National Transportation Safety Board
Office of Highway Safety
Washington, DC 20594

HWY24MH005

SURVIVAL FACTORS

Group Chair's Factual Report

TABLE OF CONTENTS

LIST OF FIGURES

A. CRASH

Location: Rushville, Schuyler County, Illinois
Date: March 11, 2024
Time: 11:29 a.m. CDT

B. SURVIVAL FACTORS GROUP

Group Chair — Ronald Kaminski
National Transportation Safety Board
Washington D.C.

C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Information and Summary Report*, which can be found in the NTSB docket for this investigation.

D. DETAILS OF THE INVESTIGATION

The Survival Factors Group Chairman's factual report is a collection of information regarding the crash damage to the 2020 Micro Bird MB II 25-passenger school bus and a 2001 Mack CH613 truck-tractor in combination with a 2001 Advantage 39-foot dump semi-trailer loaded with sand. Additional information was gathered regarding the emergency response and fatal injuries to the driver and three occupants of the Micro Bird school bus and the Mack truck driver. This crash resulted in five fatalities, with both vehicles being consumed by a post-crash fire.

E. FACTUAL INFORMATION

1.0 Scene

An inspection of the scene was conducted on March 12, 2024. The crash site was located near Rushville, Schuyler County, Illinois, on U.S. Route 24 (US-24). The crash occurred within the westbound travel lane, approximately 150 feet east of mile marker 7.00.

At this location, US-24 was an undivided two-lane rural road with a posted speed limit of 55 miles per hour. Each lane was bordered by an asphalt concrete and aggregate shoulder.[1] Refer to Figure 1 below for a view taken of the scene the day after the crash occurred.

[1] See the *Highway Factors Group Chairman Report* in the docket.

Figure 1. View looking west at tire marks leading to the area of impact.

Illinois State Police (ISP) provided terrestrial and drone photographs of the site documenting the final position of the vehicles and road evidence.

2.0 Vehicles

The Survival Factors investigation focused on the interior damage sustained by the 2020 Micro Bird MB II 25-passenger school bus, hereafter referred to as the bus, and 2001 Mack CH613 truck-tractor in combination with a 2001 Vantage 39-foot dump semi-trailer, hereafter referred to as the truck. The bus and truck examinations were conducted on March 13-14, 2024, at Belville Towing and Recovery in Beardstown, IL. The vehicle descriptions refer to the left-side (driver-side) and right-side (passenger-side).

3.0 2020 Micro Bird MB II 25-Passenger School Bus

The exterior of the bus sustained heavy front-end damage as a result of the frontal impact with the truck. Figure 2 shows the damaged bus captured from the three-dimensional scan, overlayed with an outline of the undamaged exemplar bus. The front end of the bus, including the engine block, was displaced rearward with the deformed frame rails and other metal components remaining. The bus sustained substantial

front-end crush with a measured 5 feet of engine displacement rearward from the front bumper of an exemplar, as observed in the overlay in Figure 2. The bus engine rearward displacement intruded into the driver seating area and the center console. The post-crash fire consumed the majority of the bus leaving primarily only the metal components, as shown in Figure 3.

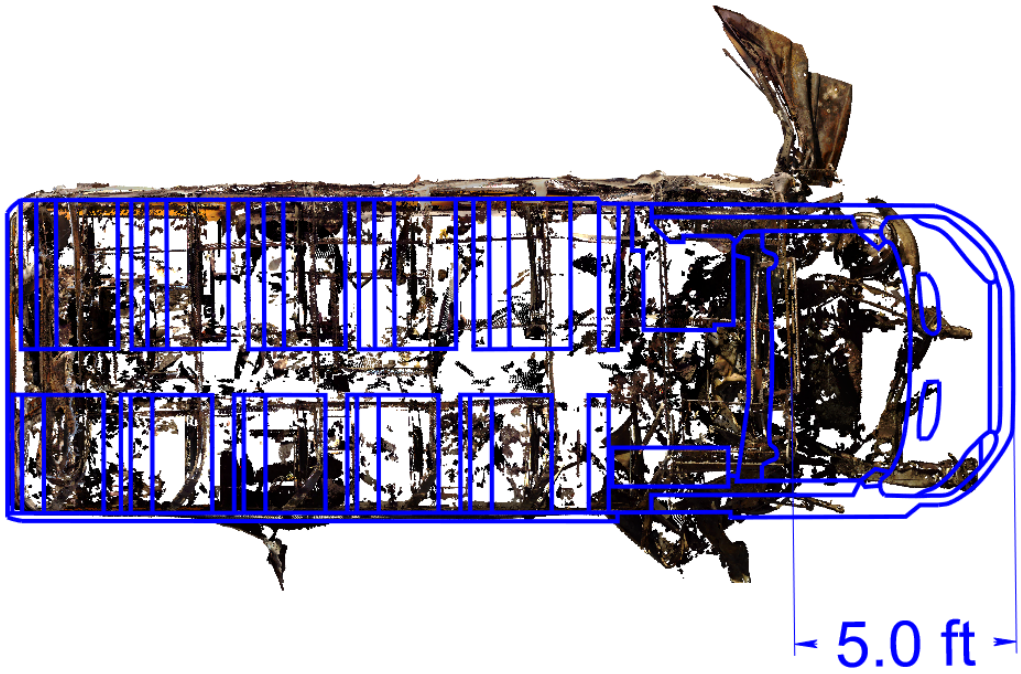

Figure 2. Graphic of the damaged bus overlayed with an outline of undamaged bus.

The bus had five 30x35 inch passenger windows on the left side behind the driver's door window. As shown in Figure 3, the right side of the bus was equipped with five 30x35 inch windows behind the bi-fold loading door. Based on the exemplar school bus, the third window from the front on each side of the bus was an emergency exit window, measuring 30x35 inches. Based on the exemplar school bus, the two-emergency exit windows displayed the appropriate signage. The exit signage was printed at the top of the window (Emergency Exit) and at the bottom of the emergency exit window (Lift Handle, Push to Open with a red arrow pointing upwards) on both the inside and outside surfaces of the bus.

The windshield and all the windows disintegrated in the crash and post-crash fire. The bi-fold door was displaced and crushed rearward, as was the loading stairwell. There was an opening in the bus roof where the plastic emergency roof exit hatch was located above the center aisle at Row 3. Examination of the rear emergency exit door showed that it was still operable. All six tires were consumed in the post-crash fire. The high-density polyethylene (HDPE) gas tank that was secured to the bus undercarriage inside the frame rails and under the first and second seat rows, was also consumed in the fire. Refer to Section 3.9 School Bus Fuel Tank Standards.

Figure 3. Comparison view of right side of exemplar bus and damage to crash bus.

The school bus was manufactured in two stages. The first stage build was the Ford Transit 350 chassis, known in the industry as an incomplete vehicle or commercial cutaway, which was completed in 2020. Micro Bird, Inc. of Drummondville, Quebec, Canada, performed the second and final stage build in 2020, when the Ford chassis was topped with a Micro Bird MB-II 25-passenger school bus body.

3.1 2020 Micro Bird MB-II 25-Passenger School Bus Interior Examination

As previously mentioned, the majority of the interior of the bus was consumed in the post-crash fire resulting in thermal damage that left primarily only the metal seat

frames and metal components, as shown in Figure 4. The school district provided an exemplar bus (2021 MB-II) to assist investigators in identifying components and systems in the crash-involved bus.[2]

Figure 4. View looking from front to rear in exemplar and crash involved buses.

The driver's seating area and loading door area were displaced rearward from the intruding engine block through the firewall, dashboard, and floorboard. The bus was equipped with an adjustable high-back bucket seat with an integral headrest for the driver seat position. The driver seat was still attached but was deformed and shifted rearward and rotated clockwise approximately 30 degrees from its original position as shown in Figure 5. The driver's steering wheel was broken off the steering column. The driver seat was equipped with a lap and shoulder seat belt attached to the B-pillar. The D-ring was in the lowest position. Examination of the driver's lap/shoulder belt showed that the latch plate was still inserted in the buckle, as shown circled in Figure 5. The webbing of the lap and shoulder belt was consumed in the fire.

The exemplar bus was equipped with the same C.E. White Standard School Bus Seats (SB11) from HSM Transportation that the crash-involved bus was equipped with. The seats allow for emergency egress with over 15" of aisle space width at the hip level. Behind the driver seating position were five rows of 29.5 inch high-back three-person 39-inch-wide bench seats and on the right side were five rows with the same SB11 29.5 inch high-back but with only two-person 30-inch-wide bench seats. The SB11 seats meet Federal Motor Vehicle Safety Standard (FMVSS) 222 and Canada Motor Vehicle Safety Standard (CMVSS) standards.[3] The interior examination of the crash bus showed many of the seatbacks still attached to the metal seat frames and damage consistent

[2] The primary difference between the exemplar bus and crash-involved bus was the 300-pound lighter GVWR for the crash-involved bus.

[3] FMVSS 222 School Bus Passenger Seating and Crash Protection - This standard establishes occupant protection requirements for school bus passenger seating and restraining barriers.

with heat distortion. The seatbacks in Row 1 on both sides of the bus appeared slightly more distorted.

Figure 5. Overhead view of deformation to driver's seating area. Note buckled seatbelt (circled).

All 25 seat positions were equipped with lap belts, which, except for the latch plates and buckles, were consumed in the post-crash fire. Examination of all 25 lap belt anchors on the bus revealed three lap belt anchors were visibly bent forward. The metal belt anchors for the lap belts for seat positions in Row 1 and 2 on the left side aisle seats and Row 2 on the right-side aisle seat were bent forward as shown in Figure 6. The Illinois State Police (ISP) discovered a single buckled seat belt in the debris on the floor of the bus. A further search was unsuccessful in finding any additional buckled lap belts.

Figure 6. View of bent lap belt anchors (circled) on the seat frame in Row 1 left side aisle seat.

3.2 Available Restraints

The Schuyler-Industry Community Unit School District #5 (SICUSD) bus barn provides IMMI SafeGuard SuperSTAR 5-point Child Safety Restraint Systems (CSRS Model # F150172) for school buses when requested by a bus driver.[4] The SafeGuard SuperSTAR 5-point restraint system is designed and tested for pre-school children that weigh between 26.5 pounds up to 90 pounds.[5] According to Stanford Medicine Children's Health, the weight of an average 3 to 4 year-old child ranges from 26 pounds to 44 pounds.[6] Postcrash autopsy reports documented the weights for the two 3-year-old passengers as 21 pounds and 22 pounds. The autopsy report documented the postcrash weight for the 5-year-old passenger as 25 pounds.[7] As shown in Figure 7, the CSRS is secured to the existing school bus seat with belts/ straps that extend underneath, between and over the back of the seat and attach to each other and is tightened down to secure it to the existing bus seat. Securement of the CSRS does not utilize the installed school bus seat lap belts. According to IMMI's website, the CSRS meets or exceeds all applicable federal, state, and Head Start safety standards, including FMVSS No. 213 *Child Restraint Systems.*[8] It should be noted that several manufacturers produce after-market CSRS (equipped with either 4-point harness or 5-point harness) similar to the one used at SICUSD.

---

[4] https://www.buyimmi.com/product/safeguard-superstar/

[5] https://deca-inc.net/2023/12/nhtsa-final-rule-fmvss-213-49-cfr-part-571-213/ Amended changes to FMVSS 213 that went into effect December 5, 2024 require that forward-facing seats can only be recommended for use by children with a minimum weight of 12 kg (26.5 lbs.).

[6] https://www.stanfordchildrens.org/en/topic/default?id=normal-growth-90-P01625

[7] The average percentage of water in your body may vary depending on sex, age, and weight. That said, more than half of your body weight is composed of water starting at birth. https://www.healthline.com/health/body-water-percentage

[8] https://www.buyimmi.com/product/safeguard-superstar/

According to one SICUSD employee (a school bus driver), she is the only school bus driver trained to install the 5-point harness CSRS and is responsible for their installation in all the school district buses.

According to the SICUSD employee, the crash-involved bus driver had not requested any CSRSs be installed in the crash-involved bus this year but may have had one installed last year. The SICUSD employee stated that she did not keep any records tracking her installation of the CSRSs. She also stated that the CSRSs are typically requested by bus drivers for the preschoolers and special needs children. When asked by NTSB investigators why the bus driver wouldn't have used the CSRSs, the SICUSD employee stated that the bus driver loved those kids and would have had them at minimum, secured by the available lap belts.

Figure 7. Front and rear views of installed 5-point CSRS in exemplar school bus.

Each SICUSD school bus was equipped with three internal cameras that recorded activity on board the bus. Because the video unit on the crash-involved bus sustained significant fire damage, investigators were unable to download the video unit. NTSB investigators did obtain five days of video for bus #62, the school bus operated by the crash-involved bus driver for her morning and afternoon routes.

Investigators previewed the interior video from bus #62 recorded during the week preceding the crash. Video documented that three 5-point CSRS were installed in bus #62 on March 4 and 5, 2024 (one on each side of Row 1 in the window seats and one in the window seat in Row 2 on right side). On March 6 through 8 video

documentation for bus #62 showed only two 5-point CSRS installed (one on each side of Row 1 in the window seats). Also documented in the March 6, 2024, video was one instance when two children entered the bus and sat in the window seats on each side in Row 1. Both students proceeded to put on the 5-point CSRS themselves without asking the bus driver to assist them. The students in the video did not appear to be preschool-aged passengers.

3.3 SICUSD School Bus Seat Belt Policies

NTSB investigators requested copies of any/all safety policies and procedures that pertained to school bus drivers and school bus operations. SICUSD did not have any SICUSD-specific safety policies, safety manual, or driver handbook for school bus drivers or school bus operations. The superintendent did provide a copy of the Illinois School Board of Education (ISBE) Administrator Manual and the Bus Driver Training Manual for the State of Illinois. The SICUSD did provide their Instructions for Bus Riders document.[9] This document represented the same information which was provided on the SICUSD website under the "Transportation" heading.

The Transportation webpage was composed of two sections: Bus Conduct and Bus Transportation. The Bus Conduct section described the rules and consequences of student passengers engaging in gross disobedience or misconduct while on the bus. The Bus Transportation section pertained to the rules regarding bus transportation (SICUSD provides transportation to and from school for all students living 1.5 miles or more from the school). There was no specific information on this webpage regarding seatbelts or seatbelt usage while riding the school bus.

The SICUSD provided students with an electronic student handbook for high school, middle school, and elementary school that were available on the school district's website (Schuyler-Industry Schools (sid5.com). Per the superintendent, the students' parent or guardian were required to acknowledge receipt of the handbook. The current high school handbook consisted of 48 pages and was titled "Rushville-Industry High School Student/Parent Handbook 2024 - 2025." The handbook provided guidance and requirements for students that included academic requirements, classroom conduct, discipline, safety, and other general information. Pages 42-43 of the handbook contained a section called "Transportation" that addressed "Bus Conduct" and "Bus Transportation Rules." There was no mention of seatbelts in any of the handbook rules.[10]

[9] See Motor Carrier Attachment - Schuyler-Industry School District Instructions for Bus Riders in the docket for this investigation.
[10] The 2024-25 elementary and middle school handbook contains the same information that was in the 2023-24 handbooks.

The SICUSD had no written or electronic policies requiring students to wear seatbelts when seatbelts were available or for school bus drivers to ensure seatbelts are being worn.

3.4 Seating Chart

The seating chart shown in Figure 8 is based on documentation obtained from evidence of occupant loading found on the three sets of lap belt seat anchors and EMT descriptions of the final rest positions of the passengers. The seating chart provided by the SICUSD Director of Transportation indicated one of the 3-year-old male students seated in the first row on the right across from the 5-year-old female. Postcrash evidence indicated that the two 3-year-old boys were seated across from each other in the second row.

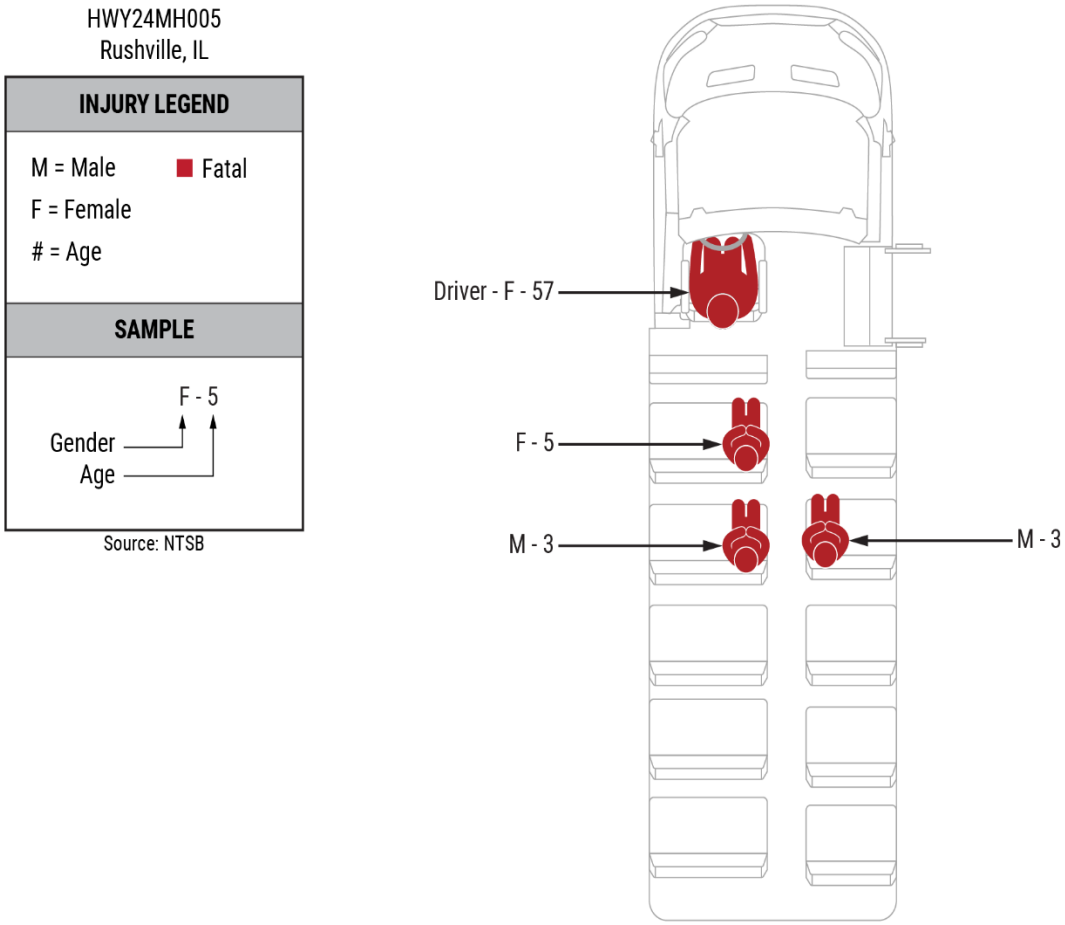

Figure 8. Seating chart of occupied seats.

3.5 School Bus Occupant Injuries

The bus driver and three passengers all sustained fatal injuries in the crash and post-crash fire. All four victims were extricated and transported by the Schuyler County Coroner's personnel to the Schuyler County EMS base, where personnel from the Sangamon County Coroner's Office transported them to Sangamon County Morgue at Springfield Memorial Hospital for autopsy. An autopsy of the bus driver and three passengers was completed by the Springfield Forensic Pathologist and testing for carboxyhemoglobin levels for all four of the bus victims was also conducted by the Springfield Forensic Pathologist on March 12, 2024.

The postmortem examination for the 57-year-old female found a complete fracture at the level of the 3rd cervical vertebra. Other blunt force injuries determined by the forensic pathologist were two separate transections of the proximal segment of the descending aorta. She had a crushed spleen, and lacerations of the liver, right lung, and bladder. Bilateral rib fractures, complete fracture of the thoracic spine (T7), and fractures of the pelvis were also noted. In addition, the driver had thermal burns over approximately 95% of the total body surface area. The forensic pathologist noted that there was no soot deposits on the mucosa of the upper or lower airway and the postmortem blood carboxyhemoglobin test was undetectable. The autopsy report stated the bus driver died as a result of multiple blunt force injuries sustained in a motor vehicle collision.

A postmortem examination was conducted on the 5-year-old female that was seated in the Row 1, left side, aisle seat. The postmortem examination of the 5-year-old female found blunt force injuries including an anterior-left scalp hematoma, and a fracture between the 7th cervical and 1st thoracic vertebrae. Thermal injuries noted in the examination report were thermal burns over approximately 95% of the total body surface area, thermal fractures of the skull, right-side ribs, right femur, tibiae, and fibulae, and a thermal epidural hemorrhage. The autopsy report noted soot deposits on the mucosa of the upper and lower airway. According to the NMS Labs toxicology report, the 5-year-old female had a carboxyhemoglobin saturation level of 26%.[11] The autopsy report concluded that the 5-year-old died as a result of blunt force injuries of the head and neck, thermal burns, and smoke inhalation.

A postmortem examination was conducted on the 3-year-old male seated in the Row 2, left side, aisle seat found blunt force spinal injuries that included a fracture between the 4th and 5th cervical vertebrae, cervical epidural hemorrhage, and a

[11] Carboxyhemoglobin (COHb) is the product of the reaction between hemoglobin and carbon monoxide, and measurement of COHb is used in the diagnosis of carbon monoxide poisoning. Carbon monoxide is a common pollutant present in smoke and car exhaust. Best evidence quoted by the experts suggests that the upper limit of normal COHb should be set at between 2 and 3 % for non-smokers and between 7 and 9 % for smokers. https://acutecaretesting.org/en/journal-scans/carboxyhemoglobin-reference-range

fracture between the 1st and 2nd lumbar vertebrae. According to the NMS Labs toxicology report, the 3-year-old male had a carboxyhemoglobin saturation level of 7%. The autopsy report concluded that the 3-year-old died as a result of multiple blunt force injuries of the spine, thermal burns and smoke inhalation.

The postmortem examination conducted on the 3-year-old male was seated in the Row 2, right side, aisle seat documented blunt force spinal injuries that included a basilar skull fracture, a subarachnoid hemorrhage, a hemorrhage between the 3rd and 4th cervical vertebrae, and epidural and subdural hemorrhages of the cervical spinal cord. Thermal burns over the total body surface area were documented along with multiple thermal fractures and a thermal epidural hemorrhage. The pathologist noted that there was no soot visible in the upper or lower airway. According to the NMS Labs Toxicology report, this 3-year-old male had a carboxyhemoglobin saturation level of 0%. The autopsy report concluded that the 3-year-old died as a result of blunt force injuries of the head and neck and thermal burns.

3.6 Entrapment and Extrication

EMT interviewees described the driver as being partially entrapped between the driver seat and the intruding dashboard and floor. The three occupants were located on the bus floor postcrash. The 5-year-old female was found in the aisle, adjacent to Row 1. One 3-year-old male was found in front of Row 2 on the left side near the aisle and the other 3-year-old male was found in front of Row 2 near the aisle on the right side.

3.7 Illinois Seat Belt Laws

There are no seat belt laws for preschoolers or any students on school buses in Illinois. Seat belts are not required to be installed on school buses in Illinois.

Illinois does have a child passenger safety law: (625 ILCS 25/) Child Passenger Protection Act.[12] Section 4 of the law includes the following:

> *When any person is transporting a child in this State under the age of 8 years in a non-commercial motor vehicle of the first division, any truck or truck tractor that is equipped with seat safety belts, any other motor vehicle of the second division with a gross vehicle weight rating of 9,000 pounds or less, or a recreational vehicle on the roadways, streets or highways of this State, such person shall be responsible for providing for the protection of such child by properly securing him or her in an appropriate child restraint system. The parent or legal guardian of a child under the age of 8 years shall provide a child restraint system to any person who transports his or her child.*

[12] 625 ILCS 25/ Child Passenger Protection Act. (ilga.gov)

The crash-involved school bus Gross Vehicle Weight Rating (GVWR) was 10,360 pounds, which exceeded the 9,000-pound GVWR stated in the Illinois statute[13] and the Illinois Child Passenger Protection Act was not applicable.

In September 2023, Illinois Senator Tammy Duckworth and Ohio Senator Sherrod Brown reintroduced the "School Bus Safety Act of 2023" S.2746.[14] The Bill would have provided that, on or after January 1, 2028, all newly purchased school buses shall be equipped with 3-point seat belts or any other federally approved restraint system in good operating condition for each passenger. The bill stalled and never moved out of committee, and since the deadline for action on Senate bills was Friday April 12, 2024, it remains in the Senate Assignments Committee.

Currently, only one state (Indiana) requires that all pre-Kindergarten students who ride school buses be secured in appropriate child safety restraint systems. Other states such as Florida, offer recommendations.[15, 16]

The Head Start transportation regulation 45 CFR Part 1310.11 requires that each child be seated in a height- and weight-appropriate restraint system while the vehicle is in motion.[17] Head Start programs are not required to provide transportation services. However, when they do provide those services, they must comply with key regulations. Agencies offering transportation services within Head Start must make sure that each vehicle used to transport children is equipped with the appropriate child safety restraint system (45 CFR §1303.72).[18] The National Highway Traffic Safety Administration (NHTSA) has established safety standards that require motor vehicle manufacturers to improve the compatibility of child restraint systems (CRS) and vehicles and make them easier to install.

Head Start and local programs providing transportation to are required to ensure the following:

- All children are restrained in a CRS (45 CFR §1303.72(a)(1)) with the appropriate child safety restraint system.
- Baggage and other items transported in the passenger compartment are properly stored and secured, and the aisles remain clear, and the doors and emergency exits remain unobstructed at all times.

---

[13] First Division: Those motor vehicles which are designed for the carrying of not more than 10 persons. Second Division: Those vehicles which are designed for carrying more than 10 persons. https://www.ilga.gov/legislation/ilcs/documents/062500050K1-146.htm

[14] https://www.congress.gov/bill/118th-congress/senate-bill/2746/text

[15] STN Pre K Safety

[16] Eligible students that are 5 years old on or before August 1 of the school year.

[17] Head Start transportation regulation 45 CFR Part 1310.11

[18] https://eclkc.ohs.acf.hhs.gov/policy/45-cfr-chap-xiii/1303-72-vehicle-operation

- Up-to-date child rosters and lists of the adults each child is authorized to be released to, including alternates in case of emergency, are maintained and no child is left behind, either at the classroom or on the vehicle at the end of the route; and,
- With the exception of transportation services to children served under a home-based option, there is at least one bus monitor on board at all times, with additional bus monitors provided as necessary.

In addition to federal regulations, the school bus industry has established voluntary guidelines via the National School Transportation Specifications and Procedures (NSTSP), which include guidance on the safe transportation of students with special needs.[19]

Addendums to the 2015 National Congress on School Transportation (NCST) were made due to the pandemic and the postponement of the 2020 Congress until May 2025. This delay resulted in the NCST Steering Committee directing the Editing Committee to update ten NSTSP sections.[20]

One of the ten amended sections was the Transportation for Infants, Toddlers and Pre-school Children. This section was designed specifically to assist with transportation decision-making for infants, toddlers and pre-school children, including training drivers and attendants who transport infants, toddlers and preschool children. The purpose of this section is to assist transportation personnel by recommending policies, procedures and guidelines, while continuing research studies to meet the needs of young children from birth to age five who ride school buses nationwide.

The addendum also recommends that the CSRSs used in school buses must be appropriate for the individual child and must be used correctly. They recommend that each pre-school age school bus passenger should use a CSRS appropriate for the child's age, weight, height and specialized needs, as determined by the Individualized Education Program (IEP) or Individualized Family Service Plan (IFSP) team.[21]

[19] Guidance on the safe transportation of students

[20]As a result of the Coronavirus pandemic the 17th National Congress on School Transportation was postponed until May 3-7, 2025. NCST Steering Committee directing the Editing Committee to update ten NSTSP sections

[21] CSRS appropriate for the child's age, weight, height and specialized needs

3.8 Micro Bird and Blue Bird School Bus Safety

In 2009, through a joint venture with Blue Bird Corporation, Girardin Minibus became Micro Bird. Micro Bird's head office and manufacturing plant are in Drummondville, Quebec, Canada.

On June 13, 2024, Blue Bird announced comprehensive safety upgrades to its school buses.[22] As of November of 2024, Blue Bird school buses will feature several safety systems to protect school children, bus drivers and other road users.[23] New Blue Bird buses will be equipped with:

- three-point seat belts as standard protection for all student passengers
- steering wheel deployed airbag (IMMI's 4Front safety system)
- high-intensity LED lighting on the outside and inside of the bus
- high-resolution front and rear cameras
- lighted stop arms, lighted school bus signs, and strobe lights
- collision mitigation systems being added to the current standard electronic stability control (ESC)

Blue Bird does advertise "*other seat options will still be available to meet specific customer needs*". When NTSB investigators inquired about this statement and if that meant customers would still be able to purchase Blue Bird buses without three-point restraint, Blue Bird's representative responded affirmatively.

Micro Bird's Product Certification and Specification Specialist informed NTSB investigators that these safety standard features will apply only to Blue Bird buses and not the Micro Bird buses. Micro Bird offers three-point seat belts on all school buses as an option for purchase and they encourage their clients to order them. Like Blue Bird, Micro Bird customers may order other seat options to meet their needs, which may or may not include seatbelts.

Per Micro Bird representatives, the standard safety features announced by Blue Bird may be offered on Micro Bird buses in the future, depending on their availability from the chassis manufacturer. This is because Micro Bird vehicles are built in 2-stages (the chassis is purchased from another manufacturer before Micro Bird adds the bus body as the final stage manufacturer). Chassis-specific new safety features must be installed by the chassis Original Equipment Manufacturer (OEM). Micro Bird cannot modify the chassis per the Incomplete Vehicle and Upfitter manuals provided by OEMs.

[22] Blue Bird announced comprehensive safety upgrades
[23] Micro Bird: our wide range of high performance school buses

3.9 School Bus Fuel Tank Standards

Based on witness accounts, the post-crash fire ignited almost instantly after the impact between the bus and the truck. Both vehicles were consumed in the post-crash fire. As shown in Figure 9, the HDPE fuel tank was consumed in the post-crash fire.

FMVSS 571.301 Standard No. 301 addresses fuel system integrity to ensure the fuel tank and its components can withstand impact and prevent fuel leakage during a collision. The standard specifies fuel tank crash resistance performance requirements, including testing procedures and performance criteria.

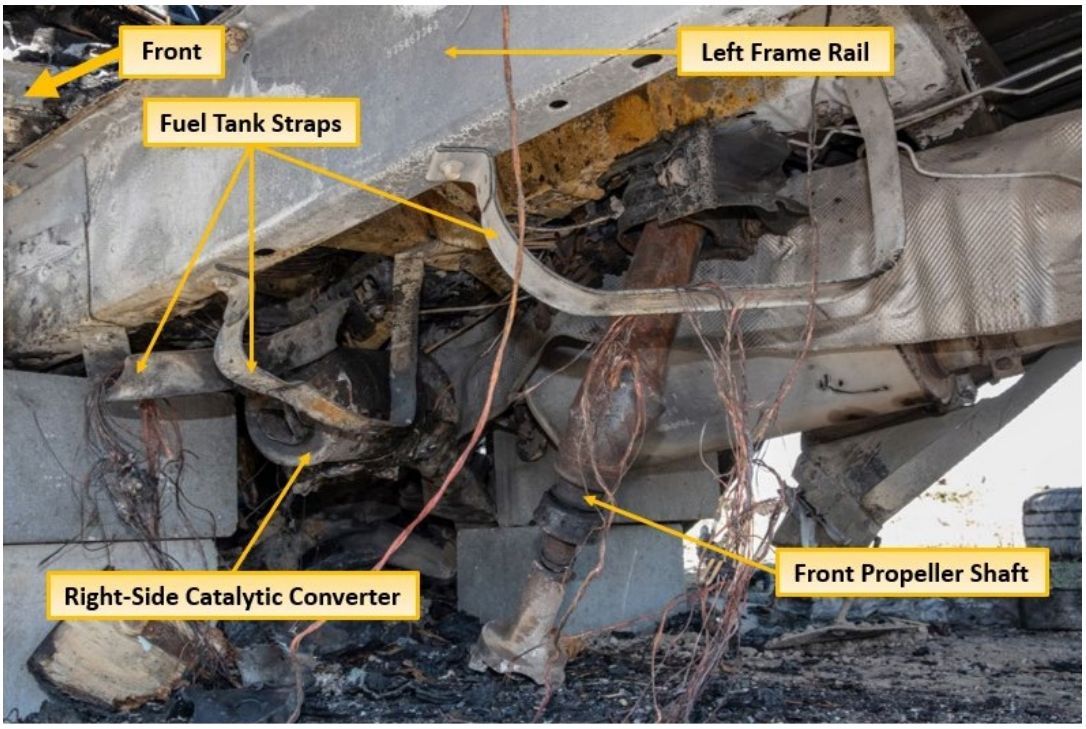

Figure 9. Undercarriage view of area adjacent to fuel tank location (Annotated).

According to FMVSS 301 school buses with a GVWR greater than 10,000 pounds shall meet the requirements of passing the moving contoured barrier crash. When the moving contoured barrier assembly traveling longitudinally forward at any speed up to and including 48 km/h (30 mph) impacts the test vehicle (school bus with a GVWR exceeding 4,536 kg) at any point and angle.

4.0 2001 Mack Truck in combination with a 2001 Vantage Dump Trailer

The Mack truck sustained extensive damage to the front end, as shown in Figure 10 from the impact and post-crash fire. The front end sustained approximately 3 feet of crush, displacing the engine rearward. All that remained were primarily the metal components and partially burnt front tires. The truck's left-side saddle gas tank was

compromised while the right-side saddle gas tank had melted in the post-crash fire. The 2001 Vantage 39-foot dump trailer sustained minor damage from the 90-degree rollover to the right side and minor damage from the post-crash fire and resultant brush fire.

Figure 10. Front-left angle view of front-end damage to Mack truck.

4.1 2001 Mack Truck Interior Damage

The cab of the truck was totally consumed in the post-crash fire as shown in Figure 10. All that remained was the metal seat frames, dash and steering wheel. The driver seat was equipped with an integral headrest. There did not appear to be any seat deformation to the metal frame. The entire steering wheel was rotated almost 90-degrees to the right as shown in Figure 11.

The truck was equipped with a lap/shoulder restraint. Examination of the interior showed that the latchplate was not inserted in the buckle and was not found on floor amongst the other debris. EMT's commented the driver was found with his legs against the center dash and his right shoulder stuck behind the front passenger seatback and his left shoulder against the driver seatback.

Figure 11. Interior view of Mack truck driver seating area.

4.2 Truck Driver Injuries

The 72-year-old unrestrained male truck driver sustained fatal injuries as a result of the crash and post-crash fire. The truck driver was extricated and transported by Schuyler County Coroner's personnel to the Schuyler County EMS base, where personnel from the Sangamon County Coroner's Office transported to Sangamon County Morgue at Springfield Memorial Hospital for autopsy. The Springfield Forensic Pathologist conducted an autopsy and testing for carboxyhemoglobin saturation levels on March 12, 2024. The results of the carboxyhemoglobin level showed that the driver had a saturation level of 36%. The report noted that there was dense soot deposits on the mucosa of the larynx, trachea, and mainstem bronchi. The report specifically stated that blunt force injuries to the head and neck were a subdural hemorrhage and a fracture of the right superior horn of the thyroid cartilage.[24] The skull was not fractured and there were no epidural or subarachnoid hemorrhages. The autopsy report stated the driver died as a result of blunt force injuries of the head with thermal burns to 95% of his body and smoke inhalation.

[24] The thyroid cartilage is a hyaline cartilage structure that sits in front of the larynx and above the thyroid gland. The cartilage is composed of two halves, called the laryngeal prominence, also called the Adam's apple. https://anatomy.co.uk/thyroid-cartilage/

5.0 Emergency Response

The Schuyler County Sheriff's Office (SCSO) dispatchers were notified of the crash at 11:31 a.m. by an off-duty firefighter who was following the school bus, witnessed the crash and radioed dispatch prior to stopping and attempting to help.[25] The McDonough County Sheriff's Office (MCSO) was notified of the crash through the 911 system at 11:32 a.m. The Schuyler County EMS was dispatched at 11:32 a.m. and responded with their first ambulance arriving on scene at 11:35 a.m. The Schuyler County Volunteer Fire Protection District (SCVFPD) was dispatched at 11:32 a.m. and responded with an engine unit and a rescue unit both arriving on scene at 11:37 a.m. The Rushville Volunteer Fire Department (RVFD) was dispatched at 11:33 a.m. and responded with engine and rescue units both arriving on scene at 11:37 a.m. Upon his arrival, the Fire Chief for both the SCVFPD and RVFD assumed incident command of the event.[26] Combined, RVFD and SCVFPD responded with three engines/pumpers, one tanker, and one brush unit.[27] According to interviews with the incident commander (IC), his Deputy Chief and several firefighters, there were plenty of water resources on the scene and the post-crash fire was extinguished within 15-20 minutes after their arrival.

The SCSO Chief Deputy Sheriff and the Rushville Police Department (RPD) Police Chief, who were working a separate investigation at the time of the crash, heard the call over the radio and responded simultaneously to the scene arriving at 11:37 a.m. They were followed by two more SCSO deputies at 11:43 a.m. and 11:45 a.m. The SCSO Chief Deputy Sheriff and RPD Chief stopped traffic in both directions and redirected traffic off westbound US 24 onto a nearby side street (previously Old US 24) that looped back to US 24 just west of the intersection with US 67. US Route 24 was reopened to traffic at 7:24 p.m. when all units were cleared from the crash scene.

The ISP was notified of the crash by the SCSO dispatch at 11:36 a.m. and their first trooper arrived on scene at 12:27 p.m. followed by eighteen other ISP units that included the Traffic Crash Reconstruction Unit (TCRU).[28]

At least eight local and State emergency service agencies responded to the scene of the crash.

Responding agencies:

1. Rushville Volunteer Fire Department
2. Rushville Police Department

[25] Refer to Survival Factors Attachment– Schuyler County Sheriff's Office CAD Logs in the docket for this investigation.
[26] Refer to Survival Factors Attachment– Schuyler County Sheriff's Office CAD Logs.
[27] The RVFD is housed across the parking lot from the SCVFD station house. Refer to Survival Factors Attachment– Rushville Volunteer Fire Department NFIR in the docket for this investigation.
[28] Refer to Survival Factors Attachment– Illinois State Police CAD Logs in the docket for this investigation.

3. Schuyler County Sheriff's Office
4. Schuyler County Volunteer Fire Protection District
5. Schuyler County Ambulance Service/EMS
6. Schuyler County Coroner
7. Illinois State Police including their TCRU unit
8. Illinois Department of Transportation

A copy of the responding RVFD's National Field Incident Reports (NFIR's) was obtained and this information is included within this report.

6.0 Interviews

Interviews were conducted with the RVFD Chief who served as Incident Commander for both fire rescue and EMS response, the RVFD Deputy Chief, two RVFD firefighters, two EMT's with the Schuyler County EMS, the Schuyler County Coroner, the RPD Police Chief, the SCSO Sheriff and Chief Deputy, and two independent witnesses to the crash. NTSB interviews with first responders are summarized below. [29]

6.1 First Responder Interview Synopses

Rushville/Schuyler County Volunteer Fire Protection District Chief and Incident Commander (IC)[30]

According to the IC, they were notified at 11:31 a.m. Upon arrival at scene, he did a walk around to see what they had. He stated that he didn't see any drivers from the crashed vehicles standing around. The IC stated that they responded to the scene with three engine/pumper units, one tanker, and one brush unit. He estimated that the fire was out in 15 minutes.

Rushville Deputy Fire Chief

According to the Deputy Chief, when the page came in at 11:31 a.m., he left his office and went to fire station, got in the brush truck and went to the west side of the incident.

Rushville Firefighter 1

The firefighter stated after getting paged, he drove to the fire station. After arriving on scene, he helped pull out the hose to start suppression of the fire. Afterwards, he waited to see if there were any hot spots.

[29] Refer to Survival Factors Attachment– First Responder Interview Transcripts in the docket for this investigation.

[30] The Rushville Volunteer Fire Department and Schuyler County Volunteer Fire Protection District are both volunteer agencies and are separated by a shared parking lot.

Rushville Firefighter 2

According to the firefighter, he was near the crash site and heard it happen. He said he went to the fire station and got paged while heading to station. After returning to the scene, he pulled the hose and charged the line.

Schuyler County EMS/Rescue, EMT's

According to the EMT's, they arrived and saw crash-involved truck on its side and on fire. They looked for patients and drivers and found none. They staged on the west side of incident while the other ambulance staged on the east side. Post-crash they found the truck driver in a kneeling position between the driver and passenger seatbacks. Firefighters used the spreader to help with the removal of the bus driver. According to the EMT's they found one child on the driver side in seat row 2 on the floor and found other child that was in seat row 2 on passenger side also on the floor. They noted that they found the female on the floor in center aisle adjacent to seat row 1 on driver side.

Schuyler County Coroner

According to the coroner, he was notified by McDonough County dispatch. He stated that he called the deputy coroner and requested they respond in the transport vehicle. He stated that after the fire was put out, the scene was turned over to him. He said he called the Springfield coroner and asked to have the bodies taken there. He noted that they preliminarily found soot in the trachea of the truck driver and two of the children.

SCSO Sheriff

According to the SCSO Sheriff, he was sitting in his office and heard the call for a "semi vs bus crash." He stated that as soon as he started heading to scene, he saw the black smoke about 100 feet in the air. After arriving he immediately blocked the roadway. He said that he saw it was a Schuyler County school bus and called the school superintendent and asked the superintendent to find out how many were on the bus and their names. The Sheriff said the fire was extinguished very fast. He said as parents started showing up at scene and he and his deputies kept them away. The Sheriff stated that he went with ISP to notify the parents and families of the deceased.

6.2 Witness Interview Synopsis

NTSB interviews with the two crash witnesses, one behind the bus and the other behind the truck are summarized below. [31]

[31] Refer to Survival Factors Attachment– Witness Interview Transcripts in the docket for this investigation.

Witness 1

According to this witness, she was stopped at the light and saw the truck go through the intersection. She said she turned west behind him and was going about 45-50 mph. According to the witness, as she started going around the curve, she saw the bus cross the centerline and come into the westbound lane. She said it seemed like at least 3-5 seconds. She said she saw the semi's brake lights and watched it go off the right side of the road. She said at impact the front ends of both vehicles lifted up off the ground three feet in the air. She said that the fire started immediately.

Witness 2

According to this witness, he was eastbound on US 24 about ½ to ¾ of a mile behind the school bus. He said he was traveling 55-60 mph. He said that while driving behind the bus it stayed in its lane until it crossed into the westbound lane. He said he saw the bus go from the eastbound lane into the westbound lane and make contact with the semi-truck traveling in the westbound lane. He said he pulled up behind bus and it was already on fire. He tried opening the rear emergency exit door and the bottom was stuck so he broke out both windows of the door and yelled inside and got no response. He stated that he is a Rushville volunteer firefighter and immediately called Schuyler County dispatch and told them what had happened and went back to his truck and drive to the fire station and put on his bunker gear and went back to help extinguish the fire.

F. LIST OF ATTACHMENTS

Survival Factors Attachment - Schuyler County Sheriff's Office CAD Logs

Survival Factors Attachment – Rushville Volunteer Fire Department NFIR

Survival Factors Attachment – Illinois State Police CAD Logs

Survival Factors Attachment – First Responder Interview Transcripts

Survival Factors Attachment – Witness Interview Transcripts

Submitted by:

Ronald Kaminski
Senior Survival Factors Investigator