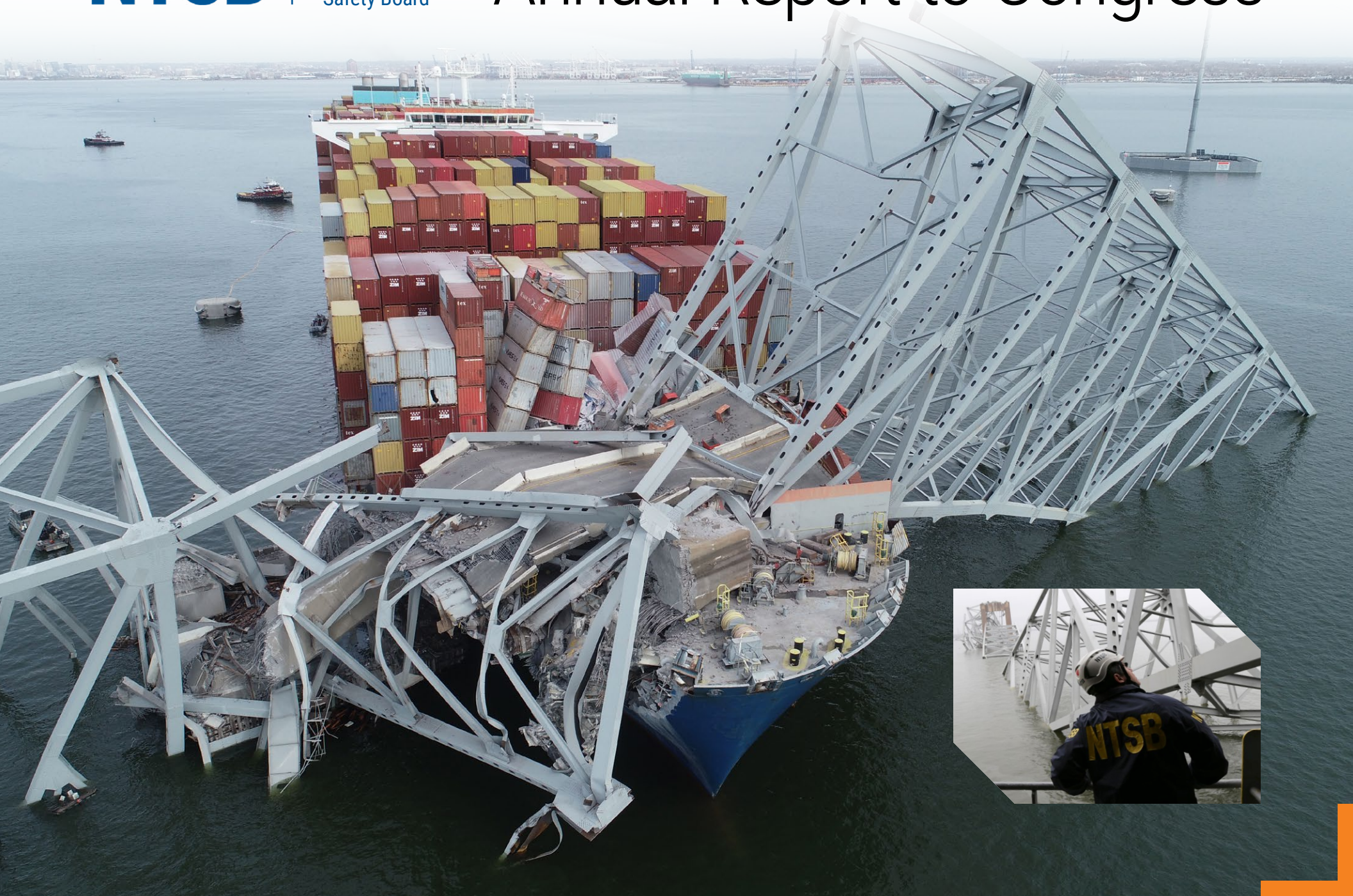
NTSB | National Transportation Safety Board

2024 Annual Report to Congress



Who We Are and What We Do

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences.

In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate.

We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

Our Mission

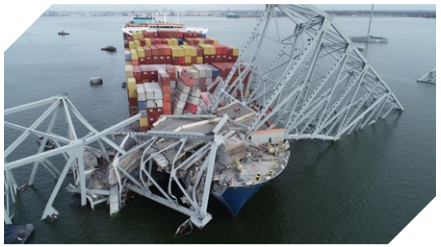
Making transportation safer. We carry out our mission by—

- Maintaining our congressionally mandated independence.
- Conducting objective, thorough investigations and safety studies.
- Deciding fairly and objectively appeals of enforcement actions by the FAA and US Coast Guard and certificate denials by the FAA.
- Advocating for implementation of safety recommendations.
- Assisting victims and survivors of transportation disasters and their families.

Our Core Values

- Integrity
- Transparency
- Independence
- Excellence

On the Cover



The cargo vessel *Dali*, which struck the Francis Scott Key Bridge in Baltimore, Maryland, on March 26, 2024. The inset (below) shows an NTSB investigator examining portions of the collapsed bridge.

Chairwoman's Message

The Honorable
Jennifer L. Homendy

I am honored to present the *2024 Annual Report to Congress* for the NTSB.

In 2024, we continued our agency's tradition as the world's leading accident investigation agency through relentless focus on our strategic goals: keeping pace with emerging transportation technologies and systems, improving processes and products, and optimizing organizational effectiveness and efficiency to meet our mission.

In the past year, we:

- Adopted more than 1,200 investigative reports.
- Issued more than 130 new safety recommendations, including four urgent safety recommendations.
- Initiated more than 190 safety actions to stakeholders and industry within the transportation safety community.
- Continued accident investigations across all modes. Major milestones include the following:
  - » Our August 2024 investigative hearing to find facts related to the ongoing Alaska Airlines Flight 1282, inflight mid-exit door plug separation investigation.
  - » Our investigation of a fatal crash in Tishomingo, Oklahoma, between a teen driver and a truck that claimed 6 lives. The crash highlighted the issues of distracted and cannabis-impaired driving and the inexperience of young drivers. This led to a safety alert as well as a public webinar on "Preventing Drugged Driving Among Youth." This investigation was completed in May 2024.
  - » Our final board meeting and two community meetings in East Palestine, Ohio, for residents impacted by the February 3, 2023, train derailment and hazardous material release. The community events provided the public an opportunity to engage with the Board and staff and learn more about our investigative process. This investigation was completed in June 2024.
  - » Our ongoing investigation into the *Dali* containership collision with the Francis Scott Key Bridge in Baltimore, Maryland. We are working with stakeholders to assess the need for improved pier protection and consider lessons learned from past marine vessel strikes and bridge collapses.
- Launched or supported 18 international aviation investigations as the US-accredited representative.
- Provided comments on seven international investigations where the United States had significant involvement.
- Established the Capital Planning and Investment Control (CPIC) Investment Review Board to oversee and streamline IT spending, align technology investments with agency priorities, and replace aging applications with scalable, cost-effective solutions.
- Improved timely access to transportation safety information by launching dashboards for pending publications on our website, automating notifications to investigation parties and international representatives, and expanding tracking and analysis of safety recommendation implementation.
- Implemented a risk-assessment tool that helps investigators identify hazards, share mitigation strategies, and address equipment needs for all potentially hazardous investigative activities.
- Launched new internal dashboards that display real-time data on staffing levels, labor costs, and hiring progress, enabling supervisors to make more informed, data-driven decisions about team structure and budget management.
- Developed a new "Safety Issues" section on ntsb.gov to highlight key safety recommendations that require further action to improve transportation safety.

In previous reports, we highlighted the railroad and transit accident investigations that we were unable to conduct due to our agency's limited resources. These are contained in Appendix D. I am grateful to Congress for the increased flexibility provided by the 2024 reauthorization of the NTSB, contained in Title XII of the FAA Reauthorization Act of 2024 (P.L. 118-63), which allows us to focus our resources on investigating grade crossing and trespasser accidents and incidents that offer the greatest safety benefits.

Thank you for your continued support of the NTSB. We hope this report provides a clear and informative overview of our agency's 2024 accomplishments, which would not have been possible without the dedication and expertise of our highly skilled workforce. Thanks to their hard work, the NTSB continues to be better positioned than ever to continue making transportation safer for all.

Sincerely,

Jennifer L. Homendy
NTSB Chairwoman

NTSB

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Abbreviations, Acronyms, and Initialisms

ACs	advisory circulars
AAL	American Airlines
AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
AC	advisory circular
AGL	Aero Global Logistics
ARFF	Aircraft Rescue and Firefighting
AUS	Austin-Bergstrom International Airport
CFR	*Code of Federal Regulations*
CVR	cockpit voice recorder
CVSA	Commercial Vehicle Safety Alliance
DAL	Delta Air Lines
FAA	Federal Aviation Administration
FedEx	Federal Express
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GHSA	Governors Highway Safety Association
HAI	Helicopter Association International
HF SITOR	high-frequency simplex teletype over radio
HF VOBRA	high-frequency voice broadcast
ICAO	International Civil Aviation Organization
IDSS	Impact-Based Decision Support Services
IMO	International Maritime Organization
ITA	vessel registration code for Italy
MAIIF	Marine Accident Investigators' International Forum
MBTA	Massachusetts Bay Transportation Authority
MOA	memorandum of agreement
mph	miles per hour
NAVTEX	navigational TELEX
NHTSA	National Highway Traffic Safety Administration
NS	Norfolk Southern Railway
NTSB	National Transportation Safety Board
NWS	National Weather Service
OMB	Office of Management and Budget
PAN	vessel registration code for Panama
PennDOT	Pennsylvania Department of Transportation
PHMSA	Pipeline and Hazardous Materials Safety Administration
POV	privately owned vehicle
PTC	positive train control
SEPTA	Southeastern Pennsylvania Transportation Authority
SGP	vessel registration code for Singapore
SMS	safety management system
TAWS	terrain awareness and warning system
TRB	Transportation Research Board
Triton	Triton Logistics Incorporated
UP	Union Pacific
US	United States
U.S.C.	*United States Code*
US DOT	US Department of Transportation
VCM	vinyl chloride monomer
VDR	voyage data recorder

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About the NTSB

History

The NTSB's origins can be traced to the Air Commerce Act of 1926, in which Congress charged the US Department of Commerce with investigating the causes of aircraft accidents. That responsibility was transferred to the Civil Aeronautics Board's Bureau of Aviation Safety when it was created in 1940.

In 1967, Congress consolidated all US transportation agencies into a new Department of Transportation (US DOT) and established the NTSB as an independent agency within the US DOT. In creating the NTSB, Congress envisioned that a single organization with a clearly defined mission could more effectively promote a higher level of safety in the transportation system than the individual modal agencies could working separately.

FIGURE 1. In 1966, President Lyndon Johnson signed the US Department of Transportation Act that created the NTSB. SOURCE: US DOT

Since 1967, the NTSB has investigated accidents, crashes, and other events in the aviation, highway, marine, pipeline, and railroad transportation modes, as well as those related to the transportation of hazardous materials. In 2022, the investigation of accidents in commercial space transportation was added to our mission.

> In 1974, Congress reestablished the NTSB as a separate entity outside the US DOT, reasoning that "no federal agency can properly perform such [investigatory] functions unless it is totally separate and independent from any other…agency of the United States."

Because the US DOT has broad operational and regulatory responsibilities that affect the safety and efficiency of the transportation system, and transportation accidents may suggest deficiencies in that system, the NTSB's independence was deemed necessary to provide objectivity in its investigations and recommendations.

Role in Transportation Safety

Since our inception in 1967, the NTSB has investigated more than 153,000 aviation accidents and thousands of significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, hazardous materials, and commercial space. On call 24 hours a day, 365 days a year, our investigators travel throughout the country and to every corner of the world in response to transportation disasters.

The NTSB investigates accidents to determine their probable cause, examines safety issues, and develop recommendations to prevent the occurrence of similar accidents and events in the future. We have issued more than 15,500 safety recommendations to more than 2,470 recipients in all transportation modes. The recommended action has been implemented for 82 percent of the over 13,000 recommendations that have been closed. The agency also develops safety research studies focused on broader safety questions and topics, enabling us to better perform our mission.

Additionally, we serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the FAA and the US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

Strategic Goals and Objectives

1. Ensure our preparedness for investigations involving emerging transportation technologies and systems

Objective:

- Prepare the agency for new transportation technologies and systems

2. Improve processes and products

Objectives:

- Improve enterprise data governance
- Enhance enterprise risk management
- Improve information technology planning
- Improve the effectiveness of agency processes and products

3. Optimize organizational effectiveness and efficiency

Objectives:

- Strengthen human capital planning
- Engage, connect, and protect the workforce
- Develop model supervisors and leaders

Organization and Program Structure

The NTSB's organizational structure is designed around sound business and management principles.

The NTSB has five Board members, each nominated by the president and confirmed by the Senate to serve 5-year terms. The president designates a Board member as chairman and another as vice chairman for 3-year terms. The chairman requires separate Senate confirmation. When there is no designated chairman, the vice chairman serves in an acting capacity.

Our current Board members are pictured below in figure 2. The position of vice chairman is currently vacant.

FIGURE 2. NTSB Board members.

Honorable
Jennifer L. Homendy
Chairwoman

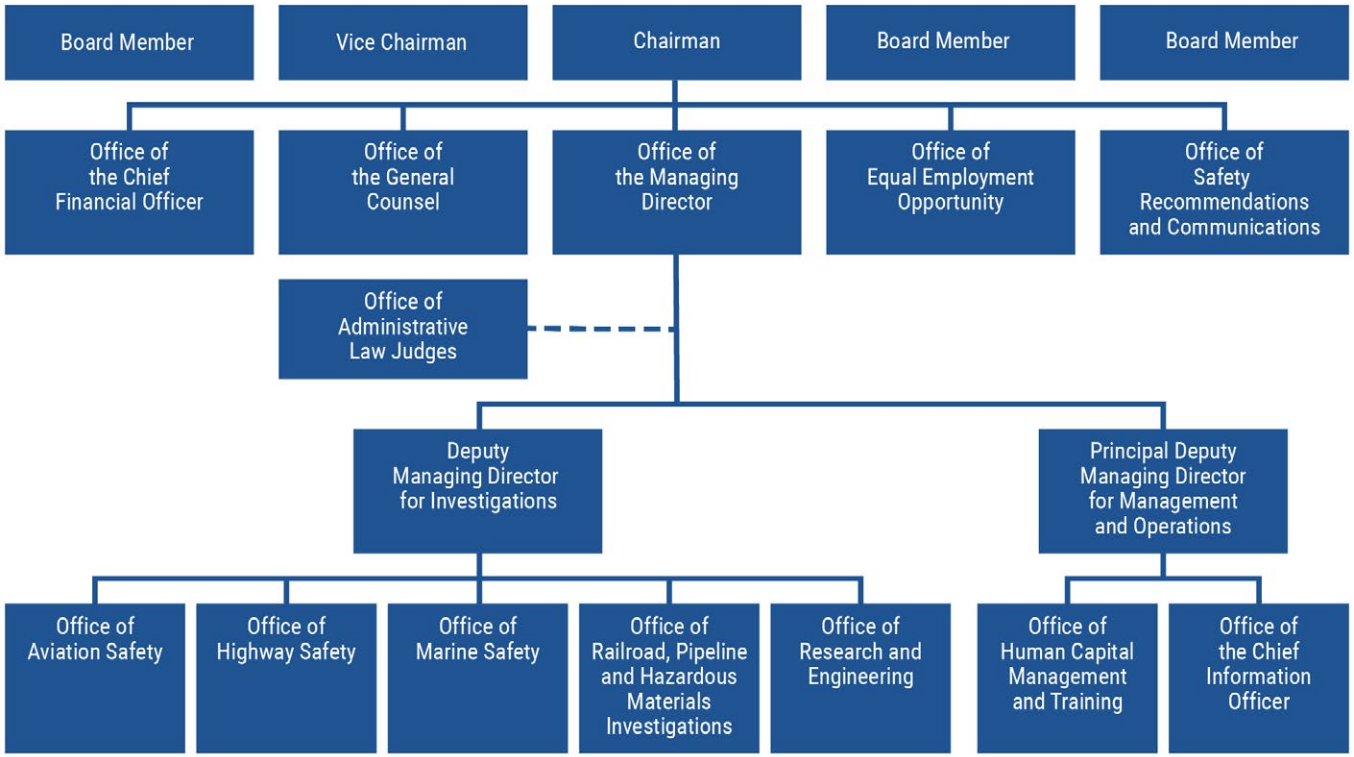
Honorable
Michael E. Graham
Board Member

Honorable
Thomas B. Chapman
Board Member

Honorable
J. Todd Inman
Board Member

Figure 3 shows our organizational structure. For more information about our offices and their functions, please visit the Organization page of our website.

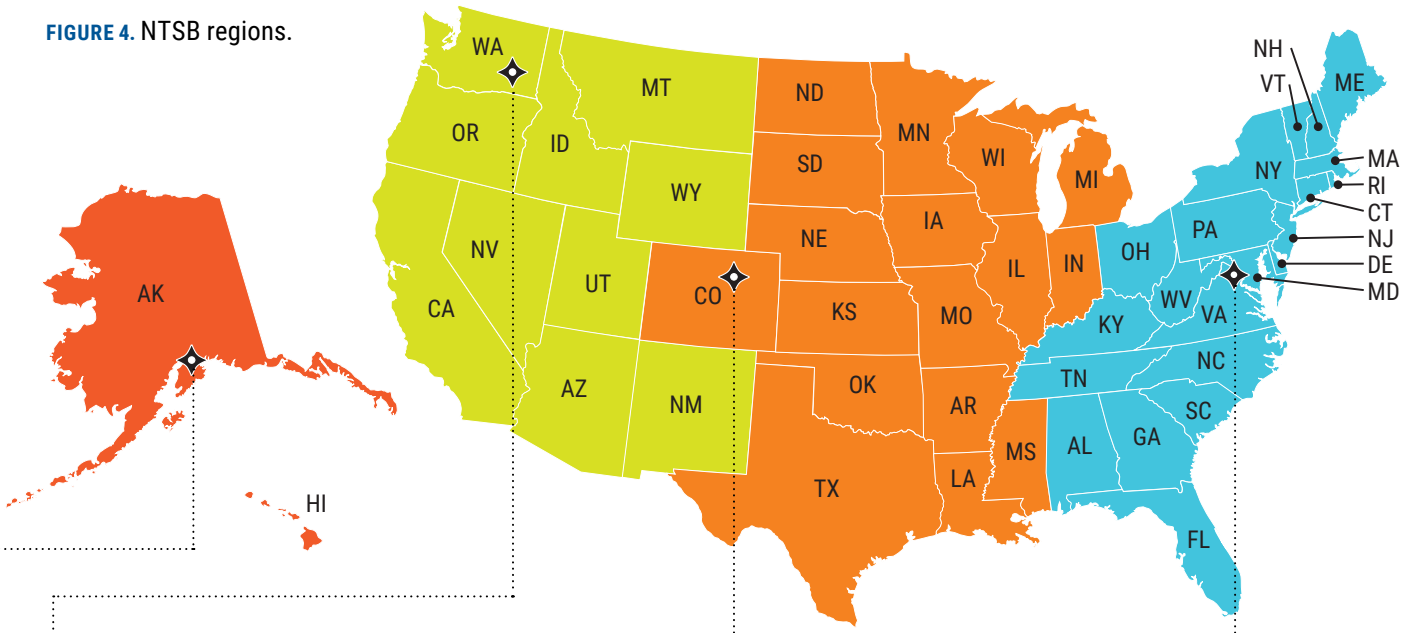
FIGURE 3. NTSB organization chart.



The NTSB is headquartered in Washington, DC, where most of our staff work, within the Eastern Region. Others work remotely throughout the country or are assigned to one of the regional offices in Anchorage, Alaska; Federal Way, Washington; or Aurora, Colorado.

The map in figure 4 depicts the four NTSB regions.

FIGURE 4. NTSB regions.



Alaska Region
Anchorage, Alaska

- Alaska
- Hawaii

Western Pacific Region
Federal Way, Washington

- Arizona
- California
- Idaho
- Montana
- Nevada
- New Mexico
- Oregan
- Utah
- Washington
- Wyoming
- American Samoa
- Guam
- Northern Mariana Islands

Central Region
Aurora, Colorado

- Arkansas
- Colorado
- Indiana
- Illinois
- Iowa
- Kansas
- Louisiana
- Michigan
- Minnesota
- Missouri
- Nebraska
- North Dakota
- Oklahoma
- South Dakota
- Texas
- Wisconsin

Eastern Region
Washington, DC

- Alabama
- Connecticut
- Delaware
- Florida
- Georgia
- Kentucky
- Maine
- Maryland
- Massachusetts
- North Carolina
- New Hampshire
- New Jersey
- New York
- Ohio
- Pennsylvania
- Rhode Island
- South Carolina
- Tennessee
- Vermont
- Virginia
- Washington, DC
- West Virginia
- Puerto Rico
- US Virgin Islands

Table 1 below provides a snapshot of the agency's activities over the past year and highlights key office and division accomplishments across the NTSB from January 1 through December 31, 2024.

TABLE 1. 2024 NTSB Safety Statistics at a Glance

Safety Recommendations[1]

Issued	132
Closed in Acceptable Status	79
Closed in Unacceptable Status	20
Urgent Issued	4

Reports and Products

Board-Adopted Investigation Reports	15
Delegated Investigation Reports	1,212
Public Hearings, Meetings, Roundtables, and Webinars	91
Safety Alerts and Videos	8
Safety Actions[2]	193

Accident and Event Launches

Major Launches	12
Field or Limited Launches	584
International Accident Launches	7

Family Assistance

Family Members and Victims Assisted	3,517

Research and Engineering/Laboratory

Safety Research Products Completed	2
Safety Data Analyses Completed	234
Readouts of Vehicle Recorders and Other Electronic Devices Completed	476
Materials Laboratory Exam Reports Completed	183
Vehicle Performance Reports and Animations Completed	60
Medical Investigation Reports Completed	188
Rapid Reports Completed[3]	8

Aviation Certificate Appeals

Total Cases Received	470
Total Cases Closed	293
Emergency Cases Received	111
Emergency Cases Closed	84
Hearings Scheduled	94
Hearings Held	21

Outreach[4]

Publications	2
Testimony or Legislative Support to State Legislative Committees	23
Board Member External Outreach Presentations and Events[5]	93
Outreach Presentations and Events	375

[1] In this report, each recommendation issued is reported as one recommendation, regardless of the number of recipients. Because some recommendations are issued to more than one recipient, however, recommendations closed are reported by the number of recipients for whom a recommendation was closed during the year. Recommendations closed in an acceptable status include those classified **Closed—Acceptable Action**, **Closed—Acceptable Alternate Action**, and **Closed—Exceeds Recommended Action**. Recommendations closed in an unacceptable status include those classified **Closed—Unacceptable Action** and **Closed—Unacceptable Action/No Response Received**. Please note that recommendations closed in 2024 may have been issued in previous calendar years. If the Board determines that a recommended course of action requires immediate attention to avoid imminent loss of life from a similar accident, the safety recommendation is designated "urgent."

[2] A safety action is a positive change within the transportation environment brought about by an NTSB investigation or study without our issuing a formal safety recommendation. Safety actions may be initiated either because of an NTSB investigation or independent of one.

[3] If the NTSB decides to launch a Board member with the investigation team to the accident site as the on-scene spokesperson, the Safety Research Division (of the Office of Research and Engineering) and the Safety Recommendations Division (of the Office of Safety Recommendations and Communications) provide a 1- to 2-page summary of background information to support the investigation team during the initial stages of the launch. These "rapid reports" typically include publicly available information related to relevant safety data and statistics on similar crashes and crash trends; a summary of relevant NTSB investigations, studies, or other products; and a summary of relevant safety recommendations.

[4] See Appendix C for additional details about NTSB outreach.

[5] This is an approximate total and may not reflect the total number conducted.

Office of **Aviation Safety**

TABLE 2. Office of Aviation Safety Statistics

Recommendations Issued[6]	37
Urgent Recommendations Issued	4
Recommendations Closed in an Acceptable Status	22
Recommendations Closed in an Unacceptable Status	10
Board-Adopted Investigation Reports	7
Delegated Investigation Reports	1,173
Investigative Hearing	1
Safety Alerts	5
Safety Actions	178
Major Investigation Launches	5
Field Investigation Launches	522
International Accident Launches	7
Outreach	45

[6] One recommendation was adopted in our December 28, 2023, Hiles, Wisconsin, investigation report, but was not issued until January 2024.

The mission of the Office of Aviation Safety is to—

- Investigate all air carrier, commuter, and air taxi accidents and certain serious incidents; fatal and nonfatal general aviation accidents and serious incidents; uncrewed aircraft systems, advanced air mobility, and public aircraft accidents and serious incidents; and commercial space launch/reentry accidents.
- Participate in the investigation of aircraft accidents that occur in foreign countries involving US carriers, US-manufactured or -designed equipment, or US-registered aircraft to fulfill US obligations under International Civil Aviation Organization (ICAO) agreements.
- Investigate safety issues that extend beyond a single accident to examine specific aviation safety problems from a broader perspective.

The Office of Aviation Safety conducts investigative activities through five specialty divisions based in Washington, DC, and a regional investigation management structure consisting of four regions. Investigators are located throughout the country. International aviation activities are coordinated from the Washington, DC office.

Investigation Reports

During 2024, the Office of Aviation Safety issued or developed for adoption by the Board a total of 1,180 investigation reports; 7 of these reports were adopted by the Board and involved safety issues that led to the issuance of 36 safety recommendations, including 4 recommendations that were designated urgent.

Below are summaries of some of the aviation investigation reports completed during this period.

In-Flight Collision During Air Show, Commemorative Air Force Boeing B-17G, and Bell P-63F

Dallas, Texas, November 12, 2022

On November 12, 2022, about 1:22 p.m. local time, a Boeing B-17G and a Bell P-63F collided in flight during a performance at the Commemorative Air Force's Wings Over Dallas air show at Dallas Executive Airport in Dallas, Texas.[7] The pilot, copilot, flight engineer, and two scanners on board the Boeing B-17G and the pilot of the Bell P-63F were fatally injured, and both airplanes were destroyed. No injuries to people on the ground were reported.

We determined that the probable cause of this accident was the air boss's and event organizer's lack of an adequate, prebriefed aircraft separation plan for the air show performance, relying instead on the air boss's real-time deconfliction directives and the see-and-avoid strategy for collision avoidance, which allowed for the loss of separation between the Boeing B-17G and the Bell P-63F airplanes. Also causal were the following:

- diminished ability of the accident pilots to see and avoid the other aircraft due to flight path geometry,
- out-the-window view obscuration by aircraft structures,
- attention demands associated with the air show performance, and
- inherent limitations of human performance that can make it difficult to see another aircraft.

Contributing to the accident were the lack of FAA guidance for air bosses and event organizers on developing plans and performing risk assessments that ensure the separation of aircraft that are not part of an approved maneuvers package, and the lack of FAA requirements and guidance for recurrent evaluations of air bosses and direct surveillance of their performance.

FIGURE 5. Left to right: Boeing B-17G and Bell P-63F shown in flight. SOURCE: COMMEMORATIVE AIR FORCE

[7] All times stated are local time.

FIGURE 6. Aerial view of the B-17G and Bell P-63F before the air show collision.
SOURCE: DYLAN PHELPS, COMMEMORATIVE AIR FORCE

We identified the following safety issues during this investigation:

(1) the air boss's and event organizer's lack of an adequate, prebriefed aircraft separation plan for the performance;

(2) the factors that limited the ability of the Boeing B-17G pilot and the Bell P-63F pilot to see and avoid each other's aircraft;

(3) the lack of adequate guidance provided by the FAA and the International Council of Air Shows to better mitigate the collision risks associated with air boss-directed performances involving multiple, dissimilar aircraft;

(4) the need for administrative controls and documented safety risk assessments; and

(5) the Commemorative Air Force's lack of a strong, clearly defined safety risk assessment plan, which resulted in air show production decisions that were not systematically developed to determine acceptable levels of risk and were susceptible to influences unrelated to safety.

As a result of this investigation, we issued safety recommendations to the FAA, the International Council of Air Shows, and the Commemorative Air Force.

» Recommendations: 7 new
» Report date: December 4, 2024

Mitigate Safety Concerns Involving Boeing 737 Airplanes with Collins Aerospace SVO-730 Rudder Rollout Guidance Actuators

Newark, New Jersey, February 6, 2024

On February 6, 2024, about 3:55 p.m., the flight crew of United Airlines flight 1539, a Boeing 737-8, experienced a rudder pedal anomaly while landing at Newark Liberty International Airport. The pilot and passengers on board were not injured.

We identified the following safety issues during this ongoing investigation:

(1) the potential for a jammed or restricted rudder control system on affected Boeing 737 airplanes due to incorrectly manufactured Collins Aerospace SVO-730 rudder rollout guidance actuators that allow moisture to enter and freeze;

(2) the potential for uninformed flight crews of affected Boeing 737 airplanes to apply rudder pedal force in an attempt to clear a jammed or restricted rudder control system that results in a large, sudden, and undesired input to the rudder and loss of airplane control; and

(3) the need to determine and disseminate guidance on appropriate flight crew responses if the affected Collins actuators on certain Boeing 737 airplanes become jammed or restricted in flight or during landing.

As a result of this investigation, we issued urgent safety recommendations to The Boeing Company and the FAA.

» Recommendations: 4 new (urgent)
» Report Date: September 26, 2024

Collision with Powerlines and Terrain During Forced Landing, MARPAT Aviation, Bell Helicopter UH-1B

Amherstdale, West Virginia, June 22, 2022

On June 22, 2022, about 4:45 p.m., a Bell Helicopter UH-1B helicopter was destroyed when, about 15 minutes after the flight departed, the helicopter impacted two powerlines and a rock face during a forced landing in Amherstdale, West Virginia. A postcrash fire ensued, and the pilot and five passengers were fatally injured.

FIGURE 7. The cockpit and cabin wreckage of a Bell Helicopter UH-1B in Amherstdale, West Virginia.

We determined that the probable cause of this accident was the operator's failure to adequately inspect the former military turbine-powered helicopter, which allowed an engine issue to progress and result in a loss of engine power and a subsequent loss of control after the helicopter struck powerlines during forced landing.

We identified the following safety issues during this investigation:

(1) insufficient inspection requirements for the UH-1B and other former military turbine-powered aircraft,

(2) inadequate operator maintenance of the accident helicopter,

(3) inadequate management of the helicopter's experimental airworthiness certificate,

(4) lack of FAA oversight of the accident helicopter's airworthiness certificate,

(5) lack of guidance for FAA inspectors to perform routine surveillance of operators with experimental exhibition airworthiness certificates, and

(6) the need for a method to ensure that operators of experimental exhibition aircraft meet their annual obligation to submit program letters to the appropriate FAA flight standards district office.

As a result of this investigation, we issued safety recommendations and reiterated a safety recommendation to the FAA.

» Recommendations: 6 new, 1 reiterated
» Report Date: August 14, 2024

FIGURE 8. The accident scene and wreckage of a Bell Helicopter UH-1B, N98F, in Amherstdale, West Virginia.

Define the Meaning and Operational Use of Instantaneous Wind Reports

Aspen, Colorado, February 21, 2022

On February 21, 2022, a Raytheon Aircraft Company Hawker 800XP airplane overran the end of runway 33 after the flight crew aborted the takeoff in gusting tailwind conditions at Aspen-Pitkin County Airport in Aspen, Colorado. The pilot and passengers on board were not injured.

FIGURE 9. Raytheon Aircraft Company Hawker 800XP airplane shown at the end of a runway at Aspen-Pitkin County Airport.

SOURCE: ASPEN-PITKIN COUNTY AIRPORT OPERATIONS

We determined that the probable cause of the accident was the flight crew's decision to take off in tailwind conditions that were consistently above the airplane's tailwind limitation, which resulted in a runway overrun following an aborted takeoff. Contributing was the flight crew's use of the instantaneous wind report for the decision to attempt the takeoff.

We identified the following safety issue during this investigation: the lack of an official definition for "instantaneous wind" and guidance on its use during flight operations in potentially hazardous wind conditions.

As a result of the investigation, we issued a safety recommendation to the FAA.

- Recommendations: 1 new
- Report Date: August 20, 2024

Safety and Industry Data Improvements for Part 135 Operations

Special Investigation Report

Historically, accident rates for Title 14 *Code of Federal Regulations* (*CFR*) Part 135 operations have remained higher than those for Part 121 operations, which are subjected to more stringent FAA requirements. In December 2022, we initiated a special investigation of 14 *CFR* Part 135 operations after our investigations of several accidents in recent years highlighted similar deficiencies, suggesting a need for a more comprehensive review of the industry.

Completed in 2024, the special investigation identified 116 fatal accidents and 460 nonfatal accidents involving flights operated under Part 135 that occurred from 2010 to 2022. We sought to identify any trends or similarities in the types of deficiencies that led to the accidents; evaluate the circumstances of each accident in the context of applicable regulations and potential mitigations that could prevent similar accidents; and review accident and flight activity data to determine whether those data could support an assessment of any trends in the historic accident rates for different industry segments based on certificate type, operating authority, and scope.

We identified the following safety issues during this special investigation:

(1) the need for certificated dispatchers for all Part 135 operators except single pilot and single-pilot-in-command operators;

(2) the need for aircraft load manifest and recordkeeping requirements to apply to all aircraft operated under Part 135;

(3) the need for safety management system (SMS) and flight data monitoring program requirements for all Part 135 operators;

(4) the need for guidance to help small operators scale an SMS, as appropriate for their operations;

(5) the need for accident and incident data collection improvements related to Part 135 certificate information for operators involved in accidents or incidents; and

(6) the need for accurate flight activity data for the various segments of Part 135 operations.

As a result of this special investigation, we issued and reiterated safety recommendations to the FAA. We also classified previously issued safety recommendations to the FAA.

- Recommendations: 3 new, 2 reiterated, and 1 classified in this report
- Report Date: July 24, 2024

FIGURE 10. Two of the accidents cited in the special investigation report, *Safety and Industry Data Improvements for Part 135 Operations.* From top: AS350-B3 helicopter crash in Palmer, Alaska, and Mitsubishi MU2B airplane crash in Sioux Falls, South Dakota.

SOURCES (FROM TOP): ALASKA STATE TROOPERS, FAA

Runway Incursion and Overflight, Southwest Airlines Flight 708, Boeing 737-700, and Federal Express Flight 1432, Boeing 767-300

Austin, Texas, February 4, 2023

On February 4, 2023, about 6:40 a.m., Southwest Airlines flight 708, a Boeing 737-700, and Federal Express (FedEx) flight 1432, a Boeing 767-300, were involved in a runway incursion at Austin-Bergstrom International Airport (AUS), Austin, Texas. The 128 occupants aboard the Southwest airplane and the 3 occupants aboard the FedEx airplane were not injured, and neither airplane sustained damage.

FIGURE 11. Top: The FedEx 767 is shown during a takeoff, and a Southwest 737 is pictured in flight (both not the incident flight). Bottom: Diagram showing the position of Southwest Airlines flight 708 when the flight crew reported that the airplane was short of runway 18L. SOURCES: JETPHOTOS.COM (TOP); GOOGLE EARTH (BOTTOM), ANNOTATED BY NTSB

We determined that the probable cause of this incident was the local controller's incorrect assumption that the Southwest airplane would depart from the runway before the FedEx airplane arrived on the same runway, which resulted in a loss of separation between both airplanes. Contributing to the controller's incorrect assumption were his expectation bias regarding the SWA airplane's departure, his lack of situational awareness regarding the SWA airplane's position when the flight crew requested takeoff clearance, and the air traffic control tower's lack of training (before the incident) on low-visibility operations. Contributing to the incident was the SWA flight crewmembers' failure to account for the traffic that was on short final approach and to notify the controller that they would need additional time on the runway before the takeoff roll. Also contributing to the incident was the Federal Aviation Administration's failure to require surface detection equipment at Austin-Bergstrom International Airport and direct alerting for flight crews.

We identified the following safety issues during this investigation:

(1) the lack of surface detection equipment at AUS to alert controllers about potential conflicts on a taxiway or runway surface;

(2) the need for flight deck technology to alert flight crews about potential conflicts on an airport surface;

(3) the need to ensure, especially during low-visibility conditions, that controllers are aware when pilots, after receiving takeoff clearance, might need extra time on the runway;

(4) the lack of training on the AUS airport's Surface Movement Guidance and Control System plan;

(5) the need for low-visibility operations training at all airports; and

(6) the need for 25-hour cockpit voice recorders (CVRs).

As a result of this investigation, we issued and reiterated safety recommendations to the FAA.

» Recommendations: 7 new, 5 reiterated
» Report Date: June 6, 2024

Runway Incursion and Rejected Takeoff American Airlines Flight 106, Boeing 777-200 and Delta Air Lines Flight 1943, Boeing 737-900

Queens, New York, January 13, 2023

On January 13, 2023, about 8:44 p.m., American Airlines (AAL) flight 106, a Boeing 777-223, crossed runway 4L on taxiway J without air traffic control clearance at John F. Kennedy International Airport, Queens, New York, causing Delta Air Lines (DAL) flight 1943, a Boeing 737 900ER, to abort its takeoff roll on runway 4L. None of the 6 crew and 153 passengers on DAL1943, nor the 12 crew and 137 passengers on AAL106, was injured, and there was no damage to either aircraft.

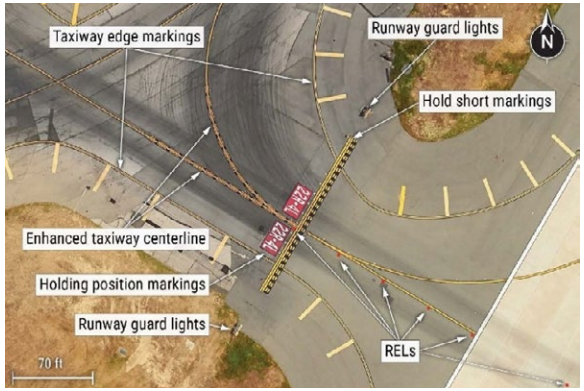


FIGURE 12. Satellite image of the taxiway J/runway 4L intersection at John F. Kennedy International Airport indicating runway lights and markings.
SOURCE: GOOGLE EARTH, ANNOTATED BY NTSB

We determined that the probable cause of the incident was the AAL106 flight crew's surface navigation error due to distractions caused by their performance of concurrent operational tasks during taxi, which resulted in a loss of situational awareness.

We identified the following safety issues during this incident investigation:

(1) the need for additional risk mitigation strategies

to prevent flight crew surface navigation errors that result in runway incursions;

(2) the need for a procedural crosscheck that requires flight crews to verbalize the number of a runway they are about to cross as indicated by runway signs; and

(3) the lack of flight deck technology to detect potential traffic conflicts.

Because the incident data on the 2-hour CVRs on both airplanes were overwritten, we also reiterated the need for CVRs with a 25-hour recording capability.

As a result of this investigation, we issued safety recommendations and reiterated a safety recommendation to the FAA.

» Recommendations: 8 new, 1 reiterated
» Report Date: May 29, 2024

Landing Gear Collapse RED Air Flight 203 McDonnell Douglas MD-80

Miami, Florida, June 21, 2022

On June 21, 2022, about 5:38 p.m., RED Air flight 203, a Boeing MD-82, overran the end of runway 9 at Miami International Airport, Miami, Florida, after the left main landing gear failed shortly after landing. Of the 140 occupants aboard the airplane, 4 passengers sustained minor injuries.

FIGURE 13. Final position of RED Air flight 203 following collapse of its landing gear.
SOURCE: GOOGLE EARTH, ANNOTATED BY NTSB

We determined that the probable cause of the accident was the structural failure of the left main landing gear downlock following ineffective shimmy dampening during the landing roll, which caused the collapse of the left main landing gear, resulting in a runway excursion and postflight fire.

We identified the following safety issue during this investigation: the failure of landing gear components.

» Recommendations: None
» Report Date: April 25, 2024

Ongoing Significant Aviation Investigations and Incidents

At the close of 2024, the Office of Aviation Safety had seven open investigations involving significant safety issues. We are devoting significant resources to these investigations and anticipate producing a report upon the completion of each one.

TABLE 3. Ongoing Significant Aviation Investigations

Location	Event Date	Description	Fatalities	2025 Report Date
Houston, Texas	10/20/2024	Robinson R44 collision with communication tower	4	
St. Mary's, Alaska	9/15/2024	Cessna 207 controlled flight into terrain	4	
Halloran Springs, California	2/9/2024	Airbus EC130 helicopter crash	6	5/6/2025
Westwater, Utah	2/7/2024	Hawker Beechcraft 900XP loss of control in flight	2	
Newark, New Jersey	2/6/2024	Boeing 737-8 rudder system anomaly	0	
Portland, Oregon	1/5/2024	Boeing 737-9 door plug separation and rapid decompression	0	6/24/2025
Stagecoach, Nevada	2/24/2023	Loss of control during departure	5	6/4/2025

Investigative Hearing

During 2024, the Office of Aviation Safety held one investigative hearing; a summary is provided below.[8]

Alaska Airlines Flight 1282 In-flight Mid Exit Door Plug Separation

August 6–7, 2024

The NTSB convened an investigative hearing in August 2024 to gather sworn testimony about the January 5, 2024, accident involving Alaska Airlines flight 1282. The accident occurred when a left mid exit door plug departed the airplane at an altitude of about 16,000 feet shortly after departing Portland, Oregon, on a flight destined for Ontario, California; following the loss of the door plug, which led to a rapid decompression, the flight crew returned to Portland, where the airplane landed safely. During the hearing, we received information on the B737-9 manufacturing and inspection processes, including events related to the opening and closing of the mid exit door plug. Key topics included production practices, mechanic training and retention, documentation of part removals and installations, the lack of records regarding the mid exit door plug's handling, and post-accident process changes. We will use the information gathered to complete the investigation, determine probable cause, and make recommendations to improve transportation safety.

FIGURE 14. Investigative hearing to gather testimony on the Alaska Airlines flight 1282 door plug departure.

[8] Investigative hearings are public hearings related to investigations in which the agency is authorized to obtain testimony under oath.

International Investigations

The United States is a signatory to the Chicago Convention on International Civil Aviation, which is administered by ICAO. The NTSB is charged with fulfilling the US obligation for accident and incident investigations in accordance with Annex 13 of this agreement in full coordination with the US Department of State.

The international investigative process is critical to maintaining aviation safety in the United States and throughout the world. When an aircraft operated by—or designed, manufactured, or registered to—a US company has been involved in an accident in a foreign state, NTSB participation in that investigation enables the United States to ensure the airworthiness and operation of its aircraft operated here and overseas. ICAO Annex 13 protocols also define the agency's engagement with international authorities whose products or operations are involved in accidents within the United States. This international process of collaboration plays an important role in enabling us to identify safety concerns and issue appropriate recommendations. We have issued numerous safety recommendations that have resulted in safety improvements worldwide as a direct result of our participation in these foreign investigations.

During 2024, the Office of Aviation Safety was notified of 448, and assisted with 50, international investigations. Of these, investigators launched to or traveled in support of 18 investigations. The following required significant US involvement.

Boeing 737 Crash Following Gear-Up Landing

Muan County, South Korea, December 29, 2024

On December 29, 2024, Jeju Air flight 2216, a Boeing 737-800, landed well beyond the touchdown zone on the arrival runway at Muan International Airport, Muan County, South Korea, without the landing gear having deployed. The airplane overran the runway, impacted the approach lighting system then an embankment, and a postimpact fire ensued. All but 2 of the 181 occupants were fatally injured. As the US-accredited representative of the state of design and manufacture of the airframe and engines, NTSB staff traveled to South Korea to assist the Aviation and Railway Accident Investigation Board in its investigation.

Boeing 737 Crash During Approach and Landing

Vilnius, Lithuania, November 25, 2024

On November 25, 2024, a SwiftAir Boeing 737-746, operated by DHL, on an international cargo flight from Leipzig, Germany, to Vilnius Airport, Vilnius, Lithuania, impacted the ground short of the arrival runway (near a house) while on approach to the airport. Of the four occupants on board (two pilots and two passengers), one pilot sustained fatal injuries, and the other occupants were injured. No one on the ground was injured. As the US-accredited representative of the state of design and manufacture of the airframe, NTSB staff traveled to Lithuania to assist the Transport Accident and Incident Investigation Division of the Ministry of Justice of Lithuania in its investigation.

Bombardier CL600 2B19 Crash After Takeoff

Kathmandu, Nepal, July 24, 2024

On July 24, 2024, a Saurya Airlines Bombardier CL-600-2B19 carrying 16 passengers and 3 crewmembers crashed and caught fire while taking off from Tribhuvan International Airport, Kathmandu, Nepal. All 16 passengers and 2 crewmembers sustained fatal injuries; the captain survived with non-life-threatening injuries. As the US-accredited representative of the state of design and manufacture of the engines, NTSB staff traveled to Singapore's Transport Safety Investigation Bureau facilities to assist Nepal's Aircraft Accident Investigation Commission investigation in downloading and interpreting data recovered from the flight data recorder and CVR.

Boeing 787 In-flight Upset

Enroute over the Republic of Türkiye, May 26, 2024

On May 26, 2024, a Qatar Airways Boeing 787-900 flying from Doha, Qatar, to Dublin, Ireland, experienced an in-flight upset while flying through Turkish airspace. Following initial reports of injuries to 6 passengers and 6 crew members, a total of 12 people received hospital treatment, of whom 8 were passengers. As the US-accredited representative of the state of design and manufacture of the airframe and engines, NTSB staff traveled to the Republic of Ireland to support the Air Accident Investigation Unit's investigation.

Boeing 777 Turbulence Encounter

Irrawaddy Basin, Burma, May 21, 2024

On May 21, 2024, a Singapore Airlines Boeing 777 carrying 211 passengers and 18 crew members encountered severe turbulence at an altitude of about 37,000 feet. One passenger died, likely from a heart attack, and dozens of others sustained serious injuries. The flight made an emergency landing at Suvarnabhumi Airport, Bangkok, Thailand. As the US-accredited representative of the state of design and manufacture of the airframe, NTSB staff traveled to Bangkok to assist in the Singapore Transport Safety Investigation Bureau's investigation.

Boeing 767 Landing with Nose Gear Retracted

Istanbul, Türkiye, May 8, 2024

On May 8, 2024, a FedEx Boeing 767 landed at Istanbul Airport, Istanbul, Türkiye, without its nose gear extended. No injuries were reported. As the US-accredited representative of the state of design and manufacture of the airframe and engines, NTSB staff traveled to Türkiye to support the Transport Safety Investigation Center's investigation.

Sikorsky S-92 Crash into Sea

Near Bergen, Norway, February 28, 2024

On February 28, 2024, a Sikorsky S-92 helicopter carrying six passengers and two pilots conducting a training exercise crashed into the sea off the coast of Norway. One occupant sustained fatal injuries, and one occupant sustained serious injuries. As the US-accredited representative of the state of design and manufacture of the airframe, the NTSB assigned staff to support the Norwegian Safety Investigation Authority's investigation.

Airbus A350 and DHC-8 Runway Incursion

Tokyo, Japan, January 2, 2024

On January 2, 2024, a Japan Airlines A350-900 and a Japanese Coast Guard de Havilland DHC-8 collided on the runway at Haneda Airport in Tokyo, Japan. Of the six crew on the DHC-8, five sustained fatal injuries; the captain survived with serious injuries. All 379 occupants of the A350 survived, 17 of whom received medical attention. The Japan Transport Safety Board requested US assistance to coordinate readout of the A350's Honeywell-manufactured flight data recorder.

US Comments on Foreign Accident Reports

We completed comments on behalf of the United States on several international investigations in which the United States had significant involvement under Annex 13, including the following.

Boeing 787 Nose Gear Failure

Incheon, South Korea, June 18, 2023

On June 18, 2023, a Scoot Boeing 787-900 experienced a failure of its nose gear during departure from Incheon International Airport, Seoul, South Korea. Officials at Incheon International Airport found nose wheel parts, including tire fragments, along one of the airport's taxiways; about the same time, while the airplane was reaching the top of its climb, the flight crew discovered that pressure readings for both nose landing gear tires were not available. The airplane landed without incident at its intended destination, Taiwan Taoyuan International Airport, Taipei, Taiwan. As the US-accredited representative of the state of design and manufacture of the Boeing 787 airframe, the NTSB provided comments on a draft report to the Singapore Transport Safety Investigation Bureau. The final report was issued in July 2024.

Boeing 777 Altitude Deviation

Muscat, Oman, January 13, 2024

On January 13, 2024, a controller in Muscat, Oman, noticed Singapore Airlines flight 306, a Boeing 777,

depart its assigned altitude into the path of crossing traffic. The controller attempted several times to call the airplane's pilots on the radio, but the crew did not respond. The airplane climbed to 32,500 feet, at which point contact was established between the flight crew and controller. When asked why the crew had climbed to an unassigned altitude, the crew responded that it was an autopilot error and that they would have to manually descend. As the US-accredited representative of the state of design and manufacture of the airframe, the NTSB provided comments on a draft report to the Oman's Civil Aviation Authority. The final report is pending.

Boeing 777 and Airbus A330 Ground Collision During Taxi

Paris, France, August 30, 2023

On August 30, 2023, an Air France Boeing 777-328ER and a DAL Airbus A330-941 were involved in a ground collision accident at Paris Charles de Gaulle Airport in Paris, France. After arrival, as the Airbus A330 was taxiing, its right winglet collided with the tail of the Boeing 777, which was holding on an adjacent runway. No injuries to occupants on either airplane were reported. As the US-accredited representative of the state of design and manufacture of the Boeing 777 airframe and one of the operators involved, the NTSB provided comments on a draft report to the Bureau d'Enquêtes et d'Analyses in April 2024. The final report was issued in May 2024.

Boeing 767 Contained Engine Failure

Glasgow, United Kingdom, February 10, 2023

On February 10, 2023, a DAL Boeing 767-332-ER suffered a failure of its right engine on takeoff from Edinburgh Airport and experienced airframe vibration and engine indications resulting in the aircraft diverting to Glasgow's Prestwick Airport. During the diversion, fuel escaping from the wing was ignited by the hot engine exhaust, but the flames extinguished before the landing. All 211 passengers and 10 crew members safely disembarked without injury. As the US-accredited representative of the state of design and manufacture of the Boeing 767 airframe and the Pratt and Whitney PW4060 engines, as well as the state of the operator, the NTSB provided comments on a draft report to the United Kingdom's Air Accidents Investigation Branch. The final report was issued in July 2024.

Boeing 737 Brazzaville Landing Gear Collapse

Democratic Republic of the Congo, February 9, 2023

On February 9, 2023, the tire on the left main landing gear of an Allied Air Cargo 737 burst on landing, and the gear collapsed. No injuries were reported. As the US-accredited representative of the state of design and manufacture of the airframe, the NTSB provided comments on a draft report to the Democratic Republic of the Congo in March 2024. The final report is pending.

Airbus A330 Runway Excursion

Amsterdam, the Netherlands, January 12, 2023

On January 12, 2023, a DAL Airbus A330-300 landed short of the runway at Amsterdam Airport Schiphol, Amsterdam, the Netherlands. No injuries were reported to the airplane occupants. The airplane sustained minor damage, and the runway pavement and runway lights were damaged. As the US-accredited representative of the state of the operator, the NTSB provided comments on the draft report to the Dutch Safety Board in February 2024. The final report was issued in July 2024.

Airbus A320 In-flight Fire

Mediterranean Sea, May 19, 2016

On May 19, 2016, an Airbus A320-200 operating as Egypt Air flight 804 from Paris Charles de Gaulle, France, to Cairo, Egypt, was en route at 37,000 feet over the Mediterranean Sea when the airplane's transponder signal ceased at 2:33 am. Postaccident analysis determined that the airplane experienced an in-flight fire. As the US-accredited representative of the state of manufacture of the engines, the NTSB provided comments on a draft report to the Egyptian Ministry of Civil Aviation. The final report was issued in October 2024.

Safety Alerts

During 2024, the Office of Aviation Safety developed the following safety alerts for issuance by the Board.[9]

Flying in Icing Conditions? » SA-097

This safety alert, which replaced a 2008 safety alert on the same subject, was derived from multiple investigations involving flight in icing conditions in which pilots had not followed their pilot's operating handbooks or aircraft flight manuals, which led to in-flight loss of control.

Wake Turbulence: Helicopters and Small General Aviation Aircraft Also Pose a Risk » SA-096

This safety alert was derived from multiple investigations involving small aircraft encountering wake turbulence from helicopters and other small general aviation aircraft. These encounters have led to serious damage to the aircraft and have also caused fatal injuries to the occupants.

Mechanics: Check the Engine Control Cables! » SA-092

This safety alert was derived from multiple investigations involving the failure of worn throttle and/or mixture cables that resulted in partial or total loss of engine power.

Know When to Feather Your Propeller: If One Engine Loses Power Don't Get Locked Out » SA-091 » Companion video: SA-091

This safety alert and accompanying video were derived from multiple accident investigations in which twin-engine airplanes experienced partial loss of engine power. The investigations described highlight scenarios in which delayed propeller feathering of an aircraft compromised control and safety, leading to aircraft damage and fatalities.

Aluminum Propeller Blades: Prevent Fractures with Proper Inspections and Maintenance » SA-090

This safety alert was derived from multiple accident investigations involving the failure of aluminum propeller blades. The investigations described highlight scenarios in which fatigue cracking and fractures were not detected before takeoff, resulting in propeller blades fracturing during takeoff or flight, causing forced landings and aircraft damage.

Explore more than 50 aviation safety alerts sorted by topic, available at ntsb.gov/advocacy/safety-alerts

[9] Safety alerts are brief information sheets that pinpoint a particular safety issue. They contain information based on investigation findings and enhance the dissemination of safety information to the traveling public. They are primarily used to alert the transportation safety community, which may not otherwise be reached through safety recommendations, of safety issues identified during multiple investigations. Safety alerts provide information on the problem, examples of accidents, what pilots can do to avoid making the same mistakes, and references for pilots to find additional information. These alerts are posted on the NTSB website, and brochures are distributed at outreach events that staff attends throughout the year.

Safety Actions

During 2024, the Office of Aviation Safety documented 178 safety actions.[10] The following are summaries of a sampling of these actions.

- As a result of our ongoing investigation of **an August 2023 fatal accident involving a total loss of power in the right engine of a twin-engine experimental amateur-built airplane**, the engine manufacturer made several changes to the engine installation manual in April 2024. These changes included reorganizing and adding additional links and important warnings to the manual's electrical system section and to installation videos. The addition of warnings included a red box warning stating "All wires are critical to engine functions."
- As a result of our investigations of **two fatal accidents that occurred within months of each other under similar circumstances at Venice Municipal Airport, Venice, Florida**, the airport authority took mitigating action concerning the airport operating environment in April 2024. Both accidents involved departures at night under visual flight rules, over water, and with no discernable horizon. Following conversations with NTSB investigators, the airport authority placed signage on the end of every runway alerting pilots departing under visual flight rules to the potential visual loss of the horizon after departure, added a warning with similar information to the airport's automated weather observing system notifications, and added a permanent entry concerning this information to the airport's notices to airmen.

[10] A safety action is a positive change within the transportation environment brought about by an NTSB investigation or study without our issuing a formal safety recommendation.

- As a result of our investigation of **an accident involving an Air Tractor AT-802 that drifted right and impacted a ditch during landing**, the airplane manufacturer issued a service letter to operators about the identified safety issue, including correction action. Postaccident examination of the airplane found movement of the rudder/brake pedal was restricted by the spray valve control pushrod. This condition prevented the simultaneous application of full left rudder and left brake when operated from the rear seat. Following issuance of the manufacturer's service letter and at the NTSB's suggestion, the FAA agreed to follow up with a standard airworthiness information bulletin in April 2024.
- As a result of our investigation of **a Hughes 369D helicopter accident in which an object became loose from a backpack while in flight, exited the helicopter, and impacted the tail rotor**, the helicopter operator made several operational changes in February 2024. These changes included revising its general operations manual to establish standards for carry on items, requiring pilots to visually ensure that all carry-on items are properly secured and meet the standards described in the manual before every takeoff, requiring that all safety briefings address and describe the company standards for carry-on items, and implementing a policy that customers are notified via email before flight that no objects are allowed to be strapped or stored on the exterior of carry-on items.

Other Significant Achievements

Regulatory Correspondence

We provided feedback and guidance on four regulatory efforts related to the following rulemakings:

- FAA's airworthiness directives for various helicopters
- 25-hour CVR requirements
- Supplemental restraint systems
- Final rule on SMSs[11]

Loss of Separation/Runway Incursions

During 2024, the NTSB investigated several events involving commercial airlines and losses of separation or runway incursions. These investigations were a top priority because of the potential catastrophic consequences. As summarized in the Investigation Reports section, the NTSB issued 15 recommendations to reduce the risk of recurrence as a result of findings in two runway incursion investigations. These recommendations, if acted upon, will result in improved technology in aircraft cockpits to alert pilots to other aircraft that could become a collision risk, improved procedures for crossing runways, support for more effective use of SMS programs, updated airport runway lighting systems, required airport surface detections systems, and improved air traffic control procedures.

Project to Optimize Regional Investigator Launch Coverage

During the first half of fiscal year 2024, the office formed a working group to evaluate the various duty schedules among the regional offices and recommend a single unified duty rotation schedule. The objectives of this project were to use limited launch resources more efficiently while maintaining launch readiness and to provide seasonally appropriate launch depth by leveraging cross-regional support. The working group completed its evaluation and delivered recommendations to office management in March 2024.

2024 ICAO Audit

The Office of Aviation Safety provided extensive support during a July 2024 audit of the US civil aviation system conducted by ICAO under its Universal Safety Oversight Aviation Programme. The Office of Aviation Safety led efforts demonstrating the US implementation of the program's critical elements and protocols related to aviation accident and incident investigation. The US achieved an effective implementation score of 94 percent for that portion of the audit—well above the global average and reflective of the comprehensive system and capabilities in place at the NTSB for accident investigation.

[11] See Congressional and Regulatory Correspondence for more information on NTSB responses to regulatory actions and requests for comment.

Office of **Highway Safety**

TABLE 4. Office of Highway Safety Statistics

Recommendations Issued[12]	44
Recommendations Closed in an Acceptable Status	18
Recommendations Closed in an Unacceptable Status	3
Board-Adopted Investigation Reports	4
Delegated Investigation Reports	4
Public Webinars	2
Safety Alert	1
Safety Actions	5
Major Investigation Launches	4
Field Investigation Launches	8
Outreach	30

[12] Eight recommendations were adopted in our November 14, 2023, North Las Vegas, Nevada, investigation report, but were not issued until January 2024.

The Office of Highway Safety investigates crashes that have significant safety implications nationwide, highlight national safety issues, involve the loss of numerous lives, or generate high interest because of emerging technologies or the circumstance of the crash. Such investigations may focus on collapses of bridges spanning roadways or tunnel structures, mass casualties and injuries on public transportation vehicles (such as motorcoaches and school buses), and collisions at highway–railroad grade crossings.

This office also investigates crashes that involve new safety issues or technologies (such as automated vehicles and alternatively fueled vehicles), and develops reports based on trends emerging from NTSB investigations and from research and data that identify common risks or the underlying causes of crashes, injuries, and fatalities.

The NTSB is the only US organization that performs independent, comprehensive, and transparent multidisciplinary investigations to determine the probable causes of highway crashes, with the goal of making recommendations to prevent similar events and to reduce injuries and fatalities. Our investigations result in recommendations that provide policymakers with unbiased analysis and that, if implemented, would reduce or eliminate the safety risks identified in the investigations.

The Office of Highway Safety comprises the Investigations Division and the Report Development Division. The Investigations Division is further divided into the Multidisciplinary Branch East, the Multidisciplinary Branch West, and the Special Investigations Branch. The multidisciplinary investigation branches conduct major highway investigations through a multidisciplinary team comprising an investigator-in-charge and five other investigators with expertise in vehicle, highway, human performance, survival, and motor carrier factors. The Special Investigations Branch performs focused investigations by specific subject matter experts on targeted safety issues.

Investigation Reports

During 2024, the Office of Highway Safety issued a total of eight investigation reports; four of these reports involved safety issues that led to the issuance of 36 new safety recommendations.

Below are summaries of the highway investigation reports completed during this period.

Box Truck Centerline Crossover Collision with Bus

Louisville, New York, January 28, 2023

On Saturday, January 28, 2023, about 6:00 a.m., a bus was traveling west on New York State Route 37 (SR-37) at a speed of 53–54 miles per hour (mph) in Louisville, New York.[13] The bus was operated by LBFNY and transporting 14 workers to a solar farm construction site. At the same time, a box truck, operated by Aero Global Logistics (AGL), was traveling east on SR-37 about 59 mph. SR-37 is a two-lane roadway with one lane in each direction and a posted speed limit of 55 mph. The roadway was wet and there was light snow in the area. As the two vehicles approached each other, the truck crossed over the highway centerline and collided with the driver's side of the bus. As a result, six bus passengers died in the crash, two were seriously injured, five had minor injuries, and one was uninjured. The bus driver sustained minor injuries, and the truck driver was seriously injured.

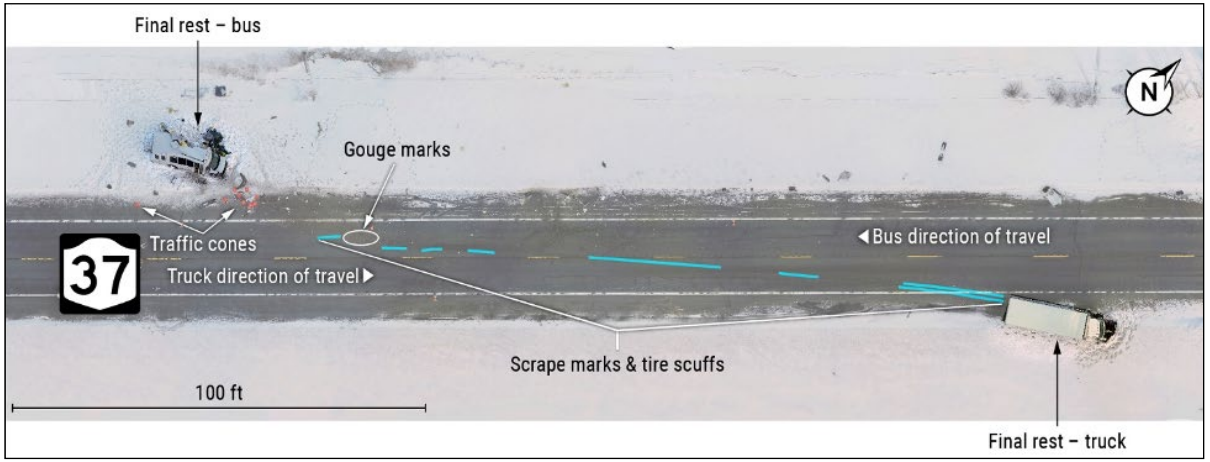


FIGURE 15. Diagram denoting gouge marks at area of impact in westbound lane of State Route 37 (SR-37), final areas of rest of truck and bus, and locations of scrape marks and tire scuffs left by truck after impact (marked in blue). SOURCE: NEW YORK STATE POLICE; ANNOTATED BY NTSB

[13] All times stated are local time.

We determined that the probable cause of the crash was the truck driver's fatigue due to insufficient sleep and circadian disruption, which lowered his level of alertness to the driving task and resulted in the truck crossing the centerline of the roadway into the opposing lane of travel and colliding with the oncoming bus. Contributing to the crash were the failure of the truck motor carrier, AGL, to effectively manage driver fatigue and monitor unsafe driving, and the failure of the bus motor carrier, LBFNY, to operate in compliance with Federal Motor Carrier Safety (FMCSA) regulations and a federal out-of-service order. Also contributing was the FMCSA's ineffective oversight of AGL during the New Entrant Safety Assurance Program and subsequent compliance reviews to ensure that the carrier had appropriate safety management controls in place to mitigate its high crash rate and driver fatigue. Contributing to the severity of the injuries was the failure of the bus motor carrier, LBFNY, to ensure that seat belts were readily accessible and worn, which resulted in multiple bus occupants being displaced from their seats and injured during the collision sequence.

We identified the following safety issues during this investigation:

(1) lack of seat belt use by the bus occupants,

(2) inadequate safety practices of AGL for managing fatigue and crash risk, and

(3) deficient motor carrier oversight by the FMCSA.

As a result of this investigation, we issued safety recommendations to the following:

- FMCSA
- State of Montana
- American Trucking Associations
- National Private Truck Council
- Amalgamated Transit Union
- International Brotherhood of Teamsters
- Owner-Operator Independent Drivers Association
- Transport Workers Union of America
- American Association of Motor Vehicle Administrators (AAMVA)
- LBFNY
- AGL

We also reiterated safety recommendations to the FMCSA, the National Highway Traffic Safety Administration (NHTSA), and the State of New York.

» Recommendations: 12 new, 3 reiterated, 2 classified in this report
» Report Date: November 19, 2024

FIGURE 16. Eastbound SR-37 showing area of impact and roadway scar extending to truck's damaged left front wheel assembly.
SOURCE: NEW YORK STATE POLICE; ANNOTATED BY NTSB

FIGURE 17. Truck at rest off eastbound shoulder of SR-37. SOURCE: NEW YORK STATE POLICE

High-Speed Vehicle Collision with Workers in a Highway Work Zone

Woodlawn, Maryland, March 22, 2023

On Wednesday, March 22, 2023, about 12:36 p.m., six highway workers were struck by a passenger vehicle in a work zone along northbound (inner loop) Interstate 695 near Woodlawn, Maryland. The work zone was a long-term closure of the left shoulder, and all six workers were behind a series of concrete barriers in place to isolate workers from vehicles operating in the travel lanes. The crash occurred when a 2017 Acura TLX, traveling at a vehicle-recorded speed of 121 mph, moved from the right lane, across the two middle lanes and toward the left lane, and struck a 2017 Volkswagen Jetta, which was traveling at a vehicle-recorded speed of 122 mph. The Acura driver lost control, and the vehicle entered the work zone through an opening in the concrete barrier that was intended for work zone access. After striking the center concrete median barrier inside the work zone, the vehicle began to overturn. While overturning, the Acura struck construction materials and equipment and the six workers, who were standing in the work zone. The Volkswagen made a controlled stop in the left lane. All six workers were fatally injured, and the Acura driver was seriously injured.

FIGURE 18. Postcrash view of the work zone and the opening in the concrete barriers through which the Acura entered.
SOURCE: MARYLAND STATE POLICE; ANNOTATED BY NTSB

We determined that the probable cause of the crash between a passenger vehicle and highway workers in a work zone was the excessive speed of two vehicles and unsafe lane change by the Acura driver, resulting in a collision with the Volkswagen and subsequent loss of control, entry into the work zone, rollover, and collision with the workers.

We identified the following safety issue during this investigation: excessive speeding.

» Recommendations: None
» Report Date: October 9, 2024

Pickup Collision with a Group of Bicyclists

Goodyear, Arizona, February 25, 2023

On February 25, 2023, about 7:55 a.m., a group of bicyclists was struck by a 2019 Ford F-250 pickup truck while traveling south over the Cotton Lane Bridge near Goodyear, Arizona. The pickup truck, which was also traveling south, departed the left lane and crossed the right southbound lane and shoulder before striking the southbound bridge barrier. Following the impact, the pickup truck veered left, struck the bicyclists, crossed over both southbound travel lanes, and stopped in the center median of the roadway. As a result of the crash, 2 bicyclists were fatally injured and 14 received injuries ranging from serious to minor. Two were not injured. The driver was wearing a lap/shoulder belt and was also uninjured.

We determined that the probable cause of the crash was the pickup driver's diminished state of alertness, likely due to fatigue. Contributing to the severity of the bicyclists' injuries was the pickup driver's speed and lack of response once the crash sequence began.

We identified the following safety issues during this investigation:

(1) the pickup truck driver's fatigue, and

(2) the lack of adequate protections for vulnerable road users, including bicyclists.

» Recommendations: None
» Report Date: September 20, 2024

FIGURE 19. View of the southbound lanes of Cotton Lane Bridge, showing the final rest positions of the pickup and some of the involved bicycles.

Rear-End Collision Between Combination Vehicle and Medium-Size Bus

Williamsburg, Virginia, December 16, 2022

On Friday, December 16, 2022, about 1:36 a.m., a truck-tractor in combination with a semitrailer, operated by Triton Logistics Incorporated (Triton), was traveling east on Interstate 64 near Williamsburg, Virginia, when it crashed into the rear of a slower-moving medium-size bus, operated by Futrell's Party Adventures, LLC. The bus was traveling about 20–25 mph, while the truck was traveling about 65–70 mph. The truck driver did not brake or take any evasive action while approaching the slower-moving vehicle. As a result of the crash, 3 bus occupants died, 9 sustained serious injuries, and 11 sustained minor injuries. The truck driver also sustained serious injuries.

FIGURE 20. Depiction of the postimpact paths of travel for the truck and bus relative to physical evidence as overlaid atop the scene (orthomosaic image).

We determined that the probable cause of the crash was the truck driver's fatigue, due to excessive driving time and limited sleep opportunity, which resulted in his lack of response to the slow-moving bus ahead.

Contributing to the truck driver's fatigue was the motor carrier, Triton, which created fictitious driver accounts in the electronic logging device system and enabled drivers to operate their vehicles for hours in excess of federal regulations. Contributing to the severity of the crash was the operation of the bus at a significantly slower speed than other highway traffic.

We identified the following safety issues during this investigation:

(1) the inadequate safety culture of the truck motor carrier,

(2) the need for federal requirements for commercial vehicle collision avoidance systems, and

(3) the inadequate safety management and oversight of the bus carrier.

As a result of this investigation, we issued safety recommendations to the FMCSA, the Commonwealth of Virginia, Triton, and the Commercial Vehicle Safety Alliance (CVSA). We also reiterated safety recommendations to NHTSA and the FMCSA.

» Recommendations: 6 new, 3 reiterated
» Report Date: August 12, 2024

Intersection Crash Between Passenger Car and Combination Vehicle

Tishomingo, Oklahoma, March 22, 2022

On the afternoon of March 22, 2022, at 12:19 p.m., a 2015 Chevrolet Spark four-passenger car, occupied by a 16-year-old driver and five teen passengers, was traveling east on Oklahoma State Highway 22 (SH-22) approaching US Highway 377 (US-377) in Tishomingo, Oklahoma. The flow of traffic on SH-22 was controlled by a stop sign, and vehicles on US-377 had no traffic controls. At the same time, a 1994 Peterbilt truck-tractor in combination with a 2017 Travis semitrailer (combination vehicle) was traveling south on US-377 at a calculated speed of 51–53 mph and approaching the intersection with SH-22. The car driver slowed her vehicle in advance of the intersection (behind another vehicle) but did not come to a complete stop at the stop sign or yield to the oncoming combination vehicle. Instead, the car driver sped up to make a left turn in front of the combination vehicle. The combination vehicle driver applied braking and steered to try to avoid the collision, but the combination vehicle struck the driver's side of the car; all six occupants in the car were fatally injured. The combination vehicle driver was not injured in the crash.

FIGURE 21. Damage to passenger car where six teens died following a crash with a truck-tractor.
SOURCE: OKLAHOMA DEPARTMENT OF PUBLIC SAFETY

We determined that the probable cause of the collision was the teen driver's acceleration through the intersection after briefly slowing without stopping, due to distraction from having five teen passengers in the car, limited driving experience, and likely impairment from cannabis.

We identified the following safety issues during this investigation:

(1) the car driver's distraction from transporting multiple teen passengers, inexperience with driving, and likely impairment due to recent cannabis use; and

(2) the need for public awareness, effective communication, and access to resources about the impairing effects of cannabis use on driving.

As a result of this investigation, we issued safety recommendations to the following:

- Oklahoma State Department of Education
- Service Oklahoma
- Governors Highway Safety Association (GHSA)
- National Conference of State Legislatures
- National Association of State Boards of Education
- AAMVA

We also reiterated previously issued safety recommendations to Oklahoma, 19 states, the District of Columbia, and the Commonwealth of Puerto Rico.

» Recommendations: 7 new, 2 reiterated
» Report Date: May 30, 2024

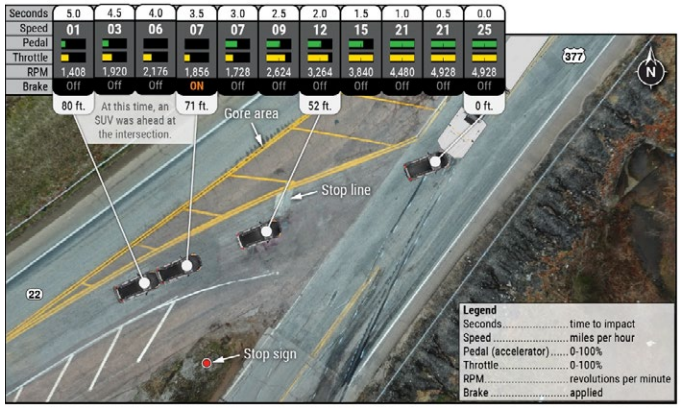


FIGURE 22. Graphical depiction of passenger car speeds, acceleration statuses, and locations in the 5 seconds before the crash, based on event data recorder.
SOURCE: OKLAHOMA DEPARTMENT OF PUBLIC SAFETY

Fire on Battery Electric Transit Bus

Hamden, Connecticut, June 23, 2022

On Saturday, July 23, 2022, about 3:39 a.m., a battery electric transit bus, owned by the Connecticut Department of Transportation and operated by public transit system CTtransit, began emitting smoke while parked inside a CTtransit maintenance facility in Hamden, Connecticut. The bus had been placed out of service 2 days earlier due to an error in the bus charging system. Responding fire department personnel did not observe any visible flames, and the bus was pushed to an outdoor, isolated parking area. In the process, two CTtransit maintenance workers suffered smoke inhalation and were treated at an area hospital. Later that same morning, the bus was again emitting smoke, and fire was observed coming from the rear of the vehicle. Fire personnel returned to the site and the incident commander decided to let the bus burn in the controlled environment. The fire remained active for several hours and fully consumed the vehicle. Following the departure of fire personnel, the bus continued to smolder while remaining isolated in the parking lot. On Monday, July 25, 2022, smoke and an orange glow were observed emanating from the right rear wheel well of the burned bus. Fire department personnel responded for a third time and applied water to the smoking battery compartment. No additional injuries were reported. We investigated two additional battery electric transit bus fires, one that occurred at an IndyGo facility in Indianapolis, Indiana and another at a Southeastern Pennsylvania Transportation Authority (SEPTA) facility in Philadelphia, Pennsylvania, that we summarized in this report.

We determined that the probable cause of the fire was moisture in the high-voltage lithium-ion battery system, which led to battery damage resulting in the fire. Contributing to the injuries to facility personnel was the lack of a safety plan by CTtransit for mitigating risks associated with high-voltage lithium-ion battery fires during emergency response.

FIGURE 23. View of the burned transit bus from the left rear corner of the bus.

We identified the following safety issue during this investigation: inadequate emergency responder safety and emergency response guides that provide vehicle-specific information about safely extinguishing fires, mitigating reignition events, and transporting and storing damaged vehicles. Following the investigation, the Federal Transit Administration (FTA) issued additional guidance.

» Recommendations: None
» Report Date: March 4, 2024

Collapse of the Fern Hollow Bridge

Pittsburgh, Pennsylvania, January 28, 2022

On Friday, January 28, 2022, about 6:37 a.m., the Fern Hollow Bridge, which carried Forbes Avenue over the north side of Frick Park in Pittsburgh, Pennsylvania, experienced a structural failure. As a result, the 447-foot-long bridge fell about 100 feet into the park below. The collapse began when the transverse tie plate on the southwest bridge leg failed due to extensive corrosion and section loss. The corrosion and section loss resulted from clogged drains that caused water to run down bridge legs and accumulate along with debris at the bottom of the legs, which prevented the development of a protective rust layer or patina. Although repeated maintenance and repair recommendations were documented in many inspection reports, the City of Pittsburgh failed to act on them, leading to the deterioration of the fracture-critical transverse tie plate and the structural failure of the bridge. At the time of the collapse, a 2013 New Flyer articulated transit bus, operated by the Port Authority of Allegheny County, and four passenger vehicles were on the bridge. A fifth passenger vehicle drove off the east bridge abutment after the collapse began and came to rest on its roof on the ground below. As a result of the collapse, the bus driver sustained minor injuries, and two bus occupants were uninjured. Of the six passenger vehicle occupants, two sustained serious injuries, one sustained a minor injury, two were uninjured, and the injury status of one was unknown.

FIGURE 24. West-looking view of collapsed Fern Hollow Bridge.

We determined that the probable cause of the collapse was the failure of the transverse tie plate on the southwest leg of the bridge, a fracture-critical member (nonredundant steel tension member), due to corrosion and section loss resulting from the City of Pittsburgh's failure to act on repeated maintenance

and repair recommendations from inspection reports. Contributing to the collapse were the poor quality of inspections, the incomplete identification of the bridge's fracture-critical members (nonredundant steel tension members), and the incorrect load rating calculations for the bridge. Also contributing to the collapse was insufficient oversight of Pittsburgh's bridge inspection program by the Pennsylvania Department of Transportation (PennDOT). Also contributing to the collapse was insufficient oversight by the Pennsylvania Department of Transportation of the City of Pittsburgh's bridge inspection program.

We identified the following safety issues during this investigation:

(1) the lack of action on repeated recommendations from bridge inspection reports, including the City of Pittsburgh's failure to maintain and repair the Fern Hollow Bridge and PennDOT's failure to ensure that the city of Pittsburgh completed the maintenance and repairs specified in the recommendations from the bridge inspection reports;

(2) PennDOT's ineffective bridge inspection program, which used bridge inspection methods and measures that did not comply with guidance from the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), that failed to identify all of the bridge's fracture-critical members, and that produced inaccurate bridge load rating calculations; and

(3) insufficient oversight by the city, PennDOT, and the FHWA, which led to their failure to carry out their responsibilities within the bridge inspection program to detect and prevent bridge failures.

As a result of this investigation, we issued safety recommendations to the FHWA, PennDOT, the City of Pittsburgh, and AASHTO. We also classified a previously issued safety recommendation to the FHWA.

- » Recommendations: 11 new, 1 classified in this report
- » Report Date: February 21, 2024

Intersection Crash between a Medium-Size Bus and a Combination Vehicle

Dermott, Arkansas, June 6, 2022

On June 6, 2022, about 2:41 p.m., a crash occurred between a medium-size bus and a truck-tractor combination vehicle at an intersection of US Highway 65 (US-65) and State Highway 35 (SH-35) near Dermott, Arkansas. The bus was traveling westbound on SH-35 and, without yielding, began crossing the southbound lanes of US-65, where it was struck by the combination vehicle. Five bus passengers died, and three bus passengers sustained serious injuries; both drivers were seriously injured.

We determined that the probable cause of the crash was the failure of the bus driver to yield to the combination vehicle, likely as the result of fatigue.

We identified the following safety issues during this investigation:

(1) the lack of onboard video recorders on the bus, and

(2) insufficient oversight of the driver's fitness for duty by the bus operator.

- » Recommendations: None
- » Report Date: February 5, 2024

FIGURE 25. The two vehicles postcrash at the scene of the collision.
SOURCE: ARKANSAS STATE POLICE, ANNOTATED BY NTSB

Ongoing Significant Highway Accident Investigations

At the close of 2024, the Office of Highway Safety had 17 open investigations involving significant safety issues. We are devoting significant resources to these investigations and anticipate producing a report upon the completion of each one.

TABLE 5. Ongoing Significant Highway Safety Investigations

Location	Event Date	Description	Fatalities	2025 Report Date
Vicksburg, Mississippi	8/31/2024	Motorcoach roadway departure and overturn	7	
Swanton, Ohio	8/15/2024	Rear-end collision and subsequent multivehicle collisions near toll plaza on Interstate 80	4	
Belle Glade, Florida	8/5/2024	Sport utility vehicle (SUV) roadway departure and overturn	9	
Kenly, North Carolina	7/24/2024	Multivehicle work zone collision and postcrash fire	5	
Rushville, Illinois	3/11/2024	School bus collision with combination vehicle and postcrash fire	5	
Millstone, West Virginia	3/4/2024	School bus roadway departure and overturn	0	
Philadelphia, Pennsylvania	3/3/2024	Rear-end collision between an SUV operating with partial driving automation and two stationary passenger vehicles	2	
San Antonio, Texas	2/24/2024	Rear-end collision between an SUV operating with partial driving automation and a stationary SUV	1	
Wilmington, California	2/15/2024	Compressed natural gas-powered truck-tractor fire and explosion	0	
Etna, Ohio	11/14/2023	Multivehicle collision including motorcoach transporting students and postcrash fire	7	
Teutopolis, Illinois	9/29/2023	Cargo tank combination vehicle roadway departure crash and subsequent release of anhydrous ammonia	5	
Wawayanda, New York	9/21/2023	Motorcoach roadway departure and overturn	2	7/10/2025
Highland, Illinois	7/12/2023	Crash between motorcoach and combination vehicles parked along rest area ramp	3	5/20/2025
Philadelphia, Pennsylvania	6/11/2023	Combination vehicle overturn, fire, and Interstate 95 overpass collapse	1	3/19/2025
Excelsior Township, Wisconsin	5/12/2023	Vehicle collision with stopped school bus and student pedestrian	1	6/4/2025

Public Webinars

Preventing Drugged Driving Among Youth: Understanding the Issue and Advocating for Change

October 24, 2024

During this webinar, experts in youth traffic safety and drug-use prevention explored the risks associated with drug-impaired driving among youth and highlighted effective advocacy strategies for preventing drug-impaired driving.

Back-to-School Safety

August 21, 2024

Our panel of NTSB experts highlighted pertinent safety recommendations and crash investigations for returning to school safely and provided examples from personal back-to-school safety stories.

Safety Alert

During 2024, the Office of Highway Safety developed the following safety alert for issuance by the Board:

Parents: Protect Your Teen from Marijuana-Impaired Driving » SA-93

Educating drivers about the risks of marijuana-impaired driving is essential for preventing fatal crashes like the one that occurred in Tishomingo, Oklahoma. As states continue to legalize marijuana and thereby remove barriers to its access and use, it becomes even more important to provide accurate information about marijuana's impairing effects and the continued illegality of driving under its influence. The NTSB's safety alert focuses on parents' role in protecting their teen drivers from marijuana-impaired driving.

Safety Actions

During 2024, the Office of Highway Safety documented five safety actions. The following are summaries of these actions.

- The CVSA's roadside inspection protocols for commercial vehicles lacked a step to compare commercial motor vehicles' gross vehicle weight rating to driver's license class. NTSB staff petitioned the CVSA to amend the inspection procedures to ensure that roadside inspectors were properly comparing vehicle gross vehicle weight ratings with the driver's license to ensure compliance with regulations. On September 21, 2022, the CVSA voted and confirmed the suggested changes to the inspection procedures. The current procedures now require the inspector to verify the gross vehicle weight rating and compare it to the license for proper license class.
- Mid-State Systems Inc. did not keep files for driver performance and qualification in the same place, which resulted in poor oversight of driver safety. As a result of our investigation of a crash in Etna, Ohio, Mid-State Systems Inc. now keeps records of all driver notices, such as those related to inspections, traffic violations, and outside communications, in the driver's file, and keeps a master list of all such documents. Drivers are interviewed, coached, and informed of the ramifications of any policy breaches. The driver signs and dates a receipt of the information.
- Our investigation into a single-vehicle fatal crash in Belle Glade, Florida, found there was no warning signage for the curve at the crash site. At our urging, the Palm Beach County Department of Transportation installed the warning signage on August 9, 2024.
- As a result of our investigation into the crash in Tishomingo, Oklahoma, the Oklahoma Department of Transportation proposed a redesign of the crash intersection to improve safety and submitted a project initiation report.
- Also as a result of our investigation into the crash in Tishomingo, Oklahoma, school officials reported that they had established policies regarding students driving off campus for lunch. These new policies included the terms of the state's graduated driver's license restrictions (including passenger limits), limiting the number of passengers to the number of seat belts available in a vehicle, and prohibiting students from traveling beyond town limits for lunch.

Other Significant Achievements

Regulatory Correspondence

We provided feedback and guidance on six regulatory efforts, including, but not limited to the following rulemakings:

- FMCSA's Safety Fitness Determinations,
- NHTSA's Federal Motor Vehicle Safety Standards Occupant Crash Protection and Seat Belt Reminder Systems,
- NHTSA's Federal Motor Vehicle Safety Standards for Pedestrian Head Protection, and
- NHTSA's Federal Motor Vehicle Safety Standards, "FMVSS No. 305a Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20."[14]

Investments in Technology

The Office of Highway Safety invested time and resources to train multiple investigators within the office and those in other modal offices on the use of drone technology to accurately and completely document our investigations. We invested in software to better visualize drone data and in tablets to expand the investigators' on-scene capabilities during drone flights.

Office of Highway Safety Manager Training

In September, the office coordinated in-person manager training focusing on communicating for employee engagement and performance.

14 See Congressional and Regulatory Correspondence for more information on NTSB responses to regulatory actions and requests for comment.

Office of **Marine Safety**

TABLE 6. Office of Marine Safety Statistics

Recommendations Issued	13
Recommendations Closed in an Acceptable Status	8
Recommendations Closed in an Unacceptable Status	7
Board-Adopted Investigation Reports	3
Delegated Investigation Reports	35
Safety Alert	1
Safety Action	1
Major Investigation Launches	1
Field Investigation Launches	33
Outreach	18

The Office of Marine Safety investigates and determines the probable cause of major marine casualties in US territorial waters, major marine casualties involving US-flagged vessels worldwide, and accidents involving both US public (federal) and nonpublic vessels in the same casualty. In addition, the office investigates select catastrophic marine accidents and events of a recurring nature.

The US Coast Guard conducts preliminary investigations of all marine accidents and notifies the NTSB when an event qualifies as a major marine casualty, which includes any one of the following:

- The loss of six or more lives.
- The loss of a mechanically propelled vessel of 100 or more gross tons.
- Property damage initially estimated to be $500,000 or more.
- A serious threat, as determined by the commandant of the US Coast Guard and concurred with by the NTSB chairman, to life, property, or the environment by hazardous materials.

The office is also responsible for the overall management of the NTSB's international marine safety program, under which the office investigates major marine casualties involving foreign-flagged vessels in US territorial waters and those involving US-flagged vessels anywhere in the world. Accidents involving foreign-flagged vessels accounted for

29 percent of NTSB marine casualty investigations over the past 5 years. Under the International Maritime Organization (IMO) *Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident*, the office also participates with the US Coast Guard as a substantially interested state in investigations of serious marine casualties involving foreign-flagged vessels in international waters. The international program involves reviewing US administration position papers related to marine investigations and participating in select IMO subcommittee meetings.

As part of the international program, the office coordinates with other US and foreign agencies to ensure consistency with IMO conventions. We also cooperate with other accident investigation organizations worldwide at annual meetings held both virtually and in person, such as the Marine Accident Investigators' International Forum (MAIIF), which has status as a nongovernmental organization with IMO, with Europe MAIIF, and with MAIIF Americas. MAIIF tracks developments related to marine casualty investigations and prevention.

The NTSB is the only federal organization that performs independent, comprehensive, and transparent multidisciplinary investigations to determine the probable cause of marine accidents, with the goal of making safety recommendations to prevent similar events from occurring in the future. The thoroughness and independence of these investigations maintain public confidence in marine transportation systems and provide policymakers with unbiased analysis.

The Office of Marine Safety comprises the Marine Investigations Division and the Product Development Division.

Investigation Reports

During 2024, the Office of Marine Safety issued a total of 38 investigation reports; three of these reports involved safety issues that led to the issuance of 13 new safety recommendations.

Below are summaries of some of the marine investigation reports completed during this period.

Fire aboard Passenger Vessel *Spirit of Boston*

Boston, Massachusetts, March 24, 2023

On March 24, 2023, about 10:52 p.m., a fire broke out in the wait station on deck 1 of the passenger vessel *Spirit of Boston* while it was moored at the Commonwealth Pier in Boston Harbor, Boston, Massachusetts.[15] All 16 persons aboard evacuated the vessel to the pier. The local fire department responded and extinguished the fire. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at $3.1 million.

We determined that the probable cause of the fire was the improper extinguishing and disposal of a chafing fuel heating canister due to City Cruises US's lack of documented procedures for handling open-flame devices, which led to the ignition of a plastic glassware rolling rack. Contributing to the growth and spread of the fire was City Cruises US not requiring a marine crewmember—designated and trained to execute City Cruises US's emergency response plan for a fire aboard a vessel—to remain aboard the vessel until all hospitality staff and other noncrew personnel departed the vessel.

FIGURE 26. Passenger vessel *Spirit of Boston* after the fire.

We identified the following safety issues during this investigation:

(1) the absence of marine crewmembers aboard the vessel during an emergency while hospitality staff were still aboard,

(2) improper handling of open-flame devices, and

(3) the lack of established mechanisms for City Cruises US to identify unsafe practices and fire risks.

[15] All times stated are local time.

As a result of this investigation, we issued safety recommendations to the Passenger Vessel Association and to City Cruises US. We also reiterated a previously issued safety recommendation to the US Coast Guard.

» Recommendations Issued: 4 new; 1 reiterated
» Report Date: December 13, 2024

Contact of *Cindy B* Tow with Dock

Clatskanie, Oregon, November 12, 2023

On November 12, 2023, about 5:52 a.m., the towing vessel *Cindy B* was pushing the loaded deck barge *St. John* upbound on the Columbia River at mile 53 near Clatskanie, Oregon, when the tow gradually moved to starboard out of the navigation channel and struck the Port Westward Beaver Dock. The three crewmembers aboard the *Cindy B* were uninjured. During the cleanup, about 2 gallons of renewable diesel fuel leaked onto the dock from a damaged pipe on the dock, with about 1 gallon going into the river; a portion of the spilled fuel was recovered. Damage to the *St. John* and the Beaver Dock was estimated to be about $6 million.

FIGURE 27. *Cindy B* and *St. John* underway after contact with the Beaver Dock.
SOURCE: COLUMBIA PACIFIC BIO-REFINERY

We determined that the probable cause of the contact was the deckhand falling asleep at the helm due to fatigue that he did not perceive, which occurred during a night watch, at a low point in his circadian rhythm, and following a change in his awake/sleep cycle. Contributing to the casualty was the pilothouse alerter system not alarming to wake the incapacitated deckhand at the helm because a swinging very high frequency radio microphone in the motion sensors' field of view defeated the system.

» Recommendations Issued: None
» Report Date: September 23, 2024

Contact of Towing Vessel *John 3:16* with Pier

Saint Rose, Louisiana, September 12, 2023

On September 12, 2023, about 6:41 a.m., the towing vessel *John 3:16* was transiting the Lower Mississippi River near Saint Rose, Louisiana, when the vessel contacted an industrial cargo pier. No pollution or injuries were reported. The final cost to repair the damages to the towing vessel and pier was $285,441.

FIGURE 28. *John 3:16* underway on an unknown date before the contact. SOURCE: MARQUETTE TRANSPORTATION

We determined that the probable cause of the contact was the pilot falling asleep while navigating due to an accumulated sleep debt. Contributing to the pilot's fatigue was cell phone use during off-watch time, which significantly limited the pilot's opportunity for sleep.

» Recommendations Issued: None
» Report Date: August 1, 2024

Engine Room Fire on board Passenger Ferry *Sandy Ground*

Staten Island, New York, December 22, 2022

On December 22, 2022, about 4:54 p.m., an engine room fire broke out aboard the passenger ferry *Sandy Ground* while the vessel was underway in New York Harbor near Staten Island, New York, with 884 persons aboard. The crew extinguished the fire by activating the engine room's fixed fire extinguishing system. The vessel lost propulsion and electricity, and the crew deployed both anchors. Most of the passengers transferred to responding Good Samaritan vessels; the *Sandy Ground* was towed to the St. George Ferry Terminal in Staten Island, where the remaining persons on board disembarked. There were no injuries, and no pollution was reported. Damage to the vessel was estimated at $12.7 million.

We determined that the probable cause of the engine room fire was the design of the vessel's diesel engine fuel oil return system, which included isolation valves that could be regularly adjusted by the crew and, when closed, stopped return fuel oil flow from all operating engines, resulting in the overpressurization of the fuel oil system and the ignition of fuel oil spraying from ruptured fuel oil filters onto the exhaust manifold of a running engine. Contributing to the overpressurization was the operator's inadequate training program on fuel oil system operation, which did not provide follow-on instruction after the installation of fuel oil return isolation valves at the day tanks.

FIGURE 29. Evacuation of passengers from the *Sandy Ground* to the *Franklin Delano Roosevelt*.
SOURCE: NEW YORK CITY DEPARTMENT OF TRANSPORTATION FERRY DIVISION

We identified the following safety issues during this investigation:

(1) engineering crewmembers' ineffective management of fuel oil day tank levels on the *Sandy Ground*,

(2) inadequate training for engineering crewmembers on the use of fuel oil return isolation ball valves in the fuel oil system,

(3) the need for a requirement to maintain unimpeded return flow in diesel engine fuel oil return systems, and

(4) the need for additional regulatory and classification society guidance on fuel oil return system design.

As a result of this investigation, we issued safety recommendations to the US Coast Guard and to the American Bureau of Shipping.

» Recommendations Issued: 5 new
» Report Date: July 9, 2024

Contact of *Queen City* Tow with Vane Dike

Louisville, Kentucky, March 28, 2023

On March 28, 2023, about 2:24 a.m., the towing vessel *Queen City* was downbound on the Ohio River in high-water conditions, pushing an 11-barge tow, when the tow struck the Vane Dike at the arrival point for the McAlpine Locks and Dam in Louisville, Kentucky, and broke apart. No pollution or injuries were reported. Total damages to the barges and cargo were estimated to be $1.98 million.

We determined that the probable cause of the contact was the pilot not effectively compensating for the strong outdraft while navigating toward the lock channel entrance during a period of high-flow conditions.

» Recommendations Issued: None
» Report Date: May 7, 2024

FIGURE 30. Barges *IN995423* and *IB1938* against the lower dam gates. *IB1913* is receiving methanol from *IB1938* through a cargo transfer hose.
SOURCE: US COAST GUARD

Contact of Tank Vessel *Bow Triumph* with Pier

Charleston, South Carolina, September 5, 2022

On September 5, 2022, about 4:02 p.m., the 600-foot-long tanker *Bow Triumph* was transiting outbound on the Cooper River near Naval Weapons Station, Joint Base Charleston, South Carolina, when the vessel struck Naval Weapons Station Pier B. The vessel's bow sustained significant damage, and a 300-foot section of the pier collapsed. No pollution or injuries were reported. Damage to the vessel and pier was estimated at $29.5 million.

FIGURE 31. *Bow Triumph* at the Odfjell Terminal in Charleston on September 8, 2022, showing damage to the vessel's starboard side. SOURCE: US COAST GUARD

We determined that the probable cause of the contact was the pilot's decision to maneuver the vessel close to the left bank while approaching the turn immediately before the pier, exposing the tanker to bank effect, which the pilot's subsequent rudder and engine orders could not overcome.

» Recommendations Issued: None
» Report Date: April 15, 2024

Collision between Tugboat *Mark E Kuebler* and Tanker *Nisalah*

Port Aransas, Ingleside, Texas, January 22, 2023

On January 22, 2023, about 3:30 p.m., the tugboat *Mark E Kuebler* and the tanker *Nisalah* collided while the tanker was transiting inbound in the Corpus Christi Ship Channel near Ingleside, Texas. The tugboat's hull was breached, and the tanker's propeller was damaged in the collision. The captain of the *Mark E Kuebler* grounded the tugboat to prevent it from sinking, and, while aground, a small sheen of hydraulic oil was observed near the tugboat. The oil was recovered with absorbent pads. No injuries were reported. Damage to the *Mark E Kuebler* was estimated at $3 million; damage to the *Nisalah* was estimated at $3.9 million.

FIGURE 32. *Mark E Kuebler* aground following the collision. SOURCE: G & H TOWING

FIGURE 33. Tanker *Nisalah* in 2018.
SOURCE: PATRICK DEENIK

We determined that the probable cause of the collision was the mate maneuvering the tugboat near the starboard quarter of the tanker, which resulted in the tugboat being drawn in toward the tanker by hydrodynamic forces that the tugboat had insufficient reserve power to counteract due to the transit speed of the vessels.

» Recommendations Issued: None
» Report Date: February 21, 2024

Anchor Strike of Underwater Pipeline and Eventual Crude Oil Release

San Pedro Bay near Huntington Beach, California, October 1, 2021

On October 1, 2021, at 4:10 p.m., San Pedro Bay Pipeline controllers received the first of a series of leak detection system alarms for their underwater pipeline located in San Pedro Bay, 4.75 nautical miles off the coast of Huntington Beach, California. Over the next 13 hours, the controllers conducted seven pipeline shutdowns and restarts to identify the problem. At 6:04 a.m. on October 2, controllers shut down the pipeline for the eighth and final time. A pipeline contractor vessel crew visually confirmed a crude oil release at 8:09 a.m. and Beta Offshore, the pipeline operator, initiated an oil spill response. An estimated 588 barrels of oil leaked from the pipeline. Damage, including clean-up costs, was estimated at $160 million. There were no injuries. A postaccident underwater examination of the pipeline found a crack along the top of the pipeline within a section of the pipeline that had been displaced from its originally installed location. Additionally, scarring consistent with anchor dragging was identified on the seafloor near the crack location. Postaccident investigation determined that the containerships *MSC Danit* and *Beijing* had dragged anchor near the pipeline months before the oil release, on January 25, 2021.

FIGURE 34. Crude oil in the Pacific Ocean off the California coast on October 3, 2021. Oil spill removal organization vessels are towing a skirted oil boom to contain the oil spill. SOURCE: US COAST GUARD

We determined that the probable cause of the damage to and subsequent crude oil release from the pipeline was the proximity of established anchorage positions to the pipeline, which resulted in two containerships' anchors striking the pipeline when the ships dragged anchor in high winds and seas. Contributing to the crude oil release was the undetected damage to the pipeline, which allowed fatigue cracks to initiate and grow to a critical size and the pipeline to leak nearly 9 months later. Contributing to the amount of crude oil released was Beta Offshore's insufficient training of its pipeline controllers, which resulted in the failure of the controllers to appropriately respond to leak alarms by shutting down and isolating the pipeline. Contributing to the pipeline controllers' inappropriate response to the leak alarms was the water buildup in the pipeline, an incorrect leak location indicated by Beta Offshore's leak detection system, and frequent previous communication-loss alarms.

We identified the following safety issues during this investigation:

(1) an insufficient distance between anchorage locations and the pipeline,

(2) the need for notification of potential pipeline damage to the pipeline operator,

(3) the need for improvements to vessel traffic services vessel monitoring systems,

(4) the incorrect response by pipeline controllers to leak alarms,

(5) the lack of postaccident alcohol and other drug testing for pipeline controllers, and

(6) the need for pipeline operators to implement pipeline SMSs.

As a result of this investigation, we issued safety recommendations to the US Coast Guard, the Marine Exchange of Southern California, and the Pipeline and Hazardous Materials Safety Administration (PHMSA).

- » Recommendations Issued: 6 new
- » Report Date: January 2, 2024

Ongoing Significant Marine Investigations

At the close of 2024, the Office of Marine Safety had 67 open domestic investigations. The following ongoing investigations involved significant safety issues. We are devoting significant resources to these investigations and anticipate producing a report upon the completion of each one.

TABLE 7. Ongoing Significant Marine Investigations

Location	Event Date	Description	Fatalities	2025 Report Date
La Salle, Michigan	8/10/2024	Collision between recreational vessel and uncrewed surface vessel (US)	0	
Baltimore, Maryland	3/26/2024	Contact of containership *Dali* (SGP) with Francis Scott Key Bridge and subsequent bridge collapse	6	
Goose Creek, South Carolina	1/14/2024	Contact of bulk carrier *Hafnia Amessi* (SGP) with Joint Base Charleston—Naval Weapons Station Pier B	0	3/24/2025
La Porte, Texas	1/8/2024	Engine room fire aboard cargo vessel *Stride* (PAN)	2	1/29/2025
Dutch Harbor, Alaska	12/27/2023	Fire aboard cargo vessel *Genius Star XI* (PAN)	0	
Newark, New Jersey	7/5/2023	Fire aboard roll-on/roll-off containership *Grande Costa D'Avorio* (ITA)	2	4/15/2025
Atlantic Ocean, 900 nautical miles east of Cape Cod, Massachusetts	6/18/2023	Hull failure of submersible *Titan* (US)	5	

Investigative Hearings

US Coast Guard Marine Board of Investigation: Hull Failure of Submersible *Titan*

September 16–27, 2024

From September 16 to September 27, 2024, the US Coast Guard held a Marine Board of Investigation hearing in Charleston, South Carolina, regarding the hull failure of the submersible *Titan*, which occurred on June 22, 2023, about 900 nautical miles east of Cape Cod, Massachusetts. The *Titan* had submerged at 8:00 a.m. that day with five people on board and was scheduled to surface in the afternoon after viewing the wreckage of the *Titanic*, but the research vessel *Polar Prince* lost contact with the submersible about 1 hour and 45 minutes into its voyage. On June 22, about 3:00 p.m., the US Coast Guard announced that the *Titan*'s tail cone and additional debris had been found. All five people on board are presumed dead.

One representative from the Office of Marine Safety and another from the Office of Research and Engineering participated in the hearing. The Marine Board of Investigation, the highest level of marine casualty investigation conducted by the US Coast Guard, is tasked with examining the causes of the marine casualty and making recommendations to improve maritime safety.

US Coast Guard Formal Investigation Hearing: Fire aboard the Roll-on/Roll-off Cargo Vessel *Grande Costa D'Avorio*

January 10–18, 2024

From January 10 to January 18, 2024, the US Coast Guard held a formal investigation public hearing in Newark, New Jersey, into the fire aboard the roll-on/roll-off cargo vessel *Grande Costa D'Avorio*, which occurred at the Port of Newark during cargo loading operations on July 5, 2023. The 692-foot Italian-flagged vessel was on a regular run, loading containerized cargo and used vehicles in ports along the US East Coast and delivering them to ports in West Africa. The vessel was loading used vehicles in Newark when a vehicle fire broke out. Crewmembers were unable to extinguish the fire and evacuated the cargo space. Shoreside firefighters responded to assist, and two firefighters were fatally injured. The fire was finally extinguished on July 11, 2024.

One representative from the Office of Marine Safety and another from the Office of Research and Engineering participated alongside the US Coast Guard in questioning witnesses. The hearing detailed the condition of the *Grande Costa D'Avorio* prior to and at the time of the fire, including the cargo loading process for vehicles at the Port of Newark, initial response actions by the ship's crew, and subsequent response and recovery efforts by local land-based fire departments.

International Investigations

Given the international nature of the marine transportation system and the number of foreign-registered (-flagged) cruise and cargo ships operating from US ports, the NTSB's investigation of accidents involving both domestic and foreign-registered vessels promotes marine safety worldwide.

Capsizing and Sinking of Yacht *Bayesian*

Sicily, Italy, August 19, 2024

On August 19, 2024, at 6:14 a.m., the 184-foot recreational yacht *Bayesian* capsized and sank off the coast of Sicily, Italy, during a severe weather event. There were 22 people aboard the vessel (10 crewmembers and 12 passengers); 7 were fatally injured (1 crewmember and 6 passengers) and 15 were rescued. The US Coast Guard (Coast Guard Activities Europe) and the NTSB are participating in the investigation of this casualty with the United Kingdom (Marine Accident Investigation Branch) under the IMO *Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident*.

Weather-Related Damage to Passenger Vessel *Viking Polaris*

Cape Horn, Chile, November 29, 2022

On November 29, 2022, the 665-foot-long passenger vessel *Viking Polaris* was transiting Drake Passage near Cape Horn, Chile, when the vessel experienced weather-related damage, causing passenger cabin windows to shatter. One passenger was fatally injured, and eight passengers sustained injuries. The NTSB and the US Coast Guard represented the United States, which was invited to participate in this investigation as a substantially interested state, and we produced an investigation close-out memorandum.

Safety Alert

In 2024, the Office of Marine Safety developed one safety alert for issuance by the Board.

Reducing the Risk of Diesel Engine Fuel Return System Overpressurization » SA-094

We urged vessel owners and operators to mitigate the risk of engine room fires resulting from the overpressurization of diesel engine fuel systems by eliminating isolation valves in return lines or using one of three other alternatives: installing a check valve in the return line, a locked-open isolation valve, or a pressure relief valve in the return line.

Safety Action

During 2024, the Office of Marine Safety documented one safety action.

- In 2024, the National Oceanic and Atmospheric Administration's Ocean Prediction Center released the Freezing Spray Guidance web page in response to the NTSB's recommendations and investigation of the 2019 capsizing and sinking of the commercial fishing vessel *Scandies Rose* near Sutwik Island, Alaska. This new web page shows estimates of ice accumulation in centimeters per hour on a vessel moving through the region at an average speed of about 20 knots. It also provides icing hazard information from three forecast models and better user interface and imagery, and it covers both the Alaska and north Atlantic marine regions.

Other Significant Achievements

Safer Seas Digest 2023: Annual Publication

The *Safer Seas Digest* 2023 was released in May 2024. The digest comprises concise summaries of the previous year's casualty investigations and represents the NTSB's continuing commitment to sharing the lessons that we learn through our marine investigations to inspire safety improvements. Some of the safety issues examined in the 2023 edition included the following:

- Detecting small vessels
- Communicating effectively
- Inspecting equipment proactively
- Mitigating fatigue
- Anticipating fire hazards
- Improving firefighting training
- Conducting timely hull maintenance and repair
- Maintaining an effective watch
- Avoiding nonoperational cell phone use
- Reporting chart changes and hazards
- Avoiding excessive speed during bow-to-bow harbor-assist operations
- Preventing vessel damage from the risk of thermal runaway of lithium-ion batteries
- Reporting potential damage from dragging anchors

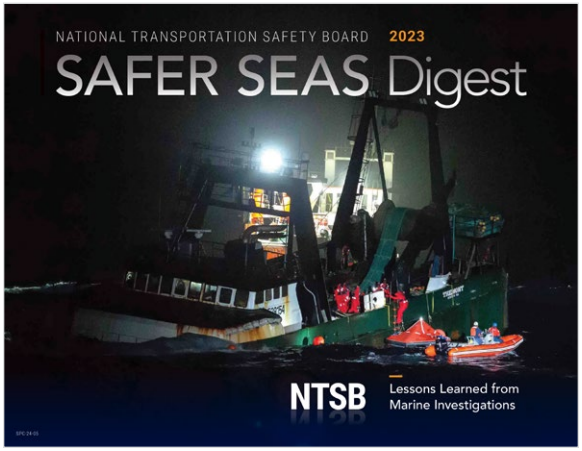


FIGURE 35. *Safer Seas Digest* 2023 cover.

Congressional and Inter-Agency Briefings

- On September 17, 2024, the acting director of the Office of Marine Safety presented information regarding the ongoing *Dali* investigation at the US Committee on the Marine Transportation System Coordinating Meeting and answered questions from committee members.
- On May 23, 2024, office staff briefed congressional authorizing committee members and staff regarding the *Dali*-Francis Scott Key Bridge investigation and the preliminary findings.

Office of **Railroad, Pipeline and Hazardous Materials Investigations**

TABLE 8. Office of Railroad, Pipeline and Hazardous Materials Investigations Safety Statistics

Recommendations Issued[16]	38
Recommendations Closed in an Acceptable Status	31
Board-Adopted Investigation Reports	1
Safety Alert	1
Safety Actions	9
Major Investigation Launches	2
Field Investigation Launches	21
Publication	1
Outreach	63

[16] Two pipeline safety recommendations were issued from the San Pedro Bay near Huntington Beach, California investigation, and two railroad safety recommendations were issued from the Arlington, Virginia investigation, which were adopted in 2023 and released on January 5, 2024.

The Office of Railroad, Pipeline and Hazardous Materials Investigations investigates accidents involving railroads, pipelines, and hazardous materials, and evaluates the associated emergency response. Based on the findings of these investigations, the NTSB may issue safety recommendations to federal and state regulatory agencies; unions, industry, and safety standards organizations; carriers and pipeline operators; equipment and container manufacturers; producers and shippers of hazardous materials; and emergency response organizations. The NTSB may also issue safety alerts to industry.

The Office of Railroad, Pipeline and Hazardous Materials Investigations comprises four divisions: Railroad, Pipeline and Hazardous Materials, System Safety, and Report Development.

Investigation Reports

During 2024, the Office of Railroad, Pipeline and Hazardous Materials Investigations issued a total of 12 investigation reports; 1 of these involved safety issues that led to the issuance of 34 safety recommendations.

Below are summaries of seven of the railroad, pipeline, or hazardous materials investigation reports completed during this period.

Union Pacific Railroad Train Collision
Chico, Texas, April 16, 2023

On April 16, 2023, about 6:44 p.m., a southbound Union Pacific Railroad (UP) train crossed a main track switch lined toward yard track C-4 and collided with a parked UP train in Chico Yard in Chico, Texas.[17]

As a result of the collision, 12 loaded hopper railcars and 2 locomotives from the southbound train derailed, and 1 empty gondola railcar and 2 locomotives from the parked train derailed. Two crewmembers from the southbound train were seriously injured. UP estimated damages to equipment and track infrastructure to be about $4.9 million.

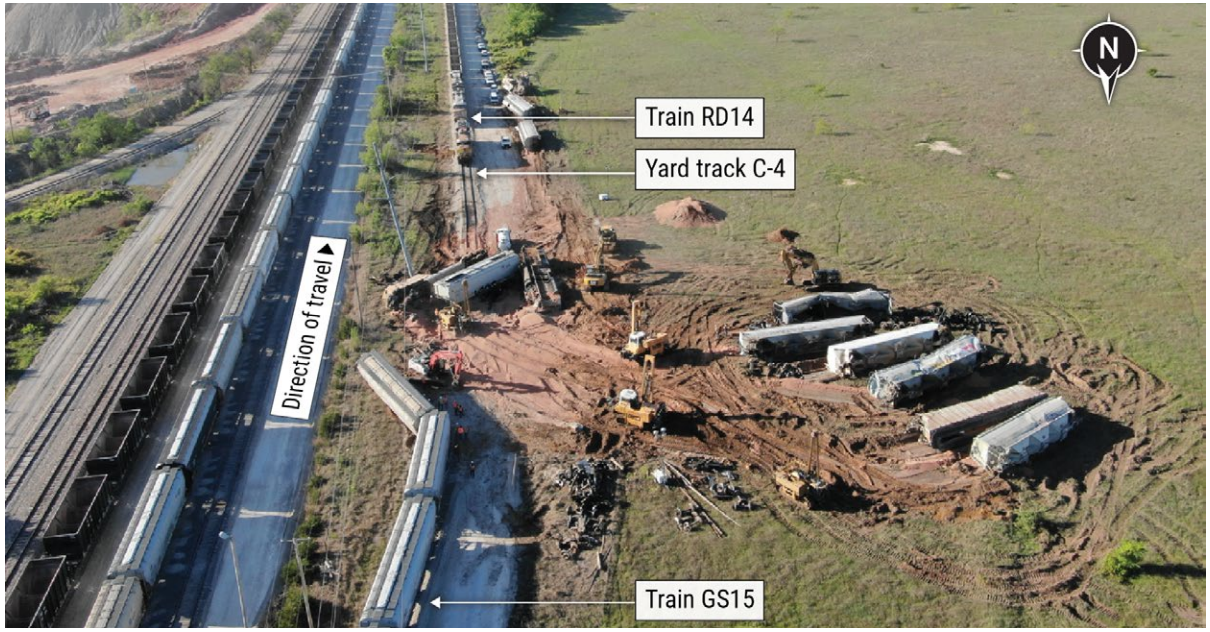


FIGURE 36. Aerial view of the Union Pacific Railroad train collision wreckage in Chico, Texas.
SOURCE: UP, ANNOTATED BY NTSB

[17] All times stated are local time.

We determined that the probable cause of the collision was the lining of the C-yard main track switch to yard track, a human error made by the conductor of the parked train. Contributing to the collision was the inability of the dispatcher and the crew of the southbound train to determine the position of the main track switch in nonsignaled territory in time to prevent the collision.

We identified the following safety issues during this investigation:

(1) failure to comply with operating procedures,
(2) insufficient training, and
(3) insufficient administrative controls related to switching operations.

After the collision, on May 9, 2023, the Federal Railroad Administration (FRA) issued a safety bulletin to railroad employees and contractors to increase awareness of safe operations of hand-operated main track switches in nonsignaled territory. The bulletin described the circumstances of the collision and provided best practices, such as visually verifying that hand-operated switches are properly lined for the intended route and guarding against complacency derived from repetitive task performance (such as the repetition associated with relining main track switches) by using multiple methods to confirm that safety critical tasks are complete.

Following the collision, UP issued an incident alert reminding employees of applicable rules, including the General Code of Operating Rules 8.2 and 8.3, and Special System Instructions Item 10-K. UP also updated Duncan Subdivision General Order No. 5 to include a head-end speed restriction of 20 mph throughout Chico Yard.

» Recommendations: None
» Report Date: November 13, 2024

Southeastern Pennsylvania Transportation Authority Trolley Derailment

Philadelphia, Pennsylvania, July 27, 2023

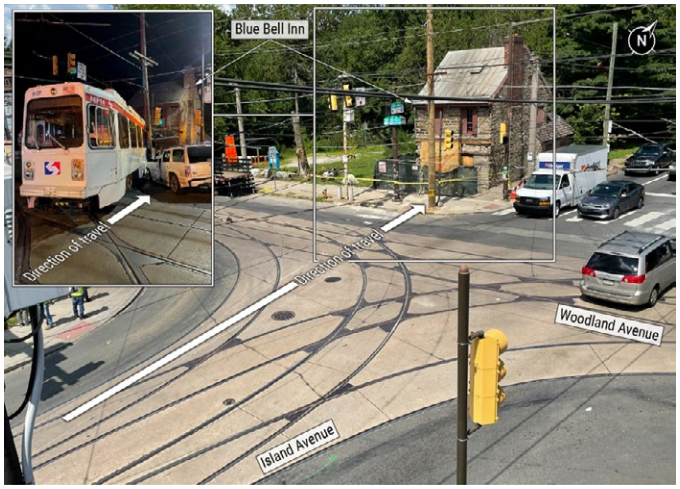


FIGURE 37. Overview of the SEPTA trolley derailment area in Philadelphia, Pennsylvania.

On July 27, 2023, about 10:18 p.m., a SEPTA trolley derailed at the intersection of Island Avenue and Woodland Avenue in Philadelphia, Pennsylvania, and struck an SUV and the Blue Bell Inn. Shortly before the derailment, an electronics specialist had started operating the trolley from SEPTA's Elmwood maintenance facility toward an adjoining yard for storage. As the trolley left the facility, the electronics specialist attempted to apply the air brakes to stop the trolley from moving downhill into Island Avenue, but the brakes had been rendered inoperable during maintenance and did not activate. The electronics specialist jumped out of the trolley before it derailed, sustaining minor injuries. The sport utility vehicle was occupied by four people, two of whom were transported to a local hospital with minor injuries. The Blue Bell Inn was occupied by one resident, who was not injured. SEPTA estimated equipment damage to be about $500,000. Damage to the Blue Bell Inn was estimated to be about $300,000.

We determined that the probable cause of the derailment was the trolley's movement with inoperable brakes, of which the electronics specialist operating the trolley was unaware because of insufficiently documented maintenance procedures. Contributing to the likelihood of the accident were inadequate training resources for maintenance employees and a maintenance shift turnover process that lacked clear communication about the condition of the brakes.

We identified the following safety issues during this investigation:

(1) insufficient maintenance procedures for replacing air compressors,

(2) inadequate training of maintenance employees, and

(3) the lack of clear communication during shift turnovers.

» Recommendations: None
» Report Date: October 22, 2024

Norfolk Southern Railway Conductor Fatality

Cleveland, Ohio, March 7, 2023

On March 7, 2023, about 1:08 a.m., a Norfolk Southern Railway (NS) conductor on an NS train was killed when the train collided with a dump truck as it entered a private highway–railroad grade crossing in the Cleveland-Cliffs Incorporated steel plant in Cleveland, Ohio. The conductor was riding the lead railcar during a shoving movement when the collision caused him to be pinned between the railcar and the dump truck.

We determined that the probable cause of the employee fatality was the crew not following NS Operating Rule 120, which requires a member of the crew to be on the ground at the private highway–railroad grade crossing to warn traffic. Contributing to the accident was the design of the intersection at the private highway–railroad grade crossing, which prevented adequate sight distance for the driver to determine if it was safe to cross the tracks.

FIGURE 38. Final resting place of a dump truck and NS train after they collided in Cleveland, Ohio.
SOURCE: FRA

We identified the following safety issues during this investigation:

(1) failure to adhere to operating rules, and

(2) grade crossing safety.

» Recommendations: None
» Report Date: July 22, 2024

Norfolk Southern Railway Derailment and Hazardous Materials Release

East Palestine, Ohio, February 3, 2023

On February 3, 2023, about 8:54 p.m., an eastbound NS train derailed 38 mixed freight railcars at milepost 49.5 on the NS Fort Wayne Line of the Keystone Division in East Palestine, Ohio. Three tank cars carrying flammable and combustible hazardous materials were mechanically breached during the derailment. A fire ignited during the derailment and grew to involve lading released from these three mechanically breached tank cars, additional derailed tank cars carrying both hazardous and nonhazardous materials, and freight

cars. Emergency responders established a 1-mile evacuation zone that affected about 2,000 residents.

The derailed equipment included five hazardous materials tank cars carrying vinyl chloride monomer (VCM), a compressed liquified flammable gas. These five cars had not been mechanically breached during the derailment, but over the next day, four of them were exposed to fires and released material from pressure relief devices. Acting on information provided by NS and its contractors that a dangerous chemical reaction was occurring within a VCM tank car, the incident commander managing the response, who was unaware of dissenting opinions the shipper had provided to NS and its contractors, chose to expand the evacuation zone and perform a vent and burn (a deliberate breach of a tank car) on all five derailed VCM tank cars. A contractor hired by NS breached the five tank cars on February 6, releasing and igniting their lading. No injuries were reported during the derailment or emergency response.

FIGURE 39. Overhead view of derailment and early fire.
SOURCE: ERIC'S TRAIN YARD, ANNOTATED BY NTSB

We determined that the probable cause of the derailment was the failure of the L1 bearing on the 23rd railcar in the consist that overheated and caused the axle to separate, derailing the train and leading to a postderailment fire that had likely began with the release of a Class 3 flammable liquid from a DOT-111 tank car punctured during the derailment.

Contributing to the postderailment fire and the severity of the hazardous materials release was the continued use of DOT-111 tank cars in hazardous materials service. Also contributing to the severity of the hazardous materials release were the failure of NS and its contractors to communicate relevant expertise and dissenting opinions to the incident commander and the inaccurate representation by NS and its contractors that the tank cars were at risk of catastrophic failure from a polymerization reaction, which created unwarranted urgency and led to the unnecessary decision to vent and burn the five VCM tank cars to prevent a polymerization-induced tank car rupture. Contributing to the exposure of emergency responders and the public to postderailment hazards were NS's delay in transmitting the train consist information to emergency responders and Ohio's insufficient training requirements for volunteer firefighters.

We identified the following safety issues during this investigation:

(1) the failure of systems intended to identify failing wheel bearings;

(2) inadequate training of volunteer first responders;

(3) the delayed transmittal of train consist information to first responders;

(4) the illegibility of fire-damaged placards;

(5) the use of tank cars with documented poor derailment performance;

(6) a tank car certification process that could not ensure that tank car fittings are compatible with approved commodities, misleading written guidance and information about chemical hazards; and

(7) the flawed communication and decision-making process leading up to the deliberate breach of five tank cars containing VCM.

As a result of this investigation, we issued safety recommendations to the following:

- US DOT
- FRA
- PHMSA
- State of Ohio
- Columbiana County Emergency Management Agency
- Association of American Railroads (AAR)
- International Association of Fire Chiefs
- International Association of Fire Fighters
- National Volunteer Fire Council
- The Chlorine Institute
- American Chemistry Council
- NS
- Oxy Vinyls, LP

We also reiterated a safety recommendation to the Class I railroads and classified safety recommendations to the Secretary of Transportation, PHMSA, and the FRA.

» **Recommendations: 34 new, 1 reiterated, 3 classified in this report**
» **Report Date: June 25, 2024**

Union Pacific Railroad Employee Fatality

El Paso, Texas, August 29, 2022

On August 29, 2022, about 9:14 p.m., the conductor of a UP train was killed during a shoving movement when two railcars of the train derailed in UP's Alfalfa Yard in El Paso, Texas. The conductor was riding on the lead end of the first railcar when the train encountered a derail that had been placed on the yard lead earlier in the day to protect maintenance-of-way employees during an upcoming installation project. As the train entered the yard, it encountered the derail device, and two railcars derailed. One of these railcars overturned, landing on its side, then sliding into a residential property where it struck a natural gas line owned by Texas Gas Service. The railcar's contact with the gas line did not result in a gas leak.

We determined that the probable cause of the employee fatality was the failure of personnel to contact the employee-in-charge before granting the train permission to enter the yard lead track.

We identified the following safety issue during this investigation: inadequate protection for maintenance-of-way employees performing shoving movements.

» Recommendations: None
» Report Date: April 25, 2024

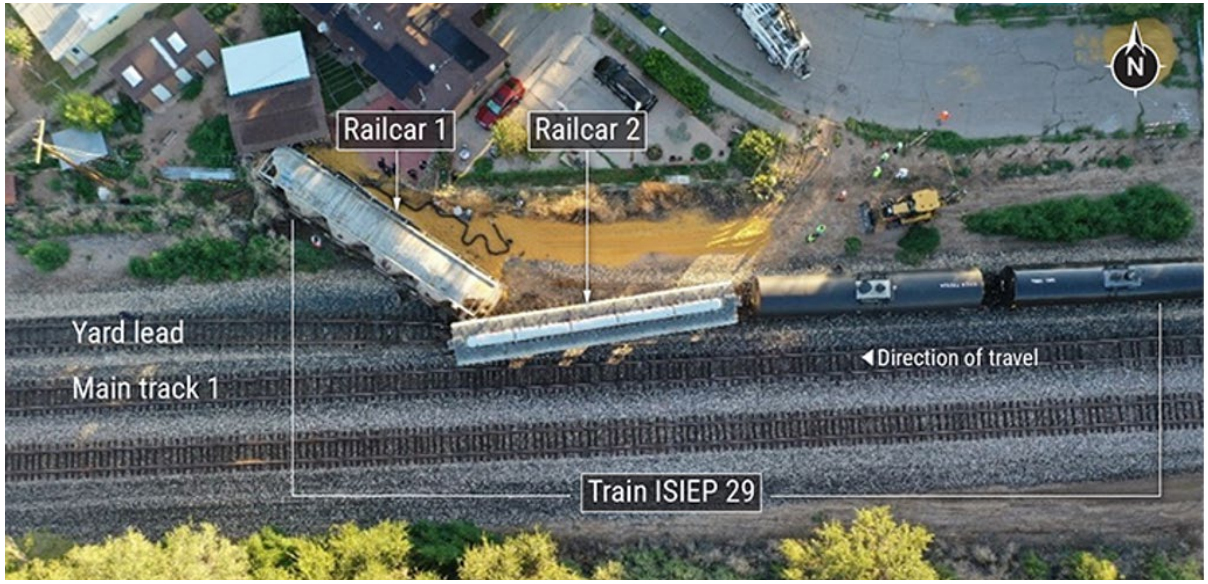


FIGURE 40. Aerial view of accident scene showing derailed railcars after a UP conductor was killed during a shoving movement at UP's Alfalfa Yard in El Paso, Texas.

SOURCE: UNION PACIFIC RAILROAD (DRONE IMAGE), ANNOTATED BY NTSB

Norfolk Southern Railway Employee Fatality

Bessemer, Alabama, December 13, 2022

FIGURE 41. Gondola car and protruding angle iron section immediately before impact.

SOURCE: NORFOLK SOUTHERN RAILWAY, ANNOTATED BY NTSB

On December 13, 2022, about 12:01 a.m., the lead locomotive of a northbound NS freight train struck a length of steel angle iron protruding from a gondola car on a stationary NS freight train on the Alabama Great Southern South Subdivision in Bessemer, Alabama. The northbound train was traveling about 54 mph on main track 2; a second NS train was stopped on main track 1. The gondola car was part of a block of 21 railcars recently added to the stopped train from a yard track near a US Pipe recycling facility. The section of angle iron was protruding from the top edge of the gondola car on its east side, fouling main track 2. As the lead locomotive of the northbound train passed the gondola car on the adjacent track, the section of angle iron penetrated the locomotive's left-front door window, continued into the operating cab, and struck the conductor trainee, who was fatally injured. The conductor was transported to a local hospital for minor injuries.

We determined that the probable cause of the employee fatality was the hazardous condition of a gondola car known to personnel at a US Pipe facility but not communicated to NS nor identified by NS personnel during required predeparture inspections.

We identified the following safety issue during this investigation: inadequate visual inspections.

» Recommendations: None
» Report Date: April 3, 2024

Caltrain Passenger Train Collision with Hi-Rail Construction Vehicles

San Bruno, California, March 10, 2022

On March 10, 2022, about 10:31 a.m., a southbound Caltrain train struck three hi-rail construction vehicles in San Bruno, California. The train's locomotive derailed, and all three construction vehicles were destroyed. Released fuel from the construction vehicles fed a fire that spread to one of the passenger railcars, and eight people were transported to local hospitals. One railroad construction employee sustained serious injuries. One train crewmember was treated and released from the hospital. Six passengers who were treated for minor injuries were also released. Caltrain estimated that the property damage exceeded $1.4 million.

We determined that the probable cause of this accident was the roadway worker-in-charge releasing exclusive track occupancy protection, leaving workers and construction equipment unprotected on the main track due to his degraded performance from excessive workload.

We identified the following safety issues during this investigation:

(1) inadequate hours-of-service requirements,
(2) the lack of a fatigue risk management plan, and
(3) inadequate roadway worker protections.

» Recommendations: None
» Report Date: February 27, 2024

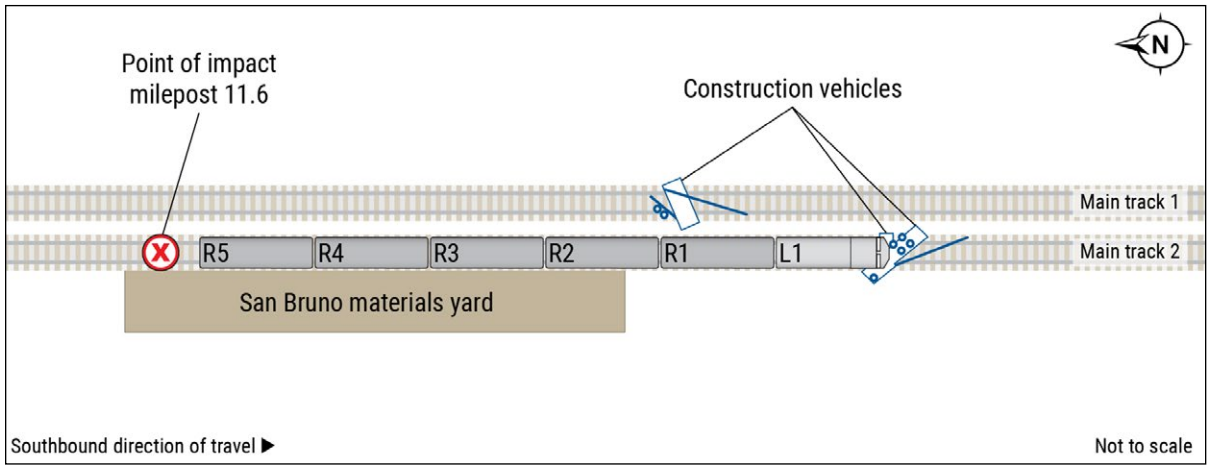


FIGURE 42. Illustration of the collision.

Ongoing Significant Railroad, Pipeline, or Hazardous Materials Investigations

At the close of 2024, the Office of Railroad, Pipeline and Hazardous Materials Investigations had 30 open investigations; 13 of which involve significant safety issues. The office is devoting significant resources to these investigations and anticipates producing a report upon the completion of each one.

TABLE 9. Ongoing Significant Railroad, Pipeline or Hazardous Materials Investigations

Location	Event Date	Description	Fatalities	2025 Report Date
Avondale, Louisiana	12/2/2024	Explosion of natural gas resulting in destruction of a home	1	
Rocky Mount, North Carolina	11/19/2024	Serious injury of Carolina Coastal Railway train conductor	0	
South Jordan, Utah	11/6/2024	Explosion of natural gas resulting in destruction of a home	1	
Bel Air, Maryland	8/11/2024	Explosion of natural gas resulting in destruction of a home	2	
Melrose Park, Illinois	7/6/2024	Fatality of UP conductor	1	
Youngstown, Ohio	5/28/2024	Explosion of natural gas in a mixed use commercial and residential building	1	
McNeil, Arkansas	4/11/2024	Union Pacific Railroad employee fatality	1	4/3/2025
Jackson, Mississippi	1/24/2024	Explosion of natural gas resulting in destruction of three homes	1	
Manhattan, New York	1/4/2024	Collision of two New York City transit trains	0	
Manhattan, New York	11/29/2023	Fatality of New York City transit employee	1	
Great Barrington, Massachusetts	8/4/2023	Fatality of railroad employee	1	
Baltimore, Maryland	6/26/2023	Fatality of CSX Transportation conductor trainee	1	
West Reading, Pennsylvania	3/24/2023	Explosion of natural gas resulting in destruction of commercial and residential buildings	7	3/18/2025

Special Investigation into Norfolk Southern Railway's Safety Practices and Culture

Following the NS train derailment and subsequent hazardous material release and fires in East Palestine, Ohio, on February 3, 2023, and several other significant NS accidents being investigated by the NTSB, in March 2023, we initiated a special investigation into NS's organization and safety culture. The Railroad Division and Office of Aviation Safety's Human Performance and Survival Factors Division are leading the investigation.

As part of this special investigation, we surveyed the NS workforce to gather real-time information from NS employees across its entire network about the organization's safety culture. The survey allows us to gather valuable insights directly from NS employees to assess its safety practices and culture. The final report is pending.

Special Inquiry into Railroad Trespassing at Lake Accotink Park, Springfield, Virginia

On June 5, 2024, about 8:20 p.m., an eastbound NS train encountered two adults and one child trespassing on a trestle bridge in Lake Accotink Park in Springfield, Virginia. The bridge was 65 feet tall and 1,120 feet long, had two main tracks, and was designed only for rail traffic. The train crew sounded the train horn at the whistle post 1,433 feet from the bridge. Shortly afterward, when the crew saw people on the bridge, they began an emergency braking application. The three people fell from the bridge into a shallow creek and were fatally injured.

We initiated a special inquiry into the accident and, as a result, met with NS, the Fairfax County Park Authority, and the FRA to discuss the incident and ways to mitigate trespasser issues in the park. As an outcome of these meetings, several safety actions were undertaken by the stakeholders, including community engagement to raise awareness about the dangers of trespassing and installation of additional signage near the tracks.

Safety Alert

During 2024, Office of Railroad, Pipeline and Hazardous Materials Investigations developed the following safety alert for issuance by the Board.

Pipeline Safety Management Systems: Vital for the Safe Operation of Pipelines » SA-095

This safety alert was derived from the October 1, 2021, anchor strike of an underwater pipeline and eventual crude oil release, off the coast of Huntington Beach, California. Our investigation found that pipeline safety would be enhanced if pipeline companies implemented SMSs. The safety alert describes additional accident scenarios in which the lack of a pipeline SMS contributed to the accident.

Safety Actions

During 2024, the Office of Railroad, Pipeline and Hazardous Materials Investigations documented 17 safety actions. The following are summaries of a sampling of these actions.

- **East Palestine, Ohio**

  On January 19, 2024, the FRA published a report describing the results of the FRA's Legacy Tank Car Focused Inspection Program, a program undertaken in response to the East Palestine derailment that focused inspection resources on DOT-111 tank cars and the shippers and tank car owners that have not yet upgraded to the DOT-117 specification.

  In February 2024, NS signed an agreement with the Brotherhood of Locomotive Engineers and Trainmen and the International Association of Sheet Metal, Air, Rail and Transportation Workers—Transportation Division to develop a Close Call Confidential Reporting pilot program.

- **Cleveland, Ohio**

  On May 22, 2024, in response to a rail conductor fatality in Cleveland, Ohio, Cleveland-Cliffs Incorporated took action to improve the safety of the accident highway–railroad grade crossing by altering the road to increase visibility at the crossing and adding additional stop signs, crossbucks, and portable light towers. Before railroad operations started back up, Stein LLC site management met with Stein LLC employees who worked in this area and reiterated the company's rail safety practices and procedures and commitment to safety. Stein LLC also audited and surveyed all rail crossings in the Cleveland-Cliffs steel plant and shared its findings with Cleveland-Cliffs. Further, Cleveland-Cliffs is exploring more robust enhancements to the crossing and has brought in an engineering firm to provide assistance.

- **Folkston, Georgia**

  On April 18, 2024, CSX published a safety alert in response to the collision in Folkston, Georgia. The safety alert discussed operating requirements for dual-controlled, power-operated switches and emphasized that all trains must approach all switches within the limits of the signal suspension at restricted speed until it is known they are lined for the authorized and intended route. In addition, CSX published a signal suspension safety bulletin that discusses signal suspension job briefing protocols and field management audits and testing.

- **Melrose Park, Illinois**

  On August 21, 2024, the UP vice president of safety emailed the general directors of safety for both regions, along with their director-level reports, and instructed the general directors of safety to ensure that all yard controllers were educated and proficient at providing a switch person or conductor a job aid when needed per the regulation.

- **Norfolk, Virginia**

  On September 13, 2024, NS published a serious incident notice to its workforce discussing the serious conductor injury and highlighting rules that must be followed. On September 6, 2024, NS issued a Norfolk Terminal-Lambert's Point special instructions bulletin modifying rules regarding equipment spacing and securement in the yard where the incident occurred.

- **Kenosha, Wisconsin**

  While NTSB investigators were on scene, UP told them that track breach protection had not been in effect on the Kenosha subdivision per Special Instructions-14, miscellaneous instructions in the UP timetable. NTSB investigators asked UP to consider updating the instructions to allow employees to utilize track breach protection on that subdivision. On September 2, 2024, UP issued a subdivision general order canceling the earlier instructions.

- **McNeil, Arkansas**

  On November 19, 2024, NTSB investigators held a conference call with B&P Enterprises and UP officials to discuss excessive cell phone usage by the B&P excavator operator, which violated railroad rules. Although the operator had not been using the phone at the time of the accident, he had used it continually for over 3 hours, ending his last call about 15 minutes before the accident. In response, UP implemented increased auditing of contractors for compliance with phone usage rules.

- **Somerville, Massachusetts**

  On October 30, 2024, NTSB investigators informed the Massachusetts Bay Transportation Authority (MBTA) that the distance between the 10 mph speed warning sign and the start of the 10-mph track segment for eastbound movement on the Green Line prior to the Redbridge Interlocking measured 286 feet. This distance was noted to be 64 feet shorter than the MBTA's own minimum distance standard for speed warning signage of 350 feet. On November 4, 2024, the MBTA reported completing relocating the advance warning sign for that segment to the previous catenary pole. In doing so, the MBTA brought the distance in compliance with the standard found in rule LR7 as published in "MBTA Rules for Operating Employees" dated August 2023.

  On October 29, 2024, the MBTA reported that it had reduced the maximum authorized speed from 30 to 25 mph for the track segment between Lechmere Station and the Red Bridge Interlocking on the Green Line to reduce the number of speed changes in this segment and to lessen the speed reduction necessary to transition to 10 mph at the Red Bridge Interlocking.

Other Significant Achievements

Adoption of Safety Recommendations

- **Safety Recommendation P-19-17 – Massachusetts Exceeds Recommended Action**

  Following the September 2018 natural gas-fueled explosion in Merrimack Valley, Massachusetts, we called on the Commonwealth of Massachusetts Executive Office of Public Safety and Security to develop guidance that includes a component for effective communications when deploying mutual aid resources within the first hours of a multijurisdictional incident.

  Our investigation of the emergency response to the community found that the state had available and ready resources to handle the large number of distress calls; however, the response involved so many different jurisdictions and first responders that the scale of the response exceeded the existing communications interoperability capabilities at the time. Specifically, we found that field radio communications used across fire departments on September 13, 2018, lacked adequate interoperability and availability to ensure that emergency responders had efficient means of interdepartmental and intradepartmental communications, making it difficult for them to communicate and coordinate the response.

  Since the Merrimack Valley pipeline accident,

Massachusetts has invested in resources to further the state's emergency response communications capabilities, including publishing a state-wide fire mobilization plan and upgrading its interoperable radio system, which facilitates interoperability between any agency or discipline in the state and any area within its coverage footprint. We determined that Massachusetts exceeded our recommendation, making several substantive changes to improve its emergency response communications and serving as a model for other states.

- **Safety Recommendation R-19-22 – Amtrak Takes Acceptable Action**

  Following the December 2017 Amtrak train derailment near DuPont, Washington, we called on Amtrak (National Railroad Passenger Corporation) to implement a formal, systemic approach to developing training and qualification programs to identify the most effective strategies for preparing crewmembers to safely operate new equipment on new territories.

  Since the derailment, Amtrak has implemented an extensive training program for engineers and conductors to address our safety concerns. By increasing performance standards, formalizing an extensive process for conducting evaluation rides for route qualification, recording trainee evaluation rides and refresher training rides for engineers to demonstrate their route proficiency during refamiliarization rides every 12 months, Amtrak has fully implemented our recommendation.

Regulatory Correspondence

We provided feedback and guidance on three regulatory efforts related to the following rulemakings:

- FTA's state safety oversight,
- FTA's rail transit roadway worker protection, and
- PHMSA's information collection.[18]

Illustrated Digest Publication: Norfolk Southern Railway Derailment and Subsequent Hazardous Materials Release

We released an illustrated digest of our investigation into the 2023 derailment of an NS freight train carrying hazardous materials in East Palestine, Ohio. The illustrated digest serves as a companion to our 201-page final report, using photos and graphics to illustrate how and why the derailment occurred as well as explaining our safety recommendations to prevent similar accidents in the future. Although the final report remains our definitive publication on the derailment, the digest highlights the depth and scope of the 16-month investigation.

FIGURE 43. Illustrated Digest cover.

Rail Communication Technology

We purchased a new spectrum analyzer for use by investigators during rail accident investigations to assess the efficacy and integrity of rail technology, including positive train control systems (PTC). This technology offers investigators the ability to measure and record PTC radio system parameters and to analyze PTC communication radio network parameters and message integrity.

[18] See Congressional and Regulatory Correspondence for more information on NTSB responses to regulatory actions and requests for comment.

Office of **Research and Engineering**

TABLE 10. Office of Research and Engineering Safety Statistics

Safety Research Products Completed	2
Safety Data Analyses Completed	234
Materials Laboratory Exam Reports Completed	183
Readouts of Vehicle Recorders and Other Electronic Devices Completed	476
Vehicle Performance Reports and Animations Completed	60
Medical Investigation Reports Completed	188
Rapid Reports Completed	8
Publication	1
Outreach	93

The Office of Research and Engineering is an investigative office providing scientific and technical expertise for NTSB accident investigations in all modes of transportation. The office, which includes four divisions and one program area, conducts safety research, generates periodic statistical reviews of aviation accidents, conducts readouts of vehicle recorders and other electronic devices, conducts materials failure analysis and fire investigations, determines vehicle performance and develops animations, and provides medical and toxicology expertise for investigations in all modes.

Consistent with the NTSB's strategic goal of improving processes and products, the office identifies ways to enhance the effectiveness and efficiency of its investigative activities and products. In 2024, to improve efficiency, effectiveness, and succession planning, the office hired two recorder specialists in the Vehicle Recorder Division through the Pathways program: an aerospace engineer with a specialty in spacecraft engineering and a computer scientist. These recent college graduates add new knowledge and experience to the division's already extensive capabilities.

Safety Research Division

The Safety Research Division examines transportation accidents, accident trends, and technological changes to identify problems and associated remedial actions that will reduce risk and improve the safety of the transportation system. Division staff includes transportation safety researchers, data analysts, and statisticians who conduct systematic examinations of the following:

(1) risks or hazards in the transportation environment that may influence accidents or injury,
(2) the techniques and methods of accident investigation, and
(3) the effectiveness of various safety countermeasures, such as policies, programs, or technologies.

The division also provides data science, data visualization, and statistical expertise to support accident launches and investigations; assists in safety recommendation development; and publishes annual statistical reviews for the NTSB, Congress, and the public.

In 2024, the Safety Research Division published the NTSB's official annual review of US civil aviation accident statistics, as well as the agency's response to an advance notice of proposed rulemaking on impaired driving prevention technology from NHTSA. In addition, division staff published a paper on delays in blood collection and drug toxicology results among crash-involved drivers arrested for impaired driving. Finally, the division completed 234 data, geospatial, and statistical analysis requests to support our accident investigations in aviation, highway, marine, rail, and pipeline, and requests from other government agencies, Congress, and the public. The division is currently updating a safety research report analyzing toxicology findings among fatally injured pilots in US aviation.

Materials Laboratory Division

The Materials Laboratory Division performs expert multidisciplinary engineering and scientific analyses to determine if material or structural performance is related to the cause or severity of an accident. Staff also analyze wreckage to determine the causes of fires and explosions. The division provides chemical and forensic science expertise, as well as technical advice and resources for experimental testing and research in the physical sciences.

In 2024, the division completed 183 reports for 97 investigations, launched to 6 accident sites, and supported numerous NTSB reports and recommendations. In one example, the division supported the investigation of the *Dali* collision with the Francis Scott Key Bridge that resulted in the partial collapse of the bridge. Staff assisted with evidence documentation and provided materials expertise in evaluating the shipboard electrical terminal block that had unexpectedly opened, causing a loss of electrical power to the ship. The division also aided in the investigation of a natural gas-fueled explosion and fire in Jackson, Mississippi, that resulted in the destruction of two homes and the death of one resident. For this investigation, we evaluated the failed service tee and provided support to the fire and explosion investigation. In a third example, the division assisted in the investigation of Alaska Airlines flight 1282 that sustained a rapid in-flight decompression caused by the separation of the left mid exit door plug. We examined the plug and determined that four bolts that prevent upward movement of the plug were missing.

FIGURE 44. Materials Laboratory Division staff examine door plug hardware with a three-dimensional laser scanner (top) and a digital microscope (bottom).

Vehicle Recorder Division

The Vehicle Recorder Division extracts, formats, and analyzes data from aircraft flight data recorders and CVRs and from recorders installed in locomotives, large ships, and some highway vehicles. Engineers also examine recorded electronic audio and video information captured by aircraft, ship, train, and support communication systems; provide electronic engineering expertise for all accident investigation modes in examining communication and control systems; provide time synchronization to correlate voice, data, and video recorder outputs; use advanced digital and analog filtering and signal representation techniques to extract critical recorder information; and perform forensic examinations of personal electronic devices and other computer hardware.

In 2024, division staff received 442 devices; completed reports, transcripts, and studies for 476 devices to support aviation, railroad, marine, and highway investigations, and launched to support seven investigations. Of the recorders received, 56 were from foreign accidents and one was from US military or other US government agency investigations. Staff downloaded and evaluated video and voyage data recorder information from the *Dali* for the Francis Scott Key Bridge collapse investigation. Staff also assisted in foreign investigations, launching to the Haneda Airport runway collision in Tokyo, Japan, and hosting international investigators from Mexico, Colombia, India, and Sudan, among other countries.

Vehicle Performance Division

The Vehicle Performance Division provides specialized aeronautical, mechanical, structural, and biomechanical engineering expertise; three-dimensional laser scanning and accident reconstruction; photogrammetry and video analysis; and animation and graphics development for all modes. Engineers use computational and visualization technology to provide accurate time-motion histories of the sequence of events and evaluate data from multiple sources to determine vehicle and occupant motion and the underlying causes of that motion. Engineers also develop video animations of accident scenarios, evaluate occupant injury mechanisms, and participate in and direct research into special projects as required.

In 2024, division staff completed 60 products in support of investigations (aircraft and surface vehicle performance studies, video/photograph studies, animations, and video compilations). Staff developed animations to support the following investigations:

- October 2021 Washington Metropolitan Area Transit Authority train derailment in Arlington, Virginia
- January 2022 Fern Hollow Bridge collapse in Pittsburgh, Pennsylvania
- February 2023 runway incursion and overflight in Austin, Texas
- November 2022 in-flight collision during an airshow in Dallas, Texas

FIGURE 45. Animation created by Vehicle Performance Division staff depicts the sequence of events in a runway incursion and overflight. YouTube link: Runway Incursion and Overflight, Southwest Airlines 708 Federal Express 1432.

Program Area — Medical Investigations

NTSB medical officers evaluate the medical aspects of investigations, including medical fitness, pathology, toxicology, and injury causation. Examples of medical issues addressed include operator incapacitation, injury prevention, vision deficiency, hypoxia, obstructive sleep apnea, carbon monoxide poisoning, mental health conditions, and impairment from the effects of medications and illicit drugs.

In 2024, the agency's two physicians participated in more than 100 investigations and completed 188 reports from all transportation modes. This included evaluating and addressing medical issues through formal factual and analytical reports, safety recommendations, coordination with other agencies, and formal presentations to the Board and external audiences.

Ongoing Safety Research Report

2018–2022 Update to Drug Use Trends in Aviation

This safety research report will provide the most recent 5 years of data from ongoing toxicology evaluations among fatally injured flying pilots. Toxicology data were obtained from the FAA's Civil Aerospace Medical Institute for the period spanning 2018 through 2022. The final report will address data trends useful for studying the relationship between drug use and accident risk in the United States and other safety issues.

Other Significant Achievements

- The Office of Research and Engineering's science, technology, engineering, and math outreach events included five laboratory tours and six university lectures.
- The State of Delaware authorized the use of automated speed enforcement in response to NTSB Safety Recommendation H-17-32 from the 2017 safety study, *Reducing Speeding-Related Crashes Involving Passenger Vehicles* (SS-17/01).
- NHTSA worked with the GHSA to revise the *Model Minimum Uniform Crash Criteria* to include data elements for electric scooters and electric bicycles in response to NTSB Safety Recommendation H-22-26 from the 2022 safety research report, *Micromobility: Data Challenges Associated with Assessing the Prevalence and Risk of Electric Scooter and Electric Bicycle Fatalities and Injuries* (SRR-22-01). The State of New York also signed into law Senate Bill 9419 requiring accidents involving electric scooters and electric bicycles to be reported by state and local authorities.

Regulatory Correspondence

We provided feedback and guidance on three regulatory efforts related to the following rulemakings:

- Drug Enforcement Administration's Schedules of Controlled Substances: Rescheduling of Marijuana,
- FAA's 25-Hour Cockpit Voice Recorder Requirement, New Aircraft Production, and
- NHTSA's Advanced Impaired Driving Prevention Technology.[19]

Investments in Technology

- Our Materials Laboratory and Vehicle Recorder divisions acquired new state-of-the-art digital microscopes with cutting-edge, three-dimensional capability to increase production and assist in advanced chip recovery work.
- We purchased three new video-processing workstations for the Vehicle Recorder Division. The new workstations will replace older equipment, improving our capability to process audio and video evidence of increasing volume and resolution.

Publication

- J. Price, R. C. Smith, A. K. Miles, and T. A. Kayagil. Delays in Blood Collection and Drug Toxicology Results Among Crash-Involved Drivers Arrested for Impaired Driving. *Traffic Injury Prevention* (2024).

Award

- Erik Mueller, a materials engineer in the Office of Research and Engineering's Materials Laboratory Division, was named an American Society for Materials International Fellow, October 1, 2024.

[19] See Congressional and Regulatory Correspondence for more information on NTSB responses to regulatory actions and requests for comment.

Office of **Safety Recommendations and Communications**

TABLE 11. Office of Safety Recommendations and Communications Safety Statistics

Recommendations Closed in an Acceptable Status[20]	79
Recommendations Closed in an Unacceptable Status	20
Testimony or Legislative Support to State Legislative Committees	23
Public Webinars and Virtual Meetings	88
Media Mentions (Print, Broadcast, and Online)	657,400
Outreach	135

[20] Recommendations closed in an acceptable status include those classified Closed—Exceeds Recommended Action, Closed—Acceptable Action, and Closed—Acceptable Alternate Action. In this report, each recommendation issued is reported as one recommendation, regardless of the number of recipients. Because some recommendations are issued to more than one recipient, however, recommendations closed are reported by the number of recipients for whom a recommendation was closed during the year.

The Office of Safety Recommendations and Communications publicly releases information on NTSB investigations, activities, and safety recommendations across multiple communication channels. The office engages a range of stakeholders, including safety recommendation recipients; members of the transportation industry; transportation workers; federal, state, and local government officials; transportation safety advocates; and the public.

Our work spans an investigation's lifecycle, providing transparency that supports our independence while building public trust and support for our mission. Following an investigation, office staff focus on advocating for and monitoring safety recommendation implementation.

The office comprises five divisions: Safety Recommendations, Media Relations, Government and Industry Affairs, Safety Advocacy, and Digital Services.

Safety Recommendations Division

NTSB safety recommendations address specific issues uncovered during investigations and specify actions to help prevent similar accidents and events from occurring in the future. These safety recommendations are the agency's most important products because they alert government, industry, and the public to the critical changes that are needed to prevent transportation accidents and events, reduce injuries, and save lives.

We issue recommendations to the organizations best able to take corrective action, such as the US DOT and its modal administrations, the US Coast Guard, other federal and state agencies, manufacturers, operators, labor unions, and industry and trade organizations. The Safety Recommendations Division helps investigative offices craft recommendations that will encourage recipients to take the corrective action needed.

Once the Board issues a recommendation, the Safety Recommendations Division handles the ongoing correspondence between the agency and each recipient, tracking and analyzing the recipient's responses and determining a classification—Acceptable or Unacceptable—for the Board members to consider. The division monitors the progress of action to implement each recommendation until it is closed (which usually takes several years), maintains a database of all recommendations, compiles monthly statistics, and responds to data queries from other offices.

In 2024, the Safety Recommendations Division reviewed and analyzed 114 responses from recommendation recipients and developed recommendation classification responses for Board review and approval. Staff generated 16 follow-up letters for recommendation recipients who had not responded to NTSB safety recommendations and helped the modal offices develop and issue 132 new safety recommendations resulting from 18 investigation reports. In addition, the division developed numerous reports and data summaries on specific recommendation topics to support NTSB Board members, other agency staff, the media, and the public.

Outreach activities in 2024 included meetings to discuss open recommendations with government and industry organizations, including the following:

- Alliance for Automotive Innovation
- AAMVA
- AAR
- AASHTO
- American Chemistry Council
- Amtrak
- Apple
- BNSF Railway
- Canadian Pacific Kansas City
- City of Pittsburgh
- The Chlorine Institute
- Consolidated Edison Company of New York, Inc.
- CSX
- CVSA
- FAA
- FHWA
- FMCSA
- FRA
- FTA
- GHSA
- Impairment-related state legislators and organizations (.05 Coalition)
- International Association of Fire Chiefs
- National Association of Charterboat Operators
- National Association of State Boards of Education
- National Conference of State Legislatures
- National Weather Service (NWS)
- NHTSA
- NS
- North Slope
- PennDOT
- PHMSA
- Runway Safety Alerting Subgroup of the Investigative Technologies Aviation Rulemaking Committee
- State of Oklahoma
- State of West Virginia
- Triton
- UP
- US Army Corps of Engineers
- US Department of Agriculture, Forest Service
- US DOT
- US Coast Guard
- US Senate Committee on Commerce
- Virginia Passenger Rail Authority
- Washington Metrorail Safety Commission
- Washington Metropolitan Area Transit Authority

In 2024, 79 open recommendations were closed in an acceptable status; 28 of these had been issued to US DOT modal agencies or the US Coast Guard. In addition, 20 safety recommendations were closed in an unacceptable status in 2024; of these, 12 were issued to US DOT modal agencies or the US Coast Guard.[21] The number of open recommendations that are closed each year fluctuates for various reasons. Over the last 5 years (2020 through 2024), the number of safety recommendations closed in an acceptable status has averaged 199 per year. As of December 31, 2024, 199 safety recommendations issued to US DOT modal agencies or the US Coast Guard remain in open unacceptable response status.

TABLE 12. Safety Recommendations Issued to the US DOT, Modal Agencies, and the US Coast Guard Closed and in Open Unacceptable Response Status in 2024

Agency	Safety Recommendations Closed in an Acceptable Status	Safety Recommendations Closed in an Unacceptable Status	Safety Recommendations Open–Unacceptable Response
Department of Transportation	0	0	4
Federal Aviation Administration	18	8	60
Federal Highway Administration	1	0	0
Federal Motor Carrier Safety Administration	0	0	11
Federal Railroad Administration	0	0	38
Federal Transit Administration	0	0	4
National Highway Traffic Safety Administration	3	0	65
Pipeline and Hazardous Materials Safety Administration	3	0	6
US Coast Guard	3	4	11
Total	**28**	**12**	**199**

[21] A summary of the recipient responses and our reasoning for closing each recommendation in an unacceptable status, as required by 49 *United States Code* (*U.S.C.*) Section 1116(c)(3), can be found in Appendix A.

Also in 2024, we referenced related open safety recommendations in our responses to several notices issued by the US DOT and other federal agencies in the *Federal Register*. The table below provides a summary of these actions.

TABLE 13. Open Safety Recommendations Referenced in NTSB Responses to *Federal Register* Notices from Federal Agencies in 2024

Agency	*Federal Register* Notices	Open Safety Recommendations Referenced
Department of Transportation	1	11
Federal Aviation Administration	4	4
Federal Transit Administration	2	17
National Highway Traffic Safety Administration	4	12
Pipeline and Hazardous Materials Safety Administration	1	1
Department of Justice, Drug Enforcement Administration	1	9
Total	**13**	**54**

Investigation and Safety Recommendations Database Search

CAROL (Case Analysis and Reporting Online) allows you to search NTSB investigations and safety recommendations across all modes.

For more information on CAROL, including details on the data structure, see the CAROL help page on our website at ntsb.gov.

Media Relations Division

The Media Relations Division is responsible for providing accurate and timely information on the NTSB's activities to the media and public.

The division provides information about accident, crash, and incident investigations and coordinates the release of investigation reports, safety research reports, safety recommendations, safety alerts, and other agency investigative products. The division provides counsel to senior leaders, responds to media inquiries, arranges media interviews of agency personnel, and serves as the on-scene public affairs contact, supporting Board members during major accident investigations. The division also supports deployed regional investigators and investigators-in-charge and provides media training to agency leaders and senior investigators.

In 2024, the Media Relations Division published 60 news releases and 14 media advisories, which resulted in more than 3.4 million page views on ntsb.gov and more than 657,400 separate news articles or television and radio segments. These mentions included information on major NTSB investigations, such as the containership strike and subsequent collapse of the Francis Scott Key Bridge and the in-flight departure of a door plug on American Airlines flight 1282 passenger airplane. Staff also made 756 posts on X during this period, gathering more than 16.3 million views. In addition, staff provided remote support for every NTSB investigation.

FIGURE 46. Media Relations staff provided support to the investigation involving the in-flight departure of a door plug on American Airlines flight 1282 passenger airplane in Portland, Oregon.

The division provided training on media relations and response communications to 66 NTSB staff and more than 335 transportation industry communicators. Venues included 2-day workshops in Washington, DC, and Denver, Colorado; and training sessions in Cincinnati, Ohio; Memphis, Tennessee; and Seoul, South Korea. The division also delivered a 90-minute webinar on NTSB postaccident communications and media relations to 20 staff members at Argentina's Junta de Seguridad en el Transporte (NTSB's counterpart in Argentina).

The division helped the NTSB garner more than 657,400 print, broadcast, and online news mentions in 2024.

TABLE 14. NTSB Media Products

Media Product	Total
News releases and media advisories	74
Tweets	756

Government and Industry Affairs Division

The Government and Industry Affairs Division initiated outreach to congressional, federal, state, and local officials and industry stakeholders. It arranged numerous briefings by Board members and investigators and responded to requests for information regarding NTSB investigations and safety recommendations.

In 2024, the division coordinated activity to support the agency's reauthorization through fiscal year 2028. Staff also prepared the chairwoman to testify at five congressional hearings regarding aviation safety, grade-crossing safety, the status of all investigations, the strike and collapse of the Francis Scott Key Bridge, and rail safety.

The division supported Board member and staff testimony and legislative advocacy on impairment in the States of California, Connecticut, Hawaii, New York, and Washington; motorcycle helmet use in Maryland; speeding in California, Connecticut, Minnesota, New York, and Washington, DC; distracted driving in Pennsylvania; and school bus safety in Illinois, Maryland, and Oregon.

The division supported major accident launches and general aviation regional investigations; updated Congress, state, and local officials as these investigations continued; and served as the main point of contact for additional outreach and inquiries.

Safety Advocacy Division

The Safety Advocacy Division leads the agency's advocacy efforts and promotes the implementation of safety recommendations. The division relays safety messages and lessons learned from NTSB investigations through print, digital, and social media channels, and delivers presentations at national conferences and meetings with state and local lawmakers and other stakeholders.

In 2024, the division helped develop, execute, and promote more than 239 advocacy and outreach activities related to the NTSB's safety priorities and other critical safety recommendations. Major activities included the following:

- Organized, promoted, and facilitated an NTSB event on the 2021 Truckee, California, *Challenger* aircraft crash. The event was attended by over 45 individuals from the National Business Aviation Association Conference in Las Vegas, Nevada.
- Supported Board member and staff testimony and legislative advocacy in collaboration with Government and Industry Affairs Division.
- Conducted outreach to communities impacted by high numbers of road deaths, including the following:

  - Hosted a road safety webinar series that had over 1,200 registrants and over 5,000 views.
  - Facilitated three road safety community engagement meetings with local council members in Prince George's County, Maryland. About 200 community members attended the meetings.
  - Organized and hosted the Wyoming Youth Interactive Traffic Safety Lab on the Wind River Reservation, with over 400 students attending.
- Created campaigns for National Distracted Driving Awareness Month, Pedestrian Safety Month, Teen Driver Safety Week, Child Passenger Safety Week, Rail Safety Week, and School Bus Safety Week.
- Worked with modal offices and the NTSB's Digital Services Division to develop the modal safety issues section of the agency's website.
- Identified and promoted speaking opportunities for Board members and modal office staff at national conferences and industry meetings, including the 2024 National Lifesavers Conference on Road Safety, Helicopter Association International (HAI) Heli-Expo, and the 33rd World Traffic Safety Symposium.

The division used its social and digital platforms to amplify information related to the NTSB's advocacy work, safety priorities, and investigative outcomes and lessons learned. Staff sent 34 email notifications to more than 123,000 stakeholders and developed hundreds of social and digital media products promoting the agency's safety messages. Followers increased across all platforms, reaching more than 1,371,000 users on X, Facebook, LinkedIn, Instagram, YouTube, and Flickr. Staff wrote or coordinated the posting of 15 blogs and produced four episodes of the "Behind-the-Scene @ NTSB" podcast, which highlighted agency activities, staff, and programs. The division also supported webinars and virtual events on a variety of topics specific to unique audiences and recommendation recipients, such as webinars on teen driving safety, traffic safety thoughts from a public health lens, and distracted driving.

FIGURE 47. Students signed a safe driver pledge during the Interactive Traffic Safety Lab held at the Wyoming Indian High School in Ethete, Wyoming.

TABLE 15. Safety Advocacy Division Social Media Followers, Connections, and Subscribers

Communication Product	Total
X followers	171,500
Instagram followers	31,100
LinkedIn followers	37,600
Email subscribers	9,900
Facebook subscribers	59,000

TABLE 16. Safety Advocacy Division Products and Events

Advocacy Activity	Total
Behind-the-Scene @ NTSB podcasts	4
YouTube videos	12
Public webinars and virtual meetings	88
Safety Compass blogs	15
Events (NTSB-led coalition meetings, conference exhibits, presentations, roundtables, testimony, and workshops)	116

Digital Services Division

The Digital Services Division supports the NTSB's internal and external strategic communications goals. Staff manage agency communications on ntsb.gov and design and develop graphics and audiovisual products that optimize the agency's ability to communicate investigation findings and safety messages and to facilitate employee engagement. The division also establishes visual style and branding standards for the agency and advises internal stakeholders on how to best use visual information to enhance their products.

In 2024, the Digital Services Division supported five Board meetings, one Board hearing, and nine other NTSB led events. Staff completed nearly 600 graphics and illustrations for use in reports and other products; developed eight major print publications, including the East Palestine Illustrated Digest; produced nearly 60 videos, podcasts, and live video streams; and fulfilled more than 850 website update requests.

The division completed the next phase of the agency's branding and design standards project, which provides guidance on annotating and labeling images used in investigation reports and other products to optimize and standardize those graphic elements.

The division is focusing on optimizing our website and customer service to comply with the requirements and recommendations in Office of Management and Budget (OMB) Memorandum M-23-22, "Delivering-a-Digital-First-Public-Experience." These improvements cover access, content, usability, and customer experience. To support this initiative, the division worked with the NTSB's Office of General Counsel to obtain generic clearance from the OMB to collect qualitative feedback on agency service delivery. This allows the agency to fast-track user feedback surveys. We launched and conducted two user surveys on the website, focusing on our investigation pages and safety issue pages. We will use the feedback to improve the content of those pages in response to user needs.

The division worked closely with modal office staff to develop and manage new safety issues content for our website, creating a way to add additional issue areas and to regularly review and update existing content.

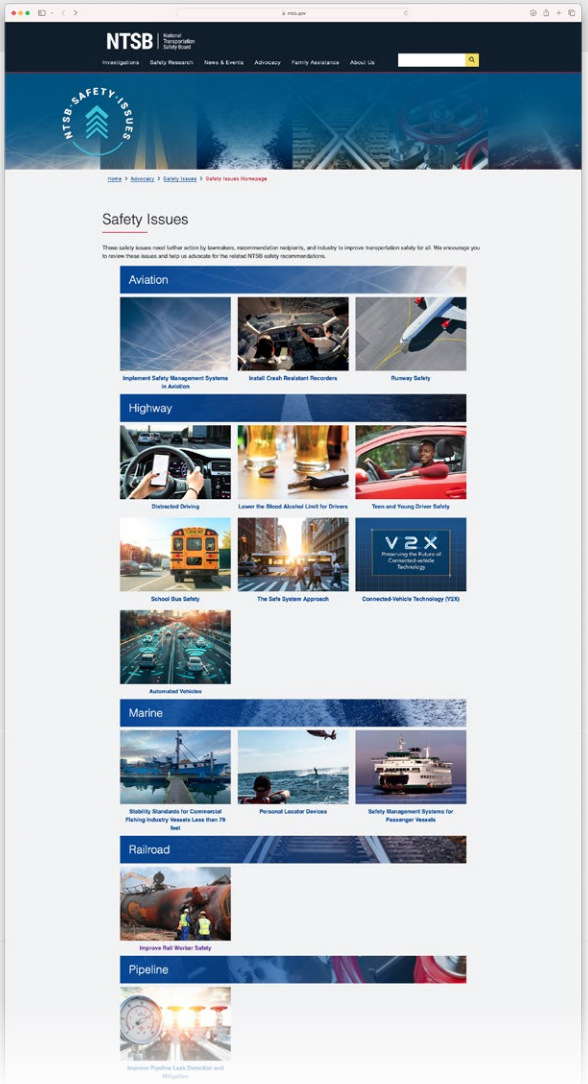


FIGURE 48. The division worked closely with modal offices to develop and maintain new Safety Issues content for our website.

Office of **Administrative Law Judges**

TABLE 17. Office of Administrative Law Judges Safety Statistics

Total Cases Received	470
Total Cases Closed	293
Emergency Cases Received	111
Emergency Cases Closed	84
Hearings Scheduled	94
Hearings Held	21
Outreach	12

The NTSB serves as the court of appeals for airmen, aircraft mechanics, air traffic controllers, air carriers, repair facilities, and any other individual or entity against whom the FAA has taken a certificate action, and for mariners against whom the US Coast Guard has taken a certificate action.

The judges within the agency's Office of Administrative Law Judges hear and consider the cases of, and issue initial decisions on, administrative appeals of FAA aviation enforcement actions. Under the Equal Access to Justice Act, the judges also adjudicate claims from certificate holders for legal fees and expenses incurred in defending against FAA certificate actions and adjudicate appeals from civil penalty actions assessed against any individual by the FAA. The certificate holder, the person being assessed, or the FAA may appeal an administrative law judge's decision. The Board's review of such an appeal is based on the record of the proceeding, which includes the transcript of the hearing testimony, exhibits, the judge's decision, and appeal briefs submitted by the parties. Marine certificate actions are heard first by US Coast Guard administrative law judges and may be appealed to the vice commandant of the US Coast Guard. The vice commandant's ruling may then be appealed to the Board.

The NTSB was saddened by the passing of our Chief Administrative Law Judge in July 2024, and a recruitment to fill that position is underway. We currently have one judge assigned to headquarters in Washington, DC; one assigned to the circuit that includes Denver, Colorado; and one assigned to the circuit that includes San Antonio, Texas. Judges have the option of holding live hearings or virtual hearings.

FIGURE 49. Office of Administrative Law Judges staff discuss the role of a NTSB Administrative Law Judge to students at the Antonin Scalia Law School at George Mason University.

Transportation Disaster Assistance Division

TABLE 18. Transportation Disaster Assistance Division Safety Statistics

Family Members and Victims Assisted	3,517
Outreach Events	82
Agencies/Organizations Supported	457

The Transportation Disaster Assistance Division coordinates federal government resources to support local and state governments, disaster relief organizations, and transportation carriers to offer services and information to family members and survivors following major aviation and rail accidents. Division staff serve as the primary source of investigative information for family members and survivors for any accident investigated by the NTSB.[22] Staff also provide direct investigative support for all modal offices by interfacing with medicolegal jurisdictions and healthcare systems to secure evidence.

To support both our investigative and family assistance efforts, we maintain formal agreements with the American Red Cross; the Departments of Homeland Security, Defense, Health and Human Services, and State; and the Federal Bureau of Investigation.

[22] In 1996, Congress enacted the Aviation Disaster Family Assistance Act (49 *U.S.C.* sections 1136 and 41113), charging the NTSB with assisting victims of aviation disasters and their families, and coordinating with federal agencies, domestic air carriers, and state and local authorities to ensure that the fundamental concerns of families are met. In 1997, the Foreign Air Carrier Family Support Act (49 *U.S.C.* section 41313) required foreign air carriers operating flights to and from the United States to meet similar victim assistance standards as their US counterparts. The Rail Safety Improvement Act of 2008 (49 *U.S.C.* sections 1139 and 24316) gave similar responsibilities to the NTSB, Amtrak, and other interstate and intercity high-speed passenger rail operators following rail passenger accidents. Finally, in 2018, Congress further expanded the Board's responsibilities to provide information regarding NTSB investigative processes and products to the families of individuals involved in any accident investigated by the NTSB to the maximum extent practicable in advance of the media (49 *U.S.C.* section 1140).

During 2024, division staff participated in 12 launches and provided nonlaunch family assistance support for an additional 787 investigations in all modes of transportation, interacting with 3,517 accident survivors, family members, and family contacts.

Staff engaged with family members associated with 64 different accidents, on average, each week; these encounters ranged from a single phone call or email to several hours of work over multiple days with numerous family members from a single accident.

Staff also provided fatality management subject matter support to the Federal Emergency Management Agency under a Stafford Act deployment for the Hurricane Helene response in North Carolina. During the 1-week deployment, staff helped establish the family assistance operation and high throughput morgue operations.

In addition, staff interfaced with 457 federal, state, and local agencies; transportation industry organizations; and other nongovernmental organizations that have a role in family assistance operations, with an average of 32 engagements per week requiring either travel or remote interaction. We also supported a total of 82 outreach events, directly interfacing with about 4,352 stakeholders.

Staff supported several ICAO initiatives to promote family assistance programs globally. Staff are actively representing the United States on ICAO's Facilitation Panel Working Group on Assistance to Aircraft Accident Victims and their Families and participated in ICAO's Symposium on Assistance to Aircraft Accident Victims and their Families, held in Haarlem, the Netherlands. Staff also supported agency participation in ICAO's Universal Safety Oversight Audit Programme, with a satisfactory assessment in all areas relevant to family assistance.

Appendix A:
Report of 2024 Recommendations Closed in an Unacceptable Status to the US DOT and the US Coast Guard

We classified 12 safety recommendations to the US DOT and the US Coast Guard Closed—Unacceptable Action in calendar year 2024.[23] We have provided a summary of the recipient response and our reasoning for closing each recommendation in an unacceptable status. Full details of each recommendation can be found via the links provided.

TABLE 19. Recommendations to the US DOT and the US Coast Guard Classified Closed—Unacceptable Action in 2024

Recommendation	Recipient	Recommendation Text	Recipient Response	NTSB Response
A-10-145	FAA	Require operators to include simultaneous dual-engine power loss scenarios in both initial and recurrent ground and simulator training for pilots of dual-engine helicopters.	The FAA has reviewed its current safety management system (SMS) risk-based decision-making protocols and determined that current FAA guidance, policies, and industry procedures adequately address this safety recommendation. The FAA will no longer pursue these actions and considers its actions complete.	Having an SMS is not enough to ensure that operators provide the recommended training, and most dual-engine helicopter operations are not required to have an SMS. Because losing power in both engines at once requires different responses from losing power in one engine, pilots of these helicopters need the recommended training. The FAA has not taken any action to address Safety Recommendation A-10-145 after 13 years. It is classified CLOSED—UNACCEPTABLE ACTION.
A-11-39	FAA	Require that role-playing or simulator-based exercises that teach first officers to assertively voice their concerns and that teach captains to develop a leadership style that supports first officer assertiveness be included as part of the already required crew resource management training for 14 *CFR* Part 121, 135, and 91 subpart K pilots.	The FAA previously planned to revise advisory circulars (ACs) dealing with training simulations and crew resource management training, respectively. The Board suggested these revised ACs should include example scenarios for first officers and captains could roleplay appropriate crew resource management supporting first officer assertiveness, but developing examples is the responsibility of the air carrier instructors, not the FAA. Therefore, the FAA no longer plans to revise this guidance. The FAA also refers the Board to the Pilot Professional Development Final Rule (85 *Federal Register* 10896) and two further ACs. This addresses the intent of the recommendation, and the FAA considers its actions complete.	We previously told the FAA that including the recommended role-playing exercises in the ACs would be an acceptable alternative to requiring these exercises, but the FAA no longer intends to revise these ACs and states that operators should develop the example scenarios. Because the FAA does not intend to require this training or include example scenarios in its training guidance, Safety Recommendation A-11-39 is classified CLOSED—UNACCEPTABLE ACTION.

[23] As required by section 1209 of the FAA Reauthorization Act of 2024.

Recommendation	Recipient	Recommendation Text	Recipient Response	NTSB Response
A-14-48	FAA	Once the minimum staffing level has been developed by the Aircraft Rescue and Firefighting (ARFF) Working Group, as requested in Safety Recommendation A-14-60, amend 14 *CFR* 139.319(j) to require a minimum ARFF staffing level that would allow exterior firefighting and rapid entry into an airplane to perform interior firefighting and rescue of passengers and crewmembers.	ARFF services vary. Each airport develops an ARFF staffing level base that, in combination with mutual-aid agreements, can result in enough personnel to handle an aircraft incident or accident. Independent organizations, such as the Airport Cooperative Research Program, have previously evaluated minimum ARFF staffing and failed to reach consensus. They found no conclusive evidence suggesting that enhanced ARFF staffing standards would make a difference in the survivability of the crashes studied. Without data to support ARFF staffing requirements the FAA cannot successfully pursue such rulemaking.	The research on which the FAA bases its response was conducted in response to Safety Recommendation A-01-65. We were aware of this research when we issued Safety Recommendation A-14-48. In addition, in response to Safety Recommendation A-14-60, the ARFF Working Group created a task group that examined theories, knowledge, methods, and techniques concerning the creation of a minimum staffing level, which the FAA co-chaired, and which recommended establishing minimum ARFF staffing levels. However, the FAA does not intend to revise section 139.319 to address this concern, so Safety Recommendation A-14-48 is classified CLOSED—UNACCEPTABLE ACTION.
A-14-73	FAA	Require operators to develop an annual recurrent dispatcher resource management module for dispatchers that includes participation of pilots to reinforce the need for open communication.	The safety issue identified in these safety recommendations occurred a decade ago. It is not prevalent in the current system and predates current air carrier awareness of terrain awareness and warning systems (TAWS) operational performance guidance. The FAA maintains that these recommendations are best addressed through reinforcement of flightpath and energy management, the previously discussed changes to the required checklist used by flightcrews and division of pilot flying (PF) and pilot monitoring (PM) duties, in combination with FAA surveillance and oversight of training activities and enroute procedures, and the use of the FAA's Safety Assurance System data collection tools. The FAA has effectively addressed Safety Recommendations A-14-73, -81, -83, and -84 and considers its actions complete with no further action planned.	The FAA still does not intend to require dispatch resource management training, as recommended. Prior to the accident, guidance was available urging that dispatchers and pilots train together, yet at UPS, they did not, and UPS did not require its pilots and dispatchers to communicate directly or have a verbal dispatch briefing before every flight. Because the FAA does not intend to require this training, Safety Recommendation A-14-73 is classified CLOSED—UNACCEPTABLE ACTION.
A-14-81	FAA	Advise operators of aircraft equipped with terrain awareness and warning systems (TAWS) of the circumstances of this accident, including that, in certain situations, an escalating series of TAWS warnings may not occur before impact with terrain or obstacles. Encourage operators to review their procedures for responding to alerts on final approach to ensure that these procedures are sufficient to enable pilots to avoid impact with terrain or obstacles in such situations.	The safety issue identified in these safety recommendations occurred a decade ago. It is not prevalent in the current system and predates current air carrier awareness of TAWS operational performance guidance. The FAA maintains that these recommendations are best addressed through reinforcement of flightpath and energy management, the previously discussed changes to the required checklist used by flightcrews and division of PF and PM duties, in combination with FAA surveillance and oversight of training activities and enroute procedures, and the use of the FAA's Safety Assurance System data collection tools. The FAA has effectively addressed Safety Recommendations A-14-73, -81, -83, and -84 and considers its actions complete with no further action planned.	Our recommendation asks the FAA to advise operators of the circumstances of this accident, including that, in certain situations, an escalating series of TAWS warnings may not occur before impact; and encourage operators to ensure that their procedures for responding to alerts on final approach enable pilots to avoid impact with terrain or obstacles in such situations. The FAA addresses neither of these concerns. As the FAA's actions are not responsive and it has not reported plans for additional actions, Safety Recommendation A-14-81 is classified CLOSED—UNACCEPTABLE ACTION.

Recommendation	Recipient	Recommendation Text	Recipient Response	NTSB Response
A-17-39	FAA	Establish minimum initial and recurrent training requirements for personnel authorized to exercise operational control, including, but not limited to, approved subject knowledge areas, training hours, subject hours, and qualification modules.	The FAA still believes its actions to date address these safety recommendations. It does not plan a rulemaking to establish new minimum or initial training for personnel authorized to exercise operational control. It updated existing guidance to include requirements and policies related to operational control that apply to 14 *CFR* Parts 121 and 135 air carriers. The FAA's actions on Safety Recommendations A-17-39 and -41 are complete and it will take no further action.	The FAA considers its existing guidance and policy adequate and, therefore, it does not intend to establish the recommended initial and recurrent training requirements for personnel authorized to exercise operational control. Although the FAA requires operators to provide training on operational control, it does not include any information about what, specifically, must be included in that training. The FAA directs inspectors to encourage operators to establish a qualification module, but also says that one is not required. The FAA has stated that it does not intend to act. Consequently, Safety Recommendations A-17-39 and -41 are classified CLOSED—UNACCEPTABLE ACTION.
A-17-41	FAA	Revise Federal Aviation Administration Order 8900.1 to include guidance for inspector oversight of operational control training program subject areas, including, but not limited to, the criteria for a qualification module.	The FAA still believes its actions to date address these safety recommendations. It does not plan a rulemaking to establish new minimum or initial training for personnel authorized to exercise operational control. It updated existing guidance to include requirements and policies related to operational control that apply to 14 *CFR* Parts 121 and 135 air carriers. The FAA's actions on Safety Recommendations A-17-39 and -41 are complete and it will take no further action.	The FAA considers its existing guidance and policy adequate and, therefore, it does not intend to establish the recommended initial and recurrent training requirements for personnel authorized to exercise operational control. Although the FAA requires operators to provide training on operational control, it does not include any information about what, specifically, must be included in that training. The FAA directs inspectors to encourage operators to establish a qualification module, but also says that one is not required. The FAA has stated that it does not intend to act. Consequently, Safety Recommendations A-17-39 and -41 are classified CLOSED—UNACCEPTABLE ACTION.
A-20-36	FAA	Establish a confidential voluntary data clearinghouse of deidentified pilot selection data that can be used to conduct studies useful for identifying effective, scientifically based pilot selection strategies. This program should be modeled after programs like Aviation Safety Information and Analysis Sharing and Flight Operations Quality Assurance.	The FAA disagrees, characterizing the recommendation as adding (or withholding) a second-level FAA endorsement of an FAA-certificated pilot. The FAA mistakenly postulates a new database, which would best be implemented by a separate federal department, such as the US Department of Labor's Bureau of Labor Statistics. The FAA adds information about the Pilot Records Database and states that it considers actions on Safety Recommendation A-20-36 complete, with no further actions planned.	This safety recommendation does not ask for an FAA database. Rather, it asks the FAA to establish a program, like ASIAS (Aviation Safety Information Analysis and Sharing), that includes airline pilot selection data instead of safety data. Establishing a program like ASIAS for collecting and analyzing deidentified airline pilot selection data would provide air carriers important aviation safety information for use in their hiring decisions and the FAA has the expertise to establish such a program. Because the FAA has not taken any action, Safety Recommendation A-20-36 is classified CLOSED—UNACCEPTABLE ACTION.

Recommendation	Recipient	Recommendation Text	Recipient Response	NTSB Response
M-09-4	USCG	Require mariners to report to the Coast Guard, in a timely manner, any substantive changes in their medical status or medication use that occur between required medical evaluations. (Supersedes M-05-5).	The Coast Guard concurs with the intent of this recommendation, but requiring all mariners to report changes in their medical condition would require a regulatory change, which sections of the maritime industry would resist. The Coast Guard tried to introduce such a requirement in a final rule in 1978, but OMB removed it, citing lack of supporting data. Since then, the Coast Guard has worked with the maritime community to encourage such disclosure. In addition, in 2007, the Coast Guard revised the Medical and Physical Evaluation Guidelines for Merchant Mariner Credentials in response to the *Cosco Busan* casualty. The Coast Guard strives to create a culture where mariners are less fearful of sharing medical information with the Coast Guard. This may also encourage mariners to actively manage their health issues, reducing the risk of medically related casualties. It hopes these positive strides meet the intent of the original recommendation.	We are aware that the Merchant Mariner Medical Manual reflects the substantial revisions that the Coast Guard has made to its medical guidance since the 2007 *Cosco Busan* accident. Although the Coast Guard has significantly improved its oversight of merchant mariner medical fitness, it has not required mariners to report any substantive changes in their medical status or medication use that occur between required medical evaluations. Accordingly, Safety Recommendation M-09-4 is classified CLOSED—UNACCEPTABLE ACTION.
M-17-17	USCG	In collaboration with the NWS, provide timely broadcasts of the Tropical Cyclone Forecast/ Advisories, Intermediate Public Advisories, and Tropical Cyclone Updates to mariners in all regions via medium-frequency navigational TELEX (NAVTEX), high-frequency voice broadcasts (HF VOBRA), and high-frequency simplex teletype over radio (HF SITOR), or appropriate radio alternatives (and appropriate future technology).	In March 2020, the NWS and the Coast Guard renewed a memorandum of agreement (MOA) for the dissemination of marine weather information. This information includes Tropical Cyclone Forecast/Advisories, Intermediate Public Advisories, and Tropical Cyclone Updates to mariners via medium-frequency Navigational TELEX (NAVTEX), high-frequency voice broadcasts (HF VOBRA), and high-frequency simplex teletype over radio (HF SITOR). The NWS and Coast Guard's joint Impact-Based Decision Support Services (IDSS) includes forecast advice and interpretative services to aid decision-making, or in response to a weather event. The Coast Guard considers action on this recommendation complete and requests that it be closed.	The Coast Guard and the NWS were working under the MOA at the time we issued this recommendation. Although we commend the Coast Guard's continuing MOA with the NWS, and its efforts to develop decision support services, it has not acted to address this recommendation specifically. Because it intends to take no further action and requests that we close this recommendation, Safety Recommendation M-17-17 is classified CLOSED—UNACCEPTABLE ACTION.
M-17-36	USCG	Require that vessels in ocean service (500 gross tons or over) be equipped with properly operating meteorological instruments, including functioning barometers, barographs, and anemometers.	The Coast Guard remains of the opinion that it is unnecessary to mandate carriage of meteorological instruments beyond that which is already recommended in SOLAS V-5.2. The *El Faro* had an anemometer, but it did not function. The Coast Guard considers its action on this recommendation complete and requests that it be closed.	The Coast Guard notified us that it does not intend to take our recommended action and requests that this recommendation be closed. Accordingly, Safety Recommendation M-17-36 is classified CLOSED—UNACCEPTABLE ACTION.

Recommendation	Recipient	Recommendation Text	Recipient Response	NTSB Response
M-17-47	USCG	Propose to the International Maritime Organization (IMO) to amend resolution MSC.333(90) to specify that "normal operations" are defined as when a ship is under way using its main propulsion unit and to assess voyage data recorder (VDR) problems, including not capturing both sides of internal phone calls on the bridge electric telephone and unrecorded very-high-frequency communications, and identify steps to remedy them.	The Coast Guard believes that the phrase "normal operations" requires no further clarification. It proposed that the IMO require VDRs to record both sides of internal bridge electric telephone conversations. It considers the Coast Guard's action on this recommendation complete and requests that it be closed.	We commend the Coast Guard for proposing that the IMO standards require VDRs to record both sides of internal calls on the bridge electric telephone. However, it did not act to clarify "normal operations" in the performance standard. Because the Coast Guard considers its actions on this recommendation complete and it requests that it be closed, Safety Recommendation M-17-47 is classified CLOSED—UNACCEPTABLE ACTION.

Appendix B:
NTSB Safety Recommendations Identified for Classification Change

Every 5 years, the NTSB is required to submit to Congress a 5-year retrospective review of open safety recommendations to determine if they should be updated, closed, or reissued.[24] Our justification for updating, closing, or reissuing each recommendation is determined based on the following required criteria:

- changed circumstances,
- more recently issued recommendations,
- the availability of new technologies, or
- new information making the recommendation ineffective or insufficient for achieving its objective.

Based on these criteria, our 2024 review found that 12 recommendations (1.1 percent) were suitable for additional review and updated classifications.

TABLE 20. NTSB Safety Recommendations Identified for Classification Change

Recommendation	Recipient	Original Classification	New Classification	Safety Recommendation Text	Justification for Classification
A-16-36	FAA	Open—Acceptable Response	Closed—Acceptable Action	Require all 14 *CFR* Part 135 operators to establish SMS programs.	The FAA published a final rule in April 2024 requiring all Part 135 operators to have an SMS and is responsive to A-16-36.
A-19-28	FAA	Open—Acceptable Response	Closed—Acceptable Action	Require all commercial air tour operators, regardless of their operating rule, to implement an SMS.	The FAA published a final rule in April 2024 that requires all operators conducting air tours under 14 *CFR* 91.147 to have an SMS and is responsive to A-19-28.
A-21-7	Maverick Helicopters (formerly Island Express Helicopters, Inc.)	Open—Unacceptable Response	Closed—Unacceptable Action	Participate in the FAA's SMS Voluntary Program.	The FAA published a final rule in April 2024 requiring all Part 135 operators to have an SMS. Although the FAA's final rule eliminates the need for this recommendation, the Board voted to classify this recommendation Closed—Unacceptable Action because the recipient previously informed us that it did not intend to act.

24 Title 49 *U.S.C.* section 1116 (d), as amended by section 1111 of the National Transportation Safety Board Reauthorization Act of 2018 (Division C of Public Law 115-254).

Recommendation	Recipient	Original Classification	New Classification	Safety Recommendation Text	Justification for Classification
A-21-13	FAA	Open—Acceptable Response	Open—Unacceptable Response	Require SMSs for the revenue passenger-carrying operations addressed in Safety Recommendations A-21-9 and -10.	The FAA published a final rule on SMS in April 2024; however, the rule does not require SMSs for all Part 91 revenue passenger-carrying operations discussed in this recommendation.
A-21-14	FAA	Open—Acceptable Response	Open—Unacceptable Response	For the revenue passenger-carrying operations addressed in Safety Recommendations A-21-9 and -10, provide ongoing oversight of each operator's SMS once established.	The FAA published a final rule on SMS in April 2024; however, the rule does not require SMSs for all Part 91 revenue passenger-carrying operations discussed in this recommendation.
A-21-48	FAA	Open—Acceptable Response	Open—Unacceptable Response	Require organizations that design, manufacture, and maintain aircraft to establish an SMS.	The FAA published a final rule in April 2024 that requires organizations that design and manufacturer aircraft (Part 21) to have an SMS; however, it does not require SMS for those organizations that maintain aircraft, such as Part 145 repair stations. Therefore, the final rule does not fully address A-21-48.
A-22-15	FAA	Open—Unacceptable Response	Closed—Acceptable Action	Develop guidance for small operators for scaling an SMS that includes methods and techniques for implementation and specific examples applicable to several operational sectors, including air tours.	The FAA's April 2024 final rule on SMS did not address our concerns regarding guidance in Advisory Circular (AC) 120-92. On May 21, 2024, the FAA published AC 120-92D. The updated AC (particularly Appendix G) is responsive to Safety Recommendation A-22-15, which was classified Closed—Acceptable Action in AIR: Safety and Industry Data Improvements for Part 135 Operations.
H-12-22	NHTSA	Open—Unacceptable Response	Closed—No Longer Applicable	Evaluate the effects of seat spacing and armrests as factors for potential occupant injury, and if safer spacing or armrest configurations are identified, develop and implement appropriate guidelines.	NHTSA's final rule amending the Federal Motor Vehicle Safety Standard No. 209 for occupant crash protection to require the installation of lap/shoulder belts at each passenger seating position in all new over-the-road buses became effective November 28, 2016. When H-12-22 was issued, lap/shoulder belts were not required and not typically installed, and any evaluation of the effects of seat spacing and armrests as factors for potential occupant injury started with the assumption that passengers would be unrestrained. However, with ever-increasing passenger restraint availability in motorcoaches, as older coaches are replaced with newer post-2016 models, and with belt use increasing, the trend is toward having more restrained passengers, reducing the potential effect of what was intended to be studied in H-12-22.

Recommendation	Recipient	Original Classification	New Classification	Safety Recommendation Text	Justification for Classification
H-12-58	NHTSA	Open—Unacceptable Response	Closed—No Longer Applicable	Develop minimum performance standards for onboard brake stroke monitoring systems for all air-braked commercial vehicles.	Collision mitigation technologies and advanced braking technologies, such as automatic emergency braking and disc brakes, make this recommendation obsolete.
H-12-59	NHTSA	Open—Unacceptable Response	Closed—No Longer Applicable	Once the performance standards in Safety Recommendation H-12-58 have been developed, require that all newly manufactured air-braked commercial vehicles be equipped with onboard brake stroke monitoring systems.	Collision mitigation technologies and advanced braking technologies, such as automatic emergency braking and disc brakes, make this recommendation obsolete.
M-19-16	USCG	Open—Acceptable Response	Closed—Acceptable Action	For DUKW amphibious passenger vessels without sufficient reserve buoyancy (commonly referred to as original and/or "stretch" DUKWs), require the removal of canopies, side curtains, and their associated framing during waterborne operations to improve emergency egress in the event of sinking.	On September 11, 2023, the Coast Guard published an interim final rule, DUKW Amphibious Passenger Vessels (88 *Federal Register* 62295-62301), which added congressionally mandated requirements to 46 *CFR* Subchapter T in a new section 175.124. As a result of this new requirement, any DUKW boat permitted to operate after January 9, 2024, is prohibited from having canopies and side curtains that would impede passengers' emergency egress.
M-20-6	Ripley Entertainment, Inc, (dba Ride the Ducks–Branson)	Open—Acceptable Response	Closed—No Longer Applicable	Re-evaluate emergency procedures regarding the donning of lifejackets aboard modified DUKW amphibious passenger vessels when equipped with fixed canopies.	On September 11, 2023, the Coast Guard's interim final rule, DUKW Amphibious Passenger Vessels (88 *Federal Register* 62295-62301), added congressionally mandated requirements to 46 *CFR* Subchapter T in a new section 175.124. As a result of this new requirement, any DUKW boat permitted to operate after January 9, 2024, is prohibited from having canopies and side curtains that would impede passengers' emergency egress.

Appendix C: **Outreach**

Office of Aviation Safety

The Office of Aviation Safety participated in 45 events in 2024. The most significant of these events are highlighted below.

Presentations and Briefings

K. Dunks and T. LeBaron. "NTSB Update." Presentation to Alaska Air Carriers; Anchorage, Alaska; February 2024.

A. Sauer and C. Shin. "Bell 407 Tail Boom Separation Investigation Summary." Presentation at the 2024 HAI Heli-Expo; Anaheim, California; February 2024.

C. Shin and A. Sauer. "Bell 407 Tail Boom Separation Investigation Summary." Presentation at the 2024 HAI Heli-Expo; Anaheim, California; February 2024.

L. Ward. "NTSB Accident Investigations." Presentation at FedEx Headquarters; Memphis, Tennessee; February 2024.

K. Dunks. "General Aviation Accident Investigations." Presentation at the Montana Aviation Conference; Butte, Montana; February 2024.

L. Ward. "NTSB Briefing." Presentation at an Airlines for America Meeting; Erlanger, Kentucky; March 2024.

K. Dunks, K. Wilson, C. Strong, and L. Read. "Where Safety is No Accident!" Presentation at the Women in Aviation Conference; Orlando, Florida. March 2024.

K. Wilson. "Is Your Cockpit a Distraction-Free Zone?" Presentation at the Sun 'n Fun Aerospace Expo; Lakeland Florida; April 2024.

L. Ward. "NTSB Safety Beyond Compliance Omni Air International Safety Symposium." Presentation at the Omni Air International Symposium; Tulsa, Oklahoma; April 2024.

A. Sauer. "An Introduction to the NTSB." Presentation at a Wisconsin US DOT Seminar; Rothschild, Wisconsin; May 2024.

R. Enders. "About the NTSB." Presentation at Cambria County Coroner's Seminar; Johnstown, Pennsylvania; May 2024.

D. Sevillian. "NTSB Perspective on Automation Issues in the Aviation Industry." Presentation at a Department of Homeland Security Marine and Aviation Event; Ashburn, Virginia; May 2024.

B. Banning. "Resilient Skies in the Face of Uncertainty." Presentation at the National Air Transportation Association Air Charter Summit; Oklahoma City, Oklahoma; June 2024.

K. Dunks. "NTSB Update." Presentation at the 2024 General Aviation Manufacturers Association General Aviation Air Safety Investigations; Wichita, Kansas; September 2024.

Participation on Panels

J. Sedor. Quad Agency Working Group Annual Meeting; Vanderberg Space Force Base; Santa Barbara, California; June 2024.

C. Johnson. Vertical Aviation International Safety Working Group Meeting; Philadelphia, Pennsylvania; June 2024.

J. Sedor. FBI Commercial Space Tabletop; Cape Canaveral, Florida; July 2024.

V. McKenny. International Bird Strike Committee; Minneapolis, Minnesota; August 2024.

P. Suffern. FAA Icing Working Group; Boulder, Colorado; September 2024.

Instruction or Instructional Presentations

E. Gutierrez. "General Aviation Accident Overview." Presentation to The Flight Academy; Renton, Washington; January 2024.

Participation in/Attendance at Meetings and Conferences

K. Wilson. Participation in the Transportation Research Board (TRB) Annual Meeting; Washington, DC; January 2024.

K. Dunks. Attendance at the General Aviation Joint Safety Committee and Headquarter meetings; Washington, DC; January 2024.

S. Blum. Attendance at the Airlines for America Council Meeting with Chairwoman; Honolulu, Hawaii; January 2024.

C. Johnson. Attendance at the 2024 HAI Heli-Expo; Anaheim, California; February 2024.

L. Read. Attendance at the Women in Aviation Conference; Orlando, Florida; March 2024.

C. Strong. Attendance at the Women in Aviation Conference; Orlando, Florida; March 2024.

K. Wilson. Attendance at the Women in Aviation Conference; Orlando, Florida; March 2024.

K. Dunks and L. Schiada. Attendance at the General Aviation Manufacturers Association and Gulfstream; Washington, DC; April 2024.

J. Demko. Attendance at the General Aviation Joint Safety Committee Safety Analysis Team Meeting; Washington, DC; April 2024.

D. Eick. Attendance at the Friends and Partners in Aviation Weather; Dallas, Texas; May 2024.

A. Sauer. Attendance at the Experimental Aircraft Association AirVenture Annual Safety Meeting; Oshkosh, Wisconsin; May 2024.

L. Ward. Attendance at the Regional Airline Association Safety Meeting; Daytona Beach, Florida; June 2024.

B. Banning. Attendance at the Q3 Airlines for America Meeting; Seattle, Washington; July 2024.

S. Woods. Attendance at the Human Factors Ergonomics Society Annual Meeting; Phoenix, Arizona; September 2024.

L. Ward and D. Bower. Attendance at the United Airlines Outreach/Training Exercise; Chicago, Illinois; September 2024.

B. Bramble. Attendance at the International Society of Air Safety Investigators; Lisbon, Portugal; September 2024.

Office of Highway Safety

The Office of Highway Safety participated in 35 events in 2024. The most significant of these events are highlighted below.

Testimony Before State Legislators

K. Poland. Testimony before the Maryland Senate regarding School Bus Seat Belt Bill 724; Annapolis, Maryland; February 2024.

K. Poland. Testimony before the Maryland House of Representatives regarding School Bus Seat Belt Bill 196; Annapolis, Maryland; February 2024.

K. Poland. Testimony before the Illinois Senate regarding School Bus Seat Belt Bill 2696; March 2024.

E. Lee. "Vehicles: Safety Equipment." Testimony before the California Senate regarding Senate Bill 961; Sacramento, California; April 2024.

E. Lee. Testimony before Transportation and the Environment Committee, Council of the District of Columbia regarding the Strengthening Traffic Enforcement, Education, and Responsibility Amendment Act, B25-0425; Washington, DC; April 2024.

Presentations and Briefings

T. Barth. "An Update of Emergency Response Recommendations and Current Investigations." Presentation at the TRB Annual Meeting; Washington, DC; January 2024.

E. Lee. "Multivehicle Crash Involving Excessive Speed, Impairment and Speeding Recidivism." Presentation at the TRB Annual Meeting; Washington, DC; January 2024.

K. Poland. "True or False? 94 Percent of Traffic Crashes Are Due to Human Error—and Why it Matters." Presentation at the SAE Government and Industry Meeting Annual Meeting; Washington, DC; January 2024.

R. Molloy. "NTSB Crash Investigation Update to the NSA Traffic Safety Committee." Presentation at the National Sheriffs Association Annual Meeting; Washington, DC; February 2024.

R. Molloy. "NTSB Investigation into the Collapse of the Fern Hollow Bridge." Presentation at the Transportation and Highway Engineers Conference; Chicago, Illinois; February 2024.

M. Fox. "NTSB Crash Update and Lessons Learned." Virtual presentation to the Summer Safety Meeting; June 2024.

D. Walsh. "NTSB Investigation of the Fern Hollow Bridge Collapse." Presentation at the AASHTO Committee on Bridges and Structures Annual Meeting; Indianapolis, Indiana; June 2024.

R. Molloy. "When the Safety Oversight Disappears: The Tragedy of the FIU Pedestrian Bridge." Presentation at the National Association of State Highway and Transportation Unions 24th Annual Conference; Washington, DC; June 2024

M. LaPonte. "Update on Current NTSB Investigations." Presentation at the American Bus Association Summer Bus Industry Safety Council Meeting; Orlando, Florida; July 2024.

K. Poland. "Automated Vehicle Rule of the Road Compliance: Theory, Practice, and Policy." Presentation at the ARTS24 Automated Road Transportation Symposium; San Diego, California; July 2024.

T. Barth. "Overview of the ARTS24 Session: First Responders First." Presentation at the Automated Vehicle Research Group; Automation Projects; July 2024.

K. Poland. "School Bus Occupant Protection." Presentation at the Maryland Fall 2024 Pupil Transportation Directors Summit; Ocean City, Maryland; October 2024.

K. Poland. "School Bus Safety." Keynote speech for the National Association for State Directors of Pupil Transportation Services 2024 Annual Conference; Arlington, Virginia; November 2024.

M. Sweeney. "School Bus Safety and NTSB Investigations." Presentation at the National Association for State Directors of Pupil Transportation

Services 2024 Annual Conference; Arlington, Virginia; November 2024.

Participation on Panels

K. Poland; panel co-chair. "NTSB Investigations." Participation in the TRB Annual Meeting; Washington, DC; January 2024.

T. Barth; panel moderator. "First Responders First." Participation in the ARTS24 Automated Road Transportation Symposium; San Diego, California; July 2024.

Participation in/Attendance at Meetings and Conferences

S. Currie. Attendance, and presentation of a case study of the investigation process, at the Amazon Safety Team Meeting; Nashville, Tennessee; September 2024.

Office of Marine Safety

The Office of Marine Safety participated in 18 events in 2024. The most significant of these events are highlighted below.

Presentations and Briefings

A. Ehlers. "Capsizing of Liftboat *SEACOR Power*: Stability of Vessels with Unusual Configurations." Presentation at the TRB Annual Meeting; Washington DC; January 2024.

M. Karr. "NTSB Overview and Marine Case Study." Presentation at the Marine Compliance Alliance Western Rivers; Washington, DC; March 2024.

D. Johnston. "Crane Wire Failure on Cargo Ship *Thorco Basilisk*." Presentation at the National Aeronautics and Space Administration Headquarters; Washington, DC; April 2024.

M. Karr. "*Spirit of Norfolk* Case Study." Presentation at the Oil Pollution Act of 1990 Forum; Washington, DC; May 2024.

L. Larue. "*Dali* Investigation Overview." Presentation at the Science for Disaster Reduction Interagency Working Group; July 2024.

E. Stolzenberg. "Grounding of Passenger Ferry *Commodore*." Presentation at the MAIIF Americas 13; Valparaiso, Chile; August 2024.

E. Stolzenberg. "Briefing on Investigation of Containership *Dali* Contact with Francis Scott Key Bridge." Presentation at the US Committee on the Marine Transportation System Coordinating Meeting; Washington, DC; September 2024.

A. Ehlers and A. Tucker. "NTSB Investigation: Passenger Vessel *Conception* Fire." Presentation at the Society of Accredited Marine Surveyors International Meeting and Education Conference; New Orleans, Louisiana; September 2024.

L. Wisniewski. "NTSB Marine Safety 101: Overview, Authority, Investigations." Presentation at the National Maritime Safety Association Technical Committee Meeting; Baltimore, Maryland; September 2024.

Participation on Panels

L. Larue, panelist. "Responding to an Accident Scenario." Participation at the Greater New Orleans Barge Fleeting Association; New Orleans, Louisiana, April 2024.

L. Larue, panelist. "*Dali* Investigation Overview." Participation at the American Waterway Operators Summer Safety Meeting; Chicago, Illinois; August 2024.

L. Larue, panelist. "The Limitations of Technology." Participation at the Navtech Conference; Seattle, Washington; December 2024.

Instructional Presentations

A. Ehlers and B. Barnum. "Casualty Analysis and Watchkeeping." Presentation to the Maine Maritime Academy; Castine, Maine; March 2024.

R. Jones. "Introduction to NTSB Investigations." Presentation to the US Coast Guard Senior Investigating Officer Training and Conference; Washington, DC; September 2024.

Participation in/Attendance at Meetings and Conferences

M. Turrell. Attendance at Passenger Vessel Association Annual Meeting; Portland, Oregon; January 2024.

D. Johnston. Participation in the IMO Subcommittee on Human Element, Training, and Watchkeeping; February 2024.

A. Ehlers. Participation on the IMO Subcommittee on Ship Systems and Equipment; London, United Kingdom; March 2024.

M. Muise. Participation on the IMO Subcommittee on Navigation, Communications and Search and Rescue; London, United Kingdom; June 2024.

Office of Railroad, Pipeline and Hazardous Materials Investigations

The Office of Railroad, Pipeline and Hazardous Materials Investigations participated in 62 events in 2024. The most significant of these events are highlighted below.

Presentations and Briefings

S. Lyons. Presentation on open and recently closed pipeline investigations at the American Gas Association Operations Executive Committee Meeting; January 2024.

A. Horton (with Chairwoman Homendy). "The NTSB Pipeline Investigative Process and Update on the NTSB Investigation of the Jackson, Mississippi Natural Gas-fueled Home Explosion and Fires." Presentation at a community meeting hosted by US Representative Bennie Thompson; Jackson, Mississippi; April 2024.

M. Hiller and S. Lynum. Briefing on recent pipeline investigations, NTSB advance notice of proposed rulemaking, and high-priority pipeline recommendations to the American Gas Association Managing Committee; Seattle, Washington; May 2024.

S. Lynum. "NTSB Investigation Protocols." Presentation to the Texas Railroad Commission Pipeline Conference; Austin, Texas; July 2024.

P. Stancil. "The NTSB Investigation of the East Palestine, Ohio, Rail Disaster." Presentation to the TRB AT040 Hazmat Committee Meeting; Washington, DC; August 2024.

B. Clatterbuck. "The Emerging Risks of Lithium Batteries." Presentation to the National Volunteer Fire Council; Kansas City, Missouri; September 2024.

P. Warren and T. Lloyd. "The NTSB Investigation of the East Palestine, Ohio, Rail Disaster." Presentation to AASHTO Council on Rail Transportation Annual Meeting; Norfolk, Virginia; September 2024.

P. Warren and S. Lyons. "NTSB Pipeline Investigations and Safety Priorities." Presentation at PHMSA All Hands Conference; Tucson, Arizona; September 2024.

Participation on Panels

A. Garcia; lectern session co-chair. "The State of Transportation Policy in Indian Country." Applied Experimental Human Factors Conference; Nice, France; July 2024.

B. Clatterbuck. Participation on rail panel at the National Volunteer Fire Council Meeting; Kansas City, Missouri; September 2024.

Participation in/Attendance at Meetings and Conferences

D. Rhine, B. Johnson, and T. Kraholik. "About the NTSB and Railroad Wheel Bearing Failure Modes." Presented at the Joint Rail Conference; Columbia, South Carolina; April 2024.

D. Casaceli. Participation in the FRA's Crashworthiness/Survival Factors Course; Pueblo, Colorado; June 2024.

G. Scott, J. Morris, and A. Rodrigues. Participation in the Railway Supply Institute Railway Interchange; Louisville, Kentucky; June 2024.

D. Rhine. Participation on a panel about university engagement in technology transfer and workforce development at the University of Texas Rio Grande Valley – University Transportation Center for Railway Safety Conference; Brownsville, Texas; June 2024.

D. Spillers. Participated in the Plastic Pipe Data Collection meeting; Washington, DC; June 2024.

D. Spillers. Participated in the American Petroleum Institute meeting; Washington, DC; June 2024.

T. Lloyd. Led discussion of the East Palestine, Ohio, NTSB accident investigation report, findings, and recommendations with the International Association of Fire Chiefs; August 2024.

J. Gordon and D. Mack. Participated in the American Railway Engineering and Maintenance-of-Way Association Conference; Louisville, Kentucky; September 2024.

E. Bozkho. Attended the International Pipeline Conference; Calgary, Canada; September 2024.

D. Spillers. Attended the American Society of Mechanical Engineers B31 and Non-Metallic Standards Development Committee meeting; Charlotte, North Carolina; September 2024.

D. Rhine, G. Scott, and M. Thompson. "About the NTSB and Railroad Wheel Bearing Failure Modes." Presented at the University Transportation Center for Railway Safety; Edinburg, Texas; September 2024.

R. Gunaratnam. Attended UL Standards and Engagement TRIP Summit; Dallas, Texas; October 2024.

B. Clatterbuck. Attended the Battery Safety Council Forum 14; Washington, DC; October 2024.

J. Morris and B. Johnson. Attended NEXTGEN Train Control 2024; Baltimore, Maryland; October 2024.

P. Warren, J. Gordon, and D. Mack. Attended Rail Share; Fort Lauderdale, Florida; November 2024.

R. Gordon and D. Mack. Participated in the FRA's Rail Safety Advisory Committee meetings; virtual and one in Phoenix, Arizona.

Office of Research and Engineering

The Office of Research and Engineering participated in 92 events in 2024. The most significant of these events are highlighted below.

Presentations and Briefings

J. Price and R. Smith. "NTSB Safety Studies Division: Alcohol, Other Drug, and Multiple Drug Use Among Drivers." Presentation at the TRB Annual Meeting; Washington, DC; January 2024.

R. Smith. "Emerging Research in Impaired Driving." Presentation at the TRB Annual Meeting; Washington, DC; January 2024.

R. Smith. "Field Detection of Non-Alcohol Drugs." Presentation at the TRB Annual Meeting; Washington, DC; January 2024.

R. Smith. "Working Together to End Impaired Driving: NTSB's Investigations, Research, and Recommendations." Presentation at the Texas Impaired Driving Forum; February 2024.

J. Price. "Fatigue-Related Consequences in Aviation." Presentation at the Working Time Society Global Seminar; March 2024.

R. Smith. "Amplifying Victims Voices: A Researcher Perspective." Presentation at the Safe Mobility Conference American Automobile Association Foundation; Chapel Hill, North Carolina; March 2024.

R. Smith. "Leveraging Data to Improve Crash Investigations and Traffic Safety." Presentation at the 2024 Auto Insurance Report Conference; Monarch Beach, California; April 2024.

J. Price and R. Smith. "NTSB Safety Research: Drug Prevalence in Aviation and Highway." Presentation at the US DOT Human Factors Coordination Working Group; Washington, DC; April 2024.

R. Smith. "The Oral Fluids Factor: Roadside and Evidential Testing to Reduce Impaired Driving." Presentation at the 2024 Lifesavers National Conference on Roadway Safety; Denver, Colorado; April 2024.

R. Smith. "Brave New World in Cannabis Detection." Presentation at the 2024 Lifesavers National Conference on Roadway Safety; Denver, Colorado; April 2024.

R. Smith. "Closing Plenary Speech for the 2024 Annual Lifesaver's Conference." Presentation at the Lifesavers National Conference on Roadway Safety; Denver, Colorado; April 2024.

A. Lamm. "Helicopter Spindle Separation in Erie, Colorado." Presentation at the American Society of Mechanical Engineers Aerospace Structures, Structural Dynamics, and Materials Conference; Renton, Washington; April 2024.

F. Zakar. "Natural Gas Pipeline Rupture in Coolidge, Arizona." American Society for Metals International Phoenix Chapter, Arizona State University; Phoenix, Arizona; April 2024.

E. Mueller. "Aviation Accident Investigations Involving Drones and Birds." Presentation at the Accident Investigations–Materials International meeting; Washington, DC; May 2024.

M. Budinski. "NTSB Agency Update." Presentation at the Accident Investigations–Materials International meeting; Washington, DC; May 2024.

D. Kramer. "Failure Analysis of Two Kaman K-MAX Twin-Rotor Helicopter Servo Flap Failures." Presentation at the Accident Investigations–Materials International meeting; Washington, DC; May 2024.

M. Fox. "Accident Investigation Data Management and Analysis at the NTSB." Presentation at the Accident Investigations–Materials International meeting; Washington, DC; May 2024.

M. Budinski. "NTSB Efforts to Prepare for Emerging Transportation Technology." Presentation at the Accident Investigations–Materials International meeting; Washington, DC; May 2024.

T. A. Kayagil. "Postmortem Carbon Monoxide Production in a Fatally Injured Helicopter Pilot." Presentation at the Aerospace Medical Association 2024 Annual Scientific Meeting; Chicago, Illinois; May 2024.

M. Moler. "Determining Airplane Trajectories for Runway Incursion." Presentation at the Accident Investigators-Performance International meeting; Canberra, Australia; June 2024.

K. Renze. "Cessna Citation Landing Overrun." Presentation at the Accident Investigators-Performance International meeting; Canberra, Australia; June 2024.

J. O'Callaghan. "Computing Load Factors at Points Removed from the Center of Gravity During Upsets." Presentation at the Radio Technical Commission for Aeronautics Turbulence Study Group Meeting; June 2024.

M. Fox. "Fan Blade Fatigue Fractures in CFM56-7B Engines." Presentation at the International Conference on Engineering Failure Analysis; Athens, Greece; July 2024.

J. O'Callaghan. "Wet Runway Overruns: Still a Slippery Problem." Presentation at the Engineering Sciences Data Unit Meeting; London, United Kingdom; July 2024.

E. Mueller and Z. Keliher. "Review of NTSB Investigations of Cessna 210 Hydraulic Actuator Fractures from Fatigue." Presentation at International Materials, Applications and Technologies 2024; Cleveland, Ohio; September 2024.

M. Budinski, E. Mueller, and J. Panagiotou. "NTSB Materials Failure Analysis of Lithium-Ion Battery Incidents from the Boeing 787." Presentation at the International Materials, Applications and Technologies 2024; Cleveland, Ohio; September 2024.

T. A. Kayagil, B. Tuttle, and D. Morgan. "Going the Extra Mile in Transportation Accident Investigations." Presentation at the National Association of Medical Examiners Annual Meeting; Denver, Colorado; September 2024.

C. Babcock. "2024 Vehicle Recorder Lab Update." Presentation at the General Aviation-Air Safety Investigators Annual Seminar; Wichita, Kansas; September 2024.

A. Lamm. "Engine Failures Related to Powder Metal Alloy Processing." Presentation at the International Society of Air Safety Investigators; Lisbon, Portugal; September 2024.

R. Smith. "Impaired Driving Data Needs: Why This is So Important." Presentation at the 2024 National Alliance to Stop Impaired Driving; November 2024.

M. Portman. "AIR 2024 - NTSB Lab Update and Automatic Speech Recognition Progress." Presentation at the Accident Investigators – Recorders International Meeting; Iceland Safety Investigation Authority; Reykjavik, Iceland; November 2024.

J. O'Callaghan. "Aircraft Performance Calculations Using the Data Analysis Numerical Toolbox and Editor (DANTE)." Presentation at the Accident Investigators–Performance International Meeting; November 2024.

Instruction or Instructional Presentations

E. Mueller. "Failure Analysis: How to Organize and Run a Failure Investigation." Guest lecture for Failure Analysis of Materials class, The Ohio State University; Columbus, Ohio; January 2024.

S. Payne. "NTSB Overview – Recorders Lab RE-40." Guest lecture for Oklahoma State Aerospace class, Oklahoma State University; February 2024.

J. Price. "Federal Perspective on Driver Impairment Detection." Guest lecture for Graduate Seminar on Driver Impairment, Center for Injury Research and Policy, Johns Hopkins University; March 2024.

M. Portman. "Inside the Black Box: How the NTSB's Vehicle Recorder Lab Supports Human Performance Investigations." Guest lecture for Introduction to Cognitive Engineering class, Department of Integrated Systems Engineering, College of Engineering, The Ohio State University; April 2024.

J. Price. "Time of Day, Performance, and Safety." Guest lecture for Human Factors class, University of Iowa; April 2024.

T. Burtch. "One in a Million? - NTSB Case Study." Guest lecture for General Aviation Accident Investigation, Transportation Safety Institute, US Department of Transportation; Oklahoma City, Oklahoma; June 2024.

S. Payne. "Electronic Devices in Accident Investigation." Guest lecture for General Aviation Accident Investigation, Transportation Safety Institute, US Department of Transportation; Oklahoma City, Oklahoma; June 2024.

J. O'Callaghan. "Aircraft Performance at the NTSB." Guest lecture for the Aerodynamics and Performance Class, Embry-Riddle Aeronautical University; Daytona Beach, Florida; November 2024.

Participation in/Attendance at Meetings and Conferences

C. Babcock, C. Cates, O. Fowler, S. Payne, and S. Smith. Participation in European Organization for Civil Aviation Equipment WG-118 Update to Technical Standards for Flight Recorders Working Group; weekly meetings throughout 2024.

T. Kayagil and B. Tuttle. Participation in Quad Agency Working Group Medical Operations Readiness Review meetings for human spaceflight with National Aeronautics and Space Administration, US Air Force, FAA, private spaceflight companies, and international agencies; multiple meetings in 2024.

T. Kayagil. Attendance at Substance Abuse and Mental Health Services Administration Drug Testing Advisory Board meetings; quarterly meetings in 2024.

B. Rawlinson. Participation in TRB's BTSCRP BTS-31: Quantifying the Safety Impacts of Reduced Traffic Enforcement; Washington, DC; monthly meetings throughout 2024.

B. Rawlinson. Participation in the TRB's Incorporating a Safe System Approach into the NCHRP (National Cooperative Highway Research Program) 500 (NCHRP 17-113) Working Group; Washington, DC; monthly meetings throughout 2024.

C. Schultheisz. Session Organizer. "NTSB Investigations." TRB Annual Meeting; Washington, DC; January 2024.

T. A. Kayagil and K. Renze. Attendance at the TRB Annual Meeting; Washington, DC; January 2024.

K. Renze. Attendance at the SAE–Government/Industry Meeting; Washington, DC; January 2024.

C. Cates. Participation in Commercial Aviation Safety Team/ICAO Common Taxonomy Team Flight Data Monitoring Definitions Working Group; Madrid, Spain; February 2024.

C. Schultheisz, T. Burtch, and J. O'Callaghan. Attendance at the Accident Investigators–Performance International meeting; June 2024.

T. Burtch, D. Horak, M. Moler, K. Renze, and C. Schultheisz. Attendance at the Accident Investigators–Performance International Meeting; November 2024.

Office of Administrative Law Judges

Presentations and Briefings

C. Mayerand, J. DeLisi. "Role of Administrative Law Judges." Presentation at the Antonin Scalia Law School of George Mason University, Fairfax, Virginia, April 2024.

V. Couch, D. Fun, C. Mayer, K. Primosch, and J. DeLisi. "Office of Administrative Law Judges and NTSB Appeals Process Overview." Presentation to the Legal Advisory Committee; EAA Airventure 2024; Oshkosh, Wisconsin, July 2024.

Appendix D:
Accident Investigations Not Completed[25]

Aviation: None to Report.

Highway: None to Report.

Marine: None to Report.

Railroad, Pipeline and Hazardous Materials: Fatal and Nonfatal Accidents.

The following two sections—Pipeline and Railroad—list those accidents that the NTSB, under 49 *U.S.C.* section 1131, is required to investigate but that the agency was unable to investigate because of the reason specified. Section 1210 of the FAA Reauthorization Act of 2024 amended the NTSB rail investigative authority to provide that accidents occurring at railroad grade crossings, or those that involve rail trespassers, are not accidents for which NTSB investigation is mandatory unless selected by the Board. Trespassing on railroad property is the leading cause of rail-related fatalities; however, the NTSB is unable to investigate every trespasser fatality and, in fact, investigates such accidents extremely rarely because of limited resources and limited safety benefits. Excluding these accidents from the requirement under 49 *U.S.C.* section 1131(a)(1)(C) allows the NTSB to focus resources on investigating rail accidents for which there are safety benefits.

Pipeline

Staff has reviewed and included all the available information needed to comply with 49 *U.S.C.* section 1116(c)(5).
Criteria used here are for reporting information only and do not represent NTSB launch criteria for investigating an accident.

TABLE 21. Required Pipeline Accident Investigations Not Completed

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	7	Ingleside, Texas	Flint Hills Resources Inc. reported a 2,915-barrel release of crude oil. The spill did not impact water or leave containment. No injuries, fatalities, or evacuations reported.	Limited resources
2	14	East Sparta, Ohio	Pipeline failure with release and fire of natural gasoline, no fatalities or injuries.	Limited resources
3	25	Atlanta, Georgia	Third-party hit to natural gas main resulted in an explosion of a closed restaurant, no fatalities or injuries.	Limited resources

[25] Title 49 *U.S.C.* section 1116(c)(5) requires that the agency provide annually "a list of accidents, during the prior calendar year, that the Board was required to investigate under 49 *U.S.C.* section 1131 but did not investigate and an explanation of why they were not investigated."

Month	Day	Location	Accident Circumstances	Reason Not Investigated
4	15	Phoenix, Arizona	Release of natural gas into the atmosphere from a regulator station after a vehicle strike. The local fire department on-scene evacuated 300 personnel and a nearby daycare.	Limited resources
4	26	Ward County, Texas	A 30-inch natural gas transmission steel line ruptured and ignited. No injuries or evacuations reported. Other pipeline facilities for other gas operators were impacted.	Limited resources
5	8	Jackson, Louisiana	Flash fire at a natural gas compressor station during preparation for construction work. One contractor received second- and third-degree burns and was hospitalized.	Limited resources
6	3	Reeves County, Texas	Flash fire during pigging operation on a natural gas liquids pipeline. Two employees were hospitalized.	Limited resources
7	7	Richardson, Texas	Atmos Mid-Tex reported a natural gas release of an unknown amount. One injury was reported. The contractor crew was retiring a service line when ignition occurred near the service line tee. The crew was removing the service line tee from the 2-inch steel main as part of the retirement. Ignition occurred when the crew punched in after removing the cap off the service line tee.	Limited resources
7	13	Willston, North Dakota	Savage Bakken Connector Inc. reported a crude oil spill from a crude oil storage tank. No reports of impacts to water. The cause of the spill was indicated to be from an employee not shutting a valve.	Limited resources
7	16	Floresville, Texas	Contractor bored into natural gas distribution line at residence causing release and explosion; no injuries or fatalities.	Limited resources
7	18	Fairfax, Virginia	Third-party damage to a 12-inch Aldyl A main causing natural gas release and migration; no injuries or fatalities.	Limited resources
9	11	Maysville, Oklahoma	Flash fire during pigging operation of a natural gas gathering line. Three employees were injured and hospitalized.	Limited resources
9	22	Bronx, New York	Natural gas main ruptured and leaked gas. Three people were sent to the hospital with gas related symptoms. Gas company was dispatched, closed the valves, and stopped the leak.	Limited resources
9	30	Vicksburg, Mississippi	Small leak on half-inch nipple on welding fitting. More than $300K repairs. No injuries or fatalities.	Limited resources
10	15	Huffman, Texas	Third-party struck a 10-inch energy transfer pipeline. About 1,000 barrels of crude oil were released. No waterway impacts.	Limited resources
11	15	Bartonsville, Texas	Plug blew out on 4-inch distribution line while running a steel tap resulting in fatality.	Limited resources

Railroad

The NTSB investigated 23 railroad accidents in 2024.[26] An additional 483 accidents that met the requirements of 49 *U.S.C.* section 1131 were identified but not investigated because of limited investigative resources. An accident with a limited safety benefit is an occurrence for which NTSB investigators were able to determine quickly that no safety recommendations were likely to be issued or reiterated. Those accidents that were not investigated because of limited NTSB resources share some similarities with those of limited safety benefits; although the causes of these accidents may not have been immediately identifiable, the low level of severity of the accidents and other factors were weighed against those of ongoing investigations to make the best use of the resources available.

TABLE 22. Required Railroad Accident Investigations Not Completed

Qualifying Event	Limited Resources	Limited Safety Benefit
Railroad accident – fatal[27]	7	
Railroad accident – damage over reporting limit, nonfatal (freight)	358	
Railroad accident – damage over reporting limit, nonfatal (passenger)	63	
Transit accident (passenger train)	55	
Subtotal	483	
Total of all railroad and transit accidents not investigated	**483**	

FRA Railroad Accidents

TABLE 23. FRA Fatal Railroad Accidents

Month	Day	Location	Accident Circumstances	Reason Not Investigated
8	20	Crawford, Arkansas	Struck by on-track equipment	Limited resources
9	15	Los Angeles, California	Struck by on-track equipment	Limited resources
10	25	Cook, Illinois	Other	Limited resources
11	1	Montgomery, Texas	Struck by on-track equipment	Limited resources
11	17	Tarrant, Texas	Struck by on-track equipment	Limited resources
11	23	Santa Clara, California	Struck by on-track equipment	Limited resources
11	24	Bexar, Texas	Struck by on-track equipment	Limited resources

[26] Data provided in this report are received from the FRA and the FTA. Criteria used here are for reporting information only and do not represent our launch criteria for investigating an accident. In addition, some information reported by the FTA does not provide details regarding agencies or locations. NTSB staff has reviewed and included all the available information needed to comply with 49 *U.S.C.* section 1116(c)(5).

[27] This data set excludes reported trespasser accidents.

TABLE 24. FRA Nonfatal Railroad Accidents with Damage Over Reporting Limit (Freight)

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	2	Roanoke, Texas	Derailment	Limited resources
1	3	Penrose, Colorado	Derailment	Limited resources
1	5	Milo, Missouri	Derailment	Limited resources
1	5	Lodi, Ohio	Derailment	Limited resources
1	6	Sealy, Texas	Derailment	Limited resources
1	7	Memphis, Tennessee	Side collision	Limited resources
1	9	Superior, Wisconsin	Derailment	Limited resources
1	11	Enid, Oklahoma	Derailment	Limited resources
1	12	Bill, Wyoming	Derailment	Limited resources
1	14	New Orleans, Louisiana	Derailment	Limited resources
1	19	Sonora, California	Derailment	Limited resources
1	19	Dupo, Illinois	Derailment	Limited resources
1	19	Roanoke, Virginia	Other impacts	Limited resources
1	21	Arlington, Nebraska	Derailment	Limited resources
1	22	Belden, California	Other	Limited resources
1	22	Topeka, Kansas	Derailment	Limited resources
1	23	Greenville, Ohio	Derailment	Limited resources
1	24	Roanoke, Virginia	Other impacts	Limited resources
1	25	Minneapolis, Minnesota	Derailment	Limited resources
1	28	Fridley, Minnesota	Derailment	Limited resources
1	30	Catoosa, Oklahoma	Derailment	Limited resources
1	30	Wright, Wyoming	Derailment	Limited resources
1	31	Laurel, Montana	Derailment	Limited resources
2	1	San Jose, California	Derailment	Limited resources
2	1	Amory, Mississippi	Derailment	Limited resources
2	3	Fort Worth, Texas	Derailment	Limited resources
2	5	Cabool, Missouri	Derailment	Limited resources
2	5	El Paso, Texas	Derailment	Limited resources
2	6	Reedpoint, Montana	Derailment	Limited resources
2	7	Valley Falls, New York	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
2	9	Cairo, Nebraska	Derailment	Limited resources
2	9	Aurora, North Carolina	Derailment	Limited resources
2	10	Selkirk, New York	Other impacts	Limited resources
2	11	Sloat, California	Derailment	Limited resources
2	12	Hazelton, Kansas	Derailment	Limited resources
2	12	Paw Paw, West Virginia	Derailment	Limited resources
2	15	Kansas City, Missouri	Derailment	Limited resources
2	15	Linden, New Jersey	Derailment	Limited resources
2	17	Sellers, South Carolina	Derailment	Limited resources
2	19	Cushman, Montana	Derailment	Limited resources
2	19	Gordon, Texas	Derailment	Limited resources
2	21	East St Louis, Illinois	Derailment	Limited resources
2	25	Kansas City, Kansas	Derailment	Limited resources
2	25	Trent, Texas	Derailment	Limited resources
2	27	Salix, Iowa	Derailment	Limited resources
2	28	Elko, Nevada	Derailment	Limited resources
2	28	Wenatchee, Washington	Derailment	Limited resources
3	2	Riverdale, Illinois	Rear-end collision	Limited resources
3	3	Floriston, California	Other	Limited resources
3	4	Springfield, Missouri	Derailment	Limited resources
3	6	Fleming, Colorado	Derailment	Limited resources
3	7	North Little Rock, Arkansas	Other impacts	Limited resources
3	8	Kearney, Nebraska	Derailment	Limited resources
3	8	Oconto Falls, Wisconsin	Derailment	Limited resources
3	9	Decatur, Indiana	Derailment	Limited resources
3	9	Yazoo City, Mississippi	Fire/violent rupture	Limited resources
3	9	Nashville, Tennessee	Other	Limited resources
3	9	Hearne, Texas	Other impacts	Limited resources
3	10	Bellevue, Ohio	Derailment	Limited resources
3	11	West Lafayette, Indiana	Derailment	Limited resources
3	11	North Platte, Nebraska	Derailment	Limited resources
3	11	Fort Worth, Texas	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
3	12	Gallion, Alabama	Derailment	Limited resources
3	13	Hopedale, Ohio	Derailment	Limited resources
3	14	Barstow, California	Derailment	Limited resources
3	15	Rice, Texas	Derailment	Limited resources
3	19	Hopedale, Ohio	Derailment	Limited resources
3	20	Springfield, Missouri	Derailment	Limited resources
3	22	Thedford, Nebraska	Derailment	Limited resources
3	24	Midland, South Dakota	Derailment	Limited resources
3	25	Bossier City, Louisiana	Other impacts	Limited resources
3	25	Socorro, New Mexico	Derailment	Limited resources
3	28	La Veta, Colorado	Derailment	Limited resources
3	28	Mulkeytown, Illinois	Fire/violent rupture	Limited resources
3	28	Pampa, Texas	Derailment	Limited resources
3	29	Gibsland, Louisiana	Derailment	Limited resources
3	29	North Platte, Nebraska	Other impacts	Limited resources
3	30	Alturas, California	Derailment	Limited resources
3	30	Galesburg, Illinois	Derailment	Limited resources
3	30	Davenport, Oklahoma	Derailment	Limited resources
3	31	Roseville, California	Derailment	Limited resources
4	3	Elkhart, Indiana	Derailment	Limited resources
4	3	Burns Harbor, Indiana	Derailment	Limited resources
4	5	Gallup, New Mexico	Derailment	Limited resources
4	6	Gary, Indiana	Derailment	Limited resources
4	10	Montpelier, Vermont	Derailment	Limited resources
4	12	Baker, California	Derailment	Limited resources
4	13	Cumberland, Maryland	Side collision	Limited resources
4	13	Wyandotte, Oklahoma	Derailment	Limited resources
4	14	Chappell, Nebraska	Derailment	Limited resources
4	16	White Hall, Alabama	Derailment	Limited resources
4	16	Nebraska City, Nebraska	Derailment	Limited resources
4	17	Mason City, Iowa	Derailment	Limited resources
4	17	Middle River, Maryland	Obstruction	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
4	18	Belen, New Mexico	Derailment	Limited resources
4	20	Chambers, Arizona	Derailment	Limited resources
4	20	Cincinnati, Ohio	Derailment	Limited resources
4	22	Bennet, Nebraska	Derailment	Limited resources
4	23	Wright City, Oklahoma	Derailment	Limited resources
4	23	Merkel, Texas	Derailment	Limited resources
4	25	Hattiesburg, Mississippi	Other	Limited resources
4	26	New Orleans, Louisiana	Other	Limited resources
4	26	Lincoln, Nebraska	Derailment	Limited resources
4	26	Aberdeen, Washington	Derailment	Limited resources
4	27	Lincoln, Nebraska	Derailment	Limited resources
4	28	Unity Village, Missouri	Obstruction	Limited resources
5	1	Groesbeck, Texas	Derailment	Limited resources
5	1	Pyote, Texas	Derailment	Limited resources
5	2	Bremen, Kansas	Derailment	Limited resources
5	2	Lottie, Louisiana	Other impacts	Limited resources
5	3	Cumberland, Maryland	Side collision	Limited resources
5	3	White Lake, South Dakota	Derailment	Limited resources
5	3	Anna, Texas	Derailment	Limited resources
5	4	Irondale, Alabama	Derailment	Limited resources
5	4	Flushing Meadows, New York	Obstruction	Limited resources
5	5	Alton, Illinois	Other impacts	Limited resources
5	7	Clifton, Arizona	Derailment	Limited resources
5	7	Stamford, Connecticut	Fire/violent rupture	Limited resources
5	7	Valley Mills, Texas	Derailment	Limited resources
5	9	Irondale, Alabama	Other impacts	Limited resources
5	9	Ashdown, Arkansas	Derailment	Limited resources
5	10	Manor, Texas	Derailment	Limited resources
5	12	Wheatland, Wyoming	Derailment	Limited resources
5	13	Porter, Indiana	Derailment	Limited resources
5	14	Dodge City, Kansas	Derailment	Limited resources
5	14	Fort Worth, Texas	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
5	15	Long Beach, California	Derailment	Limited resources
5	18	Livermore, Iowa	Derailment	Limited resources
5	19	Long Beach, California	Derailment	Limited resources
5	19	Joliet, Illinois	Other impacts	Limited resources
5	21	Cherokee, Kansas	Derailment	Limited resources
5	22	Macon, Georgia	Other	Limited resources
5	22	North Platte, Nebraska	Derailment	Limited resources
5	22	Fort Worth, Texas	Derailment	Limited resources
5	23	Alberta, Minnesota	Derailment	Limited resources
5	24	Stuttgart, Arkansas	Derailment	Limited resources
5	24	Lottie, Louisiana	Other impacts	Limited resources
5	24	Beach City, Texas	Other impacts	Limited resources
5	25	Emmet, Arkansas	Derailment	Limited resources
5	25	La Follette, Tennessee	Derailment	Limited resources
5	28	Gardner, Massachusetts	Derailment	Limited resources
5	31	Portland, Oregon	Derailment	Limited resources
6	1	West Mansfield, Ohio	Derailment	Limited resources
6	4	Custer, Washington	Derailment	Limited resources
6	5	Delta, Utah	Derailment	Limited resources
6	6	Dallas, Texas	Derailment	Limited resources
6	6	Dallas, Texas	Other impacts	Limited resources
6	7	Bylas, Arizona	Derailment	Limited resources
6	8	Waycross, Georgia	Side collision	Limited resources
6	8	Atlanta, Georgia	Other impacts	Limited resources
6	9	Silsbee, Texas	Derailment	Limited resources
6	10	Decatur, Illinois	Other impacts	Limited resources
6	10	Everett, Washington	Rear-end collision	Limited resources
6	11	Atlanta, Georgia	Derailment	Limited resources
6	11	Atlanta, Georgia	Derailment	Limited resources
6	11	Union, Nebraska	Derailment	Limited resources
6	12	Duluth, Minnesota	Derailment	Limited resources
6	13	Oakes, North Dakota	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
6	14	Florence, Minnesota	Derailment	Limited resources
6	14	Boise City, Oklahoma	Derailment	Limited resources
6	15	Silsbee, Texas	Derailment	Limited resources
6	16	Lottie, Louisiana	Other impacts	Limited resources
6	17	Oakville, Washington	Derailment	Limited resources
6	18	St Joseph, Missouri	Derailment	Limited resources
6	20	Mitchell, Nebraska	Other impacts	Limited resources
6	21	Alvord, Iowa	Derailment	Limited resources
6	21	Touchet, Washington	Derailment	Limited resources
6	22	Chicago, Illinois	Raking collision	Limited resources
6	22	Lafayette, Indiana	Derailment	Limited resources
6	22	Rugby, North Dakota	Derailment	Limited resources
6	22	Seattle, Washington	Derailment	Limited resources
6	24	Venice, Illinois	Derailment	Limited resources
6	24	Walbridge, Ohio	Derailment	Limited resources
6	24	Clearmont, Wyoming	Derailment	Limited resources
6	25	La Puente, California	Other impacts	Limited resources
6	26	Memphis, Tennessee	Derailment	Limited resources
6	26	Lindon, Utah	Derailment	Limited resources
6	27	Matteson, Illinois	Derailment	Limited resources
6	29	Melrose Park, Illinois	Derailment	Limited resources
6	29	Montpelier, Iowa	Derailment	Limited resources
7	1	Melrose Park, Illinois	Derailment	Limited resources
7	3	Missouri Valley, Iowa	Derailment	Limited resources
7	5	Linden, Indiana	Derailment	Limited resources
7	6	Warsaw, North Carolina	Obstruction	Limited resources
7	7	Gibbon, Nebraska	Derailment	Limited resources
7	8	Washington, Missouri	Obstruction	Limited resources
7	8	Auburn, Washington	Derailment	Limited resources
7	10	Galesburg, Illinois	Derailment	Limited resources
7	10	Somonauk, Illinois	Derailment	Limited resources
7	10	Newark, New Jersey	Side collision	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
7	11	Cherryvale, Kansas	Derailment	Limited resources
7	11	Eastwood, Ohio	Derailment	Limited resources
7	11	Woodward, Oklahoma	Derailment	Limited resources
7	12	Suwanee, Georgia	Derailment	Limited resources
7	12	Pocatello, Idaho	Derailment	Limited resources
7	12	Wausau, Wisconsin	Derailment	Limited resources
7	13	Congress, Arizona	Derailment	Limited resources
7	14	Fort Worth, Texas	Obstruction	Limited resources
7	14	Abilene, Texas	Derailment	Limited resources
7	16	North Charleston, South Carolina	Raking collision	Limited resources
7	17	Barstow, California	Derailment	Limited resources
7	17	Pocatello, Idaho	Derailment	Limited resources
7	17	Indianapolis, Indiana	Derailment	Limited resources
7	18	Fairfield, Connecticut	Other	Limited resources
7	18	Brewster, New York	Other impacts	Limited resources
7	20	Venice, Illinois	Derailment	Limited resources
7	20	Ottawa, Kansas	Derailment	Limited resources
7	20	Big Lake, Minnesota	Derailment	Limited resources
7	22	Dodge City, Kansas	Derailment	Limited resources
7	22	Temple, Texas	Derailment	Limited resources
7	23	Lincoln, Nebraska	Derailment	Limited resources
7	24	Atlanta, Georgia	Derailment	Limited resources
7	24	Ingalls, Kansas	Derailment	Limited resources
7	24	North Platte, Nebraska	Derailment	Limited resources
7	25	Hereford, Texas	Derailment	Limited resources
7	25	Crewe, Virginia	Side collision	Limited resources
7	26	Westwood, California	Derailment	Limited resources
7	29	Glidden, Iowa	Derailment	Limited resources
7	30	Peabody, Kansas	Derailment	Limited resources
8	1	Brownwood, Texas	Derailment	Limited resources
8	2	Adrian, Michigan	Side collision	Limited resources
8	2	Springfield, Ohio	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
8	2	Houston, Texas	Derailment	Limited resources
8	3	Temple, Texas	Derailment	Limited resources
8	4	Marshalltown, Iowa	Derailment	Limited resources
8	5	Yucca, Arizona	Derailment	Limited resources
8	7	Nampa, Idaho	Derailment	Limited resources
8	7	Willmar, Minnesota	Derailment	Limited resources
8	8	Red Oak, Iowa	Derailment	Limited resources
8	8	Shreveport, Louisiana	Derailment	Limited resources
8	10	Glenrock, Wyoming	Derailment	Limited resources
8	11	Union Mills, Indiana	Derailment	Limited resources
8	12	Klamath Falls, Oregon	Derailment	Limited resources
8	14	Lehigh, Kansas	Other	Limited resources
8	14	Livonia, Louisiana	Derailment	Limited resources
8	15	Keithville, Louisiana	Derailment	Limited resources
8	16	Topeka, Kansas	Derailment	Limited resources
8	18	Slaton, Texas	Derailment	Limited resources
8	19	Millbury, Ohio	Derailment	Limited resources
8	20	Vacherie, Louisiana	Derailment	Limited resources
8	21	Baton Rouge, Louisiana	Derailment	Limited resources
8	21	Flint, Michigan	Raking collision	Limited resources
8	22	Boulder, Colorado	Derailment	Limited resources
8	25	Rocky Mount, North Carolina	Derailment	Limited resources
8	27	Buna, Texas	Derailment	Limited resources
8	28	Colton, California	Derailment	Limited resources
8	28	Ayer, Massachusetts	Derailment	Limited resources
8	28	Steele, North Dakota	Derailment	Limited resources
8	29	Belen, New Mexico	Derailment	Limited resources
8	29	Fort Worth, Texas	Derailment	Limited resources
8	30	Gallup, New Mexico	Derailment	Limited resources
8	30	Fort Worth, Texas	Derailment	Limited resources
8	31	Memphis, Tennessee	Derailment	Limited resources
8	31	Gladstone, Virginia	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
9	3	Linden, Alabama	Derailment	Limited resources
9	4	Roanoke, Virginia	Derailment	Limited resources
9	6	Beaumont, Texas	Other impacts	Limited resources
9	7	Hardin, Montana	Derailment	Limited resources
9	8	Topeka, Kansas	Derailment	Limited resources
9	11	Kansas City, Kansas	Derailment	Limited resources
9	15	Gothenburg, Nebraska	Derailment	Limited resources
9	15	Portland, Oregon	Derailment	Limited resources
9	16	Bellevue, Ohio	Side collision	Limited resources
9	18	Wolf Point, Montana	Derailment	Limited resources
9	18	Tulsa, Oklahoma	Derailment	Limited resources
9	20	Greenville, Texas	Derailment	Limited resources
9	22	Caliente, California	Derailment	Limited resources
9	24	Flat Rock, Michigan	Derailment	Limited resources
9	24	Columbus, Nebraska	Derailment	Limited resources
9	25	Kansas City, Kansas	Derailment	Limited resources
9	25	Cohasset, Minnesota	Derailment	Limited resources
9	26	Portage, Wisconsin	Derailment	Limited resources
9	29	Amboy, California	Fire/violent rupture	Limited resources
9	30	New Salem, Illinois	Derailment	Limited resources
10	1	Hammond, Indiana	Derailment	Limited resources
10	4	Black Rock, Arkansas	Derailment	Limited resources
10	4	Benton, Arkansas	Derailment	Limited resources
10	4	Kansas City, Kansas	Derailment	Limited resources
10	4	Woodbridge, New Jersey	Derailment	Limited resources
10	4	Houston, Texas	Side collision	Limited resources
10	4	Fort Worth, Texas	Derailment	Limited resources
10	7	Covington, Virginia	Derailment	Limited resources
10	8	San Antonio, Texas	Derailment	Limited resources
10	10	Cedar Rapids, Iowa	Derailment	Limited resources
10	10	Eunice, Louisiana	Fire/violent rupture	Limited resources
10	10	Slaton, Texas	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
10	11	Sahuarita, Arizona	Derailment	Limited resources
10	11	Onida, South Dakota	Derailment	Limited resources
10	12	Essex, Montana	Derailment	Limited resources
10	12	Jamaica, New York	Derailment	Limited resources
10	13	Waycross, Georgia	Derailment	Limited resources
10	13	Simsboro, Louisiana	Derailment	Limited resources
10	15	Des Moines, Iowa	Derailment	Limited resources
10	15	Walbridge, Ohio	Derailment	Limited resources
10	17	North Platte, Nebraska	Derailment	Limited resources
10	18	Donaldsonville, Louisiana	Derailment	Limited resources
10	18	San Antonio, Texas	Other impacts	Limited resources
10	19	Bakersfield, California	Derailment	Limited resources
10	22	Austin, Texas	Derailment	Limited resources
10	23	Clifton Forge, Virginia	Derailment	Limited resources
10	27	Nampa, Idaho	Derailment	Limited resources
10	27	Galesburg, Illinois	Derailment	Limited resources
10	28	Florence, South Carolina	Derailment	Limited resources
10	30	L'Anse, Michigan	Rear-end collision	Limited resources
10	30	Falls City, Nebraska	Derailment	Limited resources
11	1	Hitchcock, Texas	Derailment	Limited resources
11	2	Falls City, Nebraska	Derailment	Limited resources
11	2	La Crosse, Wisconsin	Derailment	Limited resources
11	3	Sherman, Texas	Derailment	Limited resources
11	4	Leavenworth, Washington	Other impacts	Limited resources
11	5	Groesbeck, Texas	Derailment	Limited resources
11	8	Winterboro, Alabama	Derailment	Limited resources
11	8	Jacksonville, Florida	Side collision	Limited resources
11	8	Grants, New Mexico	Derailment	Limited resources
11	10	Bartow, Florida	Derailment	Limited resources
11	10	North Platte, Nebraska	Other impacts	Limited resources
11	12	Stanfield, Oregon	Other impacts	Limited resources
11	13	North Little Rock, Arkansas	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
11	16	Cincinnati, Ohio	Derailment	Limited resources
11	17	North Platte, Nebraska	Other impacts	Limited resources
11	17	Ambrose, North Dakota	Derailment	Limited resources
11	18	Pine Bluff, Arkansas	Derailment	Limited resources
11	18	Jacksonville, Florida	Other	Limited resources
11	18	Tulsa, Oklahoma	Derailment	Limited resources
11	18	Denison, Texas	Derailment	Limited resources
11	20	Frankfort, Indiana	Other	Limited resources
11	23	Madill, Oklahoma	Derailment	Limited resources
11	24	Saginaw, Michigan	Derailment	Limited resources
11	25	Washington, District of Columbia	Fire/violent rupture	Limited resources
11	26	Greeneville, South Carolina	Derailment	Limited resources
11	28	Morrill, Nebraska	Derailment	Limited resources
12	1	Arbor, Nebraska	Derailment	Limited resources
12	2	Ringgold, Texas	Derailment	Limited resources
12	3	Estill, South Carolina	Derailment	Limited resources
12	4	Decatur, Illinois	Derailment	Limited resources
12	4	Laflin, Pennsylvania	Derailment	Limited resources
12	4	Austin, Texas	Side collision	Limited resources
12	6	Highlands, Texas	Rear-end collision	Limited resources
12	7	St Louis, Missouri	Derailment	Limited resources
12	7	Fort Worth, Texas	Other impacts	Limited resources
12	8	Louisville, Kentucky	Derailment	Limited resources
12	11	Danville, Kentucky	Derailment	Limited resources
12	12	Tulsa, Oklahoma	Derailment	Limited resources
12	13	Cameron, Texas	Derailment	Limited resources
12	16	North Platte, Nebraska	Derailment	Limited resources
12	18	Cleburne, Texas	Derailment	Limited resources
12	20	Climax, Michigan	Derailment	Limited resources
12	22	Gary, Indiana	Derailment	Limited resources
12	23	Carson, California	Side collision	Limited resources
12	23	Flat Rock, Michigan	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
12	24	Potsdam, New York	Derailment	Limited resources
12	24	Brenham, Texas	Derailment	Limited resources
12	26	Thompsonville, Illinois	Derailment	Limited resources
12	27	San Antonio, Texas	Derailment	Limited resources
12	29	Pocatello, Idaho	Derailment	Limited resources
12	29	Bellevue, Ohio	Derailment	Limited resources
12	30	Mojave, California	Derailment	Limited resources
12	30	Mill Creek, Oklahoma	Derailment	Limited resources

TABLE 25. FRA Nonfatal Railroad Accidents with Damage Over Reporting Limit (Passenger)

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	3	Bay Head, New Jersey	Derailment	Limited resources
1	6	Carbondale, Illinois	Other	Limited resources
1	12	Wilmington, Delaware	Other	Limited resources
1	13	Windsor, Wisconsin	Obstruction	Limited resources
2	11	Oakland, California	Obstruction	Limited resources
2	24	Crystal Lake, Illinois	Derailment	Limited resources
2	26	South Brunswick, New Jersey	Other	Limited resources
2	27	Acton, Massachusetts	Other	Limited resources
3	2	Spokane, Washington	Derailment	Limited resources
3	8	Pell City, Alabama	Obstruction	Limited resources
3	15	Leominster, Massachusetts	Other	Limited resources
3	17	West Palm Beach, Florida	Derailment	Limited resources
3	24	Brunswick, Maryland	Obstruction	Limited resources
3	25	Bentonia, Mississippi	Obstruction	Limited resources
4	6	North Miami Beach, Florida	Other	Limited resources
4	13	Lakewood, Washington	Raking collision	Limited resources
4	15	Metuchen, New Jersey	Other	Limited resources
4	17	Middle River, Maryland	Obstruction	Limited resources
4	29	Long Island City, New York	Obstruction	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
4	29	Ravenna, Ohio	Obstruction	Limited resources
5	11	Bethune, South Carolina	Obstruction	Limited resources
5	13	Long Branch, New Jersey	Obstruction	Limited resources
5	19	Berlin, Connecticut	Obstruction	Limited resources
5	25	Emporia, Kansas	Derailment	Limited resources
5	31	Suffolk, Virginia	Obstruction	Limited resources
6	6	Morrisville, Pennsylvania	Other	Limited resources
6	8	Dover, New Jersey	Derailment	Limited resources
6	9	Three Oaks, Michigan	Obstruction	Limited resources
6	11	Norwalk, Connecticut	Other	Limited resources
6	20	Nahunta, Georgia	Obstruction	Limited resources
6	20	Plaistow, New Hampshire	Obstruction	Limited resources
6	21	New York, New York	Other	Limited resources
6	25	South Bend, Indiana	Obstruction	Limited resources
6	26	Windsor, Connecticut	Obstruction	Limited resources
7	1	Chicago, Illinois	Other impacts	Limited resources
7	6	Queens Village, New York	Derailment	Limited resources
7	8	Augusta, Missouri	Obstruction	Limited resources
7	13	Augusta, Michigan	Obstruction	Limited resources
7	15	Paterson, New Jersey	Fire/violent rupture	Limited resources
7	16	Minersville, Pennsylvania	Obstruction	Limited resources
7	17	Pontiac, Michigan	Derailment	Limited resources
8	5	North Berwick, Maine	Fire/violent rupture	Limited resources
8	10	Point Pleasant, New Jersey	Fire/violent rupture	Limited resources
8	13	Princeton Junction, New Jersey	Obstruction	Limited resources
8	18	Rensselaer, New York	Fire/violent rupture	Limited resources
8	19	New York, New York	Derailment	Limited resources
8	20	Bay Head, New Jersey	Derailment	Limited resources
8	21	Duluth, Minnesota	Derailment	Limited resources
8	27	New Buffalo, Michigan	Obstruction	Limited resources
9	19	Goleta, California	Derailment	Limited resources
9	30	Dallas, Texas	Derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
10	10	Washington, District of Columbia	Raking collision	Limited resources
10	24	Morton Grove, Illinois	Obstruction	Limited resources
11	1	Spring Valley, New York	Derailment	Limited resources
11	13	Raritan, New Jersey	Derailment	Limited resources
11	15	Pawcatuck, Connecticut	Fire/violent rupture	Limited resources
11	15	Melbourne, Florida	Obstruction	Limited resources
12	3	Latta, South Carolina	Obstruction	Limited resources
12	5	New York, New York	Derailment	Limited resources
12	13	Hoboken, New Jersey	Derailment	Limited resources
12	21	Port Jervis, New York	Derailment	Limited resources
12	21	Peninsula, Ohio	Derailment	Limited resources
12	24	Port Jefferson, New York	Derailment	Limited resources

FTA Transit Accidents

TABLE 26. FTA Transit Fatal Accidents (Passenger, Customer, or Employee)

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	1	Washington Metropolitan Area Transit Authority	Rail collision with person	Limited resources
1	5	Chicago Transit Authority	Rail collision with person	Limited resources
1	16	MTA New York City Transit	Rail collision with person	Limited resources
1	29	San Francisco Bay Area Rapid Transit District	Rail collision with person	Limited resources
3	1	Washington Metropolitan Area Transit Authority	Rail collision with person	Limited resources
3	19	MTA New York City Transit	Rail collision with person	Limited resources
4	5	Los Angeles County Metropolitan Transportation Authority	Rail collision with person	Limited resources
4	21	MTA New York City Transit	Rail collision with person	Limited resources
5	7	San Diego Metropolitan Transit System	Rail collision with person	Limited resources
5	13	Port Authority Transit Corporation	Rail collision with person	Limited resources
5	18	MTA New York City Transit	Rail collision with person	Limited resources
5	24	MTA New York City Transit	Rail collision with person	Limited resources
5	24	SEPTA	Rail collision with person	Limited resources
6	8	MTA New York City Transit	Rail collision with person	Limited resources
6	28	Massachusetts Bay Transportation Authority	Rail collision with person	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
7	2	MTA New York City Transit	Rail collision with person	Limited resources
7	24	Massachusetts Bay Transportation Authority	Rail collision with person	Limited resources
8	6	MTA New York City Transit	Rail collision with person	Limited resources
8	8	MTA New York City Transit	Rail collision with person	Limited resources
8	8	Metropolitan Transit Authority of Harris County, Texas	Rail collision with person	Limited resources
9	24	MTA New York City Transit	Rail collision with person	Limited resources
10	14	New Jersey Transit Corporation	Rail collision with fixed object	Limited resources
10	17	SEPTA	Rail collision with person	Limited resources
11	26	MTA New York City Transit	Rail collision with person	Limited resources
12	26	MTA New York City Transit	Rail collision with person	Limited resources

TABLE 27. FTA Transit Fatal Accidents (Not a Passenger, Customer, or Employee)

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	28	Los Angeles County Metropolitan Transportation Authority	Rail collision with person	Limited resources
2	24	Valley Metro Rail, Inc.	Rail collision with non transit motor vehicle (POV[28])	Limited resources
3	20	Los Angeles County Metropolitan Transportation Authority	Rail collision with non transit motor vehicle (POV)	Limited resources
4	22	Dallas Area Rapid Transit	Rail collision with non transit motor vehicle (POV)	Limited resources
5	29	Metro Transit	Rail collision with person	Limited resources
7	23	Metro Transit	Rail collision with person	Limited resources
10	23	Santa Clara Valley Transportation Authority	Rail collision with person	Limited resources
11	12	Tri-County Metropolitan Transportation District of Oregon	Rail collision with person	Limited resources

TABLE 28. FTA Transit Nonfatal Accidents (Passenger Train)

Month	Day	Location	Accident Circumstances	Reason Not Investigated
1	1	San Francisco Bay Area Rapid Transit District	Main line derailment	Limited resources
1	3	New Orleans Regional Transit Authority	Main line derailment	Limited resources
1	3	Valley Metro Rail, Inc.	Rail collision with non transit motor vehicle (POV)	Limited resources
1	4	MTA New York City Transit	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
1	24	Utah Transit Authority	Main line derailment	Limited resources

[28] POV: privately owned vehicle

Month	Day	Location	Accident Circumstances	Reason Not Investigated
2	21	Metropolitan Atlanta Rapid Transit Authority	Yard derailment	Limited resources
2	27	Kansas City, City of Missouri	Main line derailment	Limited resources
2	29	San Diego Metropolitan Transit System	Main line derailment	Limited resources
3	8	The Greater Cleveland Regional Transit Authority	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
3	9	Massachusetts Bay Transportation Authority	Main line derailment	Limited resources
3	17	SEPTA	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
3	21	Sacramento Regional Transit District	Main line derailment	Limited resources
3	23	Massachusetts Bay Transportation Authority	Main line derailment	Limited resources
4	4	Metro Transit	Rail collision with fixed object	Limited resources
4	10	Massachusetts Bay Transportation Authority	Main line derailment	Limited resources
4	16	Washington Metropolitan Area Transit Authority	Main line derailment	Limited resources
4	17	Massachusetts Bay Transportation Authority	Rail collision with person	Limited resources
4	23	New Jersey Transit Corporation	Main line derailment	Limited resources
4	30	Los Angeles County Metropolitan Transportation Authority	Rail collision with non transit motor vehicle (POV)	Limited resources
5	4	City of Milwaukee	Main line derailment	Limited resources
5	7	Pittsburgh Regional Transit	Yard derailment	Limited resources
5	10	City of Milwaukee	Main line derailment	Limited resources
5	12	Utah Transit Authority	Main line derailment	Limited resources
5	13	Pittsburgh Regional Transit	Main line derailment	Limited resources
5	16	Massachusetts Bay Transportation Authority	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
5	18	Pittsburgh Regional Transit	Main line derailment	Limited resources
5	30	San Francisco Bay Area Rapid Transit District	Main line derailment	Limited resources
5	30	SEPTA	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
6	5	SEPTA	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
6	26	San Francisco Bay Area Rapid Transit District	Rail collision with rail transit vehicle-rail transit maintenance or service vehicle on the rail fixed guideway	Limited resources
7	2	Staten Island Rapid Transit Operating Authority	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
7	5	Pittsburgh Regional Transit	Yard derailment	Limited resources

Month	Day	Location	Accident Circumstances	Reason Not Investigated
7	22	New Orleans Regional Transit Authority	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
7	27	MTA New York City Transit	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
8	2	New Jersey Transit Corporation	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
8	13	Utah Transit Authority	Main line derailment	Limited resources
8	23	Massachusetts Bay Transportation Authority	Rail collision with rail transit vehicle-rail transit maintenance or service vehicle on the rail fixed guideway	Limited resources
8	28	Massachusetts Bay Transportation Authority	Rail collision with person	Limited resources
9	15	Massachusetts Bay Transportation Authority	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
9	16	Bi-State Development Agency of the Missouri-Illinois Metropolitan District	Rail collision with rail transit vehicle-rail transit maintenance or service vehicle on the rail fixed guideway	Limited resources
9	20	SEPTA	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
10	4	New Orleans Regional Transit Authority	Rail collision with rail transit vehicle/rail passenger train - not in revenue service	Limited resources
11	1	SEPTA	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
11	3	San Francisco Bay Area Rapid Transit District	Rail collision with rail transit vehicle-rail transit maintenance or service vehicle on the rail fixed guideway	Limited resources
11	5	San Diego Metropolitan Transit System	Rail collision with non transit motor vehicle (POV)	Limited resources
11	6	Dallas Area Rapid Transit	Rail collision with rail transit vehicle-rail transit maintenance or service vehicle on the rail fixed guideway	Limited resources
11	11	SEPTA	Rail collision with rail transit vehicle/rail passenger train - revenue service	Limited resources
11	18	Tri-County Metropolitan Transportation District of Oregon	Rail collision with non transit motor vehicle (POV)	Limited resources
11	28	Valley Metro Rail, Inc.	Rail collision with non transit motor vehicle (POV)	Limited resources
12	3	Valley Metro Rail, Inc.	Rail collision with non transit motor vehicle (POV)	Limited resources
12	4	Metropolitan Atlanta Rapid Transit Authority	Main line derailment	Limited resources

Appendix E:
Accident Investigations Taking Longer than 12 Months[29]

TABLE 29. Ongoing Investigations That Have Exceeded the Expected Time Allotted for Completion

Mode	Event Date	Location	Reason Not Completed	2025 Report Date
Aviation (fatal only)	None			
Highway	5/12/2023	Excelsior Township, Wisconsin	Technical complexity	6/4/2025
Highway	6/11/2023	Philadelphia, Pennsylvania	Prioritization of resources	3/19/2025
Highway	7/12/2023	Highland, Illinois	Technical complexity	5/20/2025
Highway	9/21/2023	Wawayanda, New York	Technical complexity	
Highway	9/23/2023	Teutopolis, Illinois	Technical complexity	
Highway	11/14/2023	Etna, Ohio	Prioritization of resources	
Marine	6/18/2023	Atlantic Ocean	Technical complexity; participation in USCG Marine Board of Investigation hearings	
Marine	7/5/2023	Newark, New Jersey	Technical complexity; participation in USCG Marine Board of Investigation hearings	4/15/2025
Marine	12/27/2023	Dutch Harbor, Alaska	Technical complexity	
Pipeline	11/15/2023	Gulf of America	Delayed determination of jurisdiction	6/13/2025
Pipeline	3/24/2023	West Reading, Pennsylvania	Technical complexity	3/18/2025
Railroad	11/29/2023	Manhattan, New York	Prioritization of resources	
Railroad	8/4/2023	Great Barrington, Massachusetts	Technical complexity	
Railroad	6/26/2023	Baltimore, Maryland	Prioritization of resources	

[29] Title 49 *U.S.C.* section 1116(c)(6) requires that the agency provide annually "a list of ongoing investigations that have exceeded the expected time allotted for completion by Board order and an explanation for the additional time required to complete such investigation." The list above includes investigations not completed within 12 months of initiation and only those which have been submitted to the Board for consideration.