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December 2024

**Special Crash Investigations:  
Remote Move-Over-Law Crash  
Investigation;  
Vehicle: 2018 Pierce Fire Truck;  
Location: Colorado;  
Crash Date: January 2022**

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<b>15. Supplementary Notes</b> Each crash represents a unique sequence of events and generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicles or their safety systems. This report and associated case data are based on information available to the Special Crash Investigation team on the date this report was published.			
<b>16. Abstract</b> This report documents the remote investigation of a crash selected by the National Highway Traffic Safety Administration to be included in its Move-Over-Law investigations. The crash occurred in the pre-dawn morning in January 2022 in dark, snowy conditions in Colorado. The struck vehicle was a 2018 Pierce Manufacturing aerial fire truck, which was stopped in the right lane in response to a prior crash. Two fire fighters were in the Pierce's second row, an unbelted 31-year-old male and unbelted 27-year-old male. The striking vehicle was a stolen 2005 Chevrolet Silverado C1500 pickup driven by a male of unknown age. A second male was seated in the front-right seat. Their belt usage is unknown. The second-row-right seat was occupied by a belted 25-year-old female. The Chevrolet was traveling westbound in the right lane at a police-estimated speed of 105 km/h (65 mph). The Chevrolet's front plane struck the Pierce's left plane. The Pierce was displaced forward. The Chevrolet was displaced to the left, departed the roadway, and came to rest facing west in the grass median. The Chevrolet's two front-row occupants fled the scene on foot. The Chevrolet's second-row occupant sustained "C" (possible) injuries and was transported to a local hospital by ambulance. Her treatment status is unknown. The Pierce's second-row-left occupant sustained "B" (suspected minor) injuries to his head. He was transported to a local hospital where he was treated and released. The second-row-right occupant was not injured or transported.			
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**Special Crash Investigations**  
**Remote Move-Over-Law Crash Investigation**  
**Case No. DS22006**  
**Vehicle: 2018 Pierce Fire Truck**  
**Location: Colorado**  
**Crash Date: January 2022**

## **Background**

This report documents the remote investigation of a crash selected by the Special Crash Investigations (SCI) group of the National Highway Traffic Safety Administration to be included in its “Move-Over-Law” investigations. The investigation used data from local authorities including the police report, on-scene photos, and fire department photos.

The source material was used to document the case and reconstruct the causal factors relative to Colorado’s Move-Over Law (Revised Statute Section 42-4-705) that requires all drivers to move into the next lane over for stopped vehicles. If it is not safe or possible to move over, drivers of an approaching vehicle must reduce and maintain safe speed. The following speeds are presumed to be safe: if the speed limit is less than 45 mph, 25 mph or less; or if the speed limit is 45 mph or more, 20 mph less than the speed limit. Drivers in Colorado must also immediately yield the right-of-way and move to the farthest right-hand lane available, if possible, when approached by emergency vehicles using their audible or visual emergency signals. Drivers must stop in these situations and remain halted until the emergency vehicle has passed.

This investigation was initiated by SCI in response to a police report notification sent by the SCI team. The case was assigned as a remote investigation to Dynamic Science, Inc., in March 2022. The police and fire department investigative reports and photos were obtained.

The crash occurred in the morning in January 2022 in Colorado. The crash site was the westbound lanes of a divided east/west Interstate highway. Conditions at the time of the crash were dark without artificial lighting. It was snowing and the roadway was snow-covered. The roadway had two westbound lanes bordered with solid painted edge lines and paved shoulders. The westbound and eastbound lanes were separated by a depressed grass-covered median. The posted speed limit was 105 km/h (65 mph). The struck vehicle was a 2018 aerial fire truck (Figure 1) built by Pierce Manufacturing, Inc., that was stopped in the right lane and blocking that lane in response to a prior crash. There were two firefighters in its second row, an unbelted 31-year-old male and unbelted 27-year-old male, who were moving to their seats. The striking vehicle was a 2005 Chevrolet Silverado C1500 pickup (Figure 2) driven by a male of an unknown age. Another male was seated in the front-right seat. Their seat belt usage is unknown. The second-row-right seat was occupied by a belted 25-year-old female. The Chevrolet was stolen and traveling westbound in the right lane at a police estimated speed of 105 km/h (65 mph). The Chevrolet's front plane struck the Pierce's left plane. The Pierce was displaced forward. The Chevrolet was displaced to the left, departed the roadway, and came to rest facing west in the grass median. One second-row-firefighter sustained “B” (suspected minor) injuries to his head. He was transported to a local hospital where he was treated and released. The other firefighter was not injured or transported. The Chevrolet's two front-row occupants fled the scene on foot. The Chevrolet’s second-row occupant sustained “C” (possible) injuries and was transported to a local hospital by ambulance. Her treatment status is unknown. Both vehicles were towed from the scene due to damage.



*Figure 1. Struck vehicle, 2018 Pierce Manufacturing aerial fire truck, damaged area highlighted in yellow (fire department photo)*



*Figure 2. Striking vehicle, 2005 Chevrolet*

## Summary

### Crash Site

The crash site was the westbound lanes of a divided east/west interstate highway (Figure 3). The roadway was oriented northeast to southwest at this location but will be referred to as east and west in this report. Conditions at the time of the crash were dark without artificial lighting. The roadway had two westbound travel lanes bordered with solid painted edge lines and paved shoulders. The westbound and eastbound lanes were separated by a depressed grass-covered median. The posted speed limit was 105 km/h (65 mph). The weather at the nearest reporting station was -17° C (1° F), 83 percent humidity, and the winds were out of the north northeast at 9 km/h (6 mph). It was snowing and the roadway was snow-covered. A crash diagram is included at the end of this technical report.



*Figure 3. Overhead view of the Pierce's stopped location  
(image source: Google Maps © 2022 Maxar Technologies)*

### Pre-Crash

The Pierce was responding to a prior crash in the westbound lanes. It was positioned at an angle in the right lane and right shoulder in a blocking position to direct traffic from the scene and protect the crash site. The Pierce's emergency lighting was activated. There were five vehicles in the right lane in front of the Pierce in the following order: private vehicle, private vehicle, police vehicle, ambulance, and private vehicle. The Pierce had been on-scene for approximately 15 to 20 minutes. There were four fire personnel assigned to this unit: one officer, one engineer, and two firefighters. The officer was with the ambulance in front of the Pierce. The engineer and firefighters had been ordered back into the Pierce due to weather conditions and to shelter from the snow. The engineer and firefighters entered the vehicle on the right side. The engineer stepped back out of the vehicle to help the officer retrieve some vehicle information. The 27-year-old firefighter was seated in the second-row-right position. The 31-year-old firefighter was in the cab moving toward the second-row-left position. The Chevrolet was traveling west in the right lane at a police-estimated speed of 105 km/h (65 mph). This was a stolen vehicle.

## **Crash**

The Chevrolet's front plane struck the Pierce's left plane and displaced it forward. The Chevrolet was displaced to the left, departed the roadway, and came to rest facing west in the grass median.

## **Post-Crash**

Both of the Pierce's second-row firefighter occupants exited the vehicle on the right side. The second-row-right firefighter was not injured or transported. The Pierce's second-row-left firefighter sustained "B" (suspected minor) injuries to his head and neck. After exiting the vehicle under his own power, he was escorted to the ambulance already on scene where he was examined. He was then transported to a local hospital where he was treated and released.

The Chevrolet's driver and front-seat passenger fled the scene on foot. The Chevrolet's second-row occupant sustained "C" (possible) injuries and was transported to a local hospital by ambulance. Her treatment status is unknown. The driver was later identified and arrested. Both the driver and second-row-right occupant were indicted in March 2022, along with multiple other parties, on charges that included motor vehicle theft. The front-row-right occupant's status is unknown.

Both vehicles were towed from the scene due to damage.

## **Move-Over Discussion**

As stated above, Colorado's Move-Over Law (Revised Statute Section 42-4-705) requires all drivers to move into the next lane over for stopped vehicles. The law was revised in 2020 to address situations where a lane change is not possible. If it is not safe or possible to move over, the driver must reduce his or her speed by 20 mph if the speed limit is 45 mph or more, or to under 25 mph if the speed limit is 40 mph or less.

It is unknown if the Chevrolet driver was familiar with the State's Move-Over law and the actions required of drivers in such circumstances. The driver was already engaged in an illegal activity (vehicle theft) leading up to the crash.

## 2018 Pierce Manufacturing Aerial Fire Truck

### Description

The 2018 Pierce fire truck was identified by the Vehicle Identification Number (VIN) 4P1BCAGF0JAXxxxxx. It was configured as an aerial fire truck with an Ascendant 107-foot heavy-duty aerial ladder. The cab-over-engine unit had an overall length of 1,203 cm (39.4 ft), overall width of 248 cm (97.6 in), and a wheelbase of 594 cm (233 in). It had a Detroit DD13 6-cylinder, 12.8-liter diesel engine and automatic transmission. There were four doors with two front-facing seats in the first row and two rear-facing seats in the second row.

### Emergency Lighting Discussion

The Pierce had emergency lights visible from the rear (Figure 4), including: an amber and red center mounted LED traffic directing light; dual white LED deck lights; dual white scene lights; red LED marker lights; and LED light sets with stop, tail, and backup and directional lights in a common bezel. The front and side emergency and running lights were activated.

The Pierce was white with red and yellow diagonal reflective markings on the rear plane, linear red reflective markings on the sides, and red and yellow diagonal reflective markings on the front bumper.



*Figure 4. 2018 Pierce fire truck rear lighting (fire department photo)*

## Exterior Damage



*Figure 5. 2018 Pierce fire truck left-plane damage (fire department photo)*



*Figure 6. 2018 Pierce fire truck left-plane damage (fire department photo)*

The Pierce had moderate left-plane damage that included the frame forward of the left-rear wheel, both roll up doors, second-row passenger door, and left-front wheel (Figures 5 and 6). There was also damage to various hydraulic and water piping and controls. The truck deformation classification was 06LZEW2.

## NHTSA Recalls and Investigations

Searches in the NHTSA recall database ([www.nhtsa.gov/recalls](http://www.nhtsa.gov/recalls)) in September 2022 and October 2024 using the Pierce's VIN found no data available.

## Interior Damage

There was no interior damage according to the fire department.

## Manual Restraint Systems

The Pierce had lap and shoulder belts for the front and second rows. The second-row occupants were unbelted.

## 2018 Pierce Fire Truck Occupants

### Second-Row-Left Firefighter Demographics

Age/sex: 31 years/male  
Height: Unknown  
Weight: Unknown  
Eyewear: Unknown  
Seat type: Rear-facing box  
Seat track position: NA  
Manual restraint usage: Lap and shoulder seat belt available, not used  
Usage source: Fire department report  
Alcohol/drug data: None  
Egress from vehicle: Exited under own power  
Transport from scene: Ambulance  
Type of medical treatment: Treated and released

### Second-Row-Left Occupant Injuries

Inj. No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Forehead laceration (3 cm)	210600.1	Door frame	Probable
2	Neck strain	640278.1	Door frame	Probable

Source: Emergency room, radiology

### Second-Row-Left Firefighter Kinematics

The second-row-left occupant had just entered the vehicle from the right and was moving to his seat position on the left. He was unbelted. At impact he was displaced rearward and to the left. He contacted the second-row-left door frame, resulting in a forehead laceration and neck strain. He exited the Pierce on the non-traffic, right side, under his own power. He was transported by ambulance from the scene to a local hospital where he was treated and released.

### **Second-Row-Right Firefighter Demographics**

Age/sex:	27 years/male
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Rear-facing box
Seat track position:	NA
Manual restraint usage:	Lap and shoulder belt available, not used
Usage source:	Fire department report
Alcohol/drug data:	None
Egress from vehicle:	Exited under own power
Transport from scene:	Not transported
Type of medical treatment:	None

### **Second-Row-Right Firefighter Injuries**

There were no reported injuries.

### **Second-Row-Right Firefighter Kinematics**

Presumably, this unbelted firefighter was displaced rearward and to the left. He exited the vehicle under his own power. He was not injured or transported.

## 2005 Chevrolet Silverado C1500

### Description

The 2005 Chevrolet Silverado C1500 4-door crew cab short-bed pickup was identified by police using the VIN 2GCEK13T351xxxxxx. The manufacture date was April 2005. The Chevrolet had a 5.3-liter, 8-cylinder gasoline engine with automatic transmission and 4-wheel drive. Its air bag control module was supported by the Bosch Crash Data Retrieval system, but it was not imaged by the police.

### Exterior Damage

Based on the police report and photos, the Chevrolet had direct damage to the front plane at the right bumper corner. It extended rearward along the right plane (Figures 7 and 8) to the right-front fender, both right doors, and cargo bed. The right-rear wheel was displaced rearward. The collision deformation classification<sup>1</sup> was 12FRAE9.



*Figure 7. 2005 Chevrolet Silverado front-plane damage (fire department photo)*



*Figure 8. 2005 Chevrolet Silverado right-plane damage (fire department photo)*

### NHTSA Recalls and Investigations

Searches in the NHTSA recall database ([www.nhtsa.gov/recalls](http://www.nhtsa.gov/recalls)) in September 2022 and October 2024 using the Chevrolet's VIN revealed no incomplete recalls.

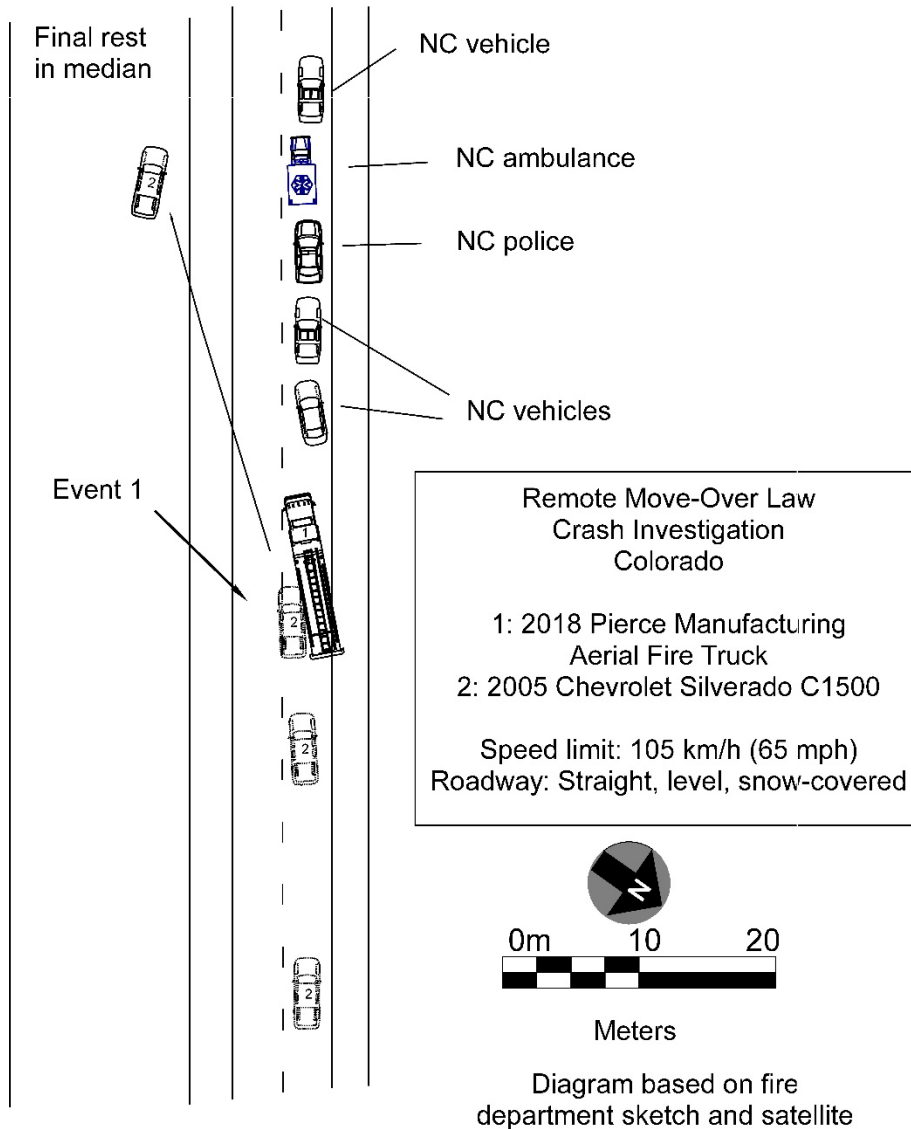
### Occupant Data

The Chevrolet's front-row driver and front passenger fled the scene on foot. Their seat belt use is unknown. The Chevrolet's belted second-row occupant sustained "C" (possible) injuries and was transported to a local hospital by ambulance. The driver was later identified and arrested. Both the driver and second-row-right occupant were indicted in March 2022, along with other defendants, on charges that included motor vehicle theft. The front-row-right occupant's status is unknown.

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<sup>1</sup> SAE J224 May 2022

# Crash Diagram



Case Number:	<b>DS22006</b>

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