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

HWY23FH014

MOTOR CARRIER/HAZARDOUS MATERIALS

Group Chair's Factual Report

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Location: Philadelphia, Philadelphia County, Pennsylvania
Date: June 11, 2023
Time: 6:17 AM (Eastern)

B. MOTOR CARRIER/HAZARDOUS MATERIALS GROUP

Group Chair	Shawn Currie National Transportation Safety Board Washington, D.C.
Group Member	Donald Orye Federal Motor Carrier Safety Administration Richmond, VA
Group Member	Keiran Stewart Pipeline and Hazardous Materials Safety Administration Washington, D. C
Group Member	Gerard McShea, Captain Pennsylvania State Police/Troop K Philadelphia, PA

C. CRASH INFORMATION AND SUMMARY

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

D. DETAILS OF THE INVESTIGATION

This investigative report addresses the motor carrier history and operation of the 2017 International truck tractor (Unit# 2334) in combination with a 2004 Heil cargo tank trailer (Unit# 4920) involved in this crash. This report also documents the management safety practices of Penn Tank Line Inc. (the carrier), employment history of the driver, Federal and State oversight, regulatory applicability and compliance.

1.0 Overview of Penn Tank Lines Incorporated

The carrier responsible for safety in the crash is Penn Tank Lines Incorporated (Penn). Penn's headquarters is based in Chester Springs, Pennsylvania. Penn has been in business for about 49 years. According to the Federal Motor Carrier Safety Administration's (FMCSA) Motor Carrier Information System (MCMIS), Penn was issued USDOT number 264473 on September 13, 1985. Penn was registered as an Interstate "for-hire" carrier of building materials, liquid/gases, intermodal containers, paper products and as a carrier for bulk flammable and combustible hazardous materials (HM) loads.[1] Penn also had an active operating authority and had been issued Motor Carrier (MC) number 290005. Per Penn's latest MCS-150, Penn's fleet consisted of 154 owned truck tractors, 386 term leased truck tractors, 94 owned semitrailers, 460 owned HM cargo tank trailers, 42 term leased HM cargo tank trailers. Penn employed 530 drivers.[2]

At the time of the crash, Penn had 31 satellite locations which consisted of actual office space and/or parking areas. The following locations had actual physical buildings: Birmingham, AL; Montgomery, AL; Fort Lauderdale, FL; Indianapolis, IN; Doraville, GA; Bainbridge, GA; Tampa, FL; Orlando, FL; Pennsauken, NJ; Allentown, PA; Mechanicsburg, PA; Coraopolis, PA, Washingtonville, PA; Fairfax, VA; Knoxville, TN; Nashville, TN; Austin, TX; North Augusta, SC and Portsmouth, NH.

1.1 Crash Trip

The truck in this crash was traveling from the Buckeye Partners Terminal, 1050 Christiana Ave., Wilmington, DE, to the Wawa Convenience Store, 7913 Oxford Ave., Philadelphia, PA, 42.1 miles away, with a projected travel time of 1 hour and 13 minutes, via Interstate 95 under normal traffic conditions.[3] The intent of the trip was for the driver to deliver his whole load of gasoline to the Oxford Avenue location.

The driver had started his shift at TK Transport's lot in Pennsauken, New Jersey at about 10:41 p.m. on June 10th. From there he had completed two separate trips after picking up his trailer in Pennsauken. The first trip was from Paulsboro, New Jersey, to a Wawa in South Hampton Township, Pennsylvania, on June 10th. The second trip was from Philadelphia, Pennsylvania, to another Wawa in Lansdale, Pennsylvania. This trip started about 2:40 am on June 11th.

[1] Penn Tank Lines was subject to both the FMCSRs and the HM Regulations 49 CFR Parts 171-185.
[2] Motor Carrier Attachment – MCS-150 Dated 06/14/23
[3] Google Maps

1.2 Carrier Responsible for Safety

The truck in this crash was owned by the driver, who was doing business under the name of AJBM LLC. AJBM listed an address of the driver's home and was a single vehicle operation and did not have a USDOT number. The truck tractor was leased to TK Transport Incorporated (USDOT 535505) of Pennsauken, New Jersey. TK Transport was then leased to Penn. TK Transport did not have nor was it required to have valid operating authority. TK Transport's USDOT was issued for registration purposes only. Penn was responsible for regulatory compliance and the safety of all leased carriers and vehicles.[4] Penn paid TK and TK paid the driver. Penn was ultimately responsible for the vehicle and its driver.

1.3 Management Safety Practices

Penn had numerous written policies and procedures covering general safety topics and operation of commercial vehicles and a formal hiring process and detailed training driver program. All of Penn's policies, procedures, standards and processes were utilized both for its drivers and any drivers employed by Penn's leased companies such as TK Transport. [5]

1.3.1 Hiring Process

Penn had a recruiting department that advertised open driver positions on the web. The minimum standards for potential employees included:

- At least 23 years old
- 1 year of flatbed experience (flatbed drivers)
- 2 years of tanker experience (HM tanker drivers) (preferred not required)
- Hazardous Materials and Tank endorsement[6]

If the applicant met these requirements, the applicant was directed to complete an application on Tenstreet.[7] Prior to any of the following portions of the formal vetting process, Penn interviewed the candidate to assess general qualification status and requisite experience. Then, if deemed sufficient, an applicant would be asked to complete the Tenstreet application. Included in the application was an electronic authorization to pull a motor vehicle record, drug and alcohol clearinghouse query, and, later in the process, a background check; Penn used a review of these materials against other criteria before the applicant moved to any further stage of the vetting

[4] 49 CFR 376.12 explains the leasing process and contents of a lease.
[5] Policies will be covered further in Section 1.3.3
[6] 49 CFR 383
[7] Tenstreet - Software That Connects Drivers and Carriers]

and hiring process. The recruiter would conduct a motor vehicle records check, criminal background check and check FMCSA's drug and alcohol clearinghouse.[8]

If the applicant passed these steps, the applicant would be subject to a pre-employment-controlled substance test and begin the training program as a driver trainee.

The hiring process was separated into two categories, Penn employees and independent contractors (drivers hired by leased carriers). Both had the same requirements. An independent contractor would have the additional step of having the independent contractor's truck tractor be approved to Penn's standards in the case of this driver and truck it was verified by TK's manager, the director of maintenance and the regional director. The truck tractor process included ensuring it met size and weight requirements along with general safety related compliance.

1.3.2 Driver Training Process

Penn's internally developed training process for a driver trainee, that this driver was subject to, was two weeks minimum (80 hours). The training was a combination of classroom instruction, instructional videos, meetings with terminal management and on-the-job training observed by lead driver trainers. The training was conducted by TK employees to the established Penn standards. A lead driver trainer (LDT) was an internally certified resource for the driver trainee (DT). The LDT's responsibilities were to observe, review and complete daily observation reports evaluating the DT's performance on certain tasks. The LDT and DT utilized a training manual that outlined what was to be covered and when it was to be introduced.[9] The manual also included quizzes and other job knowledge tasking to ensure that the DT understood and retained the lessons from training.

After the DT had completed the minimum of 80 hours of training, the trainee graduated and was placed on 90 days of probation. After at least 60 days, the LDT would have been required to complete another observation period where trainee graduate questions would be answered, or corrections be made to the trainee graduate's performance.

1.3.3 Policies and Procedures

Penn had the following policies and procedures in place at the time of the crash.

- Drug and alcohol policy
- Speed policy
- Cellular phone prohibition policy

[8] Drug & Alcohol Clearinghouse (dot.gov)
[9] Motor Carrier Attachment - LDT-DT Training Manual 2023

- Policy on use and care of personal protective equipment
- Equipment Inspection Policy
- Vapor recovery system procedures
- Policy on manhole cover inspections

Penn's speeding policy stated that where speed limits were greater than 65 mph, drivers were limited to 65 mph. Penn did not electronically limit the speed of its vehicles. Penn did have an alert set if the vehicle exceeded 68 mph for greater than 30 seconds. If the vehicle exceeded that threshold, an email alert would be sent to the safety department as the event occurred.

1.3.4 Awards and Disciplinary Program

Penn utilized a "12-point" system to help manage driver performance. The system and points were measured over a one-year period. A driver would be issued points for violations of policies or other safety related issues. For example, if a driver were to misload a trailer or make a mistake in delivering to a customer, they were issued 2-3 points, if they backed into a fence or other object, they would be issued points that would vary depending on circumstances and repair cost. As drivers accumulated points, the terminal manager or safety representative would have an engaged conversation with the driver about the issue and possibly schedule the driver for retraining. The purpose of the program was to attempt to make "positive changes" in driver's behavior. If a driver accumulated 12 points within the year time limit, they would be disqualified from operating company vehicles and dismissed. Penn's disciplinary program also had a "cardinal sin" policy in which the driver would be dismissed from service if the driver had a preventable rear-end collision or other incident the company determined was serious in nature.

Penn also had a driver's award system in place. At the time of the crash, all drivers without safety violations were placed into a pool for a potential bonus. Penn was in the process of revamping this awards program to award safety bonuses to all drivers without any accumulated points each quarter. If a driver did not accumulate points for all four quarters of the year, they would be included in a yet undecided safety award event. The driver involved in this crash had not accumulated any points in his tenure with the carrier.

1.3.5 Safety Staff

Penn had a dedicated safety staff responsible for safety of Penn and its affiliated leased carriers. The staff worked for the director of risk management and consisted of three compliance personnel and five field safety supervisors. The compliance

personnel were responsible for maintaining effective participation in Penn's environmental, health and safety (EHS) programs, maintaining and enforcing compliance with all company and applicable government regulations and rules. The field safety supervisors' responsibilities were to maintain effective communication about Penn's EHS commitment within and outside of the carrier. They performed education and training programs and provided loss management duties to include loss event investigation and emergency response duties.

1.4 Controlled Substance and Alcohol

Penn had an established controlled substance and alcohol testing program. Penn provided copies of their annual drug and alcohol testing for the past four quarters. The controlled substance testing program met the regulatory requirements under 49 CFR 382.305. Penn also had on file an inquiry into the FMCSA Drug and Alcohol Clearinghouse for the crash-involved driver, which was negative for any positive drug tests.[10] Current regulations require a Drug and Alcohol Clearinghouse inquiry and review. The crash driver had a negative pre-employment-controlled substance test on file.

1.5 Hours of Service

As of December 18, 2017, 49 CFR 395 required carriers to install and maintain an Electronic Logging Device (ELD) to track the driver's hours of service.[11] An ELD is a device or technology that automatically records a driver's driving time and facilitates the accurate recording of the driver's hours of service.

There are certain parameters that would allow carriers to be exempt from the ELD requirements. These parameters include operating a commercial vehicle in a manner requiring completion of a record of duty status on not more than 8 days within any 30-day period; in a driveaway-towaway operation in which the vehicle being driven is part of the shipment being delivered; in a driveaway-towaway operation in which the vehicle being transported is a motor home or a recreation vehicle trailer; or in a commercial vehicle manufactured before model year 2000. The carrier was not required to have an ELD because of the Short Haul operations in 49 CFR 395.1(e), but Penn Tank Lines did utilize an ELD.

[10] The Federal Motor Carrier Administration (FMCSA) established the Commercial Driver's License (CDL) Drug and Alcohol Clearinghouse (Clearinghouse). This database contains information pertaining to violations of the U.S. Department of Transportation (DOT) controlled substances (drug) and alcohol testing program for holders of CDLs. For additional information see: Commercial Driver's License Drug and Alcohol Clearinghouse | FMCSA (dot.gov).

[11] https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&ty=HTML&h=L&mc=true&=PART&n=pt49.5.395

Penn used a tablet based ELD with Omnitracs as the provider to account for the driver's hours of service (HOS).[12] This was verified through an electronic transmission of ELD data and was also confirmed by the carrier. The ELD provider was self-certified and was on FMCSA's approved device list.

2.0 Federal Oversight/Federal Motor Carrier Safety Administration (FMCSA)

2.1 CSA and SMS

In 2010, the FMCSA introduced the Compliance, Safety, Accountability (CSA) system as an initiative to improve large truck and bus safety and ultimately reduce crashes, injuries, and fatalities that are related to Commercial Motor Vehicles (CMVs). It introduced an enforcement and compliance model that allows the FMCSA and its state partners to contact a larger number of carriers earlier to address safety problems before crashes occur. Along with CSA, the FMCSA also rolled out an operational model called the Safety Measurement System (SMS), which replaced its predecessor, known as the SAFESTAT model. SMS uses a motor carrier's data from roadside inspections, (including all safety-based violations), state-reported crashes, and the Federal Motor Carrier Census to quantify performance in the following Behavior Analysis and Safety Improvement Categories (BASICs).

2.2 CSA BASICs[13]

- **Unsafe Driving** – Operation of CMVs by drivers in a dangerous or careless manner. *Example violations:* Speeding, reckless driving, improper lane change, and inattention. (FMCSR Parts 392 and 397)

- **Hours-of-Service (HOS) Compliance** – Operation of CMVs by drivers who are ill, fatigued, or in non-compliance with the HOS regulations. This BASIC includes violations of regulations pertaining to records of duty status (RODS) as they relate to HOS requirements and the management of CMV driver fatigue. *Example violations:* false HOS RODS and operating a CMV while ill or fatigued. (FMCSR Parts 392 and 395)

- **Driver Fitness** – Operation of CMVs by drivers who are unfit to operate a CMV due to lack of training, experience, or medical qualifications. *Example violations:* Failure to have a valid and appropriate commercial driver's license (CDL) and being medically unqualified to operate a CMV. (FMCSR Parts 383 and 391)

- **Controlled Substances and Alcohol** – Operation of CMVs by drivers who are impaired due to alcohol, illegal drugs, and misuse of prescription

[12] Fleet Management Software Solutions | Omnitracs
[13] CSA Methodology retrieved from www.fmcsa.dot.gov

or over-the-counter medications. *Example violations:* Use or possession of controlled substances/alcohol. (FMCSR Parts 382 and 392)

- **Vehicle Maintenance** – Failure to properly maintain a CMV and/or properly prevent shifting loads. *Example violations:* Brakes, lights, and other mechanical defects, failure to make required repairs, and improper load securement. (FMCSR Parts 392, 393, and 396)

- **Hazardous Materials (HM) Compliance** – Unsafe handling of HM on a CMV. *Example violations:* Release of HM from package, no shipping papers (carrier), and no placards/markings when required. (FMCSR Part 397 and Hazardous Materials Regulations Parts 171, 172, 173, 177, 178, 179, and 180)

- **Crash Indicator** – Histories or patterns of high crash involvement, including frequency and severity based on information from state-reported crashes.

  A carrier's measurement for each BASIC depends on the following:

  - The number of adverse safety events (violations related to that BASIC or crashes).

  - The severity of violations or crashes.

  - When the adverse safety events occurred (more recent events are weighted more heavily).

After a measurement is determined, the carrier is then placed in a peer group (i.e., other carriers with similar numbers of inspections and carrier size). Percentiles from 0 to 100 are then determined by comparing the BASIC measurements of the carrier to the measurements of other carriers in the peer group. A percentile of "100" indicates the worst performance.

The FMCSA established threshold levels that would require agency action. Unsafe Driving, HOS, and Crash BASICs were set at lower thresholds because of their inherent risk. Additionally, passenger carriers and hazardous materials carriers have lower thresholds than all other carriers because of their inherent risk. **Table 1** represents the thresholds set by the FMCSA that help prioritize agency intervention and resource management.[14]

[14] Retrieved from www.fmcsa.dot.gov

Table 1 - Basic Thresholds[15]

BASIC	Passenger Carrier	HM Carrier	All Other Motor Carriers
Unsafe Driving, HOS, Crash	50%	60%	65%
Driver Fitness, Drug & Alcohol, Maintenance	65%	75%	80%
Hazardous Materials	80%	80%	80%

On a carrier's SMS profile, which is publicly available on the SAFER website for only passenger carriers, an alert symbol ⚠ is displayed in any designated BASIC where the carrier has exceeded the corresponding threshold.[16] This is also referred to as having an "alert" in a BASIC.

At the time of the crash, the Penn displayed an alert in the crash indicator BASIC as their threshold exceeded the 60th percentile and was stated to be 76%. The SMS profile also shows that at the time of the crash, Penn's driver out of service rate was 1.1 percent, hazardous materials out of service rate was 1.1 percent and the vehicle out of service rate was 12 percent. These rates were in comparison to the national averages of 6.0 percent. 4.5 percent and 21.4 percent, respectively. This information was based upon 597 roadside inspections between June 30, 2022 and June 11, 2023.

Since becoming a carrier, Penn had been subject to eight interventions by FMCSA prior to this crash. Penn had never been subject to a New Entrant Safety Audit as they had obtained their operating authority prior to the implementation of the program.

A compliance review (CR) is an enforcement intervention, which includes offsite investigations, onsite focused investigations, and onsite comprehensive investigations. Offsite investigations are the recommended intervention type for carriers with up to two BASICs that require investigation, unless it is determined that the carrier requires an onsite investigation. For carriers with more than two (2) BASICs that require investigation:

- Offsite investigations may be conducted on non-hazardous materials (HM) carriers with up to five (5) BASICs or HM carriers with up to six (6) BASICs (excluding the Vehicle Maintenance BASIC), unless it is determined that an onsite comprehensive investigation is required.
- Onsite focused investigations may be conducted on non-HM carriers with up to five (5) BASICs or HM carriers with up to six (6) BASICs, unless it is determined that an onsite comprehensive investigation is required.

[15] Retrieved from http://csa.fmcsa.dot.gov/FAQs.aspx.
[16] FMCSA BASIC information publicly available for Passenger and Hazardous Material carriers only. See additional information at the FMCSA Safer website: http://safer.fmcsa.dot.gov/CompanySnapshot.aspx.

- Onsite comprehensive investigations are required when all six (6) BASICs are investigated for a non-HM motor carrier or if all seven (7) BASICs are investigated for an HM motor carrier.

Offsite investigations and onsite focused investigations normally do not result in a safety rating and are usually classified as "non-rated" when completed, however they may result in an adverse safety rating (conditional or unsatisfactory) at the conclusion of the investigation. A comprehensive investigation addresses all aspects of a carrier's operation and normally results in a safety rating. The safety rating is determined by the FMCSA using safety rating methodology outlined in 49 CFR 385.5 which evaluates patterns of critical and acute violations.[17] **Table 2** summarizes Penn's CR history to include the post-crash CR.

Table 2 - Compliance Reviews

Type of CR	Review Date	Safety Rating
On Site Focused review - Significant crash	07/11/2023	Non-rated
Hazardous Materials Review	02/01/2022	Non-rated
Compliance Review	10/18/2017	Non-rated
Compliance Review	02/04/2016	Non-rated
Cargo Tank Facility Review	08/01/2004	Non-rated
Compliance Review	08/03/2004	Non-rated
Compliance Review	10/11/2000	Satisfactory
Compliance Review	09/12/1996	Satisfactory

[17] Acute violations are those identified where non-compliance is so severe as to require immediate corrective action by the motor carrier regardless of the overall safety posture of the carrier. Critical violations relate to management and/or operational controls that show a pattern of non-compliance. A list of acute and critical violations is listed in Appendix B of 49 CFR 385.

Compliance Review	10/11/1995	Satisfactory

FMCSA safety investigators completed an on-site focused investigation on July 11, 2023.

As a result of the post-crash compliance review, FMCSA discovered the following violations. None of the violations annotated in **Table 3** were attributed to this crash, vehicle or driver and have no relationship to this crash. The open manhole that is discussed in Section 5.1 was not included this CR as the violation was discovered after the CR had been closed out.

Table 3 - Post-crash Compliance Review Violations

Violation	49 CFR Section
Transporting hazardous materials in a package which has an identifiable release of the hm to the environment	173.24(b)(1)
Allowing a driver to operate a commercial motor vehicle that does not possess a current CDL	383.37(a)
Using a specification cargo tank not marked, maintained, reconditioned, repair or retested in accordance with the applicable cargo tank spec	171.2(g) and 180.3(a)
Failing to revise and/or update the security plan at least annually or due to changing circumstances	172.802(c)
Failing to retain a cargo tank manufacturer's data report, certificate and related papers, as required	180.417(a)(1)
Failing to prepare and maintain on file a record stating the reasons the alcohol post-accident test was not properly administered	382.303(d)(1)
Failing to conduct an annual inquiry	382.701(b)(1)
Making or permitting a driver to make, a false report regarding duty status	385.8(e)(1)

A notice of claim against Penn was served with a proposed civil penalty of $73,260 through FMCSA's Eastern Service Center.

3.0 State Oversight/Commonwealth of Pennsylvania

The primary enforcement agency for commercial vehicle rules and regulations in Pennsylvania is the Pennsylvania State Police (PSP). Members of the Pennsylvania Public Utilities Commission (PUC) and select municipal police agencies assist in the goal of commercial vehicle safety. The FMCSA provides funding to the PSP through the Motor Carrier Safety Assistance Program (MCSAP) to conduct roadside inspections[18] and intrastate compliance reviews.[19] The PUC also receives MCSAP funding to conduct New Entrant Safety Audits.

PSP as the lead agency had 362 personnel involved in the MCSAP program in fiscal year 2023. PUC had 30 personnel and there were 234 certified MCSAP inspectors spread across other jurisdictions. These agencies combined inspect approximately 100,000 commercial vehicles per year within Pennsylvania. [20]

Section of Pennsylvania Vehicle Code (Title 75) incorporates by reference the Federal Motor Carrier Safety Regulations, and thus, the federal regulations are enforced by state personnel.

Neither the PUC nor PSP conducted any post-crash compliance review of the Penn as it was conducted by FMCSA.

4.0 Truck Driver

The driver in this crash was a 53-year-old male from Philadelphia, Pennsylvania.

4.1 Driver Qualification

The driver held a valid Pennsylvania Class A commercial driver's license (CDL) with endorsements for tanker, hazardous materials, and double/triple trailers. The driver was restricted from operating Class A passenger vehicles.[21] The driver had obtained his commercial drivers permit in August 2003, and then upgraded to his CDL on November 10, 2003, giving the driver almost 20 years of commercial driving experience.

The driver had a valid two-year USDOT medical certificate that was issued by a certified medical examiner, listed on FMCSA's National Registry of Certified Medical Professionals, in October 2021 and was due to expire in October 2023.[22] For further information about the medical certificate, experience and history refer to the public

[18] Inspections - CVSA – Commercial Vehicle Safety Alliance
[19] eCFR :: 49 CFR 350.201 -- What is MCSAP?
[20] Pennsylvania FY23 CVSP Final.pdf (dot.gov)
[21] License Types & Restrictions (pa.gov)
[22] National Registry of Certified Medical Examiners | FMCSA (dot.gov)

docket for this case. The driver had recent hazardous materials training as required by 49 CFR 172.204.[23]

4.2 Driver's Work History

The driver had several safety sensitive/commercial vehicle driver jobs prior to working for Penn. These jobs were listed in his application provided to Penn. The employers and date of employment are listed below in **Table 4**.

Table 4 - Driver's prior employment

Employer	Dates of Employment
Riggins Inc	September 2018 to September 2021
Foodliner	June 2017 to September 2018
7 Oil Company Inc	May 2016 to August 2017
JB Hunt	September 2014 to May 2016
Westermann Express	September 2011 to August 2014

The driver was hired for his current position on October 7, 2021.

4.3 Driver's Controlled Substance and Alcohol Testing

The driver had submitted to a pre-employment-controlled substance test on October 12, 2021. That test showed negative results. The driver had not been subject to any other test for controlled substances or alcohol prior to the crash. For post-crash testing results see additional information located in the public docket for this case.

4.4 Driver's Hours of Service

The driver in this crash was utilizing an ELD to account for his HOS. Penn's safety personnel stated the driver commonly worked from about 10pm to about 8am, Sunday through Thursday. For further information on the driver's hours of service refer to the *Human Performance Group Chair's factual report*. Table 5 is a summary of the ELD information.

Table 5 - Driver's Hours of Service

Date	Hours driving/on-duty
Saturday, June 3, 2023	01 hour 13 minutes
Sunday, June 4, 2023	10 hours 32 minutes
Monday, June 5, 2023	09 hours 34 minutes
Tuesday, June 6, 2023	07 hours 37 minutes
Wednesday, June 7, 2023	09 hours 20 minutes

[23] Hazmat Transportation Training Requirements (dot.gov)

Thursday, June 8, 2023	08 hours
Friday, June 9, 2023	00 hours
Saturday, June 10, 2023	01 hour 18 minutes
Sunday, June 11, 2023	06 hours 15 minutes * Crash

5.0 Hazardous Materials

In this crash Penn was transporting UN1203, Gasoline, a Class 3 flammable liquid in Packing Group II.[24] According to the shipping papers provided by Penn, the tank trailer had been loaded at the Buckeye Terminal in Wilmington, Delaware with 8,499 gallons of gasoline. The gasoline was split between four separate compartments in the Specification DOT 406 aluminum tank trailer. The compartments were designated 1-4 from front to back of the tank trailer.

Table 6 - Compartments/Amounts

Compartment	Gallons/Octane
1	2499 gallons/87 Octane
2	1700 gallons/87 Octane
3	1500 gallons/93 Octane
4	2800 gallons/87 Octane

5.1 Hazardous Materials Package

The tank trailer in this crash was manufactured by the Heil Company of Athens, Tennessee.[25] The trailer was designed to Specification DOT 406. These low-pressure cargo tank trailers are commonly utilized to transport petroleum products. General design and construction requirements applicable to Specification DOT 406 cargo tanks are found in 49 CFR 178.345 and 49 CFR 178.346.[26] These regulations cover the manufacturing specifications and components required for the cargo tank. The cargo tank was constructed of ASTM B-209 5454 aluminum alloy and had a working pressure of 3.3 psig.[27] These cargo tanks are required to have a specification plate affixed adjacent to the front head of the cargo tank that shows the specifications and other information. Per 49 CFR 178.346-2 (table II), the required minimum thickness of the cargo tank's shell was required to be 0.173 inches of aluminum alloy. Due to the extreme damage to the cargo tank involved in this crash, the specification plate was not available for inspection. Investigators reviewed the latest cargo tank retest and recertification paperwork for the cargo tank completed on December 5, 2022. The

[24] 49 CFR 172.101
[25] Petroleum | Heil (heiltrailer.com)
[26] eCFR:: 49 CFR Part 178 -- Specifications for Packaging
[27] PSIG stands for pounds per square inch gauge. Gauge pressure is pressure relative to atmospheric pressure.

following information was obtained. Table 7 summarizes the specification plate information.

Table 7 - Specification Plate Information

DOT Specification	406
Material	5454-H32
Manufacturer	Heil
Date of Manufacture	10/2003
Maximum allowable working pressure/Design Pressure	3.3 PSI
Test Pressure	5 PSI
Compartment 1 Size (front to rear)	2600 gallons
Compartment 2 Size	2200 gallons
Compartment 3 Size	1500 gallons
Compartment 4 Size	2900 gallons
Total Capacity	9200 gallons
Double Bulkheads	Yes
Insulated	No

Figure 1 shows a side view of a Spec 406 cargo tank with nomenclature labeled.

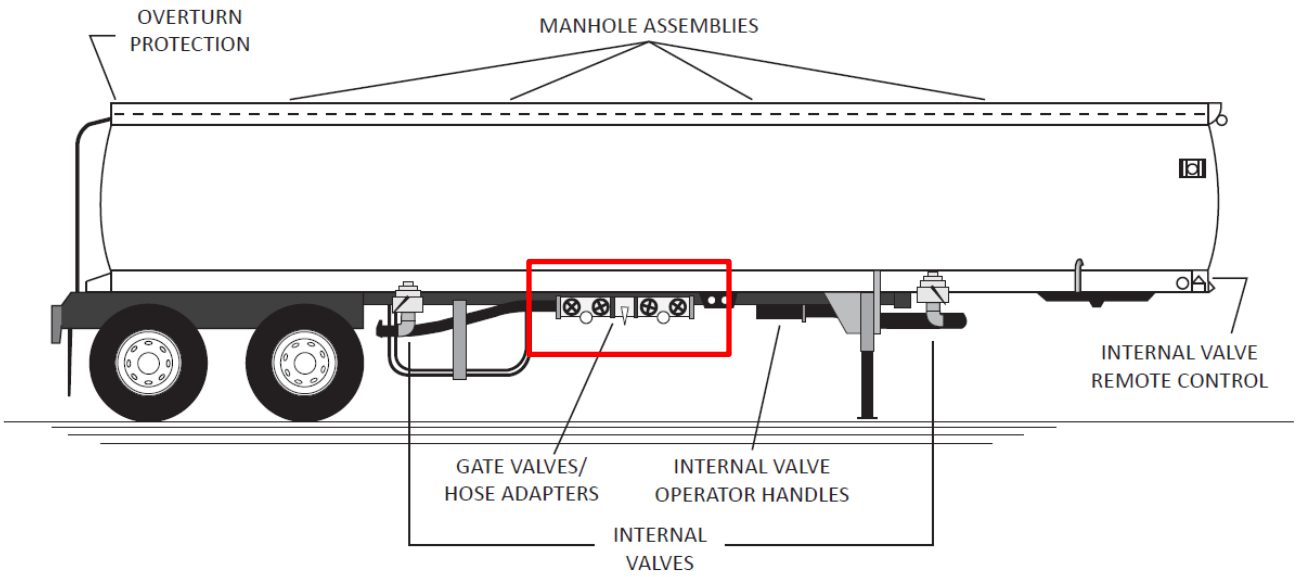

Figure 1 - Specification 406 Cargo Tank (Source: FMCSA)

As shown in **Figure 1**, there are manholes with manhole cover assemblies on the top of the cargo tank. These manholes are utilized for cleaning, inspection or top loading of certain commodities. For the cargo tank involved in this crash, the gasoline

was loaded through the bottom loading lines designated by the red box. The internal valves and internal valve remote control would be utilized to close or open the valves located within the cargo tank **Figure 2** shows a closeup view of a manhole assemble with the nomenclature labeled. A "Scully overfill" is a sensor on a stalk that extends into the tank to notify operator when the product is reaching near overfull, commonly known as a "Scully sensor."

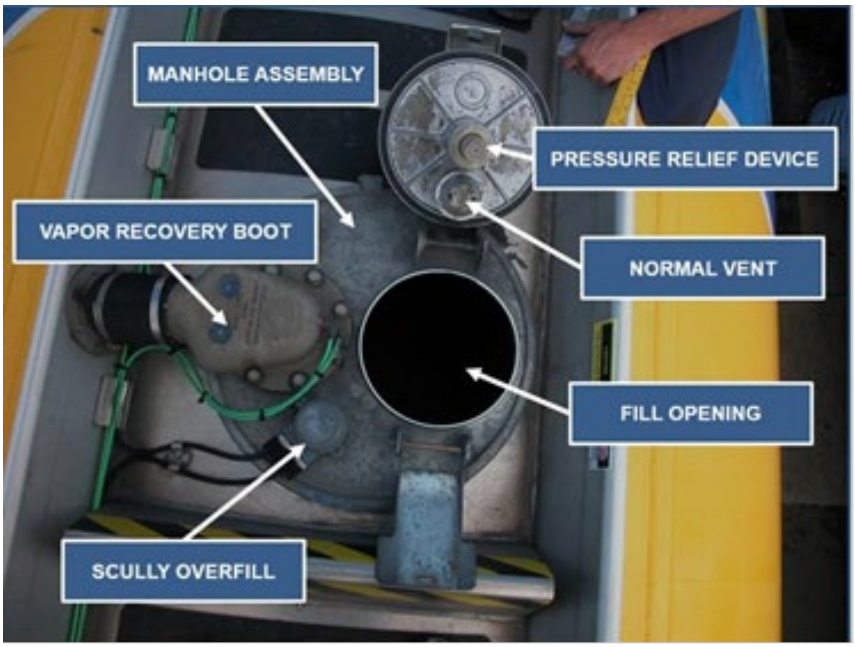

Figure 2 - Manhole Assembly

As part of this investigation, NTSB investigators examined the security video from the Buckeye loading facility in Wilmington, Delaware, where the driver received his last load of product prior to the crash. Video evidence indicated, the cargo tank was placarded and marked with Flammable Liquid placards, and the United Nations (UN) identification number 1203 was displayed on a panel within those placards. NTSB investigators noted that the manhole closure for Compartment #1 (forward most) of the cargo tank was open when the vehicle arrived at the terminal and remained opened throughout the loading process and when the truck left the loading facility onto the highway. Under 49 CFR 177.834(j)(1) it is required that all manhole closures be closed and secured while in transport. **Figure 3** shows the open manhole of compartment #1 that was discovered by NTSB investigators' review of the Buckeye security video.

Figure 3 - Open Manhole Compartment #1 (Source: Buckeye Terminal)

Penn officials provided the following measurements: Compartment #1's interior measured 62.5 inches from bottom to top. The measurement from the bottom of the compartment to the scully sensor was 58.5 inches. At the temperature and amount of gasoline in the compartment at the time of the crash, the top of the gasoline was calculated to be at 55.0 inches, 3.5 inches below the Scully sensor and 7.5 inches from the top of the compartment.

5.2 Pre-Trip Inspection Policies

Penn trained all of its drivers when they were initially hired on how to perform a pre-trip inspection to include the drivers from leased carriers. Penn has additional safety personnel who conduct random safety audits. These personnel visit each terminal and inspect all of the assigned equipment. Since 2013, Penn has had a random tag audit program. Units are "green tagged" on specific components that would normally be inspected during a pre-trip inspection. The green tag includes instructions and a number to call and report discovery of the tag. If the tags are not brought to attention of maintenance, Penn would know that a driver is not conducting a proper inspection.

In addition to the above, all equipment is inspected every 30 days to ensure compliance with USDOT regulations and, at that time, any violations found would be addressed with the driver to make certain the procedures were being performed correctly.

Penn had two policies that address manhole covers and the inspection of the manhole cover area. The first is the *Equipment Inspection Policy* dated February 2, 2022. Page 1 of the policy includes tank manhole cover in the list of regulations, and page 3 states "…make sure all lids are down and secured." Penn also has a specific *Manhole Cover Inspection Policy* dated 2022. This policy outlines the importance of checking the manhole covers, requires that the driver conduct an inspection of the covers during the pre-trip inspection which would occur at the beginning of the trip or when a new trailer is attached to the truck tractor, and outlines a specific inspection procedure utilizing a mirror to view the top of the cargo tank. The policy states that the driver is forbidden from climbing on top of the cargo tank with few exceptions. Per company policy the driver was required to report any manhole cover issue to the shop or dispatch immediately. The driver had acknowledged that he had received training on the use of a retractable mirror for the purposes of inspecing the manhole covers on April 28, 2022.[28]

NTSB investigators reviewed photographs of the Penn inspection process described in their manhole inspection policy. **Figure 4** shows a view of the top of the cargo tank viewed through the mirror as seen by the inspector. **Figure 5** shows and example where the manhole cover is open on Compartment #1 similar to the cargo tank involved in this crash.

[28] Motor Carrier Attachment – Manhole cover inspection policy acknowledgment.

Figure 4 - View through inspection mirror (TK Transport)

Figure 5 - View of the top of trailer with open manhole indicated by yellow arrow (TK Transport)

5.3 Cargo Tank Maintenance and Recertification

Penn was able to produce records for the cargo tank trailer. 49 CFR 180.407 sets the requirements for the testing and requalification of specification cargo tanks. This section requires certain tests at certain intervals for the cargo tank to be considered a valid specification cargo tank. If for any reason the specification cargo tank fails the inspection and is unable to meet the standards or not repaired and retested with a passing examination, the specification plate must be covered or otherwise removed, and the cargo tank would no longer be able to haul commodities requiring a specification package.

These tests, intervals and abbreviations for a Specification 406 cargo tank are listed in Table 8 below.

Table 8 - Tests, Intervals and Abbreviations

Test	Interval	Abbreviation
External visual inspection	1 year	V
Internal visual inspection	5 years	I
Pressure test	5 years	P
Leakage test	1 year	K

The cargo tank involved in this crash had its external visual inspection, pressure and leakage tests completed December of 2022. The internal inspection was completed in December of 2019. All inspections were completed by an authorized inspector at a cargo tank retest facility.[29]

6.0 Scene Observations

At the scene of the crash, fire and bridge collapse, NTSB investigators were able to observe the remains of the cargo tank. After removal of the debris from the bridge, the top of the cargo tank was observed to be top down on the road surface with approximately 1 to 2 feet of aluminum visible and the two axles near the rear of the debris. Some of the manhole assemblies were present but were damaged in recovery making it impossible to match manhole assemblies with compartments or to determine if they were or not secured.

E. DOCKET MATERIAL

The following attachments have been included in the docket for this investigation:

Attachments

- Motor Carrier Attachment – MCS-150 Dated 06/24/2023
- Motor Carrier Attachment – LDT – DT Driver Training Manual 2023
- Motor Carrier Attachment – Manhole cover inspection policy acknowledgement.

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[29] Authorized inspector is defined by 49 CFR 171.8