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

VEHICLE FACTORS GROUP CHAIRMAN'S FACTUAL REPORT

PHOENIX, ARIZONA - HWY21MH008

A. CRASH INFORMATION & CRASH SUMMARY

Refer to the *Crash Information and Crash Summary Report* in the docket for this investigation.

B. VEHICLE FACTORS GROUP

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

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

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

Tomasz Frankowski, State Trooper
Arizona Department of Public Safety
P.O. Box 6638 MD 1240
Phoenix, Arizona 85005

Todd Peterson, Detective
Arizona Department of Public Safety
Vehicular Crimes Unit
P.O. Box 6638 MD 3100
Phoenix, Arizona 85005

Sean O'Bryant, Detective
Arizona Department of Public Safety
Vehicular Crimes Unit
P.O. Box 6638 MD 3100
Phoenix, Arizona 85005

Ritchie Huang, Executive Manager, Safety and Government Affairs
Daimler Trucks North America
800 Maine Ave. SW suite 625, Washington, D.C. 20024

C. 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 vehicles, in conjunction with the Arizona Department of Public Safety (AZDPS).

The detailed inspection of the 2015 Walker tank-trailer was conducted at 1st Class Auto Transport in Phoenix, Arizona; and the detailed inspection of the 2016 Freightliner truck-tractor and general inspection of the passenger vehicles were conducted at the AZDPS evidence holding facility in Phoenix, Arizona. The inspections were completed between June 15 and June 18, 2021.

All major mechanical systems on the 2016 Freightliner truck-tractor and 2015 Walker tank-trailer were examined, including the steering, braking, and suspension systems. Overall collision damage, along with any damage or anomalies within major vehicle mechanical systems were documented. Some areas of the vehicles could not be reliably documented due to extensive collision and post collision fire damage. Supporting photographs, vehicle specifications, maintenance records, and prior inspection reports were collected.

Further vehicle information and additional photographs were gathered between July 7 and July 8, 2021, on the passenger vehicles and the truck-tractor. The inspections were conducted at the AZDPS evidence holding facility in Phoenix, Arizona.

All the passenger vehicles were equipped with a pyrotechnically deployed supplemental occupant restraints, where the deployment is directed by a programmed algorithm within the restraint control module (RCM) that evaluates changes in acceleration relative to time. The Event Data Recorder (EDR) is part of the vehicle's RCM.

The RCMs were either removed from the vehicle by the AZDPS or imaged in the vehicle utilizing the Bosch Crash Data Retrieval software. Seven of the eight passenger vehicles were imaged.[1] The AZDPS provided NTSB investigators with the EDR reports. (For further information see Technical Reconstruction Report).

[1] The RCM for the 2021 Chevrolet Equinox LS was damaged due to post-collision fire and not able to be imaged.

1. Vehicle 1: 2016 Freightliner in combination with 2015 Walker tank-trailer

1.1. General Information

VIN[2] :	3AKJGEDR0GSGW6726
Manufacturer:	Freightliner
Model:	Cascadia
Manufactured:	04/11/2015
Unit #:	57
GVWR[3] :	52,000 lbs.
GAWR[4] 1:	12,000lbs
GAWR[5] 2:	20,000lbs
GAWR 3:	20,000lbs
Engine:	Detroit Diesel DD15 400HP
Transmission:	DT12-DA-1750 12-speed Automated
Steering Gear:	TRW THP-60
Brake System:	Front – Wabco Maxxus Pneumatic Disc Rear – Pneumatic Drum Brakes

1.2. Damage Description

In this report, "left" refers to the driver's side, and "right" refers to the passenger's side of the vehicles.

The entire cab and engine were severely fire damaged. The portion of the tractor to the rear of the cab did not sustain severe fire damage, as shown in **Figures 1, 2 and 3.**

Figure 1 - A left-side view of the truck-tractor showing collision and post fire damage.

[2] Vehicle Identification Number **(VIN)**.
[3] Gross Vehicle Weight Rating **(GVWR)** is the maximum operating weight of a vehicle as specified by the manufacturer including the vehicle's chassis, body, engine, engine fluids, fuel, accessories, driver, passengers, and cargo.
[4] Gross Axle Weight Rating **(GAWR)** is the maximum distributed weight that a given axle is designed to support.
[5] For consistency in describing the axles of the truck-tractor, the front (steer) axle will be referred to as Axle 1, the drive axles as Axles 2 and 3.

Figure 2 - A top-down view of the truck-tractor, showing collision and post fire damage.

Figure 3 - A left-side view of the truck-tractor showing the entire cab and engine severely fire damaged.

Damage to the truck-tractor from its initial impact with the rear of a passenger vehicle was masked due to the subsequent fire, affecting all major mechanical systems. The tractor's frame rails were displaced outward, and the front frame connector was displaced inwards showing signs of impact with melted and solidified remnants of material present, as shown in **Figure 4**.

Figure 4 - A front view of the truck-tractor, showing collision and post fire damage.

1.2.1. Tank-Trailer Information

Make:	Walker Stainless Equipment, Inc.
VIN:	5WSAA432XFN047046
Model:	Tank-trailer
Year:	2015
Manufactured:	09/2014
Unit #:	474
Capacity:	6,500 gallons
GVWR:	65,000lbs
GAWR 1:	20,000lbs
GAWR 2:	20,000lbs

1.2.2. Damage Description Tank-Trailer

The stainless front cap of the tank-trailer was partially detached from the rest of the stainless trailer cladding at the top, exposing the foam insulation beneath as shown in **Figure 5**.

Figure 5 - The stainless front cap of the tank-trailer was partially detached from the rest of the stainless trailer cladding at the top, exposing the foam insulation beneath.

The kingpin located under the tank-trailer approximately 24-inches rearward from the nose still had the 5th wheel plate from the tractor locked to it. During the crash sequence the plate was torn away from the sliding 5th wheel assembly on the tractor as shown in **Figure 6**.

Figure 6 - The 5th wheel plate from the truck-tractor torn from the tractor still attached to the tank-trailer's kingpin.

The right-front fender of the tank-trailer was displaced upward and flush with the side of the tank, approximately 16-inches. The side marker light located on the right front edge of the fender was missing. The front support bracket was fractured at its mount to the frame rail. The

second, third and fourth fender support brackets were still attached, but deformed and partially pulled away from the frame rail. The ends of the brackets were partially ground away.

There were multiple scuff marks along the entire right-side of the tank, beginning approximately 88-inches from the ground extending to 115-inches high.

The ladder enabling access to the top of the tank and the loading hatch was located at the midpoint of the tank-trailer. There were scuff marks on the rails of the ladder beginning approximately 48-inches high extending to approximately 80-inches high. The support beams which would normally attach to the ladder rails from the bottom of the frame rail were both fractured away from the rails. The front ladder support beam was deformed rearward approximately 24-inches. The rear ladder support beam was fractured at the frame rail and was missing.

The rear fender was displaced approximately 7-inches upward and the front support bracket on the fender was displaced rearward approximately 11-inches. The rear portion of the fender was folded and displaced forward.

The rear stainless end cap of the tank-trailer was detached at the top exposing the foam insulation beneath. One of the three marker lights at the top of the cap was displaced from its mount and dangling from its wires. The cap was deformed with depressions and folds covering the entire surface. The right side of the rear bumper was scuffed and ground away. The right-side lamp bracket was displaced upward approximately 4-inches and the rear marker light was displaced from its mount. The left-side lamp bracket was displaced downward approximately 3-inches, with a fold in the portion closest to the frame rail. The seal (#11365905) was still in place in the rear valve.

The front fender on the left side was displaced upwards. There were four support brackets attached to the fender. The front bracket was displaced upward approximately 14-inches, the second bracket displaced upwards approximately 22-inches, and the third bracket displaced upward approximately 2-inches. The rear support bracket was in its normal position. The front three support brackets were partially pulled away from the frame rail they were connected to.

The access ladder on the left side was still attached to the support beams but was displaced to the right beginning at 61-inches high. Two of the ladder treads had pierced the side of the tank-trailer through the steel cladding into the foam insulation at approximately 88-inches to 99-inches high.

The rear fender had three support brackets connected at the top to the fender and to the frame rail at the bottom. The front bracket was displaced rearward approximately 8-inches. The second bracket was displaced approximately 3-inches rearward and 9-inches downward. The rear bracket was displaced approximately 2-inches rearward and 6-inches downward. There was a rear side marker missing from its mount on top of the fender.

There was an approximate 244-inch depression in the left side of the tank extending from approximately 63-inches to 74-inches high. See Vehicle Factors Photograph Attachment for additional photographs depicting collision and post fire damage.

1.1. Weight and Measurements

Stotz Dairy in Buckeye, Arizona, was the last stop for the driver prior to the crash. The truck-tractor combination was weighed at arrival and departure. The vehicle arrived unladen on June 9, 2021, at 8:50 p.m. (local time) weighing 27,760 lbs. The truck-tractor combination was loaded with 54,100 lbs. of raw milk. Prior to the vehicle departing at 9:25 p.m. it was weighed again at 81,860 lbs.[6] The vehicle was registered for 80,000 lbs. and was overweight by 1,860 lbs.

United Dairyman of Arizona provided 30 days of weigh scale tickets for the crash involved driver. The NTSB reviewed 111 scale tickets. Of the 111 scale tickets reviewed, 58 loads were overweight more than 1,000 lbs.[7]

NTSB investigators scanned an exemplar truck-tractor and tank-trailer using a 3-dimensional LASER scanner that will allow for the creation of a 3-D model from which scaled measurements can be taken. For additional information see the Technical Reconstruction Factual Report in the public docket for this case.

1.2. Driver's Controls

Due to the extensive collision and fire damage to the truck-tractor, none of the driver controls were able to be documented.

1.3. Steering

Due to the extensive collision and fire damage sustained by the truck-tractor, a functional check of the steering system was not able to be performed. All the steering components sustained heavy damage. The steel hoop that made up the steering wheel core was located near the upper steering shaft. The upper steering shaft was connected to the upper splined intermediate shaft by means of a universal joint. The upper splined portion of the intermediate shaft was pulled out of the lower portion of the intermediate shaft and was located near the steering wheel and driver's seat in the wreckage. Both pinch bolts on the upper and lower universal joints of the intermediate steering shaft were found to be securely connected during the post-crash inspection.

The lower portion of the intermediate shaft remained connected to the input shaft of the TRW steering gear, connected by means of another universal joint.

1.4. Suspension

The truck-tractor was equipped with conventional air suspension system components. The suspension consisted of two leaf spring packs mounted to the solid steer axle, and shock absorbers. All four U-bolts connecting axle 1 to the leaf springs were broken and the steer axle was detached

[6] Additional information is contained in Vehicle Factors Attachment – United Dairyman of Arizona, invoice #38211609.
[7] Additional information is contained in Vehicle Factors Attachment - Scale Tickets.

from the vehicle. Most of the remaining suspension components were missing or damaged from the collision sequence and post-collision fire.

The suspension of axle 2 and axle 3 consisted of two leaf spring packs, and two drive axles. The leaf springs were intact, in place, and securely mounted on both sides of the axles. No signs of cracks or bending in the springs were noted. Axle 2 left side airbag lower mount was dislodged from the leaf spring and displaced aft.

1.5. Tires and Wheels

Table 1 includes the tire and wheel information documented on the truck-tractor combination.

Table 1: Tire Information for truck-tractor combination.

Axle 1 Tractor-Truck	**Left**		**Right**	
Tire Make/Model	Unknow fire damage		Unknown fire damage	
Axle 2	**Left**		**Right**	
	Outside	Inside	Inside	Outside
Tire Make	Hankook	Hankook	Hankook	Hankook
Tire Model	AH24	AH24	AH24	AH24
Tire Size	11R22.5	11R22.5	11R22.5	11R22.5
Pressure	0 psi	83 psi	70 psi	72 psi
DOT #	T73TYH4120	T73TYH0920	T73TYH4319	T73TYH4319
Radius	21	21	21	21
Load Rating	5,840 lbs. Dual	5,840 lbs. Dual	5,840 lbs. Dual	5,840 lbs. Dual
Axle 3	**Left**		**Right**	
	Outside	Inside	Inside	Outside
Tire Make	Hankook	Hankook	Hankook	Hankook
Tire Model	AH24	AH24	AH24	AH24
Tire Size	11R22.5	11R22.5	11R22.5	295/75 R22.5
Pressure	0 psi	94 psi	94 psi	100 psi
DOT #	T73TYH4120	T73TYH4120	T73TYH4120	T73TYH4120
Radius	21	21	21	21
Load Rating	5,840 lbs. Dual	5,840 lbs. Dual	5,840 lbs. Dual	5,840 lbs. Dual
Axle 4 Tank-Trailer	**Left**		**Right**	
	Outside	Inside	Inside	Outside
Tire Make	Hankook	Hankook	Hankook	Hankook
Tire Model	Max TL 21	Max TL 21	Max TL 21	Max TL 21
Tire Size	295/75 R22.5	295/75 R22.5	295/75 R22.5	295/75 R22.5

Pressure	104 psi	104 psi	104 psi	102 psi
Tread Depth	11/32”	11/32”	9/32”	9/32”
DOT #	KCFDBL34316	GB551P20118	FAABJAE4818	FAABJAE4818
Radius	20.5-inches	20.5-inches	20.5-inches	20.5-inches
Load Rating	5,675 lbs. Dual	5,675 lbs. Dual	5,675 lbs. Dual	5,675 lbs. Dual
Axle 5	**Left**		**Right**	
	Outside	Inside	Inside	Outside
Tire Make	Hankook	Hankook	Hankook	Hankook
Tire Model	Max TL 21	Max TL 21	Max TL 21	Max TL 21
Tire Size	295/75 R22.5	295/75 R22.5	295/75 R22.5	295/75 R22.5
Pressure	110 psi	102 psi	100 psi	0 psi
Tread Depth	9/32”	9/32”	8/32”	8/32”
DOT #	KCFDBL34316	GB551P20118	FAABJAE4818	FAABJAE4818
Radius	20.5-inches	20.5-inches	20.5-inches	20.5-inches
Load Rating	5,675 lbs. Dual	5,675 lbs. Dual	5,675 lbs. Dual	5,675 lbs. Dual

During the tire examination, several areas of damage were noted for many of the rims 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:

Truck-Tractor

- Axle 1- Left and Right Side
  - Tires destroyed by fire
  - Both front aluminum rims melted, damaged by fire and impact damage
- Axle 2- Left - Outboard
  - Damage to the rim bead seat
- Axle 3 – Left – Outboard
  - Damage to the rim bead seat

Tank-Trailer:

- Axle 4 Left – Outboard Side
  - Sidewall scuff entire circumference of tire
- Axle 5 Left – Outboard Side
  - Sidewall scuff entire circumference of tire
  - 6:00 – 8:00 cracks in tire sidewall

- Axle 4 Right – Outboard Side
  - Rim scuffs entire circumference
  - Debris pinched between tire and rim entire circumference
  - Tire sidewall scuff entire circumference
  - 1:00 – 1:30 – Tear in tread
  - 10:00 - 10:30 - 4-inch crack in sidewall
  - 8:00 – 8:30 – 6-inch gouge in sidewall

- Axle 5 Right – Outboard Side
  - 6:00 – 8:00 – Radial collapse in rim

Tread depth measurements were taken utilizing a commercially available laser scan tool.[8] This instrument uses a laser to measure over 600 points across the surface of the tire. **Table 2** and **Table 3** shows the diagnostic tire data obtained by the tool displayed in a side-profile visual format. The data displayed is representative of only a single location on the circumference of each tire. 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. This may not be the minimum tread measurement, as other segments of the tire may have more or less available tread.

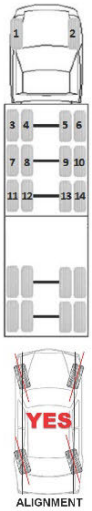
[8] http://www.tireprofiles.com/grooveglove/

Table 2 – Tire Report 2016 Freightliner.

NTSB Office of Highway Safety
490 L'Enfant Plaza Southwest
Washington, DC 20594-003

31259047

UNIT ID	57
NAME	Freightliner Cascadia
VIN	3AKJGEDR0GSGW6726
LICENSE PLATE	- Not Captured - AZ



Vehicle Scan Summary · 7/8/2021, 12:27 PM

3	13.2 10.1 13.2 Average Groove Depth: 12.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK • The tire has severe center wear. Check the tire pressure.
4	15.4 12.3 11.6 12.8 Average Groove Depth: 14.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK
5	7.6 8.4 9.7 11.3 Average Groove Depth: 10.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK • There is minor inside wear. Inspect Suspension.
6	8.3 7.5 7.5 9.7 Average Groove Depth: 9.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK • The tire has minor center wear. Check the tire pressure.
7	20.6 20.4 19.9 21.1 Average Groove Depth: 21.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK
8	22.7 19.5 19.4 20.7 Average Groove Depth: 21.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK • The tire has minor center wear. Check the tire pressure.
9	21.3 19.6 20.4 20.6 Average Groove Depth: 21.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK
10	21.1 20.1 20.6 20.8 Average Groove Depth: 21.0 **32nds**	DOT: Size: Load: Pressure: Notes:	• Tread Depth OK

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Table 3 – Tire Report 2015 Walker Tank-Trailer.

NTSB Office of Highway Safety
490 L'Enfant Plaza Southwest
Washington, DC 20594-003

30847506

Unit ID	474	
Name	Walker Stainless Trailer	
VIN	5WSAA432XFN047046	
License Plate	72443E	AZ

Vehicle Scan Summary · 6/15/2021, 1:27 PM

9	11.5 11.4 11.6 11.6 Average Groove Depth: 11.5 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
10	11.4 11.8 11.8 10.9 Average Groove Depth: 11.2 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
11	9.2 9.8 10.3 10.6 Average Groove Depth: 9.9 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
12	10.3 9.5 9.6 9.8 Average Groove Depth: 10.0 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
13	9.4 9.5 9.6 Average Groove Depth: 9.4 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
14	8.7 9.2 9.4 9.1 Average Groove Depth: 8.9 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
15	8.5 8.3 8.7 9.8 Average Groove Depth: 8.9 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK
16	9.0 8.3 8.3 8.3 Average Groove Depth: 8.6 **32nds**	DOT: Size: Load: Pressure: Notes:	● Tread Depth OK

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1.6. Brakes

Due to the significant collision and fire damage sustained by the truck-tractor, direct functional checks of the braking systems were not able to be performed. The truck had pneumatic disc brakes on the front axle and pneumatic drum brakes on axles 2 and 3.

The tank-trailer had pneumatic drum brakes on both axles. Although there was damage to the tank-trailer, the brake system was operable. Both tank-trailer axles were equipped with size 30 service and parking brake chambers (Type 30/30) equipped with automatic slack adjusters. To conduct functional tests of the tank-trailer brakes, an external source supplied the system with between 90 and 100psi of air pressure, the parking brakes were released, pushrods were marked, and then the foot valve was applied to its maximum 85 psi pressure. The brakes performed as designed and the brake adjustments were found to be within adjustment.

All tank-trailer brake components were examined, measured and were within minimum specifications.[9]

1.7. Electrical

Due to the extent of the collision and post-crash fire damage, the truck-tractor's entire electrical system was compromised, and the tank-trailer's electrical connection was torn from the trailer's bulkhead. It was not possible to check the function or integrity of the electrical system.

1.8. Collision Avoidance and Mitigation Systems

This vehicle was not purchased with or required to have a forward collision avoidance system (CAS). This was an optional feature at the time of purchase and is part of driver assist technology that detects a forward conflict and alerts the driver, and if necessary, automatically applies the brakes.

1.9. Engine Control Module

The Detroit engine was controlled by an Engine Control Module (ECM) that controlled engine timing and fuel injection, based on various engine and 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. The ECM was destroyed by the post-crash fire. The Aftertreatment Control Module (ACM) was located and removed, the module had thermal damage to the exterior and wiring connectors. The device cleans exhaust gases to ensure the engines meet emission regulations. According to the manufacturer, there is no usable crash data recorded in this module.

[9] According to Title 49 *Code of Federal Regulations (CFR)* 393.47(d), the minimum brake pad thickness for hydraulic disc or drum brakes is 1.6mm or 1/16-inch on both the steering axle and non-steering axle brakes.

1.10. Maintenance and Inspection History

Maintenance and inspection records for the truck-tractor, were obtained from the motor carrier, Arizona Milk Transport, Inc. The carrier provided vehicle inspection reports (DVIR) for the truck-tractor for the months of April, May and June 1-8, 2021. The reports were completed by the same driver operating the vehicle during the collision event and no recorded maintenance deficiencies were documented in the reports.[10] The milk tank-trailer was owned by Shamrock Dairy and leased to United Dairymen of Arizona (UDA). UDA had performed all of the preventative maintenance and annual inspections on the tank-trailer since February 2018. UDA provide NTSB investigators with the maintenance records and inspection reports for the tank-tailer.

According to the *Federal Motor Carrier Safety Regulations* (FMCSRs), commercial vehicles must be inspected at a minimum every 12 months to ensure compliance with the requirements set forth in the regulations.[11]

The truck-tractor involved in this collision was last inspected on December 28, 2020[12] and the tank-trailer was last inspected May 5, 2021[13], with each of these inspections meeting the requirements of an annual inspection under the FMCSRs.

1.11. Documented Recalls and Warranty Claims

A recall repair record and warranty claim information were obtained from the manufacturer. Freightliner Trucks (a division of Daimler Trucks North America LLC, a Daimler company) indicated that on April 12, 2019, the vehicle had a warranty claim for a cracked crossmember. The part was removed and a new crossmember was installed.[14]

A search of the safety recall database maintained by the National Highway Traffic Safety Administration (NHTSA) on June 12, 2021, indicated there were no open safety recalls on the Freightliner or the Walker tank trailer.

[10] Additional information is contained in Vehicle Factors Attachment - Driver Vehicle Inspection Reports.
[11] According to the State of Arizona oversight for commercial motor vehicles and applicable state regulations, this annual inspection, meets the requirements prescribed under to 49 CFR 396.3.
[12] Additional information is contained in Vehicle Factors Attachment - Truck-Tractor Annual Vehicle Inspection Report.
[13] Additional information is contained in Vehicle Factors Attachment - Tank-Trailer Annual Vehicle Inspection Report.
[14] Additional information is contained in Vehicle Factors Attachment - Claim DLXD2019A651T.

2. Vehicle 2: 2021 Chevrolet Equinox LS

2.1. General Information

VIN:	3GNAXHEV7MS[redacted]
Manufacturer:	Chevrolet
Model:	Equinox LS
Curb Weight:	3,274 lbs.

2.2. Damage Description

The entire vehicle had extensive fire damage. All tires were consumed by fire and all windows were missing. The entire front had contact damage. The bumper was missing, the radiator was displaced rearward to the front axle and the engine was also displaced rearward into the passenger compartment. The hood was folded at the midpoint and displaced downward onto the engine as shown in **Figure 7**. The front left door had been removed during the extrication process. Both right side doors were in place but missing the door handles. There was contact damage to the entire rear of the Equinox, with the hatchback displaced forward to the second-row seats, as shown in **Figure 8.**

Figure 7 - A front view of the 2021 Chevrolet Equinox LS showing extensive front-end collision and post-crash fire.

Figure 8 - Left-side and rear view of the 2021 Chevrolet Equinox LS showing extensive collision and post-crash fire damage.

3. Vehicle 3: 2015 Nissan Altima

3.1. General Information

VIN:	1N4AL3AP5FC[redacted]
Manufacturer:	Nissan
Model:	Altima
Curb Weight:	3,121 lbs.

3.2. Damage Description

The Nissan sustained damage to both the front and rear. The front bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced rearward with the right side displaced farther to the rear. The hood was folded at the midpoint and displaced rearward to the A pillar. The windshield was shattered with portions of it still in the frame. The driver window was missing, the left rear passenger window was in-place. As shown in **Figure 9**, the front passenger window was in place, but the right rear passenger window was missing.

There were scrapes and striations in the paint on the top edges of both the left and right sides of the vehicle. The roof was deformed upward with a fold at the midpoint. The rear bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced forward to the rear axle. Both rear fenders were displaced forward to the rear wheel wells. The trunk lid was displaced forward exposing the trunk, and the rear window was missing as shown in **Figure 10**.

The right rear tire was torn and flat with deformation to the rim. Both left front and left rear tires were deflated and had deformation to the rims. The right front tire remained inflated.

Figure 9 - A left-side view of 2015 Nissan Altima showing front, side roof and rear damage.

Figure 10 – A rear and right-side view of the 2015 Nissan Altima showing rear and right-side collision damage.

3.3. Tires and Wheels

Table 4 includes the tire information documented on the Nissan Altima at the time of inspection.

Table 4 - Tire information for 2015 Nissan Altima.

Front Axle	Left	Right
Tire Make/Model	West Lake/Radial	West Lake/Radial
Tire Size	215/60R 16	215/60R 16
Pressure	34 psi /max 44 psi	15 psi / max 44 psi
Tread Depth	7/32nd	6/32nd
DOT Number	00KKEEACJ4318	00KKEEACJ3918
Rear	**Left**	**Right**
Tire Make/Model	Vee Rubber/Unknown	Pirelli/Cinturato
Tire Size	215/60R 16	215/60R 16
Pressure	0 psi/ max unk.	0 psi / max 55psi
Tread Depth	Unable to obtain	4/32nd
DOT Number	6MSJCX4917	XL94R6216

4. Vehicle 4: 2018 Mercedes C300W

4.1. General Information

VIN: WDDWF4JB6JR[redacted]
Manufacturer: Mercedes
Model: C300W
Curb Weight: 3,582 lbs.

4.2. Damage Description

The front bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced rearward and upward. The hood was folded rearward into the windshield, which was in place but shattered, as shown in **Figure 11**. The sunroof glass was missing. There were minor marks on the right front rim, but all tires on the vehicle were still inflated. The rear bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced forward to the rear axle. Both rear fenders were displaced forward to the rear wheel wells. The trunk lid was displaced forward to the rear window as shown in **Figure 12**.

Figure 11 - A front left-side view of the 2018 Mercedes C300W showing front end and rear bumper collision damage.

Figure 12 - A rear view of the 2018 Mercedes C300W showing collision damage.

4.3. Tires and wheels

Table 5 includes the tire information documented on the Mercedes C300W at the time of inspection.

Table 5 – Tire information for 2018 Mercedes C300W

Front Axle	Left	Right
Tire Make/Model	Pirelli/Cinturato	Pirelli/Cinturato
Tire Size	225/50R 17	225/50R 17
Pressure (psi)	38 psi / max 51 psi	38 psi / max 51 psi
Tread Depth	9/32nd	7/32nd
DOT Number	UNNUR7434529	UNNUR7433418
Rear	**Left**	**Right**
Tire Make	Pirelli/Cinturato	Pirelli/Cinturato
Tire Size	225/50R 17	225/50R 17
Pressure (psi)	42 psi / max 51 psi	0 psi / max 51psi
Tread Depth	6/32nd	4/32nd
DOT Number	UNNUR7433518	UNNUR7431718

5. Vehicle 5: 2013 Lexus CT200H

5.1. General Information

VIN: JTHKD5BH1D2[redacted]
Manufacturer: Lexus
Model: CT200H
Curb Weight: 3,218 lbs.

5.2. Damage Description

There was no damage to the front of the Lexus as shown in **Figure 13**. The rear bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced forward to the rear axle. Both rear fenders were displaced forward to the rear wheel wells. The glass from the hatchback was missing. The right-side brake light assembly was detached from its mount and hanging by connecting wires. The hatchback was displaced forward and deformed at the midpoint as shown in **Figure 14**. The driver's door was displaced to the right approximately 6-inches. The driver's window was missing. The left rear door had a tear in the bottom portion of the sheet metal. Both right-side windows were intact. All four tires were inflated with no damage to the wheels.

Figure 13 – A left-side and front view of the 2013 Lexus CT200H, showing no damage to the front of the vehicle.

Figure 14 – A rear view of the 2013 Lexus CT200H, showing extensive rear contact damage.

5.3. Tires

Table 6 includes the tire information documented on the Lexus CT200H at the time of inspection.

Table 6 – Tire information for 2013 Lexus CT200H.

Front Axle	Left	Right
Tire Make/Model	Hercules/Raptis R-T5	Hercules/Raptis R-T5
Tire Size	P215/45Z R17	P215/45Z R17
Pressure (psi)	31 psi / max 40 psi	32 psi / max 40 psi
Tread Depth	7/32nd	6/32nd
DOT Number	UAOKEAER3819	UAOKEALL4719
Rear	**Left**	**Right**
Tire Make	Hercules/Raptis R-T5	Hercules/Raptis R-T5
Tire Size	P215/45Z R17	P215/45Z R17
Pressure (psi)	31 psi / max 40 psi	32 psi / max 40 psi
Tread Depth	7/32nd	7/32nd
DOT Number	UAOKEALL4719	UAOKAAMR0820

6. Vehicle 6: 2015 Dodge Charger

6.1. General Information

VIN: 2C3CDXBG5FH[redacted]
Manufacturer: Dodge
Model: Charger
Manufactured: 01/2015
Curb Weight: 4,263 lbs.

6.2. Damage Description

The front bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced rearward. The hood was folded rearward at the midpoint as shown in **Figure 15**. The windshield was in place but shattered. The trunk lid was displaced forward into the rear window, which was missing. Both left and right-side windows were intact. The rear bumper fascia was missing as was the underlying foam bumper absorber. The metal bumper reinforcement under the absorber was displaced forward to the rear axle. Both rear fenders were displaced forward to the rear wheel wells as shown in **Figure 16**. The right rear tire was flat, and the spokes of the wheels were all fractured.

Figure 15 - A front and left-side view of the 2015 Dodge Charger showing front end collision damage.

Figure 16 – A rear view of the 2015 Dodge Charger showing rear collision damage.

6.3. Tires and wheels

Table 7 includes the tire information documented on the 2015 Dodge Charger at the time of inspection.

Table 7 - Tire information for 2015 Dodge Charger.

Front Axle	Left	Right
Tire Make/Model	Ironman/iMOVE GEN2 SUV	Ironman/iMOVE GEN2 SUV
Tire Size	P265/35R 22	P265/35R 22
Pressure (psi)	40 psi / max 50 psi	38 psi / max 50 psi
Tread Depth	8/32nd	8/32nd
DOT Number	IYJM4HTHE3820	1YJM4HTHE4820
Rear	**Left**	**Right**
Tire Make	Delinte/Desert Storm	Delinte/Desert Storm
Tire Size	265/35ZR 22	265/35ZR 22
Pressure (psi)	40 psi / max 49 psi	31 psi / max 49 psi
Tread Depth	9/32nd	4/32nd
DOT Number	TB5AEH5C3420	TB5AEH5C4619

7. Vehicle 7: 2013 Toyota Prius

7.1. General Information

VIN: JTDKN3DU2D1[redacted]
Manufacturer: Toyota
Model: Prius
Curb Weight: 3,042 lbs.

7.2. Damage Description

Contact damage to the front of the Prius shifted the radiator and engine rearward to the front axle. The windshield was shattered and folded, but present. The left front door was in place, but damaged and missing its glass. The left rear door was present but folded as shown in **Figure 17**. The rear of the vehicle had contact damage. The rear axle was shifted forward under the rear doors and the hatchback was shifted downward. Both right side doors were in place with minor damage as shown in **Figure 18**. The right front door window was missing. The front portion of the roof was crushed downward to the dash.

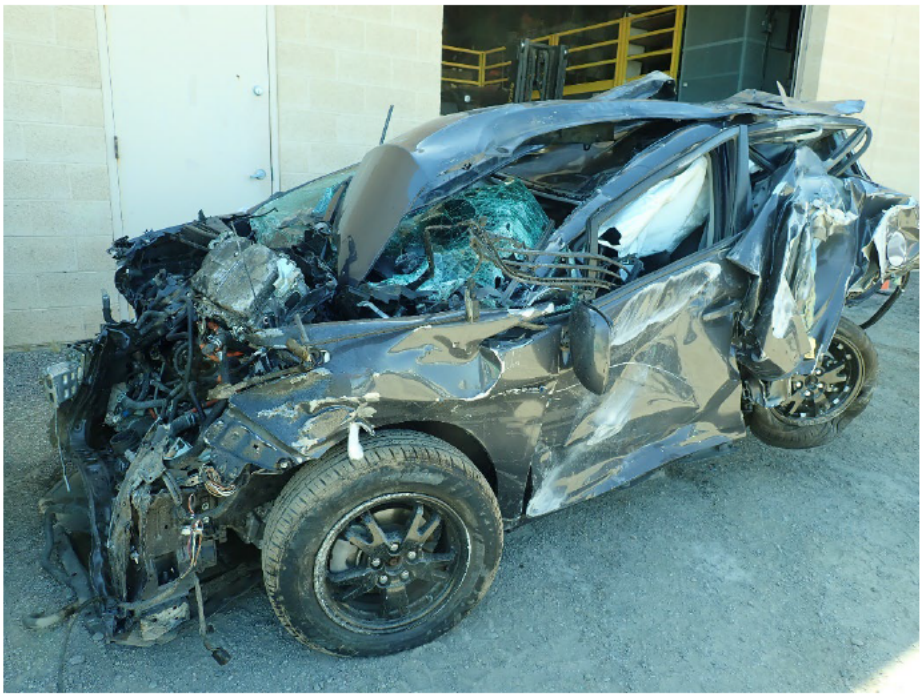

Figure 17 - Left-side view of the 2013 Toyota Prius showing extensive collision damage.

Figure 18 - A rear view of the 2013 Toyota Prius showing collision damage.

7.3. Tires

Table 8 includes the tire information documented on the Toyota Prius at the time of inspection.

Table 8 - Tire information for 2013 Toyota Prius

Front Axle	Left	Right
Tire Make/Model	Sentury	Sentury
Tire Size	195/65 R15	195/65 R15
Pressure (psi)	20 psi / max 44 psi	0 psi / max 44 psi
Tread Depth	6/32nd	9/32nd
DOT Number	TBRDAYSC3620	TBRDAYSC3620
Rear	**Left**	**Right**
Tire Make	Sentury	Sentury
Tire Size	195/65 R15	195/65 R15
Pressure (psi)	0 psi / max 44 psi	30 psi / max 44 psi
Tread Depth	9/32nd	7/32nd
DOT Number	TBRDAYSC3620	TBRDAYSC3620

8. Vehicle 8: 2016 Ford Fusion

8.1. General Information

VIN: 3FA6P0H73GR[redacted]
Manufacturer: Ford
Model: Fusion
Manufactured: 09/2015
Curb Weight: 3,434 lbs.

8.2. Damage Description

The front of the Fusion was crushed rearward to the front axle. The hood was displaced rearward to the windshield and roof area. The left side doors were missing as was the left side B-pillar. The rear fenders were both missing as was the rear bumper as shown in **Figure 19**. The trunk lid was torn away from its mounts and shifted right. The rear seats had been torn from the vehicle and were found on the ground to the rear of the Fusion as shown in **Figure 20.** The right front door was present, but the B-pillar was also missing.

Figure 19 – A left-side view of the 2016 Ford Fusion showing catastrophic collision damage.

Figure 20 - A left-side and rear view of the 2016 Ford Fusion showing catastrophic collision damage.

8.3. Tires

Table 9 includes the tire information documented on the Ford Fusion at the time of inspection.

Table 9 - Tire information for 2016 Ford Fusion

Front Axle	Left	Right
Tire Make/Model	Road Hugger/STP	Road Hugger/STP
Tire Size	P225/55 R17	P225/55 R17
Pressure (psi)	31 psi / max 51 psi	32 psi / max 51 psi
Tread Depth	3/32nd	5/32nd
DOT Number	00YPBYARZ0620	00YPBYARZ0620
Rear	**Left**	**Right**
Tire Make	Road Hugger/STP	Road Hugger/STP
Tire Size	P225/55 R17	P225/55 R17
Pressure (psi)	0 psi / max 51 psi	0 psi / max 51 psi
Tread Depth	3/32nd	8/32nd
DOT Number	00YPBYARZ0620	00YPBYARZ4520

9. State of Arizona truck weight requirements

State of Arizona Law 28-1100. Vehicles and loads; gross weight restrictions; exceptions[15]

A. Except as provided in subsection H of this section or section 28-1099, a person may operate a vehicle on all highways, including a toll facility as defined in section 28-7751, subject to the following maximum gross weights:

1. Twenty thousand pounds, including enforcement tolerances, on any one axle.

2. Thirty-four thousand pounds, including enforcement tolerances, on a tandem axle.

3. Eighty thousand pounds on a vehicle combination of five axles or more.

4. On a group of two or more consecutive axles, including any steering or castering axles, an overall gross weight, including enforcement tolerances, produced by application of the following formula in which W equals overall gross weight on any group of two or more consecutive axles to the nearest five hundred pounds, L equals distance in feet between the extreme of any group of two or more consecutive axles to the nearest foot and N equals number of axles in any group under consideration, except that two consecutive sets of tandem axles may carry a gross load of thirty-four thousand pounds each if the overall distance between the first and last axles of the consecutive sets of tandem axles is thirty-six feet or more if the overall gross weight does not exceed eighty thousand pounds, including all enforcement tolerances:

$W = 500 (LN/(N-1) + 12N + 36)$

[15] 28-1100 - Vehicles and loads; gross weight restrictions; exceptions (azleg.gov)

B. For the purposes of subsection A of this section, "tandem axles" means two or more consecutive axles that are more than forty inches but not more than ninety-six inches apart.

C. This section does not apply to a vehicle and load that cannot be easily dismantled or divided and that have been issued a special permit pursuant to section 28-1103.

D. It is not a defense in a prosecution for a violation of this section that a vehicle or vehicle combination is registered for a declared gross weight as defined in section 28-5431 in excess of the amount allowed under this section. The department shall not make an allowance or refund for fees paid for the weight in excess of the amount allowed under this section.

E. A single vehicle or a single vehicle of a combination of vehicles shall not be equipped with more than three axles, including the front steering axle, unless the additional axles are steering axles or castering axles. The limitation on the number of axles provided in this subsection does not apply to a vehicle operated with a permit issued pursuant to section 28-1103.

F. A vehicle or combination of vehicles equipped with one or more variable load axles shall have the pressure control preset and located outside of the cab so that the operator of the vehicle cannot vary the weight carried on the variable load axle or axles during transport of a load. The actuating control that raises or lowers the axle or axles may be located inside the cab for safety purposes. This actuating control must completely raise or completely lower the axle or axles when activated.

G. This section does not apply to a truck that meets all of the following requirements and for which a special permit has been issued pursuant to section 28-1103:

1. Is equipped with a conveyor bed.
2. Is used solely as a fiber and forage module mover.
3. Does not exceed forty-eight feet in length.
4. Is only operated each year from August 1 through January 30, unless the director extends the period of use.

H. The gross weight of a heavy-duty vehicle that is equipped with idle reduction technology and the gross weight imposed on the highway by the wheels of any one axle or axle group of the vehicle may exceed the weight limitation specified in subsection A of this section by not more than five hundred fifty pounds or the weight of the idle reduction technology, whichever is less. This subsection only applies if the heavy-duty vehicle operator, on request, proves by written certification the weight of the idle reduction technology and, by demonstration or certification, that the idle reduction technology is fully functional at all times. For the purposes of this subsection, "heavy-duty vehicle" and "idle reduction technology" have the same meanings prescribed in 42 United States Code section 16104a.

I. The gross weight of a vehicle operated by an engine fueled primarily by natural gas, battery electric, or hydrogen and the gross weight imposed on the highway by the wheels of any one axle or axle group of the vehicle may exceed the weight limitation specified in subsection A of this section, but may not exceed eighty-two thousand pounds or an amount that is equal to the difference between the weight of the vehicle attributable to the natural gas tank and fueling system

or battery electric or hydrogen fuel cell electric fueling system and the weight of a comparable diesel tank and fueling system, whichever is less.

D. DOCKET MATERIAL

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

LIST OF ATTACHMENTS

Vehicle Factors Attachment - United Dairyman of Arizona, invoice #38211609.

Vehicle Factors Attachment - Scale Tickets.

Vehicle Factors Attachment - Driver Vehicle Inspection Reports.

Vehicle Factors Attachment - Truck-Tractor Annual Vehicle Inspection Report.

Vehicle Factors Attachment - Tank-Trailer Annual Vehicle Inspection Report.

Vehicle Factors Attachment - Claim DLXD2019A651T.

END OF INFORMATION

David Pereira
Vehicle Factors Group Chairman