan 2 (Sam 2) is the helicopter assigned to Rochester and based at the Fulton County Airport located behind the Rochester fire station.

Interviews were conducted with the first responders. The officer in charge of the Rochester Fire Department units, on the day of the crash, advised that the 911dispatcher reported that at least three victims had been struck by an automobile. The officer then advised the crew of the primary Lutheran EMS medic unit that at least one and potentially three helicopters may be needed for this incident. The medical transport helicopter, "Sam 2", was immediately dispatched to the scene. An additional truck was sent by the fire department in the neighboring town of Mentone. The first Lutheran EMS medic unit and the RFD rescue truck arrived on the scene just moments before the first arriving Fulton County Sheriff's deputy. Two additional medic units, also housed at the RFD station, arrived on the scene soon afterwards. This was followed shortly thereafter by the arrival of the helicopter. While the flight medics prepared for the transfer Pedestrian #4 to the trauma center in Fort Wayne, Indiana; the pilot verified that the two additional helicopters that were dispatched, would not be needed.

During follow up interviews, a member of Lutheran EMS reported that on several occasions he observed school buses picking up students on curved portions of roadways with limited sight distance. He believed, that due to the curvature of the roadway, approaching drivers would be upon the school bus and the crossing students with little time to react. In addition, lights on the school bus could potential blind or disorient approaching drivers. The flashing white "wig-wags" obscured the red flashing lights on the bus and were so bright that it "mesmerized" approaching drivers. The individual noted that on one occasion, in an emergency vehicle, he inadvertently passed a stopped school bus. He noted that the intensity of the lights; though an issue during normal driving conditions, was necessary during inclement weather conditions such as intense fog.[22]

7.3. Emergency Response Timeline

The Fulton County Sheriff's Office E911 Center provided the CAD printout for the incident. The center dispatches all emergency services for Fulton County except the State Police who maintain their own communications center. The timeline for the event as provided by FCSO E-911 Center is shown below in Table 1.[23]

[22] See Survival Factors Attachment-First Responders Interviews
[23] Survival Factors Attachment- FCSO E911 CAD/911 report

Table 1

7:15:25	**Call received in FCSO 911 Center**
7:15:50	**Call dispatched to FCSO personnel**
7:21:47	**Medic 2 arrives on scene**
7:22:13	**Medic 2 requests 3 helicopters**
7:25:46	**First FCSO deputy arrives on scene**
7:29:30	**Medic 1 arrives on scene**
7:36:17	**Medic 3 arrives on scene**
7:49:06	**Sam 2 in the air- enroute to hospital**

E. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS

Survival Factors Attachment - TVSC State Route 25 School Bus Stop Locations

Survival Factors Attachment - Interview with retired TVSC driver

Survival Factors Attachment- Rochester Community Schools Interview

Survival Factors Attachment- Industry Response Letter to Congress

Survival Factors Attachment - Crowheart, Wyoming Fatal Student Collision

Survival Factors Attachment- IDOE Pilot Program- Gardian Angel Lighting System

Survival Factors Attachment- Interview with Director of Student Transportation-IDOE

Survival Factors Attachment- Witness Interviews

Survival Factors Attachment- Indiana State Police Incident Reports

Survival Factors Attachment- First Responder Interview

Survival Factors Attachment- FCSO E911 CAD/911 Report

LIST OF PHOTOGRAPHS

Survival Factors Photo 1- Looking northbound on SR-25 at the approach to the mobile home park bus stop

Survival Factors Photo 2- Aerial view of the crash scene showing the location of the stopped school bus at the driveway to the mobile home park

Survival Factors Photo 3- Close-up of the driveway and the adjacent trailer where the pedestrians stood to wait for the school bus

Survival Factors Photo 4- Aerial view looking northbound at the final rest position of the striking truck

Survival Factors Photo 5- Photograph of the incident school bus with warning lights activated

Survival Factors Photo 6- Incident school bus with warning lights activated and close-up of the deployed stop arm

Survival Factors Photo 7- Photograph of agricultural vehicle with similar coloring and shape to that of a school bus

END OF REPORT

Sheryl Harley
Survival Factors Group Chairman