DOT-TSC-RSPA-89-3

U.S. Department
of Transportation
**Research and
Special Programs
Administration**

Transportation Safety Information Report

1988 Annual Summary

Transportation Systems Center

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-RSPA-89-3		

4. Title and Subtitle	5. Report Date
TRANSPORTATION SAFETY INFORMATION REPORT 1988 ANNUAL SUMMARY	December 1989
	6. Performing Organization Code DTS-32
7. Author(s) James Kelley	8. Performing Organization Report No. DOT-TSC-RSPA-89-3
9. Performing Organization Name and Address U.S. Department of Transportation Research and Special Programs Administration Transportation Systems Center, Center for Transportation Information, Cambridge, MA 02142	10. Work Unit No. (TRAIS) RS909/P9002
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Special Programs Administration Office of Budget and Programs Washington, D.C. 20590	13. Type of Report and Period Covered Final Report 1989
	14. Sponsoring Agency Code DMA-20

15. Supplementary Notes

16. Abstract

The "Transportation Safety Information Report" is a compendium of selected national-level transportation safety statistics for all modes of transportation and for multimodal transportation of hazardous materials. The report presents and compares data for transportation fatalities, accidents, and injuries for the current and preceding years. The report is based on data input to the Transportation Safety Information System (TRANSIS) by representatives in each of DOT's modal administrations and the National Transportation Safety Board.

Featured in this annual report is the summary of modal safety hazards and safety program highlights for 1988, as well as summary charts detailing modal safety trends from 1978 to 1988.

17. Key Words	18. Distribution Statement
Safety, Statistics, Transportation, Fatalities, Accidents, Injuries	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	128	

Form DOT F1700.7 (8-72) Reproduction of completed page authorized

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I. INTRODUCTION

Purpose of Report

The purpose of the Transportation Safety Information Report is to provide a summary of statistics on safety data for individual transportation modes, and for hazardous material transportation by any mode.

The report includes a selection of data from many statistical sources within DOT and from outside organizations; most data comes from the Transportation Safety Information System (TRANSIS). Offices and publications cited as sources can provide additional detail and in-depth discussion of the use and interpretation of data.

Background

The TRANSIS system was established in 1972 in response to a growing requirement for a base of multimodal safety data, both within DOT and from other agencies. A need was perceived for a system that would provide timely reporting of transportation safety statistics and related information on a modal and multimodal basis, and for monitoring current transportation safety problems, activities and accident trends.

This report is published on an annual basis. A related annual publication, *National Transportation Statistics*, is also available from the Government Printing Office.

Altogether, there are 75 charts and 15 tables covering a total of six transportation modes. A special multimodal section is also presented that shows safety trends in the transportation of hazardous materials. Because of the nature of reporting cycles for the different modal administrations in DOT, there may be some omissions of data for 1988.

The TRANSIS report is used by DOT policy makers, State and local safety officials, and private research organizations.

Ms. Karen Philpott of the Center for Transportation Information, and EG&G Dynatrend, Incorporated, provided valuable assistance in the preparation of this report.

Comments or inquiries regarding this report or its contents may be directed in writing to: TRANSIS Coordinator, Center for Transportation Information (DTS-32), DOT/Transportation Systems Center, Cambridge, Massachusetts 02142.

1987 - 1988 STATISTICAL SUMMARY

Fatalities

The total number of transportation fatalities recorded in 1988 increased 1.1 percent when compared with 1987, as shown in Table 1. The following modes experienced an increase in reported fatalities in 1988: Motor Vehicle Traffic, Air Carrier, Rail-Highway Grade Crossings, Pipeline, and Hazardous Materials operations. However, General Aviation, Recreational Boating, Railroad, Waterborne Transportation, and Rail Rapid Transit operations showed a decrease in 1988.

During 1988, an estimated 47,093 people died in Motor Vehicle Traffic accidents, up 1.5 percent from the 46,390 fatalities reported in 1987. The fatality rate per 100 million vehicle miles of travel was 2.37 in 1988, the lowest rate recorded in the past 12-year period. In addition, passenger car occupant fatalities rose, from 25,132 in 1987 to 25,802 in 1988. The total number of vehicles registered and number of licensed drivers all continued to rise in 1988.

U.S. Air Carrier fatalities, scheduled and nonscheduled, experienced an increase in 1988 when compared with 1987 -- from 231 to 285. Total Air Carrier fatalities, including Commuter Carriers and On-Demand Air Taxis, increased from 356 during 1987 to 376 during 1988. Both Commuter Carrier and On-Demand Air Taxi fatalities decreased in 1988. General Aviation fatalities fell to a 13-year low in 1988, from 832 to 805.

Rail-Highway Grade Crossing fatalities experienced an increase during 1988 when compared with 1987. There were 689 Rail-Highway Grade Crossing fatalities during 1988 versus 624 during 1987. Rail Rapid Transit fatalities dropped from 34 in 1987 to 19 in 1988.

CHART 2.
TRANSPORTATION FATALITIES, 1988

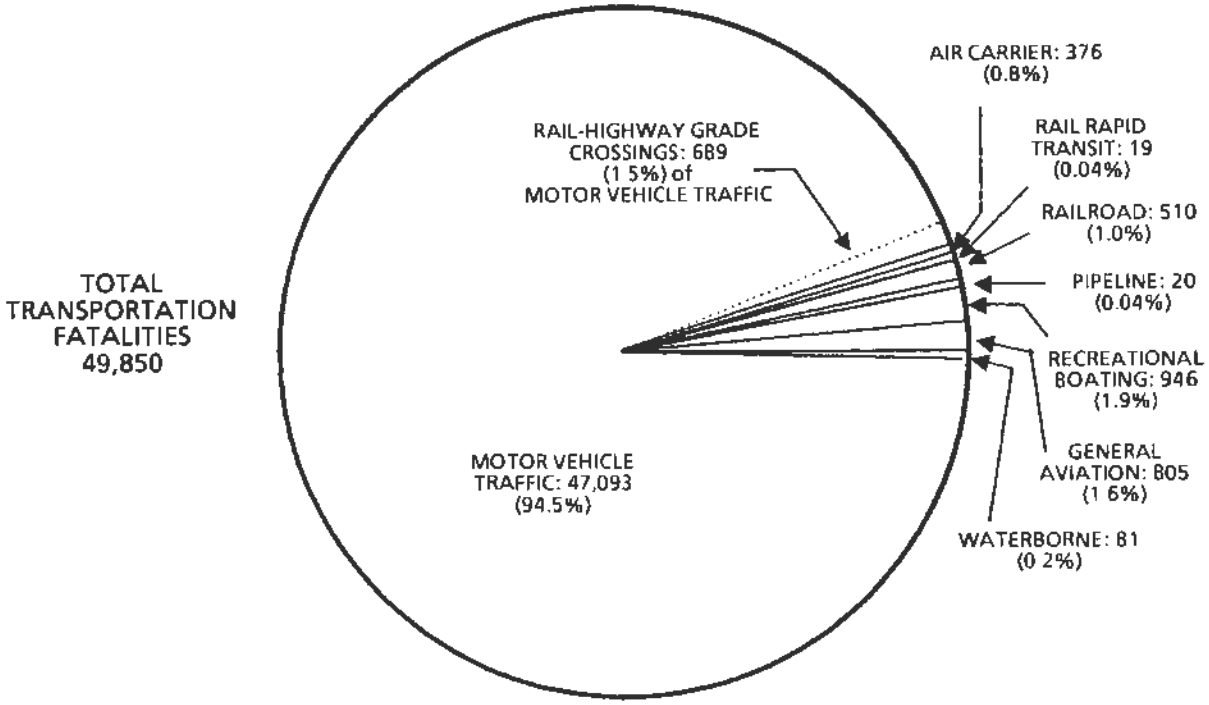


TABLE 1.

FATALITIES, INJURIES, AND ACCIDENTS BY TRANSPORTATION MODE, 1987 - 1988

TRANSPORTATION MODE	FATALITIES			INJURIES			ACCIDENTS/INCIDENTS		
	1987	1988	% CHANGE	1987	1988	% CHANGE	1987	1988	% CHANGE
Motor Vehicle Traffic[1]	46,390	47,093	+ 1.5	1,700,000	N/A	-	20,800,000	20,600,000	-1.0
Railroad*	541	510	-5.7	23,604	24,465	+ 3.6	25,868	26,940	+ 4.1
Air Carrier**	356	376	+ 5.6	87	105	+ 20.7	173	156	-9.8
General Aviation***	832	805	-3.2	463	506	+ 9.3	2,463	2,363	-4.1
Recreational Boating	1,036	946	-8.7	3,501	3,476	-0.7	6,746	6,718	-0.4
Pipeline +	12	20	+ 66.7	121	106	-12.4	466	454	-2.6
Waterborne[2]	119	81	-31.9	119	130	-31.9	3,496	3,593	+ 2.8
Rail Rapid Transit#	34	19	-44.1	3,122	3,050	-2.3	3,156	3,069	-2.8
Total Transportation[3]	49,320	49,850	+ 1.1	1,731,089	N/A	-	20,842,368	20,643,293	-1.0
Hazardous Materials[4]	10	17	+ 70.0	331	165	-50.2	6,136	6,161	+ 0.4
Rail-Highway Grade Crossings[4]	624	689	+ 10.4	2,429	2,589	+ 6.6	6,391	6,615	+ 3.5

N/A Not available.
* Fatalities, injuries, and accidents resulting from train accidents, train incidents, and nontrain incidents.
** Air Carrier now includes Commuter Carriers and Air Taxis Injuries are serious injuries only
*** Injuries are serious injuries only
# Fatalities and injuries resulting from train and nontrain accidents
+ Includes Gas and Liquid Pipeline
1 Fatality figures are NHTSA estimates for the 50 states and District of Columbia based on a 30-day definition (see Glossary)
Accident data are obtained from National Safety Council estimates. 1988 Injury data are preliminary
2 Waterborne data are for vessel casualties only. 1987 and 1988 data are incomplete
3 Total includes Rail Highway Grade Crossing fatalities which are not reported in Railroad figure
4 These fatalities are included in the above modes and Total Transportation Hazardous Materials operations injuries include major and minor injuries

III. SAFETY STATISTICS BY MODE

HIGHWAY

- The death toll on the nation's highways, which dipped in 1983 to its lowest point in 20 years, is on the increase. An estimated 47,093 were killed in 1988, up 1.5 percent from the 46,390 highway fatalities of the year before and the highest total since 1981.

- Nearly 50 percent or 23,352 of the 47,093 fatalities in 1988 were alcohol-related.

- Preliminary estimates of travel show an increase of 3.5 percent in 1988. The fatality rate per 100 million vehicle miles of travel was 2.37 in 1988, a decrease of 1.7 percent over the rate in 1987.

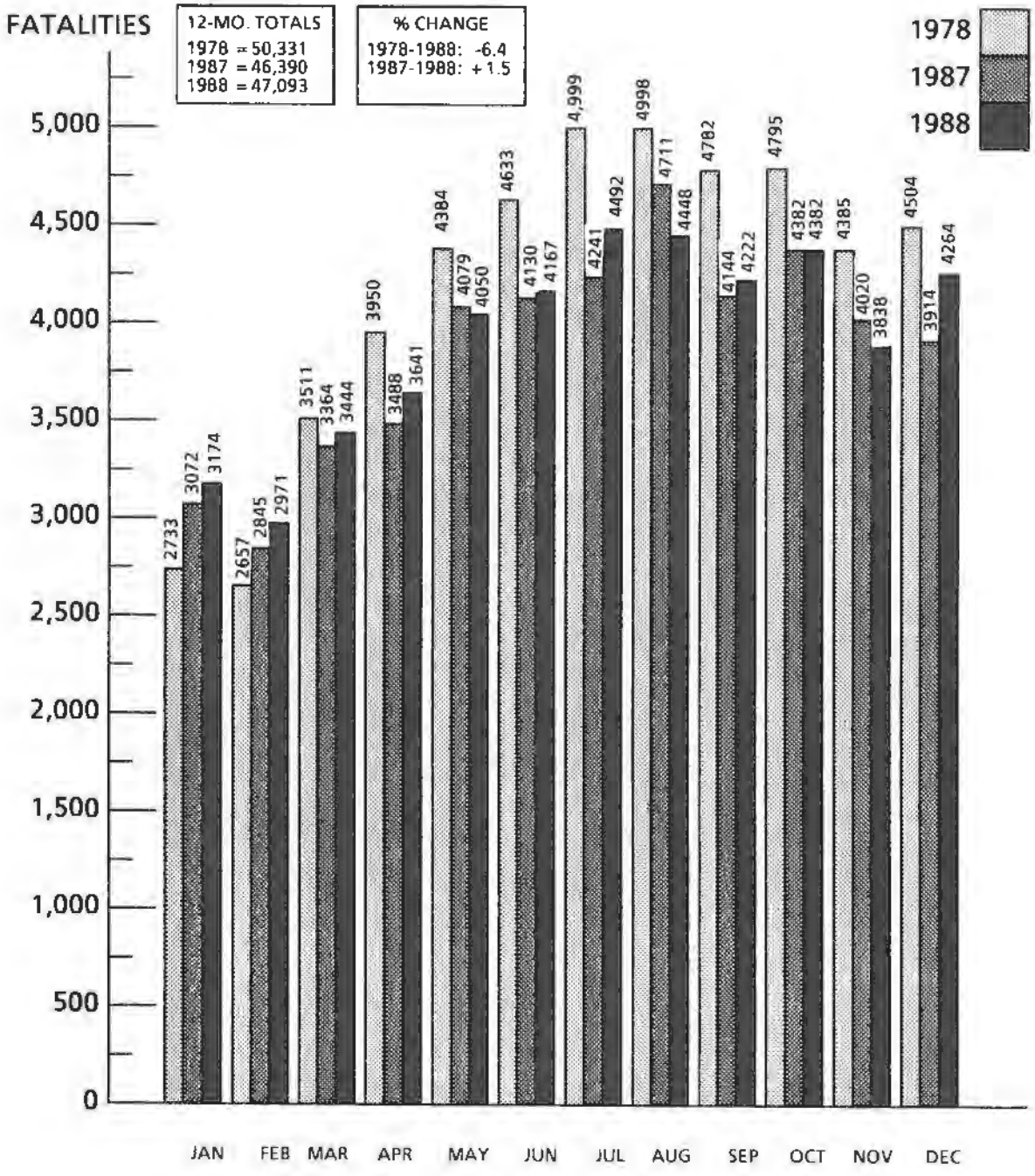
- The number of licensed drivers increased 1.47 percent from 1987 to 1988, while the number of vehicles registered increased 2.47 percent during the same period. However, the increases are much more dramatic when 1978 through 1988 are compared. The number of licensed drivers rose nearly 17 percent and the number of registered vehicles rose over 23 percent in the 11-year period.

- When occupant fatalities by type of motor vehicle are compared for 1987 and 1988, passenger cars recorded a 2.7 percent increase, while trucks increased 3.5 percent; motorcycles dropped 9.3 percent, and other vehicle types rose 1.9 percent. Total non-occupant fatalities increased 1.2 percent during the same period.

- Occupants of passenger cars accounted for more than half of the total highway fatalities in 1988. The largest proportion of these fatalities were occupants of subcompact and full size cars -- 34 and 22 percent, respectively.

CHART 4.

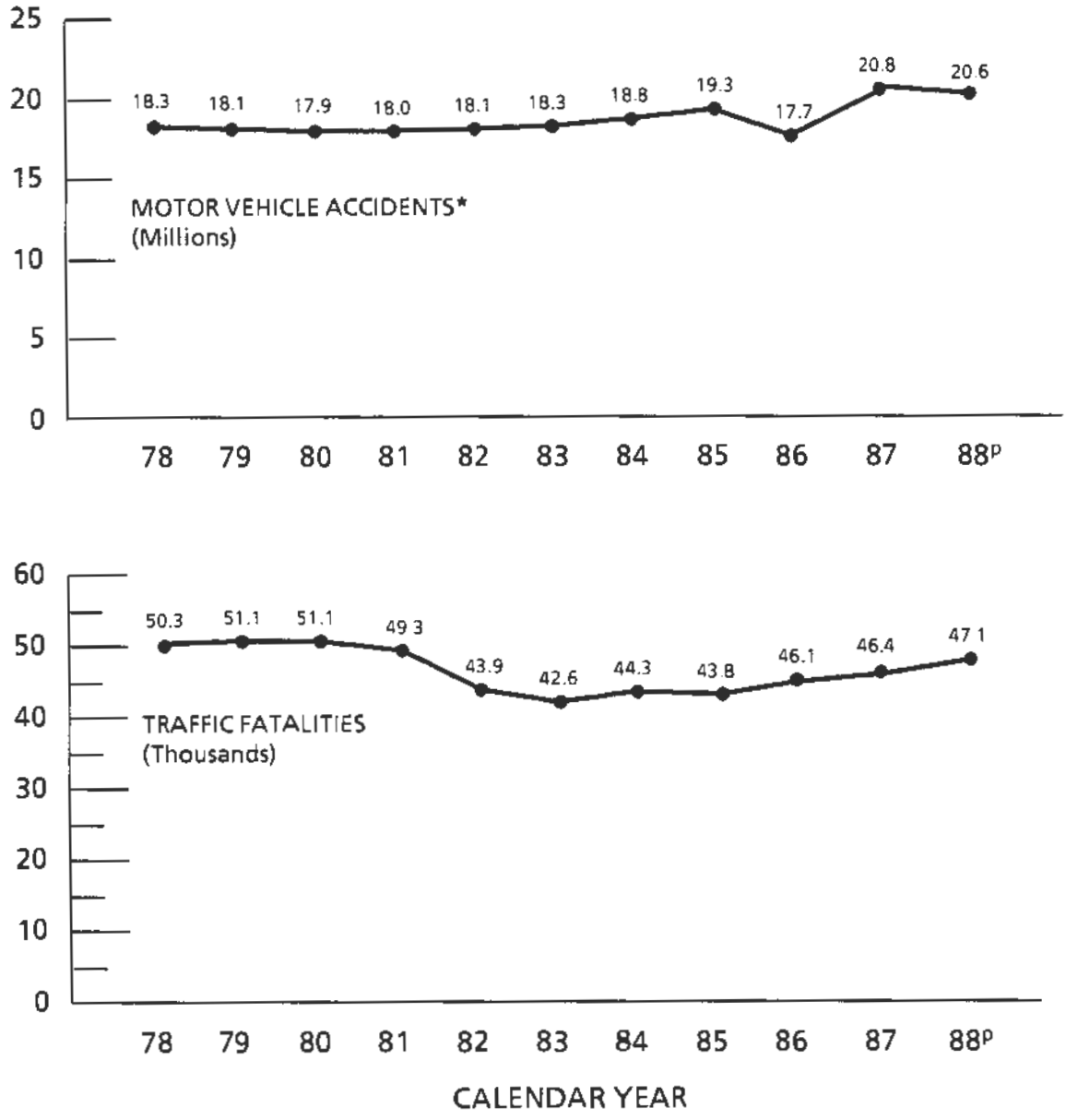
MOTOR VEHICLE TRAFFIC FATALITIES BY MONTH, 1978, 1987 AND 1988



NOTE: Figures are based on 30-day fatality definition (see Glossary)
1988 data are preliminary
SOURCE: NHTSA,National Center For Statistics and Analysis, Fatal Accident Reporting System (FARS).

CHART 6.

MOTOR VEHICLE ACCIDENTS AND TRAFFIC FATALITIES
1978 - 1988



P = Preliminary.

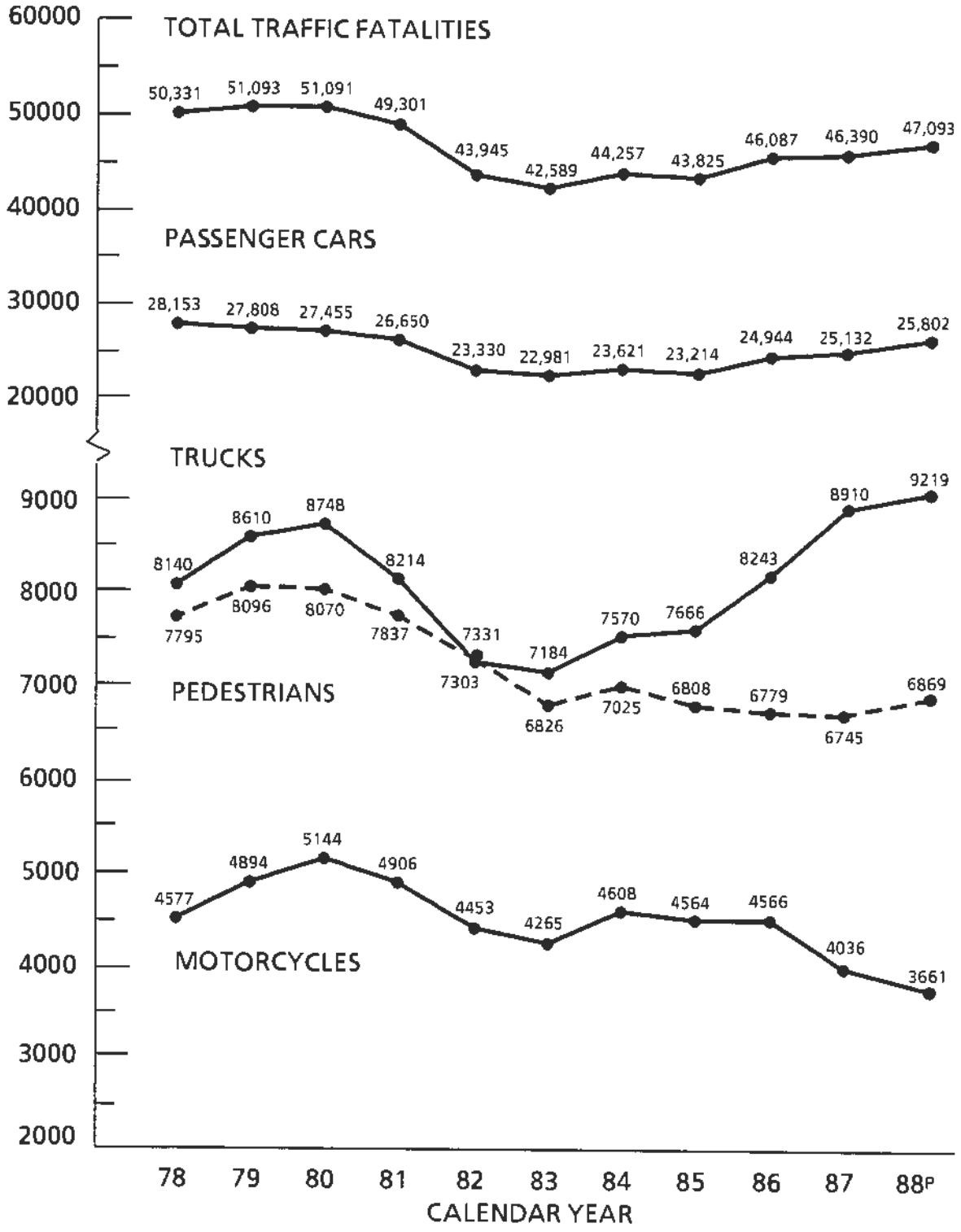
* The National Safety Council reports motor vehicle accidents rather than motor vehicle traffic accidents. The numbers shown are larger than the number of motor vehicle traffic accidents upon which the traffic fatalities are based.

NOTE: Fatalities in this chart are based on a 30-day definition, and include 50 states and the District of Columbia.

SOURCE: Fatality Data, NHTSA, Fatal Accident Reporting System (FARS).
Accident Data, National Safety Council, Accident Facts.

CHART 8.

TRAFFIC FATALITIES BY MAJOR CATEGORIES
1978 - 1988



P = Preliminary
SOURCE: NHTSA, National Center for Statistics and Analysis, Fatal Accident Reporting System (FARS)

TABLE 4.

TRAFFIC FATALITIES BY MAJOR CATEGORY, 1978, 1986-1988*

Occupant Fatalities by Vehicle Type

	1978	1986	1987	1988*	Average Annual % Change 1978-1988	% Change 1987-1988
Passenger Cars	28,153	24,944	25,132	25,802	-1.13	+2.67
Subcompact	5,559	8,536	8,760	8,688	+4.65	-0.82
Compact	792	3,350	3,943	4,706	+17.41	+19.35
Intermediate	2,594	4,803	4,917	4,985	+6.60	+1.38
Full	12,428	6,903	6,097	5,688	-6.87	-6.71
Unknown	6,780	1,352	1,415	1,735	-14.50	+22.61
Trucks	8,140	8,243	8,910	9,219	+0.91	+3.47
Light Trucks	6,745	7,317	8,058	8,306	+1.79	+3.08
Heavy Trucks	1,044	781	727	785	-3.55	+7.98
Other Trucks	351	145	125	128	-9.81	+2.40
Motorcycles	4,577	4,566	4,036	3,661	-1.25	-9.29
Other and Unknown Vehicle Type	663	481	487	496	-3.04	+1.85
Total	41,533	38,234	38,565	39,178	-0.74	+1.59

Non-Occupant Fatalities

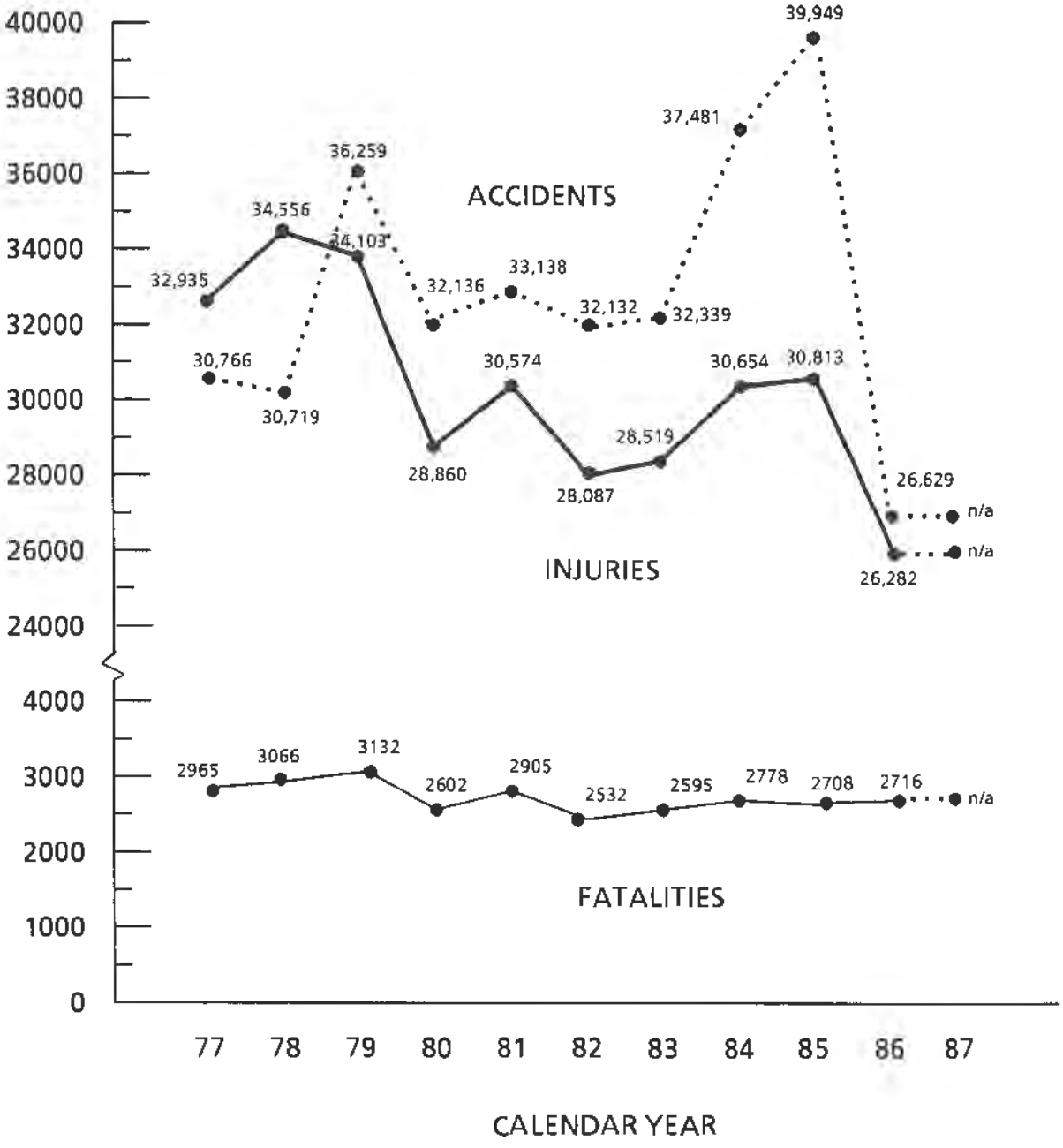
	1978	1986	1987	1988*	Average Annual % Change 1978-1988	% Change 1987-1988
Pedestrian	7,795	6,779	6,745	6,869	-1.44	+1.84
Pedalcyclist	892	941	948	910	+0.61	-4.01
Other	111	133	132	136	+1.75	+3.03
Total	8,798	7,853	7,825	7,915	-1.17	+1.15

* Preliminary.

SOURCE: NHTSA, National Center for Statistics and Analysis, Fatal Accident Reporting System (FARS).

CHART 9.

MOTOR CARRIER* FATALITIES, ACCIDENTS, AND INJURIES
1977 - 1987



n/a: Not available.

* Includes only those Motor Carriers of Property and Passengers operating in Interstate or Foreign Commerce.

SOURCE: FHWA, Motor Carrier Information Division, HIA-10.

Pedestrian Injuries and Fatalities

Every year, about 7,000 pedestrians are killed when they are struck by motor vehicles, and nearly 100,000 are injured. For years, the conventional wisdom has been that the only way to deal with this problem was avoid these incidences. However, it now appears that vehicle designs that are much less likely to cause serious injuries to pedestrians are possible and quite feasible. The most promising results to date involve preventing head injuries, which account for a major portion of the pedestrian injury problem. Injuries to the thorax are also very important and work in this area is progressing. Although thorax protection is more complex and difficult, the researchers are cautiously optimistic that significant progress can be made.

SOURCE: NHTSA, NRD-20.

SAFETY PROGRAM HIGHLIGHTS

Alcohol Safety Programs

NHTSA continues to strengthen its alcohol countermeasures program with general deterrence remaining the leading strategy. The following measures have been undertaken to prevent drinking and driving:

- In 1988, a total of 18 States were receiving Alcohol Traffic Safety Incentive Grants (Section 408) which are intended to act as a catalyst to help states expand their efforts over and above the basic support supplied by usual funding. Those States receiving such grants have not only reduced the proportion of their fatalities that are alcohol-related, but also have a lower proportion of alcohol-related fatalities as a group, than do non-408 States.

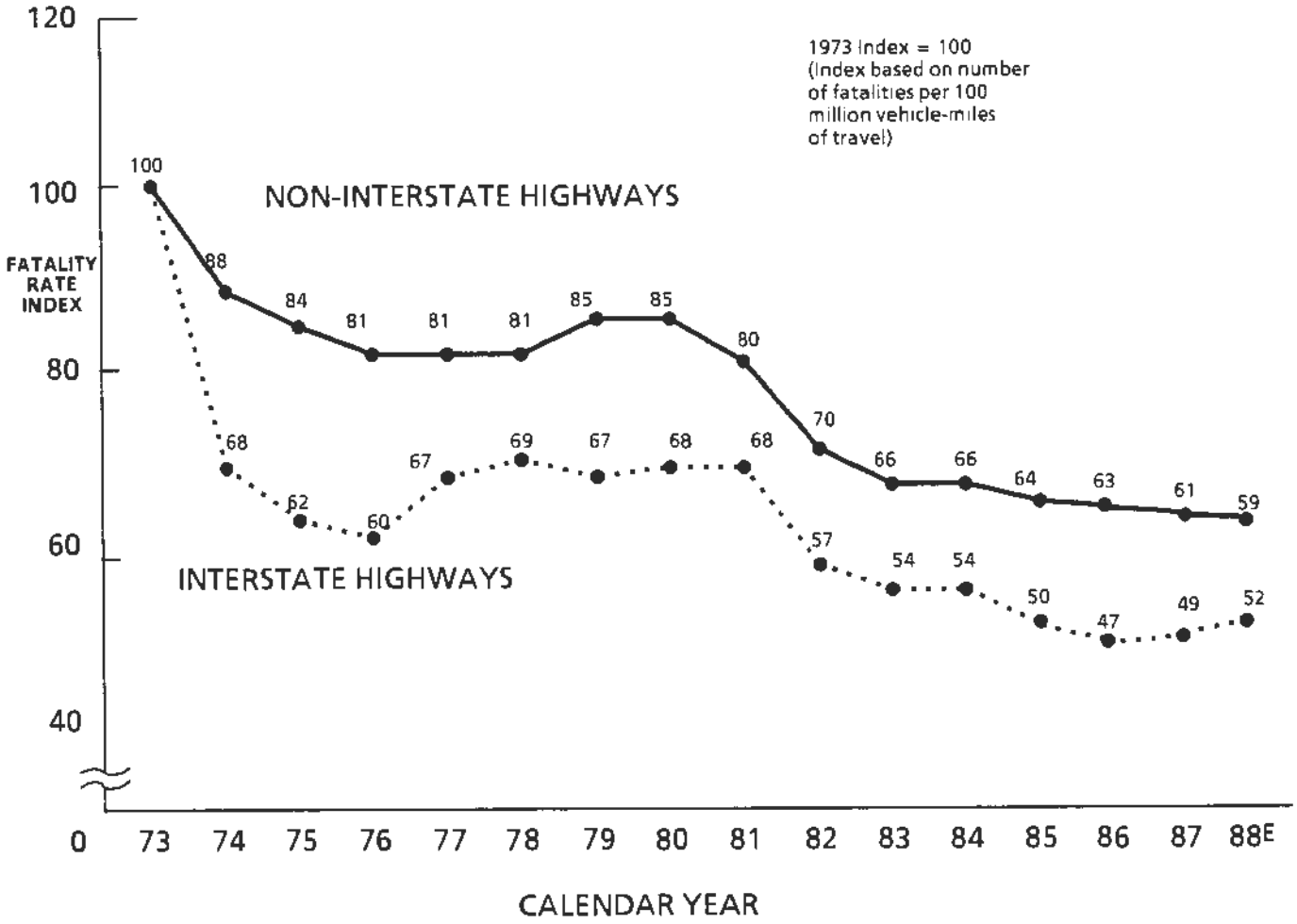
- Since 1985, when the Techniques for Effective Alcohol Management (TEAM) program, was formed, TEAM assisted in the assessment, policy development and training of over 20,000 employees in over 100 facilities, in working with their facilities and communities to promote responsible alcohol use. This includes reducing the incidence of drinking and driving as people travel to and leave sporting events in public assembly facilities. More than $5.5 million worth of prime television air-time has been devoted to airing TEAM PSA messages such as "don't drink and drive," "pass the keys," and "the best sport is the designated driver." TEAM has three major components: (1) national/local public awareness; (2) facility alcohol management (policy formulation and training) and; (3) community coalitions.

- In 1987, NHTSA conducted training programs for community prevention/intervention teams; educators who present programs for youth; judges, prosecutors, administrative hearing officers and others who deal with alcohol crashes. Courses teaching advanced techniques for detecting alcohol-influenced persons (such as horizontal gaze nystagmus instructor training) have been provided to each State.

- The sixth annual observance of National Drunk and Drugged Driving Week carried the theme, "Designated Driver."

SOURCE: NHTSA, NTS-01.

CHART 10.
FATALITY RATE TRENDS BY HIGHWAY TYPE, 1973 - 1988E



E: Estimated.

SOURCE: FHWA, Office of Highway Safety, HHS-22

Emergency Medical Services (EMS)

The goal of NHTSA's EMS program is to assist States and communities in developing trauma systems of care. Major projects have been initiated to identify institutional factors necessary for the development of trauma systems, and to develop a uniform evaluation system to assist States in identifying underserved areas. A technical assistance program has been initiated to assist states in long range planning to meet emergency medical services needs. Training initiatives include development of standardized curricula for aeromedical crewmembers, and testing of new training technologies to address skill retention problems in rural areas. The development of EMS standards has been transferred from the Federal level to a national voluntary standards organization made up of members from all levels of government, professional organizations and the private sector.

Recognizing that pre-hospital and hospital care providers are effective spokespersons for highway injury prevention, the EMS program has fostered the development of State and community highway injury programs, and 38 States now have statewide or community programs on highway injury prevention, coordinated by pre-hospital and hospital providers of trauma care.

SOURCE: NHTSA, NTS-40.

Effectiveness of the Highway Safety Improvement Programs

In 1974, the Federal Highway Administration (FHWA) began addressing the need for highway safety improvements through the Rail-Highway Crossings and Hazard Elimination Programs. Since that time, the FHWA has conducted annual evaluations of benefits attributed to safety projects funded under these programs. The evaluations examine changes in the number and severity of accidents where safety improvements were implemented. Evaluation results are shown in Table 6. The history of funding and obligations is shown in Table 7.

The evaluations are based on nationwide data and may not be representative of local conditions. The reported benefits are based on evaluations of safety improvements to hazardous locations where the potential for accident reductions was significant. Similar benefits may only be expected at locations with similar conditions.

Motor vehicle accident costs of $1,200,000 per fatality and $7,000 per injury were used to calculate the benefit/cost ratio of safety improvements. These accident costs are based on the findings of a 1986 FHWA research entitled "Alternative Approaches to Accident Cost Concepts."

- Rail-Highway Crossings Program

  Since 1974, the Rail-Highway Crossings Program shows the greatest percentage of accident reductions. Fatal, injury, and fatal-plus-injury accidents have been reduced by 89, 63, and 67 percent, respectively. The Rail-Highway Crossings Program has prevented over 5,000 fatalities and 20,000 injuries resulting from crashes between trains and motor vehicles since 1974.

- The Hazard Elimination Program

  The Hazard Elimination Program has provided substantial reductions in highway accidents. Fatal, injury, and fatal-plus-injury accidents have been reduced hy 47, 22, and 23 percent, respectively. The Hazard Elimination Program has saved about 15,000 lives and over 400,000 injuries since 1974.

SOURCE: FHWA, Highway Safety Evaluation System (1987), Office of Highway Safety, HHS-21.

RAILROAD

- The year 1988 saw railroad accidents and the train accident rate per million train miles increase over 1987. There were 2,854 accidents in 1988 compared to 2,512 in 1987, an increase of 14 percent. Railroad accidents involving trains declined 75 percent since 1977, and the accident rate per million train miles dropped 69 percent in the 12-year period.

- The total number of rail-related fatalities increased from 1,165 in 1987 to 1,199 in 1988, representing a 3 percent increase. Of the total number of fatalities reported last year, 57 percent occurred in rail-highway grade crossing accidents. Rail-highway grade crossing accidents increased by 10 percent in 1988, rising from 624 to 689. Fatalities resulting from other accidents/incidents decreased by 6 percent in 1988, dropping from 541 to 510.

- Total injuries increased from 26,033 in 1987 to 27,054 in 1988, an increase of 4 percent. Injuries resulting from grade-crossing accidents increased from 2,429 in 1987 to 2,589 in 1988, an increase of 7 percent.

TABLE 8.

RAILROAD FATALITIES AND INJURIES, BY TYPE OF PERSON, 1987-1988

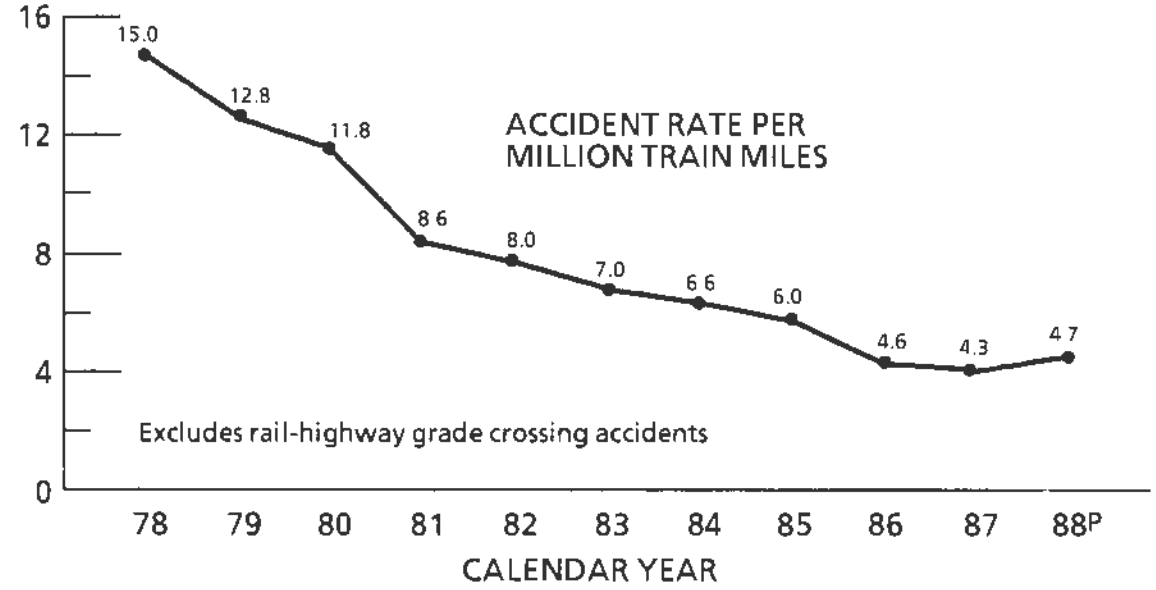
	FATALITIES		INJURIES**	
CLASSIFICATION	1987	1988	1987	1988
Employees on Duty	55	43	21,982	22,573
Employees Not on Duty	1	1	396	427
Passengers on Trains	16	2	475	337
Nontrespassers	506	554	2,354	2,575
Trespassers	584	598	673	920
Contractor Employees	3	1	153	222
Total Railroad and Grade Crossing	**1,165**	**1,199**	**26,033**	**27,054**
Railroad Only*	541	510	23,604	24,465
Grade Crossing Only	624	689	2,429	2,589

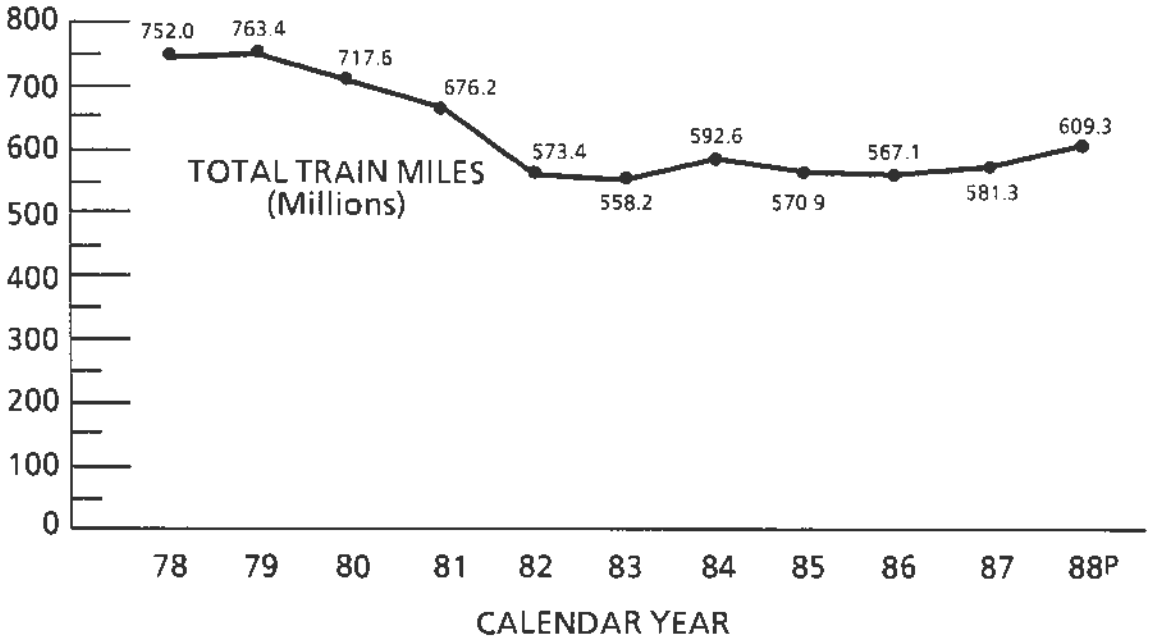
* Includes train and nontrain data.
** Includes occupational illness.

SOURCE: FRA, Office of Safety Analysis, RRS-20.

CHART 13.

RAILROAD ACCIDENT RATE TRENDS, 1978 - 1988





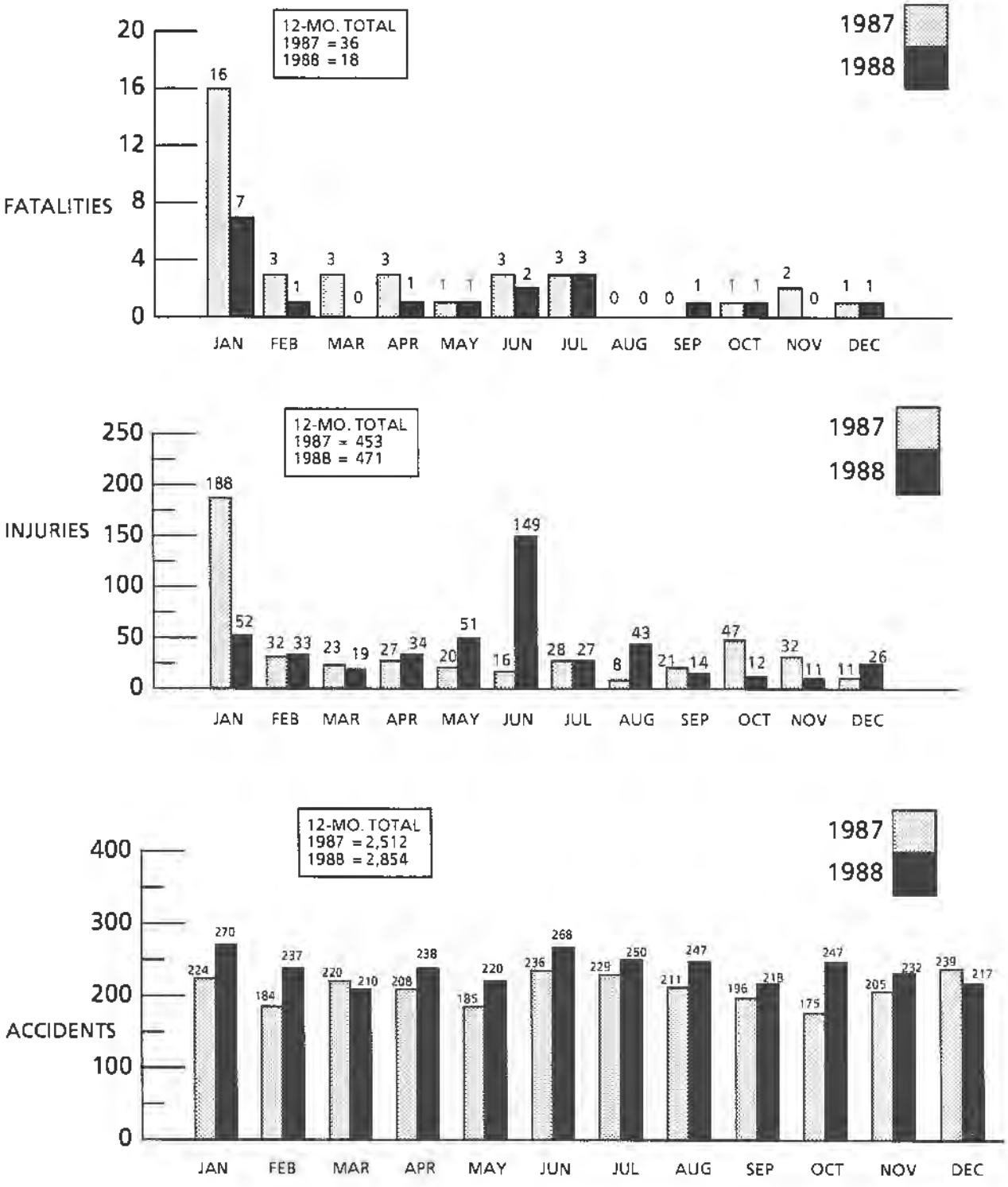
P = Preliminary.
* Train accidents only--also includes those Rail-Highway Grade Crossing accidents which have been classified as Train accidents.

NOTE: Reporting threshold for Train accidents was raised to $2,300 in 1977, to $2,900 in 1979, to $3,700 in 1981, to $4,500 in 1983, to $4,900 in 1985, and to $5,200 in 1987

SOURCE: FRA, Office of Safety Analysis, RRS-20.

CHART 14.

TRAIN ACCIDENT* FATALITIES, INJURIES AND ACCIDENTS, 1987-1988



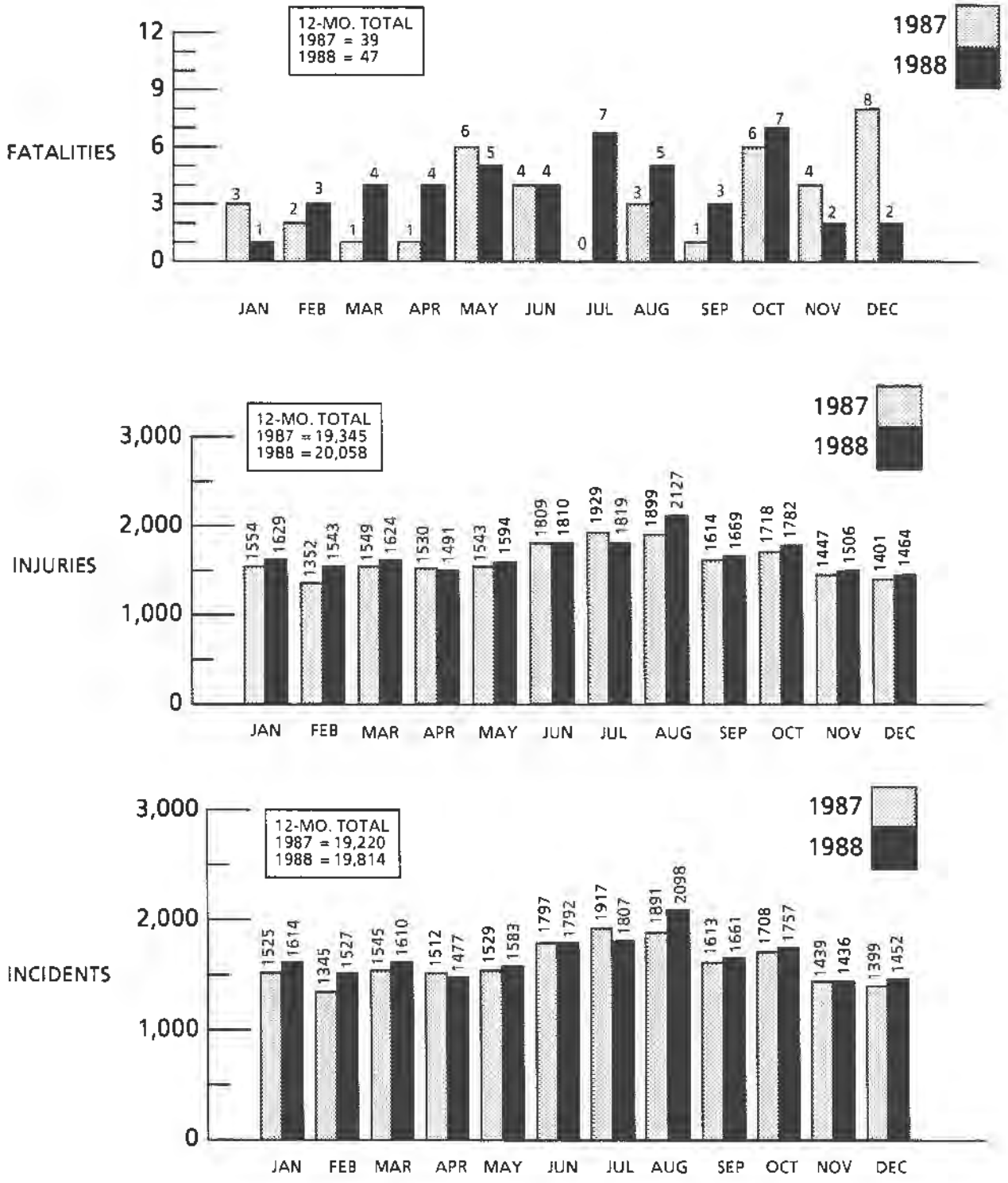
* See Glossary for Train Accident definition. This chart does not include Grade Crossings.

NOTE: 1988 data are preliminary.

SOURCE: FRA, Office of Safety Analysis, RRS-20.

CHART 16.

NONTRAIN* FATALITIES, INJURIES AND INCIDENTS, 1987-1988



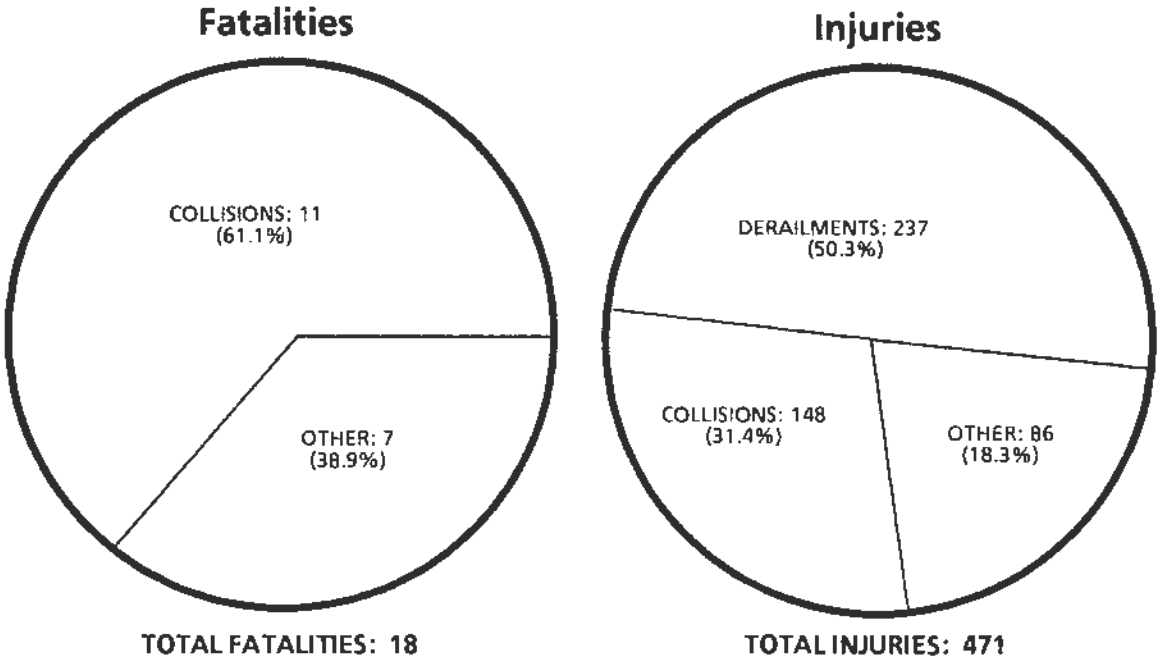
* See Glossary for definition. This chart does not include Grade Crossings.

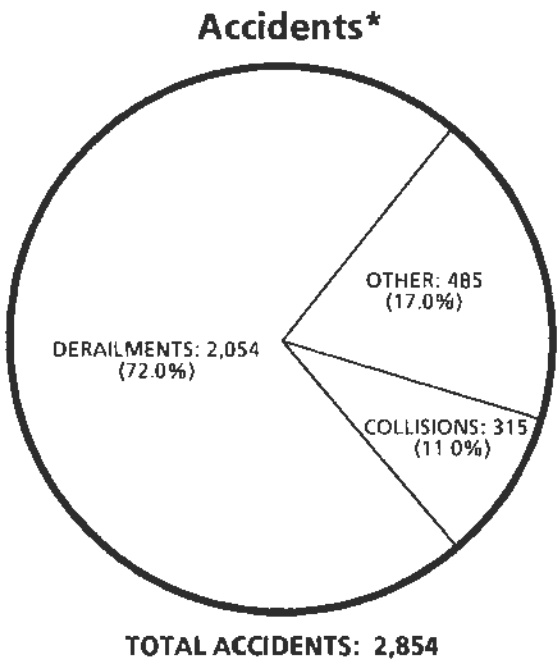
NOTE: 1988 data are preliminary.

SOURCE: FRA, Office of Safety Analysis, RRS-20.

CHART 18.

TRAIN ACCIDENT* FATALITIES, INJURIES, AND ACCIDENTS BY TYPE, 1988





* See Glossary for Train Accident Definition (does not include Train and Nontrain Incidents and Grade Crossing Accidents)

SOURCE: FRA, Office of Safety Analysis, RRS-20.

should be trained on the equipment they will be using and under normal operating procedures or on simulators using expected power and braking conditions. In this case, the Board said, "engineers were allowed to operate trains carrying passengers without first having operated, under supervision, trains on this newly and completely renovated territory."

SOURCE: NTSB News Digest, Vol. 7, No. 10.

Sleeping Crew Cited in Collision of Two Trains

A crew that fell asleep, due mainly to erratic system-wide work schedules, led to the head-on collision of two Consolidated Rail Corp. (Conrail) freight trains at Thompsontown, Pennsylvania on January 14, 1988, the NTSB has determined.

The engineers and brakemen on both trains died, but the conductors, who were located in rear locomotive units, escaped with minor injuries. Total damage was estimated to be $6,015,000.

The Board found that the sleeping crew on eastbound Conrail train (UBT-506) failed to heed a restrictive signal and ran past a crossover and into the path of an oncoming train (TV-61). The latter crew failed to take timely action to slow their train as required by a "restrictive" cab signal. The collision, which took place at about 7:50 a.m. EST, occurred at a closing speed of 71 miles per hour.

Train UBT-506, enroute from Altoona, PA to Baltimore, MD consisted of two diesel-electric locomotives and 105 coal cars. TV-61, with three diesel-electric locomotives and 61 car loaded with piggyback highway trailers and containers, was bound for Chicago.

"The National Transportation Safety Board determines that the probably cause of this accident was the sleep-deprived condition of the engineer and other crewmembers of train UBT-506 which resulted in their inability to stay awake and alert, and their consequent failure to comply with restrictive signal aspects," an NTSB report said, adding:

"Contributing to the failure of the crewmembers were their unpredictable work/rest cycles, their voluntary lack of proper rest before going on duty, and the inadequate alerting and acknowledging devices of the locomotive safety backup systems. Contributing to the severity of the accident was the failure of the engineer of train TV-61 to adequately reduce the speed of his train in conformance with a restricting cab signal and the inability of the dispatcher to recognize the emergency because of inadequacies in the computer-based traffic control system."

Problems in the traffic control system included frequent false track occupancy indications and software anomalies that caused incorrect video displays, said the Safety Board, adding to the dispatcher's work, distracting him, and undermining his confidence in the computer-based system. "Although aware of the problems with the system, Conrail had not taken steps to alleviate them," stated the NTSB.

The Safety Board said the engineer and brakeman of train UBT-506 probably were chronically sleep deprived because their work shifts and off-duty periods at home were unpredictable and irregular. NTSB found that none of UBT-506 crewmembers probably had more than two hours of restful sleep during the 22-24 hours preceding the accident.

"The crewmembers' sleep-deprived condition was compounded by the monotonous environment of the locomotive cab and possibly by their failure to eat a meal for at least 13 hours before the accident," said the Safety Board. "The changing nature of railroad operations and competitive factors have materially increased the relative number of train crewmembers who must work irregular and unpredictable shifts on a long-term basis," NTSB added.

RAIL RAPID TRANSIT

Users of Rail Rapid Transit (RRT) statistics should use caution when comparing 1987 and 1988 data to data for years prior to 1986. In 1986, the Urban Mass Transportation Administration (UMTA) in conjunction with the transit operators, revised the reporting system categories and new thresholds were instituted. Fires, which prior to 1986 were reported as train accidents, are now reported separately. The figures shown in the following charts represent data received from all 13 Rail Rapid Transit systems as reported in the Safety Information Reporting and Analysis System (SIRAS). SIRAS is a voluntary reporting system, developed by UMTA in cooperation with the American Public Transit Association (APTA) and the heavy rail transit (RRT) systems operating in the United States. Since its implementation on January 1, 1983, the operating RRT systems have been reporting transit safety data to UMTA on a monthly basis. All transit systems submit a monthly Statistical Data Report containing the total number of car miles and number of passengers in the reporting month. A Train Accident Report, Casualty Report and Fire Report are submitted only during those months when reportable train accidents, fire or casualties occur.

- During calendar year 1988, there were 89 Rail Rapid Transit (RRT) revenue train accidents compared to 91 in 1987. These RRT train accidents resulted in 172 injuries and 19 fatalities in 1988. The following summarizes train accidents by type.

	CY 1987	CY 1988*
Collision with other train	6	2
Collision with obstacle	7	9
Collision with person	67	66
Derailment	5	10
Rail-Highway Crossing	6	2
TOTALS	91	89*

- Of the 3,156 train and non-train casualties (injuries and fatalities) reported in calendar year 1987, a total of 1,111 (35%) occurred on the platform.

- Of the 3,050 train and non-train casualties (injuries and fatalities) reported in calendar year 1988, a total of 1,235 (40%) occurred on the platform.

- Of the 4,524 reported train fires during 1987, a total of 1,271 (28%) were reported in the category of Train Fires "other".

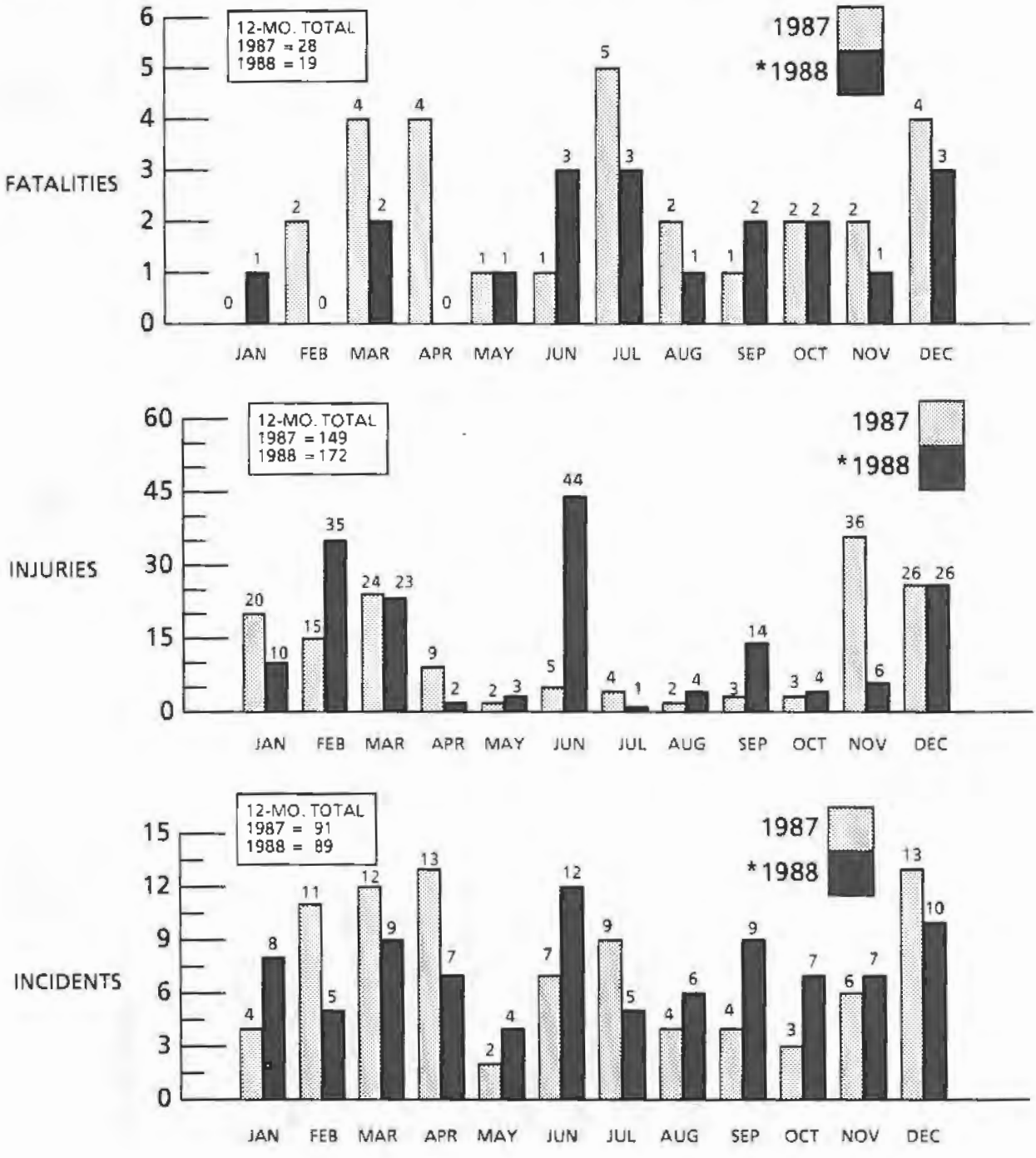
- Of the 4,815 reported train fires during 1988, a total of 1,136 (23%) were reported in the category of Right-of-Way Fires "grass, trash debris", etc.

* Preliminary data prior to verification.

Source: TSC, Safety and Security Division, DTS-43.

CHART 20.

RRT TRAIN** FATALITIES, INJURIES AND INCIDENTS, 1987 - 1988*

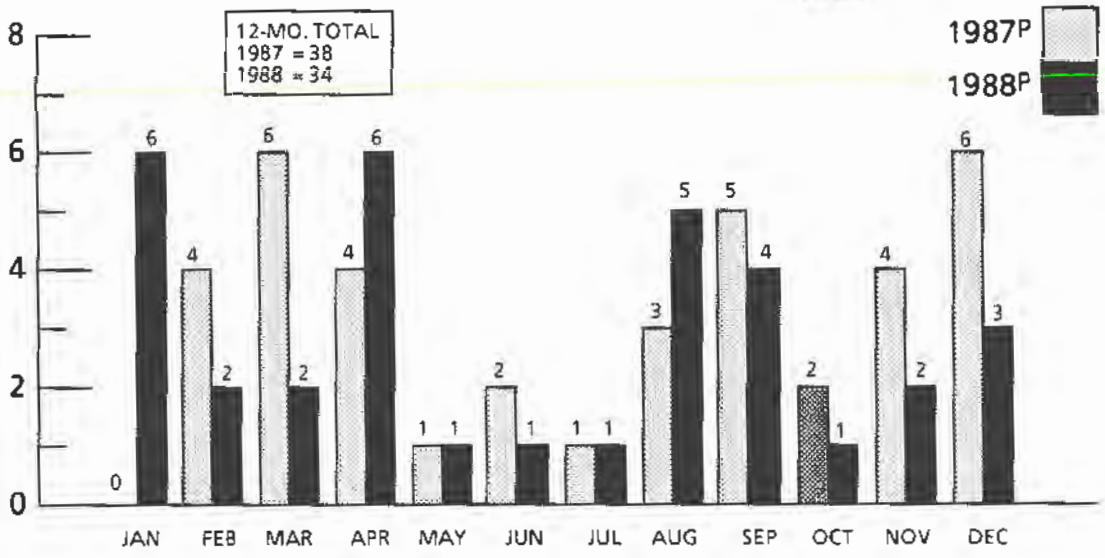


* Preliminary data prior to verification.
** See glossary for definition.

SOURCE: TSC, Safety and Security Division, DTS-43.

CHART 25.

U.S. AIR CARRIER ACCIDENTS*, 1987 - 1988

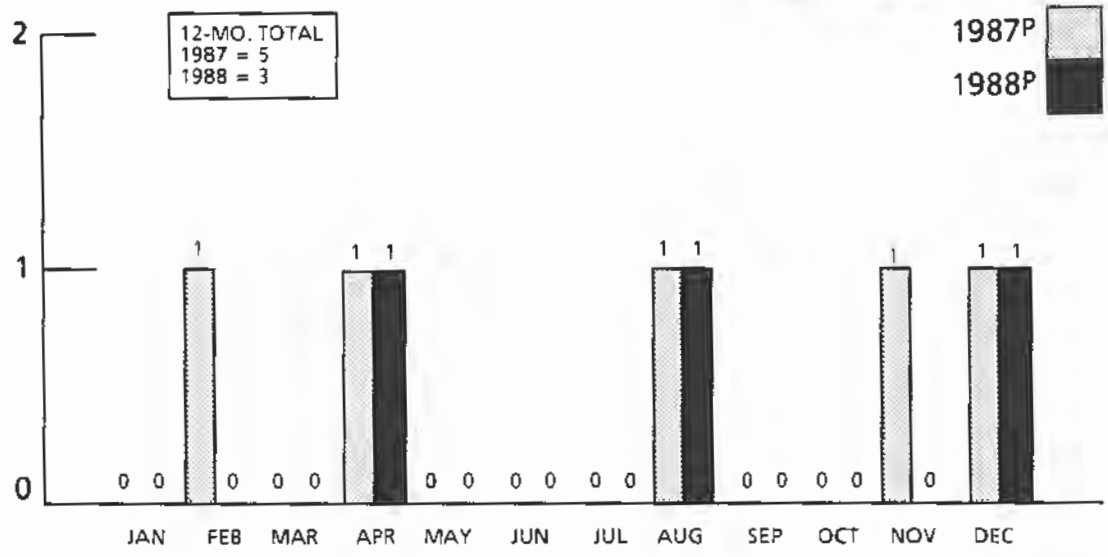


P = Preliminary.
* All scheduled and nonscheduled service operating under 14 CFR 121, 125, and 127.

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 26.

U.S. AIR CARRIER* FATAL ACCIDENTS, 1987 - 1988

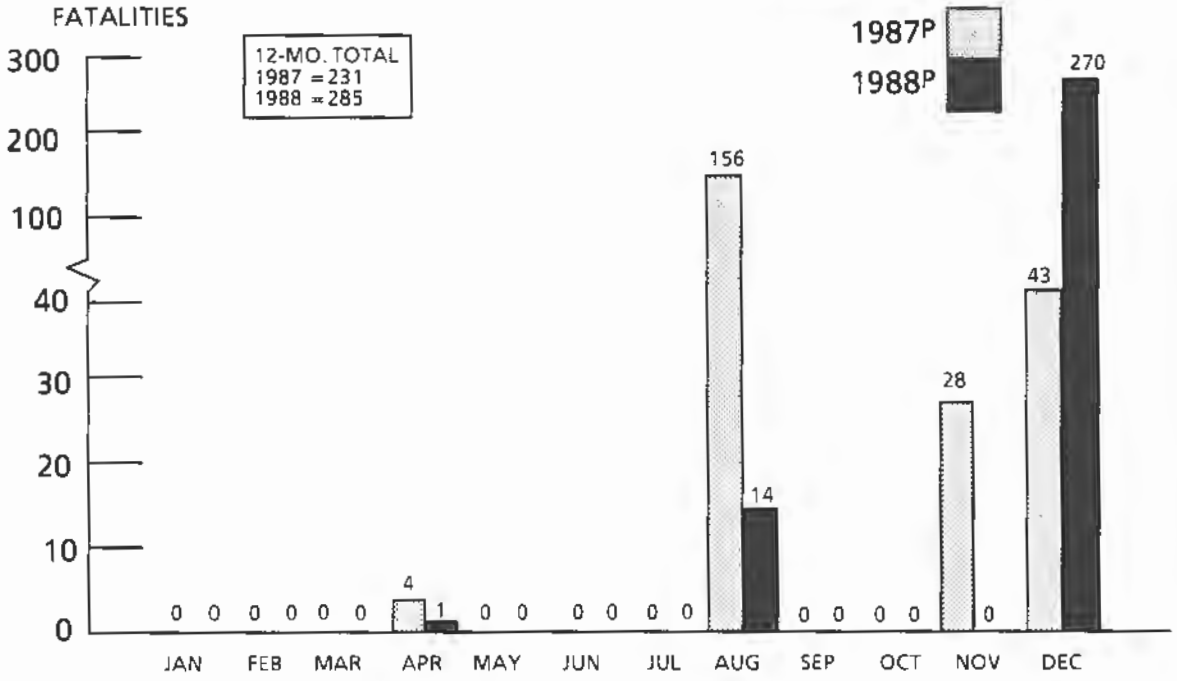


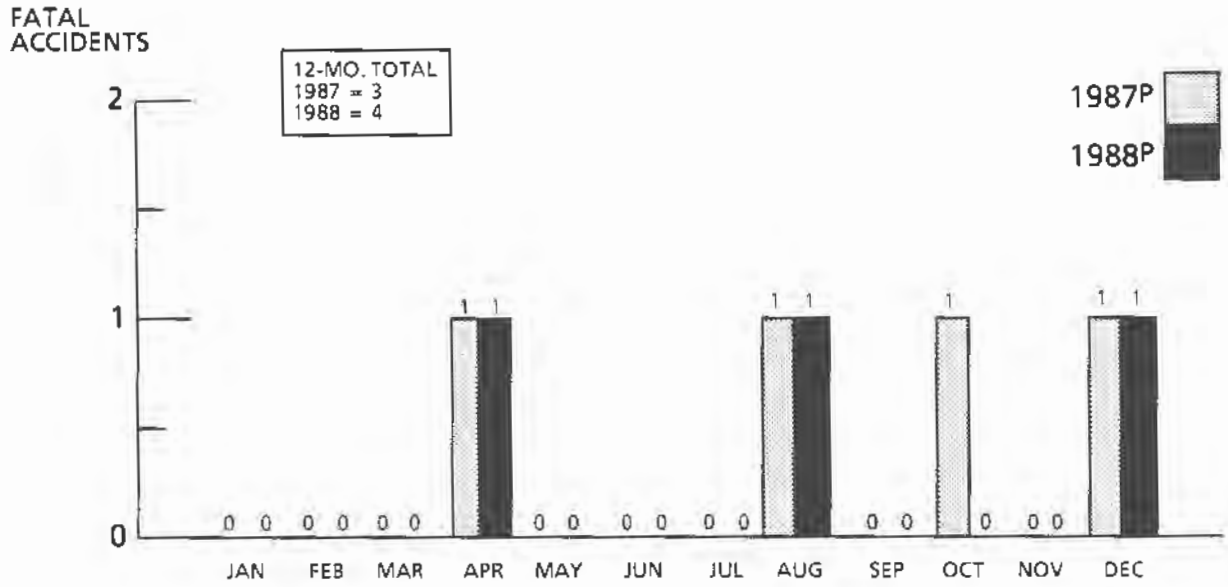
P = Preliminary.
* All scheduled and nonscheduled service operating under 14 CFR 121, 125, and 127.

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 29.

U.S. AIR CARRIER FATALITIES AND FATAL ACCIDENTS, ALL SCHEDULED SERVICE*, 1987 - 1988





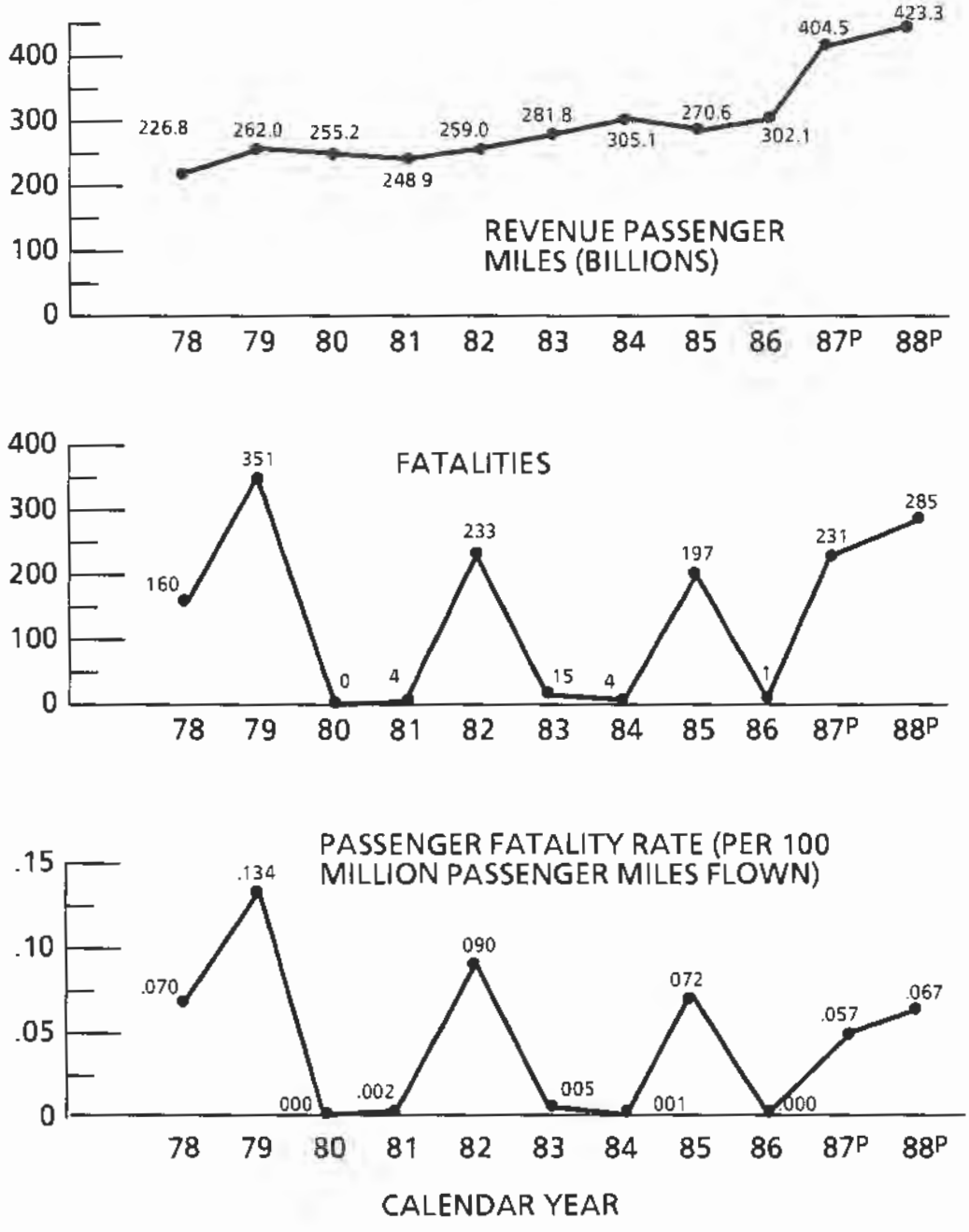
P = Preliminary

* All scheduled service operating under 14 CFR 121, 125, and 127.

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 31.

U.S. AIR CARRIER PASSENGER FATALITY RATES, ALL SCHEDULED REVENUE PASSENGER SERVICE,* 1978 - 1988



P = Preliminary.
* All scheduled service operating under 14 CFR 121, 125 and 127. Nonscheduled service not included

SOURCE: NTSB, Accident Data Division, SP-30. RSPA, TSC, Air Carrier Traffic Statistics Monthly, DTS-32.

TABLE 10.
COMMUTER CARRIERS* ACCIDENTS, FATALITIES AND INJURIES, 1987-1988

	JANUARY		FEBRUARY		MARCH	
CLASSIFICATION	1987	1988	1987	1988	1987	1988
FATALITIES	11	9	0	20	9	0
FATAL ACCIDENTS	2	1	0	4	1	0
TOTAL ACCIDENTS	4	2	2	3	4	0
SERIOUS INJURIES	0	1	0	0	7	0

	APRIL		MAY		JUNE	
CLASSIFICATION	1987	1988	1987	1988	1987	1988
FATALITIES	2	0	2	0	0	0
FATAL ACCIDENTS	1	0	1	0	0	0
TOTAL ACCIDENTS	4	0	2	1	1	1
SERIOUS INJURIES	1	0	2	0	0	0

	JULY		AUGUST		SEPTEMBER	
CLASSIFICATION	1987	1988	1987	1988	1987	1988
FATALITIES	0	0	1	0	1	0
FATAL ACCIDENTS	0	0	1	0	1	0
TOTAL ACCIDENTS	0	2	2	2	2	1
SERIOUS INJURIES	0	0	0	0	1	1

	OCTOBER		NOVEMBER		DECEMBER	
CLASSIFICATION	1987	1988	1987	1988	1987	1988
FATALITIES	1	0	18	0	16	0
FATAL ACCIDENTS	1	0	1	0	3	0
TOTAL ACCIDENTS	1	3	3	0	10	3
SERIOUS INJURIES	0	0	3	0	6	0

	12-MONTH TOTALS		
CLASSIFICATION	1987	1988	% Chg
FATALITIES	61	29	-52.5
FATAL ACCIDENTS	12	5	-58.3
TOTAL ACCIDENTS	35	18	-48.6
SERIOUS INJURIES	20	2	-90.0

NOTE: 1987 and 1988 data are preliminary.

* All scheduled service operating under 14 CFR 135.

SOURCE: NTSB, Accident Data Division, SP-30.

TABLE 12.

COMMUTER AIR CARRIERS* ACCIDENTS, FATALITIES AND ACCIDENT RATES, 1978 - 1988

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987P	1988P
Fatalities	48	66	37	34	14	11	48	37	4	61	29
Fatal Accidents	14	15	8	9	5	2	7	7	2	12	5
Total Accidents	61	52	38	31	26	17	22	21	15	35	18
Serious Injuries	32	45	14	24	28	12	23	16	12	20	2
Fatal Accident Rate**+	0.06	0.08	0.04	0.05	0.02	0.01	0.02	0.02	0.01	0.03	0.01
Total Accident Rate**+	0.27	0.27	0.20	0.16	0.12	0.07	0.08	0.07	0.05	0.10	0.05
Fatal Accident Rate#+	0.70	0.80	0.45	0.49	0.25	0.09	0.26	0.27	0.08	0.44	0.07
Total Accident Rate#+	3.06	2.76	2.14	1.69	1.28	0.73	0.82	0.82	0.56	1.29	0.68

P = Preliminary.
* All scheduled service operating under 14 CFR 135.
** Per million aircraft miles flown.
\+ Rates are based on all accidents including some involving operators not reporting traffic data formerly to the CAB, now to DOT.
\# Per 100,000 departures.

SOURCE: NTSB, Accident Data Division, SP-30.

TABLE 13.

ON-DEMAND AIR TAXIS* ACCIDENTS, FATALITIES AND ACCIDENT RATES, 1978 - 1988

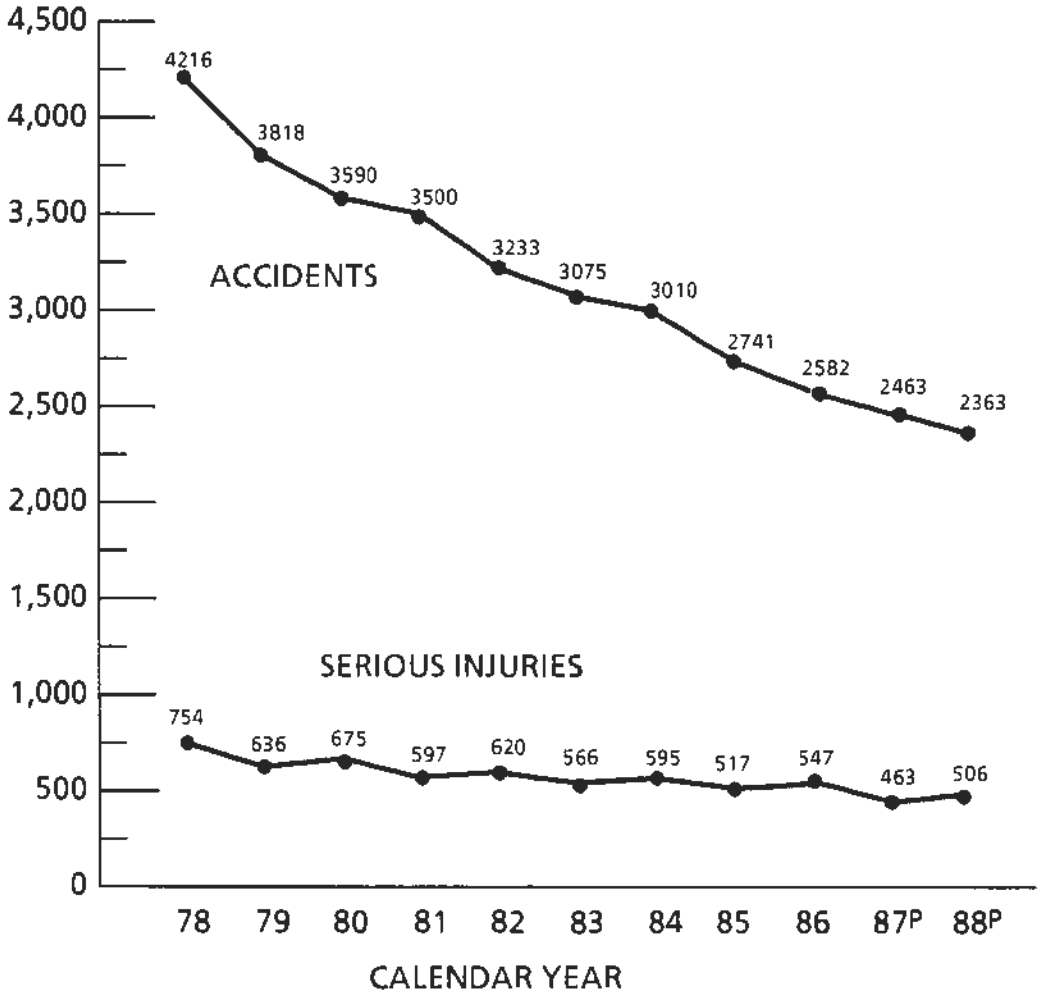
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987P	1988P
Fatalities	155	77	105	94	72	62	52	76	65	64	62
Fatal Accidents	54	30	46	40	31	27	23	35	31	29	29
Total Accidents	198	160	171	157	132	141	146	152	116	100	104
Serious Injuries	67	32	43	37	39	29	35	43	33	19	40
Fatal Accident Rate**	1.52	0.81	1.27	1.38	0.95	1.05	0.75	1.26	1.06	1.01	1.00
Total Accident Rate**	5.58	4.34	4.73	5.42	4.05	5.48	4.74	5.46	3.98	3.41	3.56

P = Preliminary.
* Nonscheduled service operating under 14 CFR 135.
** Per 100,000 aircraft hours.

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 34.

GENERAL AVIATION* ACCIDENTS AND SERIOUS INJURIES, 1978 - 1988

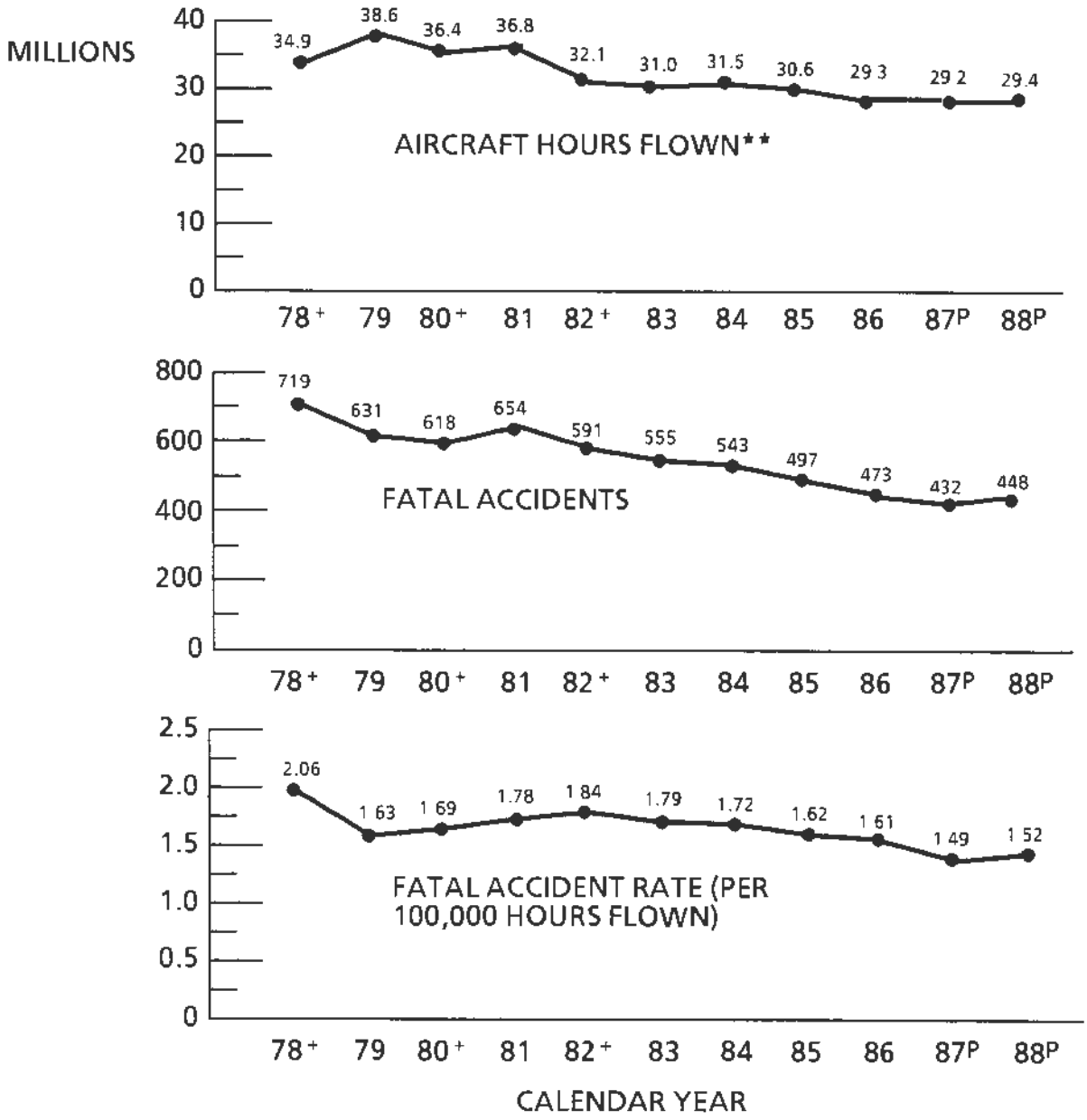


P = Preliminary.
* All operations other than those operated under 14 CFR 121, 125, 127 and 14 CFR 135.

SOURCE: NTSB, Accident Data Division, SP-30

CHART 36.

GENERAL AVIATION* FATAL ACCIDENTS AND RATES, 1978 - 1988



P = Preliminary.
* All operations other than those operated under 14 CFR 121, 125, 127 and 14 CFR 135.
** Source of estimate: FAA.
\+ Suicide/sabotage fatal accidents included in all computations except rates (1978 - 2, 1980 - 1, 1984 - 2, 1985-2, 1987-1).

SOURCE: NTSB, Accident Data Division, SP-30.

TABLE 14.

GENERAL AVIATION FATALITIES BY TYPE OF FLYING, 1987-1988

	JANUARY		FEBRUARY		MARCH		APRIL	
CLASSIFICATION	1987	1988	1987	1988	1987	1988	1987	1988
PERSONAL	33	37	40	46	26	24	44	66
BUSINESS	11	7	2	8	8	8	1	5
CORPORATE/EXECUTIVE	6	0	0	0	1	0	0	0
AERIAL APPLICATION	0	0	0	0	0	0	2	1
INSTRUCTIONAL	13	5	0	11	12	2	11	2
OTHER	1	1	7	2	13	0	7	4
TOTAL GENERAL AVIATION	64	50	49	67	60	34	65	78

	MAY		JUNE		JULY		AUGUST	
CLASSIFICATION	1987	1988	1987	1988	1987	1988	1987	1988
PERSONAL	41	50	52	38	65	62	58	52
BUSINESS	16	8	6	7	1	5	9	11
CORPORATE/EXECUTIVE	0	0	0	0	2	0	0	0
AERIAL APPLICATION	3	2	0	2	3	5	2	5
INSTRUCTIONAL	2	5	4	5	3	4	5	2
OTHER	2	15	7	7	8	7	12	5
TOTAL GENERAL AVIATION	64	80	69	59	82	83	86	75

	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
CLASSIFICATION	1987	1988	1987	1988	1987	1988	1987	1988
PERSONAL	53	58	58	59	52	50	46	30
BUSINESS	10	5	12	15	19	7	3	7
CORPORATE/EXECUTIVE	1	0	0	2	0	0	0	0
AERIAL APPLICATION	1	0	0	0	1	2	0	0
INSTRUCTIONAL	4	2	7	3	11	9	2	5
OTHER	8	12	7	2	1	7	4	4
TOTAL GENERAL AVIATION	77	77	80	81	84	75	55	46

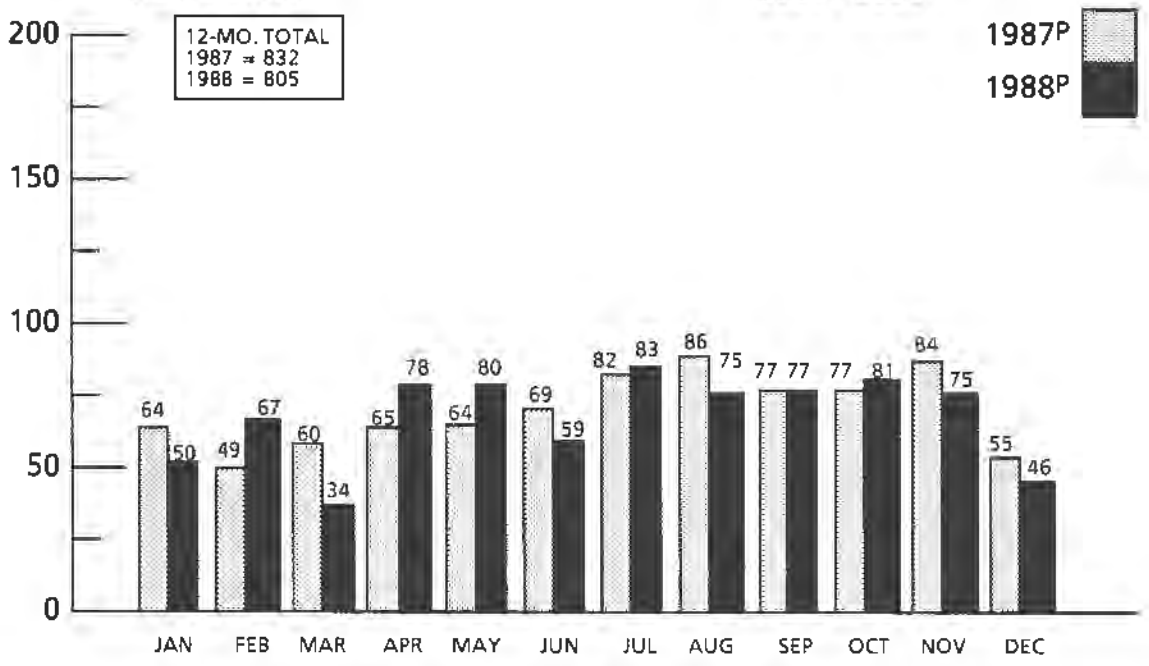
	12- MONTH TOTAL		
CLASSIFICATION	1987	1988	% Chg
PERSONAL	568	572	+0.7
BUSINESS	98	93	-5.1
CORPORATE/EXECUTIVE	10	2	-80.0
AERIAL APPLICATION	12	17	+41.7
INSTRUCTIONAL	67	55	-17.9
OTHER	77	66	-14.3
TOTAL GENERAL AVIATION	832	805	-3.2

NOTE: 1987 and 1988 data are preliminary.

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 40.

GENERAL AVIATION* FATALITIES, 1987 - 1988

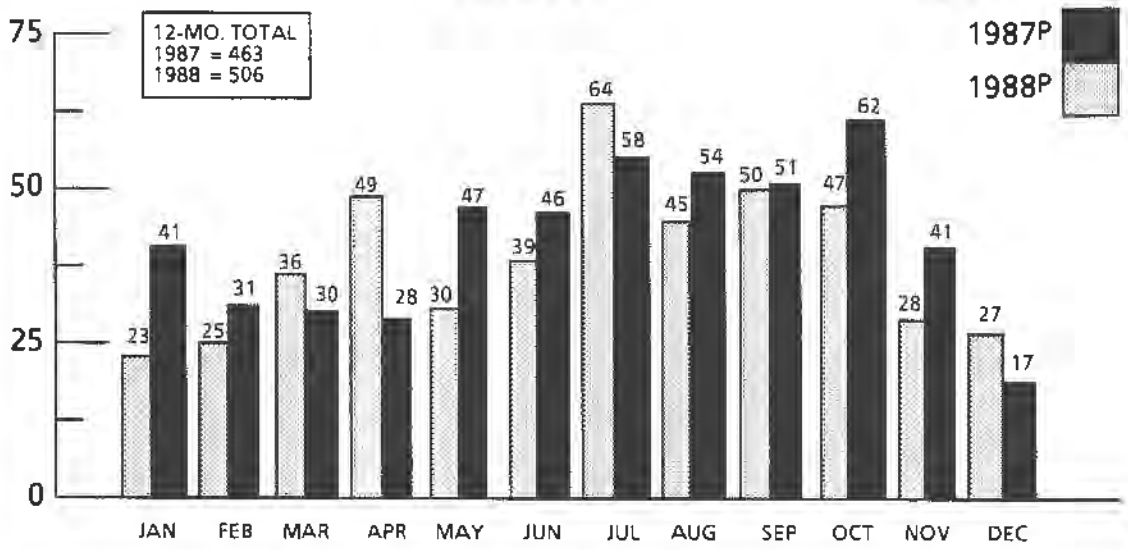


P = Preliminary.
* All operations other than those operations under 14 CFR 121, 125, 127, and 135

SOURCE: NTSB, Accident Data Division, SP-30.

CHART 41.

GENERAL AVIATION* SERIOUS INJURIES, 1987 - 1988



P = Preliminary.
* All operations other than those operations under 14 CFR 121, 125, 127, and 135.

SOURCE: NTSB, Accident Data Division, SP-30

MODAL SAFETY HAZARDS

Unstabilized Approach and Cocaine Use Cited in Fatal Trans-Colorado/Continental Express Accident, January 1988

The deficient performance of a Trans-Colorado Airlines Metro III crew to stabilize their approach to the Durango, Colorado airport and the captain's use of cocaine before the accident were cited by the National Transportation Safety Board in the January 19, 1988 crash of Continental Express flight 2286.

The aircraft had leveled off after a rapid descent, when it clipped the top of a hill, pitched up, impacted the ground on the opposite side of the hill and slid about 300 feet through a four-foot ground cover of snow. The first officer was flying the plane.

Of the 17 persons on board the Metro III, 7 passengers and both crewmen died; 8 passengers survived. The aircraft was destroyed.

On this particular approach to the airport, the crew chose to begin their descent from 14,000 feet. The speed of the aircraft ranged from 187 down to 135 knots during the descent, but during the last minute of the flight increased to 165 knots almost until impact. The Fairchild Metro III impacted at an altitude of 7,180 feet, over 1,200 feet below the minimum altitude on that segment of the approach. "Moreover, its descent rate, which it maintained almost through(out) the approach, was approximately 3,000 feet per nautical mile," more than twice the normal rate.

The Board found that, from the outset, the flightcrew flew the approach "at an altitude that was too high to fly safely within the parameters established for the published approach," and the difficulties the crew created for themselves were further aggravated by a 10 to 15 knot tailwind.

Had the crew flown the full approach as published, it would have added 10 minutes to their flight time. However, the Safety Board said, "Since the flight was only scheduled for 70 minutes, the Trans-Colorado schedule for the flight, as published, would have discouraged pilots from flying the full approach when conditions warranted."

The Safety Board believes the approach was a "challenging one" and the prevailing conditions combined to make it a particularly difficulty approach that night. "As a result," the Board stated, the pilots "should have been reluctant to execute the approach as flown." Having made the decision to approach from 14,000 feet, under those conditions, the captain "should have recognized the compelling need to monitor closely the first officer's conduct of the approach to ensure that he was maintaining altitude and situational awareness and not prematurely descending below the published descent profile."

The Safety Board believes that flying this approach in the existing meteorological conditions required a high level of pilot skills and abilities. The evidence indicates a continued history of deficiencies in the first officer's piloting abilities, particularly in instrument flight skills.

The captain had a reputation both as a highly skilled pilot and as one who could make up for lost time and attempt to arrive on schedule.

The Safety Board noted that the evidence indicates that the captain had used cocaine 10 to 18 hours before the accident, most likely the night before. As a result, he probably experienced fatigue from cocaine use, which affected his perceptual abilities. Medical literature indicates that cocaine can affect the user in a variety of ways, both while under the influence and during withdrawal. The Safety

MARINE

WATERBORNE TRANSPORT

Users of Waterborne Transport statistics should exercise caution when comparing accident, fatality, and injury data for 1987 and 1988. Data for 1988 are incomplete at this time since many of the marine casualties are still being investigated or are in various stages of completion.

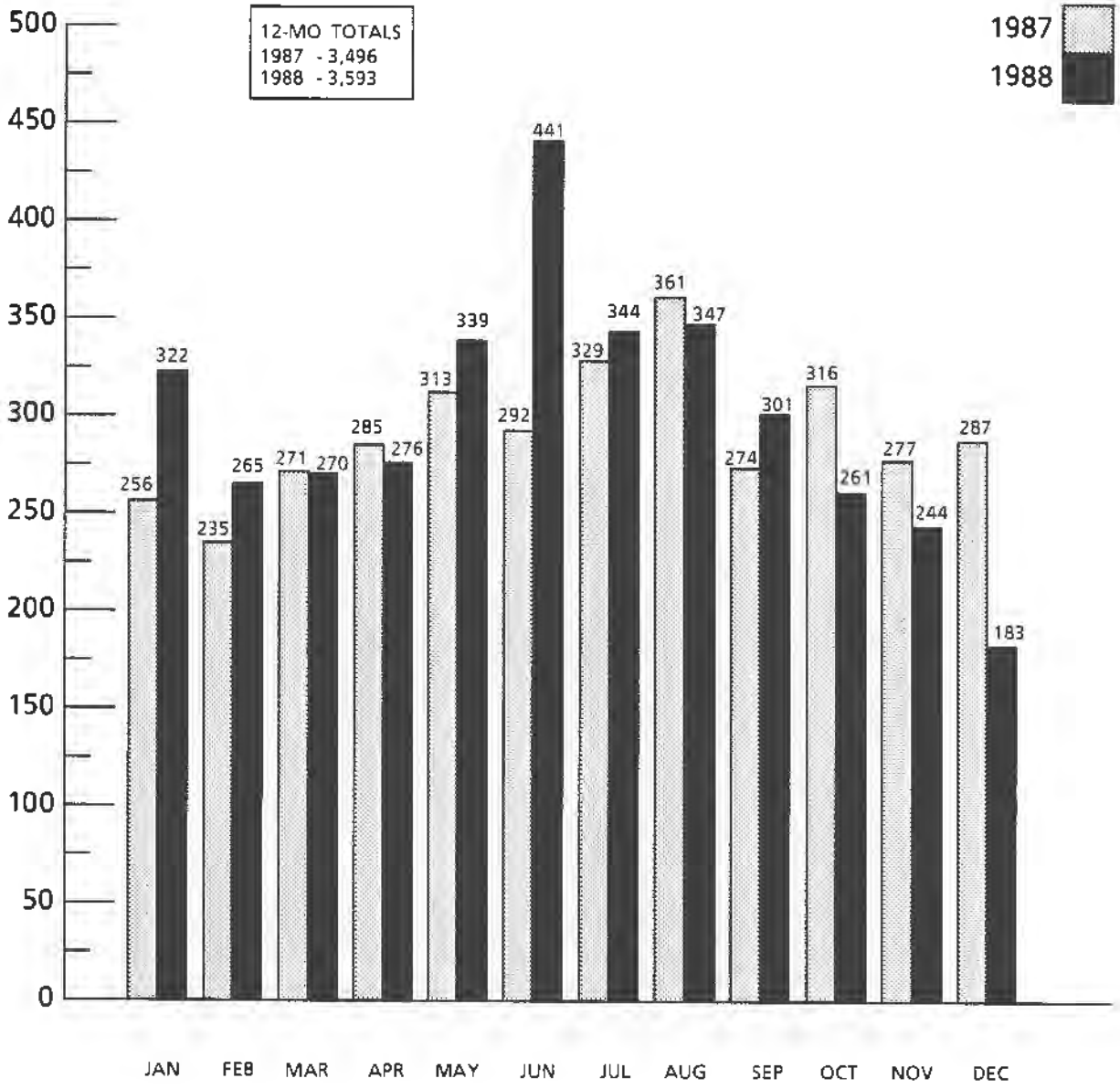
- As of October 24, 1989, a total of 3,593 marine accidents involving 5,694 vessels occurred for 1988. As a result of these marine accidents, 81 fatalities and 130 injuries have been reported.

- In 1987, 296 vessels were lost. About 95 percent of all U.S. vessel losses were uninspected vessels. Fishing vessels accounted for 69 percent of the total number of losses.

- In 1987, 121 fatalities were reported as a result of non-vessel-related accidents. Of this number, 28 (23 percent) resulted from falls overboard.

CHART 44.

WATERBORNE ACCIDENTS BY MONTH, 1987-1988P



P preliminary

NOTE: More than one vessel may be involved in a marine accident.
Data for 1987 and 1988 are incomplete.

SOURCE: USCG, Marine Investigation Division, G-MMI.

CHART 46.

WATERBORNE FATALITIES RESULTING FROM VESSEL CASUALTIES*, 1987 - 1988P

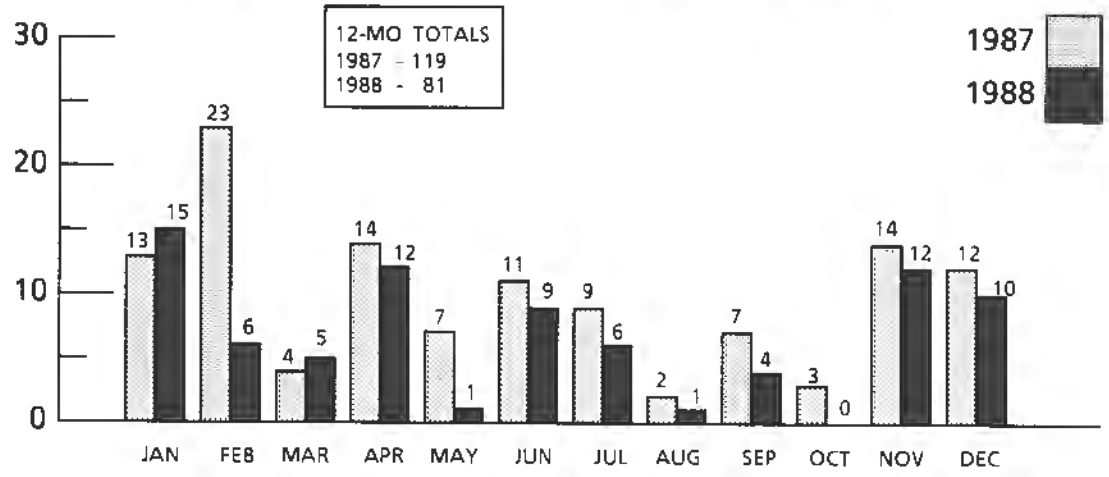
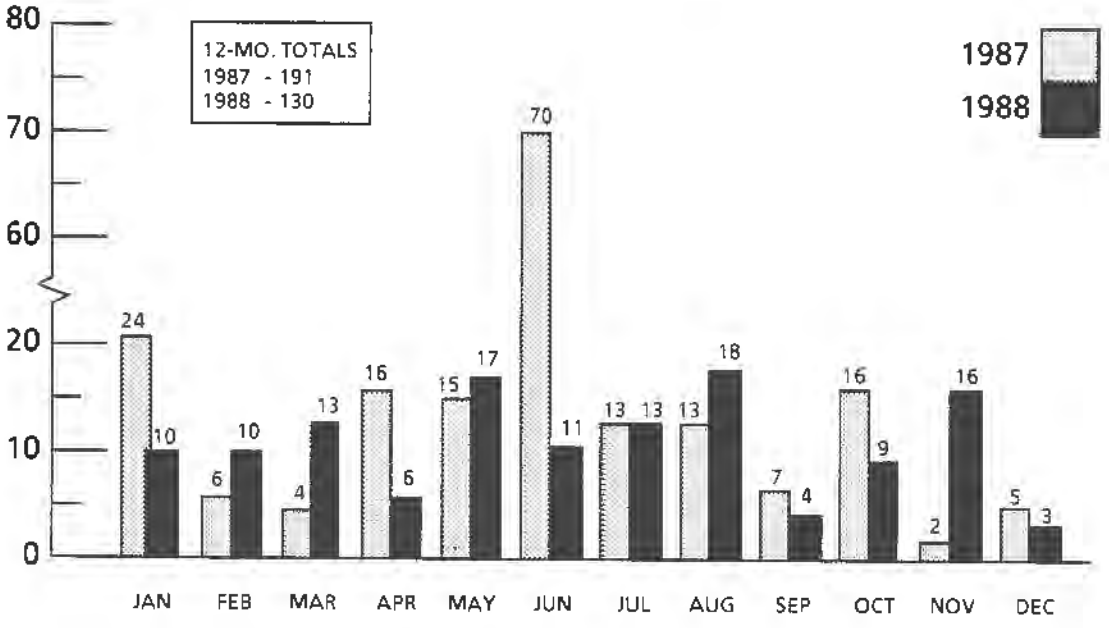


CHART 47.

WATERBORNE INJURIES RESULTING FROM VESSEL CASUALTIES*, 1987 - 1988P

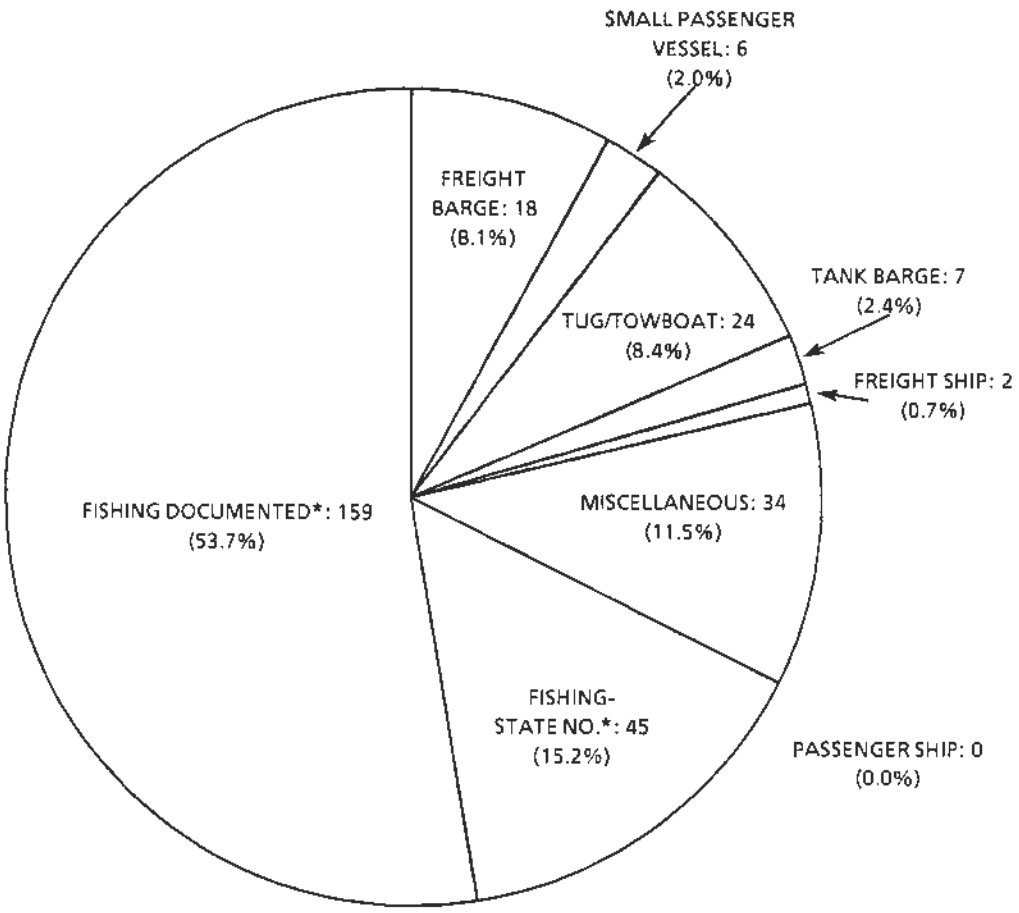


P preliminary
* Includes foreign vessels having casualties in U.S. navigable waters.
n/a: Not available.
NOTE: Data for 1987 and 1988 are incomplete.

SOURCE: USCG, Marine Investigation Division, G-MMI.

CHART 49.

U.S. VESSELS TOTALLY LOST IN 1987



TOTAL VESSELS LOST: 296

* All commercial fishing vessels over 5 net tons are documented by the Coast Guard; if less than 5 net tons, commercial fishing vessels are registered in the state.

NOTE: Data supplied as of 10/24/89.
SOURCE: USCG, Marine Investigation Division, G-MMI.

MODAL SAFETY HAZARDS

M/V Cape Henlopen, O.N. 281371 and M/V North Star, O.N. 515290

The M/V *North Star* and M/V *Cape Henlopen*, two ferry vessels operated by the Cross Sound Ferry Service on a regular route between Orient Point, New York and New London, Connecticut collided at 0915 EDT, July 9, 1987 in a dense fog approximately 500 yards North of the Plum Gut buoy "2PG" just off the North Fork of Long Island, New York. The *Cape Henlopen* incurred damage in the area of the port bow and its hydraulic bow doors. On the *North Star*, a hole measuring 30 feet long, and 4 feet high, that began 15 feet aft of the stem and at the main deck, was opened where the port bow of the *Cape Henlopen* met the *North Star*. All 21 injuries reported resulted when the injured were thrown about upon impact. Fourteen of the injured were incapacitated for more than 72 hours. After the collision, the ships' crews evaluated their damage, sighted the hull of the other vessel and then continued to their destinations. Ambulances and emergency medical assistance were waiting for the *North Star* at Orient Point, New York when it arrived at 0940.

M/V Pride of Texas, O.N. 634621

The bulk cargo carrier M/V *Pride of Texas* suffered a major engine room fire at 1250 local time on June 8, 1987, approximately 130 miles Northwest of Las Palmas, Canary Islands. The M/V *Pride of Texas* was in a ballast condition enroute to New Orleans, Louisiana after off-loading grain at Agadir, Morocco. The M/V *Pride of Texas* was disabled and unable to use its fire main system. The fire reflashed after the engin room carbon dioxide system was discharged. At 2241 the passing Danish vessel M/V *Meonia* provided fire fighting water to the M/V *Pride of Texas*. The fire was extinguished at 0240, June 9, 1987 but a number of reflashes continued through the morning. The M/V *Meonia* was released at 1130 on June 9, 1987 when the M/V *Pride of Texas* was able to regain its fire main system. The M/V *Pride of Texas* incurred hull and engine room damage and was towed to Las Palmas, Canary Islands.

SAFETY PROGRAM HIGHLIGHTS

Drug and Alcohol Testing of Commercial Vessel Personnel

The Federal Register published on November 21, 1988 provided the final rules for mandatory drug and alcohol testing of personnel employed on U.S. commercial vessels. These rules promulgate regulations in the 46 Code of Federal Regulations (CFR), Part 16 requiring marine employers to implement four categories of testing:

- Pre-employment testing for drugs for all new crewmembers.
- Random testing for drugs at an annual rate of at least 50 percent.
- Reasonable cause testing for drugs for individuals suspected of being under the influence of drugs.
- Post casualty testing for drugs and alcohol for involved individuals following the occurrence of a serious marine incident.

RECREATIONAL BOATING

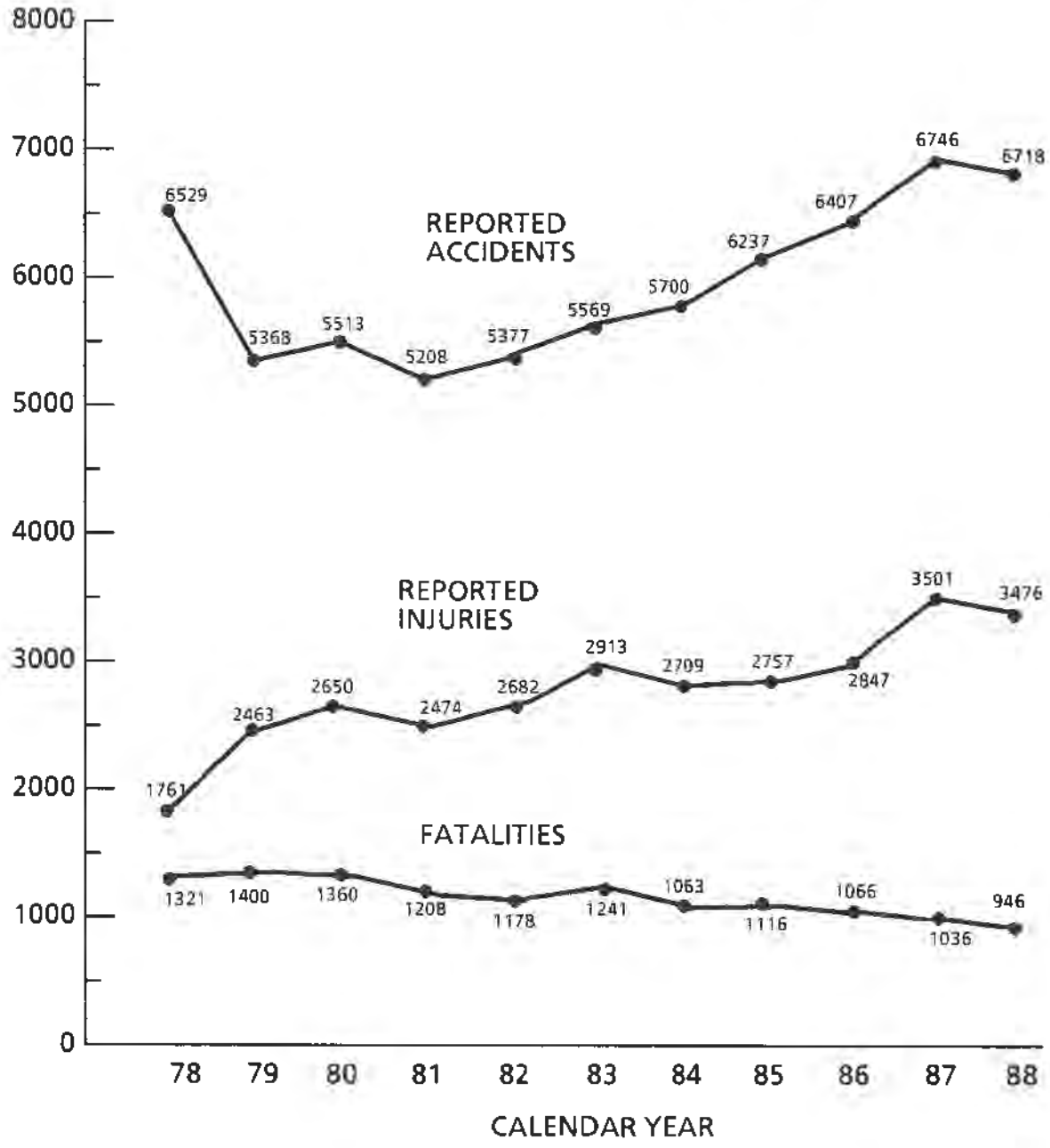
- The number of fatalities in 1988 was the lowest the annual total has been since 1961, when fatalities were first counted completely. Fatalities dropped to 946 during 1988. The fatality rate also dropped to a record low of 5.5 fatalities per 100,000 boats. Several factors have contributed to the reduction in fatalities and the fatality rate, including safer boats, wider selection of personal flotation devices, safety education and publicity including greater awareness of the dangers of alcohol, and better emergency care following boating accidents. Even the number of accidents and injuries dropped slightly in spite of the increasing popularity of recreational boating. The estimated number of recreational boats reached 17.3 million in 1988.

- The number of reported injuries dropped slightly to 3,476 in 1988, a decrease of 0.7 percent from the 3,501 reported in 1987.

- Property damage reported, however, reached a record high of $24.3 million in 1988. Only a small fraction of property damages are reported to the Coast Guard.

CHART 53.

RECREATIONAL BOATING FATALITIES, INJURIES, AND ACCIDENTS, 1978 - 1988



NOTE: Only a small fraction of property damages and non-fatal accidents are reported to the Coast Guard.

SOURCE: BAR File, USCG, Auxiliary, Boating, and Consumer Affairs Division, G-NAB.

CHART 55.

RECREATIONAL BOATING FATALITIES, 1987-1988

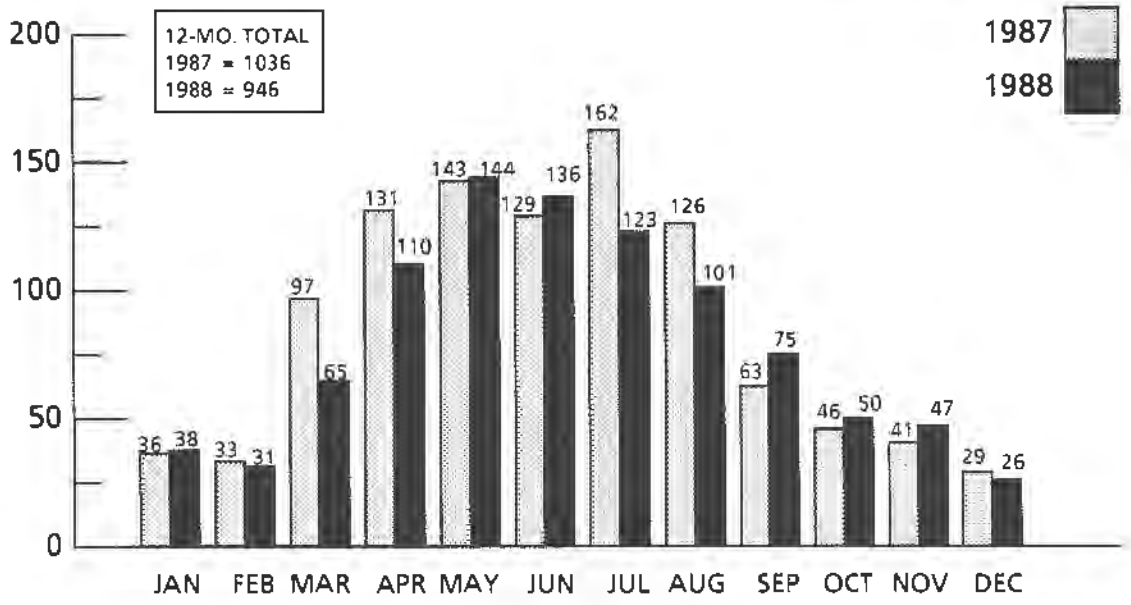
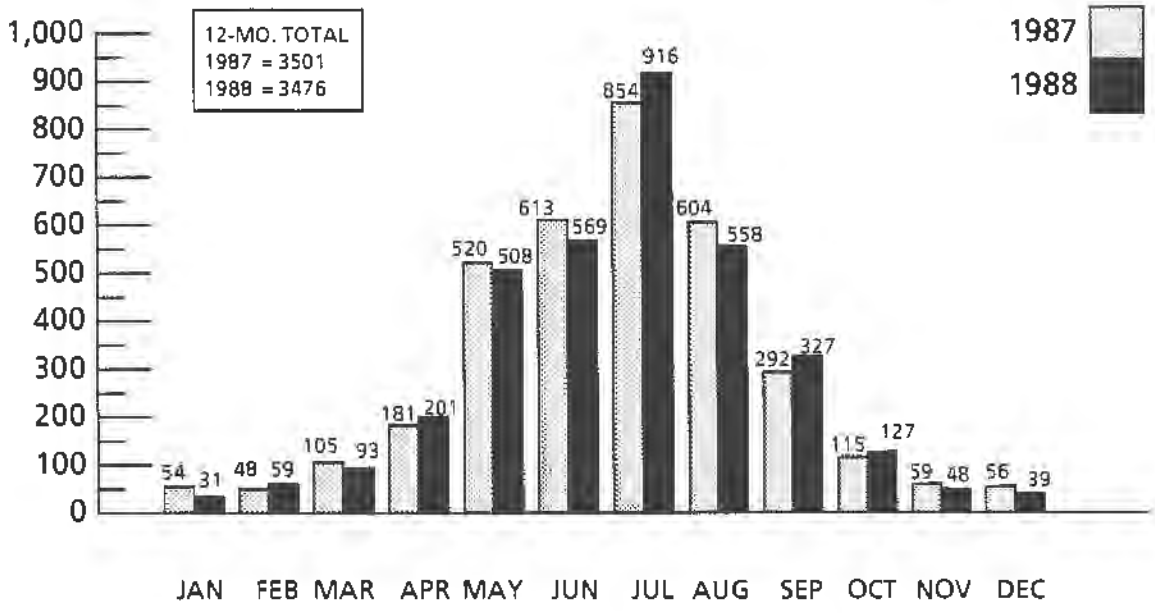


CHART 56.

RECREATIONAL BOATING INJURIES, 1987 - 1988



SOURCE: BAR File, USCG, Auxiliary, Boating, and Consumer Affairs Division, G-NAB.

MODAL SAFETY HAZARDS

Personal Watercraft

Using personal watercraft has become a well-publicized form of entertainment. They can be seen in magazines and on TV shows and advertisements, where they are shown being used by adventuresome young people. Everyday operators, many of whom are not experienced boaters, may realize that there is a high risk of falling off the boat, but they may not be aware of the increased risk of collision with other boats. For someone not knowledgeable of other boating operations, a comparison to characteristics of automobile operations may lead to trouble when cruising near other boats. Here is an example.

Two friends, Marc and Jason, decided to enhance their excitement during their vacation. (Marc has rented a personal watercraft earlier in the year after hearing some school friends talk about their experience.) At the lakeside, they read and signed the rental agreements. However, Marc's later actions showed that he either ignored or did not read the item concerning the allowable distance between boats. While Jason was still getting the feel of the boat, Marc sped by, perhaps with the intention of creating a high spray just for fun. the scare confused Jason and caused him to fall, sending his watercraft to idle away on its own. Not knowing about the fall, Marc turned in a tight circle and, before he could see where he was headed, hit the riderless boat. The collision caught Marc by surprise, and, because he was off balance, forced his body against the handlebars causing two broken ribs and the need for a few stitches on his cheek.

Waterskiing

Another water activity which is riskier than most other boating activities is waterskiing. Although water has the quality which allows objects to skim over the surface, it can cause calamitous reactions when the timing, angle, and amount of the forces do not mesh.

Ray and Diane were anxious for an afternoon of waterskiing. They especially liked one of the less popular lakes a little further from town. Since waterskiing requires an observer in the boat, as well as a boat operator, they thought they would ask their new neighbor, Jack, and get to know him better. Nothing unusual happened in the first 3 hours while they took turns skiing, sometimes resting and enjoying the sun and quiet conversation. Then, there was a problem. While Jack was skiing, Diane was driving the boat in the proper direction when she noticed another boat coming from her left across the lake. since she had a skier under tow and was running properly, she expected the other operator to yield to her by slowing and passing behind Jack. However, when the other operator did not alter his course, she decided to take action herself to avoid a possible accident. The problem came about because Jack was, at that very instant, watching a pair of seagulls soaring nearby. As Jack felt the change in tension in the ski rope, he looked ahead to see the incident. However, when the full tension returned to the rope, Jack was not ready for it, lost his balance, and fell. While airborne the back part of the ski barely touched the surface of the water, but it forced the tip of the ski to rotate and strike Jack in the forehead with a force that cut him and stunned him. Since Ray, the observer, saw Jack fall, they were able to retrieve Jack and get to an emergency clinic in a reasonable time.

Alcohol Use in Recreational Boating

Boat operators have the same responsibility on the water as automobile operators have on roads. In fact, even if the operator of a boat is sober, a serious problem can arise if passengers have used alcohol heavily. Drunken passengers in cars usually stay in their seats. However, boats provide the opportunity for passengers to move about and get into trouble. It is then that the operator needs the maximum skill to avoid loss of life or property.

SAFETY PROGRAM HIGHLIGHTS

Boating While Intoxicated Enforcement

It is estimated that alcohol may have been related to as many as half of the 946 lives lost in boating accidents in 1988.

Intoxication poses dangers to the boating public, both directly and indirectly. It can cause a lack of stability, shorten a person's survival time if he or she is dumped into cold water, and interfere with an individual's ability to cooperate in his or her own rescue. And studies show that an intoxicated person may be unable to swim, even if he or she is an excellent swimmer when sober.

In addition, people under the influence of alcohol may lose the ability to differentiate among colors at night. This is particularly dangerous because the operator of a boat must be able to clearly see the red and green running lights on other boats. Adding alcohol or drugs to boating stress factors such as noise, vibration, sun, glare, wind and motion intensifies the effect and multiplies the accident risk.

The U.S. Coast Guard began enforcing Federal boating-while-intoxicated laws and regulations in 12 Gulf Coast and mid-Atlantic States this past summer. Coast Guard enforcement will be expanded to other States as more testing equipment and trained personnel become available. Intoxicated boaters face a civil penalty of $1,000 or a criminal fine of $5,000 and 1 year in jail. The Coast Guard cooperates with State and local authorities to conduct boating-while-intoxicated enforcement. It is illegal to operate a boat while intoxicated in every State, and most of the States are increasing enforcement.

The Coast Guard simply wants boaters to act responsibly, to know their limits, and be aware of the dangers of alcohol, illegal drugs, and the potential seriousness of combinations of alcohol and prescription drugs.

Waterskiing

Waterskiing is a popular sport for everyone in the family. While not a major problem, it was, however, the cause of 25 fatalities in 1988.

The Coast Guard, cognizant of the dangers involved in waterskiing, is constantly bringing this fact to public attention. In cooperation with the American Water Ski Association, the Coast Guard is developing new material on waterskiing safety -- proper hand signaling, posting a lookout, wearing a personal flotation device, boat maneuvering, watching the weather, and choosing the appropriate location. These are all very important considerations to ensure safe waterskiing. This material will be widely disseminated and used in boating safety classes. The Coast Guard also gave a fiscal year 1989 grant to the National Safety Council to develop a film on water ski tow boat safety.

Since regulation of waterskiing is primarily a State function, the Coast Guard will also offer this material to State Boating Law Administrators for their use and distribution among boaters.

SOURCE: USCG, Auxiliary, Boating, and Consumer Affairs Division; G-NAB.

Personal Watercraft

The increasing popularity of small motorboats known as personal watercraft (sometimes called "jet skis") has caused a substantial jump in the number of accidents and fatalities for this type boat. In one year (1987 to 1988) reported personal watercraft accidents nearly doubled (from 376 to 650) and deaths quadrupled (from 5 to 20). Rising concern among State Boating Law Administrators and the Coast Guard has prompted action to improve personal watercraft safety.

- Specially-trained members of the Auxiliary are authorized to conduct Courtesy Marine Examinations of recreational boats upon consent of the owners or operators. This is a check of the boat's safety-related equipment covering both the requirements of Federal and State law and certain additional criteria for safety which have been adopted by the Auxiliary. Boats meeting these criteria are awarded the respected Auxiliary CME decal "Seal of Safety." If a boat does not pass the examination, the owner is advised of the deficiencies and no report is made to any law enforcement official. This examination is in effect a form of boater education - - a one to one exchange of boating safety information.

- The Auxiliary offers the public an array of boating safety courses, each tailored to a specific need. There are courses for both those who sail and for power boaters - - both novices and experts. Courses are taught by experienced Auxiliarists using slides, movies, and demonstrations.

- To assist the USCG, members of the Auxiliary perform rescue and assistance missions, patrol regattas and marine events, and add a large measure of safety to the nation's waterways by their safety patrols. These Auxiliary operations are often performed in conjunction with regular Coast Guard units.

The Coast Guard Auxiliary reports the following achievements in 1988:

Persons enrolled in public safe boating courses	330,170
Courtesy Marine Examinations conducted	287,935
Safety patrols	27,186
Support missions for Coast Guard	33,978
Assists to the public	9,394
Regatta patrols	2,461
Persons assisted	27,131
Lives saved	458
Value of property saved/assisted	$157,012,000

SOURCE: USCG, Boating Statistics 1988, June 1989.

CHART 58.

LIQUID AND GAS PIPELINE LEAKS/FAILURES, 1978 - 1988

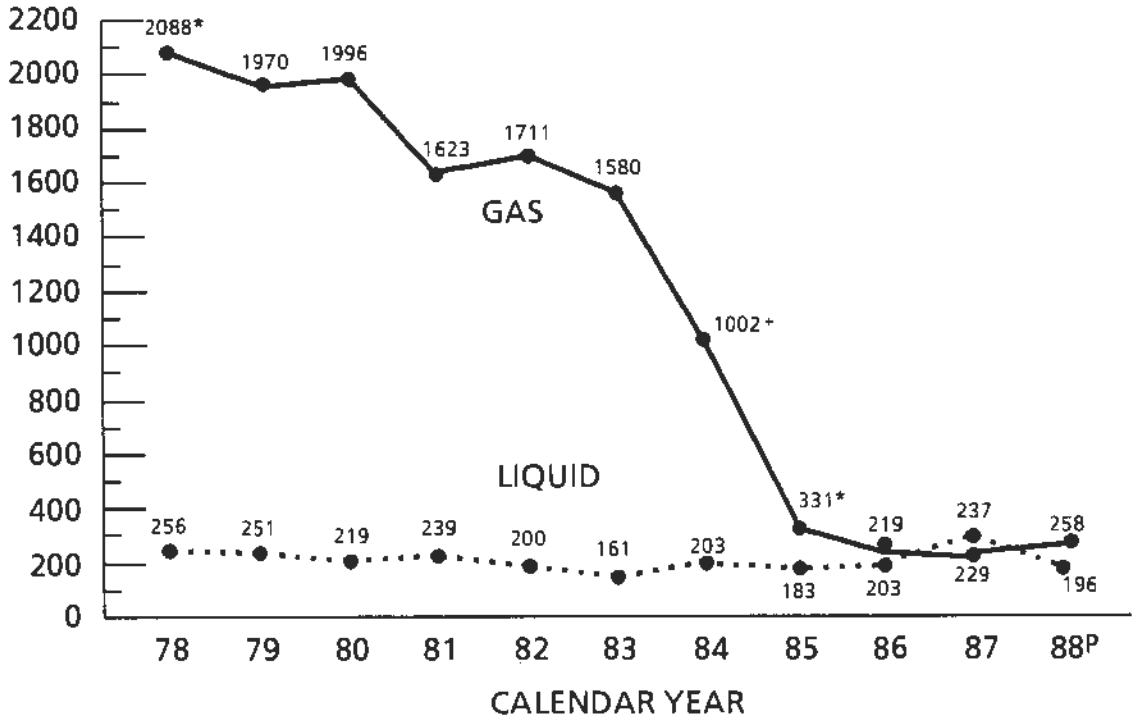
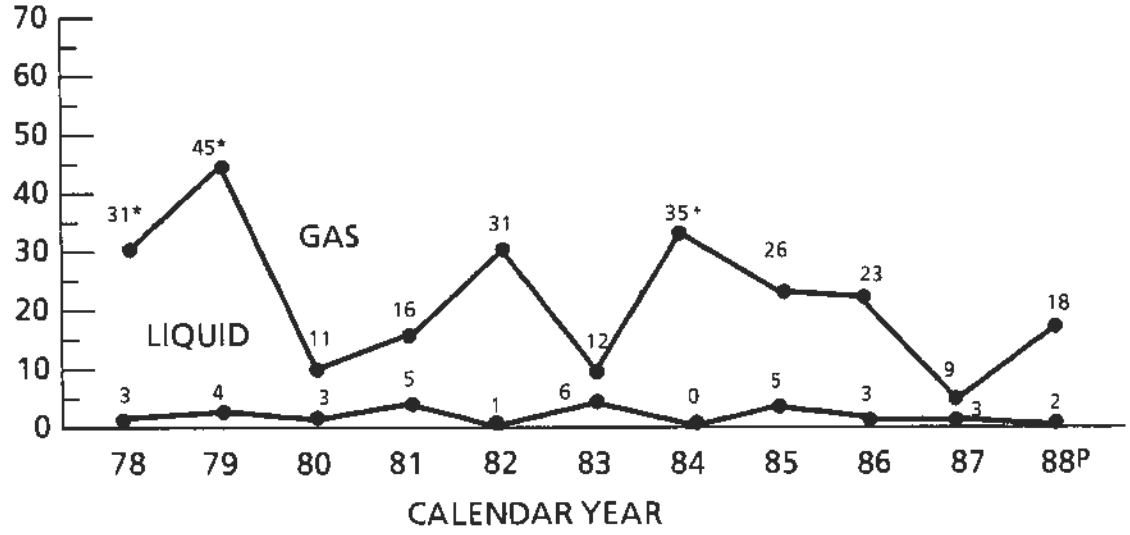


CHART 59.

LIQUID AND GAS PIPELINE FATALITIES, 1978 - 1988



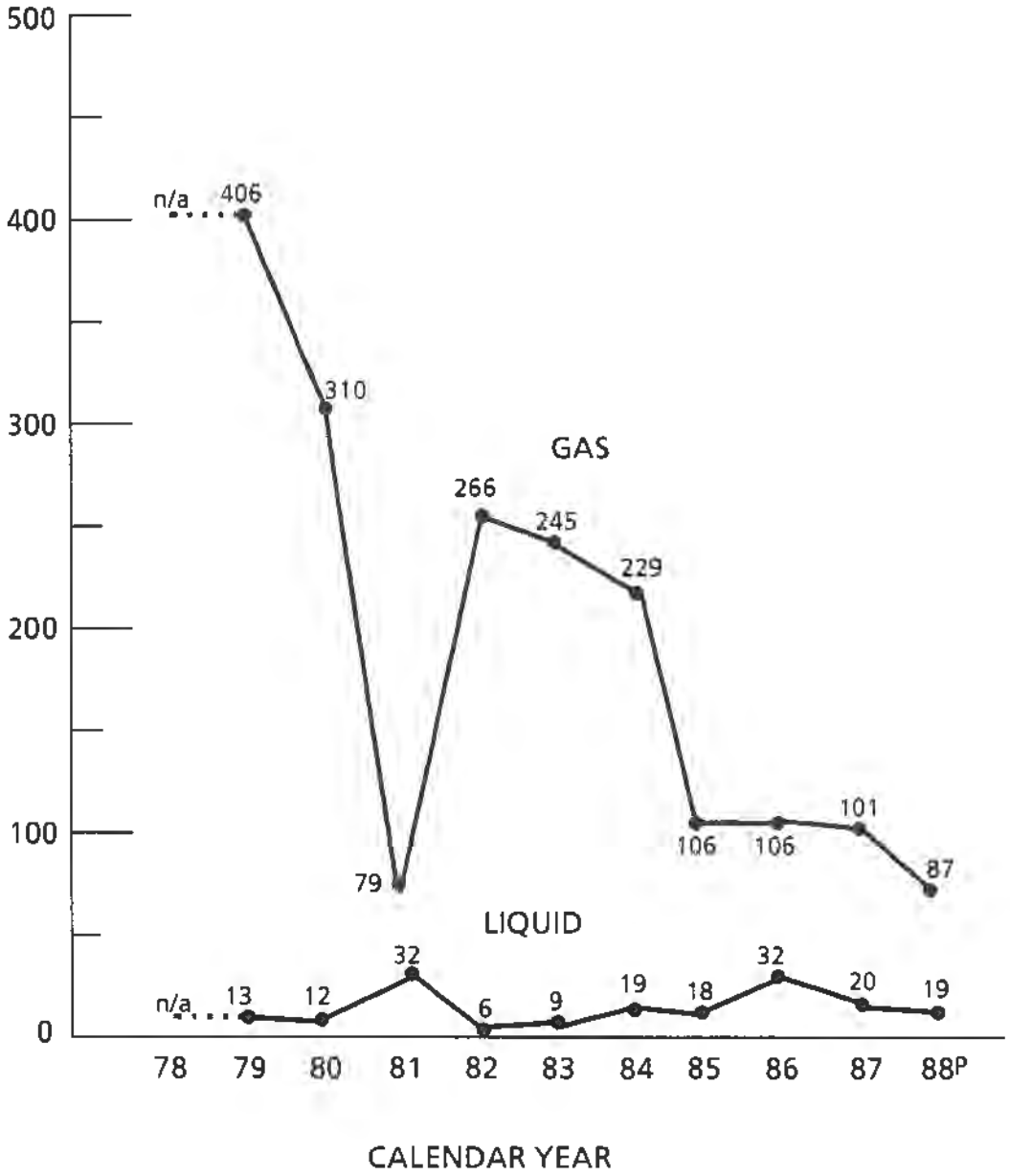
P = Preliminary.
* Includes preliminary notification of pipeline leaks via telephonic reports.
\+ Effective July 1, 1984, the criteria for reporting gas pipeline incidents changed. See glossary for definition.

NOTE: Data supplied as of 10/11/89.
Beginning with 1983 data, pipeline incidents are credited to the year in which they occurred, not the year in which the report was received.

SOURCE: Liquid Pipeline: DOT F 7000-1 Pipeline carrier accident report.
Gas Pipeline: DOT F7100.1; F7100.2 and telephone reports.
RSPA, Hazardous Materials Information Systems, DPS-20.

CHART 60.

LIQUID AND GAS PIPELINE INJURIES, 1978 - 1988

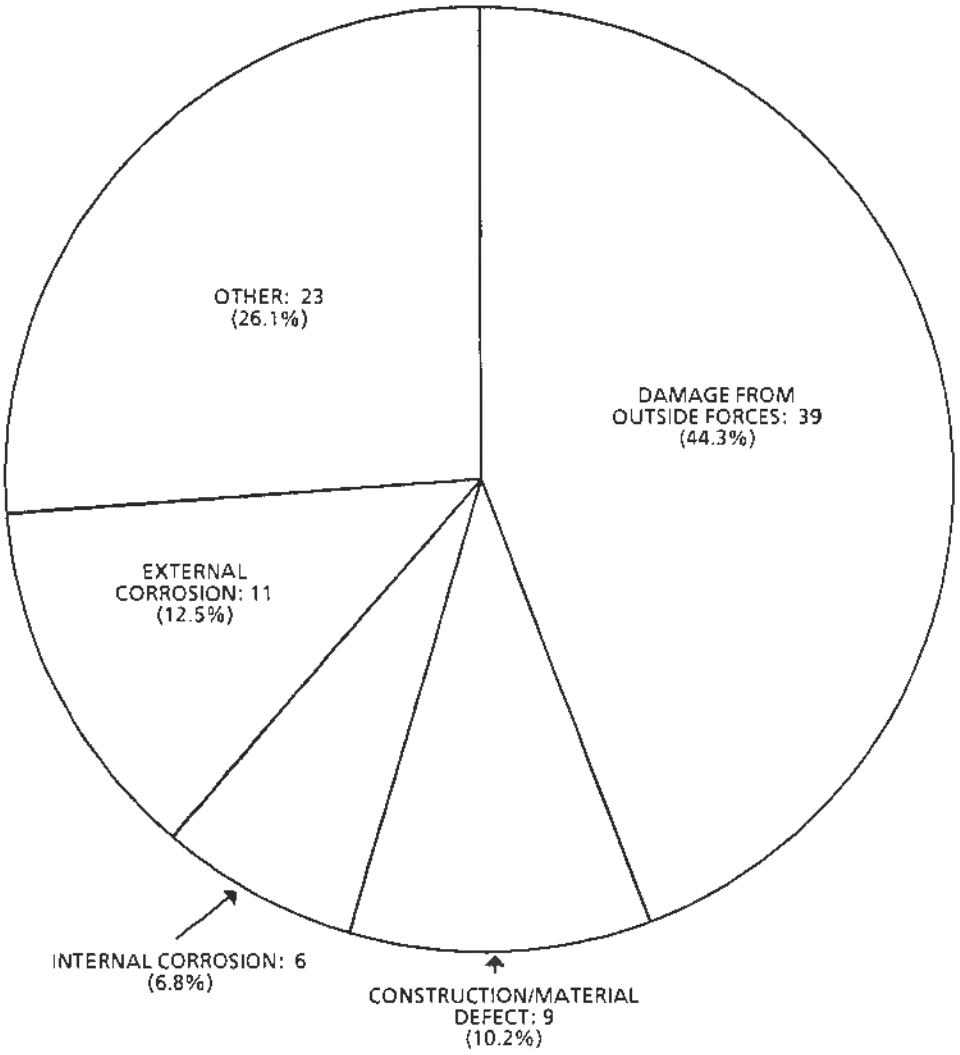


n/a = Not available
P = Preliminary.
NOTE: Data supplied as of 10/11/89

SOURCE: RSPA, Office of Pipeline Safety, DPS-20.

CHART 62.

NATURAL GAS TRANSMISSION AND GATHERING PIPELINE INCIDENTS BY CAUSE, 1988P



TOTAL INCIDENTS: 88

P = Preliminary.
NOTE: Data supplied as of 10/11/89.

SOURCE: Gas Pipeline: DOT F7100.2.
RSPA, Office of Pipeline Safety, DPS-20.

HAZARDOUS MATERIALS

- Hazardous materials fatalities increased in 1988 when compared with 1987. A total of 17 fatalities were reported in 1988 compared with 10 for 1987. Most fatalities occurred while transporting gasoline.

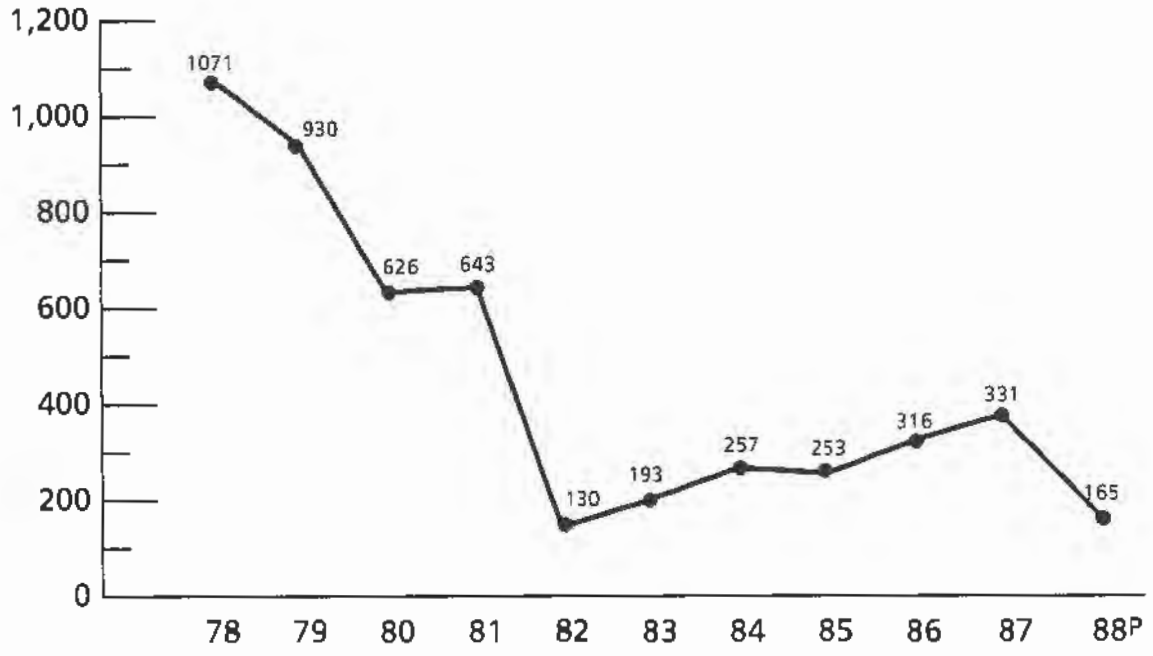
- In 1988, the number of incidents involving the transport of hazardous materials increased when compared with 1987. There were 6,161 incidents reported in 1988 and 6,136 in 1987.

- Major injuries resulting from hazardous materials incidents increased from 21 in 1987 to 35 in 1988. However, minor injuries decreased from 310 in 1987 to 130 in 1988.

- Total damages resulting from hazardous materials incidents dropped to $21,033,411 in 1988. Transporting gasoline caused more damages than any other single hazardous material.

CHART 66.

HAZARDOUS MATERIALS INJURIES+, 1978 - 1988*



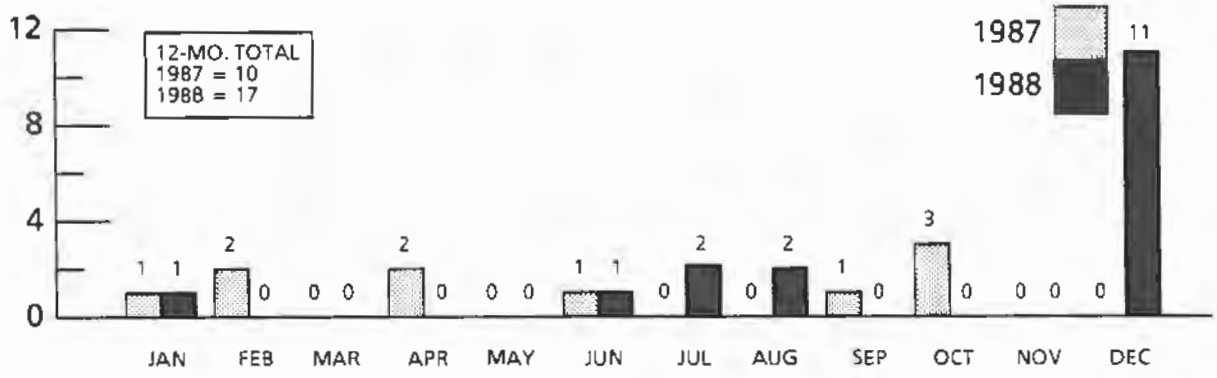
P = Preliminary.
* Effective January 1, 1981, the reporting requirements were changed to exclude incidents involving consumer commodities, wet electric storage batteries, or paint, enamel, lacquer, stain, shellac, etc., in packaging of 5 gallons or smaller unless the incident results in death, injury or property damage over $50,000; the material is being transported by air or the material is classified as a hazardous waste.
\+ Includes major and minor injuries.

NOTE: Data supplied as of 9/28/89.
Hazardous Materials incidents are reported in the year in which they occurred.

SOURCE: RSPA, Hazardous Materials Information Systems, DHM-63

CHART 67.

HAZARDOUS MATERIALS FATALITIES, 1987-1988P

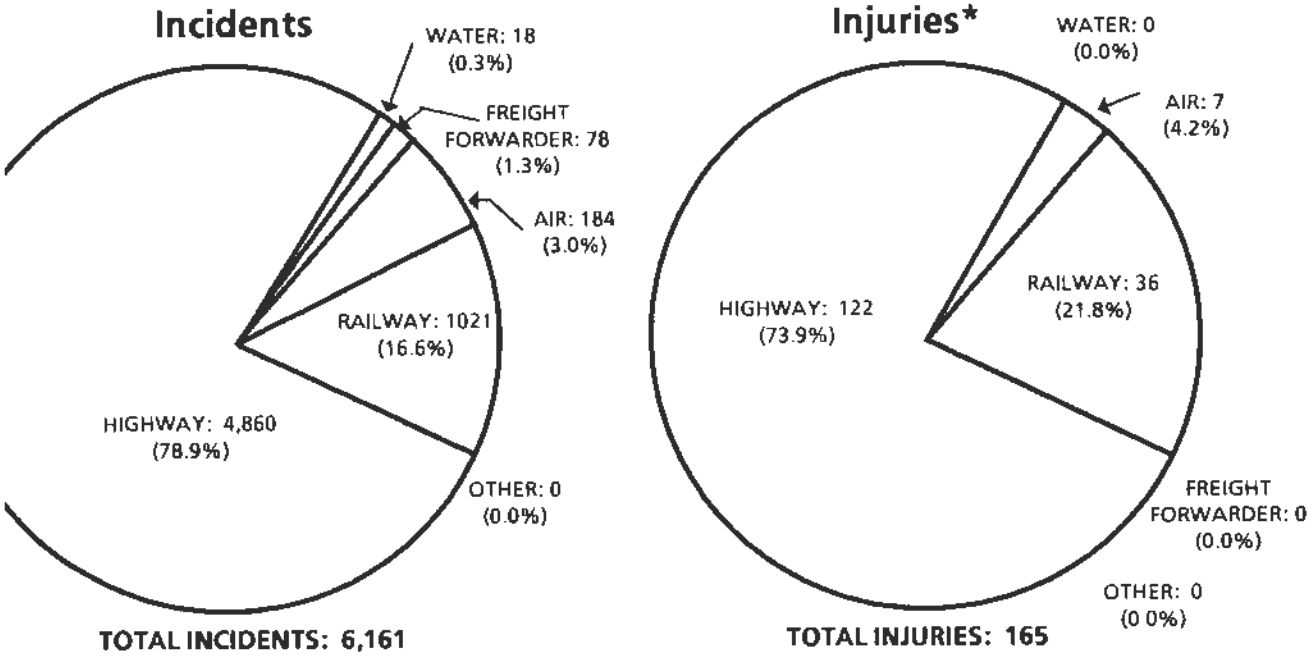


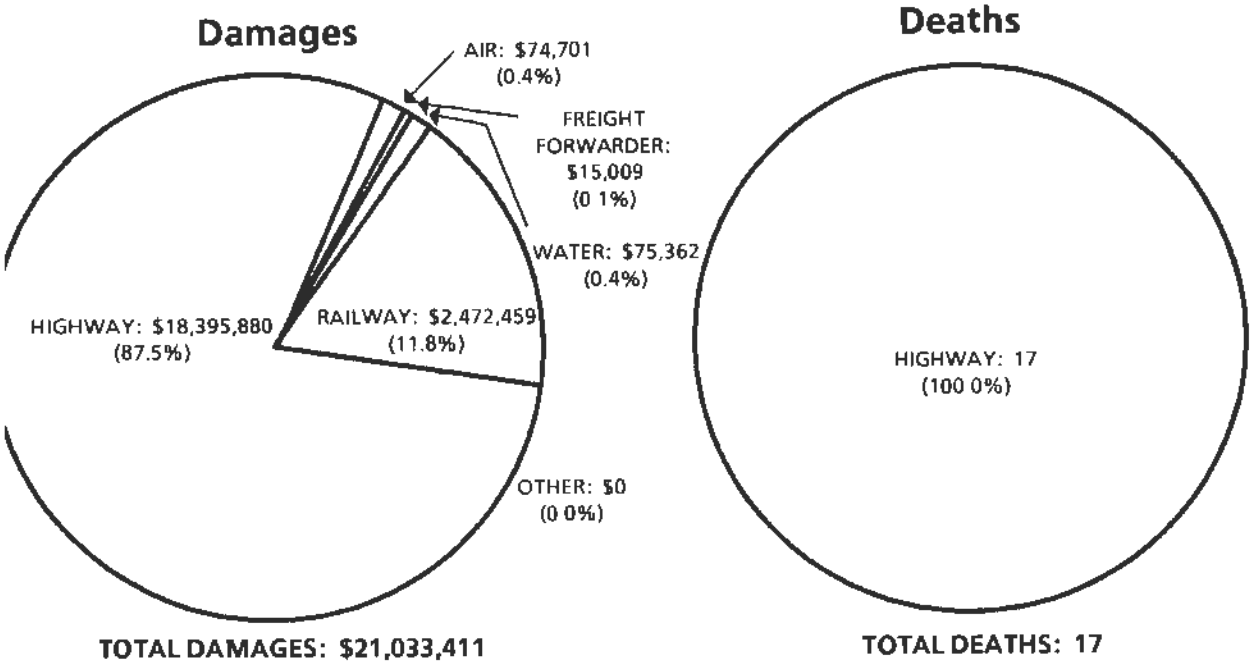
P = Preliminary.

SOURCE: RSPA, Hazardous Materials Information Systems, DHM-63.

CHART 71.

AZARDOUS MATERIALS INCIDENTS, INJURIES, DEATHS AND DAMAGES BY MODE, 1988P



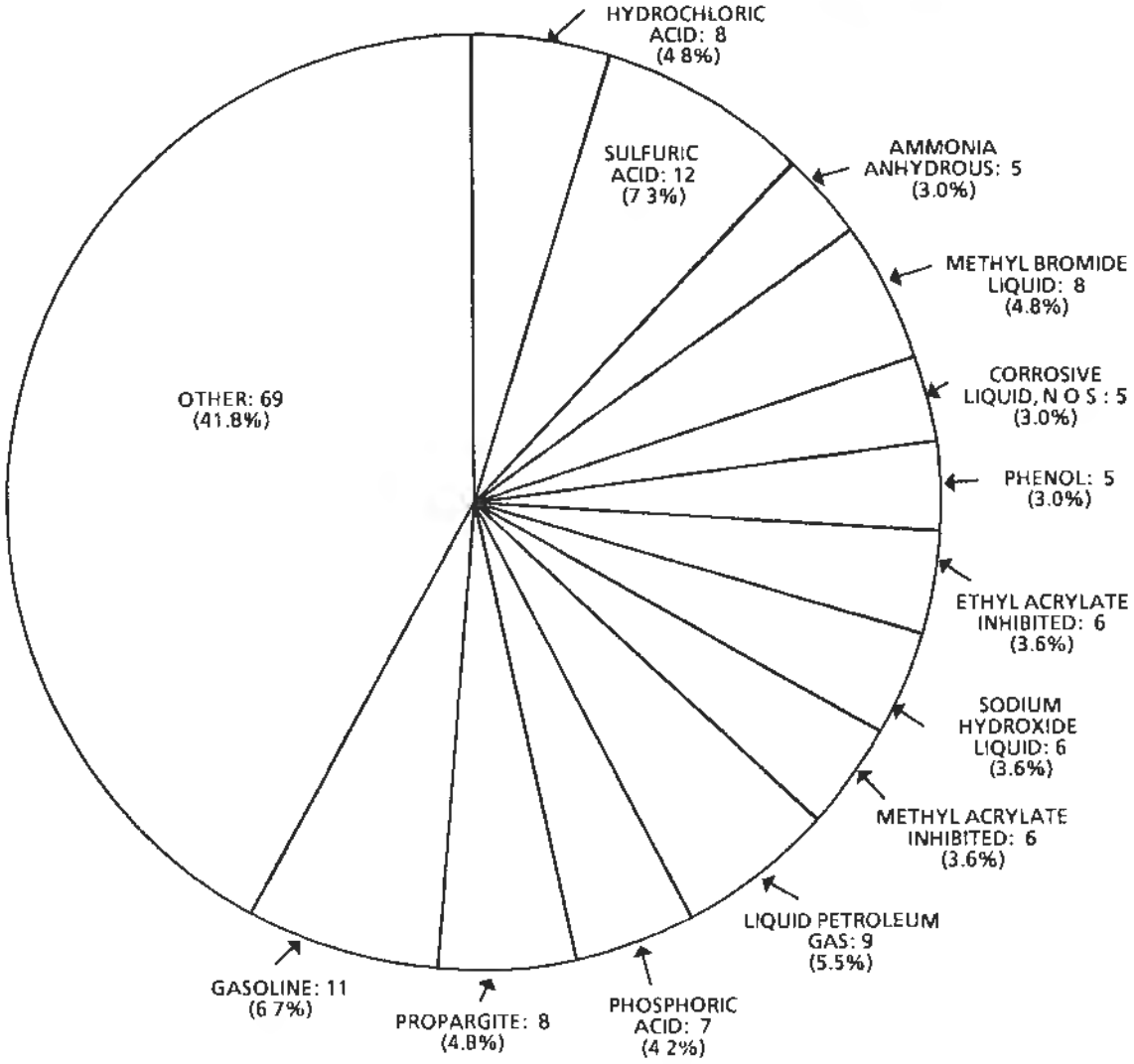


P = Preliminary Data supplied as of 9/28/89
* Includes Major and Minor Injuries.

SOURCE: RSPA, Hazardous Materials Information Systems, DHM-63.

CHART 73.

HAZARDOUS MATERIALS INJURIES BY TOP 13 COMMODITIES INVOLVED, 1988P



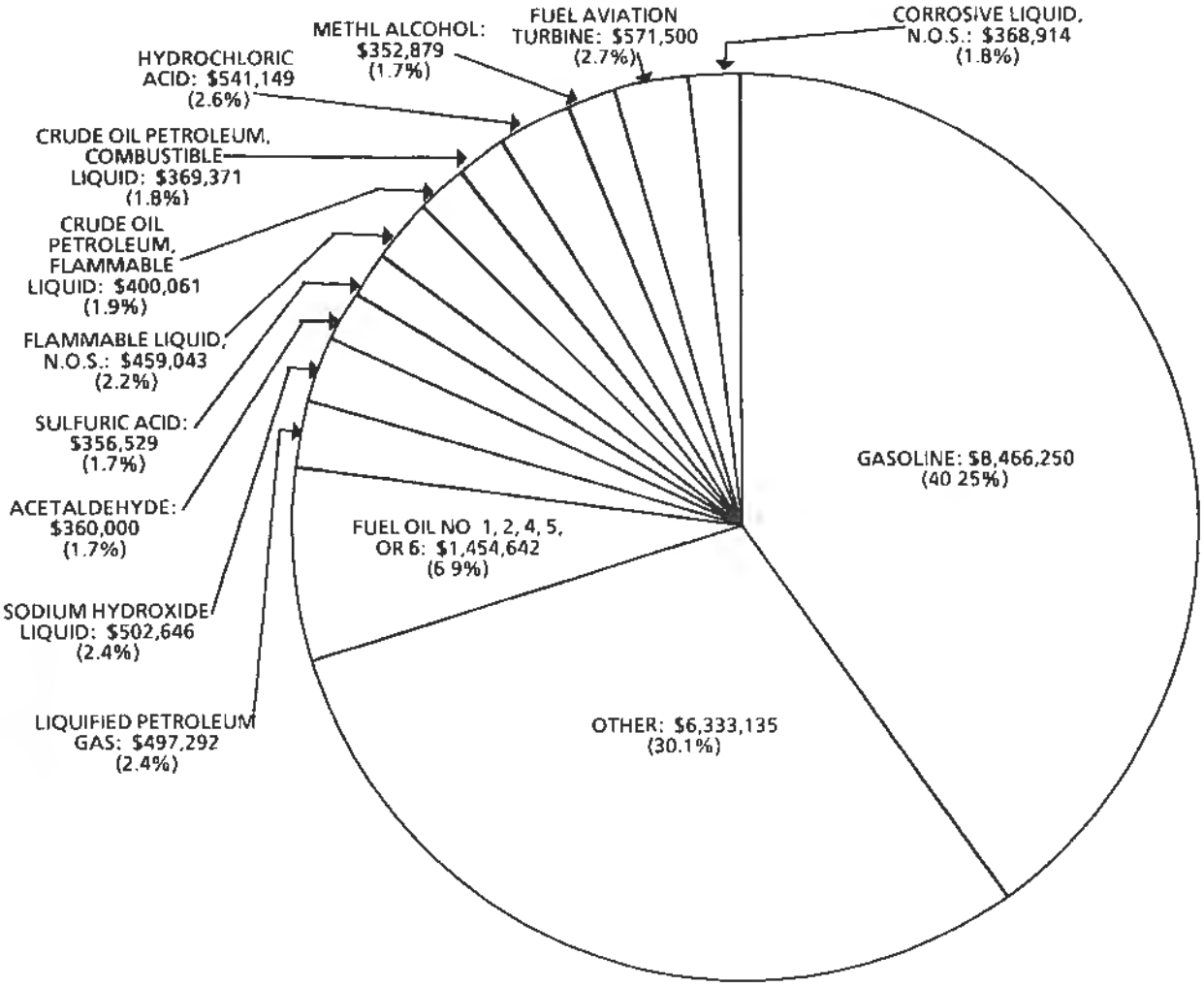
TOTAL INJURIES: 165*

* Includes major and minor injuries
P = Preliminary
NOTE: N.O.S. = Not Otherwise Specified.
Incidents do not add up to total since a single incident may involve more than one commodity.
Data supplied as of 9/28/89

SOURCE: RSPA, Hazardous Materials Information Systems, DHM-63

CHART 75.

HAZARDOUS MATERIALS DAMAGES BY TOP 13 COMMODITIES INVOLVED, 1988P



TOTAL DAMAGES: $21,033,411

* Incidents do not add up to total since a single incident may involve more than one commodity.
P = Preliminary
NOTE: N.O.S. = Not Otherwise Specified.
Data supplied as of 9/28/89.

SOURCE: RSPA, Hazardous Materials Information Systems, DHM-63.

IV. MAJOR DOT SAFETY REGULATIONS

JANUARY 1, 1988 - DECEMBER 31, 1988

The actions below are selected and summarized from the final rules and regulations published in the Federal Register (FR) during the period covered. These regulations amend the designated titles and sections of the Code of Federal Regulations (CFR).

U.S. COAST GUARD

33 CFR Parts 4, 126, and 127 -- Liquefield Natural Gas Waterfront Facilities

This rule establishes safety standards for the design and construction, equipment, operations, maintenance, personnel training, firefighting, and security at liquefied natural gas waterfront facilities. It implements the Ports and Waterways Safety Act of 1972, as amended, and is necessary to prevent or mitigate the results of an accidental release of liquefied natural gas (LNG) at a LNG waterfront facility (facility). This rule will reduce the possibility that such an accident could occur, and will reduce the damage and injury to persons and property should an accident occur. Effective date: June 2, 1988. (53 FR 3370, February 5, 1988.)

46 CFR Parts 2, 31, 34, 58, 71, 76, 91, 95, 107, 108, 109, 146, 147, 167, 176, 181, 189, and 193 -- Hazardous Materials Used as Ships' Stores On Board Vessels

The Coast Guard is revising the rules for hazardous materials used as ships' stores on board vessels. Except for minor amendments, the present rules have remained unchanged since January 18, 1941. Many of the citations, terms, and definitions have become outdated. This revision updates the text and replaces lengthy tables by cross referencing existing Department of Transportation Hazardous Materials regulations and Consumer Product Safety Commission labeling regulations. It also eliminates the requirement for hazardous materials to be certified for use as ships' stores on board vessels to reduce the paperwork burden for industry and the Coast Guard, while maintaining the current level of safety. Materials presently listed which are no longer used as ships' stores are removed. Effective date: April 11, 1988. (53 FR 7745, March 10, 1988.)

46 CFR Parts 150 and 153 -- Incinerator Vessels

This document finalizes safety rules for incinerator vessels carrying liquid hazardous wastes in bulk for the purpose of incineration at sea. Existing regulations do not specifically address safety hazards unique to the operation of incinerator vessels. The rules in this document adopt standards for incinerator vessels in Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code) of the International Maritime Organization (IMO) as well as standards in existing safety regulations that apply to chemical tank vessels. These rules apply to vessels required to obtain an ocean incineration permit from the Environmental Protection AGency (EPA). EPA has proposed rules for obtaining a permit in EPA rulemaking docket FRL-2698-5. Effective date: June 3, 1988. (53 FR 15826, May 4, 1988.)

14 CRF Part 39 -- Boeing Model 767 Series Airplanes

This amendment adopts a new airworthiness directive (AD), applicable to all Boeing Model 767 series airplanes, which requires repetitive functional testing of the wing and engine anti-ice control system. This amendment is prompted by reports of problems associated with the switches used in anti-ice control panels, and of the inadequacy of the anti-ice circuit logic that can result in the flight crew not being warned that the anti-ice system has not been activitied. An undetected failure of the anti-ice system could result in an unacceptable ice build-up on the wings or the engine inlets. Effective date: March 4, 1988. (53 FR 3001, February 3, 1988.)

14 CFR Part 39 -- Pratt & Whitney (PW) JT8D-209, -217, -217A, -217C, and -219 Turbofan Engines

This amendment adopts a new airworthiness directive (AD) that requires initial and repetitive inspections of low pressure turbine (LPT) third stage vane anti-rotation pins and modification of the LPT case assembly on JT8D-200 series engines. The AD is needed to detect and remove from service turbine modules containing fractured anti-rotation pins which could result in turbine vane rotation and subequent uncontained engine failures. Effective date: March 4, 1988. (53 FR 3002, February 3, 1988.)

14 CFR Part 39 -- Boeing Model 747 Series Airplanes

This amendment adopts a new airworthiness directive (AD), applicable to Boeing Model 747 series airplanes, except Model 747SP, which requires periodic inspection of both inboard and outboard trailing edge flaps carriage spindles for fracture or cracks, and repair or replacement, if necessary. This amendment is prompted by a report of two spindles failing on one flap, causing severe control problems during approach and landing. This condition, if not corrected, could lead to the inability of the pilot to safely control the airplane during landing. Effective date: March 7, 1988. (53 FR 4114, Febuary 12, 1988.)

14 CFR Part 39 -- Boeing Model 747 Series Airplanes

This amendment adopts a new airworthiness directive (AD), applicable to certain Boeing Model 747 series airplanes, which requires repetitive inspections of the Auxiliary Power Unit (APU) fuel supply line for leaks and repair, if necessary. Replacement of existing APU fuel line shroud drain tube and APU fuel pump drain tube assemblies with new parts terminates the need for repetitive inspections. This action is prompted by a report of fuel leak at a coupling on the APU fuel line shroud. Fuel was found in the forward cargo compartment and in several of the overwing floor beam bays. This condition, if not corrected, could result in a fire. Effective date: March 25, 1988. (53 FR 7346, March 8, 1988.)

14 CFR Part 39 -- Boeing Model 757 Series Airplanes

This amendment adopts a new airworthiness directive (AD), applicable to certain Boeing Model 757 series airplanes, which requires the installation of a door in the vertical fin access opening in the section 48 fuselage section, and the installation of covers in the four front spar access holes of the horizontal stabilizers. This action is needed because the vertical fin and horizontal stabilizers could be overpressurized to the point of structural failure in the event of a failure of the aft pressure bulkhead. Effective date: April 22, 1988. (53 FR 7729, March 10, 1988.)

bulkhead tee cap from the forward side of the bulkhead and increases the current repetitive inspection intervals. This action also expands the applicability to include certain Model DC-9-80 series airplanes. This action is prompted by reports of cracks in the aft pressure bulkhead tee cap. If this condition is not corrected, bulkhead tee cap cracks may develop, which could result in rapid depressurization and cause severe structural damage to the airplane. Effective date: July 15, 1988. (53 FR 21411, June 8, 1988.)

14 CFR Part 39 -- Pratt & Whitney (PW) PW2037 and PW2040 Turbofan Engines

This action publishes in the Federal Register and makes effective as to all persons an amendment adopting a new airworthiness directive (AD) which was previously made effective as to all known. U.S. owners and operators of PW2037 and PW2040 turbofan engines installed in Boeing 757 aircraft by individual telegrams. The AD requires replacement or modification of certain fuel tube assemblies on the engines. The compliance schedules are dependent upon the Boeing 757 aircraft status under the Master Minimum Equipment List (MMEL) and aircraft operational constraints. The AD is needed to prevent cracking of the fuel tubes that can result in fuel leaks with substantial fuel quantity loss and possible engine fire. Effective date: July 13, 1988. (53 FR 26043, July 11, 1988.)

14 CFR Part 39 -- McDonnell Douglas Helicopter Company (MDHC) Model 369D, E, F, and FF Helicopters

This amendment adopts a new airworthiness directive (AD) which requires an initial inspection, a repetitive pilot's preflight check, the removal of damaged parts, and a repetitive inspection of the tail rotor transmission tail boom extension mounting studs on all MDHC Model 369D, E, F, and FF helicopters. This AD is prompted by several reports of tail rotor transmission tail boom extension mounting studs having failed due to fatigue, which could result in the loss of the tail rotor assembly in flight with subsequent loss of the helicopter. Effective date: August 24, 1988. (53 FR 30023, August 10, 1988.)

14 CFR Part 39 -- General Electric Co. (GE) CF6-80C2; Series Turbofan Engines

This amendment adopts a new airworthiness directive (AD) which establishes low cycle fatigue (LCF) retirement lives for certain fuel manifolds installed on GE CF6-80C2 series turbofan engines. It also requires inspections for fuel manifold leakage and manifold clamping device security. This AD is needed to prevent fuel manifold leakage resulting in an uncommanded loss of engine power and/or a possibility of fire. Effective date: November 29, 1988. (53 FR 45894, November 15, 1988.)

14 CFR Part 39 -- Pratt and Whitney (PW) JT9D-3A, -7, -7A, -7AH, -7H, -7F, -7J, and -20 Turbofan Engines

This amendment adopts a new airworthiness directive (AD) which requires modification of the sixth stage turbine inner airseal (IAS) assembly in accordance with Revision 5 of PW Series Bulletin (SB) 4835. It also requires a one-time visual and fluorescent penetrant inspection (FPI) and removal, if necessary, in accordance with Revision 5 of the SB for IAS assemblies that have been modified in accordance with Revision 3 or earlier revisions of the SB. The AD is needed to prevent uncontained engine failure. Effective date: December 15, 1988. (53 FR 45895, November 15, 1988.)

14 CFR Part 39 -- General Electric (GE) CF6-50 Series Turbofan Engines

This amendment adopts a new airworthiness directive (AD) which establishes a rework and inspection program for certain high pressure turbine (HPT) stage 2 disks installed in CR6-50 series turbofan engines. This AD is needed to prevent rupture of the disk, and possible uncontained engine failure. Effective date: December 29, 1988. (53 FR 52673, December 29, 1988.)

49 CFR Part 225 -- Adjustment of Monetary Threshold for Reporting Accidents/Incidents

This rule inceases the reporting threshold from $5,200 to $5,700 for railroad accidents/incidents involving property damage that occur during the calendar years 1989 and 1990. This action is needed to ensure that the FRA reporting requirements reflect the impact of inflation since the reporting threshold was last computed in 1986. Effective date: January 1, 1989. (53 FR 48547, December 1, 1988.)

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

49 CFR Part 571 -- Federal Motor Vehicle Safety Standards; Air Brake Systems

This notice amends Federal Motor Vehicle Safety Standard No. 121, *Air Brake Systems*, to clarify the standard's parking brake requirements. The amendments require actuation of a mechanical means for holding the parking brakes, within three seconds after operation of the parking brake control. (For trailers, such actuation is required within three seconds after venting to the atmosphere of the front supply line connection is initiated.) In addition, vehicles are required to be capable of meeting requirements related to parking brake retardation force within the three second period. The amendments also require that the grade holding test (or alternative drawbar test) be met with only the mechanical means of holding the parking brakes in operation. Effective date: April 11, 1988. (53 FR 7931, March 11, 1988.)

49 CFR Part 571 -- Federal Motor Vehicle Safety Standards; Occupant Crash Protection

This rule upgrades the safety belt requirements for new trucks, buses, and multipurpose passenger vehicles with a gross vehicle weight rating of more than 10,000 pounds. Specifically, this rule:

1. Standardizes the buckle release mechanism for safety belts used in those vehicles;
2. Requires that the safety belts in these vehicles must be equipped either with an emergency locking retractor or with an automatic locking retractor that has certain features to prevent it from progressively tightening the belt around the wearer; and
3. Requires that retractors in these vehicles must be attached to the seat structure that moves, if the retractor is an automatic locking retractor and if the seat at which the safety belt system is installed has some type of suspension system for the seat.

These changes will make the safety belt systems in heavy vehicles more comfortable and convenient to use, which in turn should promote the use of safety belts in those vehicles. This rule will also assist drivers of those vehicles in complying with the Office of Motor Carrier Standards' regulation requiring safety belt use in the trucks and buses engaged in interstate commerce and with the mandatory safety belt use laws being adopted by the States. Effective date: January 3, 1989. (53 FR 25337, July 6, 1988.)

23 CFR Part 1309 -- Incentive Grant Criteria for Alcohol Traffic Safety Programs

This final rule revises the agency's regulation implementing section 408 of the Highway Safety Act of 1966, relating to the criteria States must meet to be eligible for alcohol incentive grants. The agency believes some portions of the regulation are unnecessarily restrictive in defining the manner in which a State may demonstrate compliance with the statutory criteria. This action is intended to increase flexibility for the States, by establishing alternative methods of demonstrating compliance with the section 408 criteria to qualify for alcohol incentive grant funds. Effective date: August 25, 1988. (53 FR 32375, August 25, 1988.)

V. GLOSSARY

AVIATION

Air Carrier - beginning with 1975*, air carriers comprise three operational categories:

(1) Certificated Route Air Carrier - one of a class of air carriers holding a certificate of public convenience and necessity issued by the Civil Aeronautics Board to conduct scheduled services over specified routes and a limited amount of nonscheduled charter operations.

(2) Supplemental Air Carrier - one of a class of air carriers holding operating certificates issued by the Civil Aeronautics Board, authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the Certificated Route Air Carriers.

(3) Commercial Operator (of large aircraft) - one of a class of air carriers operating on a private for-hire basis, as distinguished from a public or common air carrier, holding a commercial operator certificate, issued by the Administrator of the Federal Aviation Administration (pursuant to Part 45 of the Civil Air Regulations) authorizing it to operate (large) aircraft in air commerce for the transportation of goods or passengers for compensation or hire.

Air Taxi - any use of an aircraft by the holder of an air carrier operating certificate authorized by the certificate, or carries mail on contract (see Paragraph 298.3 of FAR 38).

Aircraft Accident - is an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, and in which any person suffers death or serious injury as a result of being in or upon the aircraft or by direct contact with the aircraft or anything attached thereto, or in which the aircraft receives substantial damage.

Aviation Mid-Air Near-Collision - is broken down into three categories:

(1) Critical - where collision avoidance was due to chance rather than any action taken by either pilot. Less than 100 feet of aircraft separation would be considered critical.

(2) Potential - where a collision would have resulted had no action been taken by either pilot. Closest proximity of less than 500 feet would usually be required in this case.

(3) No Hazard - where a report was made, but subsequent investigation determined that direction and altitude would have made a mid-air collision improbable regardless of evasive action taken.

Commuter Carrier - any operator who performs, pursuant to published schedule, at least five round trips per week between two or more points (see Paragraph 298.2 of FAR 38).

Fatal Injury - is any injury which results in death within seven days of the accident.

Prior to 1975, air carriers did not comprise commercial operators.

HAZARDOUS MATERIALS

tality - the information received indicated that the death was due to the hazardous material olved.

.zardous Material - a substance or material which has been designated by the Secretary of ınsportation to be capable of posing an unreasonable risk to health, safety, and property when nsported in commerce, and which has been so designated.

:ident - refers to any unintentional release of hazardous material while in transit or storage.

ıjor/Minor Injury - (1) injuries requiring hospitalization; (2) injuries involving second or third ;ree burns; (3) injury-related lost time at work of one or more days such as would be caused by ıalation of strong, irritating vapors are classified as major injuries. All other reported injuries are ısidered minor.

HIGHWAY

ɔtor Vehicle Occupant - is a driver of or passenger in a motor vehicle other than a motorcycle or ıtorscooter. For reporting purposes, this category also includes riders of animals, occupants of imal-drawn vehicles, occupants of streetcars, unauthorized riders, etc.

ɔtor Vehicle Traffic Accident - is any motor vehicle accident that occurs on a trafficway or that :urs after the motor vehicle runs off the roadway but before events are stabilized.

otor Vehicle Traffic Fatality - is a death resulting from motor vehicle accident injuries occurring a trafficway within 30 days of the accident.

otorcycle - is a two-wheeled motor vehicle having one or more riding saddles, and sometimes a ird wheel for the support of a sidecar. The sidecar is considered a part of the motorcycle. lotorcycle" includes motorized bicycle, scooter, or tricycle.

ɛdalcycle - is a vehicle operated solely by pedals, and propelled by human power.

cludes: Bicycle (any size, with two wheels in tandem), tricycle, unicycle, and sidecar or trailer attached to any of these devices.

ɛcludes: These devices when towed by a motor vehicle, including hitching.

ɛdestrian - is any person not in or upon a motor vehicle or other road vehicle.

cludes: Person afoot, sitting, lying or working upon a land way or place; person in or operating a pedestrian conveyance.

xcludes: Person boarding or alighting from another conveyance, except pedestrian conveyance; person jumping or falling from a motor vehicle in transport.

rafficway - is the entire width between property lines, or other boundary lines, of every way or ace, of which any part is open to the public for purposes of vehicular travel as a matter of right or ıstom.

1. Fires/explosions which involve the participation of the local fire department in the fire fighting, and/or which cause the evacuation of passengers onto the system right-of-way.

Exclusions

1. Accidents (collisions, derailments or fires/explosions) occurring in yards and non-revenue service areas which do not involve revenue trains; accidents (collisions, derailments or fires/explosions) which involve only work trains and servicing equipment; and collisions between train cars resulting from coupling operations which do not involve passenger casualties are excluded.

RT Casualty - is any casualty which satisfies the following threshold levels:

Employee Casualties

Employees who are on-duty and who are killed or sustain lost workdays resulting from reportable train accidents.

"Lost workday" means any full day or part of a day (consecutive or not) other than the day of the injury, that an employee is away from work because of the injury. The day of the reportable train accident is not to be reported as a lost workday even though the injured employee does not complete the work assignment that day.

Passenger and Other Casualties

Casualties involving passengers or other personnel (off-duty employees, contractors, etc.) which occur at or in exclusive approaches to or from faregates, or equivalent, or within the normal "paid" area, and which result in:

A. Fatalities, or

B. Personal injuries which require immediate medical treatment beyond first aid.

"Medical treatment" means treatment requiring the attention of a physician or registered professional medical personnel. "Medical treatment" as used here, does not refer to minor first aid treatment (one- time treatment), precautionary measures such as tetanus shots, or subsequent observation of minor scratches, cuts, bruises or splinters.

Exclusions

Assaults, attempted suicides, and suicides are excluded.

RAILROAD

atality -

(1) The death of any person from an injury within 365 days of the accident/incident;

(2) The death of a railroad employee from occupational illness within 365 days after the occupational illness was diagnosed by a physician.

(3) Occupational illness of a railroad employee, as diagnosed by a physician.

c. Damage to the vessel and other property damage totaling more than $200; or

d. A person's disappearing from the vessel under circumstances indicating death or injury.

ıtality - refers to all deaths (other than deaths by natural causes) and missing persons resulting ɔm an occurrence that involves a vessel or its equipment.

jury - refers to all injuries meeting the criteria set forth in b. above, resulting from an occurrence at involves a vessel or its equipment.

WATERBORNE TRANSPORTATION

ıasualty - casualties involving commercial vessels are required to be reported to the Coast Guard ıenever the casualty results in the following:

a. Actual physical damage to property in excess of $25,000.

b. Material damage affecting the seaworthiness or efficiency of a vessel.

c. Stranding or grounding.

d. Loss of life.

e. Injury causing any persons to remain incapacitated for a period in excess of 72 hours, except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

ıtality - refers to all deaths and missing persons resulting from a vessel casualty.

jury - this term refers to all personal injuries resulting from a vessel casualty.

on-Vessel-Casualty-Related Death - is one which occurs on board a commercial vessel, but not as ·esult of a vessel casualty, such as collision, fire, or explosion.

essel-Casualty-Related Death - is one which occurs on board a commercial vessel as a result of a ssel casualty, such as collision, fire, or explosion.

aterborne Transportation - is the transport of freight and/or people by commercial vessels under SCG jurisdiction.

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