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Safety Report

Transportation Safety Databases

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Abstract: The National Transportation Safety Board relies on many external databases when performing accident investigations, safety studies, and special investigations. Most of these databases are sponsored and operated by the modal administrations of the U.S. Department of Transportation (DOT). The Board's ability to study important safety issues is often affected by poor data quality. The Board studied transportation safety databases to evaluate data quality issues and to encourage improvements in this area. The effort had four specific objectives: (a) highlight the value and potential uses of transportation safety data; (b) describe some accident and incident databases commonly used by the Board; (c) summarize past Board recommendations involving transportation data; and (d) evaluate Bureau of Transportation Statistics (BTS) efforts to establish data quality standards, identify information gaps, and ensure compatibility among the safety data systems maintained by the DOT.

The Safety Board's past recommendations indicate that exposure data are not adequately detailed to support the analysis of risk factors for transportation accidents, reducing the ability of the Federal government to understand safety problems and target safety resources. BTS efforts to identify information gaps and to establish data quality standards are an important first step toward improving data quality. As a result of this finding, the Board issued a recommendation to the BTS to develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States.

Contents

Acronyms and Abbreviations

AIDS	Accident/Incident Data System
ASRS	Aviation Safety Reporting System
ATC	air traffic control
ATS	American Travel Survey
BARD	Boating Accident Report Database
BTS	Bureau of Transportation Statistics
CAB	Civil Aeronautics Board
CAMI	Civil Aerospace Medical Institute
CDC	U.S. Centers for Disease Control
CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
FAA	Federal Aviation Administration
FAA-AFS	Federal Aviation Administration Flight Standards Service
FAR	*Federal Aviation Regulations*
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FR	*Federal Register*
FRA-RRS	Federal Railroad Administration's Office of Safety Analysis
FTA	Federal Transit Administration
GPRA	Government Performance and Results Act of 1993
GSA	General Services Administration
GXIR	Highway–Rail Grade Crossing Incident Report Database
HMIS	Hazardous Materials Information System
ISTEA	Intermodal Surface Transportation Efficiency Act
ITDB	Intermodal Transportation Database
MCMIS	Motor Carrier Management Information System
MINMOD	Marine Investigations Module
MISLE	Marine Information for Safety and Law Enforcement
MSIS	Marine Safety Information System
MTB	Materials Transportation Bureau
NASA	National Aeronautics and Space Administration

NASDAC	National Aviation Safety Data Analysis Center
NASS/CDS	National Accident Sampling System/Crashworthiness Data System
NASS/GES	National Accident Sampling System/General Estimates System
NCIPC	National Center for Injury Prevention and Control
NHTS	National Household Travel Survey
NHTSA	National Highway Traffic Safety Administration
NMAC	near-midair collision
NMACS	Near Midair Collision System
NPRM	notice of proposed rulemaking
NPTS	Nationwide Personal Transportation Survey
NRC	National Research Council
NTAD	National Transportation Atlas Database
NTD	National Transit Database
NTL	National Transportation Library
NTSB	National Transportation Safety Board
OE	operational error
PFD	personal flotation device
RAIR	Rail Equipment Accident/Incident Report Database
RSPA	Research and Special Programs Administration
RSPA-OHM	Research and Special Programs Administration's Office of Hazardous Materials Safety
RSPA-OPS	Office of Pipeline Safety
SAMIS	Safety Management Information Statistics Database
SDR	service difficulty report
TEA-21	Transportation Equity Act for the 21st Century
TWA	Trans World Airlines
USC	*United States Code*
USCG	U.S. Coast Guard
USCG-MSEP	U.S. Coast Guard's Office of Marine Safety and Environmental Protection
UNISHIP	Unified Shippers Enforcement Data System

Executive Summary

The National Transportation Safety Board relies on many external databases when performing accident investigations, safety studies, and special investigations. Most of these databases are sponsored and operated by the modal administrations of the U.S. Department of Transportation (DOT). The Board's ability to study important safety issues is often affected by poor data quality. The Board studied transportation safety databases to evaluate data quality issues and to encourage improvements in this area. The effort had four specific objectives: (a) highlight the value and potential uses of transportation safety data; (b) describe some accident and incident databases commonly used by the Board; (c) summarize past Board recommendations involving transportation data; and (d) evaluate Bureau of Transportation Statistics (BTS) efforts to establish data quality standards, identify information gaps, and ensure compatibility among the safety data systems maintained by the DOT.

The Safety Board's past recommendations indicate that exposure data are not adequately detailed to support the analysis of risk factors for transportation accidents, reducing the ability of the Federal government to understand safety problems and target safety resources. BTS efforts to identify information gaps and to establish data quality standards are an important first step toward improving data quality. As a result of this finding, the Board issued a recommendation to the BTS to develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States.

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Chapter 1

Uses of Transportation Safety Data

Transportation safety databases are used by Federal, State, and local government organizations to monitor transportation accidents and to develop programs for improving safety. The National Transportation Safety Board (NTSB) relies on many of these external databases when performing accident investigations, safety studies, and special investigations. The most recent directory of the U.S. Department of Transportation (DOT) data sources, published in 1996 by the Bureau of Transportation Statistics (BTS), lists 173 different databases and data collection forms.[1] Among these data sources, the DOT modal administrations maintain over 40 major databases containing accident, incident, and related transportation activity data.[2] A recent data quality review, requested by Congress and performed by the BTS, concluded that improvements to existing DOT data systems were needed.[3]

The Safety Board initiated this safety study on transportation safety databases to evaluate data quality issues and to encourage improvements in this area. The study has the following four specific objectives:

1. highlight the value and potential uses of transportation safety data;
2. describe the primary accident and incident databases used by the Board;
3. summarize past Board recommendations citing deficiencies in existing data; and
4. evaluate government efforts to establish data quality standards, identify information gaps, and ensure compatibility among DOT safety data systems.

Transportation safety data are valuable because they inform us about the risk of harmful outcomes associated with transportation operations. Many different approaches can be applied to the analysis and management of risk. The U.S. Centers for Disease Control (CDC) National Center for Injury Prevention and Control (NCIPC) advocates a data-driven approach that is quite relevant to the field of transportation safety.[4] This

[1] Bureau of Transportation Statistics, *Directory of Transportation Data Sources* (Washington, DC: U.S. Department of Transportation, BTS, 1996).

[2] Bureau of Transportation Statistics, *Safety Data Action Plan*, (Washington, DC: U.S. Department of Transportation, BTS, 2000).

[3] Bureau of Transportation Statistics, *Transportation Statistics Beyond ISTEA: Critical Gaps and Strategic Responses* (Washington, D.C: U.S. Department of Transportation, BTS, 1998).

[4] National Center for Injury Prevention and Control, "Research Agenda" (Washington, DC: Centers for Disease Control, U.S. Department of Health and Human Services, June 2002).

approach is grounded in the science of epidemiology[5] and consists of three stages: surveillance, identification of risk factors, and development and evaluation of prevention strategies.

Surveillance

The principal function of most transportation safety databases maintained by the Federal government is to collect information that can be used for surveillance. Surveillance is the recording and cataloguing of harmful events that result from transportation operations. These harmful events can include property damage, human injury, or pollution. In a transportation context, surveillance data are used for trend analysis and for studying the relation of harmful events to basic characteristics of people, vehicles, and environments. Surveillance data are used to answer questions such as:

- What kinds of harmful events result from transportation activity?
- What proportion of transportation operations result in a harmful outcome?
- What kinds of vehicles are involved?
- What kinds of people are involved?
- How, when, and where do these harmful events occur?

Most Federal transportation safety surveillance databases have evolved independently within the different Federal agencies responsible for overseeing safety in different modes of travel. As a result, the databases have different reporting requirements, data coding conventions, and levels of sophistication.[6] Most "accident" or "incident" databases record events resulting in injury, property damage, or pollution. In some modes, however, surveillance databases have also been developed to monitor the occurrence of near-miss events. Near-miss databases are designed to record and catalogue occurrences in which a harmful event nearly occurred and they are particularly useful for analyzing safety issues associated with rare events (for example, commercial jet accidents).

Identification of Risk Factors

Monitoring the incidence and severity of transportation accidents and injuries does not, by itself, lead to the improvement of transportation safety. Safety improvement results

[5] "Epidemiology is the field of public health and medicine that studies the incidence, distribution, and etiology of disease in human populations. The purpose of epidemiology is to better understand disease causation and to prevent disease in groups of individuals." (*Reference Manual on Scientific Evidence* [Washington, DC: Federal Judicial Center, 2000] 333.)

[6] The Safety Board maintains the Federal government's database of aviation accidents. The DOT maintains aviation incident and activity databases and transportation safety databases in the nonaviation modes.

from influencing the factors that affect the likelihood of harmful outcomes. Accident investigations document the circumstances of individual accidents, often pointing out one or more factors that are seen as causal to the event of interest. For example, an aircraft structure may have failed, a driver may have fallen asleep, a recreational boater may have been going too fast, or a passenger may not have worn a life jacket. Sometimes an accident investigation pursues the notion of cause back to a company's operating procedures or to a weakness in existing safety regulations. However, some factors influencing accident likelihood can be difficult to observe in the context of a single accident. These relationships emerge only when the characteristics of many accidents are considered together and compared with the characteristics of similar nonaccident operations. Understanding these patterns depends on the identification and objective analysis of risk factors in groups of transportation accidents.

Risk factors are characteristics of people, vehicles, or environments that are related to the increased incidence of transportation crashes, injuries, or other harmful outcomes.[7] Statistical techniques can be used to analyze the strength of the relation between specific risk factors and harmful outcomes. Because many different risk factors can affect the likelihood of an accident, a common framework can be quite useful for identifying potential risk factors and organizing them for analysis. Some injury epidemiologists use a schematic approach to the identification of risk factors called the Haddon Matrix.[8] The Haddon Matrix organizes risk factors according to a three-phase conceptualization of the event sequence (pre-crash, crash, post-crash) as it relates to people, vehicles, and environments (table 1–1).[9] This approach is advantageous because it promotes consideration of a wide array of factors that can influence the likelihood of a harmful outcome in a format that is easy to interpret. The Haddon Matrix has been credited with broadening the focus of highway safety efforts from a preoccupation with accident prevention to an increased emphasis on the crashworthiness of vehicles and the quality of emergency medical care.[10]

[7] Pipeline characteristics, rather than vehicle characteristics, are of interest in the pipeline mode.

[8] "Injury epidemiology is a young scientific field with a theoretical basis within the wider framework of epidemiology. This new discipline has focused on the development of epidemiological tools to identify problems, define their extent, and determine causative factors that are amenable to intervention. An equally important objective has been to develop evaluation methods to determine the effectiveness of countermeasures." (National Research Council, Commission on Life Sciences, *Injury in America: A Continuing Public Health Problem* [Washington, DC: National Academy Press, 1985] 25.)

[9] William Haddon, a public health physician who served as the first Administrator of the National Highway Traffic Safety Administration (NHTSA), developed this model.

[10] Allan F. Williams, "The Haddon Matrix: Its Contribution to Injury Prevention and Control," *Proceedings, 3rd National Conference on Injury Prevention and Control* (Queensland, Australia: University of Queensland, 2000) 15-16.

Table 1–1. The Haddon matrix, with example risk factors from the highway mode.

	Risk factor		
Phase	**Human/Host**	**Agent/Vehicle**	**Physical environment**
Pre-crash	Driver intoxication	Poor visibility from inside the vehicle	Narrow road, poor lighting, and sharp curves
Crash	Lack of restraint use	Reaction of vehicle structures to impact forces	Hard structures adjacent to the roadway
Post-crash	Hemorrhaging	High difficulty and cost to repair vehicle	Remote area

Source: Adapted from information provided in W. Haddon, Jr., "Approaching the Reduction of Road Losses—Replacing Guesswork With Logic, Specificity and Scientifically Determined Fact," Paper presented at the National Road Safety Symposium, Canberra, Australia, 1972.

Development and Evaluation of Prevention Strategies

Prevention strategies vary considerably from mode to mode, because many of the factors affecting accident likelihood are mode specific. In general, prevention strategies seek either to minimize the likelihood of a particular kind of harmful event (for example, a crash), or to minimize its impact (in terms of property damage, injury, or environmental pollution). For example, the *Federal Aviation Regulations* (FAR) prohibit pilots from operating aircraft under visual flight rules when weather conditions cause flight visibility to decrease below certain levels (Title 14 *Code of Federal Regulations* (CFR) Part 91.155). Pilots who wish to fly under such conditions are required to receive specialized training and to fly under instrument flight rules. This strategy aims to reduce the likelihood of crashes resulting from pilot spatial disorientation. The FARs also prohibit pilots from operating aircraft without an approved automatic type emergency locator transmitter, which can be used to locate an aircraft in the event of a crash (14 CFR 91.207). This strategy aims to minimize the consequences of injuries suffered by aircraft occupants by reducing the time it takes for rescue crews to locate a downed aircraft. Safety data can be useful for evaluating the effectiveness of existing preventative strategies such as these. However, data must be relevant, accurate, and detailed if they are to be used for this purpose.

To summarize, a scientific approach to controlling the harmful outcomes associated with transportation operations depends on access to relevant, accurate, detailed data. These data should foster a broad understanding of the losses and consequences stemming from transportation operations, the risk factors related to these outcomes, and the effectiveness of preventive measures. When such data are collected and made available for analysis, safety resources can be more effectively targeted, and the government's ability to ensure the safety of the traveling public is enhanced.

Chapter 2

Overview of Transportation Safety Databases

The BTS has identified many transportation safety databases in its various printed and on-line publications. Some of the major safety databases identified by the BTS are listed in appendix A. This chapter discusses the primary accident and incident databases used by the Safety Board (table 2–1).

Table 2–1. Databases reviewed for the study.

Mode of transportation and database name	Operating agency
Aviation:	
Aviation Accident Database	NTSB
Accident/Incident Data System (AIDS)	FAA
Aviation Safety Reporting System (ASRS)	FAA/NASA
Highway:	
Fatality Analysis Reporting System (FARS)	NHTSA
National Accident Sampling System/General Estimates System (NASS/GES)	NHTSA
National Accident Sampling System/Crashworthiness Data System (NASS/CDS)	NHTSA
Motor Carrier Management Information System (MCMIS)	FMCSA
Marine:	
Boating Accident Report Database (BARD)	USCG
Marine Information for Safety and Law Enforcement (MISLE)	USCG
Pipeline:	
Hazardous Liquid Pipelines Accident Database	RSPA
Natural Gas Gathering and Transmission Systems Incident Database	RSPA
Natural Gas Distribution Systems Incident Database	RSPA
Rail:	
Rail Equipment Accident/Incident Report (RAIR) Database	FRA
Highway–Rail Grade Crossing Incident Report (GXIR) Database	FRA
Railroad Injury and Illness Summary Database	FRA
Intermodal:	
Safety Management Information Statistics (SAMIS) Database	FTA
Hazardous Materials Information System (HMIS) Incident Database	RSPA

FAA = Federal Aviation Administration; FMCSA = Federal Motor Carrier Safety Administration; FRA = Federal Railroad Administration; FTA = Federal Transit Administration; NASA = National Aeronautics and Space Administration; NHTSA = National Highway Traffic Safety Administration; NTSB = National Transportation Safety Board; RSPA = Research and Special Programs Administration; USCG = United States Coast Guard.

Information describing each database was obtained from a variety of printed sources.[11] In addition, the managers of each database were interviewed to obtain additional information and to learn about scheduled improvements to each system. The following discussions identify the agency responsible for day-to-day operations, general nature of information stored in each database, reporting procedures, year established, annual records added, frequency of update, and means of dissemination for selected transportation databases.

Aviation Databases

Aviation Accident Database

The National Transportation Safety Board maintains the Aviation Accident Database, which contains the probable cause and other data describing (a) all civil aviation accidents occurring in the United States and its territories; (b) government public use accidents occurring under certain conditions; (c) accidents occurring in foreign states involving civil aircraft of U.S. registry or manufacture or a U.S.-based operator; and (d) some nonaccident events (aviation incidents) that could affect the safety of U.S. aircraft operations (event occurrences).[12] Data entered into the database come directly from Safety Board investigation records. Board investigators enter accident/incident data using an automated data entry system. Newly entered information is uploaded daily from regional and field offices via the Board's wide area computer network. Established in 1962, the database underwent major revisions in 1981 and 1982. On January 1, 2001, the database was revised again and updated to a relational database format. Additionally, a new software program was developed to facilitate data entry. The current version of the database describes accidents that occurred between 1982 and the present. Approximately 2,000 new accident records are added to the database each year. The Board publishes annual statistical summaries of the data, for both commercial and general aviation, and makes these summaries available via the Internet and other sources. Narrative reports can be found on the Board's Web site, where an on-line search tool is provided (http://www.ntsb.gov).

FAA Incident Data System

The Federal Aviation Administration's (FAA) Flight Standards Service (FAA-AFS) maintains the FAA Accident/Incident Data System (AIDS). The FAA AIDS database contains incidents only, using the Safety Board's Aviation Accident Database as the primary source for accident information. Because of its broad reporting criteria, the AIDS database contains many different kinds of incidents, ranging from airport events involving collisions between aircraft and catering trucks to the loss of a cabin door in

[11] These included (a) Bureau of Transportation Statistics, *Directory of Transportation Data Sources*, (Washington, DC: U.S. Department of Transportation, BTS, 1996); and (b) *Source and Accuracy Statements* maintained by the Bureau of Transportation Statistics.

[12] Title 49 CFR 831.2 contains more detailed criteria for reporting aviation accidents and incidents.

flight. The database does not contain reports of near-midair collisions, which are handled through separate reporting procedures and are contained in a separate database called the Near Midair Collision System (NMACS). Operators, airport personnel, and air traffic controllers inform FAA inspectors of aviation incidents. FAA inspectors investigate the incidents and submit data on standardized forms (FAA form 8020-5). The incident data system has been in use since 1974, although commercial aviation incidents were not included until 1978. Thousands of incidents are entered into the AIDS database each year. The FAA currently does not publish an annual statistical summary of AIDS data. The FAA's Office of System Safety does, however, provide public Internet access to abbreviated incident reports with an on-line search tool for locating incident records on its Web site. The FAA's publicly accessible data clearinghouse at its headquarters office, the National Aviation Safety Data Analysis Center (NASDAC), offers more advanced search capability and data access.

Aviation Safety Reporting System

The Aviation Safety Reporting System (ASRS) was established by a memorandum of agreement between the FAA and the National Aeronautics and Space Administration (NASA). The FAA funds the database, NASA Ames Research Center manages it, and Battelle Corporation's ASRS division handles the processing and analysis of reports. The ASRS is a confidential reporting system containing operator-submitted narratives describing events or conditions related to the safety of flight. Individuals who submit reports are granted limited immunity from enforcement action on the part of the FAA. The system is designed primarily as an early warning system for the FAA and for participants in the National Airspace System. Pilots, air traffic controllers, flight attendants, mechanics, and ground personnel are encouraged to submit reports after witnessing any event during which they feel aviation safety was compromised. This information is used to detect and correct unsafe conditions. However, because the reports are mostly narrative, statistical analysis is difficult. Because of resource limitations, ASRS staff store only a fraction of the 30,000 reports submitted each year. A representative sample of reports, approximately 10 percent of the total, is entered in the database. Analysts examine the remaining reports and retain any they believe describe significant issues. These reports are coded differently from the randomly selected cases, so the two types of cases can be distinguished. In total, about one-third of ASRS submissions are retained. Created in 1975, ASRS data are available for 1983 to the present. NASA publishes a monthly newsletter, *ASRS Callback*, which highlights recent reports addressing safety issues of general importance. The FAA's Office of System Safety provides the capability to search ASRS database records on line. Neither the FAA nor NASA publish an annual statistical summary of ASRS reports.

Highway Databases

Fatality Analysis Reporting System

The National Highway Traffic Safety Administration's (NHTSA) National Center for Statistical Analysis maintains the Fatality Analysis Reporting System (FARS). The FARS contains data describing all fatal accidents occurring on public roads in the United States. Data included in the FARS database are collected by State and local police officers, coroners, emergency medical services, and State motor vehicle administrations. NHTSA funds 125 data collectors employed by the motor vehicle authorities of the States. These collectors obtain data from the sources listed above and encode relevant information using data entry programs developed by NHTSA. During the first half of each calendar year, data describing all fatal accidents that occurred during the previous year are transmitted electronically to NHTSA headquarters. More than a dozen full- and part-time NHTSA employees run automated checks at NHTSA headquarters, looking for errors in the incoming reports, and working to correct any that are found. The FARS was established in 1975. Data describing approximately 40,000 fatal accidents are added to the FARS annually. Official data files are released once each year. NHTSA publishes an annual summary of FARS data,[13] and its Web site provides an on-line search capability.

National Accident Sampling System/ General Estimates System

NHTSA's National Center for Statistical Analysis maintains the National Accident Sampling System/General Estimates System (NASS/GES). The NASS/GES contains an annual sample of police-reported traffic crashes in the United States, which is used to estimate the number of U.S. traffic accidents and their injury outcomes. Unlike the FARS, which only contains data describing fatal accidents, the NASS/GES contains data on both fatal and nonfatal accidents. Data contained in the NASS/GES are gathered using a cluster sampling approach. Each year, about 400 police jurisdictions are selected for visits by NHTSA-contracted data collectors. Data processing contractors code information from police accident reports into an electronic file using NHTSA software. These records are sent to one of NHTSA's regional data centers for quality review and processing. Police jurisdictions are selected using a weighted sampling procedure. Reports within each jurisdiction are selected using a sampling procedure that ensures that important but infrequent kinds of accidents are adequately represented in the sample. Mathematical weights are assigned to each record to reflect the probability of selection so that national estimates can be made.[14] The NASS/GES was created in 1988. More than 50,000 accident records are recorded in the database each year. Official data files are released once each year. NHTSA publishes annual summaries of the records contained in the NASS/GES.

[13] National Highway Traffic Safety Administration, *Traffic Safety Facts* (Washington, DC: Department of Transportation, NHTSA.)

[14] NHTSA's NASS/GES "Analytical User's Manual," 1988–1997.

National Accident Sampling System/ Crashworthiness Data System

NHTSA's National Center for Statistical Analysis also maintains the National Accident Sampling System/Crashworthiness Data System (NASS/CDS). The NASS/CDS was designed to provide detailed information about the crashworthiness of specific models of passenger vehicles and the injuries sustained by their occupants. To qualify for investigation and inclusion in the NASS/CDS, the crash must result in the towing of at least one vehicle from the crash scene. Special crash investigators, contracted by the NHTSA, collect NASS/CDS crash data on a continuous basis from police accident reports, vehicle and on-scene inspections, medical examiner's and coroner's reports, emergency room and hospital records, driver and vehicle occupant interviews, and witness interviews. Over 100 NASS/CDS investigators divided into 24 field research teams conduct in-depth investigations of a sample of police-reported crashes and enter the data by computer. Completed records are reviewed by analysts at NHTSA headquarters, and complete annual data sets are delivered to the John A. Volpe National Transportation Systems Center in Cambridge, Massachusetts. The sampling procedure used to select police jurisdictions is similar to that used for the NASS/GES. However, the report sampling process is designed to ensure adequate representation of accidents within predefined categories. Sampling strata include: (a) type and model year of vehicle, (b) severity of injury, (c) transport of victims to a medical facility, (d) overnight hospitalization, and (e) tow status of the accident vehicles. Mathematical weightings are assigned to each record to reflect the probability of selection so that national estimates can be made based on the sample of accidents contained in the NASS/CDS. Approximately 5,000 police-reported crashes are investigated and included in the NASS/CDS each year. Official data files are released once each year. NHTSA publishes reports summarizing NASS/CDS data every 3 years. An on-line query system is provided through NHTSA's Web site.

Motor Carrier Management Information System

The Federal Motor Carrier Safety Administration's (FMCSA) Analysis Division maintains the Motor Carrier Management Information System (MCMIS), which contains census, crash, inspection, enforcement, and compliance review information. Accidents contained in the MCMIS crash data involve at least one truck or bus. In addition to this requirement, each accident must result in at least one of the following outcomes: (a) a fatality, (b) at least one injury requiring transport to a medical facility, or (c) damage requiring that at least one vehicle be towed from the accident scene. Created in 1989, the MCMIS contains data gathered from police accident reports by State agencies (the agency varies from State to State) which are transferred electronically to the FMCSA for inclusion in the MCMIS. Nearly 100,000 accident records are added to the MCMIS each year. Data summaries from the MCMIS are presented in combination with other information from the NASS/GES and the FARS in the annual *Large Truck Crash Overview* published by the FMCSA. The FMCSA is developing an on-line query system for users of MCMIS data. Anticipated completion date for the query system is September 3, 2002.

Marine Databases

Boating Accident Report Database

The U.S. Coast Guard's (USCG) Office of Boating Safety maintains the Boating Accident Report Database (BARD), which contains data on recreational boating accidents occurring in State waters. Title 33 CFR 173.55 requires that boat owners and operators report accidents involving a death, injury requiring medical care beyond first aid, or more than $500 in property damage to the State boating law administrator's office. State boating law officials determine whether an event meets the criteria for inclusion in the BARD, and the operator reports are sometimes supplemented by findings from State investigations. State boating law offices enter and transmit data records electronically to the Coast Guard using custom-built software. The BARD system was created in 1995, and it superseded a database that contained data on recreational boating accidents that had occurred between 1969 and 1994. Data for roughly 8,000 new accidents are added to the BARD each year. The Coast Guard publishes an annual statistical summary of BARD data.

Marine Information for Safety and Law Enforcement

The Coast Guard's Office of Marine Safety and Environmental Protection (USCG-MSEP) maintains the Marine Information for Safety and Law Enforcement (MISLE) information system. One module of the MISLE, the Marine Casualty and Pollution Database, contains data describing all safety-related investigations involving commercial vessels operating in U.S. territorial waters or U.S.-registered commercial vessels operating elsewhere in the world. Investigations are initiated for events resulting in any of the following: (a) one or more deaths, (b) one or more injuries resulting in substantial impairment of any body part or function, (c) a fire causing property damage exceeding $25,000, (d) an oil spill exceeding 200 barrels, or (e) "any other injuries, casualties, accidents, complaints of unsafe working conditions, fires, pollutions, and incidents the Officer in Charge, Marine Inspection deems necessary to promote the safety of life or property or protect the marine environment."[15] A vessel's "owner, agent, master, operator, or person in charge" is responsible for notifying the Coast Guard when a commercial vessel is involved in a reportable accident or incident. Computerized data, entered by Coast Guard staff, are reviewed by front-line supervisors and then transmitted to the USCG-MSEP for inclusion in the MISLE safety module. Casualty and pollution data are available, in one form or another, from 1975 to the present. The MISLE was implemented in December 2001. Previously, data describing investigations of accidents or incidents involving commercial vessels were stored in the Marine Investigations Module (MINMOD) of the Marine Safety Information System (MSIS). Commercial vessel casualties, injuries, and deaths prior to 1992 can be found in the CASMAIN database. In the year 2000, approximately 17,000 casualty and 8,000 pollution events were added to the MISLE (then MSIS). MISLE data summaries describing oil spills involving commercial vessels are integrated into a number of Coast Guard publications. The Coast Guard does not currently publish annual summaries of commercial marine casualties or vessel losses.

[15] Title 46 CFR Subpart 4.05, "Notice of Marine Casualty and Voyage Records."

Pipeline Databases

Hazardous Liquid Pipelines

The Research and Special Programs Administration's (RSPA) Office of Pipeline Safety (OPS) maintains the Hazardous Liquid Pipelines Accident Report database, which contains data describing accidents involving hazardous liquid pipelines.[16] To be reportable, an event must result in (a) an explosion or fire not intentionally set by the operator, (b) a loss of 5 or more gallons of hazardous liquid or carbon dioxide, excepting some spills under 5 barrels that do not cause water pollution or that result from maintenance activity, (c) death of any person, (d) personal injury necessitating hospitalization, or (e) estimated property damage, including cleanup, recovery, value of lost product, and damage to property exceeding $50,000.[17] Following an accident, pipeline operators are required to submit a report to RSPA (DOT form 7000-1) as soon as practicable, but not more than 30 days after the event. Reports are reviewed for accuracy and completeness by RSPA staff and entered into a database monthly. The database was established in 1970 and was revised in 1986 and 2002. Before 2002, between 80 and 250 new accident records were added to the database annually. In January 2002, RSPA reduced the threshold for reporting hazardous liquid pipeline accidents from 50 barrels to 5 gallons or 5 barrels, depending on the circumstances of the spill.[18] As a result of this change, the total number of hazardous liquid pipeline accidents reported in 2002 will be much higher than the number reported in prior years. RSPA publishes annual tables summarizing hazardous liquid pipeline accidents on the Internet.

Natural Gas Gathering and Transmission Systems Incident Database

RSPA-OPS also maintains the Natural Gas Gathering and Transmission Systems Incident Database, which contains data describing incidents involving natural gas gathering and transmission pipelines.[19] A release of gas from a liquefied natural gas facility is reportable if it results in (a) death or injury requiring in-patient hospitalization, (b) estimated property damage, including cost of gas lost, of $50,000 or more, (c) emergency shutdown of a transmission facility, or (d) an event that is "significant" in the view of the pipeline operator (49 CFR Ch. 1, Section 191.3). Incident data are collected by pipeline operators and submitted directly on RSPA form 7100.2 to RSPA-OPS for database entry. Reports are reviewed for accuracy and completeness by RSPA staff. The database was revised in 1984 and again in 2001. Data describing 50 to 100 pipeline incidents are added to the Natural Gas Gathering and Transmission Systems Incident

[16] Based on RSPA form F 7100.1. Hazardous liquid pipelines carry petroleum, petroleum products, or anhydrous ammonia.

[17] These requirements are paraphrased; precise language is contained in 49 CFR 195.50.

[18] Details are given in 49 CFR 195.50.

[19] Gas pipelines are classified according to function. Gathering lines transport gas from a production facility to a transmission line or processing facility, transmission lines transport gas to distribution centers, and distribution lines transport gas to customers.

Database each year. Summary tables are published annually by RSPA and made available on the Internet.

Natural Gas Distribution Systems Incident Database

RSPA-OPS also maintains the Natural Gas Distribution Systems Incident Database, which contains data describing incidents associated with natural gas distribution pipelines. Reporting requirements for natural gas distribution pipelines are the same as those for gathering and transmission pipelines. Incident data are collected by pipeline operators and submitted directly on RSPA form 7100.1 to RSPA-OPS for database entry. The database, last revised in 1984, is currently being redesigned to effect reporting for 2003. Data describing between 80 and 200 new gas distribution incidents are added to the Natural Gas Distribution Systems Incident Database each year. Summary tables are published annually by RSPA-OPS and made available on the Internet.

Railroad Databases

Rail Equipment Accident/Incident Report Database

The Federal Railroad Administration's (FRA) Office of Safety Analysis (FRA-RRS) maintains the Rail Equipment Accident/Incident Report (RAIR) Database. This database contains information describing collisions, derailments, fires, explosions, or other events involving the operation of railroad on-track equipment, signals, track, or track equipment (standing or moving) that result in damage greater than the annual dollar value serving as a reporting threshold ($6,700 for calendar year 2002) (49 CFR Ch. 2, Section 225.19). Rail operators submit rail accident reports monthly to a Federal contractor using standardized forms (FRA form 6180.54). The contractor reviews the accident reports, enters them into the RAIR database, and finalizes each annual data file by the spring of the following calendar year. The RAIR database was established in 1975. Between 2,500 and 3,000 new records are added to the RAIR database each year. The RAIR data are summarized in an annual FRA-RRS publication, *Railroad Safety Statistics Annual Report*, and an on-line search capability is provided on the FRA's Web site.

Highway–Rail Grade Crossing Incident Report Database

The FRA-RRS also maintains the Highway–Rail Grade Crossing Incident Report (GXIR) Database, which contains data describing impacts between railway equipment and highway users. Any contact between railway equipment and a highway user, or a highway user's vehicle, qualifies for inclusion in the database; there is no minimum injury or damage threshold (49 CFR Ch. 2, Section 225.19). Operators submit reports monthly on FRA form 6180.57 to a contractor working for the FRA. Where reported damage exceeds the RAIR reporting threshold, a record is created in both the GXIR and the RAIR databases. Like the RAIR database, the GXIR was established in 1975. More than 3,000 incidents are added to the GXIR database each year. The GXIR data are also summarized

in an annual FRA-RRS publication, *Railroad Safety Statistics Annual Report*, and an on-line search capability is provided on the FRA's Web site.

Railroad Injury and Illness Summary Database

The FRA-RRS also maintains the Railroad Injury and Illness Summary Database, which contains, among other things, data describing railroad employee injuries and deaths sustained during events that do not qualify for inclusion in either the RAIR or the GXIR database. The Railroad Injury and Illness Summary Database is the primary source of data for railroad employee and railroad trespasser injuries and fatalities. To be reportable, injury or death must be sustained during the operation of a railroad. Additional criteria require that injuries or illnesses included in the database: (a) require medical treatment other than first aid, (b) result in a day away from work, (c) cause temporary restriction of work or motion, (d) cause the employee to be transferred to another job, (e) result in termination of the employee, or (f) cause the employee to lose consciousness. Railroad injury/illness reports are submitted to an FRA contractor monthly. Annual data files are finalized by the spring of the following calendar year and delivered to the FRA-RRS. The Railroad Injury and Illness Summary Database was established in 1975. Approximately 13,000 records are added to the database each year. The data are summarized in an annual FRA-RRS publication, *Railroad Safety Statistics Annual Report*, and are searchable on line.

Intermodal Databases

Safety Management Information Statistics Database

The Federal Transit Administration's (FTA) Office of Safety and Security, located within the Office of Program Management, maintains the Safety Management Information Statistics (SAMIS) Database. SAMIS is a component of the National Transit Database (NTD), which also contains public mass transportation financial and operating data. Safety statistics are submitted annually by over 500 federally funded transit agencies operating in communities with populations over 50,000.[20] Incidents are included in the database if they involve a collision, a derailment, an injury, a fatality, a fire, or if transit property damage exceeds $1,000. The data are submitted in a summary table. Incident types (for example, collisions, derailments, casualties, nonarson fires) make up the table rows; injury counts, and fatality and injury counts by type of victim (for example, patrons, employees, others) are recorded in the table columns. Separate tables are submitted for each type of service provided by the reporting transit agency. The SAMIS database was established in 1978. Over 60,000 incidents are added to the database each year. The FTA publishes the *Safety Management Information Statistics (SAMIS) Annual Report* and provides a tool on the FTA's Safety and Security Web page for finding and viewing reports

[20] Transit services include automated guideway transit (rail); light rail (street car); cable car (rail); bus (nonrail); commuter rail (rail); monorail (rail); demand response (nonrail); publico (nonrail); ferryboat (nonrail); trolleybus (nonrail); heavy rail; aerial tramway (nonrail); inclined plane (rail); vanpool (nonrail); and jitney (nonrail).

from specific transit agencies. In 2000, the FTA began a project examining the timeliness, quality, and usefulness of the NTD with the ultimate goal of developing redesign recommendations. This project was initiated at the request of the U.S. House and Senate Committees on Appropriations as part of the U.S. Department of Transportation (DOT) FY 2000 Appropriations Act. This request was made because of congressional concern about the timeliness, accuracy, and relevance of NTD data. Based on feedback from users of the NTD, the FTA developed and is testing a new NTD prototype using a relational database structure.

Hazardous Materials Information System Incident Database

RSPA's Office of Hazardous Materials Safety (RSPA-OHM) maintains the Hazardous Materials Information System (HMIS), which contains data on reportable incidents involving the transportation of hazardous materials. A reportable incident is one that occurs during the transportation (including loading, unloading and temporary storage) of a hazardous material/waste and results in one of the following outcomes: (a) a fatality occurring within 365 days of the event, (b) an injury requiring hospitalization, (c) property damage in excess of $50,000, (d) evacuation of the general public, (e) closure of a major transportation artery or facility, (f) alteration of the operational flight pattern or routing of an aircraft, (g) any release involving a radioactive material or infectious substances, (h) the release of a marine pollutant exceeding 450 liters or 400 kilograms, or (i) any unintentional release of a hazardous material from a package or any quantity of hazardous waste discharged during transportation (49 CFR Ch. 1, Section 171.15). Operators must submit data on DOT form 5800.1 directly to RSPA-OHM within 30 days of a reportable incident. RSPA-OHM uses operator reports to update the HMIS monthly. The HMIS was established in 1971. Currently, about 15,000 new records are added to the database each year. RSPA-OHM publishes annual summary tables on its Web site.

Chapter 3

Previous Safety Recommendations

This chapter examines past safety recommendations concerning data that were issued by the Safety Board between January 1968 and October 2001.[21] A complete list of these 233 data recommendations is provided in appendix B. Recommendations in this sample address the collection, processing, storage, analysis, use, or dissemination of transportation-related safety data (henceforth, "data recommendations").

Most data recommendations (more than half) addressed issues in the aviation and highway modes. However, when data recommendations were examined as a *proportion* of recommendations issued within each mode, the relative emphasis on data issues appeared greatest in the intermodal and highway categories (table 3–1).

Table 3–1. Data recommendations versus all recommendations issued in each mode.

Mode of transportation[a]	Data recommendations	All recommendations	Data recommendations as a percentage of recommendations issued in each mode
Aviation	66	4,367	1.5
Highway	66	1,897	3.5
Marine	25	2,239	1.1
Pipeline	25	1,193	2.1
Railroad	34	1,955	1.7
Intermodal	17	226	7.5
All modes	233	11,877	2.0

[a] Recommendations dealing with transit data issues are classified in National Transportation Safety Board records as highway or rail recommendations, and were counted as such for this table.

Because Federal agencies maintain most sources of safety data that are national in scope, it is not surprising that the Safety Board issued 83 percent of its data recommendations to agencies of the Federal government. The remaining 17 percent were issued to State governments, industry/trade associations, city governments, and private companies. Table 3–2 contains a list of Federal agencies that have received data recommendations from the Board since 1968.

[21] Recommendations were identified using keyword searches of the Safety Board's electronic records. These searches were supplemented by manual searches of Board studies and special investigation reports. Only recommendations involving data useful for the surveillance of accidents or safety-related incidents and corresponding exposure data were included in the set. Data types included accident, incident, vehicle census, operator census, and transportation activity. Recommendations involving the collection or analysis of data from vehicle recorders were not included in the sample, because the Federal government does not use aggregated vehicle recorder data for safety surveillance purposes.

Table 3–2. Federal agencies receiving data recommendations from the National Transportation Safety Board.

Federal agency	Number of data recommendations
Federal Aviation Administration (FAA)	58
Research and Special Programs Administration (RSPA)	27
Office of the Secretary of Transportation (DOT)	25
National Highway Traffic Safety Administration (NHTSA)	23
United States Coast Guard (USCG)	21
Federal Railroad Administration (FRA)	20
Federal Highway Administration (FHWA)	10
Civil Aeronautics Board (CAB)[a]	3
Federal Transit Administration (FTA)[b]	3
General Services Administration (GSA)	2
Centers for Disease Control (CDC)	1
Federal Motor Carrier Safety Administration (FMCSA)	1
Total	194

[a] The Civil Aeronautics Board was abolished on January 1, 1985.

[b] Includes data recommendations issued to the Urban Mass Transportation Administration, which was redesignated the Federal Transit Administration by an act of Congress, December 18, 1991.

A taxonomy, consisting of the following five broad classifications, is used to categorize these recommendations:

I. Develop a new database or reporting system,
II. Modify an existing database and/or reporting form,
III. Improve the accuracy or completeness of information submitted,
IV. Address problems of underreporting, and
V. Analyze or disseminate existing data.

This taxonomy accommodated all 233 data recommendations, although some recommendations were coded in more than one category.[22] A review of these categorizations, shown in table 3–3, indicates that the Safety Board's recommendations concerning data improvement have been wide-ranging.

[22] Twenty-three recommendations were coded in two categories, and two recommendations were coded in three categories. Multiple codings were necessary because some recommendations proposed more than one desired action.

Table 3–3. Data recommendations by mode and recommendation category.

Mode	I Develop new database	II Modify existing database	III Improve data accuracy, currency, or completeness	IV Improve event identification and reporting	V Improve data analysis or dissemination	Number of recommend-ations for mode
Aviation	19	10	11	19	15	66
Highway	13	25	16	2	13	63
Marine	5	5	8	0	7	25
Pipeline	3	4	8	2	12	25
Railroad	9	7	7	2	6	27
Transit[a]	4	4	1	1	4	10
Intermodal	9	3	1	3	3	17
Total	62	58	52	29	60	[b]233

[a] Transit recommendations were tabulated separately in this table. Transit recommendations were identified by manual review of each data recommendation in the sample.

[b] A total of 233 recommendations were issued. In analyzing these, National Transportation Safety Board staff coded a total of 260 desired actions.

The remainder of this chapter discusses some specific data issues the Safety Board has addressed. Because the Board has issued over 200 data recommendations, it was necessary to discuss only a sample of issues. In selecting issues to discuss, staff attempted to highlight dominant issues and themes within each category of desired action. Efforts were made to ensure broad modal representation in the issues discussed. The discussion focuses chiefly on recommendations issued to the Office of the Secretary of Transportation and to the operating administrations of the DOT. These organizations received the bulk of all data recommendations the Board has issued.

Category I: Develop a New Database or Reporting System

The Safety Board has issued numerous recommendations asking for the creation of new exposure data systems. In 1979, for example, the Board published a safety study that compared single-engine aircraft makes, models, and configurations in terms of accident rates, fatal accident rates, and accident types.[23] The Board found that three models of single-engine fixed-wing aircraft had significantly higher in-flight airframe separation rates than similar aircraft. The Board also found that weather was more of a factor in accidents involving these aircraft models than for the broader set. However, without exposure data adequately describing the conditions under which different models of aircraft were flown, and the characteristics of their pilots, it was not possible for the Board to analyze the relative importance of aircraft design, weather conditions, or pilot proficiency as potential causes for in-flight breakups. Following that study, the Board

[23] National Transportation Safety Board, *Single-Engine, Fixed-Wing General Aviation Accidents 1972–1976*, Safety Study NTSB/AAS-79/01 (Washington, DC: NTSB, 1979).

recommended that the FAA collect more detailed general aviation exposure data that would support the analysis of pilot and other characteristics as risk factors for specific kinds of aviation accidents (Safety Recommendation A-79-44). The FAA notified the Board that it would study the issue, but took no further action.

The Safety Board remains concerned about the quality of general aviation exposure data. Existing FAA flight activity estimates say nothing about pilot characteristics or about the environmental conditions in which nonaccident flights are conducted. Existing estimates provide only very general information about hours flown within broad categories of aircraft and overlapping purposes of flight.[24] Furthermore, the FAA still does not collect data on commercial operator nonrevenue flights, general aviation departures, or air tour operator flying activity, even though the Board has suggested the value of collecting this kind of information for monitoring aviation safety. The lack of detailed aviation exposure data in general aviation and other sectors limits the ability of the Board to analyze risk factors for aviation accidents. In the 2001 study, *Public Aircraft Safety,* for example, the Board recommended that the FAA identify and implement exposure data collection methods independent of the General Aviation and Air Taxi Activity Survey[25] that could be used to check the accuracy of nonairline flight hour estimates (A-01-74). Communications on this matter are ongoing.

In a 1997 study on excavation damage prevention, the Safety Board examined the leading cause of accidents to pipelines—excavation and construction activity.[26] The Board was limited in its efforts to examine the rate of excavation damage events because excavation exposure data were not available from any national data collection system. The Board suggested that one-call communication centers, voluntarily established in local areas to notify utility companies about digging activities, represented the best opportunity for collecting excavation activity data. However, existing one-call systems are operated locally and are not designed to support the development of regional or national excavation activity estimates. The Board recommended that RSPA, in conjunction with the American Public Works Association, develop a plan for collecting excavation damage exposure data, and use this data to assess the effectiveness of State excavation damage prevention programs (P-97-22 and -24).

[24] A discussion of the issues related to current general aviation activity estimates are contained in the following publication: National Transportation Safety Board, *Public Aircraft Safety,* Safety Study NTSB/SS-01/01 (Washington DC: NTSB, 2001).

[25] The FAA's General Aviation and Air Taxi Activity (GAATA) Survey is used for estimating annual flight hours for general aviation, air taxi, and public aircraft.

[26] National Transportation Safety Board, *Protecting Public Safety Through Excavation Damage Prevention,* Safety Study NTSB/SS-97/01 (Washington, DC: NTSB, 1997).

In its Transportation Equity Act for the 21st Century (TEA-21), Congress directed the DOT to conduct a study to determine "best practices" for preventing damage to underground facilities. As a result of this requirement, RSPA formed a working group consisting of 160 damage prevention stakeholders to study the problem. This working group produced a report, the *Common Ground Study of One-Call Systems and Damage Prevention Best Practices*.[27] After the publication of that study, RSPA facilitated the establishment of a nonprofit private sector organization, known as the Common Ground Alliance, to promote the use of the "best practices" identified in the study. RSPA recently indicated to Safety Board personnel that it is working with the Common Ground Alliance to develop a system for the collection of nationwide excavation damage exposure data as recommended by the Board.

Category II: Modify an Existing Database and/or Reporting Form

Highway recommendations made up 43 percent of the recommendations seeking modifications in the design of existing databases or report forms. Recipients of category II recommendations in the highway mode have included NHTSA, the Federal Highway Administration (FHWA), and the DOT. Highway data recommendations most often targeted the NASS, FARS, and State highway crash information systems, typically seeking the addition of new variables to these databases or the addition of new coding options. For example, the Safety Board recommended that NHTSA modify the FARS so that the database could store test results for operator drug use (H-90-16), and NHTSA agreed to do so. NHTSA also agreed to add a variable to FARS identifying cross-median accidents (H-98-17) and to modify the database so that wheel failures could be differentiated from tire failures (H-92-103). NHTSA's responsiveness to recommendations of this sort has resulted in positive changes to existing highway data systems, improving the ability of the Safety Board and other organizations to monitor specific highway safety issues.

The Safety Board has also issued a number of category II recommendations in the marine mode. In 1986, for example, the Board determined that existing Coast Guard boating accident data could not be used to determine the in-service effectiveness and performance of personal flotation devices (PFDs). The required information was not being reported on boating accident report forms. As a result, the Board recommended that the Coast Guard, in coordination with the National Association of State Boating Law Administrators, expedite revision of the Boating Accident Report form to include specific variables permitting assessment of PFD performance (M-86-100). The Coast Guard concurred with this recommendation, revising the Boating Accident Report form to enable assessment of PFD performance and distributing the new form to each State boating law administrator in March 1988.

[27] U.S. Department of Transportation, Research and Special Programs Administration, Office of Pipeline Safety, *Common Ground Study of One-Call Systems and Damage Prevention Best Practices* (Washington, DC: OPS, 1999).

In aviation, the Safety Board has sought modifications to several maintenance and incident databases maintained by the FAA. The Board recommended changes to the Service Difficulty Report (SDR) form in 1997, after investigating three incidents involving failed elevator trim cables on Shorts Brothers SD3-60 airplanes. The Board searched for information on such failures in the FAA's SDR database but found little information that could assist the Board in evaluating the adequacy of current inspection and maintenance procedures for this type of airplane. For example, existing reports contained no information on flight hours since last inspection and rarely described the total time elevator trim cables had been installed in the airplanes. The Board issued Safety Recommendation A-97-125, asking the FAA to modify the SDR system so that it would contain more complete and accurate information about component failures (category II), but also asked the FAA to relate to the operators who submit SDRs the need for complete and accurate information when they report component failures and to remind FAA inspectors assigned to Part 121 and Part 135 operators of their need to review the component failure reports for accuracy and completeness (category III). The FAA published a notice on September 15, 2000, requesting comments on information collection requirements for the final rule, prior to issuing a revised SDR form.[28] The FAA subsequently issued a series of postponements in the effective date of the rule, citing the need for revisions to take industry feedback into account. The currently scheduled date for issuance of the final rule is January 2003.[29] The Board continues to monitor this important effort.

The Safety Board has a history of recommendations seeking improvements in the design of RSPA's pipeline safety reporting forms. In a 1978 study on the safe service life for liquid petroleum pipelines the Board found that the Liquid Pipeline Accident Reporting System supported little useful analysis beyond the tabulation of cumulative accident totals.[30] The Board made several recommendations to RSPA, asking the agency to evaluate its data needs and improve its safety data collection and analysis activities. One of these recommendations suggested that RSPA redesign the Hazardous Liquid Pipeline Accident Report system (P-78-59). In a 1996 report that evaluated accident data and Federal oversight of petroleum product pipelines, the Board concluded that RSPA's failure to fully implement the Safety Board's 1978 recommendations had hampered its ability to effectively oversee the Nation's pipelines.[31] The Board again recommended that RSPA evaluate its data needs and redesign its data collection systems (P-96-1). In a 1997 study on protecting public safety through excavation damage prevention, the Board found that RSPA's pipeline accident databases did not capture basic information about the causes of pipeline failures, including excavation activity, which was commonly associated with

[28] The Board determined that the proposed changes would significantly improve the SDR process, and closed Safety Recommendation A-97-125 in January 2000.

[29] "Air Carrier Certification and Operations: Service Difficulty Reports; Effective Date Delay," 66 *Federal Register* (FR) 58911, November 23, 2001.

[30] National Transportation Safety Board, *Safe Service Life for Liquid Pipelines*, Safety Study NTSB/PSS-78/01 (Washington, DC: NTSB, 1978).

[31] National Transportation Safety Board, *Evaluation of Accident Data and Federal Oversight of Petroleum Product Pipelines*, Special Investigation Report NTSB/SIR-96/02 (Washington, DC: NTSB, 1996).

pipeline ruptures.[32] The Board recommended that RSPA revise the causal categories on its gas and hazardous liquid pipeline accident report forms to eliminate overlapping and confusing categories, to clearly list excavation damage as one of the data elements, and to consider developing subcategories. In a 1998 report on brittle-like cracking in plastic pipe for gas service, the Safety Board noted that RSPA's accident data were insufficient to serve as a basis for assessing the long-term performance of plastic pipe, which is commonly used for natural gas distribution, echoing the conclusion that RSPA's accident/incident report forms were poorly designed.[33]

In recent years, RSPA has made serious efforts to redesign its pipeline accident data collection system. Citing the recommendations of the DOT Inspector General, the Safety Board, Congress, and the White House, RSPA issued a notice of proposed rulemaking (NPRM) that redesigned the Hazardous Liquid Pipeline Accident Report form. The final rule pertaining to this change was issued January 8, 2002. The revised form includes more detailed information on pipeline characteristics and a better description of the causes of pipeline failures. The reporting threshold was also reduced from 50 barrels to 5 gallons of spilled product, with some exceptions for spills that are greater than 5 gallons, but less than 5 barrels.[34] RSPA revised its Incident Report For Gas Transmission and Gathering Systems and Annual Report For Gas Transmission and Gathering Systems. Changes to these forms were final on August 8, 2001. The revisions to the incident form will facilitate the collection of more detailed information. The revisions to the annual report will allow the collection of more detailed information describing miles of pipe operated by class and decade of installation for each pipeline operator. RSPA is also in the process of revising the Incident Report for Gas Distribution Systems and expects to complete this activity by the end of 2002. These improvements will enhance RSPA's ability to perform methodologically sound accident trend analyses. The Board will continue to monitor RSPA's important work in this area.

Category III: Improve the Accuracy or Completeness of Information Submitted

More than a third of the category III recommendations sought more complete and accurate reporting of toxicological test results. Although many accident databases contain data fields for recording the toxicological test results of drivers or operators, this information is often missing. This occurs because accident investigators often do not request tests that would detect the presence of toxicological substances in the blood of transportation operators. Furthermore, if a test is performed too long after an initiating accident event, toxicological substances can be metabolized by the body, and test results

[32] National Transportation Safety Board, *Protecting Public Safety Through Excavation Damage Prevention*, Safety Study NTSB/SS-97/01 (Washington, DC: NTSB, 1997).

[33] National Transportation Safety Board, *Brittle-Like Cracking in Plastic Pipe for Gas Service*, Special Investigation Report NTSB/SIR-98/01 (Washington, DC: NTSB, 1998).

[34] Excepted spills are those resulting from maintenance activity, that occur on company property, that do not result in water pollution, and that are cleaned up promptly, as specified in 49 CFR Part 195.

can be inaccurate. The Safety Board has long been concerned about issues involving the intoxication of transportation operators because operator intoxication has been identified as a causal factor for accidents involving all types of vehicles. As a result, the Board has sought more consistent and accurate reporting of toxicological test results in all modes so that the extent of this problem can be better monitored.

In 1984, for example, the Safety Board issued a recommendation asking the FAA to establish implied consent to toxicological testing as a condition of issuance of an airman certificate (A-84-46). The FAA responded favorably to this recommendation, adopting a new rule (14 CFR 91.17), effective April 9, 1986, that requires aircraft crewmembers to submit to chemical tests for detecting alcohol performed by an authorized law enforcement officer to investigate a suspected violation of FAA rules against alcohol or drug use. In 1992, after completing a study of alcohol involvement in general aviation accidents, the Board recommended that the FAA take steps to ensure consistent, accurate reporting of toxicological test results involving air crewmembers. The Board recommended that the FAA establish procedures for receiving, processing, and analyzing toxicological test results reported by the States and distribute procedures for the States to follow when notifying the FAA of test results and refusals (A-92-107 and -108). The FAA designated the Civil Aerospace Medical Institute (CAMI) Toxicological and Accident Research Laboratory as the central reporting office for toxicological test results. The FAA also established procedures for the reporting of toxicological test results which were distributed to State and local law enforcement agencies.

In 1988, the Safety Board recommended that the FRA require railroads to collect all appropriate toxicological samples as soon as practicable and not more than 4 hours after the triggering event (R-88-31). FRA regulations at that time, 49 CFR Part 219, stated only that toxicological testing should be performed "as soon as possible" following an accident. In 1994, the FRA adopted a rule change incorporating the 4-hour time limit.

In 1993, the Safety Board addressed toxicological testing in recreational boating accidents in a safety study that concluded that alcohol involvement was not being adequately documented.[35] The Board recommended that the 41 U.S. States without such laws enact legislation requiring a chemical test to determine the alcohol concentration of recreational boat operators involved in fatal accidents (M-93-2). In addition, the Board recommended that 11 States without such laws enact legislation requiring toxicological testing of all recreational boating fatalities (M-93-6). As of September 2002, 28 of the 41 States targeted in Safety Recommendation M-93-2 had taken action requiring the testing of boat operators in fatal accidents. Recommendation M-93-2 remains open. Six of the 12 States targeted had responded favorably to Safety Recommendation M-93-6 and that recommendation also remains open. The Safety Board continues to work with the States on the development of more stringent regulations in these areas.

The Safety Board's interest in data accuracy and completeness has not been limited to toxicological test results. For example, in a 1978 study on the safe service life

[35] National Transportation Safety Board, *Recreational Boating Safety*, Safety Study NTSB/SS-93/01 (Washington, DC: NTSB, 1993).

for liquid petroleum pipelines, the Board found inconsistency in the data submitted by pipeline operators.[36] As a result, the Board asked RSPA to provide clear instructions and definitions to ensure the accuracy and consistency of data submitted on the Hazardous Liquid Pipeline Accident Report forms (P-78-60). The Board again documented problems in the accuracy and completeness of pipeline safety data in a 1980 report on pipeline data.[37] As a result, the Board asked RSPA to train its personnel to more effectively validate incoming leak reports. RSPA responded that, beginning in 1985, a validation procedure would be used by each regional office, with additional instruction distributed to each State agent. In 2002, RSPA reported to the Safety Board that new quality control procedures had been put into place, and that five new staff positions had been created, one at each of RSPA's regional offices. The new positions are designated part-time inspection and part-time file review. RSPA has also implemented a new file review policy. Under this new policy, operators will be contacted twice annually for further information on reported incidents until a report is "closed" or final. These new personnel and policies should improve the quality of pipeline incident/accident data collected by RSPA.

The Safety Board's 1997 study on excavation damage prevention noted continued problems with the accuracy of data submitted on pipeline incident/accident reports.[38] Specifically, the Board was concerned that RSPA provided facility operators with inadequate guidance for estimating property damage and other costs resulting from an accident. The Board recommended that RSPA develop better written guidelines for estimating such damage (P-97-20). RSPA has made substantial revisions to its accident and incident reporting forms in recent years. The revised accident/incident forms allow operators to break down damage estimates into specific categories, which should guide them in deciding what to include in damage estimates. The revised forms are accompanied by revised instructions that also detail the costs that are to be included in damage estimates for pipeline accidents and incidents. RSPA's recent efforts have improved the completeness and accuracy of accident/incident information submitted by pipeline operators.

Category IV: Address Problems of Underreporting

Aviation recommendations made up two-thirds of the recommendations concerning underreporting. Subsequent to Safety Board recommendations, changes have been made to improve the reporting of aviation maintenance and incident data. In 1993, for example, the Board determined that the FAA's SDR database was of limited value in

[36] National Transportation Safety Board, *Safe Service Life for Liquid Petroleum Pipelines*, Safety Study NTSB/PSS-78/01 (Washington, DC: NTSB, 1978).

[37] National Transportation Safety Board, *The Materials Transportation Bureau's Pipeline Data System*, Safety Effectiveness Evaluation NTSB/SEE-80/04 (Washington, DC: NTSB, 1980). The MTB was a unit of RSPA and has since been abolished. RSPA's Office of Pipeline Safety currently performs the incident reporting and data analytic functions formerly assigned to the MTB.

[38] National Transportation Safety Board, *Protecting Public Safety Through Excavation Damage Prevention*, Safety Study NTSB/SS-97/01 (Washington, DC: NTSB, 1997).

identifying accurate service defect histories because many reportable service difficulties were not actually being reported. When investigating a 1992 accident in New York involving a Trans World Airlines (TWA) L-1011, the Board searched the FAA's SDR database for information on stall warning system failures. The database contained only 2 such reports, but 24 additional records were identified by Lockheed and TWA. None of these incidents was found in the FAA's SDR database. The Board has issued a number of recommendations designed to improve the SDR system. To increase ease of submission, the Board recommended that the FAA develop electronic reporting for SDRs. The Board also asked the FAA to encourage submission of malfunction and defect reports among members of the general aviation community (A-93-61 and -62). The FAA subsequently identified operators who were not submitting SDR data electronically and encouraged them to do so. The FAA also published an advisory circular[39] to promote understanding and participation of the general aviation community in the SDR program.

In 1998, the Safety Board investigated the near-collision of a US Airways McDonnell-Douglas DC-9 and an Air Canada Airbus A-319 above the intersection of runways 22 and 31 at LaGuardia Airport, Flushing, New York. The Board noted that the air traffic controller advising these aircraft did not file a report of an operational error (OE) or a near-midair collision (NMAC) because radar separation standards were not in effect. The controller also made no mention to the pilots of their option to file an NMAC report, despite communications from the crew of both aircraft that a near-midair collision had occurred. The Board determined that under FAA Order 8020.11, controllers were actually required *not* to ask flight crew members if they intend to file an NMAC report. Although the crew of the two aircraft involved in the 1998 near-midair collision did, in fact, file NMAC reports, the Board was concerned that the existing FAA policy might result in underreporting of near-midair collisions. The Board recommended that the FAA amend its existing policies to require that controllers ask any member of a flight crew receiving air traffic control (ATC) services who expresses concern about the proximity of another aircraft if he or she desires to file a formal NMAC report (A-00-37). The FAA agreed to a similar change, directing controllers, workload permitting, to notify any member of a flight crew receiving air traffic control services who expresses concern about the proximity of another aircraft to contact facility representatives.

Although the bulk of recommendations addressing underreporting have been in the aviation mode, the Safety Board has addressed underreporting in other modes as well. During the 1990s, for example, the Board had limited success in analyzing accident/incident trends using the hazardous materials accident/incident data in the HMIS. In a 1992 report addressing cargo tank rollover protection, the Board cited problems with underreporting of accidents to the FHWA and RSPA, differences in reporting requirements between the two agencies, and inadequacies in the type of data collected about accidents involving cargo tank trucks.[40] The Board concluded that FHWA and RSPA accident databases were not adequate to identify trends or problems related to the design and

[39] U.S. Department of Transportation, Federal Aviation Administration, *Service Difficulty Program (General Aviation)*, Advisory Circular 20-109A (Washington, DC: FAA, 1993).

[40] National Transportation Safety Board, *Cargo Tank Rollover Protection*, Special Investigation Report NTSB/SIR-92/01 (Washington, DC: NTSB, 1992).

construction of bulk liquid cargo tanks. As a result, the Board issued Safety Recommendation H-92-6 to RSPA and H-92-9 to the FHWA suggesting that the two agencies "jointly implement a program to collect information necessary to identify patterns of cargo tank equipment failures, including reporting of all accidents involving a DOT specification cargo tank."

Recently, the Safety Board has been concerned about underreporting of hazardous materials incidents involving the loading or unloading of bulk containers, such as railroad tank cars, highway cargo tanks, and intermodal bulk containers. The Board has historically and consistently considered such loading and unloading operations to be transportation-related functions, and has investigated three such accidents since November 1998.[41] One of these accidents, involving the rupture of a railroad tank car containing hazardous waste near Clymers, Indiana, was not reported to the HMIS. DOT *Hazardous Materials Regulations* (49 CFR 171.16) place the responsibility for submitting Hazardous Materials Incident Reports on the carrier. In this case, the incident was not reported because the railroad had delivered the tank car to a chemical plant more than 2 months before the accident took place, and the unloading operation was performed by nonrailroad personnel. The Board was concerned that other loading and unloading accidents like this one were not being reported to the DOT. The Board recommended that RSPA develop and implement policies and procedures to ensure that comprehensive reports concerning all significant failures of U.S. DOT specification tank cars, highway cargo tanks, and intermodal bulk containers containing hazardous materials are submitted to RSPA (I-01-1). RSPA published an NPRM in 2001 titled *Applicability of the Hazardous Materials Regulations to Loading, Unloading, and Storage* (66 *Federal Register* (FR) 32420). However, the proposed rule would result in the adoption of a criterion that effectively removes the loading and unloading of railroad tank cars, highway cargo tanks, and other bulk containers as regulated operations under the hazardous materials regulations. Consequently, incidents or accidents involving these operations would no longer be reportable under the HMIS system. Communications between the Board and RSPA are ongoing, and the Board will monitor RSPA's rulemaking activities in this area.

Category V: Analyze or Disseminate Existing Data

The Safety Board has issued numerous recommendations asking the modal agencies of the DOT to analyze or disseminate existing data. Recommendations calling for short-term analysis projects and longer term research programs have a long history. For example, the Board's 1972 study on stall/spin accidents examined accident records for 37 small, fixed-wing, U.S. general aviation aircraft.[42] An evaluation was made of the relative frequency of occurrence of stall/spin accidents involving each airplane. Other types of events that preceded or were associated with a stall/spin (such as engine failure) were also considered in connection with broad and detailed causal factors. Based on the

[41] HZM-01-01, HZB-00-02, HZB-00-03.

[42] National Transportation Safety Board, *General Aviation Stall/Spin Accidents, 1967–1969*, Safety Study NTSB/AAS-72/08 (Washington, DC: NTSB, 1972).

results of these analyses, the Board recommended that the FAA conduct further statistical review, technical evaluation, and operational testing of aircraft exhibiting a "very high" frequency of stall/spin accidents (A-72-230). The FAA responded favorably to this recommendation by performing additional analyses of stall/spin accident data and by developing an operational test to reassess performance and handling characteristics of airplanes found to be susceptible to stall/spin accidents. The FAA also pursued research programs to relate design and handling characteristics to stall/spin likelihood. The FAA revised regulations governing spin certification requirements for small airplanes.

Another recommendation involving an analysis project was issued in the marine mode. On April 26, 1984, a tow consisting of 12 barges laden with grain was being pushed ahead by the U.S. towboat *Erin Marie* when it collided with a pier of the Poplar Street Bridge, which crosses the upper Mississippi River between St. Louis, Missouri, and East St. Louis, Illinois.[43] As a result of the collision, 8 of the 12 barges broke free from the *Erin Marie.* One barge sank, three were punctured, and two other barges sustained minor damage. The Board determined that the probable cause of this accident was the tow vessel operator's insufficient knowledge of the St. Louis Harbor which resulted in his failure to identify the main navigation span of the Poplar Street Bridge in time to align his tow for safe passage. The Board concluded that tow vessel operators on inland waterways should have a more thorough knowledge of navigation issues in seldom-visited areas covered by their licenses. As a result, the Board recommended that the Coast Guard analyze the cause of accidents in areas of Western rivers and develop questions addressing local hazards for exams used to award licenses to tow vessel operators planning to operate in these areas (M-85-18). The Coast Guard responded favorably, developing questions involving hazardous areas of Western rivers, such as around inland locks, dams, bridges, rivers, and hazardous cargo facilities, and including these questions on license exams.

[43] National Transportation Safety Board, *Ramming of the Poplar Street Bridge by the Towboat* M/V Erin Marie *and its Twelve-Barge Tow, St. Louis, Missouri, April 26, 1984,* Marine Accident Report NTSB/MAR-85/02 (Washington, DC: NTSB, 1985).

Chapter 4

Initiatives Sponsored by the Bureau of Transportation Statistics

The Bureau of Transportation Statistics (BTS) was formed in 1991, under the authority of the Intermodal Surface Transportation Efficiency Act (ISTEA). In this act, Congress recognized the importance of high-quality transportation statistics as a foundation upon which policy decisions should be made. Congress also recognized that existing data sources were in need of improvement, and determined that the best way to improve transportation data would be to establish a central intermodal statistical agency. Congress gave the BTS the following responsibilities (Title 49 *United States Code* [USC] Chapter I, Section 111):

1. compiling and analyzing transportation statistics,
2. issuing data collection guidelines,
3. making statistics accessible,
4. identifying information needs,
5. implementing a comprehensive long-term data collection program, and
6. coordinating the collection of statistical information.

Although the BTS was to serve as the central coordinating agency for transportation statistics, Congress placed certain limitations on the authority of the new agency. The BTS was not granted the authority to require collection of data by any other department or agency or to reduce the authority of any other office of the DOT to collect and disseminate data independently. These limitations preserved the autonomy of data processes within the individual operating agencies of the DOT. BTS's mission, stated in the agency's *Strategic Plan for Transportation Statistics (2000-2005)*, is to "lead in developing transportation data and information of high quality and to advance their effective use in both public and private decision making."[44]

Initiatives Launched Under ISTEA

After the passage of ISTEA, the BTS initiated a number of efforts to make transportation statistics more accessible. In 1993, the BTS began publishing *National Transportation Statistics*. This annual report is a compilation of safety and activity

[44] Bureau of Transportation Statistics, *A Strategic Plan for Transportation Statistics (2000–2005)*. (Washington, DC: U.S. Department of Transportation, BTS, 2000) 1.

statistics from all modes of transportation. It contains information on traffic flows, miles traveled, commodity flows, accidents, and injuries. In 1996, the BTS published a *Directory of Transportation Data Sources*. During the late 1990s, the BTS worked to make transportation statistics more accessible via the Internet, compiling links to the Web pages of the DOT operating administrations and making them available on the agency's Web site.

The BTS also worked to improve the analysis of transportation statistics. Shortly after the agency's creation in 1991, the BTS began developing statistical reports on special topics, including economics and finance, freight, geospatial information, international travel maritime transportation, and bicycle safety. In 1994, the BTS began publishing *Transportation Statistics Annual Report*. Unlike *National Transportation Statistics*, this annual report contains detailed analysis of transportation statistics and commentary on statistical trends. The BTS also developed reports documenting information needs for better analysis of transportation data. These reports included *Information Needs to Support State and Local Transportation Decision Making*, published in 1997, and the congressionally mandated *Transportation Statistics Beyond ISTEA: Critical Gaps and Strategic Responses*, published in 1998. Also in 1998, the BTS launched a quarterly periodical, the *Journal of Transportation and Statistics*, containing peer-reviewed works of scholarly research involving transportation statistics.

The BTS also initiated programs to improve the collection of transportation activity data. The agency joined forces with the FHWA to help administer the Nationwide Personal Transportation Survey (NPTS).[45] The BTS created the American Travel Survey (ATS) in 1995, a tool designed to measure patterns of long-distance travel among U.S. residents. Conducted every 5 years, the NPTS and the ATS assessed amount of travel, purposes of travel, and characteristics of travelers in all modes of transportation using large, representative samples of Americans.

When the National Research Council (NRC) reviewed the statistical programs of the BTS in 1996, the NRC concluded that the BTS had been relatively successful at compiling data and making statistics readily available to the public. However, the NRC stated that it was important the BTS do more to "take on the leadership functions assigned to it by the 1991 ISTEA to improve the relevance and quality of transportation data."[46]

Increased Momentum Under TEA-21

The passage, in June 1998, of the Transportation Equity Act for the 21st Century (TEA-21)[47] gave the BTS new responsibilities, including the following:

[45] The NPTS measures patterns of local travel for a representative sample of people residing in the United States.

[46] Constance F. Citro and Janet L. Norwood, eds., *The Bureau of Transportation Statistics: Priorities for the Future* (Washington, DC: National Academy of Sciences/National Research Council Panel on Statistical Programs and Practices of the Bureau of Transportation Statistics, 1997).

[47] Enacted as Public Law 105-178.

1. support DOT efforts to measure agency performance,
2. establish a new intermodal transportation database,
3. create a National Transportation Library, and
4. develop the National Transportation Atlas Database.

TEA-21 authorized the BTS to coordinate its long-term data collection planning with DOT efforts to measure performance outcomes under the Government Performance and Results Act of 1993 (GPRA; 107 Stat. 285 et seq.). Specifically, Congress specified that the BTS should

> …review and report to the Secretary of Transportation on the sources and reliability of the statistics proposed by the heads of the operating administrations of the Department to measure outputs and outcomes as required by the Government Performance and Results Act of 1993, and the amendments made by such Act, and shall carry out such other reviews of the sources and reliability of other data collected by the heads of the operating administrations of the Department as shall be requested by the Secretary [from 49 USC Section 111, Part c, Subpart 3].

This provision granted the BTS the authority to audit the quality of DOT safety data systems used for DOT performance measures.

The BTS created the Data Initiative Working Group, a mechanism for developing data quality standards, in 1999. The Data Initiative Working Group was composed of technical experts and data system managers from throughout the DOT. Members of the Data Initiative Working Group began their work by compiling information about the origins, collection procedures, and possible sources of error for each DOT-supported database related to a GPRA performance measure. This information was compiled in standardized "source and accuracy statements." In addition to compiling source and accuracy statements, the BTS and the Data Initiative Working Group developed a *Guide to Good Statistical Practice* discussing appropriate practices in the analysis and presentation of statistical information, including the definition of errors and documentation of data quality.

The BTS began to develop a new Intermodal Transportation Database (ITDB) to provide a single source for transportation safety and activity data from all the modes, eliminating the need to search for such information from individual modal agencies. Based on congressional guidelines, the BTS stated the following vision for the ITDB:

> The ITDB when fully developed will describe the basic mobility provided by the transportation system, identify the denominator for safety rates and environmental emissions, illustrate the links between transportation activity and the economy, and provide a framework for integrating critical data on all aspects of transportation.[48]

[48] Bureau of Transportation Statistics, *Transportation Statistics Annual Report 1999* (Washington, DC: U.S. Department of Transportation, BTS, 2000) 144.

A trial version of the ITDB went on line in May 2001, providing access to data sets from a number of accident/incident and exposure databases.

Also under TEA-21, the BTS created the National Transportation Library (NTL). The NTL, which the BTS administers in cooperation with the Transportation Research Board, is a large on-line collection of documents and databases provided by public and private organizations throughout the Nation. The public can search the NTL collection via the Internet, and then read, download, and print many of the electronically available documents, free of charge. The BTS also provides a small reference staff to assist the public in locating documents and answering questions.

The BTS continued development of the National Transportation Atlas Database (NTAD), a program the agency had started prior to TEA-21. This new electronic geographic information system contains information on transportation facilities, transportation services provided on those facilities, transportation flow volumes through those facilities, and other background information (such as political and environmental features). It is intended as a primary data system to support transportation mapping and network analysis nationwide and as a starting point for a future data system, the National Spatial Data Infrastructure. The NTAD is still evolving. However, data sets on CD-ROM are available from the BTS Publications Department. A project to develop a combined geographic representation of transportation infrastructure began in fiscal year 2001.

In response to directives set forth in both ISTEA and TEA-21, the BTS expanded its role in the collection of transportation activity data. In cooperation with the FHWA, the BTS combined the NPTS and the ATS to create the National Household Travel Survey (NHTS), which is currently administered every 5 years. The 2001-2002 NHTS sampled 65,000 households, asking for information describing trips people made by all means including car, bus, train, plane, as well as biking and walking trips. In addition to the NHTS, the BTS developed the Omnibus Survey, a monthly survey of travel activity first administered in 2000. Each Omnibus Survey is administered to 1,000 U.S. households and 1,000 nonresidential U.S. establishments. The survey consists of a core set of items, asking for information about general travel activity, supplemented by special items serving the short-term information needs of the operating administrations of the DOT. Omnibus Survey results are posted on BTS's Web site. In addition to the NHTS and the Omnibus Survey, the BTS began to perform short-term targeted activity surveys, providing "snapshots" of special populations of travelers, including boaters and airline passengers.

Crafting a Long-Term Plan

In the spring of 1999, the BTS organized a National Transportation Safety Conference, sponsored by the Office of the Secretary of Transportation, bringing together transportation interests from the Federal government, State and local governments, and other organizations from across the country. The purpose of this conference was to identify priorities for future efforts aimed at improving transportation safety data. Conference participants indicated that better data collection and reporting were needed to improve

transportation safety. In response to the findings of this conference, the DOT Safety Council, a committee made up of high-ranking DOT staff from the Office of the Secretary of Transportation and the offices of the modal administrators, established data improvement as a top priority for the DOT. Under the direction of the DOT Safety Council, the BTS developed a new initiative titled, "Safety in Numbers: Using Statistics to Make the Transportation System Safer." The following objectives guided the project:

1. work with constituents to prioritize actions that will improve the timeliness, relevancy, and quality of safety data;
2. develop a road map to improve safety data that includes recommendations from across the transportation community; and
3. improve transportation safety-related products and customer service to meet the needs of DOT's constituents.

The BTS organized four safety data workshops in September and October 1999, which were attended by Safety Board staff. These workshops were organized by mode: one for marine, one for aviation, and two for surface transportation. Each workshop brought together approximately 200 participants from government, industry, professional and trade associations, and academia. Participants discussed the characteristics of existing safety data systems, the relation of these characteristics to safety policy, and information needs. Common themes were heard across the four workshops, including concerns about data relevancy, timeliness, and quality; comparability of definitions across the modes; and deficiencies in existing exposure data. Recommended next steps varied by mode because of differences in the relative sophistication of the modal data collection systems.

The BTS used feedback from the modal workshops to draft a *Safety Data Action Plan* published in September 2000.[49] This plan, produced under the direction of the DOT Safety Council, identified the BTS as the DOT's lead agency for coordinating data improvement efforts, and proposed 10 project areas to be managed by the BTS over the next few years, as follows:

1. reengineer existing data systems,
2. develop common criteria for reporting deaths and injuries,
3. develop common denominators for safety measures,
4. advance the timeliness of safety data,
5. develop common data on accident circumstances,
6. develop better data on accident precursors,
7. expand the collection of "near-miss" data to all modes,
8. link safety data with other data,
9. explore options for using technology in data collection, and
10. expand, improve, and coordinate safety data analysis.

[49] Bureau of Transportation Statistics, *Safety Data Action Plan* (Washington, DC: U.S. Department of Transportation, BTS, 2000).

BTS data improvement efforts are guided by a Committee on Transportation Statistics, established by the Deputy Secretary of Transportation, chaired by the director of the BTS, and composed of senior leaders from the operating administrations of the DOT.

Implementing the Safety Data Action Plan

In 2001, the BTS assigned tasks related to 9 of the 10 research projects described in the *Safety Data Action Plan* to four working groups consisting of internal staff; staff from the operating administrations of the DOT and other Federal agencies; and outside contractors.[50] In January 2002, the BTS sponsored another Intermodal Safety Data Conference in Washington, D.C. At this conference, the BTS presented draft implementation plans for projects 2, 3, 5, and 9, and status reports for projects 1, 6, 7, and 10. No progress was reported for project 4 (advance the timeliness of safety data), because the BTS decided that this project would be addressed as part of project 1.

The draft implementation plans contained a variety of recommendations addressing safety data improvement needs. The project 2 report found that the different modal agencies responsible for safety data collection used a variety of definitions for incidents, accidents, fatalities, and nonfatal injuries. The report recommended that the DOT develop cross-modal definitions for these outcomes. The report also noted that accident databases in different modes of transportation classify injuries differently, leading to incompatible definitions of injury severity. Furthermore, for some databases, uninjured persons involved in transportation accidents or incidents were not being consistently documented. The report recommended the creation of a common injury classification and coding scheme and the collection of data describing both injured and uninjured persons.

The project 3 report catalogued exposure measures used for calculating safety statistics in each mode of transportation, pointing out differences and similarities in current exposure data collection practices across modes. The report recommended that different sets of exposure measures be used for cross-modal comparisons, depending on the purpose of travel. The report suggested different sets of exposure measures, for example, when making cross-modal comparisons of risk for passenger travel, occupational travel, or recreational travel. The report went on to identify specific exposure measures that would be needed to facilitate comparisons of transportation risk across modes.

The project 5 report noted that some DOT accident databases are so limited in their capacity to document causal information that they only allow the recording of a single contributing factor. The report recommended that accident data quality, adequacy, and completeness should receive significant attention and proposed a minimum list of accident data elements. The report contained more than 20 additional recommendations, including greater utilization of electronic reporting by State governments, winnowing of existing accident databases to remove seldom-used variables, greater use of sampling in safety data

[50] Project 8 was excluded because BTS's Intermodal Transportation Database team had already assumed responsibilities related to this task (linking safety data with other transportation data).

collection, expanded use of confidential reporting systems, and collection of more detailed information describing crash-related injuries. A list of possible research projects exploring methods for improving the quality of accident data collected was also included.

The project 9 report indicated that each of the modes is engaged in independent technology development efforts related to the safety mission of their respective agencies. A list of eight technologies, ranked in terms of priority for further development as tools for improving data collection, was included in the report. The top three technologies were electronic identification of vehicle operators, automated real-time operator performance monitoring, and hands-free wearable computers for data collection. The report recommended development of multiple unspecified projects exploring applications for these three top-ranked technologies.

BTS staff working on project 1 reported that auditing DOT data systems would be the first step toward reengineering DOT data systems.[51] The first systems selected for audit included the NTD, the HMIS, the FAA's safety databases assessable through NASDAC, the BTS's Origin and Destination Survey, and RSPA's Unified Shippers Enforcement Data System (UNISHIP). Draft audit reports for the HMIS, the Origin and Destination Survey, and the UNISHIP databases were provided to the Safety Board for review. These audit reports followed a format specified in another BTS draft document, *Working Plan for Project # 1—Data Quality Assessments*. Each audit report contained information describing the background of the selected system, frame and sampling information, data collection procedures, data preparation procedures, data dissemination practices, self-evaluation by the data process owner, and a BTS analysis of the data from the database to assess missing values. Each audit also contained a summary evaluation and a list of BTS recommendations for improving data quality and completeness.

The BTS staff are conducting interviews with senior modal staff to determine existing data analysis capabilities within the DOT in support of project 10, which is just getting under way.

The BTS had planned to use its implementation plans for projects 2, 3, 5, and 9 to develop data improvement projects during the 2002 and 2003 fiscal years. However, Federal budgetary changes during summer 2001 affected funding for the *Safety Data Action Plan* projects. Seven BTS statisticians are available for part-time assignment to database audits, but these staffers are also responsible for developing data quality standards, and producing GPRA-related reports. The Data Initiative Working Group, consisting of mid-level managers from the operating administrations of the DOT, meets bimonthly and is currently reviewing final reports for the 10 research projects performed in 2001.

[51] TEA-21 gave the BTS the authority to audit data systems used to provide DOT performance measures.

Chapter 5

Analysis

The Safety Board has issued a variety of recommendations seeking the improvement of transportation safety data. An analysis of past recommendations revealed that roughly 30 percent of the Board's data recommendations addressed the collection or use of exposure data in some way. These measures are needed to calculate broad safety indicators (for example, fatality rates), risks for operational categories (for example, vehicle type comparisons), and to evaluate safety interventions (for example, seat belt use).

Broad indicators of transportation activity, such as vehicle miles, vehicle departures, hours of operation, or passenger miles, are available in all modes of transportation. These measures are commonly used to calculate accident and injury rates by qualifying how often a risk event had the chance to occur. Most activity measures are derived by estimation methods that vary by mode. For example, a vehicle census or an operator survey may be used to develop transportation activity estimates. Depending on the estimation method used, different activity measures will have varying levels of precision.

Although the Safety Board recognizes that broad indicators of transportation activity are well documented, activity measures specific to operational segments within a mode of transportation are less likely to be available. Activity measures for specific segments of transportation are necessary for safety comparisons between groups, such as comparing the safety of different models of vehicles or comparing operators with different levels of training. They are also useful for determining the effectiveness of safety interventions, particularly those designed to target specific operators, equipment, or conditions.

There are many examples of exposure data limitations that restrict the transportation community's ability to assess risk. In aviation, for example, the flight hour activity for air carrier nonrevenue flights are not reported, activity of air tour operators is based on survey responses from a small fraction of aircraft owners, and no reliable estimates of general aviation departures are available. Activity data are sparse for recreational boating, with only one national survey conducted in the last 10 years. Data describing activity at the Nation's highway–rail crossings are lacking. The U.S. Census Bureau conducts the Vehicle Inventory and Use Survey that estimates miles traveled, but that data cannot support comparisons of certain types of interstate versus intrastate operations. Estimates of active pipeline mileage are available, through the Federal Energy Regulatory Commission, for only some varieties of pipelines that carry potentially hazardous petroleum products. The collection of more detailed exposure data would support improved safety surveillance, making it possible to normalize accident trends within each sector and to monitor overall risk.

Many existing exposure data collection programs are insufficient to support the analysis of risk factors for transportation accidents because they lack adequate detail. For example, general aviation exposure data are expressed in terms of annual flight hours by aircraft category and region, but the FAA does not collect data describing the characteristics of active pilots, flight conditions, or specific models of aircraft flown. In the highway mode, the FHWA collects highway exposure data including annual vehicles miles traveled, but the data do not describe driver characteristics, driving conditions, or specific vehicle models. In the marine mode, DOT databases provide no information on passenger or cargo movement via commercial vessels, and surveys of recreational boat use are conducted at infrequent, irregular intervals and therefore do not collect standard information over time. The FRA requires railroads to submit exposure data including train miles, freight train miles, and passenger train miles, but the FRA does not collect exposure data describing train or highway vehicle activity at highway–rail crossings despite the fact that hundreds more people die at grade crossings than die as train passengers. The FTA collects transit exposure data including passenger miles traveled, vehicle miles traveled, vehicle hours, and unlinked passenger trips, but FTA exposure data contain little or no information about the population of transit users. Without detailed information about the people and vehicles involved in transportation activities, and the conditions under which such activities take place, it is difficult to assess the degree to which various factors may influence the likelihood and severity of transportation accidents. This circumstance lessens the usefulness of the relatively detailed data collected for transportation accidents as a tool for monitoring and improving transportation safety.

The BTS addressed exposure data issues as part of the Safety Data Initiative through its project 3, *Common Denominators for Safety Measures*. The term for that project's "common denominators" refers to the relationship between accident measures and representative exposure data that are used to assess transportation risks. The BTS report concluded that exposure data collection could be made more consistent across the modes, and recommended the collection of information such as trip length, trip time, number of vehicle occupants, and hours of duty for most modes. The BTS has also been developing its Omnibus and ATS surveys to collect better data on household travel activity. These surveys may facilitate better analysis of risk factors for the most common forms of travel, such as personal highway vehicle travel. However, these surveys are not as useful for qualifying travel for specific types of vehicles or for specific purposes, such as commercial trucks. The Safety Board concludes that the DOT's exposure data collection programs can be improved and expanded to better support the monitoring of accident risk for specific transportation sectors, to support the detailed analysis of risk factors, and to evaluate the effectiveness of strategies for preventing transportation accidents.

Any programmatic effort to improve exposure data collection and make it more relevant for safety data analysis will require the participation and expertise of the operating administrations of the DOT. It will also require consideration of the statistical methods to appropriately use the data. Congress made the BTS responsible for issuing data collection guidelines and implementing a comprehensive long-term data collection program. It is therefore logical that the BTS would be the appropriate agency to lead any

DOT-wide effort to improve exposure data. The Safety Board concludes that the BTS should develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States. Within each mode, representative exposure data should be maintained for distinct transportation sectors, industry segments, or travel purposes because these differences relate to unique operational and/or regulatory characteristics. These data should be collected in such a fashion that they are useful for: (a) the normalization of accident data on at least an annual basis; (b) the analysis of risk factors involving people, vehicles, and environments; and (c) the evaluation of safety improvement strategies implemented at the State or national level.

In reviewing BTS efforts to establish data quality standards, identify information gaps, and ensure compatibility between DOT safety data systems, the Safety Board recognizes a number of important BTS accomplishments. The BTS has drafted standards for data collection and analysis, and these standards are being refined as BTS staff gain experience during audits of existing DOT databases. The agency has published several reports identifying DOT safety data gaps, including *Information Needs to Support State and Local Transportation Decision Making*, published in 1997, and *Transportation Statistics Beyond ISTEA: Critical Gaps and Strategic Responses*, published in 1998. The BTS has identified additional gaps through its Safety Data Initiative and Data Gaps projects, which began in 1999 and 2001, respectively. The BTS has also begun to explore areas of incompatibility among different DOT safety data systems through the Safety Data Initiative. In short, the BTS has led safety data improvement efforts in recent years, and the Safety Board commends the DOT's efforts in this area.

Although the BTS does not have the authority to require changes in data collection programs, the BTS is authorized to audit safety databases that are used to calculate DOT performance measures. These audits will help to highlight areas of inconsistency between the modal databases and should point out specific problems in each database involving the completeness of records. These audits should lay the groundwork for future cooperative efforts aimed at improving DOT safety data. The BTS will complete five such audits during the 2002 fiscal year and plans to continue at a rate of five audits per year given current resources. At that pace, it will take at least 8 years for the BTS to audit the 40-plus safety databases mentioned in the *Safety Data Action Plan*. After these audits are completed, additional time will be required for the modal agencies to make voluntary changes that may remedy deficiencies identified in BTS audits. BTS audits of DOT-sponsored safety databases need to be accelerated to support timely, coordinated reengineering efforts by the modal agencies. The Safety Board urges the BTS to complete audits of the 40-plus safety data systems referenced in the *Safety Data Action Plan* and make the results of these audits available to modal administrations prior to modal reengineering of those data systems.

Conclusions

1. The Department of Transportation's exposure data collection programs can be improved and expanded to better support the monitoring of accident risk for specific transportation sectors, to support the detailed analysis of risk factors, and to evaluate the effectiveness of strategies for preventing transportation accidents.

2. Bureau of Transportation Statistics audits of Department of Transportation-sponsored safety databases need to be accelerated to support timely, coordinated reengineering efforts by the modal agencies.

Recommendations

As a result of this safety study, the Safety Board made the following recommendation to the Bureau of Transportation Statistics:

> Develop a long-term program to improve the collection of data describing exposure to transportation risk in the United States. Within each mode, representative exposure data should be maintained for distinct transportation sectors, industry segments, and travel purposes. (I-02-05)

By the National Transportation Safety Board

Marion C. Blakey
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September 11, 2002

Appendix A

Major Federal Safety and Activity Databases

NTSB Aviation Accident Database
FAA Accident/Incident Data System (AIDS)
FAA/NASA Aviation Safety Reporting System (ASRS)
FAA National Airspace Incident Monitoring System (NAIMS)
FAA General Aviation and Air Taxi Activity Survey (GAATA Survey)
Near Mid-Air Collisions System (NMACS)
Pilot Deviations (PD)
Operational Errors (OE)
BTS Omnibus Survey
BTS Form 41, Schedules T100 and T100(f) Air Carrier Data
BTS Form 41 T-3 passengers enplaned and other traffic data
NHTSA Fatality Analysis Reporting System (FARS)
NHTSA National Accident Sampling System/General Estimates System (NASS/GES)
NHTSA National Accident Sampling System/Crashworthiness Data System (NASS/CDS)
NHTSA Crash Outcome Data Evaluation System (CODES)
NHTSA Motor Vehicle Defects Investigation Database
NHTSA Motor Vehicle Defects Non-compliance Database
NHTSA National Occupant Protection Use Survey (NOPUS)
FHWA Highway Performance Monitoring System (HPMS)
FHWA Licensed Drivers Data
FHWA/BTS National Household Travel Survey (NHTS)
FMCSA Motor Carrier Management Information System (MCMIS)
FRA Rail Equipment Accident/Incident Report (RAIR) Database
FRA Highway-Rail Grade Crossing Incident Report (GXIR) Database
FRA Railroad Injury and Illness Summary Database
FRA Railroad Operations Database
FTA National Transit Database (NTD)
FTA Safety Management Information Statistics (SAMIS) Database
RSPA Hazardous Liquid Pipelines Accident Database
RSPA Natural Gas Gathering and Transmission Systems Incident Database
RSPA Natural Gas Distribution Systems Incident Database
RSPA Hazardous Materials Information System (HMIS) Incident Database
U.S. Army Corps of Engineers Lock Performance Monitoring System
U.S. Census Bureau/BTS Commodity Flow Survey (CFS)
University of Michigan Transportation Research Institute
    Trucks Involved in Fatal Accidents (TIFA)
USCG Boating Accident Report Database (BARD)

USCG Search And Rescue Management Information System (SARMIS)
USCG Marine Safety Information System (MSIS) Vessel Casualty Data
USCG Marine Safety Information System (MSIS) Pollution Data
USCG Merchant Mariner Licensing and Documentation (MMLD) System
USCG Marine Information for Safety and Law Enforcement (MISLE)

More information on these and other sources of transportation safety data is available on the Bureau of Transportation Statistic's Web site <http://www.bts.gov>.

Appendix B

Data Recommendations by Mode and Topic

The National Transportation Safety Board maintains a status record of safety recommendations. Responses to a given safety recommendation are classified to track the action taken by the recommendation recipient. This appendix uses the following recommendation status classifications:

Recommendation status and abbreviation used in this appendix	Description of status
Open—Await Response (OAWR)	Automatically assigned to newly issued safety recommendations.
Open—Response Received (ORR)	Recipient response under evaluation but has not been approved by the Board Members.
Open—Acceptable Response (OAR)	Recipient response indicates a planned action that would comply with the safety recommendation when completed.
Open—Acceptable Alternate Response (OAAR)	Response by recipient indicates an alternate plan that would satisfy the objective of the safety recommendation when implemented.
Open—Unacceptable Response (OUR)	Response by recipient expresses disagreement with the need outlined in the recommendation or action is not being taken in a timely manner.
Closed—Exceeds Recommended Action (CERA)	Response to safety recommendation has been completed and surpassed what the Safety Board envisioned.
Closed—Acceptable Action (CAA)	Response by recipient indicates action on the safety recommendation has been completed and meets the objective of the recommendation.
Closed—Acceptable Alternate Action (CAAA)	Response by recipient indicates an alternate course of action has been completed that meets the objective of the recommendation.
Closed—Unacceptable Action (CUA)	Response by recipient expresses disagreement with the need outlined in the recommendation.
Closed—Unacceptable Action/ No Response Received (CUAN)	No response to the recommendation was ever received.
Closed—No Longer Applicable (CNLA)	The recommended action has been overtaken by events.
Closed—Reconsidered (CR)	Recipient rejects the safety recommendation and supports this rejection with a rationale with which the Board concurs.
Closed—Superseded (CS)	Applied to a previous recommendation held in an open status when a new, more appropriate safety recommendation is issued.

Aviation

Databases related to aviation data recommendations issued by the National Transportation Safety Board are listed below. Most of these databases are maintained by the FAA, two are maintained by the BTS, and one—the Aviation Accident/Incident Database—is maintained by the Safety Board.

Database name or description	Sponsoring organization
Automated Runway Incursion Information System	Federal Aviation Administration
Aviation Accident/Incident Database	National Transportation Safety Board
Aviation Safety Reporting System (ASRS)	Federal Aviation Administration
BTS Form 298–C, Report of Financial and Operating Statistics for Small Aircraft Operators	Bureau of Transportation Statistics
BTS Form 41, Schedules T100 and T100(f), U.S. Air Carrier Traffic and Capacity Data	Bureau of Transportation Statistics
Civil Aircraft Registry	Federal Aviation Administration
Comprehensive Airmen Information System (CAIS)	Federal Aviation Administration
FAA Incident Data System (FIDS)	Federal Aviation Administration
Federal Aviation Interactive Reporting System (FAIRS)	General Services Administration
General Aviation and Air Taxi Activity (GAATA) Survey	Federal Aviation Administration
List of air taxi certificate holders	Federal Aviation Administration
Mechanical Reliability Reports (MRR)	Federal Aviation Administration
National Wildlife Strike Database	Federal Aviation Administration
Near Midair Collision System (NMACS)	Federal Aviation Administration
Operational Errors (OE)	Federal Aviation Administration
Pilot Deviations (PD)	Federal Aviation Administration
Service Difficulty Reporting (SDR) Database	Federal Aviation Administration

Aircraft Accident/Incident Data

Recommendation	Recipient and recommended action	Status
A-68-033	FAA: Monitor the Lebanon VOR area for signal interference. Install dual navigation facilities at locations where potential problems are found. Review pertinent standards for compatibility of ground and airborne navigation components. Provide leadership in developing and implementing an industrywide operational incident reporting system for the interim period. Ensure a wider dissemination of existing operational incident data among elements of your organization.	CAA
A-72-148	FAA: Require incident reporting of events involving damage/injury from jet blast during ground operation not incident to flight.	CUA
A-72-165	FAA: Develop a system to evaluate the effectiveness of improvements and developments in midair collision avoidance systems, to assess, measure, and analyze hazard trends.	CUA

Recommendation	Recipient and recommended action	Status
A-90-014	FAA: Establish reporting requirements, a reporting system, and a database on successful and unsuccessful high energy rejected takeoffs of transport category airplanes.	CR
A-91-041	FAA: Establish a national database for the purpose of identifying and tracking pilots who have been involved in accidents and/or have violated FARs, and correlate activity of such pilots with the designated pilot examiner who administered their flight test(s).	CAA
A-93-166	FAA: Direct the Office of Aviation System Standards to implement an appropriate management/supervisor structure to ensure that a method of resolving conflicts, grievances, and incident reporting exists at the appropriate management level in each flight inspection area office.	CS
A-940-87[a]	FAA: Improve criteria to specify the operational and maintenance related incidents that are required to be reported to a central aviation authority, and implement procedures to verify that all incidents meeting such criteria are being reported.	CAA
A-94-088	FAA: Develop and implement a program guaranteeing that personnel who bring safety-related concerns to the attention of management can do so without fear of retribution, and with assurance that such concerns will be addressed thoroughly and impartially.	CAA
A-94-057	FAA: Require reporting of wake vortex encounters and establish a system to collect and analyze pertinent information, such as recorded radar data, atmospheric data, and operational information, including selected flight data recorder data.	CUA
A-96-042	FAA: Issue appropriate bulletins to urge pilots and maintenance personnel to report all bird strike incidents using FAA form 5200-7.	CAA
A-96-062	FAA: Develop an organizational structure and a communications system that will enable the aircraft evaluation group (AEG) to obtain and record all domestic and foreign aircraft and parts/systems manufacturers' reports and analyses concerning incidents and accidents involving aircraft types operated in the United States, and ensure that the information is collected in a timely manner for effective AEG monitoring of the continued airworthiness of aircraft.	CUA
A-00-018	FAA: Consider the accident and incident history of foreign air carriers as a factor when evaluating the adequacy of a foreign civil aviation authority's oversight and whether a reassessment may be warranted.	CAA

[a] Safety Recommendation A-94-087 is also listed in the table of safety recommendations that addressed data concerning maintenance incidents and related information.

Air Traffic/Operational Incident Data

Recommendation	Recipient and recommended action	Status
A-69-030[a]	FAA: (1) Amend the FARs to require reporting of additional flight safety incidents and delete from the regulations the operators' option to file such reports. (2) Establish requirements for reporting operational incidents, particularly those involving the air traffic control system. (3) Provide for input of mechanical interruption summary data into the MAC computer system. (4) Improvement of risk factor assignment criteria and evaluation, and inclusion of these data into the computer program with readily available retrieval capability.	CAA
A-81-154	FAA: Establish a program to periodically reemphasize use of the NASA ASRS by controllers to report hazardous conditions.	CAA
A-83-037	FAA: Expedite the development and implementation of computer programming procedures at all appropriately equipped en route and terminal radar facilities by which less-than-standard aircraft separation occurrences are automatically detected and flagged for investigation and analysis of possible controller errors or pilot deviations.	CAAA
A-83-038	FAA: Institute air traffic control directives and procedures to require, when the assigned first-line supervisor is occupied working a control position, that there is adequate supervision to ensure detection and reporting of all controller errors or deviations, detection and monitoring of fatigue and/or stress, and control of each controller's workload.	CUA
A-83-039	FAA: Revise immediately air traffic control directives to reduce or eliminate, possibly by means of an immunity program, the punitive nature of controller operational error/deviation investigation.	CAA
A-83-040	FAA: Improve compliance with existing directives to air traffic controllers and staff on the use of the FAA-sponsored NASA ASRS program to supplement existing incident reporting programs, with the view toward instituting quality control measures and improvements in the traffic control system.	CAA
A-86-039	FAA: Revise the near-midair collision reporting and investigating program to make clear that near collisions on or near the airport surface constitute an occurrence which must be investigated as a near-midair collision.	CUA
A-86-040	FAA: Revise and enforce the requirements to report and investigate operational errors, pilot deviations, and near-midair collisions that involve aircraft on the ground and in the air, and develop a combined database for causal analyses of runway incursion incidents.	CAA
A-00-027	FAA: Establish a formal method for air traffic control personnel to report instances in which sectors become overloaded so that the circumstances causing or permitting overloading can be identified and addressed.	CUA

Recommendation	Recipient and recommended action	Status
A-00-037	FAA: Amend FAA Order 7110.65, “Air Traffic Control,” to require that controllers ask any member of a flight crew receiving ATC services who expresses concern about the proximity of another aircraft if he or she desires to file a formal near-midair collision report.	CAAA
A-00-038	FAA: Modify FAA form 8020-21, “Preliminary Near Midair Collision Report,” to include a section describing air traffic control actions relevant to the incident.	CAA

ASRS = Aviation Safety Reporting System, NASA = National Aeronautics and Space Administration.

[a] Safety Recommendation A-69-030 was a multi-part recommendation; it is also listed in the table of safety recommendations that addressed data concerning maintenance incidents and related information.

Maintenance Incidents and Related Information

Recommendation	Recipient and recommended action	Status
A-69-030[a]	FAA: (1) Amend the FARs to require reporting of additional flight safety incidents and delete from the regulations the operators’ option to file such reports. (2) Establish requirements for reporting operational incidents, particularly those involving the air traffic control system. (3) Provide for input of mechanical interruption summary data into the MAC computer system. (4) Improvement of risk factor assignment criteria and evaluation, and inclusion of these data into the computer program with readily available retrieval capability.	CAA
A-79-104	FAA: (a) Revise 14 CFR 121 to require that operators investigate and report the circumstances of any incident wherein damage is inflicted on a component identified as “structurally significant” regardless of the phase of flight, ground operation, or maintenance in which the incident occurred; and (b) require that damage reports be evaluated by appropriate FAA personnel to determine whether the damage cause is indicative of an unsafe practice and assure that proper actions are taken to disseminate relevant safety information to other operators and maintenance facilities.	CUA
A-80-050	FAA: Issue an advisory circular, or by other means, advise operators of specific illustrations of failures and malfunctions which should be reported to the SDR program under 14 CFR 121.703(c) and 14 CFR 135.415(c).	CAA
A-84-008	FAA: Provide air carrier inspectors, for use in their surveillance activities, failure trend information based on airline maintenance data which have been reported by airlines, and analyzed and ranked by the FAA for their significance on flight safety.	CAA
A-90-172	FAA: Create the mechanism to support a historical database of worldwide engine rotary part failures to facilitate design assessments and comparative safety analysis during certification reviews and other FAA research.	CAA
A-93-061	FAA: Establish standardized reporting formats for malfunction defect reports and SDRs that include the capability for electronic submission. Encourage electronic submission for all operations under 14 CFR Parts 21, 43, 91, 121, 125, 127, 135, and 145.	CAA

Recommendation	Recipient and recommended action	Status
A-93-062	FAA: Encourage persons or organizations operating under 14 CFR Parts 43 and 91 to submit malfunction or defect reports and provide guidance to improve the quality and content of the general aviation service difficulty database.	CAA
A-93-063	FAA: Ensure prompt analysis and dissemination of SDR data and dissemination of alerting information is being accomplished in accordance with FAA policies and procedures.	CAA
A-93-064	FAA: Encourage foreign regulatory agencies to provide service difficulty data from resident operators and manufacturers to the FAA for incorporation into the FAA service difficulty database.	CAA
A-94-087[b]	FAA: Improve criteria to specify the operational and maintenance related incidents that are required to be reported to a central aviation authority, and implement procedures to verify that all incidents meeting such criteria are being reported.	CAA
A-97-125	FAA: Modify the SDR system so that it contains more complete and accurate information about component failures; for example, (a) revise the SDR form and database to include cycles and times since last inspection for failed components; (b) relate to the operators the need for complete and accurate information when they report component failures; and (c) remind FAA inspectors assigned to Part 121 and Part 135 operators of their need to review the component failure reports for accuracy and completeness.	CAA

SDR = Service Difficulty Report.

[a] Safety Recommendation A-69-030 was a multI-part recommendation; it is also listed in the table of safety recommendations that addressed air traffic/operational incident data.

[b] Safety Recommendation A-94-087 is also listed in the table of safety recommendations that addressed aircraft accident/incident data.

Exposure Data

Recommendation	Recipient and recommended action	Status
A-72-172	FAA: Establish and maintain a separate listing of all current holders of air taxi operator certificates to permit identification of each operator by type of service performed.	CAA
A-72-191	CAB: Require all air taxi operators registered with the CAB, and designated as commuter air carriers, to report hours flown, miles flown, and number of departures in scheduled revenue operations.	CNLA
A-72-192	CAB: Require all air taxi operators to report passengers carried, hours flown, and miles flown, and number of departures in revenue operation.	CNLA
A-74-042	FAA: Collect from commercial operators and make available, on a calendar year basis: (a) for nonrevenue operations, hours flown, miles flown, and departures; (b) for passenger and cargo operations, separate tabulations of hours flown, miles flown, departures, freight ton-miles flown, and freight ton-miles available; and (c) for passenger operations, seat-miles available and passenger-miles flown.	CUA

Recommendation	Recipient and recommended action	Status
A-74-043	FAA: Conduct a comprehensive sampling survey to estimate general aviation departures by make and model and by the kinds of flying depicted on the aircraft registration, identification, and activity report (AC form 8050-73).	CUA
A-74-044	CAB: Require the periodic reporting of certain additional statistical activity data for certificated route and supplemental air carrier operations.	CNLA
A-79-044	FAA: Generate, through a stratified sampling of general aviation pilots, representative data about general aviation flight activity.	CUA
A-85-013	FAA: Require the registration of ultralight vehicles and develop a mail notification system for effective dissemination of significant safety information to owners of new and used ultralight vehicles.	CAAA
A-93-12	DOT: Devise a method for collecting data from air tour operators that can be included in civil aviation exposure information for industry comparisons.	CS
A-95-057	DOT: Establish and maintain a database of all air tour operators that would provide data for use in determining the scope of air tour operations and accident rates that can be used to assess the safety of the air tour industry.	CUA
A-97-053	FAA: Revise procedures for registering experimental aircraft built from kits so that the Aircraft Registry database reflects the aircraft kit manufacturer, model name and serial number, and make and model of installed powerplant.	CAA
A-01-073	FAA: Revise the GAATA Survey to more clearly distinguish between government aircraft operations that qualify for legal public aircraft status and those that do not.	OAR
A-01-074	FAA: Identify and implement methods independent of the GAATA Survey to check the accuracy of nonairline flight hour estimates.	OAR
A-01-075	FAA: Implement a program to (a) measure and track currency of aircraft owner contact information in the Civil Aircraft Registry, and (b) systematically improve the currency of this information.	OAR
A-01-076	FAA: Revise the sampling strategy of the GAATA Survey to achieve a precision of public use flight hour estimates equivalent to the precision of estimates for personal, business, or corporate general aviation.	OAR
A-01-077	FAA: Develop a new reporting matrix on the GAATA Survey form that separates administrative purpose-of-flight from the actual flying activity performed. Incorporate these changes in published flight hour estimates.	OAR
A-01-078	FAA: Revise the GAATA Survey form so that aircraft owners can report public aircraft flight hours according to the level of government served (Federal, State, or local) within each purpose-of-flight.	OAR
A-01-079	FAA: Remove Civil Air Patrol flight hours from future estimates of public aircraft activity so that the figures are consistent with the current legal definition of public aircraft.	OAR
A-01-080	FAA: With GSA, define purpose-of-flight categories in the FAIRS that correspond to purpose-of-flight categories in the GAATA Survey.	OAR

Recommendation	Recipient and recommended action	Status
A-01-081	GSA: Collect data in such a way that it is possible to distinguish Federal public from other Federal aircraft operations.	OAR
A-01-082	GSA: With FAA, define purpose-of-flight categories in the FAIRS that correspond to purpose-of-flight categories in the GAATA Survey	OAR

GAATA Survey = General Aviation and Air Taxi Activity Survey, FAIRS = Federal Aviation Interactive Reporting System.

Toxicological Testing

Recommendation	Recipient and recommended action	Status
A-84-046	FAA: Issue a rule which establishes implied consent to toxicological testing as a condition of issuance of an airman certificate.	CAA
A-88-036	FAA: Require commercial operators to collect or to cause the collection of toxicological speciments from surviving crewmembers involved in reportable aircraft incidents or accidents.	CUA
A-92-107	FAA: Establish procedures for receiving, processing, and analyzing toxicological test results reported by the States.	CAA
A-92-108	FAA: Distribute, in conjunction with the NASAO, to State aviation authorities and law enforcement agencies the procedures for States to follow when notifying the FAA of toxicological test results and refusals to submit to testing.	CAA
A-92-109	FAA: Amend 14 CFR 91.17 to require crewmembers to submit to a toxicological test for drugs when, under authorization of State or local laws, a test is requested by a law enforcement officer.	CUA
A-92-110	FAA: In cooperation with industry organizations, develop and disseminate new informational materials on (a) effects of alcohol and other drugs on flying and in general aviation accidents, and (b) procedures or actions that will encourage pilots, fixed-base operator personnel and others to intervene when a general aviation pilot attempts to fly after consuming alcohol or using other drugs.	CAA
A-92-113	States: Enact comprehensive laws pertaining to alcohol and drug use in aviation, or amend existing laws as appropriate.	Various

NASAO = National Association of State Aviation Officials.

Other Topics

Recommendation	Recipient and recommended action	Status
A-72-193	CAB: In proceedings involving suspension of service by a certificated carrier and substitution of service by an air taxi commuter operator, request of the FAA a written safety evaluation of such an operator; make a specific finding as to the operator's safety fitness; and place the FAA evaluation in the public docket of such a proceeding. The evaluation should include all accident data concerning the operator available in NTSB files.	CAA
A-72-230	FAA: Conduct further statistical review, technical evaluation, and operational testing of those aircraft which exhibited a "very high" stall/spin frequency of occurrence.	CAA
A-76-128	FAA: Include in air carrier training programs flightcrew discussions of formal reports involving approach and landing accidents or incidents.	CAA
A-92-069	FAA: Ensure that flight attendant training programs provide detailed guidance on the relative probability of hazards associated with emergency situations, such as fire, toxic smoke, and explosion.	CAA
A-00-079	FAA: Review the 6-foot height requirement for exit assist means to determine if 6 feet continues to be the approprate height below which an assist means is not needed. The review should include, at a minimum, an examination of injuries sustained during evacuations.	OUA
A-00-091	FAA: Document the extent of false indications for cargo smoke detectors on all airplanes and improve the reliability of the detectors.	OAR

Highway

Databases related to highway data recommendations issued by the National Transportation Safety Board are listed below.

Database name or description	Sponsoring organization
Highway Management Information System (HMIS)	Federal Highway Administration
CDL Driver Database	Federal Motor Carrier Safety Administration
Fatality Analysis Reporting System (FARS)	National Highway Traffic Safety Administration
Florida Vehicle Database	Florida Department of Motor Vehicles
Insurance Industry Data Systems	Insurance Companies
National Accident Sampling System (NASS)	National Highway Traffic Safety Administration
National Commercial Truck Database System	National Governors Association
National Electronic Injury Surveillance System (NEISS)	U.S. Department of Health and Human Services
Safety Net	Federal Highway Administration
State Police Accident Reports & Data Systems	States

CDL = commercial driver's license

NASS Development

Recommendation	Recipient and recommended action	Status
H-78-020	FHWA: Conduct a comprehensive study to identify highway safety accident problem factors for which data must be collected to identify the problem magnitude, and support research and countermeasure formulation.	CAA
H-78-021	NHTSA: Establish a NASS advisory committee to provide NHTSA with a broader perspective on types of data that should be collected and methods of data storage and retrieval.	CAA
H-78-022	NHTSA: Study the practical problems associated with collecting key data, such as injury data, to determine the magnitude of any problems and to assess the impact on the effectiveness of the NASS program before selecting the number and location of future NASS investigation sites.	CAA
H-78-023	NHTSA: Study effects on cost and quality of data collection that could result from the need for NASS investigators to testify in liability cases resulting from motor vehicle accidents.	CAA
H-78-024	NHTSA: Do not increase the number of NASS accident investigation sites until after experience with field data collection and processing is evaluated, exposure data system design, sample design, accident causation methodology, and other NASS studies are completed and a comprehensive plan is made public.	CAA

Recommendation	Recipient and recommended action	Status
H-78-025	NHTSA: Retain sanitized accident reports and case files completed by each NASS investigation team and file at a central location for use by persons interested in further research.	CAA
H-78-026	NHTSA: Revise currently proposed NASS data collection forms to include substantially increased emphasis on the highway environment.	CAA

Work Zones

Recommendation	Recipient and recommended action	Status
H-92-032	NHTSA: Revise reporting of work zone fatalities to distinguish persons driving highway maintenance vehicles within work zones from other drivers who crash while traversing the work zone site.	CAAA
H-92-033	NHTSA: Review, with FHWA, all State accident report forms, select elements that comprehensively document work zone accidents, and encourage the States to incorporate these elements in their accident report forms.	CAA
H-92-034	FHWA: Review, with NHTSA, all State accident report forms, select elements that comprehensively document work zone accidents, and encourage the States to incorporate these elements in their accident report forms.	CAA
H-92-035	FHWA: Develop a program to collect exposure data for construction work zones on the Interstate system.	OAR

School Buses

Recommendation	Recipient and recommended action	Status
H-70-015	NHTSA: Examine, in accident research investigations and studies, the nature of school bus disintegration and its significance in injury causation.	CAA
H-85-009	Florida Department of Highway Safety and Motor Vehicles: Adopt regulations to require the owner of a private bus to declare annually if the bus is to be used for pupil transportation; use the data to identify privately owned and operated schoolbuses subject to vehicle inspection and driver certification requirements	OAR
H-89-049	NHTSA: Collect and evaluate accident data on the crash performance of the roof and emergency exits on small school buses in rollovers.	CAA

Recommendation	Recipient and recommended action	Status
H-89-050	NHTSA: Collect and evaluate accident data involving small school buses to ascertain whether school buses rated 10,000 pounds or less should be required to meet *Federal Motor Vehicle Safety Standard* 221, regarding body joint strength	CAA
H-99-052	NHTSA: Modify methods of collecting accurate, timely, and sufficient data on passenger injuries resulting from school bus accidents so that thorough assessments can be made relating to school bus safety.	CAA

Commuter Buses

Recommendation	Recipient and recommended action	Status
H-81-055	DOT: Establish a separate vehicle classification for commuter buses for the collection of accident data and development of safety statistics.	CUA
H-81-056	DOT: Institute a program for gathering and analyzing exposure data for the commuter bus industry.	CUA

Air Bag and Restraint Use

Recommendation	Recipient and recommended action	Status
H-83-063	States: Use State accident data systems to collect and analyze data on the use/misuse of child safety seats.	CAA
H-85-023	NHTSA: Add child safety seat use/misuse variables to FARS.	CUA
H-85-024	NHTSA: Revise NASS report forms to include additional information on restraint and child seat misuse.	CR
H-85-026	NHTSA: Train NASS investigation teams to investigate child seat use/misuse.	CR
H-96-017	NHTSA: Evaluate passenger-side air bag safety using all available data; modify performance and testing requirements	CAA
H-97-004	States: Replace current restraint use data collection systems with uniform procedures, tools, and sampling procedures to be provided by NHTSA.	Various
H-97-013	NHTSA: Establish, with CDC, database of airbag-induced injuries identified by the medical community.	OAAR
H-97-022	CDC: Establish, with NHTSA, database of airbag-induced injuries identified by the medical community.	OAR

Motor Carriers and Commercial Vehicles

Recommendation	Recipient and recommended action	Status
H-81-002	FHWA: Establish database to study relation between Federal motor carrier/hazmat regulations and motor carrier accident/incidents.	CAA
H-81-003	FHWA: Perform periodic inspections providing statistically valid data on carrier compliance with Federal motor carrier safety regulations and motor vehicle-related Federal hazardous materials regulations.	CAA
H-81-004	FHWA: Develop a plan for using the management information system of the Bureau of Motor Carrier Safety for improving enforcement, evaluating the effectiveness of enforcement, and for assisting State enforcement programs.	CAAA
H-81-005	FHWA: Allocate more resources to the development of the Bureau of Motor Carrier Safety's management information system.	CAA
H-81-006	FHWA: Develop explicit criteria to ensure that the resources of the Bureau of Motor Carrier Safety are focused on companies in most need of attention; include such factors as accident experience and related exposure data.	CAA
H-83-038	AAMVA: Coordinate program among States to collect accident, traffic conviction, and other data for truckdrivers transporting hazardous materials.	CAA
H-88-027	RSPA: Revise the criteria for reporting hazardous materials incidents to include vacuum failures of cargo tanks.	CUA
H-88-029	State of California: Develop information system to serve as a clearinghouse for employment history and training data on commercial bus operators.	CAAA
H-90-012	DOT: Develop a program to merge elements concerning commercial vehicle operations from the separate DOT-operated and supported highway accident databases.	OAR
H-92-006	RSPA: Implement, in cooperation with FHWA, a program to collect information necessary to identify patterns of cargo tank equipment failures.	OAR
H-92-009	FHWA: Implement, in cooperation with RSPA, a program to collect information necessary to identify patterns of cargo tank equipment failures.	OUR
H-92-059	FHWA: Review the National Highway Data System to ensure that sufficient data can be obtained to readily evaluate the role of braking deficiencies in commercial vehicle accidents.	CAA
H-92-060	States: Encourage State commercial vehicle accident investigation agencies to develop policies requiring collection of data from injury or fatal accident-involved vehicles, especially brake system data.	Various
H-92-061	States: Review the National Highway Data System for your jurisdiction to ensure that sufficient data can be obtained to readily evaluate the role of braking deficiencies in commercial vehicle accidents.	Various

Recommendation	Recipient and recommended action	Status
H-92-062	States: Require towing companies, in order to preserve evidence for accident investigations, to employ methods of releasing locked airbrakes that do not alter brake adjustment when removing wreckage.	Various
H-92-063	TRAA and ITA: Encourage members to discontinue practice “backing off” airbrakes on commercial vehicles during wreckage removal.	OAWR

AAMVA = American Association of Motor Vehicle Administrators, TRAA = Towing and Recovery Association of America, ITA = Interstate Towing Association, “States” refers to the U.S. States, territories, and District of Columbia.

Toxicological Testing

Recommendation	Recipient and recommended action	Status
H-90-011	DOT: Assess and revise the reporting and accuracy of existing database elements regarding toxicological tests in DOT-operated and supported highway accident databases and trucking operations databases.	OAR
H-90-013	DOT and Others: Standardize procedures for postaccident toxicological specimen collection, chain of custody, testing, and reporting among the States for accidents involving medium and heavy trucks.	OAR
H-90-014	DOT and Others: Establish a postaccident alcohol and other drug analytic test plan with results reported at state-of-the-art sensitivity levels.	OAR
H-90-015	DOT: Provide funding incentives, guidance, and assistance to the States to obtain complete toxicological tests and report results to DOT on all vehicle operators in fatal commercial vehicle accidents.	OAWR
H-90-016	NHTSA: Revise the FARS to include standardized drug toxicological tests; use results to estimate national drug involvement in fatal accidents.	CAA
H-90-040	NGA: Coordinate development of national programs for state implementation of standardized testing for alcohol and other drugs.	CUAN
H-90-041	NGA: Develop a program for the reporting of all accident toxicological results to the national commercial truck database system.	CUAN
H-90-042	States: Enact legislation or issue regulations to require the collection of blood samples for alcohol and other drug toxicological testing from all vehicle operators in fatal commercial truck accidents.	CUA
H-90-043	States: Report alcohol and other drug toxicological tests requested and results obtained in fatal accidents to the FARS operated by NHTSA.	CUA

NGA = National Governors Association.

Accident Environment/Event Data

Recommendation	Recipient and recommended action	Status
H-81-021	NHTSA: Revise FARS form to record distance from edge of road to objects struck.	CR
H-81-025	States: Record distance from edge of road to objects struck, road curvature.	CR
H-81-052	Virginia: Revise accident data system to permit accident data storage and retrieval for each roadway on divided highway facilities.	CAAA
H-98-017	NHTSA: Include data element identifying cross median accidents in the Minimum Uniform Crash Criteria.	CAA

Accident Vehicle Data

Recommendation	Recipient and recommended action	Status
H-72-022	NHTSA: Expand data collection and analysis for recreational vehicles.	CAA
H-87-006	15 States and D.C.: Include vehicle identification number on police accident reports and computerized databases.	OAR
H-87-007	NHTSA: Include vehicle identification number in FARS accident records.	CAA
H-92-103	DOT: Encourage States to separate wheel from tire defects in accident vehicle records.	CAA

Other Topics

Recommendation	Recipient and recommended action	Status
H-72-039	DOT: Negotiate with U.S. Department of Health, Education, and Welfare to use the NEISS for collecting data on nonoperating motor vehicle accidents and injuries.	CAA
H-79-052	New York City Police Commissioner: Provide accident data to highway transportation officials until a central accident records system is implemented.	CAA
H-81-046	DOT: Direct NHTSA and FHWA to meet with All Insurance Research Advisory Council to establish consultative arrangement to use insurance industry data for agency research.	CAA
H-97-006	States: Incorporate standardized data elements developed by NHTSA, FRA, and Association of Governor's Highway Safety Representatives on State police accident report forms.	Various

Marine

Databases related to marine data recommendations issued by the National Transportation Safety Board are listed below.

Database name or description	Sponsoring organization
Boating Accident Report Database (BARD)	United States Coast Guard
State Boating Accident Report Databases	U.S. States and territories

BARD Development

Recommendation	Recipient and recommended action	Status
M-69-047	USCG and States: Use the same boating accident report form and collect more detailed information describing weather, engine and material failures, operator intoxication, and physical impairment. Conduct thorough, uniform investigations.	CNLA
M-71-020	USCG and States: Develop information useful for formulating preventative measures for boating accidents.	CAA
M-71-021	USCG: Consider the use of specially trained investigators who would be familiar with small boat design and operations, and who could conduct on-scene investigations in depth.	CAA
M-71-022	USCG and NASBLA: Consider establishment of a training program for boating accident investigators.	CAA
M-71-023	USCG: Evaluate the effectiveness of the present narrative boating accident investigation report as source of data documenting the need for minimum safety standards for recreational boats and equipment:	CAA
M-71-024	USCG: Consider limiting narrative reports to accidents investigated on scene and in sufficient detail to develop preventative measures.	CAA
M-71-025	USCG: Review boating accident reports, analyzing those involving similar or identical boats to determine design changes necessary to prevent recurrence.	CAA
M-71-026	States: Utilize Federal and State funds to increase the number of State boating officials and necessary equipment to expand and improve the effectiveness of boating accident investigations	CAA
M-71-027	USCG: Consider alternative investigative techniques in recreational boating accident investigations, such as those used in highway accidents, and select accidents for in-depth investigation which have the best potential for preventative countermeasures.	CAA
M-93-010	USCG: Implement a fatal accident reporting system, comparable to the NHTSA FARS, and develop a three-level report form and corresponding data files. Develop guidelines for the submission of data and standardization of cause codes. Develop uniform data entry at the State level	CAA

NASBLA = National Association of State Boating Law Administrators.

Tow Vessels and Inland Waterways

Recommendation	Recipient and recommended action	Status
M-71-008	USCG: Analyze the casualties involving towing vessels operating in inland waters to determine whether there is a need for legislation requiring inspection of all towing vessels.	CAAA
M-85-018	USCG: Analyze the cause of accidents in critical areas of western rivers which are difficult to navigate and in areas with above average accident rates or recurrent major accidents to determine which accidents resulted from personnel error or operator unfamiliarity with the area. Use this data to develop exam or exercise questions on local knowledge of these areas.	CAA
M-88-006	State of Louisiana: Require the Board of New Orleans-Baton Rouge Steamship Pilot Commissioners to compile data on accidents and submit an annual report to the Louisiana DOT.	CAA
M-00-010	USCG: Seek authority to require domestic towing companies to develop and implement an effective safety management system to ensure adequate management oversight of the maintenance and operation of all towing vessels.	OAAR

Survival Equipment

Recommendation	Recipient and recommended action	Status
M-71-031	USCG: Analyze casualty reports of towing vessels to evaluate the need for regulations requiring inflatable liferafts of sufficient capacity to accommodate all persons on board.	CAA
M-72-027	USCG: Analyze data on loss of U.S. vessels more than 20 miles off shore which were not subject to provisions of the 1960 SOLAS Convention and determine to what degree the carriage of emergency position-indicating radio beacons might have reduced loss of life; determine whether carriage of these beacons should be mandatory for these types of vessels.	CNLA
M-86-100	USCG: Revise the Boating Accident Report Form, in coordination with the NASBLA, to include data that would enable assessment of personal flotation device performance.	CAA

NASBLA = National Association of State Boating Law Administrators.

Toxicological Testing

Recommendation	Recipient and recommended action	Status
M-83-070	USCG: In coordination with the NASBLA, revise the Boating Accident Report Form to include a specific accident causal entry for alcohol involvement in recreational boating accidents.	CAA
M-83-074	NASBLA: In coordination with the USCG, revise the Boating Accident Report Form to include a specific accident causal entry for alcohol involvement in recreational boating accidents.	CAA
M-83-078	10 States: Require procedures for toxicological tests in the event of a recreational boating fatality to document the role of alcohol in recreational boating accidents and fatalities.	CS
M-93-002	States: Enact legislation requiring a chemical test to determine the blood alcohol concentration of all recreational boat operators involved in a fatal boating accident.	OAR
M-93-006	States: Enact legislation requiring toxicological testing of all recreational boating fatalities.	OAR
M-93-007	NASBLA: Urge members to seek legislative action requiring a chemical test to determine the blood alcohol concentration of all recreational boat operators involved in a fatal boating accident.	CAA

NASBLA = National Association of State Boating Law Administrators.

Marine Exposure Data

Recommendation	Recipient and recommended action	Status
M-72-003	USCG: (a) Evaluate conditions of marine traffic in major ports and waterways to determine needed traffic controls; (b) establish a priority list for establishment of traffic control; (c) compile casualty data on a more localized basis; (d) obtain data pertaining to traffic density, traffic patterns, types of cargo moved, and other pertinent data for determining the need for traffic control.	CAA
M-98-091	USCG: Collect recreational boating exposure data, such as “operational use time” or “vessel running time” and update this information on an annual basis or conduct periodic surveys	CAA

Pipeline

Databases related to pipeline data recommendations issued by the National Transportation Safety Board are listed below. All of these databases are maintained by RSPA.

Database name or description	Sponsoring organization
Incident Report: Gas Transmissions and Gathering Systems	Research and Special Programs Administration
Accident Report: Hazardous Liquid Pipeline	Research and Special Programs Administration
Incident Report: Gas Distribution System	Research and Special Programs Administration

Develop Analysis Plan

Recommendation	Recipient and recommended action	Status
P-78-058	RSPA: Publish a plan for using pipe safety data.	CS
P-78-061	RSPA: Computerize liquid pipeline accident data; analyze.	CUA
P-80-061	RSPA: Develop pipeline data analysis plan.	CUA
P-80-062	RSPA: Create office responsible for pipeline data analysis.	CAA
P-80-063	RSPA: Postpone promulgation of new forms until analysis plan in place.	CUA
P-90-009	Kansas Power & Light: Develop collection and analysis program.	CAA
P-96-001	RSPA: Develop plan for collection and analysis of gas and liquid data.	OAR

Excavation Exposure Data

Recommendation	Recipient and recommended action	Status
P-97-022	RSPA: Develop plan for collecting excavation damage exposure.	OAR
P-97-023	RSPA: Ensure that excavation exposure data are consistently collected.	OAR
P-97-024	RSPA: Use excavation exposure data to evaluate State safety programs.	OAR
P-97-026	APWA: Develop plan for collecting excavation damage exposure data.	CUAN
P-97-027	APWA: Ensure that excavation exposure data are consistently collected.	CUAN
P-97-028	APWA: Use excavation exposure data to evaluate State safety programs.	CUAN

APWA = American Public Works Association.

Improve Report Completeness/Accuracy

Recommendation	Recipient and recommended action	Status
P-78-060	RSPA: Improve instructions/definitions on liquid form.	CUA
P-78-062	RSPA: Check liquid reports for completeness.	CAA
P-80-064	RSPA: Improve directions on report forms, define uncommon terms.	CR
P-80-065	RSPA: Train personnel to validate incoming leak reports.	CAAA
P-97-020	RSPA: Distribute guidelines to operators to improve report accuracy.	OAR

Improve Event Identification

Recommendation	Recipient and recommended action	Status
P-68-002	RSPA: Improve communication with State agencies.	CAA
P-72-042	RSPA: Require operators to maintain leak/emergency report log.	CAAA
P-88-002	RSPA: Require reporting of incidents involving excess concentrations of hydrogen sulfide in gas pipes.	CUA

Redesign Pipeline Reporting System

Recommendation	Recipient and recommended action	Status
P-78-059	RSPA: Redesign liquid system to be more like gas.	CUA
P-97-021	RSPA: Revise incident categories on gas and liquid report forms.	OAR

Other Topics

Recommendation	Recipient and recommended action	Status
P-80-069	RSPA: Examine safety of fillet-welded reinforced sleeves using incident reports.	CUA
P-85-021	AGA: Companies examine records for failures like Phoenix, Arizona, accident.	CAA

AGA = American Gas Association.

Railroad

Databases related to railroad data recommendations issued by the National Transportation Safety Board are listed below.

Database name or description	Sponsoring organization
AAR–RPI Accident Data	Association of American Railroads
FRA test center data	Federal Railroad Administration
Grade Crossing Incident Report Database	Federal Railroad Administration
Grade Crossing Inventory Database	Federal Railroad Administration
Hours-of-Duty Records	Railroad Operators
Operator near-miss databases for highway–rail crossings	Railroad Operators
Railroad Accident/Incident Report Database	Federal Railroad Administration
TOFC/COFC Reporting System	Association of American Railroads

Highway–Rail Grade Crossings

Recommendation	Recipient and recommended action	Status
H-83-002	State of Arkansas: Encourage railroad companies operating within the State to develop a near-miss data system that will permit them to promptly report violators of grade crossing safety laws to State authorities.	CAA
H-96-001	DOT: Amend the DOT/Association of American Railroads Grade Crossing Inventory Database to include vertical profile information on all highway–rail grade crossings in the United States.	OAR
H-98-033	DOT: Develop a standardized hazard index or a safety prediction formula that will include all variables proven by research or experience to be useful in evaluating highway–rail grade crossings, and require the States to use it.	OAR

Hazardous Materials

Recommendation	Recipient and recommended action	Status
R-69-027	AAR: Review the function of the Bureau of Explosives (BE) regarding its performance in protecting the public from danger resulting from railroad accidents involving hazardous materials and develop a cooperative program with the carriers to help fulfill the BE's responsibility. The Safety Board endorses the FRA's proposed amendment to the regulations which will provide that reports of incidents and accidents involving hazardous materials presently made to the BE by rail carriers will also be filed with the FRA.	CNLA
R-79-016	FRA: Develop a database that will allow the definition and rating of railroad safety problems, particularly those related to derailment of hazardous materials.	CAA
R-80-014	DOT: Collect data on tank car derailment behavior to identify breach mechanisms, analyze these mechanisms, identify control methods, and incorporate findings in new car construction.	CAA

AAR = Association of American Railroads.

Rail Accident/Incident Data

Recommendation	Recipient and recommended action	Status
R-74-001	FRA: Revise criteria for reporting train accidents so that the causal categories involving rail failures are consistent with other FRA regulations and accurately identify areas requiring further corrective measures.	CAA
R-74-008	AAR and AREA: Gather and evaluate data necessary to identify the types and magnitude of rail failures experienced by American railroads. Computerize the information for rapid retrieval.	CAAA
R-78-005	FRA: Analyze the data relating to the role of radio in train accidents and report the findings.	CUA
R-83-106	FRA: Require that landslides on railroad rights-of-way be reported separately from other weather-related accident data.	CR
R-91-040	FRA: Require the recording of data pertaining to postcrash fires involving locomotive fuel tank rupture and spillage, and types of locomotives involved, to enhance current accident data collection and analysis.	CS
R-94-009	AAR: Collect data from your members on vessel collisions with railroad bridges and, if appropriate, take steps to increase protection for bridges identified as vulnerable.	CAA
R-96-013	FRA: Conduct appropriate research and develop a database that can be used to assess the risk posed by flattened rail heads.	CAAA

Recommendation	Recipient and recommended action	Status
R-97-011	FRA: Develop and maintain separate identifiable data records for commuter and intercity rail passenger operations.	OAR
R-95-023	AAR: Advise the NTSB within 90 days of progress toward developing and maintaining a database of incidents involving unsafe conditions for TOFC/COFC shipments.	CAA

AAR = Association of American Railroads, AREA = American Railway Engineering Association.

Toxicological Testing

Recommendation	Recipient and recommended action	Status
R-83-032	FRA: With the assistance of the AAR and the RLEA, develop and promulgate a requirement that alcohol/drug abuse involvement accidents/incidents be fully reported to the FRA.	CAA
R-88-023	FRA: Amend 49 CFR 219 to require postaccident toxicological testing of all employees in safety-sensitive positions.	CR
R-88-026	FRA: Amend 49 CFR 219 to require toxicological testing in all train accidents in which estimated railroad damage, based on replacement costs and other estimated losses, including nonrailroad property losses, are $150,000 or more.	CR
R-88-027	FRA: Amend 49 CFR 219 to require toxicological testing of all employees involved in any impact accident resulting in an injury as defined in 49 CFR 225.5(3)(III).	CR
R-88-031	FRA: Amend 49 CFR 219 to require railroads to collect all appropriate toxicological samples as soon as practicable and not more than 4 hours after the triggering event.	CAA
R-89-033	Burlington Northern Railroad Company: Reemphasize to on-line officers involved in the sample collection process the need to collect toxicological samples promptly.	CAA
R-01-017	FRA: Modify 49 *Code of Federal Regulations* 219.201(b) as necessary to ensure that the exemption from mandatory postaccident drug and alcohol testing does not apply to any railroad signal, maintenance, and other employees whose actions may have contributed to the occurrence or severity of the accident.	OAR

RLEA = Railway Labor Executives Association.

Rail Exposure Data

Recommendation	Recipient and recommended action	Status
R-91-039	FRA: Develop a uniform simplified format for work-record data collected by the rail carriers.	CAA
R-98-041	FRA: Modify the grade crossing inventory system to include information on (1) the sign distances available to a motorist, and (2) the presence of curves on the roadway and on the tracks. Direct States to include these data as a part of the regularly scheduled updates of the database.	CAA
R-98-042	FRA: Encourage the railroads to ensure that the U.S. Department of Transportation identification number is properly posted at all grade crossings.	OUR

Rail Maintenance Data

Recommendation	Recipient and recommended action	Status
R-72-001	FRA: (a) to the extent that data are available, promulgate regulations to insure the retirement of critical car components before normal service failure; (b) where data are not available, initiate programs to determine the data required to promulgate regulations in those areas; (c) promulgate regulations to prevent misapplication of critical components.	CNLA
R-00-009	FRA: Audit the AAR and individual railroad equipment repair databases to determine whether adequate quality control procedures have been incorporated to ensure that database information is complete, accurate, and secure. Direct the AAR and individual railroads to correct all identified deficiencies.	OAR

Transit

Databases related to transit data recommendations issued by the National Transportation Safety Board are listed below.

Database name or description	Sponsoring organization
Safety Management Information System	Federal Transit Administration
New York City Transit Authority Automated Management Information System	City of New York

Rail Rapid Transit

Recommendation	Recipient and recommended action	Status
R-71-019	FRA: Establish, by regulation, a uniform system of data gathering and accident reporting encompassing all the rail rapid transit operations in the United States from which safety statistics can be compiled.	CAA
R-73-034	State agencies authorizing rapid transit systems: Develop budget, planning, and technical safety capability competent to: (a) define safety criteria that the system must meet for operating authorizations to be issued; (b) describe the data that is to be presented, and the methods to be used by the transit authority in demonstrating to the agency that the system meets the safety criteria established; (c) schedule agency safety activities to be in consonance with the transit program development schedules.	CNLA
R-81-115	NYCTA: Revise the NYCTA Automated Management Information System to provide sufficient detailed information to permit analysis of the incidence and causes of equipment failures or malfunctions affecting the safety of passengers.	CAA
R-85-113	NYSPTSB: Require the NYCTA to establish integrated reporting systems on track and structures fires and car equipment fires.	CAA
R-85-114	NYSPTSB: Require the NYCTA to ensure that all track and structures fires and all repairs and maintenance of car equipment are being reported in its data collection systems.	CAA
R-88-034	UMTA: Require that all employees involved in a rail rapid transit accident with a fatality, injury, or property damage be tested in a timely manner for alcohol and drugs.	CS
R-91-036	UMTA: Develop an accident/incident reporting form for rail rapid transit systems that distinguishes between passenger and employee injuries and fatalities and require transit systems to file these reporting forms periodically. Publish this information and exposure rate data for each system annually. Regularly analyze the data to determine trends in accidents and injuries.	CAA

NYCTA = New York City Transit Authority, NYSPTSB = New York State Public Transportation Safety Board, UMTA was the Urban Mass Transportation Administration.

Transit Buses

Recommendation	Recipient and recommended action	Status
H-97-026	DOT: Collect accident data involving school children riding transit buses, including pedestrian accidents to assist development of appropriate means to ensure that school children riding on transit buses are afforded an equivalent level of operational safety as school children riding on school buses.	OAR
H-98-044	DOT: Collect accurate, timely, and sufficient data so thorough assessments can be made regarding transit bus safety.	OAR
H-98-045	DOT: Evaluate the collected data, as part of the oversight program, to identify the underlying causes of transit bus accidents that could lead to the identification of safety deficiencies at transit agencies.	OAWR

Intermodal

Databases related to intermodal data recommendations issued by the National Transportation Safety Board are listed below.

Database name or description	Sponsoring organization
Hazardous Materials Information System (HMIS)	Research and Special Programs Administration

Cross Modal Accident Data

Recommendation	Recipient and recommended action	Status
I-71-004	DOT: Develop and publish, on a regular basis, comparable data on losses and loss rates associated with all modes of freight transportation.	CNLA
I-81-010	DOT: Develop method to cross-reference accidents compiled by DOT administrations to periodically assess the validity of the data and the completeness of the data files.	CAA
I-01-001	RSPA: Ensure that comprehensive reports are submitted for all significant failures of US DOT specification containers of hazardous materials.	OAR

HMIS Development

Recommendation	Recipient and recommended action	Status
H-69-002	DOT: Develop a uniform, cross-modal reporting form for hazardous materials incidents and accidents.	CAA
H-69-003	DOT: Develop a centralized reporting system, coordinating the handling of reports of all hazardous materials incidents and accidents by carriers to the administrations and the Coast Guard, and operating through a central “clearinghouse” where such data would be collected and evaluated.	CAA
H-69-004	DOT: Develop uniform regulations for all modes of transport relating to the shipment and carriage of hazardous materials to assure substantial uniformity as to reporting requirements and processing of hazardous materials incident and accident reports.	CAA
I-76-009	DOT: Redesign the hazardous materials incident data reporting system so it will generate information about what emergency actions were taken, why they were taken, and what influence they had on the outcome of the emergency, for use in training firefighters and law enforcement personnel.	CAA

Recommendation	Recipient and recommended action	Status
I-79-014	RSPA: Incoporate hazardous materials incident survival action data in the new centralized HMIS.	CAA
I-79-015	RSPA: Establish procedures to promptly utilize survival action data and evaluate the influence of regulatory safeguards on the outcome of serious hazardous materials incidents.	CAA
I-79-016	RSPA: Use survival action data to revise emergency guidelines, incorporating recommended actions, their purpose, and the effect they should have in reducing losses following the release of hazardous materials.	CAA
I-81-008	DOT: Include NHTSA as a member of the task force for the HMIS which will determine hazardous materials data needs for accident reports.	CAA
I-81-009	DOT: Consider the development of uniform short supplemental accident data forms to supplement existing FHWA, FRA, and NHTSA accident report forms.	CAA

Toxicological Testing

Recommendation	Recipient and recommended action	Status
H-00-015	FMCSA: Establish, in coordination with the DOT, FRA, FTA, and USCG, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to identify the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	OAWR
I-00-001	DOT: Establish, in coordination with the DOT, FMCSA, FRA, FTA, and USCG, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to identify the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	OAWR
M-00-004	USCG: Establish, in coordination with the DOT, FMCSA, FRA, FTA, and USCG, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to identify the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	OAWR

Recommendation	Recipient and recommended action	Status
R-00-004	FRA: Establish, in coordination with the DOT, FMCSA, FTA, and USCG, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to identify the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	OAR
R-00-008	FTA: Establish, in coordination with the DOT, FMCSA, FRA, and USCG, comprehensive toxicological testing requirements for an appropriate sample of fatal highway, railroad, transit, and marine accidents to identify the role played by common prescription and over-the-counter medications. Review and analyze the results of such testing at intervals not to exceed every 5 years.	ORR

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