



**VEHICLE FACTORS GROUP CHAIRMAN'S  
FACTUAL REPORT**

**Houston, TX**

**HWY15FH010**

(9 pages)

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

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FACTUAL REPORT**

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**A. CRASH INFORMATION**

Location: Eastbound Interstate 610 (I-610) overpass above Telephone Road, Houston, Harris County, Texas

Vehicle #1: Houston Independent School District (HISD) 47-passenger 2009 International School Bus

Vehicle #2: 2004 Buick LeSabre passenger vehicle

Date: September 15, 2015

Time: 7:03 a.m. CDT

NTSB #: **HWY15FH010**

**B. VEHICLE FACTORS GROUP**

Brian Bragonier, Senior Vehicle Factors Investigator, Group Chairman  
NTSB Office of Highway Safety  
490 L'Enfant Plaza East, S.W., Washington, DC 20594

**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**

This document is a collection of factual information obtained during the inspection of the vehicles involved in the collision. Inspections of the 2009 HISD International school bus and the 2004 Buick LeSabre were conducted at the Houston Police Department (HPD) Impound Yard in Houston, Texas between September 16 and 17, 2015.

All major mechanical systems were examined, including the steering, braking, and suspension systems. Overall collision damage, along with any damage or anomalies within major vehicle mechanical systems was documented. Supporting photographs, vehicle specifications, and prior annual inspection reports were reviewed.

## E. VEHICLE INSPECTIONS

### 1. VEHICLE #1: 2009 INTERNATIONAL SCHOOL BUS

#### 1.1. GENERAL INFORMATION

VIN <sup>1</sup> :	4DRBUAAL99B■■■■■■■
Make:	International
Model:	073814
Model Year:	2009
Company Unit #:	9655
Manufactured:	May 2008
Mileage:	Unknown <sup>2</sup>
GVWR:	25,500 lbs.
GAWR – Axle #1:	8,000 lbs.
GAWR – Axle #2:	17,500 lbs.
Engine:	International MaxxForce 7, 200 HP
Transmission:	Allison 2500 PTS 5-speed automatic
Steering Gear:	TRW Power Steering, model TAS-40
Brake Type:	Bendix 4-wheel air operated antilock drum brakes

#### 1.2. DAMAGE DESCRIPTION

Collision contact damage was extensive to the front end and the left side of the bus. The hood was completely detached from the vehicle and the windshield was entirely missing. The left side of the engine had numerous crushed and damaged components, including the air dryer and radiator.

The right side of the HISD bus from the passenger door back, had little damage. The second emergency window exit was open at the time of inspection, but all windows were intact. The entire body of the bus was shifted to the right due to the impact damage to the left side. **Figure 1** shows the damaged school bus from the rear.

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<sup>1</sup> Vehicle Identification Number (VIN) with the last six characters redacted.

<sup>2</sup> Information is unavailable at this time; however, it may be able to be estimated based on vehicle records and known trip information at a later date.



**Figure 1.** View showing contact damage to the top left corner of the HISD bus.

The right side of the rear bumper of the bus had been torn away from its connection to the frame rail. The rear emergency exit was no longer attached to the bus exposing the seat backs of the rear bus seats. Due to the damage to the left side and top of the bus, the roof was crushed to the top of the left side seat backs.

The left side of the bus had extensive contact damage with crush concentrated at the left rear corner near the roofline. Crush at the left rear corner measured approximately 48 inches with an additional 24 inches due to the body shifting to the right from impact. The crush decreased from the rear of the bus to the front, with little crush at the left front roofline. There was approximately 12 inches of body shift to the right measured at this location.

All windows were damaged, with many no longer intact. Lap belts from the seats hung from several of the windows. Due to crush and the shifted bus body, the top left corners of several seat backs extended out of the windows. The retractable stop sign mounted to the left rear corner of the bus was folded and crushed. The retractable stop sign near the driver's window was torn from its mount and located inside the bus. The roof emergency exit at the rear of the bus was missing the hatch cover, which was located on a seat in the interior of the bus. The hatch cover of the roof emergency exit at the front of the bus was partially open, but in place.<sup>3</sup>

### **1.3. INTERIOR AND OCCUPANT RESTRAINT**

There was intrusion into interior of the bus at the firewall and floorboard near the driver's seat. The key was in the "on" position and the shift selector was in the "D" position. The driver's 3-point seatbelt was locked in the retracted position. Each bench style seat on the bus had one

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<sup>3</sup> See Vehicle Photo #1 – Overall damage view from the left front corner of the HISD school bus.

brown, one red, and one blue lap belt. The rear seat on the left side had two lap belts available. The latch plates on all but two of the 47 belts were extended to the end of the strap. The brown belt located at the left rear seat and the blue belt on the right rear seat were the only belts with latch plates not fully extended.

#### 1.4. STEERING AND SUSPENSION

The left front wheel was rotated out at an approximately 45 degree angle from the vehicle with damage to steering components. The steering slip shaft was hanging from the universal joint near the firewall. The steering shaft had dislodged from the slip shaft and was hanging from the TRW steering gearbox, which had broken away from the frame rail. The gearbox, with the pitman arm and drag link still connected, were resting on the ground while still partially connected to the left front wheel assembly by the steering arm. The front of the left side leaf suspension was broken away from the frame rail.<sup>4</sup>

#### 1.5. BRAKING

The airbrake system was inoperable due to damage to the system. The brake line leading to the left front Type 20 brake chamber was disconnected. A visual inspection of the brake lining and pads showed they were within regulatory standards.

#### 1.6. TIRES AND WHEELS

The tire and weight rating placard on the HISD bus suggested that 245/75R22.5 tires be placed on 22.5x7.5 inch rims. General information about each of the school bus tires as they were at the time of inspection is included in **Table 1**. Tire tread depth measurements were taken in the major tread grooves of each tire. The smallest depth measured is displayed in the table, and represents a minimum tread depth value for that tire. All of the rims were inspected for cracks, welds, and elongated lug nut holes. No non-collision related defects were found on any of the rims.

Table 1: Tire Information for Collision Involved HISD Bus

Axle 1	Left		Right <sup>1</sup>	
Make	Bridgestone		Bridgestone	
Model	R260		R260	
Size	295/75R22.5		295/75R22.5	
Pressure	Deflated		Deflated	
Tread Depth	15/32 inches		N/A <sup>1</sup>	
DOT #	N/A <sup>2</sup>		32BT3DB0612	

  

Axle 2	Left		Right	
	Outside	Inside	Inside	Outside <sup>1</sup>
Make	Bridgestone	Bridgestone	Bridgestone	Bridgestone
Model	R260	R260	R260	R260

<sup>4</sup> See Vehicle Photo #2 – Damaged HISD school bus steering components.

Size	295/75R22.5	295/75R22.5	295/75R22.5	295/75R22.5
Pressure	Deflated	80PSI	Deflated	Deflated
Tread Depth	5/32 inches	6/32 inches	7/32 inches	N/A <sup>1</sup>
DOT #	32BT3DB0512	N/A <sup>2</sup>	N/A <sup>2</sup>	32BT3DB0612

<sup>1</sup> Two tires were detached (RF and RR outside). Their pre-crash mounting location could not be determined.

<sup>3</sup> Unable to obtain accurate DOT# information due to tire position/location.

During the tire examination, several areas of damage were noted to many of the rims and tires. The detached tires were retained with the school bus and also inspected. 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
  - Deflated, but still mounted on the damaged rim. Fresh paint transfer and rub marks on the wheel studs.
- Axle 1 Right
  - Tire completely separated from the rim. Rim severely damaged with multiple folds and the entire circumference of the outside flange showing scrape marks.
- Axle 2 Left – Outside
  - Tire was still attached to the rim, deflated. Damage to the tread at the 6 o'clock position
- Axle 2 Left – Inside
  - No apparent damage was observed.
- Axle 2 Right – Outside
  - Detached. Severely damaged rim.
- Axle 2 Right – Inside
  - Partially attached to the rim, multiple lateral tears extending into the sidewall. Top cap (tread) separated from the body of the tire.
- Detached Tire 1
  - 26 inch tear in the sidewall at the Bridgestone lettering.
- Detached Tire 2
  - 1 inch x 2 inch hole at the re-groovable stamp.
  - 8 inch tear in the sidewall at “B” on Bridgestone.

## 1.7. INSPECTION HISTORY

The HISD bus had undergone and passed an annual safety only vehicle inspection by the Texas Department of Public Safety on August 11, 2015. The school district performed a preventative maintenance inspection and service on the bus on July 21, 2015.<sup>5</sup> No issue areas were identified.

## 2. VEHICLE #2: 2004 BUICK LESABRE

### 2.1. GENERAL INFORMATION

VIN: 1G4HP52K344■■■■■■■  
Make: Buick  
Model: LeSabre  
Model Year: 2004  
Manufactured: December 2003  
GVWR: 4,710 lbs.  
GAWR – Axle #1: 2,336 lbs.  
GAWR – Axle #2: 2,174 lbs.

### 2.2. DAMAGE DESCRIPTION

The damage to the Buick LeSabre was entirely on the right side of the vehicle. There were pattern scratches in the paint on the right front fender near the wheel well. There were creases in the right front fender leading to the front passenger door. The front portion of the door was peeled back, away from the side of the vehicle, causing some induced damage below the rearview mirror. The rear passenger door had light scrapes and blue paint transfer leading into the right rear wheel well. The NTSB and HPD investigators were unable to determine the source of the blue paint transfer. The right rear bumper and fender area was undamaged. There was no damage to the interior of the vehicle. The driver's seatbelt was retracted but not locked.

### 2.3. TIRES AND WHEELS

The tire and weight rating placard on the Buick LeSabre suggested that P225/60R16 tires be placed on the rims at 30 PSI. General information about each of the Buick tires as they were at the time of inspection is included in **Table 2**. Tire tread depth measurements were taken in the major tread grooves of each tire. The smallest depth measured is displayed in the table, and represents a minimum tread depth value for that tire. All of the rims were inspected for cracks, welds, and elongated lug nut holes. No non-collision related defects were found on any of the rims.

Table 2: Tire Information for Collision Involved Buick LeSabre

Axle 1	Left	Right
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<sup>5</sup> See Vehicle Attachment 1 – HISD Bus PM Inspection Report.

Make	Michelin	Michelin
Model	Symmetry	Symmetry
Size	P225/60R16	P225/60R16
Pressure	25PSI	Deflated
Tread Depth	3/32 inches	3/32 inches
<b>Axle 2</b>	<b>Left</b>	<b>Right</b>
Make	Michelin	Michelin
Model	Symmetry	Symmetry
Size	P225/60R16	P225/60R16
Pressure	29PSI	34PSI
Tread Depth	5/32 inches	7/32 inches

The right front rim had portions of the outside flange broken away. There was an approximate 3 inch x 3 inch tear in the sidewall near the valve stem. The pattern scratches and the tear were caused by contact with the wheel studs on the rotating left front wheel of the HISD bus. **Figure 2** shows the damage on the Buick LeSabre caused by the wheel studs. A portion of the right side control arm of the steering system was fractured through at a fitting near the frame.<sup>6</sup>



**Figure 2.** Pattern scratches and tire damage from contact with the HSID bus.

#### **2.4. AIRBAG CONTROL MODULE DOWNLOAD**

<sup>6</sup> See Vehicle Photo #3 – Fractured Buick LeSabre passenger side control arm.



The airbags did not deploy in the collision, however, a non-deployment event was recorded by the vehicle's airbag control module. This module was imaged by Houston Police Department investigators. Data contained within the image indicated that the seatbelt was buckled at the time of the crash. The vehicle speed recorded by the module was approximately 68 mph in the three seconds prior to the collision. No brake application by the driver was shown in the data up to one second prior to impact.<sup>7</sup>

## **E. DOCKET MATERIAL**

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

### LIST OF ATTACHMENTS

Vehicle Attachment 1 – HISD Bus Preventative Maintenance Report

Vehicle Attachment 2 – Buick LeSabre Airbag Control Module Download

### LIST OF PHOTOGRAPHS

Vehicle Photo 1 – Bus - Overall damage view from the left front corner of the HISD school bus.

Vehicle Photo 2 – Bus - Damaged HISD school bus steering components.

Vehicle Photo 3 – Buick - Fractured Buick LeSabre passenger side control arm.

**END OF REPORT**

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Brian Bragonier  
Vehicle Factors Investigator

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<sup>7</sup> See Vehicle Attachment 2 – Buick LeSabre Airbag Control Module Download