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

VEHICLE FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

A. CRASH INFORMATION

Location:	State Route 12 (SR-12) mile marker 10.4 near Bryce Canyon City, Garfield County, Utah
Vehicle 1:	2017 Freightliner, Embassy body 37- passenger medium-size bus
Operator 1:	America Shengjia, Inc.
Date:	September 20, 2019
Time:	Approximately 11:30 a.m. MDT
NTSB #:	**HWY19MH012**

B. VEHICLE 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 VEHICLE FACTORS INVESTIGATION

The Vehicle Factors Factual Report is a collection of factual information obtained during the detailed inspection of the involved vehicle. The 2017 Freightliner was inspected between September 22 – 25, 2019, at Ramsay Towing, 3695 Mountain View Road, Kanab, Utah. All major mechanical systems on the Freightliner were examined, including the steering, braking, and suspension systems. Overall accident damage, along with any damage or anomalies within major vehicle mechanical systems were documented. Some areas of the vehicle could not be reliably documented due to extensive collision damage. Supporting photographs, vehicle specifications, maintenance records, and prior inspection reports were collected.

1. Vehicle Inspections

1.1. Vehicle #1: 2017 Freightliner M2 Chassis with Embassy Mid-Size Bus Body

1.1.1. General Information

This vehicle was manufactured in three stages. The first build stage of the Freightliner truck cab and chassis, known in the industry as an incomplete vehicle, or commercial cutaway, was completed in December 2016. The second build stage consisted of configuring the truck's chassis was completed in February 2017, by MOR/Ryde International. The final stage build consisted of configuring the vehicle with a midsize Embassy bus body by the SVO Group, also completed in February 2017.

VIN[1] :	3ALACWDT7HDJD9595
Manufacturer 1st Stage:	Freightliner
Model:	M2 106 Chassis
Manufactured:	12/2016
Manufacturer 2nd Stage:	MOR/Ryde International
Manufactured:	02/2017
Manufacturer 3nd Stage:	SVO Group
Manufactured:	02/2017
Model:	Embassy M380
Mileage:	172,946
Unit #:	3961
GVWR[2] :	26,000lbs
GAWR[3] #1:	10,000lbs
GAWR[4] #2:	17,500lbs
Engine:	Cummins ISB 6.7-300 300HP

[1] Vehicle Identification Number (VIN) used by the automotive industry to identify individual motor vehicles.
[2] Gross Vehicle Weight Rating (GVWR).
[3] Gross Axle Weight Rating (GAWR).
[4] For consistency in describing the axles of the bus, the front (steer) axle will be referred to as Axle #1, the drive axle as Axle #2.

Transmission:	Allison 2200 Automatic
Steering Gear:	TRW
Brake System:	Meritor/Haldex Pneumatic Drum Brakes w/Antilock Brake System (ABS)

1.1.2. Damage Description

The front of the Freightliner had minor damage. The left fog lamp was torn from its mount and missing the lens, but the bulb was intact.[5] The hood was undamaged. The windshield was shattered and displaced from the frame and was laying in the engine compartment. The top of the cab was shifted to the right and downward approximately 1 foot. The roof of the cab was torn away and displaced rearward.

The driver's door was ajar and unable to close due to the frame being deformed. There were abrasions to the left fender and it was missing the side marker light. The driver's side mirror was missing and torn from its mount. The top of the rear bus body was displaced rearward away from the cab of the Freightliner.

The fiberglass panels on the left side just behind the cab were damaged and torn away from the body exposing the metal frame and Styrofoam insulation beneath. All damage was measured longitudinally from the front bumper of the Freightliner rearward and all height measurements were from the ground up. Between 144-inches and 168-inches on the left side was a hole in the lower fiberglass panel extending from 12-inches to 26-inches high. The 2.25-inch wide metal transition strip between the upper and lower fiberglass panels had abrasions on it extending from 96-inches to 372-inches. There were tears in the top of the fiberglass side panels at 216-inches, 324-inches, 348-inches, and 396-inches. Tears were also present on the bottom of the side left side fiberglass panels at 120-inches and 138-inches. At 441-inches rearward was an 8-inch tear in the panels approximately 60-inches high.

All left side windows were missing, and the window frames were deformed rearward. Between 96-inches and 252-inches rearward, the frames were pushed inward toward the interior. Between 252-inches and 396-inches the frames were displaced outward away from the bus. The rear window frame and roof support structure extended outward approximately 48-inches from the side of the bus. The seventh row left outside seat back and headrest were deformed and protruding from the window area. The marker light above axle #2 was missing. **Figure 1** shows the damage to the left side of the Freightliner as seen from the left front corner.

[5] For uniform description, "left" will refer to the driver's side, and "right" will refer to the passenger side of the vehicle.

Figure 1: View of damage to Freightliner from left front corner

On the rear of the bus, there was a tear in the fiberglass body approximately 65-inches from the ground near the left rear taillight. The rear bumper was displaced upward approximately 12-inches on the right side. The fiberglass body was damaged and torn on both the top right and left rear corners, with the left side tear extending inward to the center marker light cluster.

Damage to the right side of the bus included the right-side mirror, which was displaced inward to the door, but still attached. The passenger side door was deformed causing the door to open and close with difficulty. The right-side step fairing had abrasions to the fiberglass and the panel was damaged at 108-inches rearward from the front bumper. The boarding door frame at 114-inches was damaged and the glass on the left side of the bi-fold door was missing. The left side boarding door mount was shifted rearward. There was damage to the bottom of the fiberglass panels between 156-inches and 168-inches. The metal structural frame securing the bottom of the fiberglass panel was displaced upward and inward between 216-inches and 228-inches. At 252-inches the metal frame was displaced upward. This displacement ended at the 264-inch mark. There was a wood 6-inch by 8-inch guardrail post embedded in the right side of the bus between 288-inches and 264-inches to the rear of the front bumper. The bottom of the fiberglass panel was damaged again between 390-inches and 417-inches. The fiberglass panels were warped between 156-inches and 192-inches. The panels were torn at the 246-inch, 264-inch, and 282-inch locations. **Figure 2** shows the damage to the right side of the Freightliner as seen from the right front corner looking rearward.

Figure 2: View of the damage and roof shift to the right side of the Freightliner

The roof structure and window frames were shifted out, away from the side to the left beginning at the rear of the cab, extending to the rear of the bus with the exception of the last three window frames which were shifted inward. The fiberglass roof and structural metal bows were torn away from the metal sidewall frame mounts on both the left and the right side. The left side of these bows showed signs of having been in contact with pavement, with portions worn through and asphalt debris present. The roof frame bows were approximately 1-inch by 1 ½ -inch galvanized metal tubes and were spaced 24-inches apart on center. During the bus body's fabrication, the roof bows were welded to the bus's sidewall frame near the top of the windows. Post-crash, all roof bows on the left side were separated at the weld joint with the sidewall frame. Investigators removed two of these joint sections for analysis in the NTSB Materials Lab. Visual inspection concluded that there was sufficient fusion along the entire length of the welds, but the base metal of the sidewall frame had torn away at the weld during the overturn. **Figures 3 and 4** show the separated roof bow and frame welds.

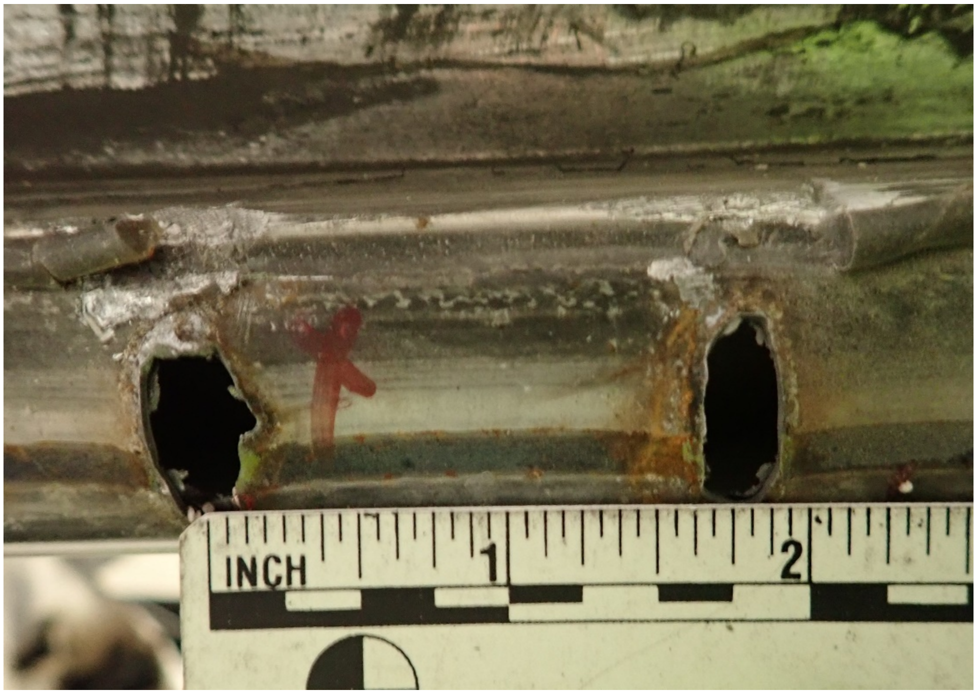

Figure 3: Location on sidewall frame where roof bow connects.

Figure 4: Separated roof bow with attached weld material.

During the rollover, the roof had collapsed downward and to the right onto the tops of the right-side seats. The left side seats were exposed with no roof above. The roof of the cab was also missing, having shifted to the rear. **Figure 5** shows the damage to the roof structure as seen from the cab facing rearward.

Figure 5: View of the damage and integrity loss to the roof structure of the Freightliner

Driver's Controls

The driver's seating area was relatively undamaged. The driver's seat was intact and in place in the bus. The driver's lap/shoulder seatbelt was found unbuckled, retracted, and hanging from the upper attachment point to the left of the driver's seat location. The driver's 17 ¾ -inch diameter steering wheel was found to be undamaged and was positioned approximately 16-inches in front of the driver's seat. The steering wheel was mounted on a steering column that was adjustable for angle and height. A stalk located on the left side of the steering column was used to activate the turn signals and also controlled the high beam headlamps.

The 3-inch by 10-inch accelerator pedal was located 1.75-inches to the right of the 4-inch by 4-inch brake pedal. They were undamaged and in place.

The dash in front of the driver's seat contained numerous gauges, indicator lights, and switches. The gauges included: oil pressure, engine speed (RPMs), vehicle speed (mph & km/h), coolant temperature, fuel level, and electrical system voltage. The switches contained on the dash and their positions at the time of the examination include the following:

- Cruise Control – On
- Fog Lights – Off

- Passenger Compartment Lights – Off
- Light Test – Off
- Suspension – Up position
- Fan - Off
- Regeneration – Off
- Mirror Heat – Off
- Passenger Compartment Climate Control – Push button control panel above driver's seat

1.1.3. Measurements

Figure 6 shows the outside dimensions of the 2017 Freightliner as measured at inspection.

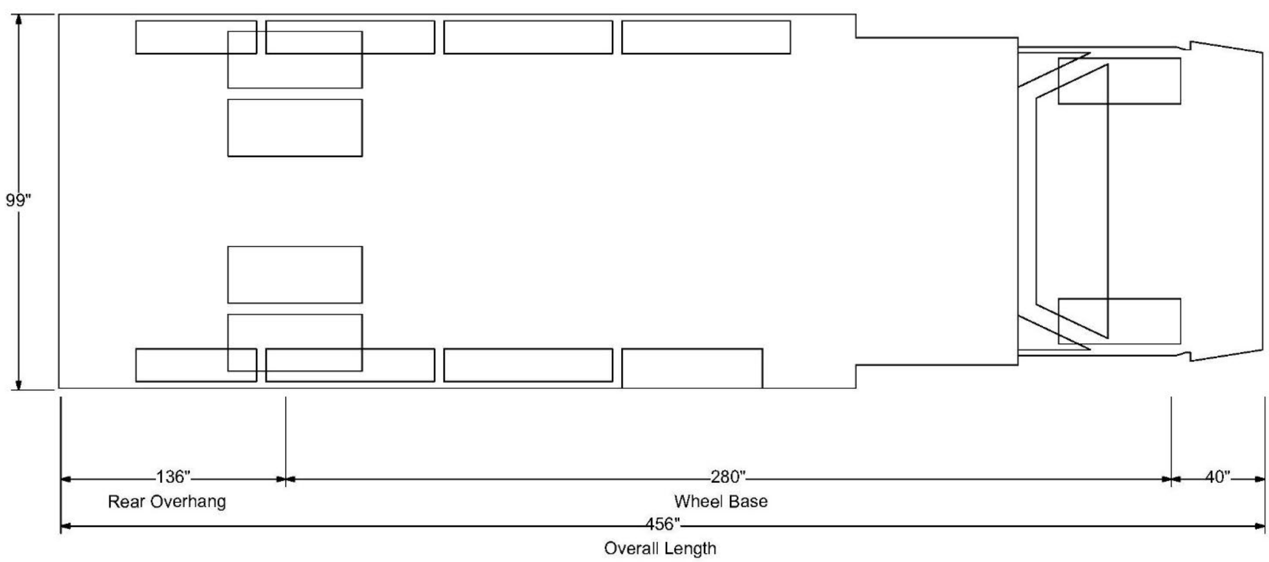

Figure 6: 2017 Freightliner Dimensions

1.1.4. Steering

No damage was noted to any of the steering linkage or steering system components. All connections were solid and free of wear or excessive play. Full rotation of the steering wheel from far left to far right resulted in movement of the front axle tires without restriction or binding.

1.1.5. Suspension

The front (axle #1) suspension consisted of a solid single beam with two 4-inch taper leaf springs with shock absorbers on each end and a stabilizer bar. The rear axle had air ride suspension with dual suspension leveling valves. The air suspension system of the bus functioned as designed with no air leaks or damage noted. The low air audible and visual warnings were operational for both the primary and secondary air systems.

1.1.6. Tires and Wheels

The manufacturer's label for this bus, listing information specific to this vehicle, was located on the driver's door frame. The information included suggested tire and wheel information showing the bus should be equipped with 275/80R22.5 (G) tires, mounted on 22.5X8.25 rims, for both axles. The tires were specified to be inflated to 110 psi for both axles. All wheels were aluminum alloy.

General information about each of the tires on the bus as they were at the time of the inspection is included in **Table 1**. Tire pressure measurements were taken using a commercial grade tire pressure gauge. Tread depth measurements were taken in 2 locations within the major tread grooves of a given tire, the lowest of which is entered in Table 1 and represents the minimum tread depth. All tread depths measured were within the minimum tread depth regulation for commercial vehicle tires, which is 4/32 of an inch for the steer axle and 2/32 of an inch for all other axles.

Table 1: Tire Information

Axle 1	**Left**		**Right**	
Tire Make	Michelin		Michelin	
Tire Size	275/80 R 22.5		275/80 R 22.5	
Pressure	97 psi		96 psi	
Tread Depth	16/32"		16/32"	
DOT #	M5EJ 014X 5018		B6DF OJUU 2018	
Radius	19"		19"	
Load Rating	7160lbs		7160lbs	
Axle 2	**Left**		**Right**	
	Outside	Inside	Inside	Outside
Tire Make	Uniroyal	Uniroyal	Uniroyal	Uniroyal
Tire Size	275/80 R22.5	275/80 R22.5	275/80 R22.5	275/80 R22.5
Pressure	96psi	95psi	105psi	105psi
Tread Depth	12/32"	12/32"	12/32"	12/32"
DOT #	UNK	UNK	UNK	UNK
Radius	19"	19"	19"	19"
Load Rating	6005lbs	6005lbs	6005lbs	6005lbs

All the wheels were inspected for cracks, welds, and elongated lug nut holes. No non-crash related defects were discovered on any of the wheels. During the tire examination, several areas of damage were noted to several of the wheels and tires. The tire and rim damage, when possible, is referenced to a clock position with the valve stem being at 12:00. The tire and rim damage observed during the inspection included the following:

- Axle 1 Left – Outboard Side
    - Abrasions to the sidewall and outside tread cap around the circumference of the tire.

    - Scrapes to hubcap.
    - 5 lug nut covers missing.
    - 6:00 – 7:00 – Lug nut covers smashed into lug nuts.

- Axle 1 Right – Outboard Side
    - Missing 4 lug nut covers.
    - 12:00 – Lug nut damaged.
    - 11:00 – 12:30 – Abrasion to rim at bead with tire.

- Axle 2 Left Outboard Tire
    - Tire abrasions around circumference of tire at sidewall and tread cap.

- Axle 2 Left Inboard Tire
    - No damage.

- Axle 2 Right Outboard Tire
    - 10:00 – 01:00 – Damage to rim at bead with tire. Debris pinched between rim and tire.

- Axle 2 Right Inboard Tire
    - No damage.

1.1.7. Brakes

Although there was significant damage to the body of the bus, the mechanical components were relatively undamaged. Direct functional checks of the braking systems were able to be performed using air contained within the air tanks on the bus. There was 100psi of air pressure present when the parking brakes were released, pushrods were marked, and then the foot valve was applied to its maximum 85 psi pressure. None of the brakes were found to be out-of-adjustment.

The bus was equipped with a dual air Antilock Brake System (ABS) with pneumatic drum brakes on all axles. The bus was equipped with size 20 long stroke service brake chambers (Type 20L) on the front axle. Axle 2 was equipped with size 30 long stroke service and parking brake chambers (Type 30/30L). All axles were equipped with automatic slack adjusters.

The dual air brake system allows for separation between the front and rear brakes. Each brake system contains an air reservoir with a one-way check valve installed on the inlet side of the reservoir. The one-way check valves will open if the air pressure filling the reservoir is equal to or greater than the air pressure inside the reservoir. Once the air pressure inside the reservoir becomes greater than the air pressure being supplied, the check valve will close to prevent air loss from that side of the brake system. The dual air brake system was designed so that if one of the two brake systems were to fail, the bus would still have one brake system available for braking. A detailed examination of the brake system components was conducted. All of the brake components were examined and measured. All of the brake components were within minimum specifications. ABS wheel speed sensors were found at each axle end on the bus.

1.1.8. Powertrain

The powertrain of the bus consisted of a Cummins six-cylinder diesel engine, a five-speed Allison automatic transmission, a drive shaft, and a rear drive axle assembly (axle 2) with a 5.13:1 gear ratio.

An inspection of the engine compartment, which included the accessory drive belts, operating fluids, and electrical, revealed no defects or malfunctions, either pre-existing or crash related.

The transmission was still intact and securely mounted to the engine and frame. The output shaft of the transmission was connected to the driveshaft via a yoke and universal joint assembly. The opposite end of the driveshaft was connected to the pinion gear shaft of the drive axle also via a yoke and universal joint assembly. A visual inspection of the transmission revealed no defects or malfunctions, either pre-existing or crash related.

An inspection of the drive axle housing revealed no defects or malfunctions, either pre-existing or crash related.

1.1.9. Electrical

The electrical system of the bus was not compromised. It was possible to check the function and integrity of the electrical system, and other than the side marker lights listed in the damage section of this report, all lights were in working condition.

1.1.10. Event Data

The Cummins engine was electronically controlled by an Engine Control Module (ECM) that regulated performance, fuel efficiency, and emissions based on various sensor inputs.

This module is also capable of diagnostics associated with engine and/or sensor faults, which may then illuminate warnings on the dash, as well as record vehicle speed, engine speed, and other various parameters during triggered events such as hard braking. A hard brake recording is triggered when vehicle deceleration exceeds a pre-set level (9.01 mph / s, on this vehicle). The most recent hard brake records are retained in non-volatile memory. Each hard brake record contains 15 seconds of post trigger data and 1 minute of pre-trigger data recorded at 1 second intervals

The ECM was undamaged and therefore was imaged while still mounted on the engine via the onboard vehicle network system (J1939). The image was performed by Asay Engineering on September 26, 2019 under the supervision of the Utah Highway Patrol.

Data imaged from the ECM included the following:

- Trip Activity report, containing the vehicle's operating history such as vehicle distance, total engine time, total fuel used.[6]
- Diagnostic records relating to seven fault codes. Six of the fault codes were inactive at the time of imaging. The one active fault code was related to the ambient air temperature sensor voltage being above normal or shorted.

[6]See Vehicle Attachment - 2017 Freightliner Cummins ECM Image

- Three hard brake records. The records do not include a date but are stamped with an odometer reading at the time of occurrence. The first two records occurred at odometer distances 163,449 and 168,663. These records were not associated with this crash. The final record occurred at 172,946 and was related to this crash.[7]

Parameters recorded by the hard brake records included: vehicle speed, engine speed, percent throttle, brake (applied or released), and clutch engagement. On the record related to the crash, these data indicated the vehicle speed varied between 74 and 64mph for the time period from 59 to 5 seconds before the hard brake. **Table 2** shows the data imaged from the ECM for the time starting 5 seconds prior to the hard brake trigger event to 5 seconds after.

Table 2: Cummins Engine ECM Data

Time (Seconds)	Speed (MPH)	Engine Speed (RPM)	Engine Load %	Throttle %	Brake Status
-5	64	2023	0.0	21.2	Off
-4	64	2010	0.0	0.0	Off
-3	61	1901	0.0	0.0	On
-2	56	1777	0.0	0.0	On
-1	53	1462	0.0	0.0	Off
0	46	881	0.0	0.0	On
1	37	886	0.0	0.0	Off
2	31	571	0.0	0.0	Off
3	26	143	0.0	0.0	Off
4	16	0	0.0	0.0	Off
5	15	0	0.0	0.0	Off

1.1.11. Maintenance and Inspection History

Maintenance and inspection records were obtained from the motor carrier, America Shengjia, Inc. The records detail regular service intervals and periodic bus maintenance and safety inspections as required by the California Highway Patrol.[8] Other than preventative maintenance, one repair was documented in July 2017, fixing a leaking rear differential and a leaking front axle seal.[9]

1.1.12. Documented Recalls and Warranty Claims

Recall repair records and warranty claim information was obtained from the manufacturer, Freightliner.

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[7] See Vehicle Attachment - 2017 Freightliner Sudden Deceleration Report
[8] The California Highway Patrol requires bus operators to fill out a form CHP 108A documenting monthly maintenance and safety inspections for each bus in the fleet.
[9] See Vehicle Attachments - 2017 Freightliner Maintenance Files and 2017 Freightliner CA Bus Maintenance & Safety Inspections

All warranty claims on this vehicle pertained to cosmetic scratches to the chrome wheels, dash, grill, steering column, and door panel. No claims for mechanical issues were documented.

Freightliner has issued no safety recalls on the bus.

1.1.13. Driver Assistance and Active Safety Systems

According to the to Society of Automotive Engineers (SAE) J3016, an active safety system senses and monitors conditions inside and outside the vehicle for the purpose of identifying perceived present and potential dangers to the vehicle, occupants, and/or other road users, and automatically intervene to help avoid or mitigate potential collisions via various methods, including alerts to the driver, vehicle system adjustments, and/or active control of the vehicle subsystems (brakes, throttle, suspension, etc.). Active safety systems warn or intervene during a high-risk event or maneuver.

1.1.13.1. Electronic Stability Control (ESC)

The bus was not equipped with electronic stability control, nor was it required to be. ESC helps drivers maintain control of their vehicle during extreme steering maneuvers by keeping the vehicle headed in the driver's intended direction, even when the vehicle nears or exceeds the limits of road traction. Technology for ESC to be installed on all newly manufactured air-braked commercial vehicles exists today. However: technology for ESC to be installed on all newly manufactured hydraulically braked commercial vehicles is currently only available for commercial vehicles up 19,500 pounds GVWR.

ESC systems use information received from the engine and sensors in the ABS and steering systems. This data includes wheel speed, vehicle speed, lateral acceleration, vehicle yaw, and driver input. The data is analyzed in an onboard electronic control module which determines if there is an unstable vehicle condition. The ESC then uses automatic braking of individual wheels to prevent the heading from changing too quickly (spinning out) or not quickly enough (plowing out). ESC cannot increase the available traction but maximizes the possibility of keeping the vehicle under control and on the road during extreme maneuvers by using the driver's natural reaction of steering in the intended direction.

Because of the complexity of sensor locations and wiring, ESC systems are currently unable to be retrofitted onto existing vehicles.

Due to on-vehicle testing requirements for each specific vehicle platform, one major manufacturer of ESC provides guidance recommending that the system be disabled if an ESC equipped chassis wheelbase is shortened or extended. The manufacturer warns that failure to disable the system could result in serious vehicle braking and performance issues leading to possible loss of control.

However, when a body is added to a chassis that has been originally set up with ESC, and the chassis itself is not modified in some way, then ESC should function normally. Including ESC on all incomplete chassis as they are delivered from the factory, would be beneficial with the caveat that the second and third stage manufacturers are aware that certain chassis modifications (wheelbase changes) will negatively affect the ESC system.

Beginning in 2008, in an effort to improve the safety and stability of commercial vehicles, the National Transportation Safety Board has made numerous recommendations to the National Highway Transportation Safety Administration (NHTSA). These recommendations asked NHTSA to develop stability control system performance standards for commercial vehicles and buses with a GVWR greater than 10,000 pounds. [10,11] The recommendations call for NHTSA to require the installation of stability control systems on all newly manufactured commercial vehicles and buses with a GVWR between 10,000 pounds once the standards have been established.[12]

A final rule was published in Volume 80 of the Federal Register on June 23, 2015, with an effective date of August 24, 2015. The final rule established a new Federal Motor Vehicle Safety Standard (FMVSS) No. 136, Electronic Stability Control (ESC) systems for Heavy Vehicles.

FMVSS No. 136 is applicable to certain buses and all truck tractors with GVWRs greater than 26,000 pounds. All new typical three-axle truck tractors manufactured on or after August 1, 2017 are required to be equipped with ESC. Buses over 33,000 pounds GVWR manufactured on or after June 24, 2018 and buses with GVWRs between 26,000 pounds and 33,000 pounds manufactured on or after August 1, 2019 are required to have ESC.[13] ESC systems became mandated on all passenger vehicles below 10,000 pounds GVWR manufactured after September 2012.

FMVSS No. 136 is not applicable to buses with GVWRs between 10,000 pounds and 26,000 pounds, school buses, and urban transit buses. The bus involved in this crash is included in this group.

Kenworth, Mack, Navistar, Peterbilt, and Volvo have recently made stability control standard on many models, but still allow fleets to delete the option to lower the cost of the vehicle. ESC was an option offered by Freightliner on this vehicle when it was manufactured. This option was not purchased by the SVO Group when they ordered the vehicle in June 2016.

Collision avoidance systems with active braking depend upon ABS and ESC systems to function and thus some collision avoidance systems can be retrofitted to an existing vehicle with ESC.

1.1.13.2. Lane Assist

1.1.13.2.1. Lane Departure Warning (LDW)

A lane departure warning system is an advanced safety technology that alerts drivers when they unintentionally drift out of their lanes. If the driver uses a turn signal before departing their lane of travel, the system will not alert. These alerts are visual with an additional alert which is

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[10] H-08-015
[11] H-10-005 which has been superseded by H-11-007
[12] H-10-006 which has been superseded by H-11-008
[13] See 49 CFR Part 571 – Federal Motor Vehicle Safety Standards; Electronic Stability Control Systems for Heavy Vehicles

either audible or haptic, such as a vibration in the steering wheel or seat. These systems usually function best on highways, and some will only operate at speeds over 35 mph.

The foundation of the system is a camera located near the rearview mirror which recognizes painted lane markings. If the lane markings are faded or not detectible, the system will not function. It also does not recognize curbs or unpainted road edges. Because these systems are cameral based, ESC is not required for them to be installed, either at the factory or retrofitted.

LDW was an option offered by Freightliner on this vehicle when it was manufactured. This option was not purchased by the SVO Group when they ordered the vehicle in June 2016. In addition, multiple manufacturers provide aftermarket retrofit LDW systems which would perform on the involved bus. One such manufacturer of driver's assistance safety systems has a specific part number for the Freightliner M2 for an aftermarket LDW.

1.1.13.2.2. Lane Departure Protection (LDP)

Lane departure protection is a more advanced version of LDW. Lane departure protection systems use information provided by sensors in an LDW system to determine whether a vehicle is about to move out of its lane of travel. In addition to the visual and audible/haptic alerts from the LDW system, the driver will feel a tugging on the steering wheel as the vehicle comes closer to the lane boundary. If the driver does not take corrective action, LDP uses the steering, braking or accelerating one or more of the wheels, or a combination of both, to return the vehicle to its intended lane of travel.

Multiple manufacturers provide aftermarket retrofit LDP systems which would perform on the involved bus. Some systems exclusively use steering input to guide the vehicle back into the lane of travel. These aftermarket systems generally can be placed on most vehicles. If the system also uses braking to correct the vehicles path of travel, then the vehicle must be equipped with ESC for it to function properly.

E. DOCKET MATERIAL

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

<u>*LIST OF ATTACHMENTS*</u>

Vehicle Attachment -	2017 Freightliner Maintenance and Inspection Documents
Vehicle Attachment -	Utah Highway Patrol Post-Crash Level 1 Inspection
Vehicle Attachment-	2017 Freightliner Chassis Build Sheet
Vehicle Attachment -	2017 Freightliner Warranty Claim History
Vehicle Attachment-	2017 Freightliner Engine Control Module Image

LIST OF PHOTOGRAPHS

END OF REPORT

Brian Bragonier
Vehicle Factors Group Chairman