

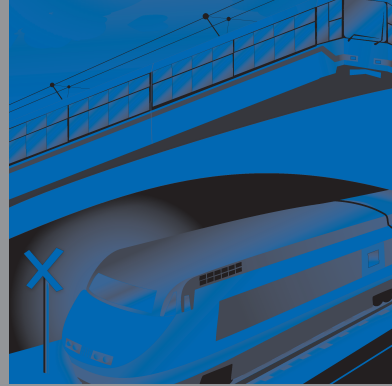
National Transportation Safety Board
ANNUAL REPORT
to Congress



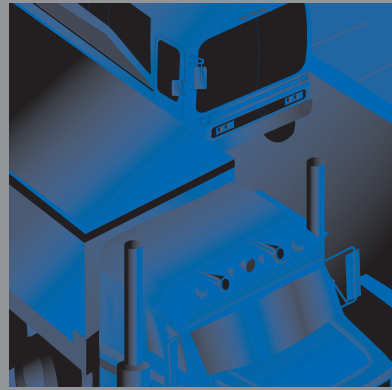
2004

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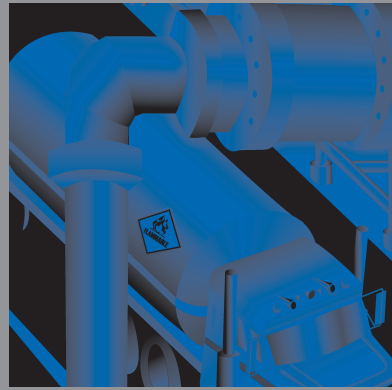
RAILROAD



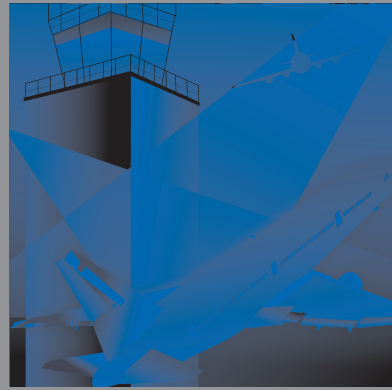
HIGHWAY



PIPELINE



HAZARDOUS MATERIALS



AVIATION



MARINE

Foreword

The National Transportation Safety Board (NTSB) is an independent agency charged with determining the probable cause of transportation accidents and promoting transportation safety. The Board investigates accidents, conducts safety studies, evaluates the effectiveness of other government agencies' programs for preventing transportation accidents, and reviews the appeals of enforcement actions involving airman and seaman certificates issued by the Federal Aviation Administration (FAA) and the U.S. Coast Guard (USCG) and civil penalty actions taken by the FAA.

To help prevent accidents, the NTSB develops safety recommendations based on its investigations and studies. These are issued to federal, state and local government agencies and to industry and other organizations in a position to improve transportation safety. Recommendations are the focal point of the NTSB's efforts to improve safety of the nation's transportation system.

The NTSB's origins can be found in the Air Commerce Act of 1926, in which Congress charged the Department of Commerce with investigating the causes of aircraft accidents. Later, that responsibility was given to the Civil Aeronautics Board's Bureau of Aviation Safety.

In 1967, Congress consolidated all transportation agencies into a new Department of Transportation (DOT) and established the NTSB as an independent agency, placed within the DOT for administrative purposes. In creating the Safety Board, 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 working separately. Since 1967, the Board has investigated accidents in the aviation, highway, marine, pipeline, and railroad modes as well as hazardous materials transportation-related accidents.

In 1974, Congress reestablished the NTSB as a completely separate entity, outside the DOT, reasoning "...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 DOT is responsible for both the regulation and promotion of transportation within the United States and accidents may suggest deficiencies in the transportation system, the Board's independence was deemed necessary for proper oversight. The NTSB, which has no authority to regulate, fund, or be directly involved in the operation of any mode of transportation, seeks to conduct investigations and to make recommendations from a totally objective viewpoint.

In 1996, Congress assigned the Board the additional responsibility of coordinating federal assistance to the families of aviation accident victims. In 2000, the Safety Board embarked on a major initiative to increase employee technical skills and make its investigative expertise more widely available to the transportation community by establishing the NTSB Academy. The George Washington University Virginia campus was selected as the academy's home. The NTSB took occupancy of its new facility in August 2003.

Since its inception, the NTSB has investigated more than 124,000 aviation accidents and over 10,000 surface transportation accidents. On call 24 hours a day, 365 days a year, NTSB investigators travel throughout the country and to every corner of the world to investigate

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significant accidents and develop factual records and safety recommendations with one aim – to ensure that such accidents never happen again.

To date, the NTSB has issued more than 12,000 safety recommendations pertaining to the various transportation modes to more than 2,200 recipients. Because the Board has no authority to regulate the transportation industry, its effectiveness depends on its reputation for conducting thorough and accurate investigations and for producing timely, well-considered recommendations to enhance transportation safety.

The NTSB's role in fostering advances in transportation safety has been significant – more than 82 percent of its recommendations have been adopted by the regulatory community and the transportation industry.

National Transportation Safety Board

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Most Wanted Safety Recommendations

The Safety Board's Most Wanted list of transportation safety improvements focuses attention on Board recommendations that have the most potential to save lives and to highlight recommendations with the greatest impact on transportation safety.

This year, the Safety Board added a major issue area to the list: improve school bus/grade crossing safety. While school bus grade crossing accidents are infrequent occurrences, the Safety Board believes that results can be catastrophic when they do occur. In 2004, there were more than 245,000 grade crossings in the United States, of which nearly 109,000 were passive crossings, or those without lights, bells or gates. Over 86,000 of the passive crossings were on public roadways. School buses encounter passive grade crossings every day. The recommendation added to the list addresses additional actions that should be taken by the states to further minimize risks to school bus passengers.

Two issues were removed from the list -- requiring voyage data recorders on large ships and requiring cab voice recorders on passenger and freight trains. Because of commitments by the International Maritime Organization to mandate voyage data recorders on large ocean-going passenger and cargo vessels, the Safety Board removed the issue from the list and labeled the Safety Board's efforts a success. The other issue, asking the Federal Railroad Administration (FRA) to require cab voice recorders, was removed because the agency told the Safety Board it did not intend to implement the recommendation -- an action the Safety Board said was "unacceptable" because cab voice recorders can be very helpful in pinpointing human factors that often cause train accidents and in assisting investigators to recommend safety remedies.

The Safety Board reviewed the Most Wanted list at two separate public meetings, one focusing on federal issues and the other on state issues. It also continued to evaluate timeliness designations for the 12 federal issues. Since 2003, items on the list have been color-coded: **green** -- acceptable action, progressing in a timely manner; **yellow** -- acceptable action, progress slowly; and **red** -- unacceptable action or progress has stalled. The items below are color-coded to indicate their status.

2004 Most Wanted List

Actions Needed by Federal Agencies

AVIATION

The FAA should act to:

Reduce Dangers to Aircraft Flying in Icing Conditions (RED)

- Use current research on freezing rain and large water droplets to revise the way aircraft are designed and approved for flight in icing conditions.
- Give flight crews accurate information to quickly recognize dangers of all types of icing and maintain airspeeds to avoid loss of aircraft control.

Eliminate Flammable Fuel/Air Vapors in Fuel Tanks on Transport Category Aircraft (YELLOW)

- Modify procedures to reduce the potential for flammable fuel/air vapors in fuel tanks until permanent changes can be implemented.
- Implement design changes to eliminate the vulnerability of flammable fuel/air vapors in all transport category aircraft.

Stop Runway Incursions/Ground Collisions of Aircraft (RED)

- Give immediate warnings of probable collisions/incursions directly to flight crews in the cockpit.

Improve Audio and Data Recorders/Require Video Recorders (RED)

- Require cockpit voice recorders to retain at least 2 hours of audio.
- Require back-up power sources so cockpit voice recorders collect an extra 10 minutes of data when an aircraft's main power fails.
- Inspect and maintain data recorders yearly to make sure they operate properly.
- Install video recorders in cockpits to give investigators more information to solve complex accidents.

Require Restraint Systems for Children Under Age 2 (RED)

- Require restraints for infants and small children during takeoff, landing, and in turbulent conditions to provide them the same protection as other passengers.

RAILROAD

The FRA should act to:

Implement Positive Train Control Systems (YELLOW)

- Prevent train collisions and overspeed accidents by requiring automatic control systems to override mistakes by human operators.

Improve Survivability of Recorders (RED)

- Improve event recorder design survivability on new and rebuilt locomotives to protect data from fire and impact forces during train accidents.

HIGHWAY

The Federal Motor Carrier Safety Administration (FMCSA) should act to:

Improve the Safety of Motor Carrier Operations (YELLOW)

- Prevent motor carriers from operating if they put vehicles with mechanical problems on the road or unqualified drivers behind the wheel.

Prevent Medically-Unqualified Drivers from Operating Commercial Vehicles (YELLOW)

- Establish a comprehensive medical oversight program for interstate commercial drivers.
- Ensure that examiners are qualified and know what to look for.
- Track all medical certificate applications.

- Enhance oversight and enforcement of invalid certificates.
- Provide mechanisms for reporting medical conditions.

The National Highway Traffic Safety Administration (NHTSA) should act to:

Enhance Protection for Bus Passengers (YELLOW)

- Redesign motor coach window emergency exits so passengers can easily open them.
- Issue standards for stronger bus roofs and require them in new motorcoaches.
- Devise new standards to protect motor coach passengers from being thrown out of their seats or ejected when a bus sustains a front, side, or rear impact or rolls over.

MARINE

The USCG should act to:

Improve Drug and Alcohol Testing of Crews After Accidents (YELLOW)

- Strengthen and clarify regulations to require that drug and alcohol testing be conducted quickly after serious marine accidents.

INTERMODAL

The DOT, FAA, USCG, and Research and Special Programs Administration (RSPA) should act to:

Update Hours-of-Service Regulations in Aviation, Marine and Pipeline Industries (YELLOW)

- Set working hour limits for flight crews, aviation mechanics, pipeline controllers, mariners and other transportation operators, and provide predictable work and rest schedules based on current fatigue research, circadian rhythms, sleep and rest requirements.

Action Needed by the States

HIGHWAY

Improve Child Occupant Protection

- Enact state laws requiring booster seats for young children.

Enact Primary Seat Belt Enforcement Laws

- Increase the number of people who wear seat belts through stronger enforcement laws.

Promote Teen Highway Safety

- Strengthen underage drinking and driving laws.
- Enact graduated driver licensing legislation.
- Prohibit nighttime driving by young novice drivers.
- Restrict the number of teen passengers traveling with young novice drivers.

Eliminate Hardcore Drinking Driving

- Enact state legislation and take other actions that are proven to reduce crashes involving those who repeatedly drink large amounts of alcohol and drive including:
 - o Frequent, statewide sobriety checkpoints;
 - o Legislation to create stricter sanctions for those arrested for the first time with a high blood alcohol concentration;
 - o Zero blood alcohol requirement for convicted drinking while intoxicated DWI offenders when they get their license back;
 - o Administrative rather than court-based license revocation for refusing to take or failing the sobriety test; and
 - o Vehicle sanctions for DWI offenders.
- Eliminate plea-bargaining DWI offenses and programs that divert offenders and purge the offense record.
- Retain DWI offense records (to identify and prosecute repeat offenders) for at least 10 years.
- Develop and operate special sanction (court-based) programs for hardcore DWI offenders.

Improve School Bus/Grade Crossing Safety

- Install stop signs at passive crossings.
- Prioritize for upgrade to lights and gates, crossings that school buses traverse that now only have warning signs.
- Install noise-reducing switches on new buses.
- Enhance bus driver training and evaluation.
- Include grade-crossing questions on commercial driver's license exams.

MARINE

Enhance Recreational Boating Safety

- Require mandatory education of boat operators.
- Require use of life jackets for children.
- Require safety instruction prior to personal watercraft rental.

The NTSB and Congress

The Safety Board provided testimony to Congressional committees on several occasions during calendar year 2004. Below is a summary of testimony provided by the Safety Board's Board Members and office directors. Copies of NTSB testimony are available on the Board's website at <http://www.nts.gov/speeches>.

Chairman Ellen Engleman Conners testified before the Subcommittee on Forests and Forest Health, Committee on Resources, U.S. House of Representatives, on May 13, 2004. This was an oversight hearing on firefighting preparedness and the nation's readiness for the 2004 wildfire season. The Chairman testified on the Board's investigations of several firefighting air tanker accidents.

Chairman Engleman Conners also testified before the Committee on Commerce, Science and Transportation, U.S. Senate, on June 2, 2004. This was a full Committee hearing on firefighting aircraft safety. She testified on the Board's safety recommendations that resulted from three separate accidents involving firefighting air tankers.

Mr. Robert Chipkevich, Director, Office of Railroads, Pipeline, and Hazardous Materials Investigations, testified before the Subcommittee on Highways, Transit and Pipelines, Committee on Transportation and Infrastructure, U.S. House of Representatives, on June 16, 2004. This was an oversight hearing regarding pipeline safety regulations by RSPA's Office of Pipeline Safety. Mr. Chipkevich testified on RSPA's acceptance rate of the Board's pipeline safety recommendations.

State and Local Government Outreach

For the first time since the October 1990 introduction of its “Most Wanted” list of safety recommendations, the Safety Board has identified a separate list of Most Wanted recommendations addressed specifically to the states. The vast majority of recommendations to the states are in the highway and recreational boating safety areas.

With more than 42,000 people killed each year in highway accidents, it is imperative that state and local governments make highway safety a top priority. Chairman Ellen Engleman Connors together with the other Safety Board Members and staff delivered this message throughout 2004 via wide-ranging public appearances including legislative testimony, presentations to public and private sector groups, media events, and leadership in a variety of safety coalitions.

The states considered and enacted a variety of legislation and regulations related to Safety Board recommendations. The National Conference of State Legislatures reports that state legislators considered more than 1,100 bills regarding highway safety issues during their 2004 legislative sessions.

Even though 36 states have adopted many elements of the Safety Board’s recommended graduated driver licensing (GDL) system, highway crashes continue to be the leading cause of death among teenagers. Almost 8,000 teen drivers were involved in fatal crashes in 2003. Thirty-six states considered teen driver legislation in 2004, with most proposing to add restrictions such as passenger limitations, cell phone use restrictions, and nighttime driving restrictions to existing GDL systems. Alaska, Colorado and South Dakota approved laws strengthening their systems. Wyoming and Montana, the only states without any elements of graduated licensing, plan to introduce bills to establish GDL systems in 2005.

Increasing proper safety belt use is the single most important measure that can be taken to reduce the deaths and injuries resulting from traffic crashes. The Safety Board provided support to state education and enforcement efforts, which led to a new milestone of belt use by 80 percent of motor vehicle occupants. Our efforts particularly focused on states that do not place restrictions on the enforcement of their safety belt use requirements, such as Tennessee, which adopted primary enforcement in 2004. The Safety Board worked with eight states in 2004 to improve safety belt use laws. Four states (Georgia, Indiana, New York, and Oklahoma) expanded the coverage of their child passenger safety requirements to require older children to use booster seats.

More than 17,000 persons die in alcohol-related highway crashes each year. This prompted many states to consider legislation to reduce impaired driving in 2004. In particular, attention was directed toward hardcore drinking drivers, offenders who drive with a high blood alcohol content (BAC), or who are repeat DWI offenders. At least nine states strengthened their laws addressing hardcore drinking drivers. Notably, Virginia adopted a package of 25 bills to comprehensively address repeat offenders and high BAC first offenders. The Safety Board recognized the leadership of key sponsors in the Virginia Legislature.

States continue to recognize the need to improve recreational boating safety. At least 12 states and the District of Columbia considered proposals to strengthen boating while impaired laws, to require children to wear a life jacket while on a boat, or to establish boater education requirements.

In 2004, the Safety Recommendations and Communications staff testified 29 times in 12 states; held 37 coalition meetings; gave 21 speeches at conferences; and conducted 38 other advocacy activities.

The Safety Board continues to actively encourage adoption of measures consistent with its recommendations, through testimony to state legislatures and numerous appearances before industry groups. Many of these groups adopted resolutions in support of Safety Board recommendations and asked their membership to support state legislation.

In addition to these advocacy activities, the Board continued to routinely inform key state officials of significant Safety Board accident investigation activities, from initial launch to final adoption of reports and recommendations. The Board provided information to the states on 10 separate accident investigations in 2004.

Office of Aviation Safety

The Federal Aviation Act of 1958, as amended, and the Independent Safety Board Act of 1974 placed the responsibility for investigating and determining the probable cause for all civil aviation accidents within the NTSB. Recent legislation also authorized the Board to investigate accidents involving public use (government) aircraft, except those operated by the armed forces and intelligence agencies.

Given the international nature of the air transportation industry and of the leading role of the United States in the development of aviation technologies, the Safety Board's investigation of domestic accidents and participation in foreign investigations is essential to the enhancement of aviation safety worldwide. The Board fulfills U.S. obligations with regard to foreign accident investigations, established by treaty under the auspices of International Civil Aviation Organization (ICAO), by sending accredited representatives to participate in investigations in cases where U.S. interests are involved.

The Board's major aviation accident reports, safety recommendations, and accident statistics are disseminated worldwide and have a direct influence on the safety policies domestically and abroad, helping to ensure the safe transportation by air of U.S. citizens and other travelers around the world.

The Safety Board also investigates more than 2,000 general aviation accidents and incidents annually. These investigations can result in safety improvements that have far-reaching impact. Typically, NTSB investigations examine all factors surrounding an accident or series of accidents or serious incidents, thereby ensuring that regulatory agencies and the industry are provided a thorough and objective analysis of actual, as well as potential, deficiencies in the transportation system. Only then can solutions be proposed to correct deficiencies that may have caused an accident.

The Office of Aviation Safety is responsible for investigating aviation accidents and incidents and for proposing probable cause(s) for the Safety Board's approval. In conjunction with other offices within the Safety Board, the office also works to formulate recommendations to prevent the recurrence of similar accidents and incidents and to improve aviation safety.

The office headquarters is located in Washington, D.C., with 10 regional offices located in Parsippany, New Jersey; Atlanta, Georgia; Miami, Florida; West Chicago, Illinois; Arlington, Texas; Denver, Colorado; Seattle, Washington; Gardena, California; Anchorage, Alaska; and Ashburn, Virginia. Seven divisions comprise the office and reflect the organization of the Safety Board's investigative process: Major Investigations, Regional Operations and General Aviation, Operational Factors, Human Performance, Aviation Engineering, Survival Factors, and Report Writing and Editing.

When the Safety Board is notified of a major aviation accident, it launches a go-team, which varies in size depending on the severity of the accident and the complexity of the issues involved. The team normally consists of an investigator-in-charge (IIC) and staff specialists in as many as 14 different specialties. Each staff expert leads a group of other specialists from government agencies, the industry, and first response teams as information is collected and analyzed. Safety Board staff members are designated as group chairmen to coordinate information for their part of the investigation from the on-scene activities through adoption

The Office of Aviation Safety has 84 investigators and 43 support staff. In 2004, it launched on 7 major domestic investigations and 10 foreign accident investigations. The office completed 4 major reports and continued work on 6 other major investigations.

of the final report. For the majority of the almost 2,000 commercial and general aviation accident/serious incidents investigated each year, a regional investigator, from one of the 10 NTSB regional offices, serves as the IIC.

Operational Factors specialists in three disciplines -- air traffic control, operations, and weather -- support major investigations with intensive work in those areas. Aviation Engineering specialists provide technical skills in the areas of powerplants (engines), structures, systems, and maintenance. Human Performance specialists review the background and performance of those associated with an accident. Survival Factors specialists investigate circumstances that affect the survival of persons involved in accidents, including causes of injuries and fatalities.

The participation of operators, manufacturers, labor, and regulators augments the Board's resources and allows first-hand access to specialized information. For example, the manufacturer is the best source of information on the design of the specific aircraft being investigated. NTSB also makes use of outside laboratories and research facilities whenever needed.

A public hearing may be convened, generally within a year of the accident, or depositions may be taken to collect additional information and review the investigation's progress. As an investigation is completed, a detailed narrative report is prepared. This report analyzes the investigative record and identifies the probable cause of the accident.

Safety recommendations resulting from major investigations generally are included in the final accident report, although recommendations can be issued at any time during the course of an investigation if an issue is determined by the Board to pose an immediate threat to safety. Regional investigations will frequently identify safety issues that can correct safety problems before they result in other accidents.

The Office of Aviation Safety manages the NTSB's international aviation affairs program as well. It does so by assigning an accredited representative and technical advisors from the manufacturers of the airframe and the engines to assist in the investigation. NTSB accredited representatives support foreign investigations conducted by other nations in accordance with the Convention on International Civil Aviation. The office also maintains liaison and coordination with other governments through the U.S. Interagency Group on International Aviation and ICAO.

Completed Major Aviation Investigations

Loss of Pitch Control Causes Crash of Air Midwest Flight 5481, a Raytheon (Beechcraft) 1900D, in Charlotte, North Carolina

On February 26, 2004, the Safety Board determined that the probable cause of the January 8, 2003 airliner crash in Charlotte, North Carolina was the airplane's loss of pitch control during takeoff. The loss of pitch control was the result of incorrect rigging of the elevator control system compounded by the airplane's center of gravity, which was substantially aft of the certified aft limit.

Air Midwest (US Airways Express) flight 5481, a Raytheon (Beechcraft) 1900D, N233YV, crashed shortly after takeoff at Charlotte-Douglas International Airport. Two crewmembers and 19 passengers aboard the airplane were killed. One person on the ground received minor injuries, and the airplane was destroyed by impact forces and a post-crash fire.



Wreckage from Air Midwest crash.

Contributing to the cause of the accident were Air Midwest's and the FAA's lack of oversight of the work being performed at Air Midwest's maintenance facility in Huntington, West Virginia. Investigators found that the accident airplane entered a maintenance check with an elevator control system that was rigged to achieve full elevator travel in the downward direction. However, the airplane's elevator control system was incorrectly rigged during maintenance, and the incorrect rigging restricted the airplane's downward elevator travel to about one-half of the travel specified by the airplane manufacturer.

Air Midwest contracted with Raytheon Aerospace to provide quality assurance inspectors, among other maintenance personnel, for the Huntington maintenance station. Raytheon Aerospace contracted with Structural Modification and Repair Technicians to supply the mechanic workforce. One of these mechanics examined and incorrectly adjusted the elevator control system on the accident airplane. The failure of the Raytheon Aerospace quality assurance inspector to detect the mechanic's incorrect rigging of the elevator control system also contributed to the cause of the accident.

The Board found that the FAA's failure to aggressively pursue the serious deficiencies in Air Midwest's maintenance training program that were previously and consistently identified permitted the practices at the Huntington maintenance facility during the accident airplane's maintenance check. For example, the Raytheon Aerospace quality assurance inspector did not provide adequate on-the-job training and supervision to the Structural Modifications and Repair Technician who performed the maintenance on the accident airplane's elevator control system. Furthermore, the quality assurance inspector and the mechanic did not diligently follow the elevator control system rigging procedure as written. As a result, they did not perform a critical step that would have likely detected the misrig and prevented the accident.

The Board also found that Air Midwest's weight and balance program contributed to the cause of the accident. At the time of the accident, the program resulted in substantially inaccurate weight and balance calculations for company airplanes. Although Air Midwest revised its weight and balance program after the accident, the program is unacceptable because it may still result in an inaccurate calculation of an airplane's center of gravity position.

The FAA's weight and balance program guidance at the time of the accident also contributed to the accident because the assumptions in the guidance were incorrect. If the FAA had performed a survey to determine average passenger and baggage weights at the time, the FAA would have realized that these weights were significantly different from the average weights in

its weight and balance program guidance and in Air Midwest's weight and balance program. The Board, therefore, concluded that periodic sampling of passenger and baggage weights would determine whether air carrier average weight programs were accurately representing passenger and baggage loads.

The Board issued 21 safety recommendations to the FAA that recommended improved surveillance of air carrier maintenance programs, improved maintenance work card and manual instructions, effective weight and balance procedures, and air carrier accountability for all contract maintenance work performed.

Forty-seven NTSB staff members were assigned to all or part of the Safety Board's investigation of this crash, devoting more than 16,000 hours of staff time to complete it in just over a year.

Flight Crew Failures Lead to FedEx Landing Crash in Tallahassee, Florida

On June 8, 2004, the Safety Board determined that a FedEx Boeing 727 crashed on landing in Tallahassee, Florida in 2002 because of flight crew performance failures.

On July 26, 2002, FedEx flight 1478, a Boeing 727-232F (N497FE) struck trees on final approach to Tallahassee Regional Airport. The captain, first officer and flight engineer were seriously injured, and the airplane was destroyed by impact and resulting fire.

In its final report, the Safety Board said that the probable cause of the accident was the failure of the captain and first officer to establish and maintain a proper glidepath during the night visual approach to landing. Contributing to the accident was a combination of the captain's and first officer's fatigue and failure to adhere to company flight procedures, the captain's and flight engineer's failure to monitor the approach, and the first officer's color vision deficiency.

Although the runway did not have an instrument landing system, it was equipped with a Precision Approach Path Indicator, a series of lights that aid flight crews in determining if they are on a proper glide slope to the runway. The Board found that the first officer, who was the flying pilot, had a history of color vision deficiency, for which he had a waiver from the FAA. Extensive post-crash evaluation of the first officer's color vision concluded that this deficiency would likely have interfered with his ability to discern the differences between the white and red lights that give the pilots their altitude clues.



Scene following crash in Tallahassee.

The Board noted that the current process of color vision screening required for pilots will not detect certain severe color vision deficiencies. The Board recommended that the FAA determine the operational effectiveness of each of the color vision test protocols it currently allows and, then, establish a standard battery of color vision tests to be administered to all commercial pilots.

The Board's report cites a series of performance deficiencies exhibited by the flight crew during the approach, including continuing their unstabilized approach below 500 feet rather than executing a go-around, and errors by the captain that suggest he was not fully alert. The captain indicated after the accident that he had not slept well the two nights before the accident, and the first officer reported that he had been having difficulty adjusting his sleep cycle to his new reserve-duty schedule.

Pilot's Excessive Rudder Pedal Inputs, Airbus Rudder System Design, and American Airlines' Pilot Training Program Contribute to Crash of American Airlines Flight 587 in Belle Harbor, New York

On October 26, 2004, the Safety Board determined that American Airlines flight 587 crashed into a Queens neighborhood because the plane's vertical stabilizer separated in flight as a result of aerodynamic loads that were created by the first officer's unnecessary and excessive rudder pedal inputs after the aircraft encountered wake turbulence. The Board said that contributing to the crash were characteristics of the airplane's rudder system design and elements of the airline's pilot training program.

On November 12, 2001, flight 587, an Airbus A300-605R (N14053), crashed in Belle Harbor, New York shortly after taking off from John F. Kennedy International Airport on a flight to Santo Domingo. All 260 people aboard the plane died, as did five persons on the ground. It was the second deadliest aviation accident in American history.



Investigators examine wreckage at AA flight 587 crash site.

The Safety Board found that the first officer, who was the flying pilot, inappropriately manipulated the rudder back and forth several times after the airplane encountered the wake vortex of a preceding Boeing 747 for the second time. The aerodynamic loads placed on the vertical stabilizer due to the sideslip that resulted from the rudder movements were beyond the ultimate design strength of the vertical stabilizer. The Board found that the composite material used in constructing the vertical stabilizer was not a factor in the accident

because the tail failed well beyond its certificated and design limits.

The Board said that American Airlines' Advanced Aircraft Maneuvering Program contributed to the accident by providing an unrealistic and exaggerated view of the effects of wake turbulence on heavy transport-category aircraft. In addition, the Board found that because of its high sensitivity, the A300-600 rudder control system is susceptible to potentially hazardous rudder pedal inputs at higher speeds. In particular, the Board concluded that, before the crash of flight 587, pilots were not being adequately trained on the effect of rudder pedal inputs have on the A300-600 at high airspeeds, and how the airplane's rudder travel limiter system operates.

The NTSB issued eight recommendations in its report. Among the seven sent to the FAA were those calling for adopting certification standards for rudder pedal sensitivity, modifying the A300-600 and A310 rudder control systems to increase protection from potentially hazardous rudder pedal inputs at high speeds (a similar recommendation was issued to the French equivalent of the FAA, the DGAC), and publishing guidance for airline pilot training programs to avoid the kind of negative training found in American Airlines' upset recovery training.

Major On-going Aviation Investigations

Federal Express Accident at Memphis, Tennessee

The Safety Board is investigating an accident involving a FedEx cargo Boeing MD-10-10F that crashed during landing in Memphis, Tennessee, on December 18, 2003. The airplane was destroyed after the right main landing gear collapsed after touchdown and the airplane veered off the right side of the runway. There were only two minor injuries to the two flight crewmembers and five jump seating employees.

Helicopter Crash off the Coast of Galveston, Texas

The Safety Board is investigating the crash of an ERA Aviation, Inc. Sikorsky S-76A twin-engine turbine powered helicopter (N579EH), which occurred on March 23, 2004 in the Gulf of Mexico. The aircraft, chartered by Unocal of Houston, Texas, departed Scholes International Airport near Galveston, Texas for the High Island A 557 refueling platform, and then an offshore drilling ship. The two crewmembers and eight passengers aboard were killed. Parties to the investigation are the FAA, ERA Aviation, Sikorsky and Unocal.

Convair 589 Cargo Plane Crash near Cincinnati, Ohio

The Safety Board is investigating the crash of a cargo aircraft near Cincinnati, Ohio on August 13, 2004. Air Tahoma flight 185, a Convair 580 (NV586P), reported engine trouble before crashing onto a golf course short of runway 36R of Cincinnati/Northern Kentucky International Airport. One crewmember was killed; the other was seriously injured.

Pinnacle Airlines Crash in Jefferson City, Missouri

The Safety Board is investigating an accident involving a Pinnacle Airlines Canadair CL-600-2B19 regional jet that crashed in a residential area in Jefferson City, Missouri, on October 14, 2004. The airplane was destroyed by the impact forces and a post-crash fire. The two crewmembers were killed.

Jetstream 32 Accident in Kirksville, Missouri

The Safety Board is investigating the crash of a twin-engine turboprop airliner in Kirksville, Missouri. The British Aerospace Jetstream 32, operating as American Connection flight 5966, crashed on approach to the Kirksville Regional Airport on October 19, 2004. The aircraft carried two crewmembers and 13 passengers; there were two survivors.

Parties to the investigation are Pinnacle Airlines, FAA, Air Line Pilots Association, National Air Traffic Controllers Association, and General Electric. The Transportation Safety Board of Canada sent an accredited representative along with technical advisors from Transport Canada, the agency that certified the aircraft, and Bombardier Aerospace, the aircraft manufacturer.

Business Jet Services Accident in Houston, Texas

On November 22, 2004, a Gulfstream G-1159A (G-III), N85VT, operated by Business Jet Services, crashed while on approach to Houston Hobby Airport, Houston, Texas. The airplane was on an instrument landing system approach to the runway when the airplane struck a light pole adjacent to a roadway and crashed into a field. The airplane was destroyed by impact forces and fire. The two pilots and one flight attendant on board were killed.

Presidential Airways Inc. Turboprop Crash near Bagram, Afghanistan

On November 27, 2004, a CASA 212 twin-engine turboprop airplane, operated by Presidential Airways Inc., of Melbourne, Florida, was destroyed when it collided with terrain about 80 miles west of Bagram, Afghanistan. The certificated airline transport pilot and co-pilot, flight mechanic, and three passengers were killed.

On December 4, 2004, the Transitional Islamic Government of Afghanistan requested, through the Embassy of United States, that in accord with ICAO Annex 13, the Safety Board be delegated to conduct the investigation. Parties to the investigation are the FAA, United States Air Force Safety Center, United States Army Safety Center, and Presidential Airways, Inc.

Regional Aviation Operations

In 2004, the regional offices initiated 1,865 accident investigations and 116 serious incident and accident investigations involving commercial operations and completed 2,361 investigations. Regional accident and serious incident investigations are handled much like major investigations, but because these investigations are typically smaller in scope, they are usually conducted by a single regional investigator, who, working with representatives from other parties, ensures the investigation of all the relevant facts, conditions, and circumstances to determine the cause of the accident and identify any safety issues. The factual reports of the accidents/serious incidents conducted by the regions are published on the NTSB's website. The brief and probable cause of the accident becomes available on the website after the determination of cause.

Completed Regional Aviation Investigations

In the Alaska Region

Pilot's Inadequate In-flight Decision-making Process and Failure to Refuel Cause Cessna 401 Ditching near Gustavus, Alaska

On July 13, 2003, a wheel-equipped Cessna 401 airplane, N6296Q, was destroyed during an emergency landing and ditching in open ocean waters, near Gustavus, Alaska. Of the six people on board, the certificated commercial pilot and three passengers have not been located

In 2004, the Office of Aviation Safety regional staff initiated 1,865 investigations; completed 2,361; and continued work on 1,165 investigations.

and are presumed to have been killed. One of the two surviving passengers sustained minor injuries, and the other sustained no injuries.

The airplane had about 140 gallons of usable fuel aboard. The flight's intended destination was located about 757 nautical miles away. The pilot planned to make one stop in order to purchase fuel before continuing on to the destination airport. As the accident flight progressed towards the intended fuel stop airport, the pilot requested to continue on to another airport located about 100 miles away, and closer to the final destination airport. As the flight neared the second fuel stop airport, the pilot again made a request to the Air Traffic Control (ATC) specialist on duty. The flight was then cleared to the pilot's intended destination airport. When the flight was about 22 miles southeast of the destination airport, the pilot informed the ATC specialist that he was concerned about his remaining fuel. The ATC specialist then informed the pilot of an alternate airport that was located closer to the flight's present position, but the pilot was not familiar with the airport, and he elected to proceed on. The pilot selected a forced landing site located about 12 miles short of his intended destination airport, in open ocean waters.

According to the two surviving passengers, after the collision with the water, all of the airplane's occupants lost consciousness momentarily. When the two survivors regained consciousness, there was about two feet of water in the airplane, and the airplane was sinking. The survivors said four of the six occupants, including the pilot, successfully evacuated the airplane. The four survivors then began to swim to the closest shoreline, located about a mile from the accident site. During the swim to shore, the two surviving occupants became separated from the other two other occupants.

On March 30, 2004, the Safety Board determined that the probable cause of the accident was the pilot's inadequate in-flight decision-making process, and failure to refuel the airplane prior to fuel exhaustion, which resulted in a total loss of engine power. A factor associated with the accident was the lack of a suitable forced landing site.

Pilot's Failure to Maintain Adequate Airspeed Causes Beech V35 to Collide with Terrain near Skagway, Alaska

On August 8, 2003, a wheel-equipped Beech V35-B airplane, N4317S, was destroyed when it collided with tree-covered terrain following a loss of control during the initial climb after takeoff from Skagway Airport, Skagway, Alaska. The private certificated pilot and the two passengers were killed. A post-crash fire consumed the cockpit/cabin area.

On April 28, 2004, the Safety Board determined that the probable cause of the accident was the pilot's failure to maintain adequate airspeed, and subsequent inadvertent stall, which resulted in a collision with trees during takeoff-initial climb. Factors contributing to the accident were terrain features consisting of a ravine and rising terrain on either side of the departure runway. As a result of the accident, the IIC was able to get the FAA to expand the Alaska Airport Supplement to reflect the hazardous terrain features surrounding the airport and to outline suggested departure routes/methods.

Pilot's Failure to Follow Procedures Causes Cessna 421 Collision with Terrain near Sitka, Alaska

On July 3, 2003, a Cessna 421C airplane, N777DX, was destroyed when it collided with terrain about three miles north of Sitka, Alaska, during an instrument approach to the Sitka Airport. The pilot and the four passengers were killed. During the flight, the right side nose baggage door opened. The pilot expressed concern to air traffic control about baggage exiting the compartment and striking the right propeller. The pilot did not fly the published approach, but abbreviated the approach and turned the wrong direction, toward higher terrain, north of the approach course. Post-accident inspection of the airplane disclosed no evidence of any preimpact mechanical problems, other than the baggage door, which was still attached to the airplane.

On September 29, 2004, the Safety Board determined that the probable cause of the accident was the pilot's failure to follow procedures by not following the published approach procedures, which resulted in an in-flight collision with terrain. Factors contributing to the accident were a low ceiling, and the pressure induced by the open baggage door.

In the Central Mountain Region

Tail Rotor Trunnion Fatigue Causes Agusta A109K2 Life Flight Helicopter Crash at Salt Lake City, Utah

On June 7, 2003, an Agusta A109K2 helicopter, N123RX, owned by IHC Hospitals, Incorporated, and operated as IHC Life Flight was destroyed when it impacted a hillside near Salt Lake International Airport, Salt Lake City, Utah. The airline transport pilot piloting the helicopter was killed. A paramedic on board sustained minor injuries. A flight nurse on board reported no injuries.

An examination of the helicopter's broken tail rotor trunnion showed four separate fatigue areas originating from the inner splines. The exam also showed that the fatigue occurred due to stresses that exceeded the design spectrum. Excessive heating was noted due to friction between the trunnion and blade grip bushings. The tail rotor trunnion had a published service life of 2,700 hours. At the accident, the trunnion had 698.0 total hours.

The Safety Board determined the probable cause of the accident was fatigue of the tail rotor trunnion resulting in complete trunnion failure and subsequent tail rotor separation from the helicopter. Factors contributing to the accident were the low altitude, low airspeed, excessive tail rotor loading, and the worn tail-rotor blade grip bushings. As a result of the investigation, an alert bulletin was immediately issued by the FAA Rotorcraft Directorate informing all A109K2 helicopter operators of the Safety Board's findings. Later, the manufacturer issued a service bulletin calling for level 2 inspections of the A109K2 tail rotor trunnion every 200 flight hours.

Inadvertent Activation of the Flight Deck Door's Upper Pressure Relief Latch Causes American Airlines Boeing 757 Cockpit Door Blowout Panel Failure near Dodge City, Kansas

On June 10, 2003, a Boeing 757-200, N704X, owned by ILFC VOLARE Inc., and operated by Trans World Airlines LLC, as American Airlines flight 2885, was in cruise flight southwest of Dodge City, Kansas, when the captain was struck on the head by the flight deck door's

upper decompression panel, rendering him incapacitated. The first officer requested an immediate flight deviation to Denver, Colorado, where he made an uneventful landing. The captain received minor injuries. The airline transport certificated first officer, three flight attendants, and 93 passengers were not injured.

The lead flight attendant had given the captain a tray of refreshments and was attempting to secure the flight deck door. When the flight attendant slammed the door closed, the upper pressure relief latch activated, causing the upper decompression panel to open. The panel fell forward and down, striking the captain on the head. An examination of the flight deck door showed the correct placard in place; however, the door was not in compliance with the manufacturer's issued Service Bulletin (SB), B231001-52-02 for the Boeing model 757-200 flight deck door. On further examination, the doorstop mechanism, mounted on the bottom of the flight deck door, was found to be loose and missing one attachment screw. The airline and the FAA were aware of previous problems with the flight deck door latches. The investigation also revealed that this was a problem found with flight deck door latches on secure cockpit doors installed in numerous other model airplanes (Boeing 737 series, McDonnell Douglas MD-11 series, several regional jet models, etc.). Approximately 1,000 airplanes were affected by the SB.

On September 1, 2004, the Safety Board determined the probable cause of the incident was the inadvertent activation of the flight deck door's upper pressure relief latch during closure of the door, resulting in the deployment of the upper decompression panel, which subsequently struck the captain. Contributing factors included the operator's improper compliance with the door manufacturer's SB, the operator's inadequate service and maintenance of the flight deck door, and the door manufacturer's inadequate SB compliance determination. The NTSB issued an urgent safety recommendation letter requesting that the FAA issue an airworthiness directive (AD) to require compliance with the manufacturer's SB within 90 days. The FAA subsequently issued the appropriate AD.

Pilot's Failure to Maintain Aircraft Control Causes Hawker Siddeley HS-125 Training Accident near Beaumont, Texas

On September 20, 2003, a Hawker Siddeley HS-125-700A, N45BP, operated by Starflite Management Group, Inc., of Houston, Texas, was destroyed when it impacted terrain near Southeast Texas Regional Airport, Beaumont, Texas. The airline transport certificated flight instructor, the airline transport pilot and the commercial pilot who were receiving instruction were killed. The purpose of the flight was for the instructor-pilot to prepare the pilots for their Part 135 competency and proficiency checks scheduled to be conducted in the accident airplane the following week.

On September 29, 2004, the Safety Board determined the probable cause of the accident was the pilot's failure to maintain aircraft control. Contributing factors included performing intentional stalls at too low an altitude to afford a safe recovery, the pilot's failure to add power in an attempt to recover, and the flight instructor's inadequate supervision of the flight.

Pilot's Failure to Maintain Aircraft Control Causes Federal Express Cessna 208 Weather/Icing Accident at Cody, Wyoming

On October 29, 2003, a Cessna 208B, N791FE, registered to Federal Express Corporation, and operated by Corporate Air, Inc., of Billings, Montana, as Airspur flight 8773, was destroyed when it impacted terrain and water during a circling approach to Yellowstone

Regional Airport, Cody, Wyoming. The airline transport certificated pilot, the sole occupant on board, was killed. The airplane slid down the embankment and out into a lake, becoming partially submerged.

On September 29, 2004, the Safety Board determined the probable cause of the accident was the pilot's failure to maintain aircraft control. Contributing factors include the pilot's failure to divert to an alternate airport, the inadvertent stall, and the snow and icing conditions. Information from this investigation was used in the continuing Cessna 208 icing study and in a study of accidents involving airplanes operating into instrument meteorological conditions. Both studies have recommendations pending.

In the Mid-Atlantic Region

Pilot's Low Altitude Maneuver and Failure to Maintain Airspeed Cause Crash of Beech B200 in Leominster, Massachusetts

On April 4, 2003, a Beechcraft B200, N257CG, was substantially damaged when it impacted a building in Leominster, Massachusetts, while on approach to Fitchburg Municipal Airport, Fitchburg, Massachusetts. The certificated airline transport pilot, the pilot-rated passenger, and four additional passengers were killed. One passenger was seriously injured, and one person inside the building received minor injuries.

Toxicology testing performed on the pilot revealed imipramine and carbamazepine in the pilot's urine and blood, and morphine in the pilot's urine. According to the pilot's medical and pharmacy records, he suffered from a severe neurological disorder, possibly a seizure disorder, which resulted in frequent, unpredictable episodes of debilitating pain. Additionally, approximately three months prior to the accident, the pilot was diagnosed with viral meningitis, and a severe skin infection with multiple abscesses on his extremities. The pilot had been prescribed imipramine, an antidepressant that has detrimental effects on driving skills and other cognitive functions. He had also been prescribed carbamazepine, typically used to control seizures or treat certain chronically painful conditions. Carbamazepine has measurable impairment of performance on a variety of psychomotor tests. Morphine, a prescription opiate painkiller, is also a metabolite of heroin and many prescription medications, such as codeine, used to control moderate pain. No indication was observed in the pilot's medical records that he was recently prescribed any opiates. Neither the pilot's medical condition, nor the medication he was routinely taking was reported on his application for an airman medical certificate.

On September 1, 2004, the Safety Board determined the probable cause of the accident was the pilot's low altitude maneuver using an excessive bank angle, and his failure to maintain airspeed that resulted in an inadvertent stall and subsequent collision with a building. A factor was the pilot's impairment from prescription medications.

In the North Central Region

Excessive Takeoff Rotation and Lack of Oversight Cause Canadair Challenger 600 Accident in Wichita, Kansas

On October 10, 2000, a Canadair Challenger CL-600-2B16 (CL-604) (Canadian registration C-FTBZ and operated by Bombardier Incorporated) was destroyed on impact with terrain and post-impact fire during initial climb from Wichita Mid-Continent Airport

(ICT), Wichita, Kansas. The pilot and flight test engineer were killed. The copilot was seriously injured and died 36 days later.

On April 14, 2004, the Safety Board determined that the probable cause of this accident was the pilot's excessive takeoff rotation, during an aft center of gravity (c.g.) takeoff, a rearward migration of fuel during acceleration and takeoff and consequent shift in the airplane's aft c.g. to aft of the aft c.g. limit, which caused the airplane to stall at an altitude too low for recovery. Contributing to the accident were Bombardier's inadequate flight planning procedures for the Challenger flight test program and the lack of direct, on-site operational oversight by Transport Canada and the FAA.

Pilot's Failure to Maintain Airspeed Above Stall Speed Causes Piper PA-46 Crash near Benton Harbor, Michigan

On August 4, 2002, a Piper PA-46-350P, N316PM, owned and piloted by a private pilot, impacted the terrain on the extended centerline of a runway at the Southwest Michigan Regional Airport, Benton Harbor, Michigan. The pilot was performing a forced landing after experiencing a total loss of engine power during cruise flight. The aircraft was substantially damaged. The pilot and his two passengers were killed.

October 28, 2004, the Safety Board determined that the probable cause of the accident was the pilot's failure to maintain airspeed above stall speed resulting in a stall/spin. Additional causes were the pilot not maintaining best glide airspeed and optimal glidepath following the loss of engine power. A factor to the accident was the engine failure due to the fatigue failure of the crankshaft.

Pilot's Spatial Disorientation Causes Pilatus' Uncontrolled Descent near Westphalia, Missouri

On September 14, 2002, a Pilatus PC-12/45, N451ES, piloted by a commercial pilot, was destroyed after colliding with terrain near Westphalia, Missouri. The airplane departed controlled flight during a climbing turn while en route to cruise altitude. The turbo-prop airplane departed controlled flight after initiating an ATC-directed turn during cruise climb. The airplane subsequently entered a rapidly descending spiral turn, impacting the terrain and exploding, and did between a quarter and half of turn, but was not spinning wildly.

On October 28, 2004, Safety Board determined that the probable cause of the accident was the pilot's spatial disorientation while turning in a cruise climb in instrument meteorological conditions, which resulted in the pilot's loss of aircraft control, and his failure to recover from a resultant tight descending spiral.

In the Northeast Region

Pilot's Improper Preflight Planning and Decision to Depart with Known Mechanical Deficiencies Cause Beechcraft 58P Crash near Swanzey, New Hampshire

On September 2, 2002, a Beechcraft 58P, N6688D, was destroyed during a forced landing after experiencing a partial loss of engine power near Swanzey, New Hampshire. The certificated private pilot and six passengers were killed. The six-passenger airplane arrived at the departure airport with a malfunctioning landing gear system. Due to lack of maintenance

personnel, the pilot elected to conduct the accident flight with the landing gear extended. Witnesses observed the airplane flying about 200-300 feet above the ground, with its engines “sputtering and backfiring.” The airplane made a left turn towards the airport, descended, and came to rest in a wooded area about two miles southeast of the airport. Examination of the right engine revealed the propeller was not feathered, and a cylinder head was fractured near the bottom of the upper portion of the head. A fatigue fracture initiated in the root radius of the cylinder head thread that engaged with the top thread on the cylinder barrel.

On June 2, 2004, the Safety Board determined that the probable cause of the accident was the pilot’s improper preflight planning, and his decision to depart with known mechanical deficiencies to the landing gear system, which resulted in a forced landing, during a partial loss of power on one engine. Factors related to the accident were the fatigue failure of an engine cylinder barrel, the inadequate manufacturing process of the cylinder barrel, the pilot’s inability to retract the landing gear, and his failure to feather the propeller of the affected engine.

Captain’s Failure to Attain Proper Touchdown on Runway and Subsequent Failure to Perform Go-around Cause Continental Express Jet Runway Overrun in Cleveland, Ohio

On January 6, 2003, an Embraer ERJ-145LR, N16571, operated by ExpressJet Airlines, Inc. (d.b.a. Continental Express) as flight 2051, was substantially damaged when it overran the departure end of the runway while landing at Cleveland-Hopkins International Airport, Cleveland, Ohio. There were no injuries.

On June 2, 2004, the Safety Board determined that the probable cause of the accident was the captain’s failure to attain a proper touchdown on runway, and his subsequent failure to perform a go-around, both of which resulted in a runway overrun. Factors were the company’s inadequate dispatch procedures with their failure to provide all NOTAMS for the airport to the flight crew, and the snow-covered runway.

Flight Instructor’s Inadequate Supervision Causes Grand Aire Express Crash in Swanton, Ohio

On April 8, 2003, a Dassault Fan Jet Falcon (DA-20), N183GA, operated by Grand Aire Express Inc. as flight 183, was destroyed when it struck trees while on an instrument approach to Toledo Express Airport, Swanton, Ohio. The two certificated airline transport pilots, and pilot-rated passenger were killed. The flight crew was practicing ILS approaches in instrument meteorological conditions with low clouds and rime ice. On the second approach, the airplane struck trees and burned.

On June 2, 2004, the Safety Board determined that the probable cause of the accident was the flight instructor’s inadequate supervision of the flight, including his failure to maintain an approach airspeed consistent with the airplane’s configuration, which resulted in an aerodynamic stall due to slow airspeed, and subsequent uncontrolled descent into trees. Factors were the icing conditions, the flight instructor’s failure to turn on the wing and engine anti-ice, and his lack of experience as an instructor pilot in the airplane.

Failure of the Left Power Control Distribution Unit Causes AirTran Accident in Flushing, New York

On March 26, 2003, a Boeing 717-200, N957AT, operated by AirTran Airways as flight 356, received minor damage when the left side power control distribution power unit failed while on approach to land at LaGuardia Airport, Flushing, New York. During a subsequent emergency evacuation, one passenger was seriously injured, and 22 passengers received minor injuries. There were no injuries to the two pilots, three flight attendants, and the other 55 passengers.

The Boeing 717 was on final approach when the display units in the cockpit blanked, and the cockpit darkened. In addition, there was smoke in the cockpit and cabin. In the cabin, the emergency light illuminated for a few minutes, and then all lights extinguished and the cabin was dark. The landing gear was lowered. When the wing flaps were positioned to 40 degrees, a landing gear aural warning commenced and continued until power was removed after landing. The captain commanded an emergency evacuation after he cleared the runway and stopped.

On July 29, 2004, the Safety Board determined that the probable cause of the accident was a failure of the left power control distribution unit.

Inadvertent Retraction of Flaps by Co-Pilot Causes Learjet 35A Crash in Groton, Connecticut

On August 4, 2003, a Learjet 35A, N135PT, operated by Air East Management Ltd., was destroyed when it impacted a residential home and terrain while maneuvering to land at the Groton/New London Airport, Groton, Connecticut. The two certificated airline transport pilots were killed.

On July 29, 2004, the Safety Board determined that the probable cause of the accident was the first officer's inadvertent retraction of the flaps during the low altitude maneuvering, which resulted in the inadvertent stall and subsequent in-flight collision with a residential home. Factors in the accident were the captain's decision to perform a low altitude maneuver using excessive bank angle, the flight crew's inadequate coordination, and low clouds surrounding the airport.

Improper Replacement of Forward Elevator Trim Cable and Inadequate Functional Check Cause Colgan Air Crash in Yarmouth, Massachusetts

On August 26, 2003, a Beech 1900D, N240CJ, operated by Colgan Air Inc. as flight 9446 (d.b.a. US Airways Express), was destroyed when it impacted water near Yarmouth, Massachusetts. The certificated airline transport pilot and certificated commercial pilot were killed.

The accident flight was the first flight after maintenance personnel replaced the forward elevator trim cable. When the flightcrew received the airplane, the captain did not address the recent cable change noted on his maintenance release. The captain also did not perform a first flight of the day checklist, which included an elevator trim check. Shortly after takeoff, the flightcrew reported a runway trim, and manually selected nose-up trim. However, the elevator trim then traveled to the full nose-down position. The control column forces subsequently increased to 250 pounds, and the flightcrew was unable to maintain control of the airplane.

On August 31, 2004, the Safety Board determined that the probable cause of the accident was the improper replacement of the forward elevator trim cable, and subsequent inadequate functional check of the maintenance performed, which resulted in a reversal of the elevator trim system and a loss of control in-flight. Factors were the flight crew's failure to follow the checklist procedures, and the aircraft manufacturer's erroneous depiction of the elevator trim drum in the maintenance manual.

In the Northwest Region

Flight Crew's Misidentification of a Parallel Taxiway as an Active Runway Causes American Airlines' Incident at Seattle, Washington

On March 14, 2003, an American Airlines DC-9-82, N298AA, landed on a taxiway at Seattle-Tacoma International Airport, Seattle, Washington. There were no injuries. The aircraft, which is owned and operated by American Airlines, Inc., was not damaged. All occupants exited the aircraft at the passenger terminal using normal means.

Neither the Captain nor the First Officer were aware they were lined up on the taxiway, and they did not know they had landed on the taxiway until advised by the tower. A rain shower had recently moved through the area, and although it was overcast over the center and north end of the airport, south of the field rays of sunlight were shining through holes in the clouds, resulting in a degradation of the visual clues that would normally help the flight crew differentiate between the runway and the taxiway.

On April 28, 2004, the Safety Board determined that the probable cause of the accident was the flight crew's misidentification of the parallel taxiway as the active runway, resulting in the flight crew executing a landing on the taxiway. Factors included sun glare from the wet paved surfaces, and a visual illusion created by the airport surface environment.

Pilot Incapacitation Causes Loss of Control of Cessna 525 near Carey, Idaho

On March 15, 2003, a Cessna 501, N70FJ, was destroyed when it impacted terrain following an uncontrolled descent near Carey, Idaho. The airplane was registered to Dancing Wind Aviation LLC, of Livingston, Montana, and operated by the pilot. The airline transport pilot and two passengers were killed.

A controller received an ident from the aircraft and instructed the pilot to descend and maintain 15,000 feet. The controller then cleared the aircraft for the GPS approach and to acknowledge with an ident. There was no response. An examination of the aircraft's flight control, pressurization, and electrical systems revealed no anomalies with these systems that would have precluded normal operations. Radar data revealed the aircraft was in level flight at FL 190 for more than four minutes, when it had previously been cleared to 15,000 feet. It subsequently began a climb reaching an altitude of 20,300 feet before beginning a right descending turn followed by a left descending turn. The last radar return before radar contact was lost indicated the aircraft was at 15,900 feet and descending. The pilot was on two medications for high blood pressure and one for high cholesterol. The pilot had recently been found to have an elevated blood sugar, suggesting early diabetes or some other systemic disease or injury. The pilot had a family history of heart disease and high blood pressure, and had at least one episode of chest tightness in the past. The circumstances of the accident suggest substantial impairment or incapacitation of the pilot. However, there is insufficient information to conclude any specific cause for the pilot's impairment or incapacitation.

On October 28, 2004, the Safety Board determined that the probable cause of this accident was pilot incapacitation for unknown reasons.

In the Southeastern Region

Inadequate Maintenance and Poor Pilot Performance Cause Air Sunshine Cessna 402C Crash off Great Abaco Island, Bahamas

On October 13, 2004, the Safety Board determined that the probable cause of the fatal ditching of a commuter airplane off Great Abaco Island, Bahamas, was the in-flight failure of the right engine and the pilot's failure to adequately manage the airplane's performance after the engine failed. The Board found that the engine failure resulted from inadequate maintenance that was performed by the operator's maintenance personnel during undocumented maintenance.

The accident airplane, a Cessna 402C, operated by Air Sunshine, Inc., was on a scheduled flight from Ft. Lauderdale, on July 13, 2003, carrying a pilot and nine passengers, when it experienced a right engine failure and was ditched in the Atlantic Ocean near Treasure Cay Airport. Two passengers (one adult and one child) died after they evacuated the airplane. Five other passengers and the pilot sustained minor injuries and the airplane was substantially damaged.

The Board found that the right engine failed while the airplane was descending through an altitude of about 3,500 feet. Two or more of the right engine No. 2 cylinder hold-down nuts became loose, which resulted in high-stress fatigue fractures that allowed the cylinder to separate from the engine. The simultaneous loosening of two or more of the cylinder hold-down nuts was due to the application of insufficient torque applied by Air Sunshine personnel during maintenance work that was not documented. The Board found that, at the time of the accident, Air Sunshine's maintenance recordkeeping and practices were not adequate.

The Board also found that the pilot had a history of below-average proficiency before the accident flight, including numerous failed FAA flight tests, which contributed to his inability to maintain maximum flight performance to reach land when the right engine was lost. Additionally, after determining that he was going to ditch the airplane, the pilot failed to conduct a required briefing for the passengers on emergency procedures, including the correct use of personal flotation devices. This failure, the Board said, contributed to passenger fatalities. Contrary to federal regulations, the pilot also did not have his shoulder harness fastened when the airplane hit the water and, consequently, sustained a head injury that reduced his ability to assist the passengers after the ditching.

The Board was also concerned about the role of the FAA in the accident, because although FAA oversight of the air carrier was in accordance with standard guidelines, it was not sufficient to detect maintenance deficiencies at Air Sunshine. The Board recommended that the FAA issue a bulletin informing inspectors overseeing Part 135 single-pilot operators about the circumstances of the Air Sunshine accident and emphasizing the need for pilots to provide timely emergency briefings. Additional safety recommendations focused on issues of maintenance, pilot proficiency, and regulatory oversight.

In the Southwest Region

Main Rotor Blade Separation Causes Medical Evacuation Helicopter, Bell 222U, Crash near Nipton, California

On September 7, 2002, a Bell 222U twin-engine helicopter, N417MA, was destroyed after impacting terrain while maneuvering near Nipton, California. The helicopter was registered to the Wells Fargo Bank Northwest of Salt Lake City, Utah, and operated by Mercy Air Service, Inc., of Rialto, California. The instrument-rated commercial pilot, flight nurse, and flight paramedic were killed.

Examination of the accident site revealed evidence of a main rotor blade separation with a debris field consisting of main rotor blade skin, honeycomb, and paint chips located 938 feet upstream of the main impact crater. Post-accident examination of the helicopter's component parts, including the main rotor blades, failed to reveal the cause for the main rotor blade separation. Examination of the aircraft's engines revealed no pre-impact anomalies.

On March 30, 2004, the Safety Board determined that the probable cause of the accident was the main rotor blade separation while maneuvering for unknown reasons. A factor was the dark night conditions.

Pilot's Inadequate Approach Airspeed and Delayed Remedial Action Cause Beech King Air 90 Crash near Reno, Nevada.

On March 13, 2002, a Beech E90, N948CC, descended into an unoccupied commercial building during an in-flight loss of control, near the Reno/Tahoe International Airport, Reno, Nevada. Pilot Services Corporation (d.b.a. Regent Air Service, Inc.), Truckee, California, operated the airplane. The airline transport certificated pilot and four passengers sustained minor injuries, and a fifth passenger was seriously injured.

During an instrument approach, the pilot failed to maintain flying airspeed. The airplane stalled, rolled left, and in an uncontrolled descent collided with a commercial building about one nautical mile from the runway's displaced threshold.

The Safety Board determined that the probable cause of the accident was the pilot's inadequate approach airspeed for the existing adverse meteorological conditions followed by his delayed remedial action to avert stalling and subsequent loss of airplane control. Contributing factors were the pilot's reduced visibility due to the inclement weather and the icing conditions.

Pilot's Loss of Control and Exceedence of the Aircraft's Design Stress Limits Cause In-flight Breakup of Cessna 425 at San Jose, California

On March 6, 2002, a Cessna 425, N444JV, experienced a loss of control and a subsequent in-flight breakup at San Jose, California. The aircraft impacted in an area of rolling, hilly pastureland. The aircraft was destroyed in the accident sequence. The instrument-rated private pilot and two passengers were killed.

The aircraft was on an IFR clearance and climbing through a cloud layer when it broke up in flight following an in-flight upset. As the airplane began to intercept a victor airway, climbing

at about 2,000 feet per minute, and passing through 6,700 feet, the airplane began a series of heading and altitude changes inconsistent with its ATC clearances.

On June 2, 2004, the Safety Board determined that the probable cause of the accident was the pilot's loss of control and resulting exceedence of the design stress limits of the aircraft, which led to an in-flight structural failure. The pilot's loss of control was due in part to the loss of primary airspeed reference resulting from pitot tube icing, which was caused by the internal failure of the pitot heat switch. Factors in the accident were the pilot's distraction caused by the airspeed reading anomaly and spatial disorientation.

Pilot's Decision Errors Cause Eurocopter Helicopter's Uncontrolled Descent and Impact with Terrain in Meadview, Arizona

On August 10, 2001, a Eurocopter AS350-B2 helicopter, N169PA, operating as Papillon 34, collided with terrain during an uncontrolled descent near Meadview, Arizona. The helicopter was operated by Papillon Airways, Inc., as an air tour flight. The helicopter was destroyed by impact forces and a post-crash fire. The pilot and five passengers were killed, and the remaining passenger sustained serious injuries. The flight originated from the company terminal at the McCarran International Airport, Las Vegas, Nevada, as a tour of the west Grand Canyon area.



Crash site in Meadview, Arizona.

On June 3, 2004, the Safety Board determined that the probable cause of the accident was the pilot's decision to maneuver the helicopter in a flight regime and in a high density altitude environment which significantly decreased the helicopter's performance capability, resulting in a high rate of descent from which recovery was not possible. Factors contributing to the accident were high-density altitude and the pilot's decision to maneuver the helicopter in proximity to precipitous terrain, which effectively limited remedial options available.

In-flight Failure of Right Wing Causes C-130A Firefighting In-flight Breakup in Walker, California

On June 17, 2002, a Lockheed C-130A, N130HP, broke apart in-flight while executing a fire retardant delivery near Walker, California. The three crewmembers were killed and the airplane was destroyed. The airplane was operated by the Department of Agriculture's Forest Service as a public use firefighting flight. Videotapes of the accident sequence indicated that the airplane had initiated its retardant delivery run. During the delivery, the wings separated from the fuselage near the wing roots. The airplane was manufactured in 1957, and placed in service by the U.S. Air Force. It entered civil service with the U.S. Forest Service in 1988. An initial examination of the airplane's records indicates the airplane had 21,863 flight hours. Preliminary examination of the wing structure found evidence consistent with fatigue at the failure locations in the wings.

On April 23, 2004, the Safety Board determined that the probable cause was the in-flight failure of the right wing due to fatigue cracking in the center wing lower skin and underlying structural members. A factor contributing to the accident was inadequate maintenance procedures to detect fatigue cracking. As a result of this accident and two other similar ones, the Safety Board issued recommendations related to enhanced maintenance programs for fire tanker aircraft.

On-going Regional Aviation Investigations

In the Alaska Region

de Havilland DHC-2 Float Airplane Crash near Sitka, Alaska

On September 20, 2004, an amphibious float-equipped de Havilland DHC-2 airplane, N712TS, departed the Sitka Rocky Gutierrez Airport, Sitka, Alaska, for a remote lodge located near the Warm Springs Bay Seaplane Base, Baranof, Alaska. The airplane did not arrive at the lodge, and was reported overdue. The airplane is missing and is presumed to have crashed. The airplane was operated by Harris Aircraft Services, Inc., Sitka. The commercial-certificated pilot and the four passengers are presumed to have been killed.

Boeing MD-11 Damaged During Excessive Rotation During Takeoff at Anchorage, Alaska

On October 8, 2004, a Boeing MD-11F airplane, N275WA, received substantial damage when the lower empennage collided with the runway during rotation at takeoff from the Ted Stevens Anchorage International Airport, Anchorage, Alaska. The two airline transport certificated pilots were not injured. The IIC has identified issues with company operating/dispatch procedures, and Boeing has agreed to clarify their two-engine operations portion of the flight manual.

In the Central Mountain Region

Piper PA-32 Accident in Mineral Wells, Texas

On August 4, 2004, a privately owned Piper PA-32 single-engine airplane, N3352W, impacted power lines and exploded near an airport in Mineral Wells, Texas. The pilot and his passenger were both killed, and the airplane was destroyed. About two-thirds of the town of Mineral Wells was without electrical power as a result of the accident.

Cessna Citation 750 Landing Gear Failure in Jackson Hole, Wyoming

On August 18, 2004, a Cessna Citation 750 business jet (known as the Citation Ten), operated by NetJets, Inc., experienced a failure of its right main landing gear during landing rollout at Jackson Hole Airport in Jackson, Wyoming. Both flight crewmembers and their two passengers were uninjured. The airplane did not sustain substantial damage; therefore, the NTSB is investigating it as an incident. Preliminary data indicates that the right main landing gear trailing link suddenly fractured on landing rollout from a normal landing.

Beech T-34 In-flight Breakup near Montgomery, Texas

On December 7, 2004, a Beech T-34 single-engine airplane, N141SW, was destroyed following an in-flight breakup while maneuvering near Montgomery, Texas. The instructor pilot and student were both killed. The airplane was being operated by Texas Air Aces.

According to ground witnesses, the right wing of the airplane separated in flight as the airplane was performed “upset training” maneuvers. The airplane was then observed spiraling straight down until it impacted a rural road. The wing was later located in a heavily wooded area in a national forest. There were no other airplanes in the area at the time of the accident.

This accident is the second fatal T-34 in-flight breakup associated with Texas Air Aces. The previous accident occurred on November 19, 2004. As a result of the previous accident, a team of FAA inspectors and managers conducted an immediate inspection and removed several managers and inspectors from the FAA’s Houston Flight Standards District Office. Additionally, a DOT Inspector General investigation was initiated into the FAA’s role in the accident.

Canadair CL-600 Crash in Montrose, Colorado

On November 28, 2004, a Canadair CL-600 corporate jet, N873G, owned by Jet Alliance/Air Castle Corporation and operated by Global Aviation as Glow Air flight 73, impacted a fence and terrain off the departure end of a runway during takeoff from the Montrose Regional Airport, Montrose, Colorado. A post-crash fire ensued. The pilot, copilot and one passenger were killed. A flight attendant on board sustained critical burn injuries. Two other passengers, NBC Sports President Dick Ebersol and his son, survived the accident with non-life threatening injuries.

This accident bears similarity to another Canadair CL-600 accident that occurred during takeoff from Birmingham, England, on January 4, 2002, killing all five persons on board. According to the final accident report by the United Kingdom, the accident occurred due to a loss of control during takeoff that resulted from frost on the wings that was not removed by the flight crew. The CL-600 employs a supercritical wing airfoil that is susceptible to significant loss of lift due to wing contamination. The temperature conditions at the time of takeoff in Birmingham were identical to the conditions in the Montrose accident.

Parties to the investigation include representatives from the FAA Accident Investigation Division, the FAA Salt Lake City, Utah, Flight Standards District Office, and representatives from Bombardier Canadair and General Electric engines. An investigator from the Canadian Transportation Safety Board was sent as an accredited representative.

In the Mid-Atlantic Region

Piper PA 32R-301T Accident in Byram Township, New Jersey

On September 8, 2002, a Canadian-registered Piper PA 32R-301T, C-GKLY, was destroyed during a forced landing to wooded terrain in Byram Township, New Jersey. The certificated private pilot and one passenger were killed. Two passengers were seriously injured. Preliminary FAA transcripts of ATC communications revealed that the pilot declared an emergency about four minutes before the crash. The airplane was in cruise flight at 3,500 feet mean sea level when the pilot reported a loss of engine oil pressure. Examination of the engine revealed that the zinc-plated crankshaft gear attachment bolt was fractured, and

that the crankshaft no longer drove the gear. A review of the manufacturer's specifications revealed that a cadmium-plated bolt was indicated for the crankshaft gear application. An emergency airworthiness directive was issued in regard to this failure mode.

Beech 200 King Air Crash in Martinsville, Virginia

The Safety Board is investigating the October 24, 2004, of a twin-engine turboprop Beech 200 King Air, N501RH, registered to Hendricks Motorsports, Inc., which impacted mountainous terrain while executing a missed non-precision approach to runway 30 at the Blue Ridge Airport, Martinsville, Virginia. Both flight crewmembers and all eight passengers were killed. The accident airplane was holding for another airplane to complete the approach to runway 30. Following the uneventful landing of that first airplane, air traffic controllers with Greensboro Approach Control cleared the accident airplane to begin the localizer-only approach. During the approach, the accident airplane was allowed to switch to the local airport frequency for landing. A few minutes later, the accident airplane came back on to the Greensboro Approach frequency and reported that they had performed a missed approach. The Greensboro Approach controllers acknowledged, and no further radar or radio contact was made with the accident airplane.

In the North Central Region

Cessna T206H Crash near Homer Glen, Illinois

On May 28, 2004, a Cessna T206H, N9548D, operated by the U.S. Drug Enforcement Administration (DEA), impacted a detached garage in a residential area during a forced landing attempt near Homer Glen, Illinois. The forced landing was precipitated by a loss of engine power, according to a radio call from the pilot. At the time, the airplane was at 1,700 feet at that time and traveling about 140 knots. The pilot was killed and the airplane was destroyed. No one on the ground was injured. The pilot was an agent for the DEA, and the purpose of the flight was to reposition the airplane to St. Louis for a routine maintenance inspection.

Air Ambulance Bell 407 Accident near Newberry, South Carolina

On July 13, 2004, a Bell 407 helicopter, operating on an air ambulance flight, impacted trees and was destroyed near Newberry, South Carolina. All four persons on board were killed. According to preliminary reports, the helicopter crashed near Interstate 26 immediately after picking up a patient from a car accident.

Kalitta American International Airways 747 Engine Separation over Lake Michigan

The Safety Board is investigating an October 20, 2004, incident involving a Boeing 747, operated by Kalitta American International Airways as an international cargo flight, which had the right outboard engine separate from the airplane in flight and fall into Lake Michigan while climbing through 18,000 feet. Following the engine separation, the flight crew elected to divert to Detroit Metro Airport, Detroit, Michigan, where the airplane landed safely.

*In the Northeast Region***Piper PA-32R-301 6 Crash near Harlan, Kentucky**

On March 21, 2004, a Piper PA-32R-301, N8173U, was destroyed when it impacted mountainous terrain, while in cruise flight near Harlan, Kentucky. The certificated private pilot and five passengers were killed.

Piper PA-32-300 Crash in Leominster, Massachusetts

On June 1, 2004, a Piper PA-32-300, N21072, was destroyed after impacting terrain in Leominster, Massachusetts, during an approach to the Fitchburg Municipal Airport, Fitchburg, Massachusetts. The certificated private pilot and passenger were killed.

KingAir Beech 200 Crash in Rupert, West Virginia

On June 13, 2004, a Beech BE-200, N200BE, was destroyed when it impacted Big Mountain, near Rupert, West Virginia. The certificated airline transport pilot and certificated commercial pilot were killed.

Piper PA-32R-301T Crash in Wheeling, West Virginia

On July 18, 2004, a Piper PA-32R-301T, N7710M, was destroyed when it impacted terrain while on approach to the Wheeling Ohio County Airport Wheeling, West Virginia. The certificated private pilot, pilot-rated passenger, and three other passengers were killed.

Cessna and Piper Mid-Air Collision near Kinnelon, New Jersey

On August 7, 2004, a Cessna A150L, N6186F, and a Piper PA28-140, N95314, were substantially damaged when they collided during cruise flight, and impacted terrain in Kinnelon, New Jersey. The certificated private pilots on both airplanes were killed.

Gulfstream IV Crash at Teterboro, New Jersey

On December 1, 2004, a Gulfstream G-IV corporate jet, G-GMAC, was substantially damaged while landing at the Teterboro Airport, Teterboro, New Jersey. The certificated airline transport flightcrew and seven passengers were not injured.

The pilot reported that upon touching down, he had difficulty using the brakes, and the thrust reversers would not deploy. The airplane continued down the runway, and approximately 1,000 feet from the end, it departed the right side of the runway. The airplane continued through a swampy area and struck a small stand of trees, where the outer half of the left wing was separated. The British AAIB appointed an accredited representative to participate in the investigation.

*In the Northwest Region***Cessna Citation Ditches in Water near Coupeville, Washington**

On July 22, 2003, a Cessna Citation 525, N996JR, ditched in the waters of Penn Cove, Coupeville, Washington, following a loss of elevator trim control resulting in an uncommanded nose-low pitch attitude. The commercial pilot and passenger were not

injured. The airplane is registered to the Tango Corporation of Minden, Nevada, and was being operated as a cross-country flight.

Cessna 182 Crash near Glasgow, Montana

On January 1, 2004, a Cessna 182G, N3171S, was destroyed when it collided with snow-covered terrain in a remote area approximately 23 miles southwest of Glasgow, Montana. The private pilot, and the three passengers aboard the airplane were killed.

Beech 99 Part 135 Air Taxi Crash near Neihart, Montana

On August 17, 2004, a Beechcraft 99 Airliner, N199GL, operated as Alpine flight 5071, was destroyed during a collision with mountainous terrain approximately six nautical miles northeast of Neihart, Montana, near the summit of Big Baldy Mountain. The aircraft was operated by Alpine Aviation, Inc. (d.b.a. Alpine Air) of Provo, Utah. The airline transport pilot-in-command and pilot-rated passenger were killed.

Bell 407 Air Ambulance Crash near Battle Mountain, Nevada.

On August 21, 2004, a Bell 407 helicopter, N2YN, operating as an air ambulance flight, impacted mountainous terrain in cruise flight and was destroyed southwest of Battle Mountain, Nevada. The airline transport pilot, the two medical crewmembers, the infant patient being transported and the patient's mother, were killed. The helicopter was operated by Jefflyn Aviation, Inc., of Boise, Idaho, (d.b.a. Access Air Ambulance).

Cessna U206G Crash near Essex, Montana

On September 20, 2004, a Cessna U206G, N206SM, impacted mountainous terrain while maneuvering about six nautical miles northwest of Essex, Montana. The airplane was being operated under contract to the United States Forest Service (USFS) by Edwards Jet Center of Kalispell, Montana, as a public use flight. Four USFS employees and an Edwards' pilot were on board. The pilot and two USFS employees were killed, and the other two USFS employees sustained serious injuries.

Cessna 208B Crash near Hailey, Idaho

On December 6, 2004, a Cessna 208B single-engine turboprop airplane, N25SA, impacted terrain and was destroyed about 12 miles from the Hailey (Sun Valley) Airport, Hailey, Idaho, while on approach to land. Both persons on board were killed. The aircraft was destroyed by impact forces and ground fire. Light snow and below-freezing temperatures prevailed at the time of the accident. The airplane was being operated as a Part 135 commercial cargo flight by Salmon Air under contract with UPS. According to the pilot of a Cessna Citation corporate jet who was performing the same approach to the airport about 10 minutes ahead of the accident airplane, significant amounts of rime ice prevailed at the time. Additionally, recorded meteorological observations indicate conditions conducive to in-flight icing. Parties to the investigation include representatives of the FAA, Cessna Aircraft Company, and Salmon Air.

This accident is one of numerous recent fatal Cessna 208 accidents that occurred in conditions conducive to in-flight icing. The Board recently adopted four recommendations related to Cessna 208 icing accidents. Additional recommendations are also being drafted by participants of the Office of Aviation Safety's Regional Safety Assessment Team on Cessna 208 icing accidents.

In the South Central Region

EMB-135LR Regional Jet Loses Nose Wheel Steering During Landing Roll near Dallas, Texas

On June 11, 2004, an Embraer EMB-135LR airplane, N843RP, operating as Chautauqua Airlines Flight 6490 sustained minor damage following a loss of control during the landing roll at the Dallas/Fort Worth International Airport near Dallas, Texas. The airline transport-rated captain, commercial-rated first officer, flight attendant, and 37 passengers were not injured. One passenger sustained a minor injury.

The captain stated that after the nose wheel touched down, the airplane began to veer to the right of the centerline and the first officer noticed that the airplane required more left rudder than usual, and that inputs were not bringing the nose straight, and adding more left rudder did not correct the veer to the right. The captain used the till in an attempt to keep the airplane on the landing surface. Just as the till was moved to the left, the airplane veered sharply off the right side of the runway. The manufacturer performed a nose wheel steering hydraulic manifold pressure functional test and teardown. An electrohydraulic servo valve functional test revealed that the C1 orifice did not contain pressure and was contaminated by a very small piece of matter.

Bell 206-L1 Helicopter Crash in Vermillion Bay, Louisiana

On June 24, 2004, a Bell 206-L1, N5006F, registered to and operated by American Helicopters Inc. (AHI), of Angleton, Texas, was destroyed when it impacted water in the Gulf of Mexico, near Vermillion Bay, Louisiana. The commercial pilot and two passengers were killed. The AHI flight was contracted by Flow Petroleum Services of Lafayette, Louisiana, to transport personnel from offshore platforms to Abbeville, Louisiana.

Bell 206 B Helicopter Crash in Cushing, Oklahoma

On June 26, 2004, a Bell 206B single-engine helicopter, N27TV, was destroyed when it impacted the water following an in-flight collision with power lines while maneuvering near Cushing, Oklahoma. The helicopter was owned and operated by Interstate Helicopters, Inc., of Oklahoma City. The commercial pilot and a passenger were killed, and three passengers were seriously injured. The main wreckage was in the middle of the Cimarron River. The fuselage came to rest inverted and was 90 percent submerged. The tail boom and main rotor system were separated from the fuselage. Witnesses around the city of Cushing have reported that prior to the accident, the helicopter was "hot-dogging" around the city. Several people also reported that they thought the helicopter might have had some problems because of the erratic way it was flying. The helicopter impacted and severed three unmarked power lines that crossed the Cimarron River and were approximately 30 to 40 feet above the river.

Bell 206 Accident in the Gulf of Mexico

On July 17, 2004, a Bell 206L-1-C30P single-engine helicopter, N1078C, registered to and operated by Rotorcraft Leasing Company (RLC) L.L.C., of Broussard, Louisiana, was reported missing while en route to a helipad at Cameron, Louisiana. The airline transport pilot, who was the sole occupant, is missing. This accident was the 18th helicopter accident in the Gulf of Mexico in the past 18 months (2003-2004). During the previous 18-month period (2001-2002), there were nine Gulf helicopter accidents.

Bell 206 Helicopter Crash in the Gulf of Mexico

On July 21, 2004, a Bell 206B single-engine turbine powered helicopter, N133RT, registered to and operated by Omni Energy Services of Carencro, Louisiana, was substantially damaged when it submerged under water after an autorotation following a loss of engine power while maneuvering near East Cameron 13, an offshore platform located in the Gulf of Mexico. The commercial pilot sustained minor injuries and his two passengers were not injured.

Piper Aerostar Accident in Lakeway, Texas

On August 3, 2004, a twin-engine, six-seat, Piper PA-60-401P Aerostar airplane, N601BV, impacted a house immediately after takeoff from a private airport in Lakeway, Texas. The two pilots and their four passengers were killed. The airplane was destroyed in the impact and post-crash fire. All three occupants in the house escaped without injury.

Mooney M20 Accident in Olney, Texas

On August 4, 2004, a single-engine, four-seat, Mooney M20 airplane, N1050W, impacted terrain and was destroyed while approaching to land at the Olney Airport in Olney, Texas. The pilot and two passengers were killed, and a third passenger was seriously injured.

In the Southeastern Region

Boeing 767 Landing Gear Failure in Miami, Florida (being conducted by Alaska IIC)

On February 19, 2004, a Dutch-registered Boeing 767-300 ER airplane had a landing gear component failure while landing at the Miami International Airport, Miami, Florida. There were no injuries to the two pilots, eight flight attendants, or the 280 passengers. The flight crew reported to their Miami-based contract maintenance company personnel that during landing rollout, as they applied the brakes to slow the airplane, they noted a significant airframe vibration, along with a pronounced rumbling noise as the airplane slowed, and eventually stopped. During a post-incident inspection, maintenance personnel discovered a broken landing gear pivot pin on the right main landing gear truck.

Messerschmitt-Bolkow-Blohm BO-105 Helicopter Crash near Santa Rosa Beach, Florida

The Safety Board is investigating an accident that occurred on October 20, 2004, involving a Messerschmitt-Bolkow-Blohm (MBB) BO-105 helicopter, N916SH, operated by Metro Aviation, Inc as an emergency medical service aircraft, which impacted water and sank in the Choctawahatchee Bay near Santa Rosa Beach in the Florida Panhandle. The pilot, flight nurse, and paramedic were killed. This was the fifth fatal EMS helicopter accident in as

many months. A total of 17 people have been killed in these accidents. An NTSB Safety Assessment Team consisting of regional and headquarters aviation investigators is researching safety issues associated with EMS flights and is drafting recommendations.

Convair 340 Ditches in Maule Lake, North Miami Beach, Florida

On December 4, 2004, a Convair 340, N41626, registered to and operated by Miami Air Lease, ditched in Maule Lake, North Miami Beach, Florida, following loss of power in one engine. The airline transport-rated pilot and copilot were not injured. The airplane received substantial damage. The pilot stated that while climbing to cruise altitude after takeoff from Opa Locka Airport, the No. 1 (left) engine lost power. He shut down the engine, but the propeller would not go into the feathered position and continued to rotate or windmill. He turned back to the Opa Locka Airport. The airplane would not maintain altitude with windmilling No. 1 propeller and the No. 2 engine at full power. When he realized he could not make it to the airport he elected to ditch the airplane in Lake Maule, which is surrounded by condominiums.

In the Southern Region

Robinson R44 Helicopter Crash in Barnesville, Georgia

On June 27, 2004, a Robinson Helicopter R44, N441MG, registered to, and operated by MG Aviation, collided with trees during a cross-country flight in a residential area in Barnesville, Georgia. Instrument meteorological conditions prevailed at the time of the accident and no flight plan was filed. The helicopter sustained substantial damage. The certified flight instructor, and two passengers were killed.

Beech B-55 Baron Crash in Atlanta, Georgia

The Safety Board is investigating an accident on October 19, 2004, involving a twin-engine Beech B-55 Baron, (T-42A), N322WW, registered to and operated by J & R Aircraft Inc., which collided with the ground and burst into flames behind an automotive repair shop near the Martin Luther King Center in Atlanta, Georgia. The private instrument-rated pilot and his passenger were killed. The airplane was substantially damaged and sustained fire damage.

In the Southwest Region

Firefighting Plane Crash in St. George, Utah

On June 17, 2004, a PZL-Mielec M-18 Dromader airplane, N8214J, impacted terrain while maneuvering during firefighting operations and was destroyed near St. George, Utah. During the accident flight, the single engine airplane was under the operational control of the Bureau of Land Management, U.S. Department of Interior. The airplane was being operated with a restricted category FAA airworthiness certificate. The purpose of the public-use flight was to release a fire retardant over a wildland fire. The airplane experienced a post-crash fire, and the commercial pilot, a non-government employee, was killed. This accident was the third fatal accident involving a Dromader M-18 air tanker in three months.

Runway Incursion at Los Angeles International Airport, Los Angeles, California

On August 19, 2004, an Asiana Airlines Boeing 747-400 initiated a go-around and flew over a Southwest Airlines Boeing 737 that was in position for takeoff by about 200 feet at the Los Angeles International Airport. No injuries or damage occurred during the incident. Preliminary information indicated that the Asiana 747 was cleared to land on the active runway by ATC, while the Southwest Airlines 737 (SWA flight 440) was cleared onto the same active runway for position and hold for takeoff. The Asiana 747 pilot executed the go-around when he noticed the conflict. The Southwest Airlines' captain was starting to move the 737 off the runway because he thought there was a conflict.

Bellanca 7ECA Citabria and Thorpe T-18 Mid-air Collision over Malibu Beach, California

On August 22, 2004, a single-engine Bellanca 7ECA Citabria airplane (N53879) collided in flight with a single-engine experiment homebuilt Thorpe T-18 airplane (N7618T) about 100 yards from Malibu Beach, California. Both persons on board each airplane were killed. Both airplanes descended into the Pacific Ocean after they collided and sank.

Collision of Two American Champion 8KCAB Single-engine Airplanes over Prescott, Arizona

On August 28, 2004, two American Champion 8KCAB single-engine airplanes, N561ER and N562ER, collided in mid-air while performing formation aerobatics seven miles east of Ernest A. Love Field, Prescott, Arizona. Both airplanes were owned and operated by Embry-Riddle Aeronautical University were destroyed. The commercial pilot of N561ER and the airline transport pilot of N562ER were killed. One of the pilots was Mr. Robert Sweginnis, a world-renowned expert and author of aircraft accident investigation and aviation safety. The other pilot, Mr. Mike Corradi, was the Chief Flight Instructor of the Prescott campus of Embry-Riddle Aeronautical University.

Tour Helicopter Crash on Kauai, Hawaii

On September 24, 2004, a Bell 206B helicopter, N16849, operated by Bali Hai Helicopter Tours, impacted mountainous terrain and was destroyed about eight miles west of Lihue Airport on the island of Kauai in Hawaii. The commercial-rated pilot and all four passengers were killed. The flight was expected to return about 45 minutes after departure on a standard sightseeing flight around the island of Kauai. It did not return as expected, and a search was initiated. The wreckage was located about 24 hours later at the 1,800-foot level in extremely rugged terrain. Over the past five years, there have been nine air tour helicopter accidents in Hawaii, three of which were fatal -- killing 16 people.

Med Flight Air Ambulance Lear 35A Crash in San Diego, California

The Safety Board is investigating the October 24, 2004, crash of a Lear 35A corporate jet, operated by Med Flight Air Ambulance, Albuquerque, New Mexico, which impacted mountainous terrain and was destroyed shortly after takeoff from Brown Field near San Diego, California. The pilot, copilot, and three medical crewmembers were killed. There were no survivors. This accident has very similar circumstances to the March 16, 1992, crash of a Hawker Siddeley corporate jet that killed 10 people, including most of the members of the

Reba McIntire musical band. That crash occurred in about the same location, after taking off from the same airport about the same time and under the same weather and lighting conditions. This is the ninth fatal air ambulance accident in less than a year (involving both fixed wing and rotary wing aircraft). A total of 31 people have been killed in these accidents.

International Aviation Accident Investigations

The NTSB assists other nations with aircraft accidents that occurred outside the United States. The following are examples of ongoing investigations.

Air China B-767 Crash in Pusan, Korea

On April 15, 2002, the NTSB dispatched a team of investigators to assist the Government of South Korea in its investigation of the crash of an Air China Boeing 767-200ER near the city of Pusan. The aircraft departed Beijing to Pusan's Kimhae Airport. While turning onto final approach to Runway 18R at Kimhae,



[Air China crash site.](#)

the aircraft impacted rising, wooded terrain, broke apart, and caught fire. Local authorities report that 128 of the 167 persons aboard were killed. The Government of South Korea is preparing a final report.

EgyptAir B-737 Crash in Tunis, Tunisia

On May 7, 2002, the Safety Board sent a team of investigators to assist the Government of Tunisia in its investigation of the crash of an EgyptAir Boeing 737-500 (SU-GBI). Fourteen of the 62 individuals on board were killed when the aircraft crashed while on approach to Tunis-Carthage Airport while on a flight from Cairo.



[EgyptAir B-737 crash site.](#)

Shortly before the accident, the captain reported a landing gear malfunction, and had performed a low pass over the airfield. The aircraft crashed during its second approach.

China Airlines Boeing 747-200 in the Straits of Taiwan



Recovery of China Airlines' wreckage.

On May 25, 2002, China Airlines flight 611, a Boeing 747-200, crashed into the straits of Taiwan near the southwest end of Makung Island, Taiwan. Preliminary radar data indicates that the 23-year-old airplane apparently broke up at about 30,000 feet. All 225 persons onboard were killed. Based on the findings of this investigation, the NTSB issued recommendations regarding repair of aircraft structure. Investigative authorities are preparing a final report on the accident.

DHL Boeing 757 and Bashkirian Airlines TU-154 Collision Over Uberlingen, Germany

On July 1, 2002, DHL flight 611, a Boeing 757 and a Bashkirian Airlines Tupolev TU-154 collided in mid-air over Uberlingen, Germany. The two flight crewmembers on board flight 611 were killed, as were the 12 flight crew members and 57 passengers onboard the Bashkirian flight. Both aircraft were under ATC control and were equipped with traffic alert and collision avoidance systems.

Swearingen Metro Crash in Mount Kenya, Kenya

On Saturday, July 29, 2003, a Swearingen Metro SA226-TC airplane, a charter flight operated by Air 2000 of South Africa, collided with mountainous terrain during cruise flight at Mount Kenya National Park, Kenya. Instrument meteorological conditions prevailed, and the aircraft was on an instrument flight plan. The two South African pilots, and the 12 American citizens onboard were killed. The airplane was destroyed. There was ground fire. The flight originated in Johannesburg, South Africa with stops in Tete, Mozambique and Nairobi, Kenya. The destination was Samburu, Kenya near a hunting lodge. A team led by an NTSB accredited representative accompanied Kenyan investigators to the scene. The team spent several days further assisting local investigators with the investigation.

Sudanese Airways Boeing 737 Crash in Port Sudan, Sudan

On July 8, 2003, Sudanese Airways flight 139, a Boeing 737-200 airplane, crashed in open terrain during an instrument approach to Port Sudan Airport, Sudan. The flight departed Port Sudan for Khartoum. However, it was returning to land after the pilot reported one of the two engines had lost power. Instrument meteorological conditions prevailed, and the aircraft was on an instrument flight plan. The two flight crewmembers, nine crewmembers, and 105 passengers were killed. One passenger was seriously injured. Impact forces and a ground fire destroyed the airplane. After Sudanese officials traveled to the United Kingdom to read the flight recorders, they requested NTSB on-site assistance. A team led by an NTSB accredited representative provided assistance for five days.

Flash Airlines Boeing 737 Crash in Sharm El Sheikh, Egypt

On January 3, 2004, a Flash Airlines Boeing 737-300 crashed into the Red Sea after departing from Sharm El Sheikh Airport, Egypt. The airplane was destroyed and all 133 passengers and 15 crewmembers on board were killed. The NTSB is assisting in the investigation that is being led by the Egyptian Civil Aviation Authority.

Georgian Express Crash into Lake Erie

On January 17, 2004, Georgian Express Flight 126, a Cessna Caravan 208B, departed Pelee Island, Ontario, enroute to Windsor, Ontario. There were nine passengers and one crewmember on board. Shortly after take-off, the aircraft struck the ice-covered surface of Lake Erie, killing all 10 occupants. Although the investigation by the Transportation Safety Board of Canada is ongoing, there is factual information to suggest that the aircraft's weight was a factor in the accident. The weather at the time was conducive to airframe icing.

Raytheon (Beech) Super King Air 200 Crash in Bosnia

On February 26, 2004, a Raytheon (Beech) Super King Air 200 crashed in Bosnia, killing all nine persons aboard including Macedonian President Boris Trajkovski. The Safety Board is assisting the government of Bosnia and Herzegovina in the investigation. The FAA and Raytheon Aircraft Company (Beech) also sent representatives to assist.

MK Airlines Boeing 747 Crash in Nova Scotia, Canada

The Safety Board is assisting the Transportation Safety Board of Canada with its investigation of an October 14, 2004, accident involving a MK Airlines Boeing 747-200F. The airplane crashed during takeoff from Halifax International Airport, Halifax, Nova Scotia, Canada, on October 14, 2004. All seven crewmembers on board were killed.

China Eastern Crash at Baotou Airport, People's Republic of China

On November 21, 2004, a China Eastern Airlines Bombardier/Canadair CRJ-200, equipped with US-manufactured General Electric engines, crashed shortly after takeoff from the Baotou Airport, People's Republic of China (PRC). The six crewmembers and 47 passengers were killed; there were also two ground fatalities. The airplane was destroyed. The NTSB is assisting in the investigation, which is being conducted by the General Civil Aviation Authority of the PRC.

Lion Air MD-82 Crash in Solo, Java, Indonesia

On November 30, 2004, a McDonnell Douglas MD-82 airline jet, Indonesian registration PK-LMN, operated by Lion Air as flight JT538, crashed during landing at the Adi Sumarmo Airport in the city of Solo, Java, Indonesia. Of the 146 passengers and seven crewmembers aboard, 31 passengers and one pilot were killed, and over 100 passengers and crew were injured, some seriously. Heavy rain and winds prevailed at the time of the accident, which occurred during night conditions. The flight had departed from the capital city of Jakarta (located about 310 miles northwest of Solo), with an en route stop in east Java town of Surabaya before heading to Solo.

Public Hearings And Forums

Air Cargo Safety Forum, March 30-31, 2004

The Safety Board hosted a forum on safety issues related to the U.S. air cargo industry on March 30-31, 2004, at the NTSB Academy in Ashburn, Virginia.

The goal of the forum was to augment and support industry-government dialogue on air cargo safety and to help advance the important work currently being done in this area. The forum was conducted because air cargo is a critical segment of our transportation system and the Board needs to ensure that the highest safety standards are maintained.

The forum program focused on four main areas -- the current state of the cargo industry, operations, human factors, and regulatory issues. Papers on these topics were presented by representatives of industry associations (Airline Pilots Association, Cargo Airline Association, Regional Airline Association, National Air Carrier Association), plus carriers like FedEx and Hawaiian Airlines, and the Federal Aviation Administration.

Chairman Ellen Engleman Connors opened the forum; other Safety Board Members attended. NTSB staff led technical panel discussions that examined the industry's pressing safety issues, potential solutions, and possible impediments to resolving safety concerns.

Office of Highway Safety

Highway transportation accidents have a significant impact on American society. The FHWA reported that vehicle miles traveled increased in 2003 to 2.88 trillion, up from 2.86 trillion in 2002. According to the NHTSA, a total of 42,643 people died in highway crashes in 2003, a less than one percent reduction from the 2002 total of 43,005 fatalities. Due to the relative stability of the number of fatalities and the increase in miles traveled, the fatality rate per 100 million vehicle miles traveled dropped to 1.48 in 2003, from 1.51 in 2002. NHTSA estimates the economic cost of an average roadway fatality at \$977,000 and the cost associated with a critically injured crash survivor at \$1.1 million. This equates to an economic impact of motor vehicle crashes on America's roadways of \$230.6 billion a year, or an average of \$820 for every person living in the United States.

The Safety Board is charged the responsibility of reducing the toll through accident investigations. Changes in highway or vehicle design, driver training, occupant protection, and regulatory oversight are frequently recommended. In 2004, the Safety Board did important work regarding work zone safety, childcare transportation oversight, motorcoach occupant protection systems, electronic data recorders, bridge safety, medical oversight of non-commercial drivers and border checkpoint traffic safety.

Completed Major Highway Investigations

Uncorrected Hazardous Work Zone Conditions Cause Fatal School Bus Crash in Omaha, Nebraska

On February 10, 2004, the Safety Board determined that the probable cause of a school bus crash in Nebraska was the failure of the Nebraska Department of Roads to recognize and correct the hazardous conditions in the work zone created by the irregular geometry of the roadway, narrow lane widths, and speed limit.

On October 13, 2001, a 78-passenger school bus carrying 27 high school students and three adults (excluding the driver) was traveling through a work zone in Omaha, Nebraska. As the bus entered the work zone lane shift, it encountered a 52-passenger motorcoach also carrying high school students traveling in the opposite direction. Although no collision occurred between the two buses, the school bus departed the roadway and struck a barrier, steered to the left and then steered abruptly back to the right, striking the barrier again and, finally, a three-rail barrier between a guardrail and a concrete bridge railing. The bus passed through the three-rail barrier, rode up onto the bridge's sidewall, and rolled 270 degrees clockwise as it fell about 49 feet, landing on its left side in the creek below the bridge. Three students and an adult were killed. The remaining passengers and the bus driver sustained injuries.

The Board found that the failure of the traffic barrier system to redirect the accident vehicle and the bus driver's unfamiliarity with the vehicle contributed to the accident. The Nebraska Department of Roads and the contractor failed to adequately maintain the barrier system, as required by the construction contract. Moreover, had the barrier system struck by the accident bus been repaired to its original design and strength, the bus would probably have been deflected back into its lane and its departure from the bridge avoided.

In 2004, the Office of Highway Safety's 34 staff members initiated 45 investigations; completed 36 dockets; issued 6 major reports; and continued work on 26 investigations.



Damage to school bus following accident.

The Board also found that the roadway geometry in the work zone created a visual phenomenon that caused the bus driver to perceive the oncoming motorcoach as impinging upon its lane. Although it could not be determined whether the motorcoach crossed the line or not, the narrowness of travel lanes in the work zone left the bus driver little room for error.

The bus driver's unfamiliarity with the vehicle, which differed both in its perceptual demands and its handling characteristics from his regular route bus, may have contributed to his inability to accurately judge the lateral distance to the guardrail, bridge rail, and oncoming bus. This may have affected the driver's ability to properly steer the bus through the work zone.

The Safety Board made recommendations to the Federal Highway Administration, Nebraska Department of Roads, Omaha Fire Department, National Association of State Directors of Pupil Transportation Services, and Thomas Built Buses, Inc. These recommendations deal with proper work zone safety inspections and maintenance, and training emergency responders for extricating passengers from school buses, among other issues.

Lack of Oversight and Driver Impairment Cause Crash of Childcare Van in Memphis, Tennessee

On April 7, 2004, the Safety Board determined that the probable cause of the fatal crash of a van transporting children from a childcare center in Memphis, Tennessee, was the absence of oversight by the center's owners and the driver's inability to maintain control of his vehicle because he fell asleep, quite likely due to an undiagnosed sleep disorder. The driver's use of marijuana may also have played a role in the accident.

The accident occurred on April 4, 2002, when a 15-passenger van transporting six children to school drifted off the right side of the roadway, overrode the guardrail and struck a bridge abutment. The driver was ejected through the windshield and sustained fatal injuries. Four of the children also were killed, and two were seriously injured.

Safety Board investigators found no mechanical defects on the van that would have contributed to the accident. The weather was clear and the roadway dry. Post-accident toxicological tests indicate that the driver consumed marijuana on the morning of the accident and was under the influence of the drug at the time of the crash. Investigators also found that the driver had a history of difficulty maintaining wakefulness, probably reflecting a condition of sleep apnea or another undiagnosed sleep disorder. This combined

with witness reports of a lack of brake light illumination and the drifting of the van off the roadway is consistent with a driver who has fallen asleep.

The Board stated that because the owners of the childcare center did not comply with state law, and the Tennessee Department of Human Services did not provide adequate oversight, the van driver was able to transport children even though he had not had a background check or medical examination. Had drug testing been conducted, the Board said, the driver's drug use would likely have been detected and he may have been prohibited from transporting children. The Board also noted that had the center's owners used a vehicle built to school bus standards, rather than a 15-passenger van, and had appropriate restraints (seatbelts, booster seats) been used, the injuries from this accident might have been less severe. The Board also identified flaws in the design of the guardrail at the accident site that allowed the van to become trapped behind the guardrail and strike the bridge abutment.



Damage to childcare van following accident.

As a result of the accident, the Board made recommendations to the agencies in the 50 states and the District of Columbia that oversee childcare transportation calling for the use of vehicles built to school bus standards, regular vehicle maintenance and inspection programs, a requirement that occupants wear age-appropriate restraints at all times, and background checks, medical examinations and drug testing to determine driver fitness. Recommendations also were made regarding improvements in roadside guardrails.

Bus Driver's Deliberate Failure to Get Adequate Rest Causes Accident near Victor, New York

On June 22, 2004, the Safety Board determined that the driver of an Arrow Line, Inc. motorcoach fell asleep while driving due to his deliberate failure to get adequate rest during his off-duty hours. The accident occurred on Interstate 90 near Victor, New York on June 23, 2002 when the severely fatigued driver fell asleep and the bus ran off the road, vaulted over an entrance ramp, landed, and rolled onto its side. Five passengers on the bus were killed.



Scene on roadway following accident.

The Board's report listed several factors contributing to the accident, including a second Arrow Line, Inc. motorcoach driver who, knowing that the driver was severely fatigued, did nothing

to stop him from driving; inadequate oversight of drivers by Arrow Line, Inc and its holding company, Coach USA; and the lack of occupant protection for motorcoach passengers.

The accident bus was one of two Arrow Line, Inc. buses chartered to take groups from Westbury, Connecticut to Niagara Falls, Ontario, Canada that weekend. During the investigation, the Safety Board learned that the accident driver arrived in Niagara Falls around 7:30 a.m. on Friday, June 21 and was in a local casino from approximately noon on Friday until 10:00 a.m. on Saturday when he returned to his room but did not sleep. He went back to the casino around 4:00 p.m. on Saturday where he remained until approximately 9:00 a.m. Sunday. Both Arrow Line motorcoaches departed for the return trip about three and a half hours later. The accident driver had only 4 hours of sleep in the 51-hour period before the accident.

Prior to departure from Niagara Falls, the trip coordinator and several passengers expressed concern over the accident driver's visible fatigue. As part of its oversight program, Coach USA contracted with Driver's Alert, a Florida-based company, to operate a complaint and compliment tracking service but no calls to Driver's Alert were made regarding the accident bus just prior to the accident. The Driver's Alert call number was displayed on the exterior of the bus, however the number was not displayed on the inside of the bus for passengers who might have safety concerns about their driver. As a result the Board recommended that the FMCSA require the posting of an emergency telephone number on the interior of motorcoaches. The Board also made a recommendation to Coach USA that all calls reporting dangerous driver behavior be evaluated immediately and that a method be established to contact the driver upon receiving a complaint.

The report cited the second Arrow Line bus driver for his failure to attempt to stop the accident driver from operating the vehicle despite his knowledge that the accident driver had not had significant sleep in the two days preceding the accident as well as passenger complaints that the accident driver did not appear fit to drive. The investigation further determined that Arrow Line, Inc. had a history of failing to adequately oversee operational safety issues, as well as recognize and correct inherent safety problems.

In an examination of the federal oversight of Arrow Line, Inc, the Board found that in 1994 Arrow was placed on the DOT's Office of Motor Carriers (OMC) (now FMCSA) "Top 500 Worst Carriers List." As a result, the FMCSA conducted a compliance review and Arrow received a "Conditional" rating for failure to comply with federal regulations. Compliance reviews for Arrow dating back to 1983 reveal that the OMC had repeatedly informed Arrow of numerous violations but never gave Arrow an "Unsatisfactory" rating because the structure of the safety rating system gives non safety-specific practices the same weight as vehicle inspections and driver performance.

Based on the Board's review of the FMCSA's motor carrier safety rating system, the report concluded that the current FMCSA compliance review process does not effectively identify unsafe motorcoach operators and prevent them from operating. In addition, the U.S. Department of Defense (DOD) Surface Deployment and Distribution Command had conducted compliance audit reviews of Arrow for transporting military personnel and had found numerous safety deficiencies; however, this information was not exchanged with the FMCSA nor is there a requirement to share such information. The Board's report concluded that if the FMCSA had been alerted to the safety problems with Arrow by the DOD's audit report, the FMCSA might have prioritized Arrow for further review. The Board recommended that the FMCSA utilize motor carrier safety information including

compliance audit reports provided by the DOD Surface Deployment and Distribution Command to determine whether further review of a carrier is warranted.

The report also determined that the lack of motorcoach occupant protection systems designed to restrain passengers in the seating compartments contributed to the passenger ejections resulting in serious and fatal injuries. The Board reiterated recommendations that asked the NHTSA to develop performance standards for motorcoach occupant protection systems and then require newly manufactured motorcoaches to have an occupant protection system that meets the newly developed standards.

Driver's Unintentional Acceleration Causes Accident in Santa Monica, California

On August 3, 2004, the National Transportation Safety Board determined that the probable cause of a July 16, 2003 accident in Santa Monica, California was the unintended acceleration by the driver who drove through a temporarily closed street, and his failure to maintain control of the vehicle. Contributing to the severity of the accident was the lack of barrier systems to protect pedestrians. As a result, the Safety Board recommended that the City of Santa Monica install rigid barrier systems as a physical barrier to errant vehicles.

An 86-year-old man struck a stopped car, inadvertently activated the accelerator rather than the brake and failed to recognize the initial mistake or correct it. He continued through an intersection and drove through a farmers' market, striking pedestrians and vendors' displays before coming to a complete stop. The accident resulted in 10 fatalities and 63 injuries.

As a result of its investigation, the Safety Board concluded that had the accident vehicle been equipped with an event recorder, a significantly higher level of science could have been applied to assessing and understanding the driver's behavior, as well as its contribution to this accident and the broader issue of unintended acceleration. Thus the Safety Board recommended that once standards for event data recorders are developed (currently underway) that NHTSA require their installation in all newly manufactured light-duty vehicles.

Also during its investigation, the Safety Board learned that the City of Santa Monica erected traffic control devices based on a 1986 plan that did not provide motorists with barriers and allowed vehicular traffic to penetrate the pedestrian zone. A-frame type I plastic barricades were in place at the accident site. Furthermore, that city had not updated its traffic plan for the market since 1986. The Safety Board recommended that the city of Santa Monica update their temporary traffic plan and install a temporary rigid barrier system.

Towboat Captain's Loss of Consciousness Causes I-40 Bridge Collapse in Webbers Falls, Oklahoma

On May 26, 2002, the towboat *Robert Y. Love*, pushing two empty tank barges, was traveling northbound on the McClellan-Karr Arkansas River Navigation System, near Webbers Falls, Oklahoma. As the tow approached the Interstate 40 highway bridge, it veered off course and rammed a pier west of the navigation channel. The impact collapsed a 503-foot section of the bridge, which fell into the river and onto the barges below. Highway traffic continued to drive into the void created by the collapsed spans. By the time traffic stopped, eight passenger vehicles and three truck tractor semi-trailer combinations had fallen into the river or onto the collapsed portions of the bridge. The accident resulted in 14 fatalities and five injuries.

On August 31, 2004, the Safety Board determined that the probable cause of the *Robert Y. Love* allision with the Interstate 40 bridge in Okalahoma and its subsequent collapse was

the captain's loss of consciousness, possibly as the result of an unforeseeable abnormal heart rhythm. Contributing to the loss of life was the inability of motorists to detect the collapsed bridge in time to stop their vehicles.

Safety Board investigators found that the captain of the towboat was not impaired due to alcohol or illegal drugs. Further, the captain's incapacitation was probably not a result of his falling asleep. However, he experienced a sudden loss of consciousness, possibly as a result



Damage to bridge following impact.

of an abnormal heart rhythm. The captain had no apparent symptoms of clinical significance prior to the accident and a reasonable clinical evaluation of the captain before the accident was unlikely to have detected the medical conditions that were discovered through post-accident testing.

The investigation also revealed that vehicles either fell with the collapsed sections of the bridge or drove off the bridge into the void. The surviving drivers indicated that they could not see the void in the

bridge in time to avoid driving into it. Therefore, the Board concluded that drivers in this accident did not have adequate time to detect, identify, and respond to the hazard posed by the collapsed sections of the bridge. Board investigators determined that a solution to this would be an effective motorist warning system on or near the bridge and capable of alerting motorists to the bridge failure or directing vehicles to stop. This might have prevented some of the vehicles from driving off the I-40 bridge and mitigated the loss of life in this accident.

As a result of this accident, the Safety Board recommended that the USCG Research and Development Center evaluate the utility and effectiveness of wheelhouse alerter systems on inland towing vessels. The Board urged the FHWA to revise the sufficiency rating system, which prioritizes bridges for rehabilitation and replacement, to include the probability of extreme events, such as vessel impact; and develop an effective motorist warning system to stop motor vehicle traffic in the event of a partial or total bridge collapse. The Board also recommended that the American Association of State Highway and Transportation Officials provide guidance to the states once the warning system is developed.

Special Investigation Report on Medical Oversight of Noncommercial Drivers

The Safety Board's interest in the medical oversight of noncommercial drivers stems from its examination of six noncommercial vehicle accidents in which a driver's medical condition played a role. Two of the most recent were:

- On March 23, 2002, a driver with a history of seizure-related accidents failed to stop his vehicle at a signalized intersection in Frederick, Maryland, resulting in a multiple vehicle collision that claimed the lives of a father and three children.

- On November 3, 2002, a driver with a history of epilepsy ran her vehicle through two intersections in Hagerstown, Maryland, and collided with two vehicles, resulting in one fatality. Evidence indicates that both drivers were suffering seizures at the time of the accidents.

The Safety Board examined four other medical impairment-related accidents, one involving a diabetic driver and three involving drivers who experienced seizures. The Safety Board has also investigated a substantial number of commercial vehicle and school bus accidents involving drivers with impairing or potentially impairing medical conditions, such as cardiovascular disease, visual impairment, renal disease, and sleep disorders.

In March 2003, the Safety Board held a public hearing to discuss the factors that contribute to medically related accidents. As a result of its accident investigations and discussions stemming from the public hearing, the Safety Board identified the following safety issues:

- Need for more data on the extent to which medical conditions contribute to the cause of accident.
- Need for improved awareness and training for healthcare professionals, law enforcement, and the public regarding state medical oversight laws and practices.
- Existence of barriers to the reporting of medically impaired drivers.
- Lack of uniform medical assessment and oversight standards throughout the states.
- Deficiencies in alternative transportation options for those who should not drive.

The Safety Board's report made recommendations to DOT, NHTSA, the National Committee on Uniform Traffic Laws and Ordinances, the American Association of Motor Vehicle Administrators, the Commission on Accreditation for Law Enforcement Agencies, the Liaison Committee on Medical Education, the American Osteopathic Association, the Association of American Medical Colleges, and the Federation of State Medical Boards.

Urgent Recommendations Issued on Border Patrol Check Points

The U.S. Border Patrol (USBP) has conducted continuous immigration checkpoint operations on Interstate 87 near North Hudson, New York, about 74 miles south of the Canadian Border, since December 29, 2003. Checkpoint operations require all vehicles in both southbound traffic lanes to stop for a brief driver interview and possible inspection. As a result, traffic sometimes becomes congested on I-87 southbound and backs up north of the checkpoint.

The NTSB investigated two accidents that occurred at the North Hudson checkpoint. The first occurred on February 22, 2004. Traffic was backed up to a point about 900 feet prior to the USBP checkpoint. A motorcoach, carrying 47 passengers, approached the area of congested traffic at 64 mph in the posted 65 mph zone. The bus driver stated that when he first observed the rear of the tractor semi-trailer at the end of the traffic queue ahead, he thought he was slowly catching up to it. Once he realized the semi-trailer was not moving, the bus driver made a hard brake application to avoid colliding with the stopped tractor semi-trailer but could not slow his vehicle in time to avoid a collision. The motorcoach swerved to the left, skid, struck the rear of the semi-trailer, pushed it into an SUV, which in turn was pushed into a passenger car. Eight motorcoach passengers sustained serious injuries. The driver and 38 passengers of the bus plus six people from the other vehicles sustained minor injuries.

The second accident occurred on September 19, 2004, when again traffic was backed up to a point about 807 feet prior to the USBP checkpoint. A tractor semi-trailer approached the area of congestion, failed to stop, and collided with a passenger car, pushing it underneath a pickup truck. The tractor semi-trailer continued forward, colliding with another pickup towing a 29-foot camper trailer, and with another tractor semi-trailer. A fire ensued, destroying three of the vehicles. Three adults and a child were killed. Three more adults sustained serious injuries.

On October 21, 2004, the NTSB issued urgent safety recommendations to the American Association of State Highway and Transportation Officials, the FHWA and the USBP to immediately develop comprehensive traffic control guidelines specifically tailored to U.S. Border Patrol checkpoints located on high-speed arterial roadways.

On-going Major Highway Investigations

SUV/Tractor-trailer Median Crossover Accident in Fairfield, Connecticut

The NTSB continues to investigate an accident in Fairfield, Connecticut in January 2003, in which a northbound tractor-trailer overran a concrete median barrier on an interstate highway. The tractor and most of the trailer came to rest encroaching on the southbound lanes; a southbound car then struck the tractor and another southbound tractor-trailer rear-ended the car. About eight minutes later, a northbound SUV carrying nine Yale college students collided with the rear of the trailer that was encroaching on the northbound lanes. There were four fatalities in the SUV.

Driver Education Car Collides with Tractor-trailer in Belgrade, Montana

The NTSB continues to investigate an accident on a rural two-lane road near Belgrade, Montana in January 2003. The accident involved a tractor-trailer that collided with a driver's education car killing the 14-year-old student driver, two other students, ages 14 and 15, and a 49-year-old instructor. The two vehicles approached each other in opposite lanes on a wet roadway where snow and slush had accumulated at the edges. Just before the vehicles passed each other, the car fishtailed into the path of the tractor-trailer. The truck driver attempted to avoid the car by steering to his left, but struck the car on its right side. The car continued down a 15-foot embankment.

Motorcoach Median Crossover Accident near Hewitt, Texas

The NTSB continues to investigate an accident near Hewitt, Texas, in February 2003 involving a motorcoach median crossover and an SUV. The motorcoach was traveling on an interstate highway in heavy rain, when it crested a hill and was confronted by stopped or nearly stopped traffic. The queue of traffic in the motorcoach's lane was greater than that in the adjacent lane so the driver began to move from the right lane into the left. As he did, a car in front of him also began to move into the left lane. The motorcoach driver braked hard, lost control and went off the roadway, through the median and struck an SUV traveling in the opposite direction. The bus overturned. Two occupants of the SUV were killed, as were five occupants of the bus. Thirty-one people on the bus were injured.

Overweight Truck Brake Failure Accident in Glen Rock, Pennsylvania

The NTSB continues to investigate an accident in Glen Rock, Pennsylvania in April 2003, involving an overloaded dump truck on a weight-restricted street. The truck was on a residential street with a steep downgrade. The truck driver reported that the brakes on the truck failed, and he was unable to stop before striking four passenger cars that were stopped at an intersection that, in turn, struck three children on the sidewalk. Two people were killed and nine others, including the pedestrians, received serious to minor injuries.

Alcohol-Impaired Driver in Median Crossover Accident in Linden, New Jersey

The NTSB continues to investigate an accident in Linden, New Jersey that occurred in May 2003 and involved two cars and six fatalities. A car with a severely alcohol-impaired driver was traveling in the right lane of a 6-lane divided highway when he swerved to the left, crossed the other two lanes, mounted and crossed the 11.5-foot wide, six-inch high raised median, entered the opposite lanes, and collided head-on with another car occupied by five adults.

Intersection Collision with Fire Accident in Slippery Rock, Pennsylvania

The NTSB continues to investigate an accident near Slippery Rock, Pennsylvania in July 2003, involving an empty tractor-trailer and a small car at an intersection in a rural area. The tractor-trailer failed to stop for a stop sign, entered the intersection, and was struck by a small car near its fuel tank. The car became lodged on the side of the truck and was dragged approximately 128 feet. A fire began in the small car at the moment of impact and spread to the truck when the vehicles came to rest. The fire destroyed both vehicles. The truck driver was uninjured. A family of five, in the small car, was all killed.



Accident scene in Slippery Rock.

Traffic Slowed for Toll Booth Accident near Hampshire, Illinois

The NTSB continues to investigate an accident near Hampshire, Illinois in October 2003 involving a shuttle bus with 20 elderly passengers, three tractor-trailers and a pick-up truck. The accident occurred as the vehicles were slowing about one-half mile from a toll plaza on Interstate 90 (Northwest Tollway). The bus was struck from behind by a faster moving truck. The collision subsequently involved the other vehicles. As a result of the accident, eight occupants of the bus were killed, six occupants received serious injuries, and six occupants received minor injuries. The other drivers received minor injuries or no injuries.

Bus Run-Off-the-Road Accident near Tallulah, Louisiana

The NTSB continues to investigate an accident near Tallulah, Louisiana in October 2003, involving a 47-passenger motorcoach, operated by a church that drifted rightward from the travel lanes of Interstate 20 and onto the shoulder where it impacted the rear of a tractor-

trailer that was stopped on the shoulder. Both accident vehicles came to rest adjacent to the south side of the interstate on the outside shoulder. Eight passengers were killed, the motorcoach driver and six passengers received serious injuries and the truck driver was not injured.

Tanker Accident near Baltimore, Maryland

The NTSB continues to investigate an accident that occurred in Elkridge, Maryland in January 2004. The accident involved a fully loaded gasoline tank truck southbound on Interstate 895. As the tanker reached the overpass bridge at Interstate 95, it departed the right side of the highway, mounted the right bridge rail and plunged 30 feet to the roadway below. As the tanker impacted the median and northbound travel lanes of Interstate 95, an explosion and large fire ensued. Several vehicles traveling northbound on Interstate 95 drove into the fire. When the fire was extinguished, two tractor semi-trailers, a passenger car and a pick-up truck were observed in their final rest positions at the accident scene. The 64-year-old driver of the tank truck and three other drivers were killed.

Collision Involving Bus Transporting Navy Personnel and Truck-tractor near Gardens Corner, South Carolina

The NTSB continues to investigate a collision that occurred in March 2004, near Gardens Corner, South Carolina, involving a bus carrying Navy personnel and a truck tractor. The accident occurred when the third bus in a four-bus caravan, traveling south, collided with a northbound truck tractor. The driver of the third bus and two front-seated passengers were killed. The driver of the truck tractor was also injured. Some passengers were ejected from the rear of bus. The accident resulted in over 40 injuries, including some to passengers on the fourth bus in the caravan, which swerved to avoid the collision. The accident bus was a school bus-type vehicle, configured to serve as an ambulance when necessary. As a result, the vehicle had fold-down seats and a larger rear door not normally found on a school bus.

Rear End Collision in Slow Traffic from Prior Accident near Sulphur Spring, Texas

The NTSB continues to investigate a collision that occurred in June 2004, near Sulphur Springs, Texas. The accident involved a tractor double-trailer that collided with the rear of an SUV that was stopped in the right-hand traffic lane in a queue of vehicles on Interstate 30. Traffic had slowed and stopped after troopers of the Texas Department of Public Safety detoured traffic around the site of a fatal accident that had occurred earlier and was under investigation. The force of the collision pushed the SUV forward, into and under the rear of the trailer of another truck, which was in turn pushed forward into the rear of a second SUV and then another truck. A fire erupted involving the first SUV and one of the trucks. All four occupants of the first SUV and the driver of the first tractor double-trailer were killed. The occupants of the other vehicles received minor injuries.

Construction Zone Accident in Chelsea, Michigan

The NTSB continues to investigate a collision that occurred in July 2004, in Chelsea, Michigan involving two tractor-trailers and an automobile in a construction zone on Interstate 94. One of the tractor-trailers and the automobile were moving slowly as part of a line of vehicles slowed by an earlier minor traffic accident in a highway construction zone. Another tractor-trailer failed to slow for the traffic ahead in time, swerved to the right, but struck the first tractor-trailer that subsequently struck the automobile. The driver of the

tractor-trailer that failed to slow was killed. The other drivers received minor injuries. The collision occurred in a 25-mile-long highway construction zone, where construction was occurring at several bridges, spaced miles apart, within the construction zone. This was the fourth fatal collision in four months in this construction zone.

Median Crossover Accident in Sherman, Texas

The NTSB continues to investigate a collision that occurred in September 2004, on US Highway 75 in Sherman, Texas. The accident involved a tractor-trailer that veered leftward, entered a 30-footwide earthen median, continued across the median and entered the opposing lanes where it collided with an SUV and a pick-up truck. After the collision, the truck and SUV came to rest in the grass on the far side of the roadway and a fire ensued, engulfing the truck and SUV. The pick-up remained in the travel lanes.

The driver and four occupants of the SUV and the driver and four occupants of the pick-up truck were killed. Two passengers of the pick-up truck sustained serious injuries and the truck driver sustained minor injuries.

Motorcoach Roll-Over near Turrell, Arkansas

The NTSB continues to investigate an accident that occurred in October 2004 on Interstate 55 near Turrell, Arkansas. The accident involved a single vehicle, a 47-passenger motorcoach driven by a 67-year-old male, transporting 29 passengers to a casino in Tunica, Mississippi. Witnesses following the vehicle prior to the incident estimated the motorcoach had been traveling about 70 miles per hour. At the exit, the vehicle veered to the right and entered the grassy area between the exit ramp and the entrance ramp. The motorcoach began to rotate in a clockwise motion striking an exit sign. It overturned, slid, struck an earthen drainage ditch and rolled over.

The roof of the vehicle separated from the body on the left side, remaining connected (hinged) on the right side. As the vehicle began to roll over, the roof opened up, allowing passengers to be thrown from the now “open topped” vehicle. The vehicle traveled 67 feet after striking the drainage ditch and came to rest upside down, with the roof laying on the ground (top side down) and still hinged on the right side of the east side of the vehicle. There were no passenger seat belts on the vehicle and the driver was not wearing his seat belt. Thirteen passengers and the driver were killed; 16 others were injured.

Motorcoach Accident in Alexandria, Virginia

The NTSB continues to investigate an accident that occurred in November 2004 on the George Washington Parkway in Alexandria, Virginia involving a motorcoach that struck an overpass, injuring nine students and severely damaging the roof of the bus. The tour bus was transporting 27 students from BWI airport to Mount Vernon as part of a tour of Washington.

Office of Marine Safety

The NTSB is authorized to investigate marine accidents involving foreign vessels in U.S. territorial waters or U.S. vessels anywhere in the world. In past years, the Board has conducted marine accident investigations as far away as the Persian Gulf and the South China Sea.

Because of the international nature of the marine transportation industry and of the large percentage of foreign flag cruise ships operating from U.S. ports, the Safety Board's investigation of accidents involving foreign flag vessels is essential to the enhancement of marine safety worldwide. The Safety Board fulfills U.S. obligations with regard to foreign accident investigations, established under the auspices of the International Maritime Organization by serving as a U.S. representative for marine accidents involving foreign flag vessels operating from U.S. ports.

These accidents typically concern the safety of U.S. passengers aboard foreign flag cruise ships, which represent approximately 95 percent of the large passenger ships operating from U.S. ports. These ships carried approximately 8.5 million passengers in 2004 with an average capacity of 1,200 passengers per ship. In keeping with their responsibilities, NTSB marine accident investigators either launch to, or assist in, international marine accident investigations involving these ships. The Board's role in international accident investigations has a direct impact on the safety of U.S. citizens and other maritime travelers worldwide. The Board's marine accident reports and safety recommendations are disseminated worldwide and have a direct influence on the marine safety requirements of the International Convention for Safety of Life at Sea, 1974, as amended.

The marine accident investigation function is performed by NTSB headquarters staff. To carry out its marine safety program, the Board maintains a small staff of professional investigators that includes licensed master mariners, marine engineers, naval architects, and human performance and survival factors specialists. The Board generally will investigate accidents involving:

- risk to the safety of 'innocent third parties', such as passengers or port facilities;
- the loss of six or more lives;
- the loss of a self-propelled vessel of over 100 gross tons;
- property damage exceeding \$500,000;
- serious hazardous materials threats to life, property, and the environment;
- Coast Guard safety functions (e.g., vessel traffic services, search and rescue operations, vessel inspections, aids to navigation); and
- a public/nonpublic vessel collision with one or more fatalities or \$75,000 or more in property damage.

In September 2002, the Safety Board and the U.S. Coast Guard concluded an agreement that set out each agency's role in the investigation of major marine shipping accidents. With the memorandum of understanding, the two agencies resolved a long-standing uncertainty over how to determine which will lead the investigation of a major marine accident. Among its advantages, the new agreement permits the Safety Board to focus its attention on cruise ships and other passenger vessel accidents, while ensuring that accidents that involve Coast Guard functions are independently reviewed.

In 2004, the 15 members of the Office of Marine Safety investigated 7 new accidents, completed 4 reports, and continued work on 18 accident investigations.

Marine accident reports of these investigations contain an in-depth analysis of the accident, a finding of probable cause or causes, and safety recommendations to prevent similar accidents from occurring. As in the other transportation modes, the Safety Board undertakes studies involving specific marine safety issues, which typically result in the issuance of recommendations to federal and state agencies and the maritime industry.

Completed Marine Investigations

Operator's Failure to Repair Hull Damage Causes Tour Boat Panther to Sink in Florida's Everglades National Park

On March 9, 2004, the Safety Board determined that the probable cause of the sinking of a tour boat in the Everglades, on December 30, 2002, was flooding through a hull breach that resulted from a grounding some weeks earlier. The Board found that the tour boat operator neglected to identify and repair the damage to the hull, instead choosing to operate the vessel with a known failure of watertight integrity and inappropriately relying on the bilge pumps to keep the vessel afloat, thus continually putting its passengers at risk.

Midway through the tour, the vessel sank in approximately 12 feet of water. Three near-by vessels responded and rescued all the 33 passengers and the master from the water. There were no fatalities, but one passenger was seriously injured. Damage to the vessel was estimated at \$60,000.



The *Panther* following the accident.

The Board found that on an earlier trip in December 2002, the *Panther* went aground in Indian Key Pass, sustaining a fracture in the hull that eventually sank the vessel. The Board also learned that the company, Everglades National Park Boat Tours, was aware that about two weeks before the sinking the *Panther* was not operating normally and was continually taking on water, but took no action to identify and correct the problem. Instead, the owner incorrectly relied on the *Panther's* bilge pumps to keep the vessel afloat. Further, the Board found that the arrangement for storing lifejackets aboard the *Panther* made it difficult for the passengers to retrieve them in an emergency, especially if the vessel was fully loaded. In the accident, passengers were unable to obtain lifejackets before the vessel sank.

The Board concluded that had the operator followed a comprehensive maintenance and repair program, the vessel would have been drydocked, the hull fracture would have been discovered and repaired, and the accident would have been avoided. As a result of the accident, the Board made recommendations to the National Park Service and the Coast Guard regarding oversight of tour boat concessionaires and requirements for maintenance programs and the availability of lifejackets.

Breakdown in Wiring’s Insulation Causes Engine room Fire on the U.S. Passenger Vessel *Columbia* near Wrangell, Alaska

On May 28, 2003, the Alaska Marine Highway System ferry *Columbia*, with 170 passengers on board, departed Petersburg, Alaska, en route to Wrangell, Alaska. While the oiler was in the auxiliary engine room, he noticed an odor suggesting that an equipment item was overheating. He was unable to locate the source of the odor and went to the control room and informed the watch engineer and the chief engineer of his observations.



The Alaskan ferry, *Columbia*.

The chief engineer immediately went into the auxiliary engine room and saw a burst of flames in the area of one of the generators’ cooling fan ports. The vessel then lost electrical power, which shut down the electrically driven main engine fuel pumps. The main engines then shut down, leaving the ship without propulsion power and the ability to steer while it was in Wrangell Narrows.

cause of the fire and the destruction of the wiring in the ship-service generator on the *Columbia* was a breakdown in the generator’s wiring insulation.

On April 19, 2004, the Safety Board determined that the probable

This was the second engine room fire within three years aboard the *Columbia* that caused the ferry to lose its main propulsion. In June 2000, a fire broke out in the main electrical switchboard in the engine control room, knocking out power to the ship’s electrical systems. As a result of that accident investigation, the Safety Board made five recommendations to the Alaska Marine Highway System related to inspection and maintenance procedures for electrical systems, management safety oversight of maintenance procedures and shipboard firefighting procedures.

Lack of Adequate Voyage Planning Causes U.S. Small Passenger Vessel, *Safari Spirit*, to Sink in Kisameet Bay, British Columbia



The *Safari Spirit* listing to starboard at an angle of about 35° when it shifted on the submerged rock. (Photograph courtesy of Shearwood Marine.)

On April 22, 2004, the Safety Board determined that the probable cause of the grounding of the *Safari Spirit* was the failure of the vessel’s master to use appropriate navigational procedures and equipment to determine the vessel’s position while transiting Kisameet Bay. Contributing to the cause of the grounding was the failure of American Safari Cruises to have, and require its masters

to use a voyage planning and procedure manual detailing port/anchorage selection criteria, identifying hazards and risks in vessel operating areas, and setting forth safety guidelines for mitigating risks and hazards.

On May 2, 2003, the uninspected U.S. passenger vessel *Safari Spirit*, owned and operated by American Safari Cruises, left Seattle, Washington, en route to Juneau, Alaska, with six crewmembers and 10 passengers on board. The voyage itinerary was unstructured in that, with the exception of the cruise terminus, the company did not require the *Safari Spirit* to be at a specific location by a specified time. American Safari Cruises allowed the vessel master the latitude to alter the route to maximize wildlife and scenic viewing opportunities and to select the stopping points. Because the *Safari Spirit* was required to have only one licensed vessel operator (the master), the vessel operated only during the day and docked or anchored in a sheltered location at night.

On May 8, the *Safari Spirit* struck a submerged rock. Crewmembers and passengers alike said that the yacht smoothly rode up on the rock, with no rough or violent vessel motion, and then became hard aground.

Collision of Barges with Highway Bridge near Webbers Falls, Oklahoma Caused by Captain's Loss of Consciousness

On May 26, 2002, the towboat *Robert Y. Love*, pushing two empty tank barges, was traveling northbound on the McClellan-Karr Arkansas River Navigation System, near Webbers Falls, Oklahoma. As the tow approached the Interstate 40 highway bridge, it veered off course and rammed a pier west of the navigation channel. The impact collapsed a 503-foot section of the bridge, which fell into the river and onto the barges below. Highway traffic continued to drive into the void created by the collapsed spans. By the time traffic stopped, eight passenger vehicles and three truck tractor semi-trailer combinations had fallen into the river or onto the collapsed portions of the bridge. The accident resulted in 14 fatalities and five injuries.

On August 31, 2004, the Safety Board determined that the probable cause of the *Robert Y. Love* collision with the Interstate 40 bridge in Oklahoma and its subsequent collapse was the captain's loss of consciousness, possibly as the result of an unforeseeable abnormal heart rhythm. Contributing to the loss of life was the inability of motorists to detect the collapsed bridge in time to stop their vehicles.

Safety Board investigators found that the captain had experienced a sudden loss of consciousness, possibly as a result of an abnormal heart rhythm. The captain had no apparent symptoms of clinical significance prior to the accident and a reasonable clinical evaluation of the captain before the accident was unlikely to have detected the medical conditions discovered through post-accident testing.

The investigation also revealed that vehicles either fell with the collapsed sections of the bridge or drove off the bridge into the void. The surviving drivers indicated that they could not see the void in the bridge in time to avoid driving into it. Therefore, the Board concluded that drivers in this accident did not have adequate time to detect, identify, and respond to the hazard posed by the collapsed sections of the bridge. Board investigators determined that a solution to this would be an effective motorist warning system on or near the bridge and capable of alerting motorists to the bridge failure or directing vehicles to stop. This might have prevented some of the vehicles from driving off the I-40 bridge and mitigated the loss of life in this accident.

As a result of this accident, the Safety Board recommended that the U.S. Coast Guard Research and Development Center evaluate the utility and effectiveness of wheelhouse alerter systems on inland towing vessels. The Board urged the FHWA to revise the sufficiency rating system, which prioritizes bridges for rehabilitation and replacement, to include the probability of extreme events, such as vessel impact; and develop an effective motorist warning system to stop motor vehicle traffic in the event of a partial or total bridge collapse. The Board recommended that the American Association of State Highway and Transportation Officials provide guidance to the states once the warning system is developed.

On-going Marine Investigations

U.S.S. Greenville and the Ehime Maru Collide in Pearl Harbor, Hawaii

The NTSB continues to investigate the February 2001 collision between the nuclear submarine *U.S.S. Greenville* and the Japanese fishing training vessel *Ehime Maru*. The *Greenville* had departed Pearl Harbor with civilian guests on board to demonstrate the ship's maneuvering capabilities. The crew was putting the submarine through a series of turns, dives, and surfacing operations. As the *Greenville* reached the surface during an emergency ascent maneuver, its conning tower and vertical tail fin struck the *Ehime Maru*, which had left Honolulu earlier that day. Shortly after the collision, the *Ehime Maru* sank. Nine of the 35 people on board the Japanese vessel perished. The U.S. Navy subsequently towed the *Ehime Maru* to shallow water and recovered eight of the nine victims. The last victim remains missing and is presumed drowned.

Tank Barge *B. NO. 125* Explodes at Dock in Bayonne, New Jersey

On February 21, 2003, an explosion and fire occurred on the loaded tank barge *B. NO. 125*, as it unloaded gasoline at the Port Mobil Terminal in southwestern Staten Island, New York. The fire did not propagate to storage tanks at the facility, which is operated by ExxonMobil. However, several buildings and vehicles close to the dock were destroyed. Two workers were killed and one was severely injured.

The Safety Board participated in the U.S. Coast Guard's investigation of this accident. On March 28, 2003, the U.S. Attorney for the Eastern District of New York requested that the U.S. Coast Guard and the Safety Board suspend their investigative efforts on this accident until after its criminal investigation has been completed.

Cruise Ship, *Norway*, Boiler Explosion in Miami, Florida

The Safety Board is investigating the May 25, 2003, boiler explosion aboard the Norwegian Cruise Line passenger ship *Norway*. The explosion occurred while the ship was moored in Miami, Florida, with 2,135 passengers and 911 crewmembers on board. The explosion killed eight crewmembers and injured 19 others. All passengers were evacuated safely.

At the time of the explosion, three of the *Norway's* four main propulsion boilers were in normal-in-port operating status supplying steam to electrical generators and auxiliary equipment while the ship was moored to the dock in Miami. Boiler no. 21, located in the forward starboard side of the boiler room, was secured and was not in operation at the time. Boiler no. 23, located aft of boiler no. 21, was the boiler involved in the explosion. No

maintenance was being carried out on boiler 23 at the time of the explosion. The explosion caused extensive damage to boiler no. 23, the boiler room and extended to accommodation spaces located three decks above the boiler. Issues involved in this investigation include the adequacy of the maintenance, repair, and inspection of the boilers on board the *Norway*.

U.S. Small Passenger Vessel, *Taki-Too*, Capsizes near Garibaldi, Oregon

The Safety Board continues to investigate the June 14, 2003 capsizing of the small passenger vessel *Taki-Too* while attempting to transit Tillamook Bar at the entrance to Tillamook Bay near Garibaldi, Oregon. The *Taki-Too*, which attempted to depart the bay despite the posting of rough bar warnings by the Coast Guard, capsized to starboard after being struck on its port side by a large wave. Of the 19 persons aboard, including the master and the deckhand, 11 died (10 passengers and the master). Eight of the nine victims whose bodies have been found were not wearing personal flotation devices (PFDs). Two persons remain missing and are presumed drowned. Issues involved in this accident include the adequacy, accessibility, and use of lifesaving equipment on board the vessel; the adequacy of current regulations related to the wearing of PFDs on board small passenger vessels; and the adequacy of Coast Guard procedures for limiting transit of small vessel when rough bar warnings have been issued.



NTSB staff examine the *Taki-Too*.

Staten Island Ferry, *Andrew J. Barberi*, Crashes into Pier in New York Harbor

On October 15, 2003, while on a regularly scheduled run between lower Manhattan (Whitehall Terminal) and Staten Island (St. George Terminal), the 310-foot Staten Island passenger ferry *Andrew J. Barberi* struck a pier at the St. George Terminal. Ten passengers were killed and more than 30 injured. As part of the investigation, the investigative team conducted witness interviews of crewmembers, passengers, first responders, and company officials. In addition, the team tested the steering and propulsion systems and examined the navigation equipment on board the *Andrew Barberi*. During these tests, the team witnessed the operation of the transfer system passing control from engine room to wheelhouse, and from wheelhouse to wheelhouse. The tests verified that the equipment and systems performed as designed. Further, the team examined the ferry *Samuel I. Newhouse* (sister ship to the *Barberi*), and completed three round trip transits over the ferry route to observe ferry operations. The team also completed preliminary surveys of damages to the vessel and to the dock.

Pontoon Water Ferry Capsizes in Baltimore, Maryland

On March 6, 2004, the small passenger vessel, *Lady D*, a pontoon water taxi operating in Baltimore Harbor, encountered a rapidly developing storm with high winds and began to roll in the waves. As the intensity of the rolling increased, the vessel, carrying 23 passengers,

heeled to starboard and capsized. As a result of the accident, five passengers died, four passengers suffered serious injuries, and 10 passengers and two crewmembers sustained minor injuries. The vessel was a total constructive loss. Parties to the investigation include the USCG Living Classrooms Foundation (owner of the *Lady D*), and the City of Baltimore Fire Department.

On December 20, 2004, the Safety Board, in issuing a recommendation in advance of the accident report, expressed their concern to the USCG that they are not using a realistic



The *Lady D* following the capsizing.

average occupant weight in calculating the number of people that can be safely carried aboard pontoon vessels. Coast Guard data indicate that, nationwide, about 270 commercial pontoon vessels transport passengers on protected waters. At any given time, these vessels have a cumulative capacity of about 9,000 occupants. Therefore, the Safety Board urged the Coast Guard to take immediate action to restrict the possibility that the occupant weight will exceed the vessel's proof test weight.

Passenger Ferry Engine Fire in Port Richey, Florida

On October 17, 2004, the *M/V Shuttle Express II* was returning from ferrying passengers to the offshore casino vessel, *Royal Casino I*, when one of the crewmembers observed smoke coming from the engine spaces. The 65-foot vessel was transiting the river and the Captain turned towards the nearby shore to beach the vessel when it lost power. Immediately thereafter a second crewmember reported to the Captain that the fire was out of control. The



NTSB investigators examine damage to the *M/V Shuttle Express II*.

Captain's subsequent firefighting efforts could not contain the fire. All three crewmembers abandoned the vessel; no passengers were aboard. One crewmember experienced smoke inhalation and was transported to the hospital for observation. The Fort Richey Fire Department responded by using a local county emergency vessel to run fire hoses and personnel out to the vessel. The *M/V Shuttle Express II* was extensively damaged by the fire and declared a total loss. The Safety Board is investigating the company's and crew's maintenance procedures and their firefighting training and experience.

Freighter Grounding Off Unalaska Island

A Safety Board team is investigating the December 8, 2004 grounding of a freighter off the coast of Unalaska Island. The Malaysian-flagged vessel, *Selendang Ayu*, was enroute from Seattle to Xiamen, China when it lost propulsion in the Bering Sea, drifted for two days and then ran aground and subsequently broke apart. The vessel, which had a crew of 26, had taken on about 1,000 tons of heavy fuel in Seattle, some of which was released in the breakup. A U.S. Coast Guard helicopter crashed while conducting rescue operations, with the reported loss of six crewmembers from the freighter. Parties to the investigation include the vessel's owner, Ayu Navigation of Kuala Lumpur, Malaysia; the U.S. Coast Guard; and the flag state, Malaysia.



Two halves of the *Selendang Ayu* following its grounding.

Office of Railroad, Pipeline and Hazardous Materials Investigations

Railroad Safety

Railroads are one of the nation's safest forms of transportation, but the potential for tragedy exists in railroad operations as it does in every other mode of transportation. Millions of passengers are carried each year on Amtrak and commuter rail systems, often over tracks owned by freight railroads. In addition, rail transit systems transport millions of commuters to and from major metropolitan areas each day.

Freight railroads own and maintain their own infrastructure including 173,000 miles of track, with the associated bridges, buildings, repair shops and switching facilities. Forty percent of the nation's freight, more than any other mode, moves by rail each year. Railroads move about 32 million carloads each year, including over 1.52 million carloads of hazardous materials. Rail freight, particularly intermodal, is continuing an upward trend.

Since 1967, Congress has assigned the primary responsibility for railroad accident investigation to the NTSB. As in the other surface modes, the Board performs in-depth analyses of selected rail accidents, determines the probable causes, and issues recommendations to make changes to prevent similar accidents. Because of its small staff and limited resources, the Railroad Division does not investigate every rail accident reported to the FRA. In order to use the Safety Board's resources most efficiently, the Board has established accident investigation criteria to help highlight accidents that have significant safety issues.

The Safety Board also conducts studies of significant railroad safety issues, often based on a set of accident investigations specifically undertaken as the basis for the study. In other cases, the studies may be based on analyses of regulations, railroad safety programs and procedures, audit reviews of management and operations practices, or other research. In addition, the Board investigates selected accidents involving specific life-saving issues.

Completed Significant Rail Investigations

Signal Maintainers' Errors Cause Chicago Transit Authority Train/Worker Incident in Chicago, Illinois

On February 26, 2002, Chicago Transit Authority (CTA) Green Line train run 2 struck two signal maintainers who were working near tower 18, which is on the section of the Chicago Loop that is above the intersection of Lake and Wells Streets in Chicago, Illinois. One maintainer fell from the structure, landing on a parked car and then the street. The CTA implemented new procedures for crewmembers before they foul the right-of-way and designated a safety lookout. One worker was seriously injured.

In 2004, the 39 Office of Railroad, Pipeline, and Hazardous Materials Investigations staff members launched on 17 accidents, completed 16 reports, and continued work on 5 investigations.

On February 6, 2004, the Board determined that the probable cause of the accident was the failure of the signal maintainers to watch for approaching trains and their failure to obey the Chicago Transit Authority's requirement to increase their visibility by displaying a flashing yellow warning light. Contributing to the maintainers' reduced awareness of oncoming trains was the absence of clear requirements regarding the designation of safety lookouts and the use of interlocking signals to protect work areas.

Conductor's Failure to Line and Lock Switches Causes Collision of Burlington Northern Santa Fe Trains, in Scottsbluff, Nebraska

On February 13, 2003, an eastbound Burlington Northern Santa Fe Railway (BNSF) coal train collided with a BNSF yard train on the main track in Scottsbluff, Nebraska. The coal train consisted of two locomotives and 124 loaded cars; the yard train consisted of a locomotive and 16 freight cars. Both locomotives of the coal train and 28 cars of coal derailed; the locomotive and three cars of the yard train derailed. The coal train engineer received minor injuries, and the conductor was killed. The yard train engineer received minor injuries.

On February 13, 2004, the Safety Board determined that the probable cause of the collision was the failure of the yard train's conductor to properly line and lock the switches for the yard train's intended route. Contributing to the cause of the accident was the lack of an electronic connection between the inner switch and main track signal system.

Worker's Inattentiveness and Failure to Comply with Rules Lead to Amtrak Train Striking Two Maintenance-of-way Workers in San Juan Capistrano, California

On April 1, 2003, eastbound National Railroad Passenger Corporation (Amtrak) train 774 struck two maintenance-of-way workers near San Juan Capistrano, California. Both workers were killed. According to event recorder data, train speed was 90 mph. The Amtrak engineer said that he sounded the horn and placed the train into emergency braking moments before impact. The two workers were part of a five-person crew providing maintenance-of-way services under a contract with the Southern California Regional Rail Authority (Metrolink).

On February 13, 2004, the Safety Board determined that the probable cause of the accident was the inattentiveness of the assigned lookout as well as his failure to comply with applicable rules by posting advance lookouts or requesting another means of protection from train movements. Also contributing to the accident was the ineffectiveness of the Metrolink and Herzog efficiency test programs with regard to on-track safety procedure compliance.

Railroad's Ineffective Inspection and Maintenance Program Causes Train Derailment in Minot, North Dakota

On March 9, 2004, the Safety Board determined that Canadian Pacific Railway's (CP's) ineffective inspection and maintenance program caused the January 18, 2002, derailment of a CP train near Minot, North Dakota. Five tank cars carrying anhydrous ammonia ruptured and released their entire contents creating a poisonous vapor plume that covered the accident site and surrounding area.

The Safety Board found that CP's rail inspection procedures were inadequate, which allowed undetected cracks in joint bars to grow to critical size and fracture completely. The CP Railway had discontinued ultrasonic testing of joint bars before the accident, a procedure



Freight train derailment in Minot, North Dakota.

that could have identified the cracks before they failed. The Board also criticized the FRA for not requiring adequate inspections and testing of joint bars in continuous welded rail and recommended that on-the-ground inspections and nondestructive testing be required for continuous welded rail.

Contributing to the severity of the accident was the failure of five tank cars and the instantaneous release of 146,000 gallons of anhydrous

ammonia. Over several days almost 221,000 gallons of the gas were released. One resident was killed from exposure to the gas. More than 300 people were injured and the vapor plume covered an area that affected about 11,600 residents.

The five tank cars that catastrophically ruptured were manufactured before 1989 with non-normalized steel. In low temperatures steel becomes brittle and fractures more easily. Outside temperatures at the time of the derailment were about -6° F and examination of the five failed tank cars revealed that the brittleness of the non-normalized steel contributed to the cars' complete fracture and separation.

The Safety Board recommended that the FRA conduct studies to determine the impact resistance of pressure tank cars manufactures before 1989 and, using the resulting information, establish a program to rank tank cars constructed before 1989 according to their risk of catastrophic fracture and attempt to mitigate the risk. In total, 35 investigators spent about 12,700 hours working on the investigation.

Operational Errors Cause Derailment of Runaway Railcars on Union Pacific Railroad in the City of Commerce, California

On June 20, 2003, a string of 31 freight cars that had been part of a Union Pacific Railroad (UP) freight train were uncoupled from their locomotives at a UP siding in Montclair, California. After crewmembers released the cars' air brakes in preparation for switching the cars in Montclair yard, the cars began rolling. The runaway cars rolled downgrade for about



One of eight residences struck by derailed equipment.

28 miles and reached a maximum speed of about 95 mph before derailling in the City of Commerce, California. Some of the derailed cars struck nearby residences. Three residences were destroyed, and five others were damaged. Thirteen people suffered minor injuries and were transported to local hospitals. About 150 people were evacuated from the area because of broken natural gas and water lines. Estimated damages were \$2.4 million.

On April 7, 2004, the Safety Board determined that the probable cause of the derailment was the failure of both the inbound train crew and the switching crew to properly secure the railcars as required by UP operating rules before the airbrakes were released on the cars. Contributing to the accident was the failure of the UP to enforce the application of its operating rules for securing freight equipment before locomotives are uncoupled.

UP officials told Safety Board investigators that since the accident they have published a track chart that shows the direction and magnitude of the grades of the main track for use by the train dispatchers in the San Bernardino train dispatching office. UP has trained the dispatchers to read the chart and has placed a copy on each train dispatcher's desk. In addition, UP initiated a system-wide drill program that addresses runaway cars. Each train dispatcher and member of the UP Response Management Communications Center has been issued a flowchart and written procedures that describe the steps to be taken when notified of a runaway situation. These procedures require prompt notification of local emergency response agencies in the event of runaway cars.

Crew's Fatigue and Inattentiveness Cause Collision and Derailment of Two Union Pacific Freight Trains at Des Plaines, Illinois

On October 21, 2002, a westbound UP train struck an eastbound UP train, which was moving through a crossover at Norma Interlocking in Des Plaines, Illinois. The lead three locomotives of the striking train, as well as six cars positioned 20 cars behind the locomotives, derailed. Three cars of the eastbound train derailed, and three others were damaged. About 5,000 gallons of diesel fuel from the derailed locomotives spilled onto the ground. The two crewmembers of the striking train sustained non-life-threatening injuries. Damages were \$1.02 million.

On May 27, 2004, the Safety Board determined that the probable cause of the collision was one train engineer's falling asleep at the controls of his locomotive and the unexplained inattentiveness and inaction of the conductor in the moments before the collision. Contributing to the engineer's falling asleep was likely his use of prescription medications that may cause drowsiness, as well as his lack of sleep in the 22 hours preceding the accident.

Track Maintenance Errors Cause Derailment of Amtrak Train No. 30, *The Capitol Limited*, in Kensington, Maryland

On July 29, 2002, eastbound Amtrak train No. 30, the *Capitol Limited*, derailed on CSX Transportation's (CSXT's) Metropolitan Subdivision in Kensington, Maryland. The train had originated in Chicago and was en route to Washington, D.C. The train comprised two locomotives and 13 cars and was moving at 60 mph on tangent (straight) track in the area of the derailment. Eleven cars derailed. Of the 164 passengers and 13 Amtrak crewmembers on



Wreckage of Amtrak train No. 30 in Kensington, Maryland.

board, 14 passengers and two Amtrak crewmembers received serious injuries. An additional 71 passengers and eight Amtrak crewmembers sustained minor injuries. Estimated damages exceeded \$14.3 million.

On May 28, 2004, the Safety Board determined that the probable cause of the derailment of Amtrak train No. 30, the *Capitol Limited*, in Kensington, Maryland, was the failure of the track surfacing crew to adequately tamp the ballast and accomplish a proper run-off, leading to an unstable condition and buckled track, an incorrect slow order code indicating that the work was complete when it was not, and CSXT's inadequate oversight of track maintenance work on this section of track.

Crew Fatigue Causes Collision of Three Union Pacific Freight Trains at Pacific, Missouri

On December 13, 2001, three UP freight trains were involved in a collision and derailment on the Jefferson City Subdivision at Pacific, Missouri, about 35 miles southwest of St. Louis. The collision occurred in double main track territory governed by a centralized traffic control signal system. In total, six locomotives and 74 cars were derailed. There were two crewmembers on each train. Two crewmembers were seriously injured, and two received minor injuries. There was a release of 10,000 gallons of diesel fuel and a small fire. Damages were \$10 million.

On June 17, 2004, the Safety Board determined that the probable cause of the rear-end collision was the conductor and engineer of one of the trains being in a fatigue-induced unresponsive state as their train passed several wayside signals and approached the rear of another train.

Train Operator's Failure to Comply with Operating Rules Causes the Collision of Two Chicago Transit Authority Trains in Chicago, Illinois

On February 3, 2004, northbound Chicago Transit Authority (CTA) Purple Line train 509 collided with the rear car of standing Brown Line train 419. The collision occurred just north of the Merchandise Mart passenger platform (MART) during the evening rush hour in Chicago, Illinois. The trains were operating in Automatic Train Control (ATC) cab signal territory. The collision occurred on track that is elevated about 20 feet from street level on a series of open deck bridges. No cars derailed as a result of the collision, but 42 passengers sustained minor injuries. A third train (Brown Line train 422) neared the striking train but stopped short of a second rear-end collision.

On July 7, 2004, the Board determined that the probable cause of the accident was the failure of the operator of train 509 to comply with operating rules. Contributing to the accident was inadequate operational safety oversight by the Chicago Transit Authority.

The Safety Board also investigated a similar accident on the CTA that occurred on August 3, 2001. As a result of its investigation of the 2001 accident, the Board issued a recommendation asking the CTA to develop and implement systematic procedures for performing and documenting frequent management checks to ensure all operating personnel are complying with Chicago Transit Authority operating rules, including speed restrictions and signal rules. On February 12, 2004, the CTA submitted a list of safety initiatives undertaken since the 2001 accident and also set forth additional actions it would take in light of the February 3 accident. In an April 15, 2004, letter, the Safety Board informed CTA that it had classified the previous safety recommendation "Closed-Acceptable Action."

CSX Freight Train Derailment and Release of Hazardous Materials in Baltimore, Maryland

On July 18, 2001, an eastbound CSXT freight train, consisting of three locomotives and 60 cars, derailed 11 cars while traveling through the Howard Street tunnel in downtown Baltimore, Maryland. Three of the derailed cars contained hazardous materials. The derailment resulted in a release of hazardous materials and a fire that lasted several days. The accident caused the city of Baltimore to restrict local traffic and to postpone a baseball game. Commercial communication facilities and a commuter trolley system were also disrupted. Two firefighters were injured.

The Safety Board, after an exhaustive investigative effort, could not identify convincing evidence to explain the derailment of the CSX freight train. No preaccident equipment defects or rail defects were found. Computer simulations were used to evaluate locomotive event recorder data, train profile data, track profile data, and preaccident track geometry data. These simulations indicated that neither train operations nor changes in track conditions alone likely resulted in a derailment. Available physical evidence and computer simulations also showed that the most likely derailment scenario involved an obstruction between a wheel and the rail, in combination with changes in track geometry. However, postaccident fire, flooding, and necessary emergency response activities, including removing burning freight cars from the tunnel, significantly disturbed the accident site; and, no obstruction was identified that could be convincingly connected to wheel climb and evidence was insufficient to determine changes in track geometry.

On December 16, 2004, the Board recommended to CSX that it maintain historical documentation of maintenance and inspection activities affecting the Howard Street Tunnel. Recommendations were also issued to CSX and Baltimore requesting they take actions necessary to enhance the exchange of information on maintenance and construction activities within and in the vicinity of the Howard Street Tunnel. The Board also recommended that Baltimore update and revise its emergency preparedness documents to include information on hazardous materials discharge response procedures specific to tunnel environments, as well as infrastructure information on the Howard Street Tunnel.

Ongoing Rail Investigations

Canadian National Illinois Central Freight Train Derailment near Tamaroa, Illinois

On February 9, 2003, a Canadian National Illinois Central freight train derailed near Tamaroa, Illinois. The train consisted of two locomotives and 108 freight cars (76 loads and 32 empties) and was moving at 41 mph. The railroad was single-track with a maximum speed of 79 mph for passenger trains and 60 for freight.

Twenty-two cars derailed, including 19 tank cars transporting flammable and corrosive hazardous materials: five loaded tank cars with vinyl chloride, seven tank cars (five loaded, two with residue) of methanol, two loaded tank cars of phosphoric acid, two loaded tank cars of hydrochloric acid, and three loaded tank cars of formaldehyde. The three other derailed cars were covered hopper cars containing plastic pellets. Methanol from two loaded tank cars was released and ignited. One vinyl chloride tank car and one hydrochloric acid tank car also released material. Between 800 and 1,000 people were evacuated from Tamaroa because of the hazardous materials release and resulting fire. There were no injuries or fatalities.

Employee Fatality on the Union Pacific Railroad in San Antonio, Texas

On December 7, 2003, a UP conductor was struck and killed by two coupled locomotives at UP East Yard in San Antonio, Texas. The locomotives were being operated using remote control technology and were under the conductor's control at the time of the accident. On this night, a second train crewmember was unavailable and the conductor was working alone.

The conductor was in the foul of the track when he was struck. He was moving the locomotives from track 32 to yard track 3 where he was assigned to switch a cut of railroad cars. When the accident occurred, the locomotives – traveling about 10 mph -- were moving back over the track they had just traversed rather than over the route leading to the destination yard track.

Freight Train Collision in Carrizozo, New Mexico

The Safety Board is investigating the collision of two UP freight trains in Carrizozo, New Mexico that occurred on February 21, 2004. The eastbound freight train, consisting of two locomotives and 78 empty auto carriers, struck the westbound train, consisting of four locomotives and 93 cars loaded with grain, about 25 cars behind the westbound train's locomotives at an interlocking between the main track and a siding. The two crewmembers on the eastbound train were killed in the accident; the two crewmembers on the westbound train were not injured. Both engines and nine cars of the eastbound train derailed, while 11 cars of the westbound train derailed. A brief fuel fire ensued.

The westbound train had a signal to diverge and was routed into the siding by the train dispatcher. The eastbound train was to stop at the stop signal to permit the westbound train to clear the track before proceeding. Before the stop signal the eastbound train encountered two signals that informed the crew that they should reduce the speed of their train. The second of these required the crew to reduce the speed of their train to 30 mph and be prepared to stop at the next signal, which was the stop signal. The event recorder from that train recorded a speed at impact of 36 mph, with no input from the crew for several miles before the collision, including no braking action before impact. The event recorder from the westbound train shows a speed at impact of 23 mph, and numerous short whistle blasts just before the collision.

Amtrak Derailment near Flora, Mississippi

The Safety Board is investigating an Amtrak derailment near Flora, Mississippi that occurred on April 6, 2004. The locomotive and nine cars of the Amtrak train 58, *The City of New Orleans* derailed on an elevated section of single track. The train consisted of one locomotive, a baggage car and eight passenger cars. The entire train derailed. The first, second and third passenger cars behind the baggage car fell onto their sides over a 20-foot trestle. The remaining five cars leaned over on their sides resting on a slope downward away from the tracks. The last car was not on its side and was almost upright. There were 61 passengers and 12 crewmembers onboard. One passenger was killed, three persons (including two Amtrak crewmembers) sustained serious injuries, and 43 persons (including seven Amtrak crewmembers and two emergency responders) sustained minor injuries. Initial estimates were \$6.9 million for equipment damage.

Union Pacific/Burlington Northern Santa Fe Freight Train Collision in Macdona, Texas

The Safety Board is investigating a rail collision involving a UP freight train and a BNSF freight train that occurred about 14 miles west of San Antonio, Texas, on June 28, 2004. The collision occurred on the UP San Antonio Division's Del Rio Subdivision near Macdona, Texas. Each train crew consisted of an engineer and conductor. The BNSF train consisted of two locomotives and 123 empty cars. The UP train consisted of four locomotives and 74 cars loaded with miscellaneous freight. Derailed equipment included the UP train's four locomotives and 19 cars as well as 13 cars of the BNSF train. A tank car containing chlorine was punctured; the escaping chlorine killed the UP conductor and two area residents. There was an evacuation of the area within a two-mile radius of the accident.

Derailed at Pico Rivera, California

On October 16, 2004, an eastbound UP freight train derailed three locomotives and 11 loaded freight cars in Pico Rivera, California. The train was traveling about 57 mph when the crew said they felt a sharp "bump" under the locomotive. The air brake system went into an emergency application almost immediately as a general derailment occurred. The derailment was in a residential neighborhood and approximately 150 people were evacuated as a precaution. Minor amounts of hazardous materials were released. Monetary damage was estimated to be \$1.3 million. Investigation revealed broken joint bars at the point of the derailment. The track in this area last inspected about two days before the derailment.

Washington Area Metropolitan Transit Authority Collision at the Woodley Park Station, Washington, D.C.

On November 3, 2004, a collision occurred between two Washington Metropolitan Area Transit Authority Red Line trains at the Woodley Park/Zoo Station. The collision resulted in a derailment and damage of several cars; one car was destroyed. The collision took place on the outbound track, on the Shady Grove side of the Woodley Park/ Zoo station. There were about 20 injuries. Damage has been estimated at \$1.5 million.

The struck train was a six-car train in revenue service, outbound, in the direction of Shady Grove, with about 70 passengers onboard. It had made a normal station stop at the Woodley Park/Zoo station. The striking train was a six-car train that was not in revenue service at the time. It was also outbound and running just ahead of the revenue train. The operator of the nonrevenue train was operating his train in "manual" and not stopping at stations as he proceeded outbound ahead of the revenue train. Trains leaving the Woodley Park/Zoo station climb a 3.7 percent ascending grade.

At some point, the non-revenue train was brought to a stop. After being stopped briefly on the 3.7 percent grade, the non-revenue train began rolling backward toward the Woodley Park/Zoo station, the wrong direction on the outbound track. Just before the impact, the operator of the standing revenue train opened the doors and yelled for passengers to exit the train and that there was going to be an impact.

Pipeline Safety

The Safety Board is responsible for investigating all pipeline accidents in which there is a fatality, substantial property damage or significant environmental impact. The Board may also investigate additional selected accidents that highlight safety issues of national importance or that involve a selected accident prevention issue.

Approximately 2.2 million miles of natural gas pipelines in the United States are managed by 834 transmission and gathering operators, 1,250 distribution operators, 70 liquefied natural gas operators, and about 50,000 master meter operators. Approximately 160,000 miles of hazardous liquid pipelines are managed by about 220 operators, as well as about 2,000 miles of carbon dioxide pipelines.

In 2003, gas transmission operators reported 98 incidents, with eight injuries, one fatality, and property damages of \$47.1 million; distribution operators reported 146 incidents, with 58 injuries, 11 fatalities, and property damages of \$22.3 million; and hazardous liquid operators reported 128 accidents with five injuries, no fatalities, \$40.4 million of property damage, and about 3.3 million gallons of spilled product resulting in a net loss of 2.1 million gallons.

Completed Significant Pipeline Investigations

Excavation Damage Causes Natural Gas Distribution Line Explosion and Fire in Wilmington, Delaware

On July 2, 2003, a contractor hired by the city of Wilmington, Delaware, to replace sidewalk and curbing dug into an unmarked natural gas service line with a backhoe. Although the service line did not leak where it was struck, the contact resulted in a break in the line inside the basement of a home, where gas began to accumulate. A manager for the contractor said that he did not smell gas and therefore did not believe there was imminent danger and that he called an employee of the gas company and left a voice mail message. Soon



Damaged buildings on West Third Street in Wilmington, Delaware.

after, an explosion destroyed two residences and damaged two others to the extent that they had to be demolished. Other nearby residences sustained some damage, and the residents on the block were displaced from their homes for about a week. Three contractor employees sustained serious injuries. Eleven additional people sustained minor injuries.

On April 6, 2004, the Safety Board determined that the probable cause of the natural gas explosion was the failure of the contractor to verify that all underground facilities were marked within the proposed dig site before beginning excavation. Contributing to the accident was the failure of the contract coordinator and the

contractor to effectively communicate about the project scope. Contributing to the severity of the accident was the failure of the contractor's employees to immediately notify the utility owner and emergency authorities when they realized they had struck and pulled up a gas service line.

Inadequate Loading of a Pipe During Transport Causes Fatigue Crack and Leads to Pipeline Rupture and Release of Crude Oil in Cohasset, Minnesota

On July 4, 2002, a 34-inch-diameter pipeline transporting crude oil experienced a rupture in a marsh west of Cohasset, Minnesota, resulting in the release of approximately 252,000 gallons of crude oil into the marsh. Because of concerns that the crude oil might escape the area, a controlled burn was executed in coordination with company, local, state, and federal officials. The fire was ignited on the afternoon of July 4th and extinguished itself approximately 24 hours later. As a precaution, residents from 12 homes were evacuated in the surrounding area before the start of the in situ burn. There were no injuries or fatalities as a result of the oil release or controlled burn. The crude oil release and the in situ burn covered an area of approximately 11 acres and affected wildlife, vegetation, the soil, surface waters, and groundwater. The cost of the accident was reported to be approximately \$5.6 million.

On June 23, 2004, the Safety Board determined that the probable cause was inadequate loading of the pipe for transportation that allowed a fatigue crack to initiate along the seam of the longitudinal weld during transit. After the pipe was installed, the fatigue crack grew with pressure cycle stresses until the crack reached a critical size and the pipe ruptured.

As a result of its investigation, the Safety Board issued three safety recommendations to RSPA to remove the exemption in the *CFR* that permits pipe to be placed in natural gas service after pressure testing when the pipe cannot be verified to have been properly transported; to amend the *CFR* to require that pipeline operators follow an American Petroleum Institute (API) recommended practice for transportation of pipe on marine vessels; and to evaluate the need for a truck transportation standard to prevent damage to pipe, and, if needed, develop the standard and incorporate it into the *CFR*.



Controlled burn surrounded by fire retardant in Cohasset, Minnesota.

The Safety Board also issued two safety recommendations to the American Society of Mechanical Engineers (ASME) to amend ASME B31.8 by removing the provision that pressure testing may be used to verify the integrity of pipe that may not have been transported in accordance with the API-recommended practices for transportation of pipe by railroad or marine vessels, and to amend ASME B31.4 to require the use of the API-recommended practice 5LW for marine transport of pipe.

The Safety Board concluded that the API standards for transporting pipe by rail and marine vessels might significantly underestimate stresses experienced by pipe during transport. The Safety Board issued a safety recommendation to the API to review the equations in both

API-recommended practice 5L1 and API-recommended practice 5LW, which are used for calculating the static load stresses at the bearing or separator strips, and to revise the recommended practices based on that review.

Static Electrical Discharge Due to Improperly Conducted Tank Operations Causes Storage Tank Explosion in Glenpool, Oklahoma

On April 7, 2003, an 80,000-barrel (3.36 million gallon) storage tank at ConocoPhillips Company's tank farm exploded as it was being filled with diesel fuel. Earlier that day,



Fire at storage tank in Glenpool, Oklahoma.

gasoline had been removed from the tank. There was an explosion and resulting fire, which lasted 21 hours. There were no fatalities. Approximately 300 nearby residents were evacuated and schools were closed for two days.

On October 13, 2004, the Safety Board determined that the probable cause of the explosion and fire was ignition of a flammable fuel-air mixture within the tank caused by a static electricity discharge due

to the improper manner in which ConocoPhillips Company conducted tank operations. Contributing to the extent of the property damage and impact on the local community was the failure of American Electric Power employees to recognize the risk the tank fire posed to nearby power lines and to take effective emergency action.

The Safety Board made recommendations to RSPA to revise the emergency response planning requirements in the pipeline safety regulations; to ConocoPhillips Company to evaluate its storage tank operating procedures and make the revisions as necessary and to revise its emergency response plans; to American Electric Power to revise its emergency response plans; to the Institute of Electrical and Electronics Engineers to revise the National Electrical Safety Code to establish requirements for operators to prepare and implement emergency response plans; and to the ASME to revise its gas and hazardous liquid pipeline code emergency response planning requirements to include coordination with electric and other utilities that may need to respond to a pipeline emergency.

Ongoing Pipeline Investigations

Home Gas Explosion in DuBois, Pennsylvania

The Safety Board is investigating the August 21, 2004, gas explosion in a house in DuBois, Pennsylvania, which resulted in the deaths of two residents of the home.

The National Fuel Gas Company tested for the presence of natural gas in the soil in the vicinity of the explosion. Natural gas readings were found to be as high as 100 percent at two locations; one was near the meter at the home and the other near a 2-inch-diameter plastic gas main in front of the home. The gas system was operated at about 50 psig. The 2-inch plastic gas main

was excavated, and a crack was found in a fusion joint in the pipe. Dry soil, indicative of a natural gas leak, was found around the fusion joint. A section of the 2-inch plastic gas main was installed in 1994. The gas main was extended in January 1996; this is when the fusion joint was installed. The Pennsylvania Public Utility Commission, the Pennsylvania State Police Fire Marshal, and National Fuel Gas Company are parties to the investigation.

Anhydrous Ammonia Pipeline Release in Kingman, Kansas

The Safety Board is investigating the October 27, 2004, anhydrous ammonia release that occurred from an 8-inch diameter carbon steel pipeline operated by Enterprise Products Operating, LP. The release was located about 36 feet from a small creek, locally known as Oak Creek, about six miles east of Kingman, Kansas and flowed into Smoots Creek and the Ninnescah River. A substantial fish kill occurred and the total amount of the release was nearly 200,000 gallons. Enterprise Products Operating L.P., RSPA's Office of Pipeline Safety, Magellan Midstream Partners, L.P., Kansas Health Safety and Environment, the Environmental Protection Agency, and the Kingman County Sheriff are parties to the investigation.

SCADA Systems Study

In conjunction with the Safety Board's Office of Research and Engineering, a study is examining supervisory control and data acquisition (SCADA) systems in the liquid pipeline industry. Advances in computer technology have enabled nearly all pipeline operators to remotely monitor and operate their pipelines. These systems that pipeline companies use to perform these operations are collectively referred to as SCADA systems. Over many years, the Safety Board has investigated numerous pipeline accidents that identified SCADA issues. The purpose of the study is to document the pipeline industry's use of SCADA systems for the detection of pipeline leaks and mitigation of leaks once detected. The study will also evaluate the designs of these SCADA systems and evaluate if these designs facilitate the controllers' job of monitoring the pipeline.

Hazardous Materials Safety

According to the American Chemistry Council, chemicals affect every sector of the economy and are an essential contributor to the nation's standard of living, including the production of synthetic fabrics, lifesaving medicines, packaging materials, adhesives and paints, automobile parts, composite materials for aircraft, and fertilizers, to name a few. The most current figures published by RSPA indicate that more than 3.1 billion tons of hazardous materials are shipped within the United States each year, and that more than 800,000 shipments of hazardous materials enter the Nation's transportation system each day in all modes, a nearly twofold increase over the RSPA's previous estimate of 500,000 shipments per day.

The impact of the transportation of hazardous materials is also reflected in the data from hazardous materials incident reports submitted to RSPA. In 2003, 15,180 incidents involving the release of hazardous materials were reported to RSPA for all modes. These incidents resulted in five fatalities, 119 injuries, and \$52.3 million in reported damages. The number of reported incidents, fatalities, and injuries reported for calendar years 1994 through 2003 have fluctuated from year to year, whereas the reported damages have increased every year during this period. The \$52.3 million in reported damages for 2003 represent an 18 percent increase over the \$44.2 million in damages reported for 1994.

Completed Hazardous Materials Investigations

Inadequate Welding and Testing Cause Nurse Tank Accident near Calamus, Iowa

On April 15, 2003, two loaders filled a cargo tank with anhydrous ammonia at a tank filling facility near Calamus, Iowa. Nurse tanks are used exclusively for injecting anhydrous ammonia into the soil to increase the nitrogen content. As the loaders were preparing to connect the tank to the truck, a 53.5-inch-long split opened along a longitudinal weld at the tank bottom. Approximately 1,300 gallons of poisonous and corrosive gas escaped, injuring two loaders. Nine days after the accident, one of the injured loaders died.

On June 22, 2004, the Safety Board determined that the probable cause of the accident was inadequate welding and insufficient radiographic inspection during the tank's manufacture, and lack of periodic testing during its service life.



Calamus accident nurse tank.

The accident nurse tank, a non-DOT specification cargo tank, was built in 1976 according to the requirements of the ASME. The ASME Boiler and Pressure Vessel Code permits the use of spot radiography to check longitudinal welds for all pressure vessels constructed to the code. Spot radiography consists of performing a 6-inch-long radiograph for every 50 feet of weld. When manufactured, the accident nurse tank's longitudinal welds were subject to spot radiography, in

accordance with the ASME code's acceptance spot radiography procedures. Since the mid-1980s, manufacturers have used radioscopy to conduct full radiographic examinations of the longitudinal welds on nurse tanks.

Tank shells are formed by two pieces of plate steel rolled into a cylinder or tube until the opposite edges of the plate meet, creating a longitudinal seam. The longitudinal seam is closed by welding inside and outside the shell. Post-accident metallurgical examination of the tank indicated that, when manufactured, a portion of the nurse tank's interior longitudinal weld was not centered on the shell seam where the inner weld was offset to one side of the seam. At this location, an unfused region was found.

Although River Valley Cooperative had no records of inspections of its nurse tanks, investigators were informed that the operator conducts external visual inspections of all of its nurse tanks annually. There are no federal or state requirements that periodic nondestructive testing be conducted on nurse tanks.

As a result of the accident, the Safety Board made recommendations to RSPA to require periodic nondestructive testing be conducted on nurse tanks to identify material flaws that could develop and grow during a tank's service and result in tank failure, and to the River Valley Cooperative to review manufacturers' material safety data sheets for anhydrous ammonia, the National Institute for Occupational Safety and Health's *HAZOP of Anhydrous*

Ammonia Use in Agriculture, and the *Emergency Response Guidebook* and establish written emergency procedures for employees to follow when anhydrous ammonia release poses an inhalation hazard.

Lack of Loading Procedures Causes Structural Failure of a Highway Cargo Tank and Release of Anhydrous Ammonia in Middletown, Ohio

On August 22, 2003, a DOT specification MC 331 cargo tank developed a crack in the front head of the tank as the tank was being loaded with anhydrous ammonia. Ammonia vented for several hours through the 16-inch crack located on a weld seam on the front head. The ammonia was transloaded into another cargo tank. Several plant employees were treated for respiratory complaints.

The MC 331 cargo tank had received the DOT-required five-year internal inspection in March 2002. Since then the cargo tank had been used only for transporting anhydrous ammonia from two producers. Because the cargo tank was constructed of tempered steel, it could only be used to transport anhydrous ammonia with a moisture content exceeding 0.2 percent. The ammonia being loaded at the time of the failure routinely did not have the minimum moisture content.

On July 22, 2004, the Safety Board determined that the probable cause of the accident was the failure of the producer and shipper of the ammonia to establish and implement loading procedures that would prohibit using a cargo tank constructed of tempered steel to transport anhydrous ammonia containing less the minimum moisture content. Contributing to the accident was the motor carrier's failure to advise its drivers that anhydrous ammonia with less than the minimum moisture content should not be loaded into cargo tanks constructed of tempered steel.

Overpressurization of Tank Car Causes Rupture of Railroad Tank Car and Release of Hazardous Materials in Freeport, Texas

On September 13, 2002, a 24,000-gallon railroad tank car containing 6,500 gallons of hazardous waste catastrophically ruptured at the BASF Corporation chemical plant in Freeport, Texas. At the time of the accident, the tank car was positioned at a cargo transfer station in the plant. To liquefy the solid waste and to facilitate its transfer, steam heat had been applied to the tank car for several hours between September 11 and the morning of September 13. The force of the explosion propelled the 300-pound dome assembly from the tank car about 1/3 mile. Two nearby storage tanks containing oleum (fuming sulfuric acid and sulfur trioxide) were damaged and released about 660 gallons of oleum. The tank car, a highway cargo tank, and the transfer station were destroyed in the accident. Twenty-eight employees and area residents reported minor injuries.



Rupture of railroad tank car in Freeport, Texas.

On December 1, 2004, the Safety Board determined that the probable cause of the accident was overpressurization of the tank car resulting from a runaway chemical reaction of the hazardous waste in the tank car. The chemical reaction was initiated by excessive heating of the hazardous waste in the tank car. The Safety Board recommended that RSPA, the Occupational Safety and Health Administration, and the Environmental Protection Agency develop regulations that require safe operating procedures be established before hazardous materials are heated in a railroad tank car for unloading.

Hazardous Materials Support Of Completed Investigations In Other Modes

CSXT Freight Train Derailment and Release of Hazardous Materials in Baltimore, Maryland

On July 18, 2001, an eastbound CSXT freight train, consisting of three locomotive units and 60 cars, derailed 11 cars while traveling through the Howard Street tunnel in downtown Baltimore, Maryland. Three of the derailed cars contained hazardous materials. The derailment resulted in a release of hazardous materials and fire that lasted several days. Hazardous materials safety issues examined included the performance of the tank cars transporting hazardous materials, environmental impact, and risks of transporting hazardous materials shipments through urban tunnels. More information on this accident can be found in the Railroad section of this report.

Canadian Pacific Railway Derailment in Minot, North Dakota

On January 18, 2002, a Canadian Pacific Railway freight train with two locomotives and 112 cars derailed 31 freight cars near Minot, North Dakota. Five of 15 cars that were carrying anhydrous ammonia catastrophically failed and instantaneously released about 150,000 gallons of anhydrous ammonia. The ammonia created a vapor plume about five miles long and 2 1/2 miles wide, and affected approximately 15,000 residents near the derailment site and a portion of the city of Minot. Over the next few days, an additional 70,000 gallons of ammonia were released from six other tank cars. The release of the ammonia resulted in one fatality, more than 300 injuries, and the displacement of residents for up to 30 days. The hazardous materials issues included the vulnerability of tank cars in cold temperatures and methods of reducing the risks of transporting hazardous chemicals. The Safety Board issued four safety recommendations addressing these issues in its report on the accident. More information can be found in the Railroad section of this report.

Pipeline Rupture and Release of Crude Oil in Cohasset, Minnesota

On July 4, 2002, a 34-inch-diameter pipeline transporting crude oil experienced a catastrophic failure in a remote open wetland area west of Cohasset, Minnesota, resulting in the release of approximately 6,000 barrels (252,000 gallons) of crude oil. The Hazardous Materials Division evaluated the environmental impact of the release and the controlled burn to consume the spilled oil. The Safety Board did not consider the environmental response to be a safety issue, and no safety recommendations addressing the environmental response were issued. More information can be found in the Pipeline section of this report.

Federal Express B-727 Crash in Tallahassee, Florida

On July 26, 2002, a Boeing B-727-232, operating as FedEx flight 1478, crashed into trees on short final approach to the Tallahassee Regional Airport, Tallahassee, Florida. The flight was operating as a scheduled cargo flight from Memphis, Tennessee, to Tallahassee. The Hazardous Materials Division documented the hazardous materials cargo on the aircraft and their impact upon the accident. The Safety Board determined that hazardous materials were not a factor in the accident. More information can be found in the Aviation section of this report.

Ongoing Hazardous Materials Investigations

Fire Involving Lithium Batteries in an Aviation Cargo Container in Memphis, Tennessee

On August 7, 2004, a fire originated in an aviation cargo container that was being loaded onto an outbound cargo aircraft in Memphis, Tennessee. The container held a variety of freight, including a fiberboard box containing two 30-pound modules of lithium ion batteries. The ground crew loading the aircraft smelled smoke as the cargo container was being loaded onto the aircraft. The ground crew removed the container from the aircraft and lowered it to the ground. The Memphis fire department responded. When firefighters opened the cargo container, a fire flared inside the container. Several packages in the cargo container were destroyed or damaged during the fire. The firefighters observed that the box containing the lithium battery modules was the lowest package in the cargo container that had extensive fire damage. The fire damage to the interior of the lithium battery box was greater than the fire damage to the exterior.

Hazardous Materials Support Of Ongoing Investigations In Other Modes

AirTran DC-9 Cargo Compartment Fire in Atlanta, Georgia

On November 29, 2000, the crew of AirTran Airways flight 956, a McDonnell-Douglas DC-9, reported an electrical malfunction and returned for an emergency landing at Atlanta Hartsfield International Airport, Atlanta, Georgia. The hazardous materials safety issue being examined is the potential involvement of hazardous materials in a cargo compartment fire.

Canadian National Illinois Central Freight Train Derailment near Tamaroa, Illinois

On February 9, 2003, a Canadian National Illinois Central freight train derailed near Tamaroa, Illinois. Between 800 and 1,000 people were evacuated from Tamaroa because of the hazardous materials release and resulting fire. Of the 22 freight cars derailed, 19 were tank cars transporting various flammable and corrosive hazardous materials. Methanol from two loaded tank cars was released and ignited. One vinyl chloride tank car and one hydrochloric acid tank car were leaking. The Hazardous Materials Division is evaluating the survivability of the tank cars that derailed in the accident.

Gasoline Cargo Tank Truck Loss of Control and Fire in Elkridge, Maryland

On January 13, 2004, a tractor/cargo tank semi-trailer combination was southbound on Interstate 895 in Elkridge, Maryland, and en route to Bethesda, Maryland, to deliver 8,800 gallons of gasoline. As the tank truck reached the overpass bridge at Interstate 95, it left the right side of the highway, mounted the right bridge rail, and plunged 30 feet to the median and northbound lanes of Interstate 95. An explosion and large fire occurred upon the impact of the tank truck. Two tractor semi-trailers, a passenger car, and a pick-up truck in the northbound lanes were caught in the fire. The drivers of the gasoline tank truck, one tractor-trailer, the passenger car, and the pick-up truck were killed. The Hazardous Materials Division is evaluating the performance of the gasoline cargo tank in this accident.

Collision between a Union Pacific Railroad Freight Train and a Burlington Northern Santa Fe Freight Train in Macdona, Texas

On June 28, 2004, a westbound UP freight train struck the side of a freight car in an eastbound BNSF freight train at a siding in Macdona, Texas. The collision resulted in the derailment of the four locomotives and 19 railcars in the UP freight train and 16 freight cars in the BNSF freight train. A loaded 17,000-gallon tank car containing chlorine gas in the BNSF train was punctured. About two-thirds of the chlorine gas was released. One railroad crewmember and two nearby residents were killed. A second crewmember was hospitalized with injuries. One firefighter and 40 residents were treated at area hospitals. Preliminary damage estimates are \$2.3 million. Hazardous materials investigators are documenting the damage to the punctured tank car and evaluating its failure.

Office of Research and Engineering

As accident investigations become more complex, investigators must receive support in a wide range of disciplines to precisely determine the source and chronology of an accident or incident. To assist them, technical specialists in the Office of Research and Engineering performed accident reconstructions, vehicle performance analyses, radar analyses, visibility calculations, simulations of vehicle and occupant motion, animations, data recorder readouts and analyses, medical factor analyses, materials failure examinations, and fire and explosion analyses. In addition, the office supported the Safety Board's investigation and administration staff by maintaining the agency's information technology system, aviation accident and other databases, information product distribution, and agency websites.

Significant Work Accomplishments

One of the office's significant achievements in 2004 was its involvement in the American Airlines flight 587 accident investigation, which involved nearly a quarter of the office's technical staff. Staff provided many technical skills to the investigation, including analysis of radar and flight recorder data, airplane performance, and aerodynamic calculations, simulations and animations of the airplane and pilot, analysis of pilot actions and airplane-pilot coupling phenomena, wreckage examination, and testing.

Safety Studies/Reports Status

The Safety Studies and Statistical Analysis Division has two major studies nearing completion: a study of pipeline supervisory control and data acquisition (SCADA) systems and a study of general aviation weather accidents. In addition, two safety reports are also ready for the Safety Board's consideration: an analysis of the FAA aircraft type certification process and a report on FAA's collection of general aviation activity reporting.

Supervisory Control and Data Acquisition Systems. The SCADA study examines the industrial process control systems used by the liquid pipeline industry. Advances in computer technology have enabled nearly all pipeline operators to remotely monitor and operate their pipelines. The systems that pipeline companies use to perform these operations are collectively referred to as SCADA systems. From 1996 through 2002, the Safety Board investigated 18 pipeline accidents. In 10 of these investigations, the Board identified SCADA safety issues. Current investigations have also revealed control system issues. The purpose of the SCADA study is to document the pipeline industry's use of SCADA systems for detecting pipeline leaks and mitigating those leaks once they are detected. The study will also evaluate the designs of these SCADA systems and determine if these designs facilitate the controllers' job of monitoring the pipeline. In 2004, the Safety Studies and Statistical Analysis Division worked with investigators from the Office of Railroad, Pipeline, and Hazardous Materials Investigations to develop a 67-item SCADA questionnaire and to distribute it to 91 liquid pipeline operators. Responses were received from 79 companies -- an 87 percent response rate. The questionnaire covered company demographics, the pipeline's SCADA system, the alarms used, and the review processes for evaluating SCADA system performance. Board staff visited 12 sites to interview controllers, SCADA managers, and training personnel and to observe the control room, workstations, and SCADA system. Completion of the study is anticipated for Spring 2005.

In 2004, the Office of Research and Engineering's 74 staff members developed 4 major safety studies and 2 annual reviews of accident data; completed 163 materials lab cases; examined 82 CVRs, 64 FDRs, and 22 rail event recorders; received 2,653 public inquiries and 585 FOIA requests; had 4.7 million site visits to the website; and supported every accident investigation across the modes.

Safety Study of Weather-Related General Aviation Accidents. Weather has always been one of the biggest hazards facing general aviation pilots, and a disproportionate number of fatal general aviation accidents are associated with bad weather. Despite numerous attempts over the years to reduce the number of these accidents, weather continues to play a significant role in general aviation accidents. Although fewer than 7 percent of all accidents occur in instrument flight rule (IFR) conditions, instrument conditions are associated with nearly 25 percent of all fatal accidents. Similarly, 64 percent of the accidents that occur in IFR are fatal, compared to less than 16 percent of the accidents that happen in VFR conditions. In 2004, the Safety Studies and Statistical Analysis Division worked with regional investigators from the Office of Aviation Safety to collect flight, aircraft, weather, and pilot data on more than 200 accident and non-accident flights. Data collection is complete, analysis is underway, and the study will be completed in 2005.

Safety Report on the Treatment of Safety-Critical Systems During the FAA's Type Certification Process for Transport-Category Airplanes. This safety report deals with aircraft type certification, is also nearing completion. Systems that are critical to safe flight and continued airworthiness of transport-category airplanes have been the center of attention in several recent aviation accident investigations conducted by the Safety Board. In a five-year period starting in 1999, the Safety Board completed four major accident investigations where certification of a safety-critical system on a transport-category aircraft was an important issue: the rudder actuator in USAir flight 427, the center wing tank in TWA flight 800, the horizontal stabilizer jackscrew in Alaska Airlines flight 261, and the rudder system and vertical stabilizer in American Airlines flight 587. These four accidents resulted in 715 fatalities, accounting for 60 percent of the fatalities in air carrier operations that occurred from 1994–2001. Each of the investigations raised questions about the certification process used by the FAA to determine the airworthiness of an aircraft system. As a result, the Board has expressed its concern about the FAA's certification of safety-critical systems and suggested the need for a directed study of the certification process.

Current Procedures for Collecting and Reporting U.S. General Aviation Accident and Activity Data. In 2002, the FAA substantially revised its estimate of nonscheduled Part 135 flight activity for 2001 and retroactively applied the change back to 1992. Those changes affected the accident rate for nonscheduled Part 135 operations by more than 40 percent. A change of this magnitude, which affected 10 years of accident rate statistics, highlighted the imprecise nature of activity measures and prompted the Safety Board to develop a 2003 recommendation letter to FAA to improve the measure of nonscheduled Part 135 operations. In 2004, the Board continued its work to improve safety data by developing a report and associated recommendations to improve the activity reporting of general aviation operations. The report will be presented to the Board in 2005.

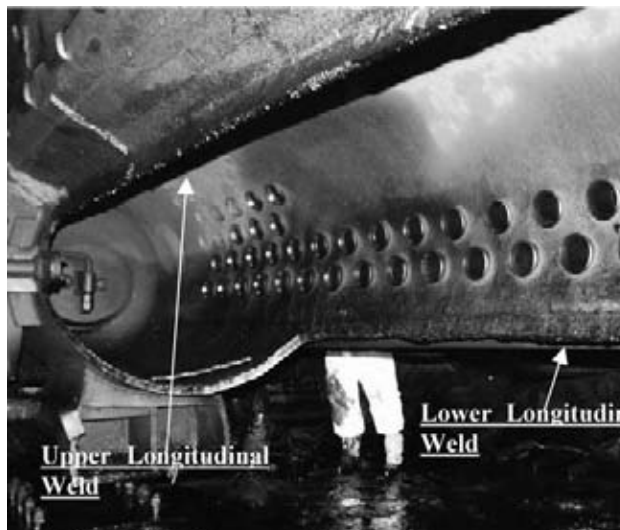
Aviation Annual Review for Commercial and General Aviation. The Safety Studies and Statistical Analysis Division prepares annual statistical reports summarizing commercial aviation accidents. The *Annual Review of Commercial Aviation* and the *Annual Review of General Aviation* graphically display accident data and include an analytical discussion of the data. In 2004, staff completed annual reviews for calendar year 2000, and two others for calendar year 2001 are nearing completion. In addition to the summary of a year's accident data, the 2000 general aviation annual review includes a focused analysis of landing accidents.

Materials Laboratory

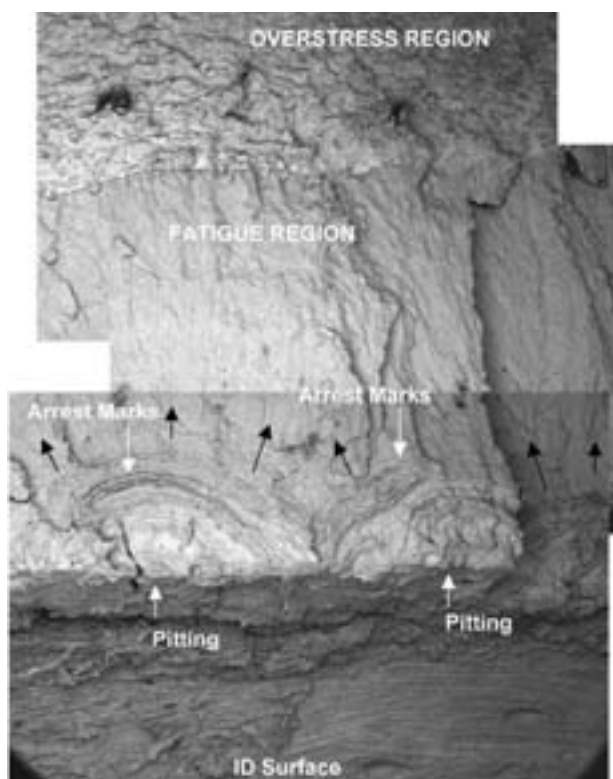
Materials Laboratory engineers examined parts and wreckage from more than 140 accidents, involving all transportation modes. In the past year, the Materials Laboratory staff issued reports on over 30 components and structures that contained fatigue cracking as well as multiple other components with more unusual fracture modes, such as stress corrosion cracking, stress rupture (creep), temper embrittlement, sulfidation corrosion, and high-temperature fractures. Based on the laboratory examinations, staff determined that for almost all of these cases, the fractures existed before the accident and initiated a series of events that led to the accident.

A prominent example of the work performed by the Materials Laboratory is the evaluation of the fractures associated with the steam boiler header that ruptured on the cruise ship, the *SS Norway* in Miami in May 2003, killing nine crewmen. The header rupture stemmed from fatigue cracking that initiated in areas of corrosion along longitudinal repair welds. Materials engineers evaluated multiple factors, such as material properties, welding techniques, boiler water chemistry, operational cycles, inspection techniques and frequency, and maintenance procedures that could have contributed to the corrosion and cracking.

Most of the examinations conducted in the Materials Laboratory were in support of aviation accidents, including foreign accidents in Guyana, the Bahamas (two accidents), Puerto Rico (two accidents), the Philippines, and El Salvador. Staff also supported several significant nonaviation accidents investigations. For example, the laboratory



Overall view of the aft portion of the ruptured header of boiler 23 from the *SS Norway*.



Scanning electron microscope photograph of a region of the header fracture surface from the *SS Norway*, showing corrosion pitting and fatigue cracking leading to a final overstress region.

conducted a study of the brittle behavior of a railroad tank car involved in a derailment in Macdona, Texas on June 28, 2004. In this accident, a tank car carrying hazardous materials was punctured. The tank car material is being tested at various temperatures to determine at what point the material changes from ductile fracture behavior to brittle fracture behavior.

Vehicle Performance

Performance engineers have conducted analyses supporting several investigations. These analyses covered a wide range of subjects including airplanes, marine vessels, trains, road vehicles, and vehicle occupants. Some of the more significant examples include the following.

American Airlines Flight 587. Staff completed the American Airlines flight 587 accident investigation. Vehicle performance issues played a significant role in the determination of probable cause for this accident. In addition, the vehicle performance animation laboratory developed detailed animations that were presented at the Board meeting. Animations are at www.nts.gov/events/2001/AA587/board_mtg_anim.htm.

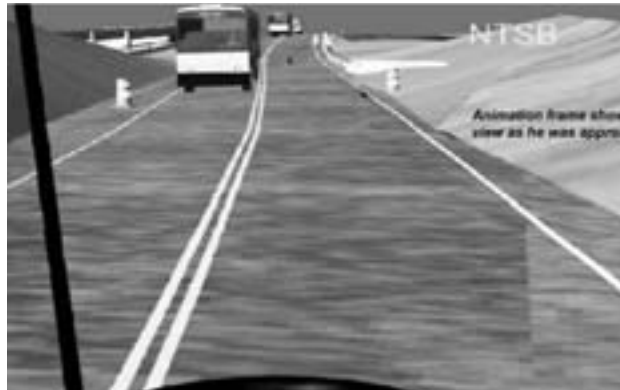
Air Midwest Flight 5481. In January 2003, an Air Midwest Beech 1900D crashed on takeoff from Charlotte International Airport, Charlotte, North Carolina. The flight crew experienced a loss of pitch control immediately after takeoff. Performance engineers developed a flight simulator for this aircraft and determined a pitch control time history for the flight that showed a limited range of travel, which helped investigators assess the role of recent maintenance activities to this system. Additionally, performance engineers analyzed the effects of the aircraft's weight and balance on its pitch control. The animations may be viewed at www.nts.gov/events/2003/AM5481/board_meeting_presentations/presentations.htm.

FedEx B-727. In June 2002, a Federal Express Boeing 727 on approach to Tallahassee, Florida, crashed short of the runway. Vehicle performance staff conducted an extensive on-scene investigation, gathering physical evidence from the scene. Airplane performance engineers derived a flight profile, which was presented at the June 8, 2004, Board meeting and was used to help analyze human performance and operational factors.

FedEx MD-10. On December 18, 2003, a FedEx MD10 crashed on landing at Memphis, Tennessee. Vehicle performance engineers integrated the flight path and derived the descent rate for each wheel, which was essential for investigators in analyzing the collapse of the right gear. Staff also produced several parameters for analyzing crew performance.

In addition to these major aviation accidents, staff continues to provide technical support to Safety Board regional office investigations of general aviation aircraft accidents. Staff engineers also supported a number of highway and railroad vehicle accident investigations in 2004 by developing detailed vehicle and occupant simulations.

Omaha, Nebraska School Bus Accident. In October 2001, a school bus ran off a bridge on a roadway that was under construction. Vehicle simulations were conducted to analyze the potential view of the school bus driver as he traveled along the reconstructed roadway. The temporary roadway was constructed so that oncoming traffic may have appeared to cross over into the path of the accident vehicle. The simulation provided an approximation of the bus driver's potential view and enabled investigators to analyze the view in detail during the moments preceding the accident.



Animation frame showing the Omaha bus driver's view as he was approaching the accident site.

Victor, New York Motorcoach Accident. In June 2002, a Coach USA motorcoach ran off the road at a New York State Thruway exit, failed to negotiate the ramp, and crossed into traffic on the entrance ramp. Vehicle simulations were used to derive the path of the bus and the required steering input to match the evidence at the scene.

Memphis, Tennessee 15-passenger Van Accident. In April 2002, a 15-passenger van transporting six children to school drifted at about 63 miles per hour from the left lane, across two other lanes, and off the right side of the roadway. Four of the children were killed; two were seriously injured. A vehicle dynamics study was conducted to provide input to an occupant kinematics study to determine injury-causing kinematics or impacts, and to investigate a variety of alternative restraint conditions. Only one passenger, in the right front seat, was restrained. Based on age and passenger size, several passengers should have been restrained in booster seats to ensure proper belt positioning on the body. Other passengers could have been properly restrained with the available lap/shoulder belts or lap belts. The occupants were first simulated in the restraint condition similar to the accident scenario, with the available restraints on the van, and finally, restrained with the available restraints or in booster seats where appropriate by age. The results of the simulations indicated injuries in both the actual and the available restraint conditions. Injury levels were reduced for the two occupants simulated in booster seats.

Hewitt, Texas Motorcoach Head-On Impact with a Sport Utility Vehicle (SUV). In February 2003, a motorcoach, occupied by a driver and 34 passengers, was involved in a fatal accident as it traveled on an interstate highway approaching stopped vehicles in reported heavy rain. Two occupants of the SUV and five occupants of the bus were killed, and 31 other occupants of both vehicles received minor to critical injuries. The accident is being simulated to determine the relative effects of worn tires and a slippery road on the accident.

Aviation Accident Investigation Software. The Data Analysis Numerical Toolbox and Editor (DANTE) windows-based computer program was developed by RE staff to simplify, automate, and augment many airplane performance calculations and to analyze and manage large volumes of electronic data from flight data recorders, radar sites, and simulator and flight tests. This program has been shared with government investigation authorities in Canada, Germany, Australia, and Taiwan, and with the U.S. Air Force 84th Radar Evaluation Squadron and the U.S. Air Force Safety Center. The program and documentation are available to authorized users worldwide by means of a link on the Safety Board website that

allows a download of the complete program, user's manual, and tutorial. RE periodically updates the program to respond to current investigative needs and as a result of suggestions made by the large user group. Among the enhancements in 2004 was the addition of script capability.

Accident Data and Public Records

Twenty-eight accident reports and studies were published in 2004, and 2,218 requests for public records and 350 requests under the Freedom of Information Act were processed through the Public Inquiries Branch.

Data specialists in the Office of Research and Engineering continued to respond to requests for aviation accident information and research and in 2004, completed more than 400 data analysis requests. Some of these requests concerned the accident frequency of a particular aircraft model or air carrier, while others concerned particular types of accidents. The availability of accident data from 1962–1983 on the Safety Board website, combined with complete download and text search capabilities, now allow many researchers to complete their own analyses. The office also issued statistical information on U.S. civil aviation and published Safety Board annual reviews of aircraft accident data for U.S. air carriers and for general aviation.

Cockpit Voice Recorders/Flight Data Recorders

Staff engineers extracted, formatted, and analyzed data from 82 cockpit voice recorders (19 were foreign), 64 flight data recorders (12 were foreign), and 22 rail recorders; staff also recovered data from 12 damaged global positioning system units and 18 digital cameras.

Recent investigations in the United States revealed problems with the quality of digital flight data recorder (DFDR) data recorded by the following regional jet airplanes: the Embraer 135 and 145, the Canadair CL-600, and the Fairchild Dornier 328. Although the DFDR systems installed on these airplanes appeared on the surface to meet the requirements of 14 CFR 121.344, Appendix M, a close examination of the recorded data revealed that the output from units supplying data to the DFDR systems is not updated at a rate sufficient to meet DFDR sampling rate requirements; that is, the DFDRs are recording data at a higher rate than the data source are being updated. As a result, repeated values are found in consecutive DFDR samples.

Staff engineers recently completed a four-year update to the minimum performance standards that are used by the aviation industry to make and install new flight data and cockpit voice recorders. The new manufacturing standards also include specifications that cover onboard cockpit video and cockpit digital data. Development of these standards was sponsored by the European Organization for Aviation Electronics and included input from representatives of all major airframe and equipment manufacturers, as well as government and accident investigation organizations throughout the world.

Medical Factors

Research and Engineering staff continued to pursue safety improvements in the use of prescription and over-the-counter medications by vehicle operators (as detailed in several safety recommendations). Staff also participated in multi-agency meetings convened by the American Society on Aging, involving representatives from the Food and Drug Administration and the NHTSA, among many others.

RE medical staff supported several investigations involving non-commercial driver medical conditions and provided input for the Board's Special Investigation Highway Report on this issue, *Medical Oversight of Noncommercial Drivers*. In addition, staff continued to follow the issue of medical oversight of commercial drivers and supported investigations in which the medical certification of commercial drivers was in question. Further, staff coordinated with the FMCSA regarding that agency's efforts to improve commercial driver medical oversight and assisted in reclassifying the Safety Board's Most Wanted recommendations on this issue.

RE staff also helped train investigators, physicians, psychologists, and physiologists in collecting and analyzing medical information for accident investigations. Individuals trained included military, civilian, private, commercial, academic, and government employees, who attended NTSB Academy classes or formal programs coordinated through the Office of Research and Engineering. These programs included presentations to the Transportation Research Board, the Aerospace Medical Association, the Texas College of Occupational and Environmental Medicine, the U.S. Air Force School of Aerospace Medicine, and the Mayo Clinic, among others.

Staff also supported the investigation of a fatal ferry allision in Staten Island, with particular attention to possible medication use, medical conditions, and medical oversight. RE medical staff also coordinated extensively with the Offices of Highway Safety and Marine Safety on medical issues regarding a barge allision with a highway bridge in Webbers Falls, Oklahoma, due in part to the tugboat captain's incapacitation as a result of an unforeseeable abnormal heart rhythm. Medical staff also coordinated with the Office of Aviation Safety on the investigation of a Boeing 727 cargo flight crash in Florida due in part to the color-vision deficiency of the pilot flying the aircraft.

Staff provides medical consultation to investigators in all modes on about 100 accidents a year. The following are some additional examples from 2004:

- Two fatal general aviation accidents (in Florida and California), involving the use of data downloaded from the pilots' implantable cardioverter-defibrillators. These are the first instances of this technology being used in an aviation accident investigation.
- Fatal rail accidents in Texas involving marijuana use.
- A fatal rail accident in Washington in which crewmembers had significant medical conditions including diabetes and sleep apnea.
- A non-fatal commercial air carrier accident involving recent use of psychoactive prescription medications.
- A fatal aviation accident in Alaska involving a commercial pilot with a history of substance abuse known to the FAA medical certification division. Post-accident toxicological analysis detected cocaine.

Fire and Explosion Factors

Fire and explosion specialists from the Office of Research and Engineering supported marine, highway, hazardous materials, and general aviation accident investigations and participated in the investigation of three major accidents in 2004: a highway accident/fire involving a gasoline tanker rolling off an overpass in Elkridge, Maryland, a lithium battery fire in a cargo container at the FedEx Express loading facility in Memphis, Tennessee, and an engine room fire on board a water taxi in Tarpon Springs, Florida. In addition, staff assisted with several general aviation accidents across the country. Staff investigators supported the investigation of the April 7, 2003, explosion and fire of a 100,000-gallon fuel storage tank in Glenpool,

Oklahoma. In each fire investigation, investigators followed on-scene work with extensive fire dynamics analysis and, in the case of the battery fire, additional laboratory testing and examination.

A fire and explosion investigative course was presented in May 2004 at the Academy. Hands-on training was enhanced with the use of the TWA flight 800 reconstruction as well as other aircraft wreckage that was used in to demonstrate the effects of in-flight fires.

Information Products and Distribution

In 2004, Internet activity for the Safety Board website at www.nts.gov showed moderate growth, with an increase of more than four million page views over 2003. A surge of activity in October and November resulted from interest in the American Airlines flight 587 Board meeting. Average daily visits averaged 12,500 for the year. More than 350,000 publications were downloaded, with the most popular reports continuing to be those involving aviation. Usage of the website's searchable aviation accident database, which was expanded in late 2002 to cover investigations conducted from 1962 to 1983, accounted for approximately two-thirds of website activity.

In 2004, all Safety Board meetings, public hearings, public forums, and symposia were webcast to a worldwide audience via the Internet. The most popular webcast in 2004 was the October 26 Board meeting to discuss the final report of the investigation of the crash of American Airlines flight 587, with over 1,600 users viewing the live webcast. Archived webcasts for these events are available for three months online and on CD-ROM. There were over 21,000 visits to the online webcast archives in 2004. The events also are videocast internally, making it easy for all employees to monitor proceedings while continuing to work in their offices.

During 2004, the Office of Research and Engineering continued to implement a revised, searchable docket management system on the agency's intranet to manage public and official-use records related to accident investigations, safety studies, and other activities. Thousands of documents were added to the new system in 2004, which is currently accessible only to Safety Board employees and fulfillment contractors. Work began late in 2003 to make the docket system an integrated part of the public website, thus making the vast majority of accident investigation information collected by Safety Board staff available to interested parties worldwide.

Information on the agency's internal website was also expanded and improved in 2004, with updated information added weekly. Efforts continue to coordinate the conversion of a variety of workflow systems to a web-based format that is seamlessly integrated with the agency's intranet. Applications converted to that format over the past years have included personnel, timekeeping, financial, and public records tracking systems.

Information Technology: e-Gov Initiatives

The Information Technology Software Development Team continues to make significant progress with Safety Board e-Gov initiatives, bringing more information to the public through an expanding Internet website and FTP site.

Aviation. Serving as the census for all aviation accidents in the United States, the entire Safety Board database is now available to the public through interactive queries and official database downloads.

A new aviation query screen was introduced this year. The full agency dataset is now available from 1962 to the present.

Subscription Services—Safety Board Press Releases and Safety Recommendations. The public is now able register, via the Safety Board website, to receive immediate notification of Board press releases and newly issued safety recommendations.

Pilot/Operator Report

Submission. A program has been developed that allows pilots/operators to submit their accident/incident reports via the Internet. Once submitted, the report is placed in the Safety Board Docket and provided to the investigator-in-charge to import into the Board's database system.

The aviation database query screen.

Accident/incident reporting form.



Public query screen.



Safety recommendation query screen.

Modal Accident Investigations.

In 2005, Information Technology will introduce a set of screens on the Safety Board website to enable the public to query and obtain reports for the various modes (marine, highway, rail, pipeline, and hazardous materials). A sample of those used for highway accident queries is shown below.

Safety Recommendation

Queries. The Safety Board issues recommendations as a result of its investigations of transportation accidents and to address other safety concerns. Letters containing the recommendations are directed to the organization, public or private, best able to act on the problem.

Starting in 2005, safety recommendation queries, retrieval results, and copies of the official Safety Board-issued safety recommendation letter will be available on the Board's website.

Academy Course Enrollment and Payment on the Internet. Online registration and payment services will soon be available to prospective Academy students. Students will be able to select a course from the NTSB Academy website, register, and make a check or credit card payment through the Treasury's *pay.gov* program.

Aviation Database Management System Portal. The Safety Board is designing an aviation portal that will serve as a single entry point into the Board's archives of aviation accident investigation data, project management and caseload management and analysis information, and related data sources and websites.

For the purposes of investigation data collection and reporting, a Web-based interface is being developed that will facilitate use and enhance accessibility of Safety Board information from work, home, hotel, or accident investigation scene.

The screenshot displays the Aviation Investigation Database Management System portal. It includes a header with the NTSB logo and the title 'Aviation Investigation Database Management System'. Below the header is a navigation bar with 'Home', 'Search', 'Reports', and 'Logout'. The main content area is divided into four sections:

- RECENTLY OPENED PROJECT KEYS:** A table with columns: BSM #, Report Status, State, City, State, Status Change, Date Assigned. It lists three entries for Los Angeles and North Platte.
- WORKLOAD SUMMARY:** A table with columns: Status, Issue Type, Age, and Total. It shows counts for Open Investigations, Pending, Partial, and Total.
- OPEN INVESTIGATIONS:** A table with columns: BSM #, Report Status, State, City, State, Status Change, Date Assigned. It lists four entries for various locations.
- EXTERNAL LINKS:** A list of links including FAA Accident Registry, Aircrft Registry, Weather, and Aviation Query.

At the bottom of the page, there is a footer with the NTSB logo and contact information: 'The National Transportation Safety Board, 1200 Jefferson Plaza, N.W., Washington, DC 20594-2000, Telephone: (202) 314-6000 Fax: (202) 314-6700'.

Aviation database management system portal.

Public Hearings and Symposia

Cockpit Video Recorders, July 27-28, 2004

The Board held a two-day public hearing on the feasibility and benefits of cockpit imaging (video) recorders. Safety Board Member Carol J. Carmody chaired the hearing, which heard testimony from witnesses from the federal government, both civilian and military, recorder manufacturers, airplane manufacturers, and commercial pilots.

The need for cockpit image recorders came to light in 2000, when Safety Board staff experienced problems retrieving data from cockpit voice recorders and flight data recorders in a series of major investigations (among them, the crash of ValuJet flight 592 in the Everglades in 1996 and the crash of EgyptAir flight 990 in the Atlantic Ocean in 1999). As a result, the Board recommended to the FAA that transport-category aircraft be equipped with cockpit image recorders to capture information on crew performance and on conditions in the cockpit. Also in 2000, the Board recommended that the FAA require video recorders, in lieu of flight data recorders, in the smaller, turbine-powered aircraft frequently employed in scheduled and nonscheduled Part 135 operations. Examples of aircraft that had no recorders but would be covered by the recommendation were the Cessna Caravan that crashed in Montrose, Colorado, in 1997, killing all 10 persons aboard, and the Raytheon King Air that crashed in Minnesota in 2000, killing Senator Paul Wellstone and six others. Installation of cockpit image recorders is an issue on the Board's Most Wanted List of Safety Recommendations.

Personal Flotation Devices Forum, August 25, 2004

The Safety Board held a one-day public forum to discuss mandatory use of personal flotation devices (PFDs) on recreational boats. The purpose of the forum was to gather all available data, and to promote an open and informative discussion of policy issues related to mandatory PFD use. The Safety Board has a long history of working to improve recreational boating safety, and related recommendations have been on the Board's "Most Wanted" list of transportation safety improvements since the list's inception in 1990.

Coast Guard statistics show that 750 boaters died in 2002. Of those who drowned, 85 percent were not wearing PFDs, even though in many cases, PFDs were aboard. These statistics have been consistent from year to year and Coast Guard statistics show that approximately 450 lives could be saved each year if PFDs were used. The Safety Board held the forum to build on this information and other data available to evaluate the safety benefits of requiring the use of PFDs on recreational boating.

Currently, most states require that PFDs be worn by children and by personal watercraft operators. No state requires PFD use for all occupants. However, six years of observational studies by the Coast Guard show that less than five percent of adults in open boats wear PFDs. Some of the issues discussed at the forum include the following:

- The impact of federal and/or state legislation mandating wearing of PFDs on recreational boats;
- Various vessels and type of operation that should be included in or exempted from mandatory wear rules;
- New PFD technology; and
- Alternatives to mandatory wear rules.

Administrative Law Judges

Since 1967, the Safety Board has served as the “court of appeal” for airmen, mechanics or mariners whenever the FAA or Coast Guard takes a certificate action.

The Board’s administrative law judges hear, consider and issue initial decisions on appeals filed with the Board. Included are appeals from orders issued by the FAA’s Administrator amending, modifying, suspending or revoking, in whole or in part, certificates of airmen, air agencies and air carriers, for alleged violations of the Federal Aviation Regulations or for lack of qualification; FAA actions denying applications for the issuance or renewal of airman certificates; and appeals of certain FAA civil penalty orders issued by the FAA against pilots, flight engineers, mechanics or repairmen where the amount in dispute is less than \$50,000. The judges also adjudicate claims for fees and expenses stemming from certificate and civil penalty actions under the Equal Access to Justice Act (EAJA).

The Board currently has four judges. Two are based in Washington, D.C. and hold hearings primarily in the eastern half of the United States. The other two are based in Arlington, Texas and Denver, Colorado and hear cases primarily in the western half of the country.

Either the certificate holder or the FAA may appeal the judges’ decisions in these cases to the five-member Board. The Board’s review on appeal of its administrative law judges’ decisions is based on the record of the proceeding, which includes hearing testimony (transcript), exhibits and the judge’s decision, as well as appeal briefs submitted by the parties.

The FAA has the right to appeal decisions of the five-member Board to the U.S. Court of Appeals where that agency determines that the Board’s decision “will have a significant adverse impact” with respect to aviation safety duties and powers designated to be carried out by the FAA. Airmen and mechanics have the right to appeal all adverse Board decisions to the Court of Appeals.

Upon review of the Board’s decision, the Court of Appeals has the power to affirm, modify or set aside that decision in whole or in part -- or, if need is found, to order further proceedings by the Board. The decision of the Court of Appeals is subject to review by the U.S. Supreme Court on *writ of certiorari*.

In April 2000, Congress enacted Section 716 of Aviation Investment and Reform Act for the 21st Century (Public Law 106-181). This Act expanded the Board’s jurisdiction to include review of FAA designations of safety enforcement actions as emergencies, which require the order to be effective immediately, upon petition by the affected certificate holder. The Board has delegated this review authority to its administrative law judges. There is no administrative review of the administrative law judges’ decisions in these cases.

Marine certificate actions are heard first by the Coast Guard’s administrative law judges, and may be appealed to the Commandant of the Coast Guard. The ruling of the Commandant may then be appealed to the NTSB, where the Board follows the same appellate process as it does in considering the initial decisions of its law judges in aviation cases. In 2004, the Board closed two marine cases. There were no marine appeals filed with the NTSB.

There were 306 aviation certificate appeals filed with the Board’s Office of Administrative Law Judges in 2004; 98 of these cases were from emergency orders. The Board’s judges held 48 hearings and closed 275 cases in 2004.

There were 306 aviation certificate appeals filed with Board's Office of Administrative Law Judges in 2004; 98 of these cases were from emergency orders. The Board's judges held 48 hearings and closed 275 cases in 2004.

During 2004, 35 of the judges' decisions were appealed to the full five-member Safety Board for review. The Board decided 39 appeals, reversing the judges' decisions in four cases and remanding one case for additional hearing on the merits. Five of the Board's decisions were appealed to the U.S. Courts of Appeals, which rendered seven decisions in 2004. The Court affirmed the Board in four, reversed the Board in one, remanded one case back to the Board for additional disposition and dismissed one case

There were four EAJA applications filed with the Board's administrative law judges in 2004, and three EAJA cases were decided by the judges. In 2004, one of the judges' EAJA decisions was appealed to the full Board, which issued rulings in two EAJA cases.

NTSB Academy

The NTSB Academy completed its first full year at its new facility on the Ashburn, Virginia campus of The George Washington University in September 2004, exceeding all expectations. During its first year, more than 1,000 individuals attended programs at the Academy. Most of the courses offered were filled to capacity, demonstrating the industry's desire to "do better" -- a mind-set the Board works hard to encourage, and reflecting the potential for the Academy's success.

Courses

Fifteen courses were delivered on topics that included the sciences involved in accident investigations, and techniques useful in Transportation Disaster Assistance, principally for air carriers and first responders at accident sites.

Course List

Course Description	Total Students	Total Student Days	NTSB Instructors
Inside the NTSB Investigation Process--A Technical Course for Aviation Media	15	30	6
Aviation Industry Training Program	54	108	11
Accident Site Photography	25	25	0
Advanced Interviewing for Accident Investigators	40	80	1
Managing Communications During An Aircraft Disaster	23	46	3
Transportation Disaster Response--Family Assistance	57	171	4
Investigating Human Fatigue Factors in Transportation Accidents	121	242	4
Aviation Industry Training for Airline Professionals	72	144	11
Aircraft Accident Investigation (combined with Marine Accident Investigation)	65	650	15
Marine Accident Investigation (combined with Aircraft Accident Investigation)	6	60	11
Cognitive Interviewing for Accident Investigators	83	166	0
Transportation Disaster Response--A Course for Emergency Responders	48	192	6
Technical Photography	25	25	0
Advanced Accident Site Photography	17	17	0
Investigating Human Fatigue Factors	78	156	6
Media Training for NTSB Investigators	15	15	0
TOTALS	744	2127	78

Academy students come from accident investigation agencies around the world. They comprise past as well as potential future parties to Safety Board investigations, such as equipment manufacturers and unions; disaster relief agencies including the American Red

In 2004, the Academy delivered 15 courses attended by more than 740 people, a 64 percent increase of those taught in 2003. Seven new courses in aviation, highway, marine, and railroad safety, and family assistance are scheduled in 2005, with many more in development.

Cross; and representatives from local, state and federal law enforcement agencies. A total of 65 students from 35 foreign countries were represented at Academy courses in 2004, more than doubling the total of 16 foreign countries represented in 2003. Participants from among the following countries attended Academy courses in 2004: Bahamas, Belgium, Bolivia, Brazil, Canada, Chile, China, Columbia, El Salvador, Finland, France, Germany, Greece, Korea, Lebanon, Mexico, New Zealand, Panama, Peru, Portugal, Puerto Rico, Slovenia, Spain, Sweden, Switzerland, Thailand, The Netherlands, the United Arab Emirates, and the United Kingdom.

Several additional new courses are currently scheduled for delivery in 2005 with more in conceptual development.

Forums

The NTSB hosted two public forums at the Academy in 2004. The first, on air cargo safety, had the goal of augmenting and supporting an industry -- government dialogue on air cargo safety and to help advance the important work currently being done in this area. The forum focused on four main areas -- the current state of the cargo industry, operations, human factors, and regulatory issues. The second forum was on personal flotation devices in recreational boating. Its purpose was to gather all available data and to promote an open and informative discussion of policy issues related to mandatory PFD use. Each forum was widely attended by members of the respective transportation community, with 262 participants total.

Another symposium has been scheduled for March 2005 to address positive train control -- a safety issue that has been on the Safety Board's Most Wanted list for many years. Others will be scheduled as identified.

Forum Description	Total Participants
AS701-033004 / Air Cargo Safety Forum	176
MS701-082504 / Forum: Personal Flotation Devices in Recreational Boating	86
Totals	262

Instructional Staff

The majority of the courses taught at the Academy are developed and delivered by NTSB staff. Nearly 25 NTSB investigators and staff provided instruction during the Academy's first year. This ensures direct relevance, while providing the instructors an opportunity to step back and rethink what they do. Outside instructors are used to supplement NTSB expertise in order to ensure the highest quality presentations. The Academy has identified outside subject matter experts to instruct on special topics including experts from the Global Maritime and Transportation School, various universities and other identified experts in relevant fields of study.

Partnerships and Alliances

In its effort to meet the training needs of those in other areas of the government and the transportation and emergency response communities, the Academy has formed alliances and partnerships with federal agencies and private organizations.

The Board's Office of Transportation Disaster Assistance has developed educational programs to assist the Federal Bureau of Investigation in their requirement to assist victims of crime. Based on this effort, a need was identified to coordinate all federal agencies that would be called upon in the event of a national disaster. The goal was to familiarize each other with established roles and coordinate a communications plan. An initial meeting was held at the Academy, attended by more than 10 federal agencies. More meetings are planned to move this initiative forward. This kind of coordinated interagency program is just the first of many identified possibilities.

Another intergovernmental partnership initiated during the Academy's first year includes a program under development at the request of NASA's newly formed Engineering and Safety Center. This group, developed on the heels of the Columbia accident, has requested NTSB assistance in training NASA accident investigators on conducting and managing independent accident investigations. This will be an ongoing program that will eventually be expanded to include other groups.

In some cases, as with the request by the Civil Aviation Administration of China, the Academy is working to develop an accident investigation training program designed to promote a fundamental understanding of the processes and requirements of the NTSB to ensure a free flow of reliable information in the event of an accident in China involving a U.S. carrier or its citizens.

Non-governmental partnerships have also been developed, such as with the Airports Council International of North America and the Aviation Safety Alliance where each party contributed unique expertise to develop training targeted to meet specific, operational demands.

The Academy will continue to develop partnerships with those that share our mission to learn from the experience of diverse working groups and enhance the level of interagency cooperation.

The following is a partial list of the organizations participating in partnerships and alliances with the NTSB Academy:

- Airports Council International of North America
- Air Transport Association
- Armed Forces Institute of Pathology
- Aviation Safety Alliance
- Civil Aviation Administration of China
- Federal Bureau of Investigation
- Global Maritime and Transportation School
- National Association of State Boating Laws Administrators (NASBLA)
- National Aeronautics and Space Administration
- New York City, Office of Emergency Management
- Transportation Safety Institute
- Society of Automotive Engineers

Investigations

The Academy facility also houses the Board's Mid-Atlantic Regional Office for aviation accident investigation. In May 2004, the complete wreckage of a Cessna 208 was brought to the lab, enabling NTSB investigators to thoroughly examine and document the aircraft components within the Academy's secure facilities. This is a departure from years past when the Board has had to rely on its parties or others for such space.

The football field-sized laboratory serves not just as an instructional venue, but also as a resource for active investigations.

Research Program

During 2004, the Board initiated a planning effort for an accident investigation research program. The accident investigation research program is designed to be integrated with the Board's existing organizational infrastructure so that it can address issues identified during accident investigations. During 2005, it is planned to initiate the following research projects:

1. Evaluation of Train Dynamics Simulation Software
2. Impact Characteristics of Aircraft Composite Structures
3. Influence of Tire Friction and Tire Stiffness on Highway Vehicle Simulations
4. Influence of Uncertainties and Incomplete Data on Vehicle Simulations

Each of these topics is the result of discussions with NTSB staff, industry, government and university researchers. These projects have been planned to enhance the Board's capabilities to perform accident investigations, to help posture the Board for effective promotion of safety recommendations, and to make the Board knowledgeable of the evolving trends in transportation system designs and operational strategies in areas critical to safety. Hence, our research program will be focused and tightly linked to the advancement of accident investigation excellence.

Dedication Ceremony

On October 18, 2004, several hundred representatives from a wide range of agencies and organizations involved in transportation safety gathered in Ashburn, Virginia to dedicate the NTSB Academy to the family members of those lost in transportation accidents.

The five Board Members – Ellen Engleman Connors, Mark Rosenker, Carol Carmody, Richard Healing, and Deborah Hersman were joined at the ceremony by Secretary of Transportation Norman Y. Mineta; Congressman James L. Oberstar; Former NTSB Chairman Jim Hall; Acting Chairman of the Transportation Safety Board of Canada, Charles H. Simpson; president of The George Washington University, Joel Trachtenberg; and representatives of the family members lost in transportation accidents.

Secretary Mineta gave the keynote address at the dedication, noting, "It should come as no surprise to anyone that the courses offered here are taught by some of the best and brightest investigators in the business, the Safety Board employees themselves. The relentless pursuit of safety has a home at the NTSB Academy."

Other Facility Usage

This year the Academy hosted the Society of Automotive Engineers forum on developing transportation-related technologies, as well as the Armed Forces Institute of Pathology's annual course for medical examiners. We anticipate significant increases in the number of outside users of the space as word spreads about the facility.

The Department of Homeland Security has used the Academy for several programs over the past year including a two-day senior manager retreat attended by the Secretary and his senior staff. Similar programs have been scheduled for the future.

The Academy has also provided the NTSB space for continuity of operations during emergencies. Space has also been made available through interagency agreements with several other small federal agencies to ensure continued operations for their essential functions as well.

TWA 800 Reconstruction and Other Learning Tools

With the support of the families, the Academy has been able to use the reconstruction of TWA 800 to showcase the work of the Board and demonstrate first-hand the complexities of accident investigation and prevention. It has been useful not just to accident investigators, but also to first responders, policy makers and other students as well.

The Academy has also provided the space to rebuild the agency's boneyard of wreckage identified as most useful for training. The Board's previous boneyard had been kept off site and the wreckage there was inadvertently discarded as trash. During the past year several pieces of new aviation wreckage have been identified and delivered to the Academy to begin the process of rebuilding the collection.

The Academy also entered into an agreement with the NASBLA to store 15 crashed boats and to provide space for their accident investigation program designed to educate state police on how to investigate small craft accidents. The NTSB has supported the work of NASBLA in the past and now has an agreement in place to provide a venue for their training and further support their important work.

The Academy is actively exploring the possibility of housing other significant wreckage at the facility, encouraging collaborative training programs with law enforcement agencies such as the FBI and foreign safety boards.

Summary and Outlook

The Academy has demonstrated great potential in its first year of operation and will continue to grow in program excellence as it matures. In addition to the 2004 course offerings, several new courses and partnership programs are scheduled for 2005, including:

- Survival Factors in Aviation Accidents
- Managing and Directing Safety Investigations (for NASA)
- Aircraft Accident Investigation (for Chinese delegation)
- Conducting Effective Technical Presentations
- Transportation Disaster Response – Airports
- Photodocumentation of Traumatic Injuries
- Digital Image Processing
- Photodocumentation Series
- Highway – 15-passenger Vehicles

In addition, one new symposium is scheduled for 2005 on positive train control. Other new courses and programs will be added as they are identified.

Transportation Disaster Assistance

In 1996, Congress passed the Aviation Disaster Family Assistance Act that gave the NTSB the responsibility of assisting the victims of aviation disasters and their families. The Board's primary responsibility involves coordination between federal agencies, commercial airlines, state and local authorities, and the families of victims. Additionally, in 1997, Congress enacted the Foreign Air Carrier Support Act to ensure foreign air carriers operating to the United States meet the same standards for victim assistance as their domestic U.S. counterparts.

In the event of an accident in which the Office of Transportation Disaster Assistance (TDA) is tasked to respond, a team of specialists is launched, including an administrative officer and managers for emergency operations, crisis operations, forensic sciences, and disaster services. Although the office has mandatory responsibilities for major aviation accidents, the expertise and techniques developed by this team have been called upon repeatedly to assist in accidents in all modes.

Primary tasks of the team upon arrival at the accident site include coordinating resources provided by local, state and federal agencies responding to assist victims and their families; establishing a Joint Family Support Operations Center (JFSOC); and ensuring that the airline establishes a Family Assistance Center (FAC). Normally the JFSOC and the FAC are co-located at a hotel where the families are lodged.

Accident Launches

In 2004, TDA specialists assisted on the following accidents:

Bell 407 Medivac Helicopter crash, Pyote, Texas (4 fatalities)

Coordinated with local, state and federal agencies to ensure support for family members of the patient on the medivac, the family members of the employees of the helicopter company, and the family members of the medical staff who worked on the medivac.

Sikorsky Helicopter crash, Gulf of Mexico (10 fatalities)

Coordinated with the Galveston, Texas medical examiner to obtain medical records from the victims' family members. Worked with various companies who had employees on board the helicopter. Maintained contact with family members, many of who will be attending the Board meeting.

Medivac Flight Accident, Tocumen, Panama (7 fatalities; 1 U.S. citizen)

The Office of Aviation Safety requested assistance in dealing with the U.S. State Department and the Panamanian medical examiner to facilitate the positive identification of the U.S. citizen onboard and to ensure that proper toxicological tests were performed.

Piper Twin-Engine Accident, Lakeway, Texas (6 fatalities)

Assisted the Office of Aviation Safety by facilitating interviews with next-of-kin and coordinating the victim recovery process and positive identification efforts with local and state agencies.

Air Tahoma Convair Cargo Crash near Cincinnati/Northern Kentucky Airport (1 fatality)

Coordinated with the local coroner regarding the autopsy of the First Officer. Also assisted in obtaining medical information on the surviving pilot.

Pinnacle Airlines Crash, Jefferson City, Missouri (2 fatalities)

Assisted with on scene agency coordination with local, state and federal officials. Assisted five families who were displaced by the accident. Returned two weeks later for crew family site visit. Assisted air carrier and local medical examiner in obtaining positive identifications in a timely manner.

Corporate Airlines Flight 5966 Crash, Kirksville, Missouri (13 fatalities; 2 survivors)

On scene agency coordination with the investigator-in-charge, FBI, and state and local law enforcement agencies. Coordinated the Family Assistance Center activities. Facilitated seven family briefings on site via the MCI Telephone Conference Bridge. Coordinated site visit for the families. Coordinated response of Disaster Mortuary Response Team, Region 7 (DMORT 7) with 30 personnel in support of the local coroner. DMORT team provided victim identification and cause and manner of death documentation. Nine victims were identified on-site; four were identified in the following weeks using DNA.

Beech King Accident, Martinsville, Virginia (10 fatalities)

Assisted the NTSB investigator-in-charge in coordinating the local law enforcement agencies in securing the accident site and transporting family members for an accident site visit.

Overtaken Motorcoach, Turrell, Arkansas (14 fatalities; 16 injured)

First on-scene investigator to integrate operations with state and local law enforcement. Assisted with proper removal of bus for investigators who arrived later. Briefed media shortly after arrival.

Tanker-truck Accident, Elkridge, Maryland (4 fatalities)

Conducted interviews of the responding public safety agencies for Office of Highway Safety. Completed full survival factors/emergency response report.

Capsized Water Taxi, Baltimore, Maryland (5 fatalities)

Coordinated interviews with survivors of the accident. Arranged crisis mental health for survivors who requested it. Located security video that captured the whole event, turned it over to the investigator-in-charge. Assisted the incident commander of the Baltimore City Fire Department by serving as NTSB representative at the recovery command post.

NTSB Academy Courses

TDA provides comprehensive courses for professionals who support families of major transportation accident victims following a tragedy. The hands-on instruction provides participants with an operational know-how that enables them to respond to transportation disasters with confidence. These courses bring together leading experts in the field and cover a wide range of topics including initial accident notification, grief and trauma, forensic procedures, multi-cultural memorial services, and effective family briefings.

The *Family Assistance During Transportation Disasters* course brings together leaders from many transportation disciplines to share knowledge and enhance family assistance operations following transportation disasters. NTSB transportation disaster assistance specialists, grief and trauma specialists, federal transportation officials, and other professionals present a course focused on meeting both the immediate and long-term needs of family members affected by transportation disasters. Topics include:

- federal and commercial carrier partnerships;
- accident notification and NTSB family assistance response;
- on-scene accident operations;
- family assistance operations;
- family briefings;
- traumatic grief and mourning; and
- forensic recovery and identification operations.

This course was presented March and October 2004 at the NTSB Academy. More than 130 transportation professionals, from 12 countries, representing domestic and international air carriers, airport authorities, several government agencies and private organizations, and airport authorities attended the two courses.

Transportation Disaster Response: A Course for Law Enforcement Officers enhances community readiness for a major aviation or other transportation accidents. NTSB disaster response specialists and accident investigators, federal and state law enforcement officials, and other professionals present a variety of disaster response topics. Law enforcement officials leave this course with new knowledge gained from other communities that have responded to major transportation disasters, and a confident skill set enabling them to prepare their own resources in advance.

Transportation Disaster Response: A Course for Emergency Responders was presented August 2004 at the NTSB Academy. NTSB transportation disaster assistance specialists, grief and trauma specialists, federal transportation officials, and other professionals present a course focused on meeting both the immediate and long-term needs of airport first responders affected by transportation disasters. Topics included:

- integrating ICS and investigative processes during a transportation disaster;
- maximizing resources in site security and support staffing;
- responding to media inquires and managing press at the scene;
- communicating with the local community and families of the victims;
- providing assistance to family members;
- forensic aspects of recovery and identification; and
- long-term issues facing the affected community following a major disaster.

Upon completion of this course participants are able to:

- improve their organization's on-scene coordination and communication;
- manage limited resources more effectively;
- more effectively manage the operational challenges during a major accident;
- address the issues that a major disaster can have on an organization's staff and local community;
- interact more knowledgeably with federal officials at the accident site; and
- avoid pitfalls and mistakes unique to major transportation accidents.

Partnerships With Other Agencies

The NTSB and the Office of Transportation Disaster Assistance share memoranda of understanding with several other federal agencies, including the American Red Cross, the Department of Health and Human Services, the Department of Defense, the Department of State, the Department of Justice, the Federal Emergency Management Agency, and the FBI. Together, these agencies often collaborate to support both the investigative and family assistance efforts at major accidents.

Member Profiles



ELLEN ENGLEMAN CONNERS CHAIRMAN

Ellen Engleman Conners serves as Chairman and Chief Executive Officer of the National Transportation Safety Board (NTSB) and also serves as one of five presidentially appointed members of the Board. An independent Federal agency, the NTSB is charged by Congress with investigating over 2,000 accidents every year involving every US civil aviation accident and significant accidents in rail, highway, marine and pipeline and issuing safety recommendations.

In this capacity, Engleman Conners:

- Has focused on improving the performance and results of the NTSB by reducing costs and improving financial planning which resulted the agency's clean audit for their first financial review; improving investment in human capital via development of a long-term strategic plan of critical skills and positions needed; instituting E-Gov measures including full webcast of all Board sunshine meetings; "cleaning up the record" through her SWAT efforts (Safety With A Team) resulting in the lowest number of open safety recommendations since 1975.
- Serves as official spokesperson for the agency and was the on-scene spokesman for the NTSB's investigation of the Staten Island ferry and the Baltimore water taxi accidents; public hearing of airline crash in Charlotte, North Carolina; Santa Monica, California elderly driver crash into an open air market; and the catastrophic release of anhydrous ammonia from rail tankers in Minot, North Dakota.
- Provides Congressional testimony for the Senate Commerce Committee, the House Transportation and Infrastructure Committee, the House Subcommittee on Aviation, the Senate and House Appropriation Committees and the House Resources Committee.
- Keynote speaker for Airline Pilots Association, Hudson Institute Board of Directors annual meeting, International Society of Air Safety Investigators, Columbia Club Harrison Award, Flight Safety Foundation, and the American Trucking Association, among others.

Awards:

- U.S. Coast Guard Distinguished Public Service Award, the highest non-life-saving medal, for her work in leading the transition of the USCG from the Department of Transportation to the Department of Homeland Security
- Secretary of Transportation 9/11 medal for her leadership of the Crisis Management Center
- Aviation Week 2003 Laurel for her SWAT (Safety With a Team) program to resolve open safety recommendations issued by the NTSB

Education: Master in Public Administration from the Kennedy School of Government at Harvard University and a J.D. and B.A. from Indiana University. She's admitted to the Indiana Bar, the Federal Court system, and has APR accreditation from the Public Relations Society of America.

Navy Career: She is an officer in the U.S. Navy Reserve and is currently assigned to (CHINFO) Chief of Information at the Pentagon.

Previous Experience:

- Administrator of the DOT's RSPA responsible for the Office of Pipeline Safety, the Office of Hazardous Material Safety, Crisis Management Center, the Volpe Transportation Center, Transportation Research Institute.
- Transportation Security Administration's representative to the initial transition planning team for the proposed Department of Homeland Security.
- Led DOT delegation to E.U. Ministers of Transport Meeting in Romania, the Global Disaster Information Network Conference in Rome and CRAF program at NATO.
- President and CEO, Electricore, Inc. a research and development consortium for advanced transportation and energy technologies.
- Co-founder of Vitamin Angel Alliance, international medical relief for women and children.

She serves a five-year term as Member, which expires on December 31, 2007. Her two-year term as Chairman, which required separate nomination by the President and confirmation by the Senate, began March 24, 2003.



MARK V. ROSENKER VICE CHAIRMAN

Mark V. Rosenker was designated by President George W. Bush as Vice Chairman of the National Transportation Safety Board on April 3, 2003. He was sworn in as a Member of the Board on March 24, 2003, after Senate confirmation.

Beginning January 20, 2001 until the announcement of his nomination to the Board, Mr. Rosenker served as Deputy Assistant to the President and Director of the White House Military Office. In this capacity, he had responsibility for policies, personnel and plans that involve Department of Defense assets in direct support of the President. He later

held a temporary assignment at the Transportation Security Administration, where he advised in the roll out of the Federal screener program.

Prior to his White House appointment, Mr. Rosenker was Managing Director of the Washington, DC office for the United Network for Organ Sharing (UNOS), overseeing the development, implementation and management of a national public information program dealing with all facets of organ transplantation in the U.S. Before joining UNOS, Mr. Rosenker served 23 years as Vice President, Public Affairs for the Electronic Industries Alliance.

Mr. Rosenker's interest and experience in transportation safety dates back more than three decades to his time at a major national public affairs organization. His clients there included the American Safety Belt Council, the Motorcycle Safety Foundation, and the Safety Helmet Council of America. He later served as Director of Communications for the American Moped/Motorized Bicycle Association.

Mr. Rosenker's professional experience also includes service in the federal government at the Department of Interior, the Federal Trade Commission and the Commodity Futures Trading Commission. In 1990, he was appointed by President Bush a member of the American Battle Monuments Commission (ABMC). After serving four years, Mr. Rosenker received the Commission's highest honor, the ABMC Meritorious Service Medal.

A Major General in the Air Force Reserve, General Rosenker entered the Air Force in 1969 through the University of Maryland ROTC program. He is a graduate of the Air Command and Staff College and the Air War College. His current reserve assignment at the Pentagon is Mobilization Assistant to the Commander of the Air Force Reserve Command.

Vice Chairman Rosenker was the Board Member on scene for the Safety Board's investigation into the April 2004 derailment of Amtrak's *City of New Orleans* near Flora, Mississippi. He also joined the NTSB's go team near Garibaldi, Oregon, for the June 2003 capsizing of the charter fishing vessel *Taki-Too*.

Mr. Rosenker's two-year term as Vice Chairman expires on April 3, 2005. His term as a Board Member expires on December 31, 2005.



CAROL J. CARMODY MEMBER

Carol J. Carmody was sworn in on June 5, 2000, as the 30th member of the Safety Board, and appointed Vice Chairman by President Clinton on January 19, 2001. Effective September 16, 2002, Ms. Carmody began serving as the Acting Chairman; she also served in that capacity from January 22 through September 23, 2001.

Ms. Carmody brings to the job more than 20 years experience with the aviation community. Before coming to the NTSB, she worked as an independent consultant focusing on international and environmental issues.

She served as the U.S. Representative to the Council of the ICAO in Montreal from 1994 to 1999. Early in her term, she was instrumental in persuading ICAO to start a safety oversight program to assess the compliance of countries with ICAO standards. This was a first at ICAO, and the results will improve safety for the traveling public around the world.

Ms. Carmody spent from 1988 to 1994 as a professional aviation staff member of the Senate Commerce Committee. She worked on legislation to mandate inspections for aging aircraft, to improve pilot training, to phase out Stage 2 aircraft, to authorize passenger facility charges, and to reform the FAA -- particularly in areas of finance and procurement.

Up until 1988 when she joined the Senate Committee, she had worked for 11 years at the FAA in jobs of increasing responsibility, leading to her appointment in 1985 as Deputy Director of Congressional Services in the Office of the Administrator. Her FAA career began in the Budget Office in 1977.

Since her appointment as Board Member, Ms. Carmody has been on-scene member at several accidents, including the aircraft accidents which killed Minnesota Senator Paul Wellstone in October 2002 and Missouri Governor Mel Carnahan in October 2000; the Amtrak derailment in Kensington, Maryland in July 2002; and the March 2001 Aspen, Colorado airline crash which killed 18 people.

In July 2002, Ms. Carmody also chaired a public hearing to examine safety issues surrounding the January 18, 2002, Minot, North Dakota, derailment and subsequent release of over 200,000 gallons of anhydrous ammonia. In October 2002, Ms. Carmody chaired an en banc hearing into the November 2001 crash of American Airlines Flight 587; all Board Members participated in this hearing, with Acting Chairman Carmody presiding.

Her career includes managing a firm that administered Taft-Hartley pension plans; owning and managing an employment agency, serving at the Central Intelligence Agency; and working at Braniff Airlines. Ms. Carmody has a Master's in Public Administration from American University in Washington, D.C. and a Bachelor of Arts from the University of Oklahoma.

Ms. Carmody's term as Member expired on December 31, 2004. Her term as Vice Chairman expired in January 2003.



RICHARD HEALING MEMBER

Richard F. Healing was sworn in as a Member of the National Transportation Safety Board on March 28, 2003.

Before joining the Safety Board, Mr. Healing had been Director of Transportation Safety and Security for the Battelle Memorial Institute since March 2002. Based in Washington, DC, he had primary responsibility for Battelle's relationship with the Federal Aviation Administration.

Prior to this, Mr. Healing had served since 1985 as Director, Safety and Survivability, for the Department of the Navy. During his Navy civilian career, his work focused on aviation safety and emphasized benefits from sharing military safety information with other aviation community participants, especially commercial aviation.

In 2001, Mr. Healing was presented the Navy's highest civilian award—the Distinguished Civilian Service Medal. He also was recognized with the SAFE International "General Spruance Award" for safety education achievement, and an Aviation Week "Laurel" for bringing new awareness to the importance of wire health and condition monitoring technology in aviation. Other awards include the Navy Superior Public Service Medal for creating the Navy's Safety Non-Developmental Items program, and the Defense Superior Service Medal for active military service during Desert Storm and Desert Shield.

Before coming to Washington in 1983, Mr. Healing was President and CEO of an engineering, construction and contracting services firm in Connecticut. He also was Executive Vice President and Managing Director of Fairfield Precision Industries, a manufacturer of replacement parts for the military.

A licensed Professional Engineer since 1974, Mr. Healing attended the U.S. Coast Guard Academy and graduated from Worcester Polytechnic Institute. He pursued graduate studies at the University of Bridgeport, Bridgeport Engineering Institute, Rensselaer Polytechnic Institute, Harvard University, and Georgetown University. He graduated from the Naval War College in 1990, and was selected to participate on the President's Commission on Executive Exchange. In 1991, he was a Senior Executive Fellow at Harvard University.

Mr. Healing served 6½ years active duty in the U.S. Coast Guard. After more than 29 years and four commands, he retired from the Coast Guard Reserve as a Captain. Mr. Healing's term as Board Member expires on December 31, 2006.



DEBORAH A. P. HERSMAN MEMBER

Deborah A. P. Hersman was sworn in on June 21, 2004 as the 35th Member of the National Transportation Safety Board.

Before joining the Board, Ms. Hersman was a senior professional staff member of the U.S. Senate's Committee on Commerce, Science and Transportation from 1999 to 2004. Prior to that, she served as Staff Director and Senior Legislative Aide to Congressman Bob Wise of West Virginia from 1992 to 1999.

In her Senate position, Ms. Hersman was responsible for the legislative agenda, oversight and policy initiatives for surface transportation issues, including both the economic and safety regulation of passenger and freight railroads; truck and bus safety; pipeline safety; and hazardous materials transportation safety. She was also involved with aviation and maritime issues. Following the attacks of September 11, she worked extensively on transportation security issues and the creation of the Transportation Security Administration.

She was a key staff member involved in the passage of the Motor Carrier Safety Improvement Act of 1999, which created a new truck and bus safety administration within the Department of Transportation. She also worked extensively to negotiate the passage of the Pipeline Safety Improvement Act of 2002; the Transportation Equity Act of the 21st Century; the Amtrak Reform and Accountability Act and numerous transportation safety and security measures.

Ms. Hersman earned Bachelor of Arts degrees in Political Science and International Studies from Virginia Tech in Blacksburg, Virginia in 1992, and a Master of Science degree in Conflict Analysis and Resolution from George Mason University in Fairfax, Virginia in 1999.

Member Hersman's term expires December 31, 2008.



JOHN J. GOGLIA FORMER MEMBER

John Goglia served as a Member of the Safety Board from August 1995 until June 2004. With more than 30 years experience in the aviation industry, he was the first Board Member to hold an FAA aircraft mechanic's certificate.

As a Board Member, Mr. Goglia distinguished himself in numerous areas of transportation safety. In particular, he was instrumental in raising awareness of airport safety issues, including the importance of airport crash fire and rescue operations and the dangers of wildlife at airports. He hosted a joint government-industry conference to highlight airport safety trends and facilitate improvements.

He played a key role in focusing international attention on the increasing significance of aircraft maintenance in aviation accidents. He pressed successfully for greater integration of civilian and military safety information, becoming a featured speaker at national aviation symposiums attended by military leaders and major defense contractors. He was also a leading proponent of airplane child safety seats.

Mr. Goglia was an outspoken advocate for greater compassion and sensitivity in dealing with surviving family members of victims of transportation accidents. He worked diligently to ensure that families receive timely and forthright information following transportation accidents. In recognition of his dedication to helping grieving families, the National Air Disaster Alliance awarded him its 2001 Aviation Safety Award.

Mr. Goglia participated in numerous air, rail and bus accident investigations. He chaired the Board's public hearing on the ValuJet crash into the Florida Everglades. He was the on-scene Member at the Fox River Grove, Illinois grade-crossing accident that killed seven high school students in a school bus, the Silver Spring, Maryland commuter rail collision and the Bourbonnais, Illinois fatal train crash involving Amtrak's *City of New Orleans*.

Prior to becoming a Board Member, Mr. Goglia held numerous positions in the airline industry and was involved for more than 20 years as a union flight safety representative on accident investigation teams. For 12 years, he operated his own aircraft service company. Mr. Goglia also served as the Governor's appointee to the Boston Area Second Airport Site Selection Board and the Massachusetts Workers Compensation Review Commission.

Long a champion of aviation education, Mr. Goglia served as Chair and a founding member of the National Coalition for Aviation Education, an aviation industry organization that advances education among America's youth and aviation workforce. He was an original member of the steering committee to establish the International Society of Aviation Maintenance Professionals, a society dedicated to advancing safety and professionalism throughout the aviation maintenance industry.

Mr. Goglia's term expired on December 31, 2003. He left the Board on June 18, 2004.