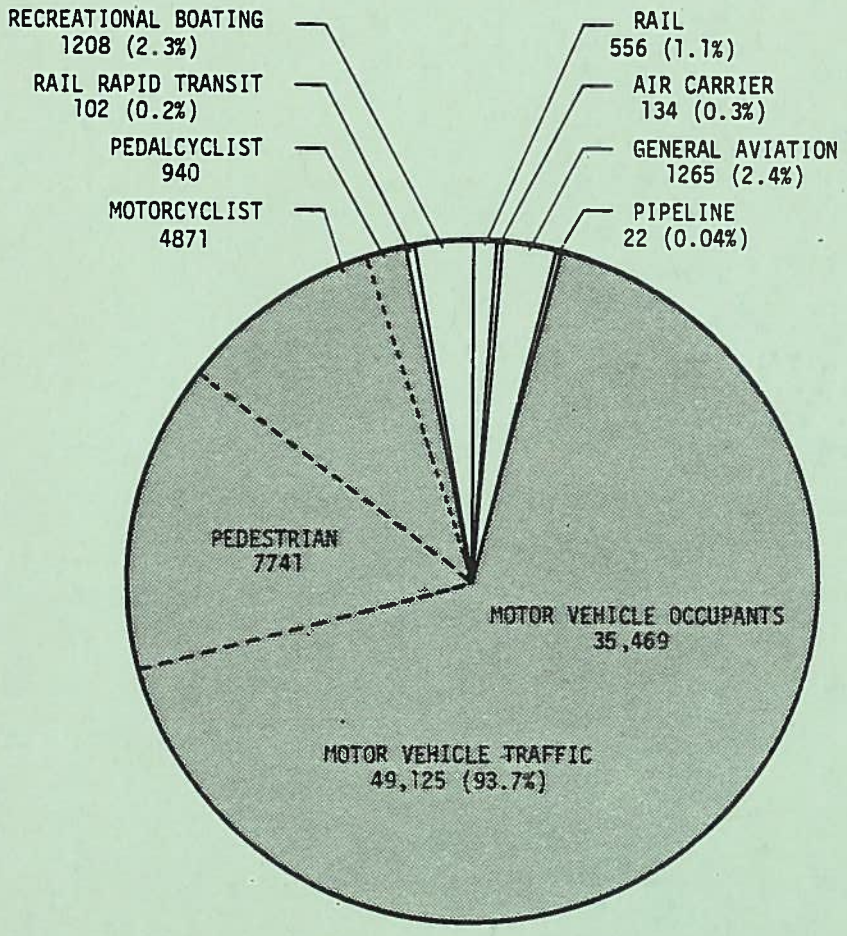
Reference ONLY

TRANSPORTATION SAFETY INFORMATION REPORT

Prepared by the
Research and Special Programs Administration
Transportation Systems Center

1981 ANNUAL SUMMARY

- Total transportation fatalities dropped in 1981 to a total of 52,412.
- The Motor Vehicle Traffic fatality total of 49,125 in 1981 was the lowest since 1977.
- Scheduled Air Carriers reported 39 fatalities in 1981. This included large carriers with 4 fatalities and Commuter Carriers with 35. Non-scheduled Air Taxis had 95 fatalities.
- General Aviation reported 1,265 fatalities in 1981 compared to 1,264 in 1980.
- Recreational Boating fatalities dropped to a record low in 1981 while Pipeline fatalities increased.



TOTAL FATALITIES: 52,412

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT-TSC-RSPA-82-4		

4. Title and Subtitle	5. Report Date
TRANSPORTATION SAFETY INFORMATION REPORT 1981 Annual Summary	September 1982
	6. Performing Organization Code DTS-32
7. Author(s) P. Doyle/J. Mitchell, Task Managers	8. Performing Organization Report No. DOT-TSC-RSPA-82-4
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) RS209/R2503
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Special Programs Administration Office of Policy, Plans and Program Management Washington DC 20590	13. Type of Report and Period Covered Final Report 1981
	14. Sponsoring Agency Code DPA-26

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. The report presents and compares data for transportation fatalities, accidents, and injuries for the current and preceding years.

Featured in this report is the annual summary of modal safety hazards and safety program highlights for 1981, as well as summary charts detailing modal safety trends from 1971-1981.

17. Key Words	18. Distribution Statement
Safety, Statistics, Transportation Fatalities, Accidents, Injuries	DOCUMENT IS AVAILABLE TO THE U.S. 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	79	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

TABLE OF CONTENTS

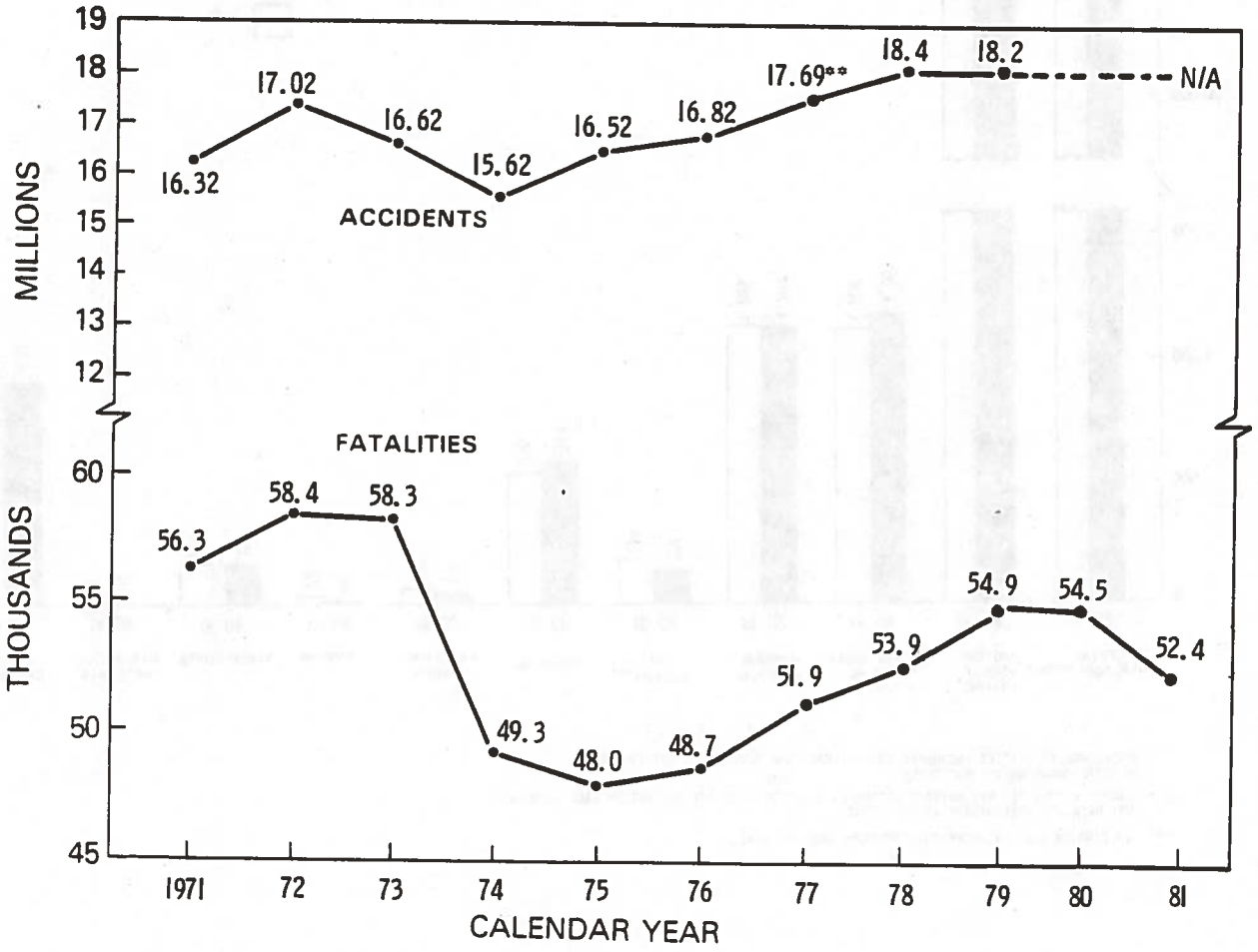
SUMMARY STATISTICS OF TRANSPORTATION SAFETY

- Total transportation fatalities for 1981 decreased to 52,412 compared with 54,520 in 1980, down 3.9%.

- The Motor Vehicle Traffic, Railroad, and Recreational Boating modes all reported reductions in fatalities in 1981. Air Carrier, General Aviation, Pipeline, and Rail Rapid Transit reported fatality increases in 1981.

- Injuries decreased in the Railroad, Rail/Highway Grade Crossing, Rail Rapid Transit, Recreational Boating, and Waterborne Transportation modes.

CHART I. TRANSPORTATION ACCIDENTS AND FATALITIES*, 1971-1981



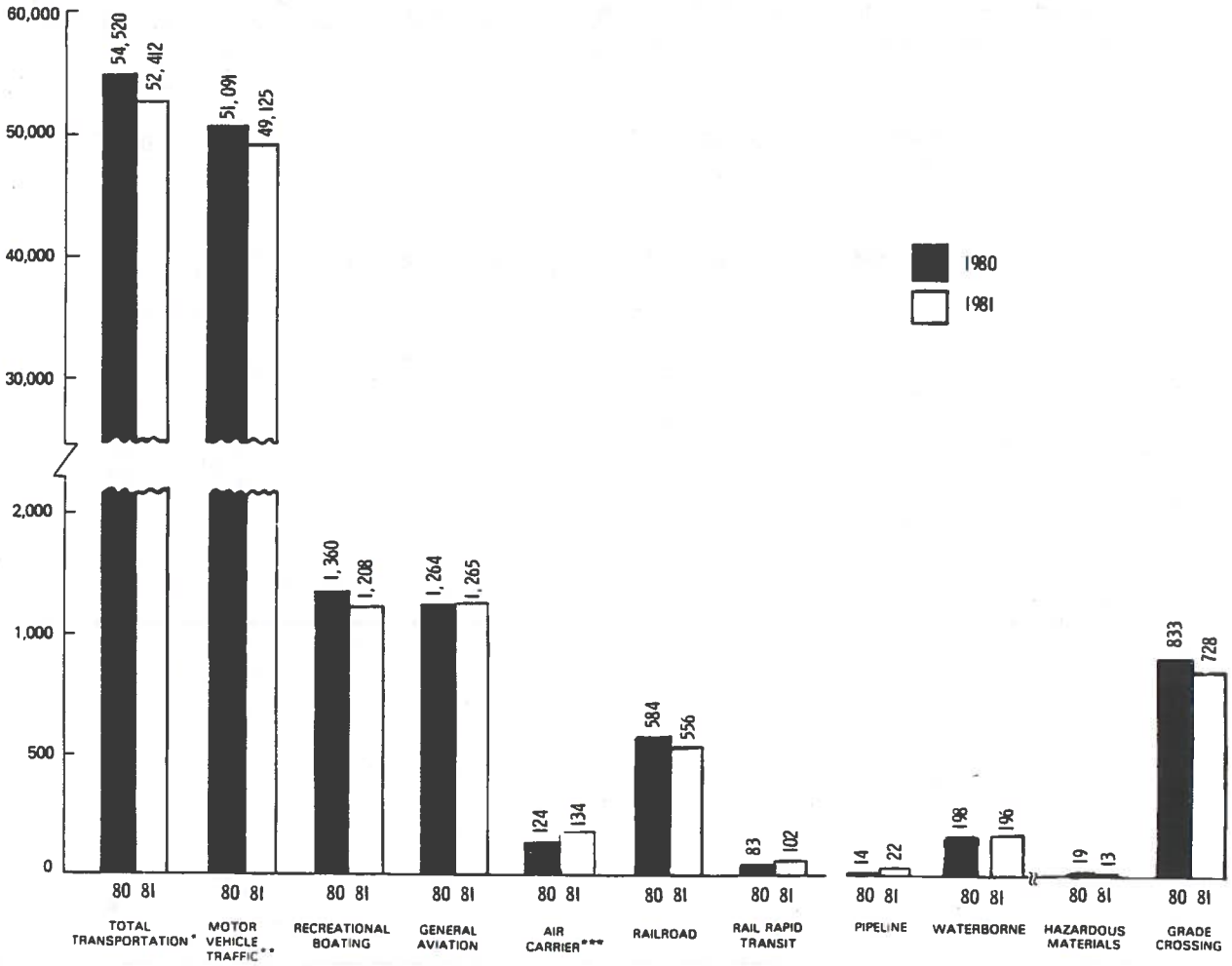
NOTE: Does not include Waterborne Transportation data.

* Most accidents and fatalities are Motor Vehicle Traffic related.

** Prior to 1977, the Rail and Rail Rapid Transit portions of Total Transportation accidents consisted of Rail Equipment accidents only. As of 1977, Train and Non-Train incidents are also included (See Glossary).

N/A = Not available.

CHART 2. TRANSPORTATION FATALITIES BY MODE, 1980-1981



* WATERBORNE FATALITIES (REPORTED ON A FISCAL YEAR BASIS) ARE NOT INCLUDED IN TOTAL TRANSPORTATION FIGURES.

** TRAFFIC FATALITIES ARE NHTSA'S ESTIMATES BASED ON A 30-DAY DEFINITION (SEE GLOSSARY). 1981 DATA ARE PRELIMINARY AS OF 2/2/82.

*** AIR CARRIER INCLUDES COMMUTER CARRIERS AND AIR TAXI.

TABLE 1. FATALITIES, INJURIES, AND ACCIDENTS BY TRANSPORTATION MODE, 1980-1981

TRANSPORTATION MODE	FATALITIES			INJURIES			ACCIDENTS/INCIDENTS		
	1980	1981	% CHANGE	1980	1981	% CHANGE	1980	1981	% CHANGE
MOTOR VEHICLE TRAFFIC [1]	51,091	49,125	-3.8	N/A	N/A	-	N/A	N/A	-
RAILROAD*	584	556	-4.8	58,356	49,710	-14.8	66,586	55,431	-16.8
AIR CARRIER**	124	134	+8.1	N/A	N/A	-	216	190	-12.0
GENERAL AVIATION	1,264	1,265	+0.08	N/A	N/A	-	3,599	3,634	+1.0
RECREATIONAL BOATING	1,360	1,208	-11.2	2,650	2,438	-8.0	5,513	5,128	-7.0
PIPELINE	14	22	+57.1	N/A	N/A	-	2,215	1,934	-12.7
WATERBORNE [2]	198	196	-1.0	122	121	-0.8	4,496	4,537	+0.9
RAIL RAPID TRANSIT*	83	102	+22.9	6,801	6,121	-10.0	6,789	6,121	-9.8
TOTAL TRANSPORTATION [3]	54,520	52,412	-3.9	N/A	N/A	-	N/A	N/A	-
HAZARDOUS MATERIALS [4]	19	13	-31.6	619	665	+7.4	16,115	9,163	-43.1
RAIL/HIGHWAY GRADE CROSSINGS [4]	833	728	-12.6	3,890	3,293	-15.3	10,611	9,295	-12.4

N/A: Not available.
* Fatalities, injuries, and accidents resulting from rail equipment accidents, train incidents, and non-train incidents.
** Air Carrier now includes Commuter Carriers and Air Taxi.
[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.
[2] Waterborne data are for vessel casualties only and are kept on a fiscal-year basis. 1981 data are estimated.
[3] Does not include Waterborne transportation.
[4] These fatalities are included in the above modes and Total Transportation.

1980-1981 STATISTICAL SUMMARY

Fatalities

The total number of transportation fatalities recorded in 1981 was 52,412 compared to 54,520 in 1980, a drop of 3.9%. Motor Vehicle Traffic, Railroad, Recreational Boating, Waterborne Transportation, Rail/Highway Grade Crossings, and Hazardous Materials Operations all reported decreases in fatalities in 1981. However, Air Carriers, General Aviation, Pipeline, and Rail Rapid Transit all reported increases in fatalities in 1981.

Motor Vehicle Traffic fatalities dropped below 50,000 for the first time since 1977. An estimated 49,125 people died in traffic accidents, a decrease of 3.8% from the 51,091 fatalities in 1980. The accident rate per 100 million vehicle miles also declined to a record low.

Air Carrier fatalities increased from 124 in 1980 to 134 in 1981. Of this total, large carriers accounted for 4 deaths, Commuter carriers for 35, and non-scheduled Air Taxis for 95. General Aviation fatalities were up very slightly in 1981. A total of 1,265 people died in General Aviation accidents, compared to 1,264 in 1980.

Recreational Boating fatalities showed a decline of 11.2% in 1981, when 1,208 deaths were reported compared to the 1,360 in 1980. The fatality rate per 100,000 boats reached a record low of 8.3. Waterborne transportation fatalities also dropped. A total of 196 deaths were reported in 1981 compared to 198 in 1980.

Railroad fatalities decreased, dropping from 584 in 1980 to 556 in 1981. Rail/Highway Grade Crossings also decreased, from 833 in 1980 to 728 in 1981. Rail Rapid Transit fatalities, however, increased in 1981. A total of 102 deaths were reported in 1981, compared to 83 in 1980.

Pipeline fatalities increased by 57.1% in 1981. A total of 22 deaths were reported in 1981 compared to 14 in 1980.

Injuries

The actual number of total transportation injuries could not be determined due to the unavailability of data from several modes. The Railroad, Recreational Boating, Waterborne Transportation, Rail Rapid Transit and Rail/Highway Grade Crossing modes all reported decreases in injuries in 1981. The only increase in injuries was reported in Hazardous Materials Operations.

Accidents/Incidents

The number of accidents/incidents declined for all reporting modes except General Aviation and Waterborne Transportation. Hazardous Materials operations showed the largest drop in accidents/incidents, 43.1%. Railroads reported 55,431 accidents/incidents in 1981 compared to 66,586 in 1980, a drop of 16.8%.

HIGHWAY

- Motor vehicle traffic fatalities in the U.S. experienced a significant 3.8 percent decrease during 1981 as compared to the previous year. The total of 49,125 fatalities in 1981 was the lowest since 1977.

- Preliminary estimates of travel show a small 2.2 percent increase during 1981. The resulting fatality rate decreased by 6.0 percent to a value of 3.16 deaths per 100 million vehicle miles of travel which is the lowest value on record.

- The number of licensed drivers increased 21.74 percent from 1973 to 1981. The number of registered vehicles increased 27.46 percent during the same period.

- The reduction in traffic fatalities was much greater (7.7 percent) on roadways posting a speed limit below 55 mph than the remaining highways which had a 1.1 percent reduction.

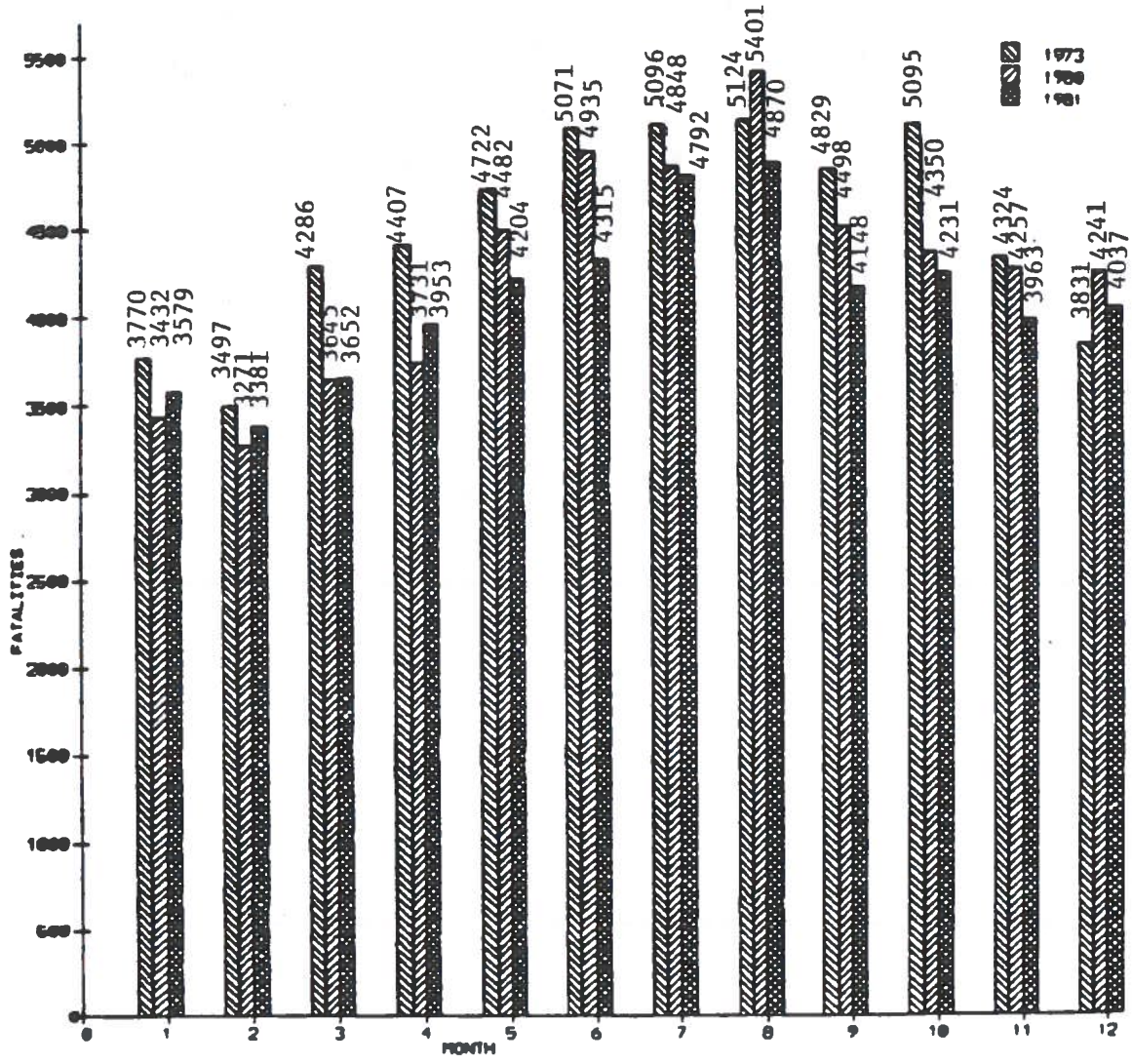
- The reduction in pedestrian fatalities was at the same level as for occupants of motor vehicles.

- Fatalities occurring in small cars increased by 11.3 percent while those occurring in large cars decreased by 10 percent. This reflects the increase in the number of smaller cars in the passenger car fleet.

CHART 3

MOTOR VEHICLE TRAFFIC FATALITIES BY MONTH

1973, 1980 AND 1981

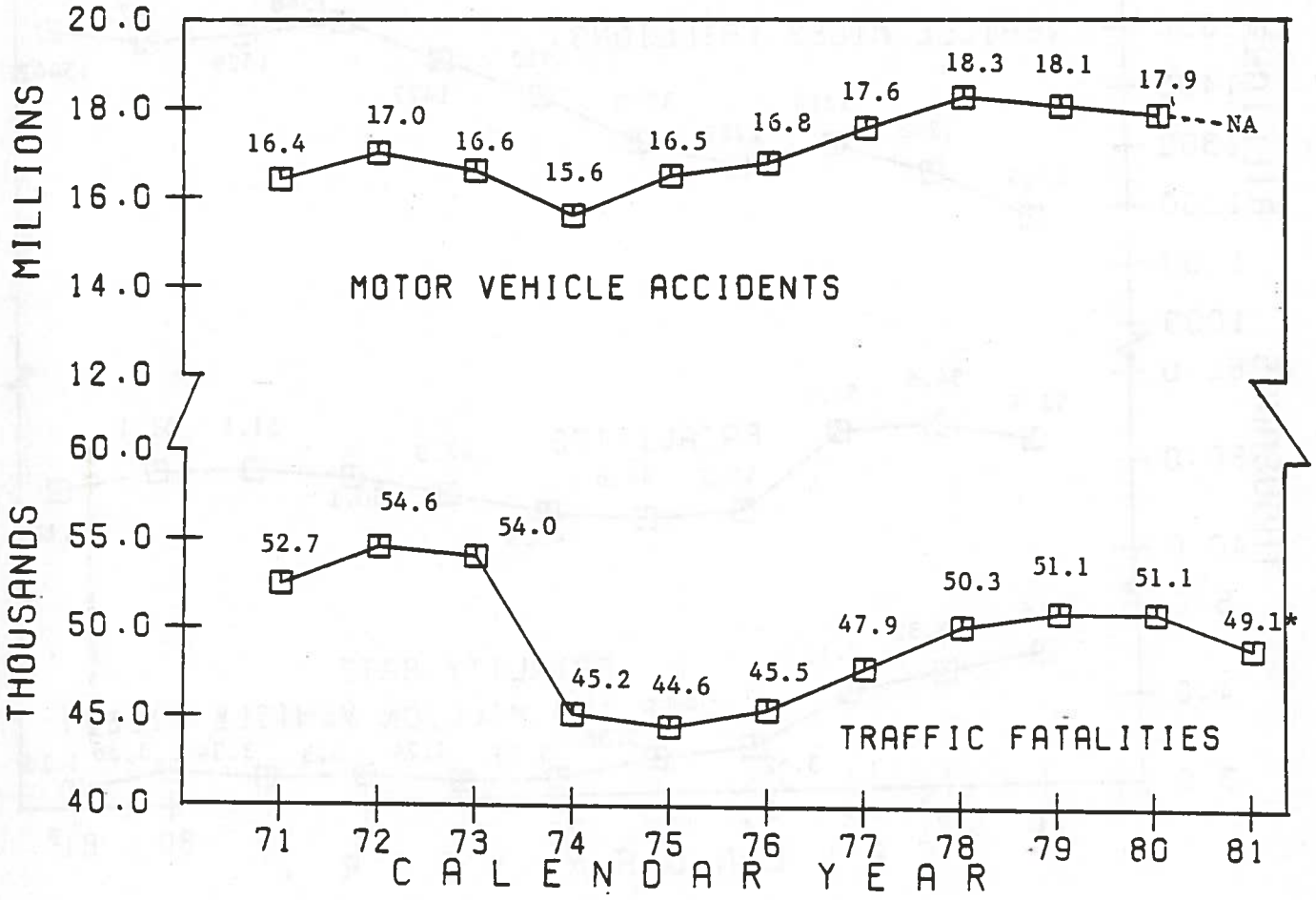


NOTE: Figures are Based on 30-Day Fatality Definition (See Glossary). Death within 30 Days Constitute Approximately 90% of All Deaths from Traffic Accidents.

SOURCE: 1973 Data from State, Annual Summaries (Adjusted to 30-Day Definitic
1980 Data from NHTSA'S Fatal Accident Reporting System (FARS).
1981 Data are Estimates from FARS.

CHART 4.

MOTOR VEHICLE ACCIDENTS AND TRAFFIC FATALITIES, 1971-1981

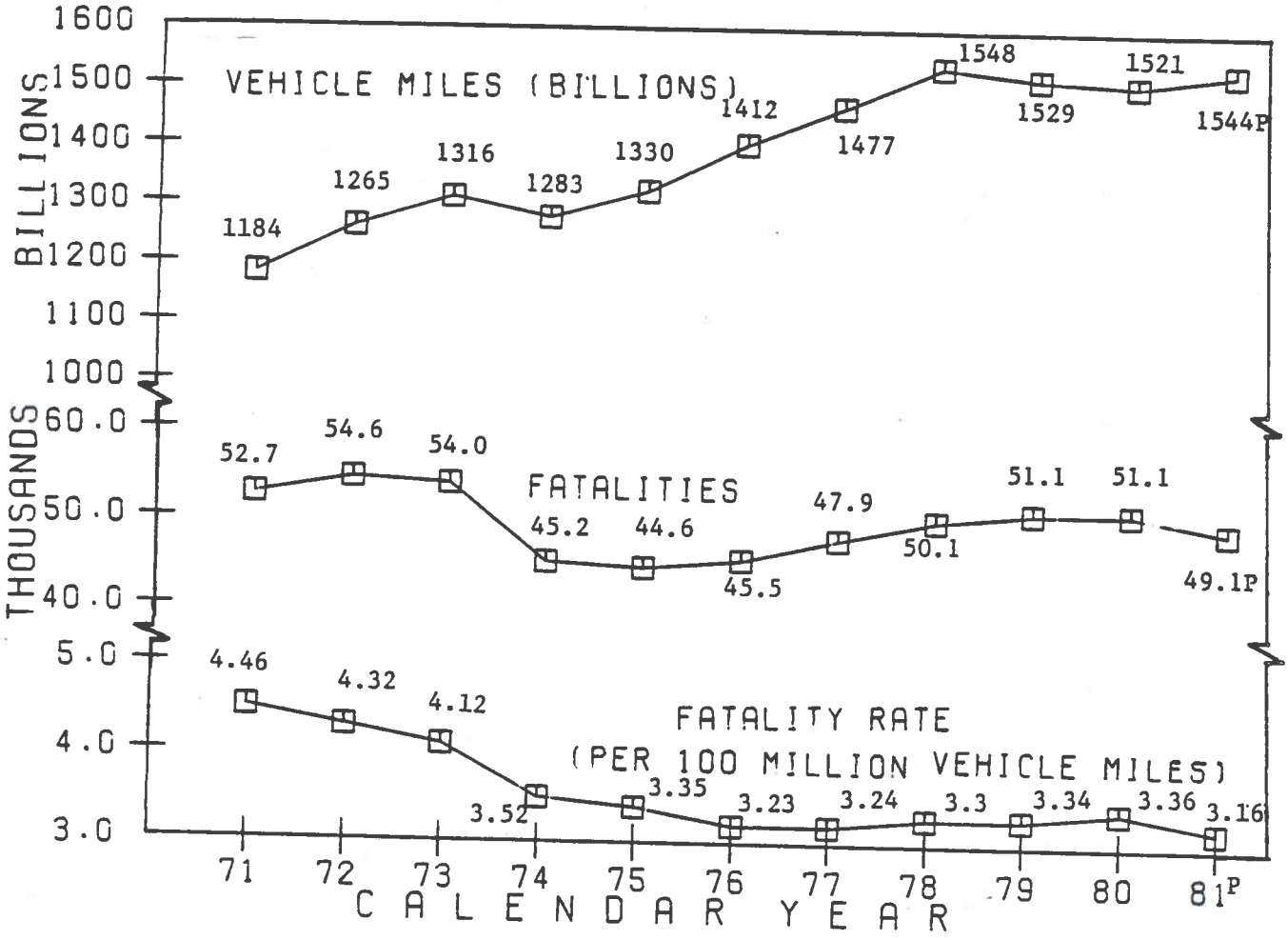


NOTE: Fatalities in This Chart are Based on a 30-Day Definition and Do Not Include Puerto Rico.

SOURCE: 1971 Fatalities--National Center for Health Statistics, HEW (Adjusted to 30-Day Definition)
1972-1974 Fatalities--State Annual Summaries (Adjusted to 30-Day Definition).
1975-1981 Fatalities--NHTSA, Fatal Accident Reporting System.
*1981 Figure is Preliminary.

CHART 5.

MOTOR VEHICLE TRAFFIC FATALITY RATES, 1971-1981



NOTE: Fatalities in this chart are based on a 30-day definition and do not include Puerto Rico.

SOURCE: 1971 Fatalities--National Center for Health Statistics, HEW (adjusted to a 30-day definition, see Glossary).
1972-1974 Fatalities--State Annual Summaries (adjusted to a 30-day definition).
1975-1981 Fatalities--NHTSA, Fatal Accident Reporting System (FARS).
Vehicle-Mile data is from FHWA, Office of Highway Planning.

TABLE 2. MOTOR VEHICLE TRAFFIC DATA COMPARISONS: 1971, 1973, 1979-1981 *

	1971	1973	1979	1980	1981**	Average Annual % Change 1971-1973	Average Annual %Change 1973-1979	% Change 1979-1980	% Change 1980-1981	% Change 1973-1981
Total Registered Motor Veh. (000)	116,330	130,025	157,291	161,615	165,732	+5.72	+3.22	+2.75	+2.55	+27.46
Automobiles	92,718	101,985	120,248	121,724	124,336	+4.88	+2.78	+1.23	+2.15	+21.92
Trucks	19,871	23,244	33,350	33,637	34,878	+8.15	+6.20	+0.86	+3.69	+50.05
Buses	397	425	520	529	546	+3.47	+3.42	+1.73	+3.21	+28.47
Motorcycles	3,344	4,371	5,422	5,725	5,972	+14.33	+3.65	+5.59	+4.31	+36.63
Licensed Drivers (000)	114,426	121,546	143,284	145,299	147,968	+3.06	+2.78	+1.41	+1.84	+21.74
Percent under 25 years old	22.0	22.3	21.6	21.0	20.7	+0.68	-0.53	-2.78	-1.43	-7.17
Percent over 64 years old	9.2	9.0	10.4	10.6	10.8	-1.09	+2.44	+1.92	+1.89	+20.00
Vehicle Mileage (Billions)	1,184	1,316	1,529	1,521	1,544	+5.43	+2.53	-0.52	+1.51	+17.33
Traffic Fatalities	52,542	54,052	51,093	51,091	49,125	+1.43	-0.93	-0.99	-3.85	-9.12
Traffic Fatality Rate ***	4.46	4.12	3.34	3.36	3.16	-3.89	-3.44	+0.60	-5.95	-23.30

* All data include the 50 States and the District of Columbia

** Preliminary

*** Per 100 Million Vehicle Miles

SOURCE: Registered Vehicles, Licensed Drivers and Vehicle Mileage - FHWA, Office of Highway Planning.
Fatalities - NHTSA, National Center For Statistics and Analysis.

TABLE 3. FATALITIES BY POSTED SPEED LIMIT: 1975, 1979 - 1981

	1975	1979	1980	1981*	Percent Change 1980-81	Average Annual % Change 1975-81
Under 55 MPH						
0-25 MPH	2,765	3,097	3,035	2,595	-14.5	-1.1
26-35 MPH	6,568	8,798	9,209	8,321	-9.6	+4.0
36-45 MPH	4,800	6,773	6,895	6,671	-3.2	+5.6
46-54 MPH	2,602	2,806	2,796	2,652	-5.2	+0.3
Total Under 55	16,735	21,474	21,935	20,239	-7.7	+3.2
55 MPH	19,099	23,786	23,799	23,529	-1.1	+3.5
Unknown	8,691	5,833	5,357	5,357	-	-
Total	44,525	51,093	51,091	49,125	-3.8	+1.7

*Preliminary as of 2/1/82.

SOURCE: NHTSA, FARS.

TABLE 4. TRAFFIC FATALITIES BY MAJOR CATEGORY, 1975, 1980-1981

OCCUPANT FATALITIES BY VEHICLE TYPE

	1975	1980	1981*	Percent Change 1980-81	Average Annual Percent Change 1975-1981
Passenger Cars	25,929	27,449	26,555	-3.3	.4
Small Subcompact	2,701	4,994	5,505	10.2	12.6
Subcompact	1,019	2,506	2,739	9.3	17.9
Small Compact	628	1,131	1,363	20.5	13.8
Compact	3,222	5,161	4,891	-5.2	7.2
Intermediate	5,763	6,260	5,621	-10.2	-.4
Full	3,435	3,454	2,921	-15.4	-2.7
Unknown	9,161	3,943	3,515	-10.9	-14.8
Trucks	5,477	7,853	7,420	-5.5	5.2
Light Trucks	4,332	6,566	6,226	-5.2	6.2
Heavy Trucks	717	976	896	-8.2	3.8
Other Trucks	428	311	298	-4.2	-5.9
Motorcycles	3,189	5,144	4,871	-5.3	7.3
Other Vehicle Type	745	1,198	1,211	1.0	8.4
Unknown Vehicle Type	585	283	283	0.0	-
Total	35,925	41,927	40,340	-3.8	2.0

NON-OCCUPANT FATALITIES

	1975	1980	1981*	Percent Change 1980-81	Average Annual Percent Change 1975-1981
Pedestrian	7,516	8,070	7,741	-4.1	.5
Pedalcyclist	1,003	965	940	-2.6	-1.1
Other Non-Occupant	81	129	104	-19.4	4.3
Total	8,600	9,164	8,785	-4.1	.4

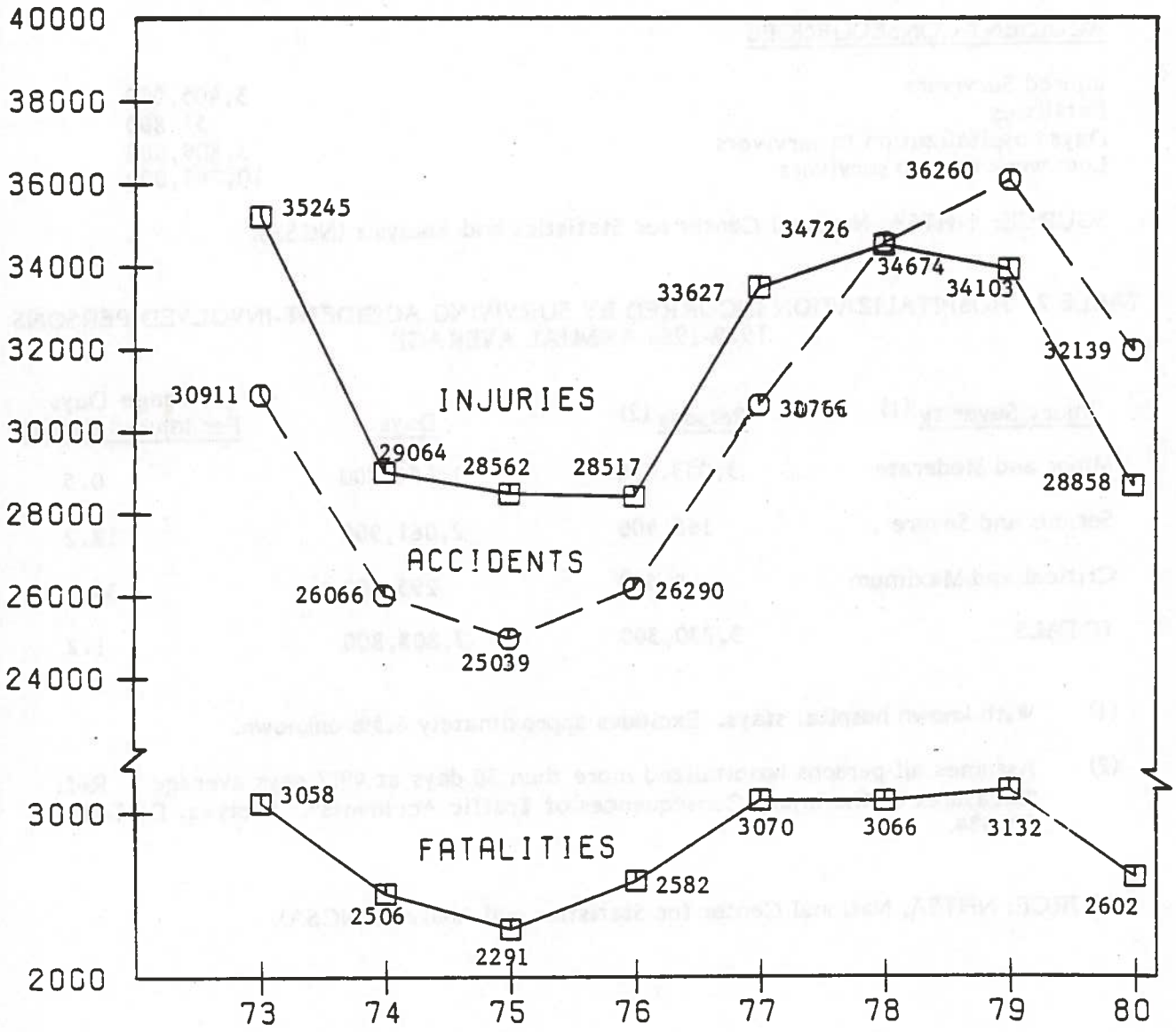
* Preliminary estimates from Fatal Accident Reporting System (FARS) as of February 2, 1982.
SOURCE: NHTSA, FARS.

TABLE 5. MOTOR CARRIER FATALITIES, ACCIDENTS, AND INJURIES, BY TYPE OF CARRIER, 1975-1980

Classification	1975	1976	1977	1978	1979	1980
Motor Carriers of Property						
Fatalities	2,232	2,520	2,983	2,998	3,072	2,528
Accidents	24,274	25,666	29,936	33,998	35,541	31,391
Injuries	26,374	26,794	31,698	32,757	32,126	27,147
Motor Carriers of Passengers						
Fatalities	59	62	87	68	60	74
Accidents	765	624	830	728	719	748
Injuries	2,188	1,723	1,929	1,917	1,977	1,711
All Motor Carriers						
Fatalities	2,291	2,582	3,070	3,066	3,132	2,602
Accidents	25,039	26,290	30,766	34,726	36,260	32,139
Injuries	28,562	28,517	33,627	34,674	34,103	28,858

SOURCE: FHWA, Bureau of Motor Carrier Safety.

CHART 6.
MOTOR CARRIER FATALITIES, ACCIDENTS, AND INJURIES, 1973-1980



SOURCE: FHWA, Bureau of Motor Carrier Safety.

TABLE 6. MAGNITUDE OF THE HIGHWAY SAFETY PROBLEM
1979-1980 ANNUAL AVERAGE

TRAFFIC ACCIDENTS REPORTED	
Police-reported accidents	6,773,000
Involved vehicles	11,607,000
Involved persons	17,777,000
ACCIDENT CONSEQUENCES	
Injured Survivors	3,405,000
Fatalities	51,800
Days hospitalization to survivors	3,809,000
Lost work days to survivors	10,763,000

SOURCE: NHTSA, National Center for Statistics and Analysis (NCSA).

TABLE 7. HOSPITALIZATION INCURRED BY SURVIVING ACCIDENT-INVOLVED PERSONS
1979-1980 ANNUAL AVERAGE

Injury Severity (1)	Persons (2)	Days	Average Days Per Injured Person
Minor and Moderate	3,053,400	1,451,700	0.5
Serious and Severe	168,400	2,061,900	12.2
Critical and Maximum	8,500	295,200	34.7
TOTALS	3,230,300	3,808,800	1.2

(1) With known hospital stays. Excludes approximately 6.5% unknown.

(2) Assumes all persons hospitalized more than 30 days at 49.7 days average. Ref: "Measures of the Injury Consequences of Traffic Accidents", Partyka, DOT-HS-805884.

SOURCE: NHTSA, National Center for Statistics and Analysis (NCSA).

TABLE 8. POLICE-REPORTED ACCIDENTS CLASSIFIED BY FIRST HARMFUL EVENT
1979 - 1980 ANNUAL AVERAGE

FIRST HARMFUL EVENT	NUMBER OF ACCIDENTS	PERCENT
Collision with Motor Vehicle	4,375,000	64.7
Collision with Object	2,000,000	29.5
Collision with Non-Motorist*	200,000	3.0
Non-Collision**	195,000	3.0
TOTAL ACCIDENTS	6,770,000	100.0

*Non-motorist category includes accidents with pedestrians, bicyclists and other pedalcyclists, occupants of horse-drawn vehicles, and with parked vehicles.

**Fire, immersion, jackknife and overturning.

SOURCE: NHTSA, National Center for Statistics and Analysis(NCSA).

TABLE 9. ACCIDENT-INVOLVED MOTOR VEHICLES CLASSIFIED BY BODY TYPE
1979-1980 ANNUAL AVERAGE

BODY TYPE	NUMBER OF VEHICLES	PERCENT
Passenger Cars	9,247,000	79.7
Light Trucks and Vans	1,484,000	12.8
Medium and Heavy Trucks	404,000	3.5
Motorcycles	186,000	1.6
Other Types*/Unknown Types	286,000	2.4
TOTAL VEHICLES	11,607,000	100.0

*Other types include buses, motor homes, farm vehicles and types distinctly different from the classifications presented.

SOURCE: NHTSA, National Center for Statistics and Analysis(NCSA).

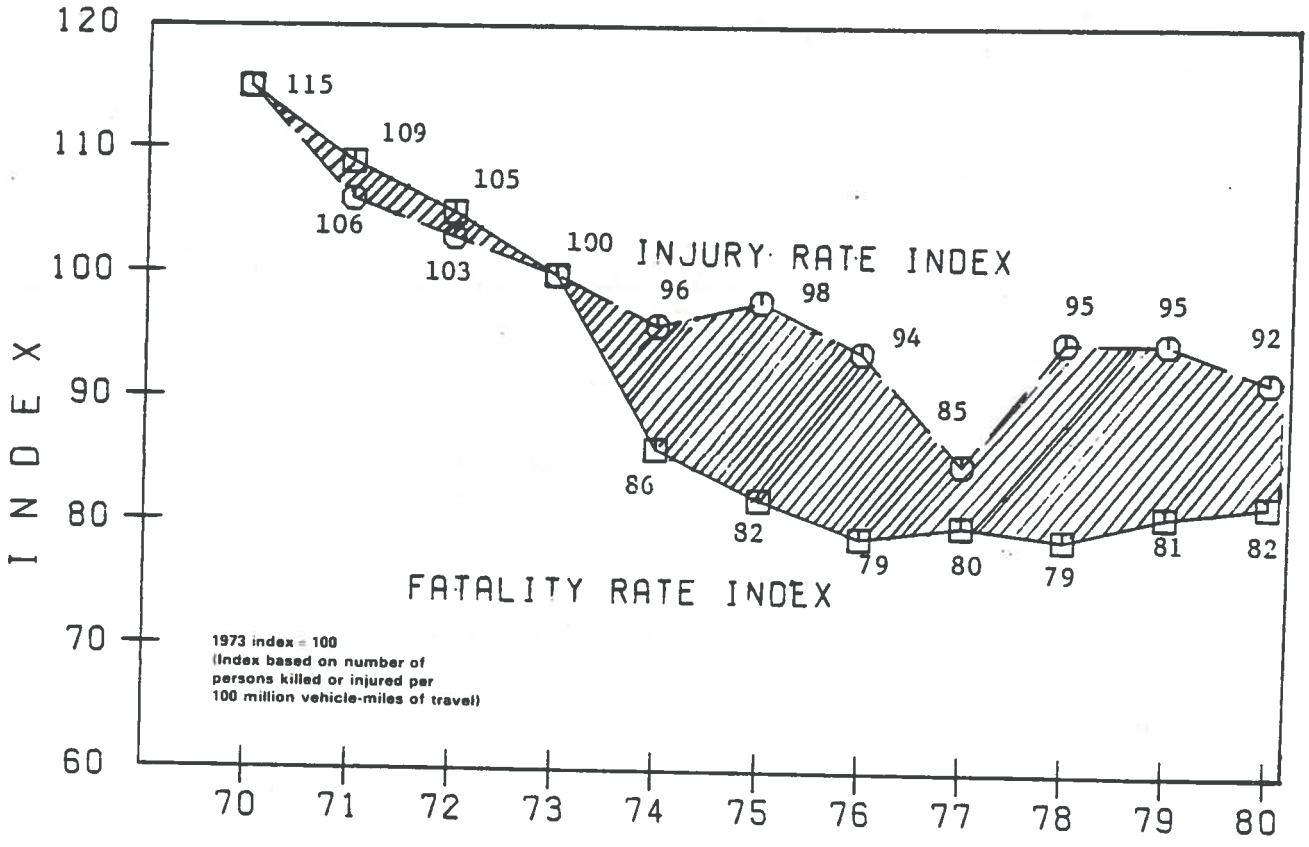
SAFETY PROGRAM HIGHLIGHTS

Fatality and Injury Rate Trends

From 1970 through 1973, fatality and injury rates, based on a 1973 index, have followed a downward pattern, dropping about 5 percent per year as shown in Figure 1. From 1973 until 1976-1977, the downward trend has continued with a significant drop in injury rate index for 1977. Since 1978, the rates have remained quite constant.

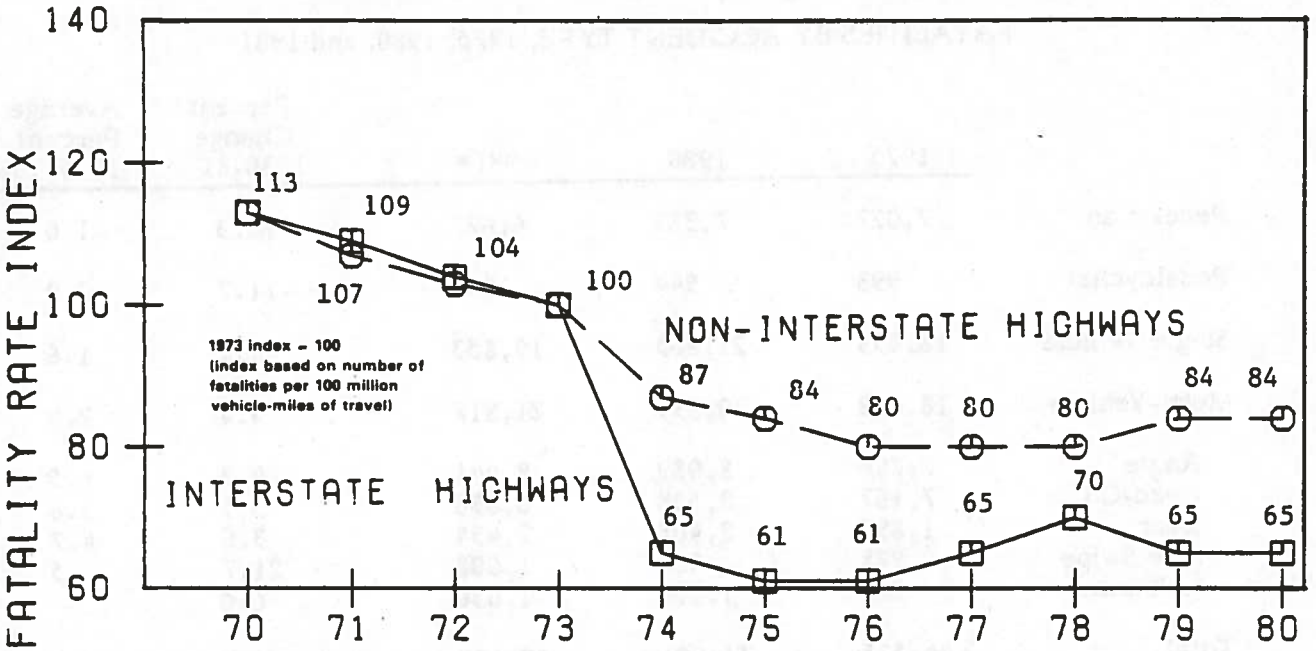
Police efforts to enforce the 55 mph speed limit have been more intensive on the Interstate highway system, where speeds and traffic volume tend to be highest. Figure 2 shows the fatality rate has dropped much more sharply on the Interstate highways than on the non-Interstate roads since 1973. However, fatality rates have shown an increase since 1976. Since 1977, fatality rates have remained constant.

FIGURE 1. FATALITY AND INJURY TRENDS, 1970-1980



SOURCE: FHWA, Office of Highway Safety.

FIGURE 2. FATALITY RATE TRENDS, 1970 - 1980



SOURCE: FHWA, Office of Highway Safety.

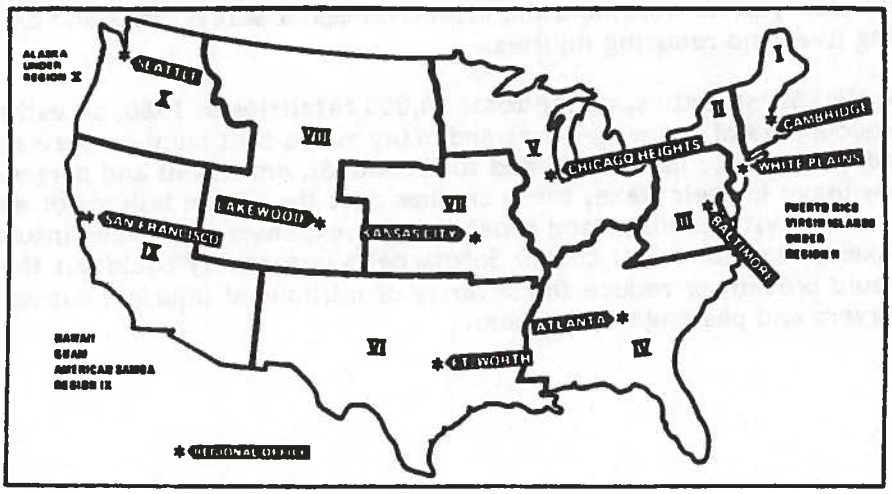
Regional Trends in Traffic Accident Fatalities

The following fatality counts are based on the 30-day definition (See Glossary) and represent the deaths resulting from traffic accidents occuring in the 50 States and the District of Columbia in the 10 administrative regions of NHTSA.

REGIONAL TRENDS IN MONTHLY FATALITIES
JANUARY 1981 to DECEMBER 1981

Region	1	2	3	4	5	6	7	8	9	10	TOTAL
TOTAL 1980	2,181	3,730	4,607	10,296	8,744	7,738	2,792	1,992	6,975	2,036	51,091
% CHANGE	-18.2	-7.2	-3.6	1.1	-8.8	3.2	-6.8	3.3	-6.5	-7.1	-3.8
TOTAL 1981	1,784	3,461	4,442	10,409	7,972	7,986	2,602	2,058	6,519	1,892	49,125

Administrative Regions of NHTSA



FATALITIES BY ACCIDENT TYPE, 1975, 1980, and 1981

	1975	1980	1981*	Percent Change 1980-81	Average Ani Percent Cha 1975-1981
Pedestrian	7,027	7,383	6,622	-10.3	-1.0
Pedalcyclist	993	944	833	-11.7	-2.9
Single Vehicle	18,093	21,865	19,853	-9.2	1.6
Multi-Vehicle	18,412	20,899	21,817	4.4	2.9
Angle	7,706	8,089	8,441	4.3	1.5
Head-On	7,167	8,538	8,838	3.5	3.6
Rear	1,897	2,408	2,494	3.6	4.7
Side Swipe	978	828	1,008	21.7	.5
Unknown	664	1,036	1,036	0.0	-
Total	44,525	51,091	49,125	-3.8	1.7

* Preliminary as of February 2, 1982.
SOURCE: NHTSA, FARS.

National Safety Belt Campaign

The National Highway Traffic Safety Administration (NHTSA) designed the National Safety Belt Campaign to prevent injuries and save lives in car crashes by increasing safety belt use. While past efforts have relied exclusively on media advertising, the campaign seeks to involve various segments of society to reach their members and constituencies through their own unique communication channels.

The National Safety Belt Campaign has the primary goal of educating and motivating individuals to make realistic decisions to help save lives, not only his or her life, but also those of loved ones. The National Seat Belt Program will provide information, give explanation, provide assistance in every aspect by informing the public about the violent forces involved in relatively low speed crashes, the probability of being in an accident, how safety belts work, and the effectiveness of safety belts and child safety seats in saving lives and reducing injuries.

According to NHTSA statistics, of the total 50,000 fatalities in 1980, an estimated 28,000 were occupants of passenger cars and many times that number were seriously injured. In addition to the loss of life and the financial, emotional and personal tragedies they leave in their wake, these crashes cost the nation billions of dollars each year in lost productivity, medical and rehabilitation expenses, increased insurance premiums, taxes and other social costs. Safety belts potentially could cut the fatalities in half and could prevent or reduce the severity of millions of injuries, but only about 10 percent of drivers and passengers use them.

NHTSA's role in the National Seat Belt Program is long-term. Its efforts rely on the participation of institutions with which the American people have frequent contact. An appeal to people where they live, work, and form their opinions will be the focal point to enlist the participation and to encourage people to also make long-term commitments to help. With the help of media, TV talk shows, news releases, feature articles, television and movie participation, and the enforcement of safety programs, those who travel the nation's highways could be persuaded to use seat belts and decrease traffic related injuries and fatalities across the nation.

SOURCE: NHTSA, NOA-40.

Heavy Truck Safety - Accident Avoidance

Work neared completion on two projects initiated in 1979, one dealing with retarders (devices which are supplements to the vehicle's braking systems and which act to slow it down) and the other for splash and spray suppression equipment (devices intended to lessen the water spray cloud that eminates from a truck operating on wet roads).

In Phase I of the retarder project, it was determined that increased safety and economic benefit could result to the Nation's heavy truck operators through expanded use of retarders. The safety benefit arises primarily from downhill runaway protection while the economic benefit results primarily through reduced brake system wear and thus maintenance. It was also found that while market penetration by product suppliers had been significant in certain regions of the country (primarily the West) and in certain types of operations (logging and aggregate hauling are notable examples), it lagged markedly in other areas and operation types that were shown to be strong candidates for expanded use. The situation is exacerbated by the increased demands being placed on vehicles' brake systems with the advent of more fuel efficient truck designs which have reduced inherent downhill retarding "drag" because of reduced engine/drive train mechanical drag, friction, and aerodynamic forces.

Work on the second phase was directed at developing a testing method for rating the performance of retarders and at developing a scheme to match these performance capabilities with the operational needs of individual carriers. In this way, it was felt that a tool could be provided to carriers to encourage and aid them in their decision to purchase a retarder.

Actual downhill testing with and without retarders confirmed the safety benefit of the devices as evidenced by significantly lower average brake shoe temperatures. These lower temperatures are indicative of both reduced brake wear and heat buildup. Reduced heat buildup decreases the potential for brake fade and loss of control.

The final phase of work will develop a driver's manual aimed at training drivers to extract the maximum safety and economic benefit from retarders.

The work on splash and spray suppression systems was directed at developing a simple, inexpensive and standardized method of rating their performance and at evaluating the in-service performance, durability and life cycle costs of products that are currently being marketed. The purpose of the program was to foster and encourage voluntary use of products that have only recently become widely available in the marketplace. Their introduction is the direct result of over 15 years of resarch by industry and the government. This final study resulted in the successful development of test procedures

which can serve as the basis of a standard for rating the performance of various products. It also uncovered many details about the installation of the products on the vehicles which are crucial to both the in-service performance of the devices as well as their durability. These details will be incorporated into a guidebook of "do's-and-don'ts" which hopefully will aid manufacturers and operators who wish, on the one hand to refine their products and, on the other, to use them effectively, practically, and economically.

SOURCE: NHTSA, NRD-20.

Cargo Tank Integrity Program

In consonance with its hazardous materials modal responsibilities, the Bureau of Motor Carrier Safety (BMCS) initiated a long-range Cargo Tank Integrity Program in 1975. Cargo tanks MC-305 and 306 were studied to determine whether existing units provide overturn integrity.

Cargo tanks MC-305 and 306 are used to transport gasoline and other flammable liquids. When this type of cargo tank is involved in an accident, a disaster potential of considerable magnitude exists. The disaster potential for fire and/or explosion increases greatly if the cargo tank overturns and cargo leakage occurs.

The research identified leakage problems related to product retention of MC-305 and 306 type tanks during overturn accidents. It also concluded existing systems do not provide overturn integrity for these types of cargo tanks.

The final report, "Cost Effective Methods of Reducing Leaking Occurring in Overturns of Liquid-Carrying Cargo Tanks" may be obtained from the National Technical Information Service, Springfield, Virginia.

SOURCE: FHWA, Bureau of Motor Carrier Safety.

Railway-Highway Grade Crossing Improvements

In 1973, there were 1,077 fatalities associated with motor vehicle accidents at railway-highway grade crossings. In that same year the Rail-Highway Crossings Program was established to provide funds for flashing light signals, automatic gates, grade separations, and other safety improvements at the most hazardous grade crossings. As of September 30, 1981, almost 13,000 hazardous crossings had been improved throughout the United States. Fatalities decreased to 708 in 1980, a reduction of 34 percent from the number of fatalities in 1973. Crossings where improvements were made showed fatality reductions of about 70 percent.

Although crossings remain that are in need of improvement, progress since 1973 has been such that less than 1.5 percent of all fatalities are now associated with railway-highway grade crossing accidents. Only about 5 percent of the public crossings experience an accident of any kind in any one year.

SOURCE: FHWA, Office of Highway Safety.

Safety Training and Education

The Federal Highway Administration's (FHWA) National Highway Institute (NHI) provides technical assistance to States through its training programs. Courses are offered on a wide variety of highway safety topics, including safety design and operational practices, railroad grade crossing, maintenance and construction zones, and the Highway Safety Improvement Program.

Each course contains state-of-the-art technology for each topic. They are designed for a variety of audiences, such as technicians, engineers, and top-level managers. Each course is developed with a curriculum which includes an instructor's guide, lesson plans, teaching objectives, workshop material, and visual aid instructions. These materials are available from the NHI, University/FHWA College Curriculum Program. They are scheduled and presented at no cost when requested by a State.

In fiscal year 1981, 2,420 persons received training in 70 highway safety courses. Nine different courses were presented in 35 different States and the District of Columbia. The table below identifies titles of courses presented, number of presentations, and the number of participants.

SOURCE: FHWA, Office of Highway Safety.

SUMMARY OF HIGHWAY SAFETY-RELATED COURSES

TITLE	PRESENTATIONS	PARTICIPANTS
Program - Related Courses		
o Highway Safety Improvement Program	5	143
o Highway Safety Engineering Studies	2	58
o Highway Safety Evaluation	3	88
Design - Related Courses		
o Safety Design and Operational Practice for Streets and Highways	14	487
o Railroad Grade Crossing Improvement Programs	5	184
o Selecting, Locating, and Designing Traffic Barriers	22	807
Construction and Maintenance - Related Courses		
o Traffic Control for Street and Highway Construction and Maintenance	14	465
o Functional Requirements of Highway Safety Features	5	188

Pedestrian Injury Causation Study

The final report of NHTSA's Pedestrian Injury Causation Study (PICS) culminates a 2½-year study on pedestrian injury causation factors. The data file contains information on 1,997 pedestrian accidents involving 2,021 vehicles and 2,068 pedestrians. Data were collected from September 1977 to March 1980 in five different geographical locations: Buffalo, Palo Alto, Los Angeles, San Antonio, and Washington, D.C.

Major findings include:

- In pedestrian accidents, adults are frequently struck and carried by a vehicle in frontal impacts and children are not. This size-related effect influences the injury experience of both. Adults sustain more serious injuries than children and receive a larger proportion of their injuries from contact with the vehicle than do children. For both children and adults, the majority of injuries to the head, neck, face, and upper and lower extremities are caused by the pavement. For children, the hood face is the source of the highest proportion of all chest injuries; for adults, it is the hood top. Abdomen injuries are most often caused by the hood face for children and by the grille/headlight or hood face for adults. Pelvic-hip injuries are most often caused by the hood face for the adults. Pelvic-hip injuries are caused nearly equally by the front bumper and grille/headlight area for children and by the grille/headlight or hood face for adults.

- The pavement ranks first and the bumper second as the source of most lower extremity injuries to children. Most injuries from the pavement consist of abrasions and contusions. The bumper produces fractures only to the lower leg. Among adults, the front bumper most often causes knee and lower leg injuries, the hood face and grille/headlight area cause pelvic-hip injuries, the grille/headlight, front bumper and hood face cause thigh injuries and the pavement causes ankle injuries. Leg fractures were more common among adults than among children.

- Vans and pickups produce more life-threatening or fatal injuries among adults than do cars. For children, vans produce more of these injuries than cars or pickups. A larger proportion of head and neck injuries is associated with vans and pickups than with cars. Car impacts result in a larger proportion of injuries to the lower extremities than to other body areas.

Other analysis findings include information on injury severity and injury types associated with impact speed, vehicle body style, injury source and pedestrian age. Vehicle-pedestrian interactions, pedestrian orientation and injury severity, vehicle braking and injury type and severity, and the effect of vehicle geometry on injury are also covered. Lower extremity injuries are evaluated in terms of pedestrian age and injury sources.

In addition to analysis findings, the report also describes the data sources, quality control measures, the data file, and the case weighting procedures used in preparing the data for analysis. The sample of five collection areas was compared with the base rate data (all police reported pedestrian accidents) to determine the representativeness of the sample.

This document is titled "Pedestrian Injury Causation Parameters - Phase II," and is available through the National Technical Information Service, Springfield, VA 22161.

SOURCE: NHTSA, NRD-30.

Highway Information Systems

The FHWA provides technical assistance to States' to encourage and suggest improvements in their highway information safety systems. State information systems can be used to assist State program managers in establishing project priorities. An integrated highway information system can link highway inventory data, highway traffic volume data, and highway traffic accident data.

In 1981, five State highway information systems were reviewed to document information which encourage improvements in highway information systems of other States. Findings included:

- All States use their systems to identify high accident locations and establish project priorities.
- Some States use high accident locations as a defense in tort liability cases.
- All States were more efficiently able to meet general and specific accident reports analyses.
- All States were more efficient in producing routine and special State accident reports analyses.
- States do not use their systems to determine hazardous elements to identify Statewide highway safety problems.

The major problems these five States encountered in implementing these systems were:

- Coordination and cooperation among State agencies.
- Identifying unique situations such as locating accidents on ramps or roads that cross each other more than once.
- Receiving prompt and accurate accident data.

A report titled, "A Synopsis of State Integrated Highway Information Systems," is being published and is expected to be available during this summer.

SOURCE: FHWA, Office of Highway Safety

Safety Inspection and Weighing Demonstration Program

The Commercial Motor Carrier Safety Inspection and Weighing Demonstration Program was initiated by the Federal Highway Administration, Bureau of Motor Carrier Safety (FHWA-BMCS). It is a 3 year program to expand the level of roadside inspection and weighing of heavy commercial vehicles, to demonstrate the feasibility of a State-Federal partnership in vehicle inspection and weighing, and to determine the safety benefits which result from an expanded program and the partnership. The FHWA-BMCS may enter into cooperative agreement with one or more States with the State funding 10 percent and FHWA-BMCS funding 90 percent of the program cost in that State. Since Fiscal Year 1979, $10 million has been appropriated for the 3 year program.

The third and last year of the program in participating States is now underway. The following preliminary statistics and observations include:

1. Less than one-half of 1 percent of trucks weighed at fixed scales are found to be overweight. That percentage runs as high as 10 percent for those vehicles weighed on portable scales. The overall percentage is about one-half of 1 percent. The issuance of overweight permits has been limited to non-divisable loads.
2. Approximately 30 percent of the vehicles randomly selected for inspection are placed out of service, and 50 percent of those otherwise selected are placed out of service.

3. Approximately 2 percent of the drivers are placed out of service.

4. The use of the weighing-in-motion device is an effective means of screening vehicles for probable overweight violations and almost eliminates the likelihood that an overweight vehicle can escape detection.

5. It appears roadside inspection of commercial vehicles in operation as an enforcement activity is more effective and less costly than requiring annual or semi-annual inspections.

6. There has been a significant reduction in the number of accidents involving heavy commercial vehicles.

Strategies for the Deterrence of Drunk Driving

The Office of Driver and Pedestrian Research in the NHTSA has initiated a research program to identify and field test promising general deterrence strategies (coupling both enforcement and related public information programs) designed to raise driver's perception of the risk of being arrested and punished for drunk driving. The general deterrence approach to the drunk driving problem is aimed at the potential drinking driver to motivate him/her to avoid drinking and driving because of the risk of legal and related consequences.

This project will identify a number of potentially effective techniques that do not require many additional State resources (e.g., funds, manpower) to implement. These techniques will be selected on the basis of their potential to raise driver's perceived risk of detection and punishment for drunk driving. The enforcement and related public information techniques identified as most promising will be combined into comprehensive general deterrence programs and will be field tested in two or three States. The field test is designed to determine the effectiveness of these programs in reducing alcohol-impaired driving and related accidents.

The specific police enforcement and adjudication techniques under examination are grouped under seven major headings:

1. Deployment
2. Increased Visibility of Enforcement Activity
3. Detection/Identification
4. Processing/Arrest
5. Sanctioning
6. Management Support
7. Additional Public Information Themes

The first six refer to action by the police, courts and administrative authorities accompanied by public information directly related to that activity and its consequences. The last heading provides for additional public information supportive of the general deterrence approach which can be used in conjunction with techniques under the first six headings.

The comprehensive general deterrence programs being developed in this project will be designed to overcome some of the shortcomings evident in current efforts to reduce the drunk driving problem. For example, drivers currently do not perceive a very high risk that they will be detected by the police if they drive while alcohol-impaired. Consideration will be given to the use of specific techniques like roadblocks and highly

visible enforcement teams in order to raise driver's perception of the risk of detection and arrest.

New enforcement techniques and technology like visual detection cues for use by police while on patrol and portable breath testers can be employed to increase the perception that the police can accurately identify drivers as alcohol-impaired. Also, new sanctioning programs like the use of early license suspension by administrative action (by the licensing agency) of drivers who have a Blood Alcohol Content (BAC) above 0.10% when arrested by the police, can increase the perception that severe punishment for drunk driving will not be avoidable.

The results of the field test should be available late in 1983 in the form of a report documenting the techniques implemented and the effects on the incidence of alcohol-impaired driving and alcohol-related accidents.

SOURCE: NHTSA, NRD-40.

- Rail Equipment accidents and the accident rate per million train miles reached a 10-year low in 1981. Train miles also reached a 10-year low.

- Total railroad fatalities decreased by 4.8% in 1981 from the 1980 figure.

SAFETY PROGRAM HIGHLIGHTS

Rail Safety through Cooperation

During 1981 the Federal Railroad Administration (FRA) redirected the emphasis of its safety program toward the development of a more cooperative relationship in working with the railroads and their employees. Top railway management's personal involvement in the effort to improve safety compliance, including FRA's safety assessment program, significantly contributed to a reduction in accidents.

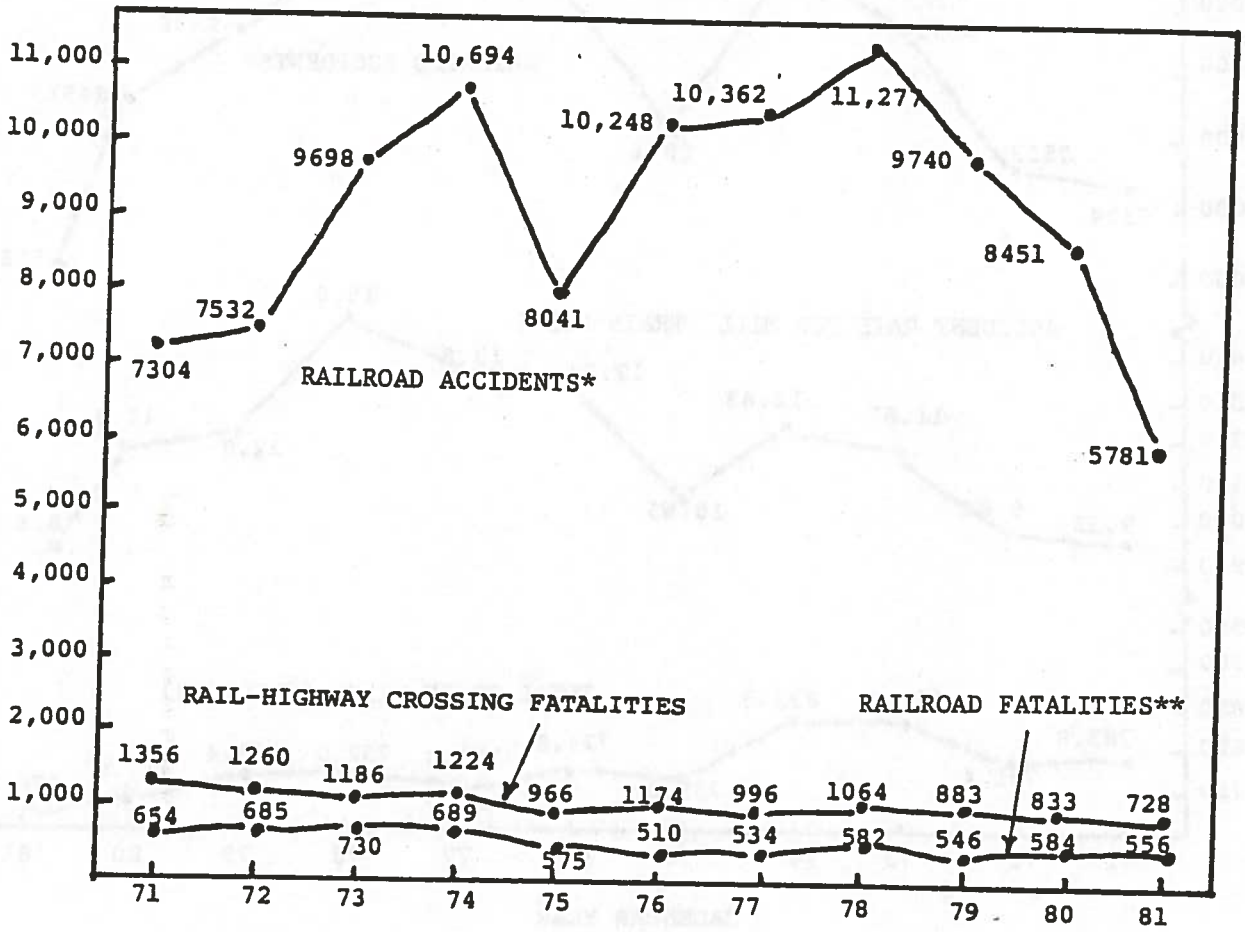
The railroad industry demonstrated a substantial reduction in the number of accidents, injuries, fatalities, and hazardous materials releases during 1981. In large part, this achievement was due to the increased awareness of labor and management of the importance of good safety practices, and improvements to plant and equipment. Similar reductions in fatalities at grade crossings resulted from the installation of warning devices and other improvements. A nationwide Industry-Government-National Safety Council educational program contributed to the improved grade crossing record.

State and local highway officials have cooperated with the railroad industry in the installation of some 3,000 warning devices at grade crossings. Although these devices are funded primarily from the Highway Trust Fund, the major burden falls upon the railroad industry, which expended approximately $275 million maintaining grade crossings during 1981. Grade crossing safety was also improved through industry efforts in completing physical upgrading such as improved visibility, illumination, surface rehabilitation and improved track detection circuitry.

The Association of American Railroads (AAR) conducted four regional grade crossing workshops in 1981. These meetings provided a forum to bring together those involved with grade crossing safety to analyze and evaluate accident reduction efforts.

On the national level, the National Safety Council coordinated "Operation Lifesaver" programs in effect in 30 states to educate the motoring public concerning grade crossing safety. Railroad participation included financial contributions and, in some states, management of the state programs. In 1981, financing for the program was received from the AAR and Amtrak.

CHART 7.
RAILROAD ACCIDENTS AND FATALITIES
AND GRADE CROSSING FATALITIES, 1971-1981



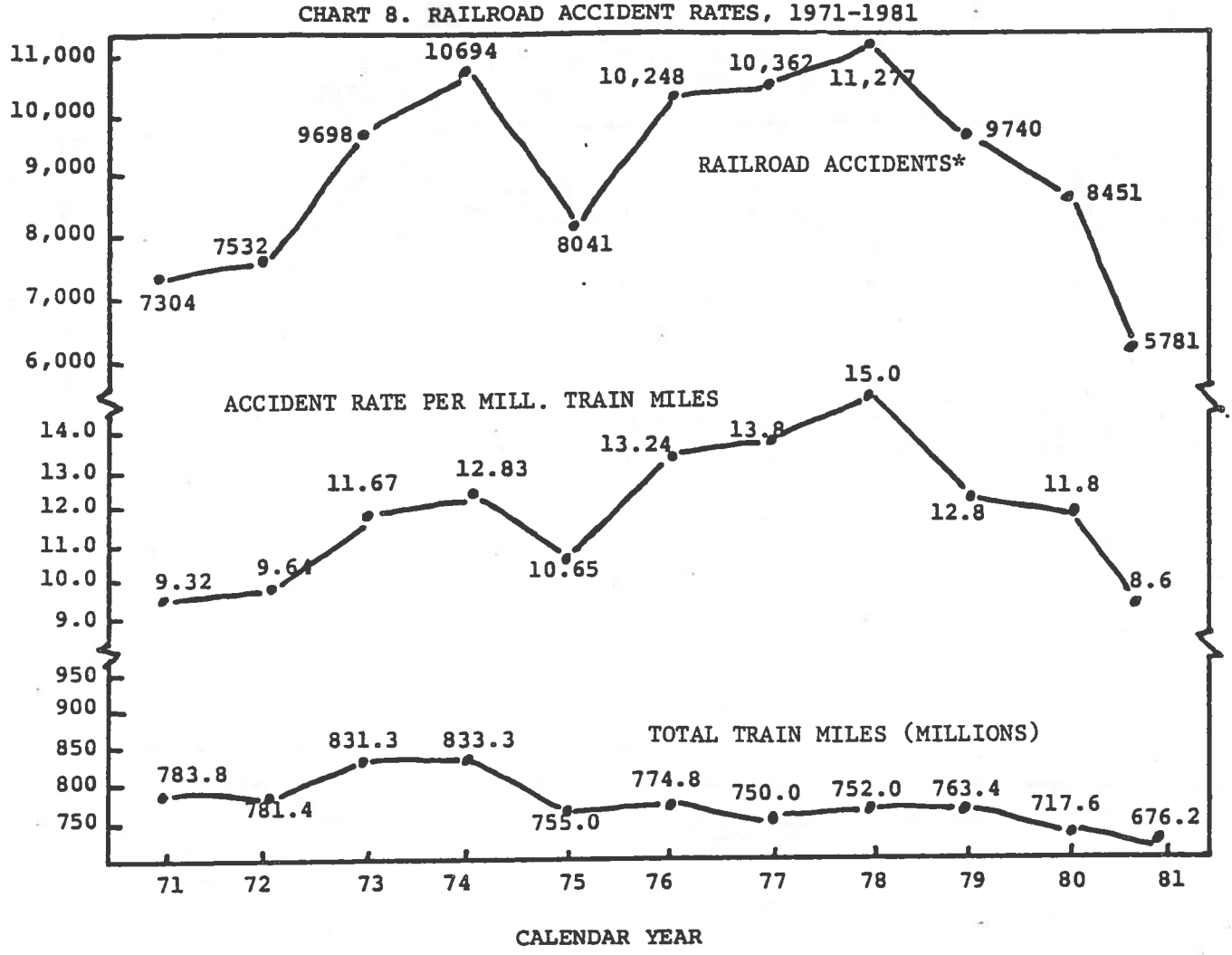
*Rail Equipment accidents only, including Rail/Highway Grade Crossings.

**Fatalities resulting from Train and Rail Equipment accidents and Non-Train incidents.

NOTE: Reporting threshold for Rail Equipment accidents was raised from $750 to $1,750 in 1975, to $2,300 in 1977, to $2,900 in 1979, and to $3,700 in 1981.

SOURCE: FRA, System Support Division, RRS-33.

CHART 8. RAILROAD ACCIDENT RATES, 1971-1981



* Rail Equipment accidents only, including Rail/Highway Grade Crossings.

NOTE: Reporting threshold for Rail Equipment accidents was raised from $750 to $1,750 in 1975, to $2,300 in 1977, to $2,900 in 1979, and to $3,700 in 1981.

SOURCE: FRA, System Support Division, RRS-33.

CHART 9. FATALITIES AND INJURIES RESULTING FROM RAIL EQUIPMENT ACCIDENTS,* BY TYPE OF ACCIDENT, 1981

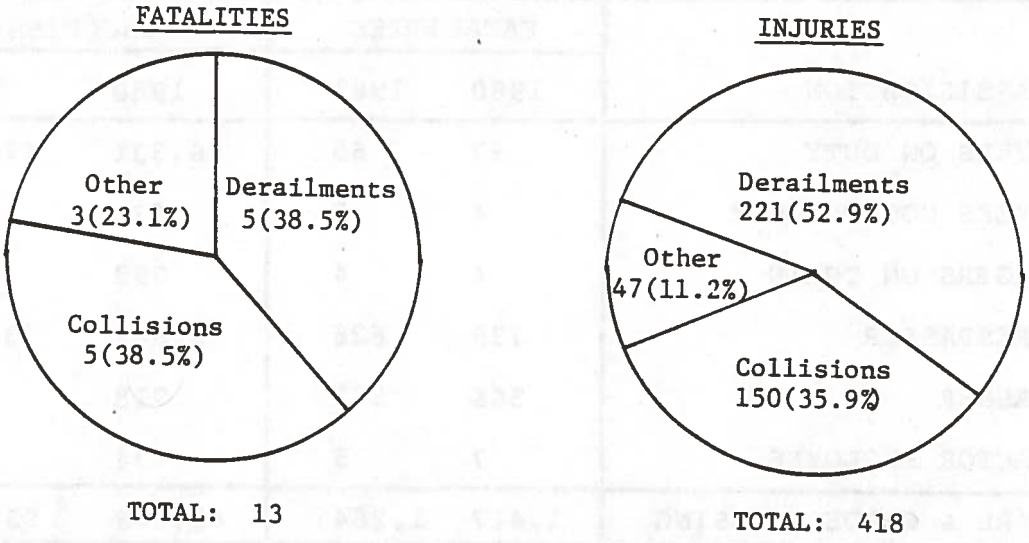
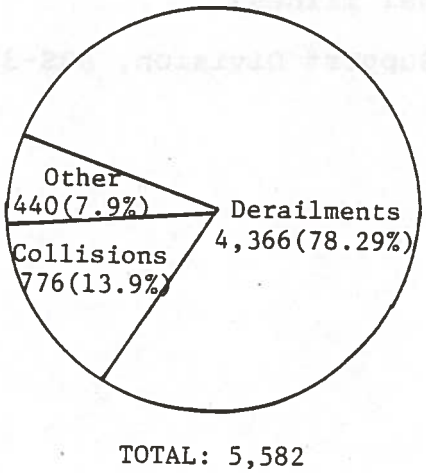


CHART 10. RAIL EQUIPMENT ACCIDENTS,* BY TYPE OF ACCIDENT, 1981



*See Glossary for Definition (Does Not Include Train, Non-Train, and Grade Crossing Accidents).

SOURCE: FRA, System Support Division, RRS-33.

TABLE 10.
RAILROAD FATALITIES AND INJURIES, BY TYPE OF PERSON, 1980-1981

CLASSIFICATION	FATALITIES		INJURIES**	
	1980	1981	1980	1981
EMPLOYEES ON DUTY	97	65	56,331	47,838
EMPLOYEES NOT ON DUTY	4	2	671	645
PASSENGERS ON TRAIN	4	4	593	409
NON-TRESPASSER	739	626	3,849	3,278
TRESPASSER	566	582	728	761
CONTRACTOR EMPLOYEE	7	5	74	72
TOTAL RR & GRADE CROSSING	1,417	1,284	62,246	53,003
RAILROAD ONLY*	584	556	58,356	49,710
GRADE CROSSING ONLY	833	728	3,890	3,293

* Includes Rail Equipment, Train, and Non-train data.
** Includes occupational illness.

SOURCE: FRA, System Support Division, RRS-33.

TABLE 11. RRT EQUIPMENT FATALITIES, ACCIDENTS AND INJURIES, 1980-1981

	1980			1981		
	ACCIDENTS	INJURIES	FATALITIES	ACCIDENTS	INJURIES	FATALITIES
JAN	4			10	1	1
FEB	3			9	1	
MAR	2	10		6	9	
APR	5	1		4	0	
MAY	2			5	29	
JUN	2			6	0	
JUL	1			5	4	1
AUG	7	27		2	0	
SEP	4			10	0	
OCT	2	1		7	0	
NOV	5	3		5	1	
DEC	4	2	1	8	2	-
TOTAL	41	44	1	77	47	2

TABLE 12. RRT TRAIN FATALITIES, INCIDENTS AND INJURIES, 1980-1981

	1980			1981		
	INCIDENTS	INJURIES	FATALITIES	INCIDENTS	INJURIES	FATALITIES
JAN	*	55	7	*	58	8
FEB	*	52	3	*	71	12
MAR	*	50	2	*	80	2
APR	*	50	5	*	64	8
MAY	*	66	3	*	70	6
JUN	*	67	4	*	93	5
JUL	*	59	5	*	88	5
AUG	*	76	5	*	117	7
SEP	*	80	2	*	110	2
OCT	*	84	3	*	53	5
NOV	*	55	2	*	72	6
DEC	*	48	8	*	49	6
TOTAL	746	742	49	959	925	72

* Not available

TABLE 13. RRT NON-TRAIN FATALITIES, INCIDENTS AND INJURIES, 1980-1981

	1980			1981		
	INCIDENTS	INJURIES	FATALITIES	INCIDENTS	INJURIES	FATALITIES
JAN	*	509	4	*	539	1
FEB	*	494	2	*	514	0
MAR	*	508	2	*	563	2
APR	*	397	1	*	447	2
MAY	*	530	1	*	417	2
JUN	*	507	6	*	400	4
JUL	*	527	6	*	435	4
AUG	*	528	4	*	419	3
SEP	*	561	3	*	347	0
OCT	*	626	1	*	375	2
NOV	*	486	1	*	317	1
DEC	*	342	2	*	376	7
TOTAL	6002	6015	33	5107	5149	28

* Not available

AVIATION

In January 1982, the National Transportation Safety Board began reporting aviation accident data according to the operating rules of the Federal Aviation Regulations under which the flights were conducted, i.e., 14 CFR 121 (major carriers), 14 CFR 135 (commuter carriers and on-demand air taxi), or other parts of the FAR's. A further change is that the term "air carrier" will denote those carriers that have Air Carrier Operating Certificates issued by the FAA (this includes all carriers operating under 14 CFR 121 and 14 CFR 135). Accidents which occur while aircraft are operated under FAR's other than 14 CFR 121 and 14 CFR 135 will be included in the category of "General Aviation." It is anticipated that classifying aviation accidents according to the operating rules will better serve aviation safety because they set the minimum levels of such safety related areas as pilot experience, flight and duty time, and maintenance of aircraft. Further exposure data now obtained from the CAB will be obtainable in less and less detail until the CAB's demise, at which time much of this data will be obtained from the FAA. Therefore, it is appropriate to begin using FAA definitions of such terms as air carriers and general aviation.

AIR CARRIER

- The major carriers had 24 accidents in 1981 compared with a record low of 15 in 1980. Their total accident rate increased by 70 percent, from 0.214 to 0.366 per every 100,000 flight hours. The four single-fatality accidents produced a fatal accident rate of 0.061 per 100,000 flight hours. One victim was a flight attendant; two were mechanics; the fourth was a passenger who fell off a boarding ramp.

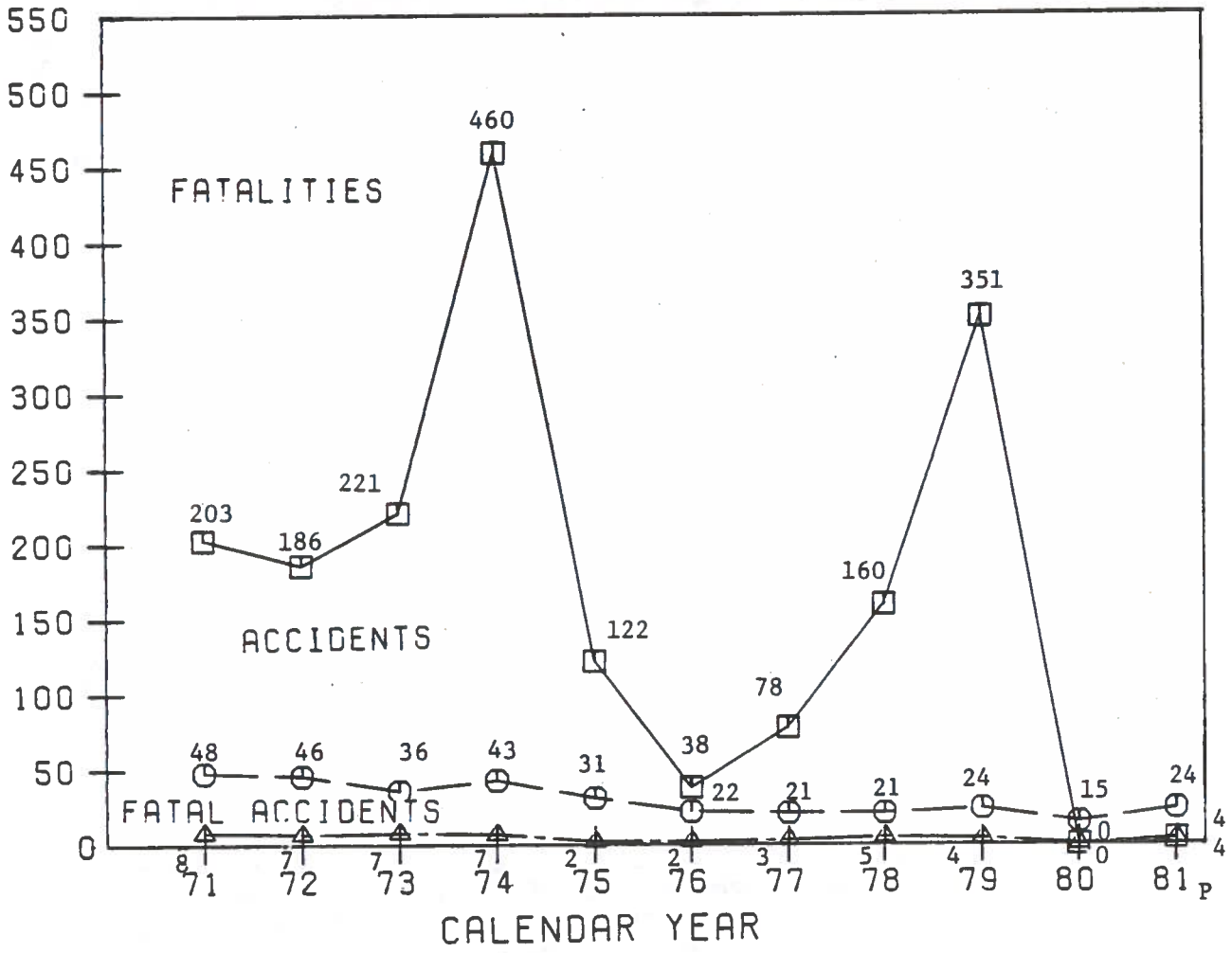
  The large airlines' total and fatal accident rates remained far below their rates of a decade ago. In 1972, both rates were roughly twice those recorded in 1981.

- Commuter carriers had 28 accidents in 1981, nine of which were fatal accidents. Fatalities totaled 35. In 1980, commuter air lines recorded 37 total accidents, seven of them fatal, and 36 fatalities. The accident rate for the short-haul commuters based on 100,000 departures was 1.64 for total accidents and 0.53 for fatal accidents in 1981. Over the 5 year period for which commuter accident statistics are available, the commuters' total accident rate per 100,000 departures has ranged from a high of 2.78 in 1978 to last year's low of 1.64. The fatal accident rate ranged from 0.70 in 1978, down to 0.37 in 1980.

- On-demand air taxis had 138 accidents and 34 fatal accidents in 1981. Both were 5-year lows for the category. The fatality total was 95, as compared with 1979's low of 84 and 1978's high of 160. The total accident rate for 1981 was 3.74 per 100,000 flight hours, down 19 percent from 1980. The fatal accident rate was 0.92 per 100,000 flight hours, down 23 percent from 1980.

CHART II.

AIR CARRIER* ACCIDENTS, FATALITIES, AND FATAL ACCIDENTS, 1971-1981

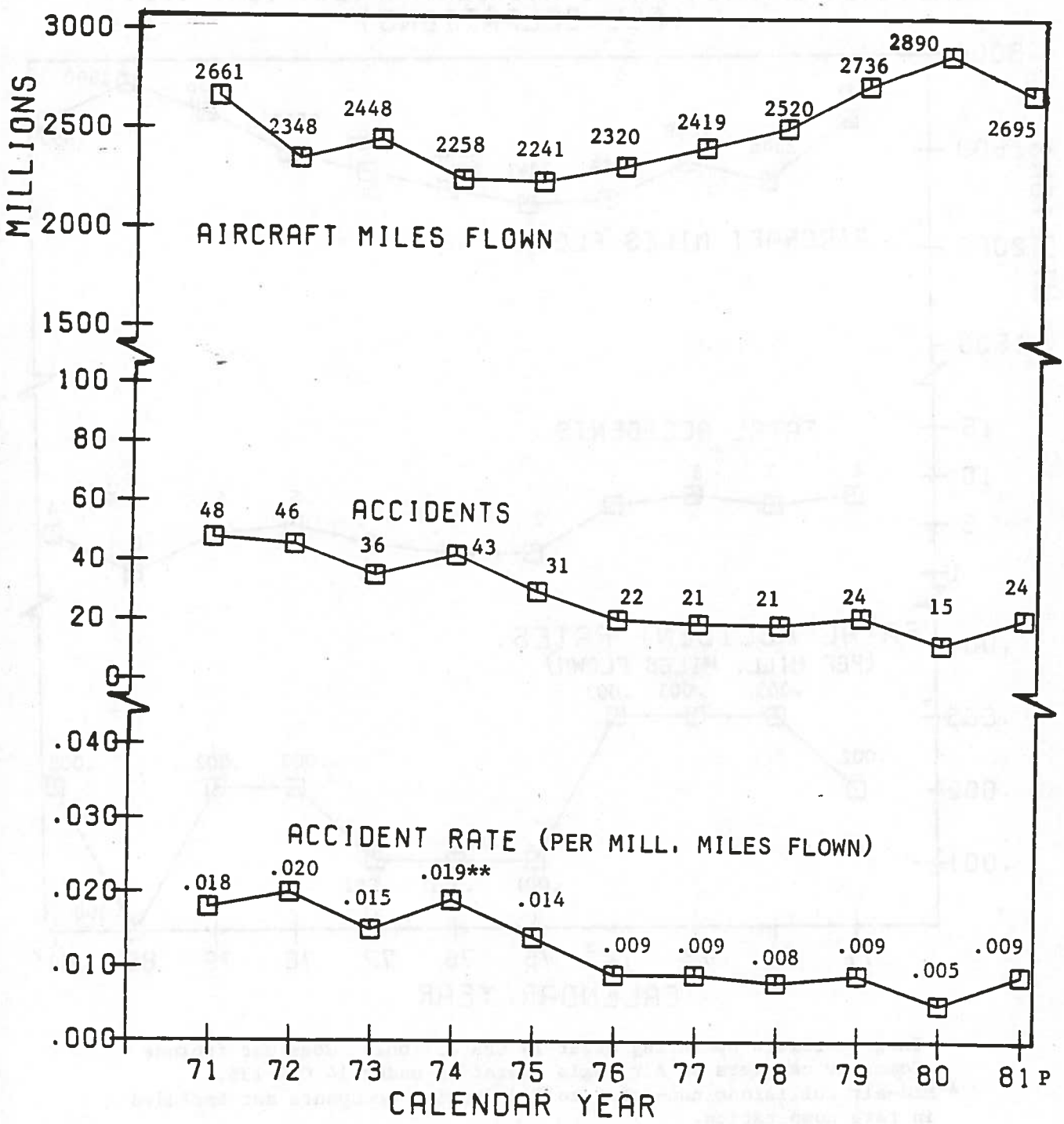


*Large carriers operating under 14 CFR 121 only, does not include Commuter carriers or Air Taxis operating under 14 CFR 135.
P = Preliminary.

SOURCE: NTSB, TE-50.

CHART 12.

U.S. AIR CARRIER* ACCIDENT RATES 1971-1981 (ALL OPERATIONS)



*Large carriers operating under 14 CFR 121 only, does not include Commuter carriers or Air Taxis operating under 14 CFR 135.

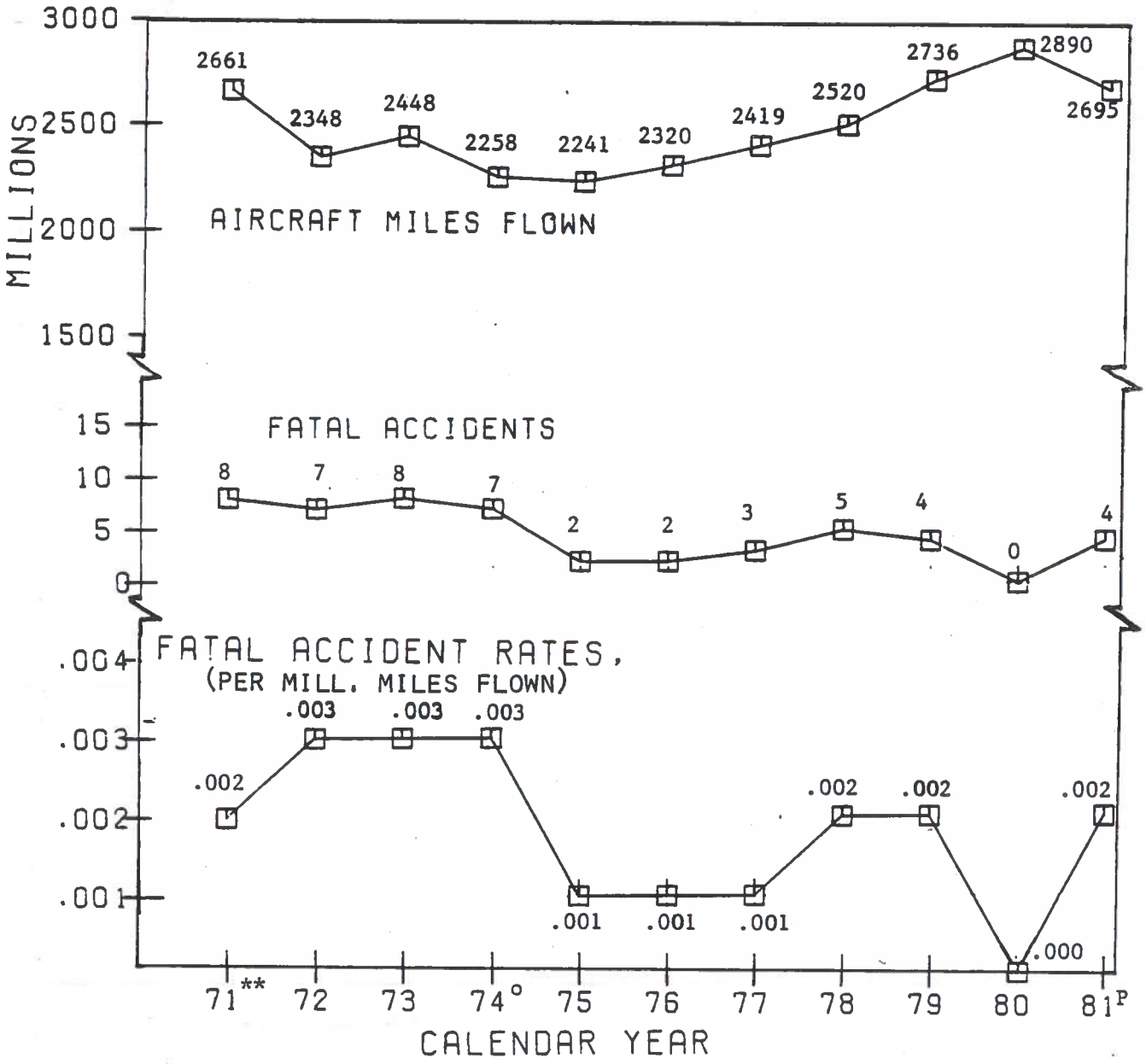
**Sabotage accident not included in rate computation.

P = Preliminary.

SOURCE: NTSB, TE-50.

CHART 13.

U.S. AIR CARRIER* FATAL ACCIDENT RATES, 1971-1981 (ALL OPERATIONS)



* Large carriers operating under 14 CFR 121 only, does not include Commuter carriers or Air Taxis operating under 14 CFR 135.

**Mid-air collisions non-fatal to Air Carrier occupants not included in rate computation.

o Sabotage accident not included in rate computation.

P = Preliminary.

SOURCE: NTSB, TE-50.

TABLE 14. COMMUTER CARRIERS* ACCIDENTS, FATALITIES AND RATES, 1977-1981

	1977	1978	1979	1980	1981
Fatalities	33	47	65	36	35
Fatal Accidents	9	13	14	7	9
Total Accidents	42	55	51	37	28
Fatal Accident Rate**	0.79	1.01	1.11	0.55	0.83
Total Accident Rate**	3.67	4.27	4.04	2.93	2.59

*Scheduled services operating under 14 CFR 135.
**Per 100,000 aircraft hours.

SOURCE: NTSB, TE-50

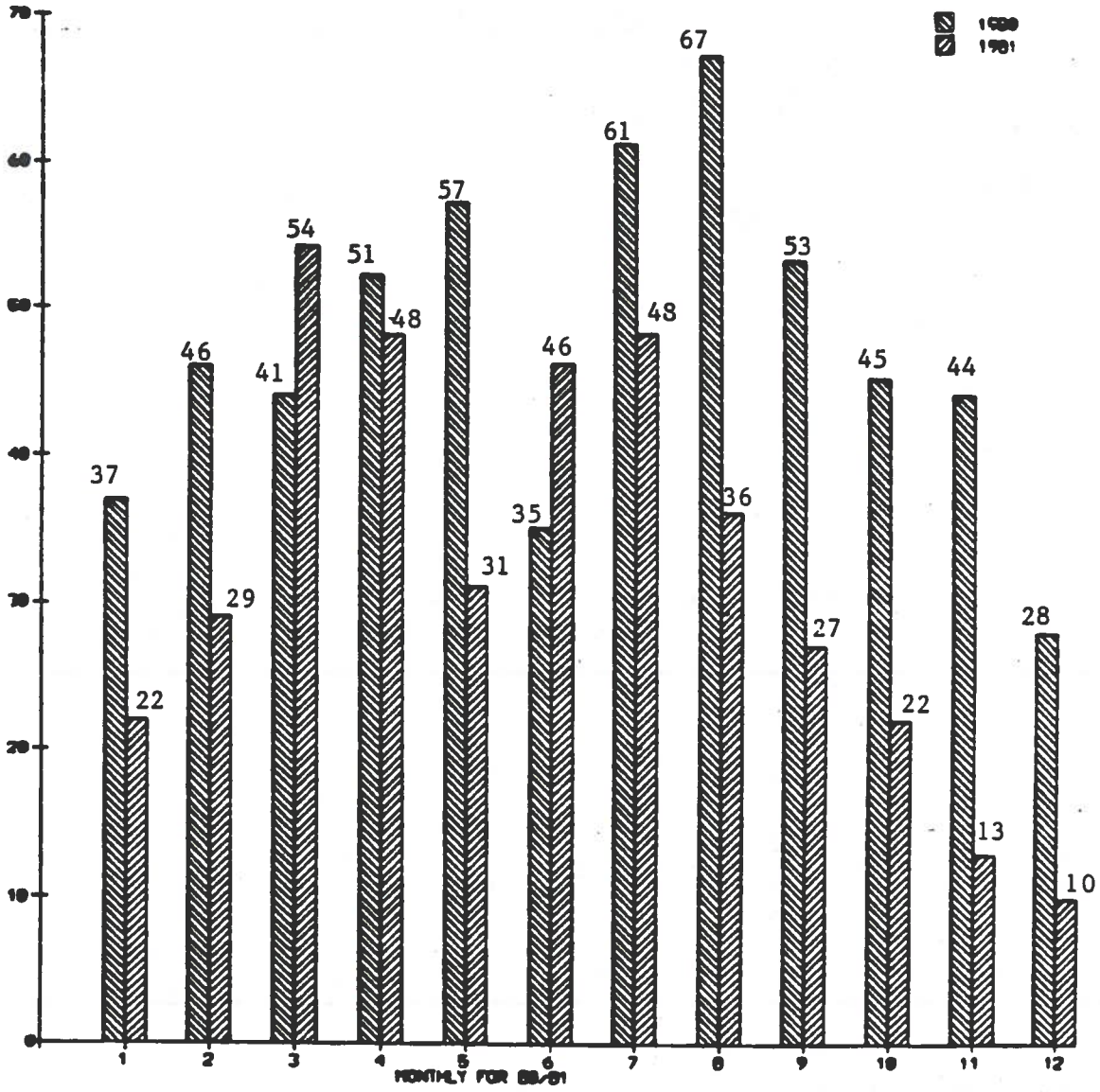
TABLE 15. AIR TAXIS* ACCIDENTS, FATALITIES AND RATES, 1977-1981

	1977	1978	1979	1980	1981
Fatalities	122	160	84	88	95
Fatal Accidents	35	57	36	42	34
Total Accidents	175	216	173	164	138
Fatal Accident Rates**	1.14	1.82	1.07	1.19	0.92
Total Accident Rate**	5.71	6.89	5.13	4.64	3.74

*Non-scheduled services operating under 14 CFR 135.
**Per 100,000 aircraft hours.

SOURCE: NTSB, TE-50

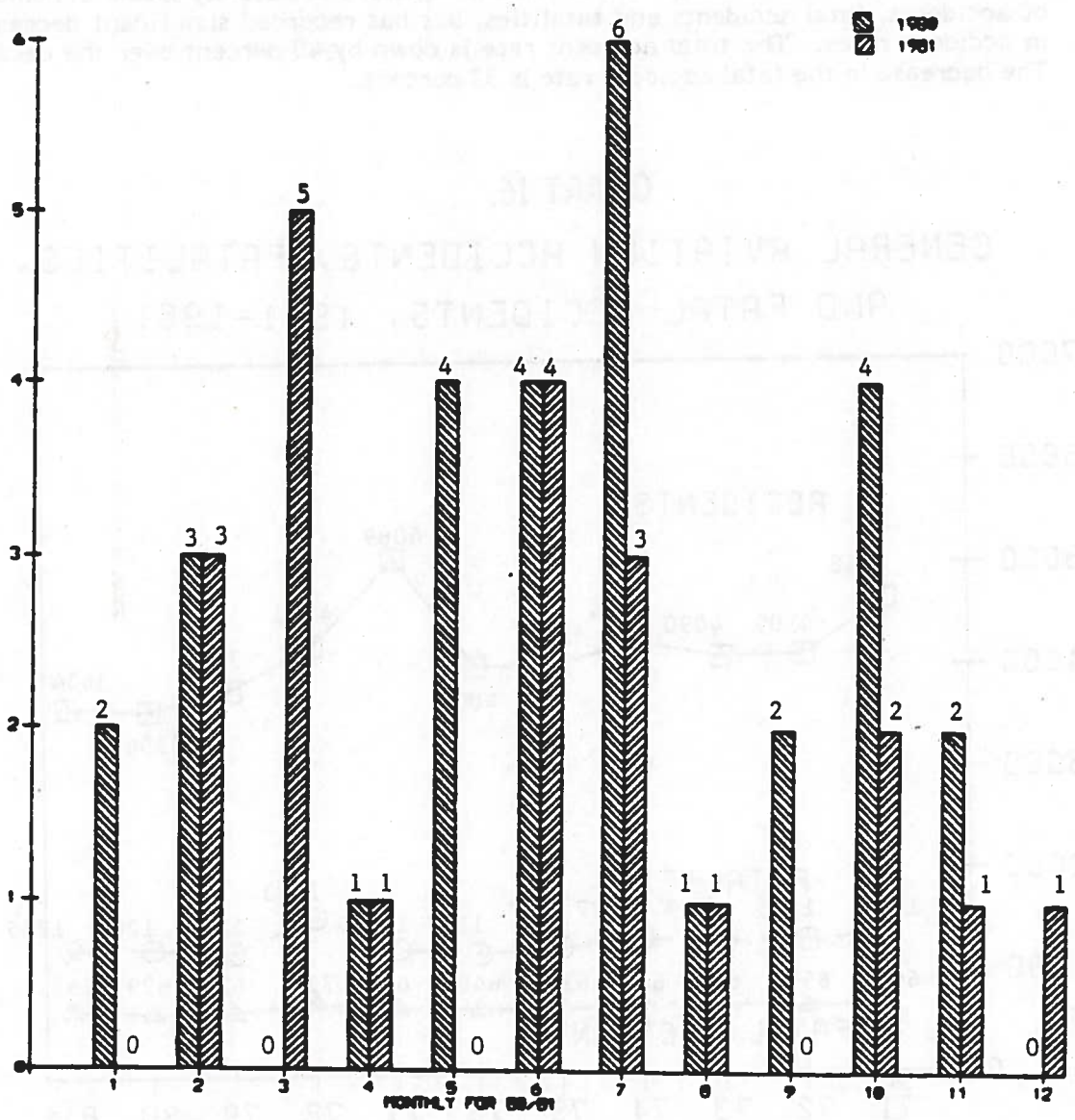
CHART 14.
AVIATION NEAR COLLISIONS* ,1980-1981



* Both Aircraft Airborne, Includes General Aviation and Air Carrier.

SOURCE: FAA, ASF-200.

CHART 15.
AVIATION MID-AIR COLLISIONS*, 1980-1981



* Both Aircraft Airborne, Includes General Aviation and Air Carrier.

SOURCE: FAA, ASF-200.

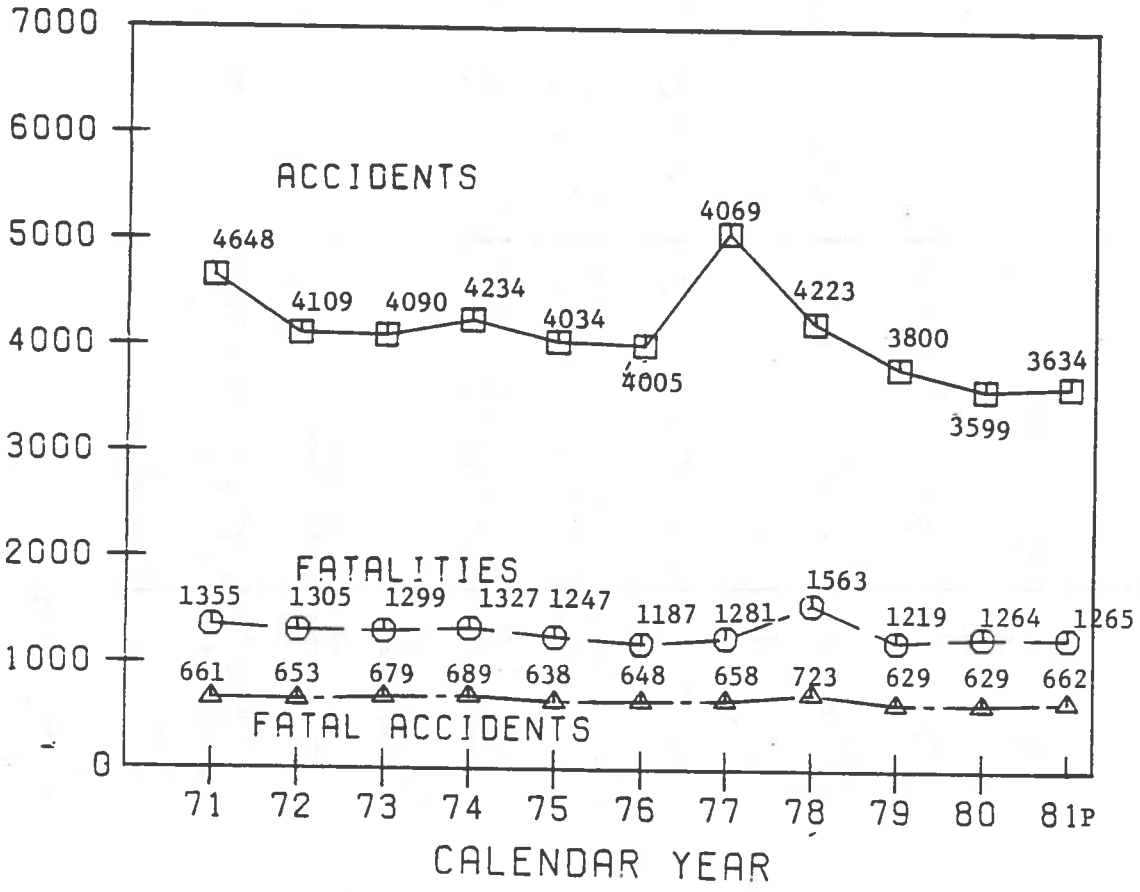
GENERAL AVIATION

- Total General Aviation accidents in 1981 were 3,634, only slightly higher than the 10-year low of 3,599 in 1980. Fatal accidents, at 662, were somewhat higher than the previous year's level of 629, also a 10-year low. The total of 1,265 fatalities almost duplicated the 1980 total of 1,264. The 1981 total accident rate was 10.0 for every 100,000 flight hours, an increase of 4 percent over 1980; the hourly fatal accident rate was 1.82, up 8 percent.

- Over the 1972-1981 decade, General Aviation has been relatively stable in numbers of accidents, fatal accidents and fatalities, but has recorded significant decreases in accident rates. The total accident rate is down by 40 percent over the decade. The decrease in the fatal accident rate is 32 percent.

CHART 16.

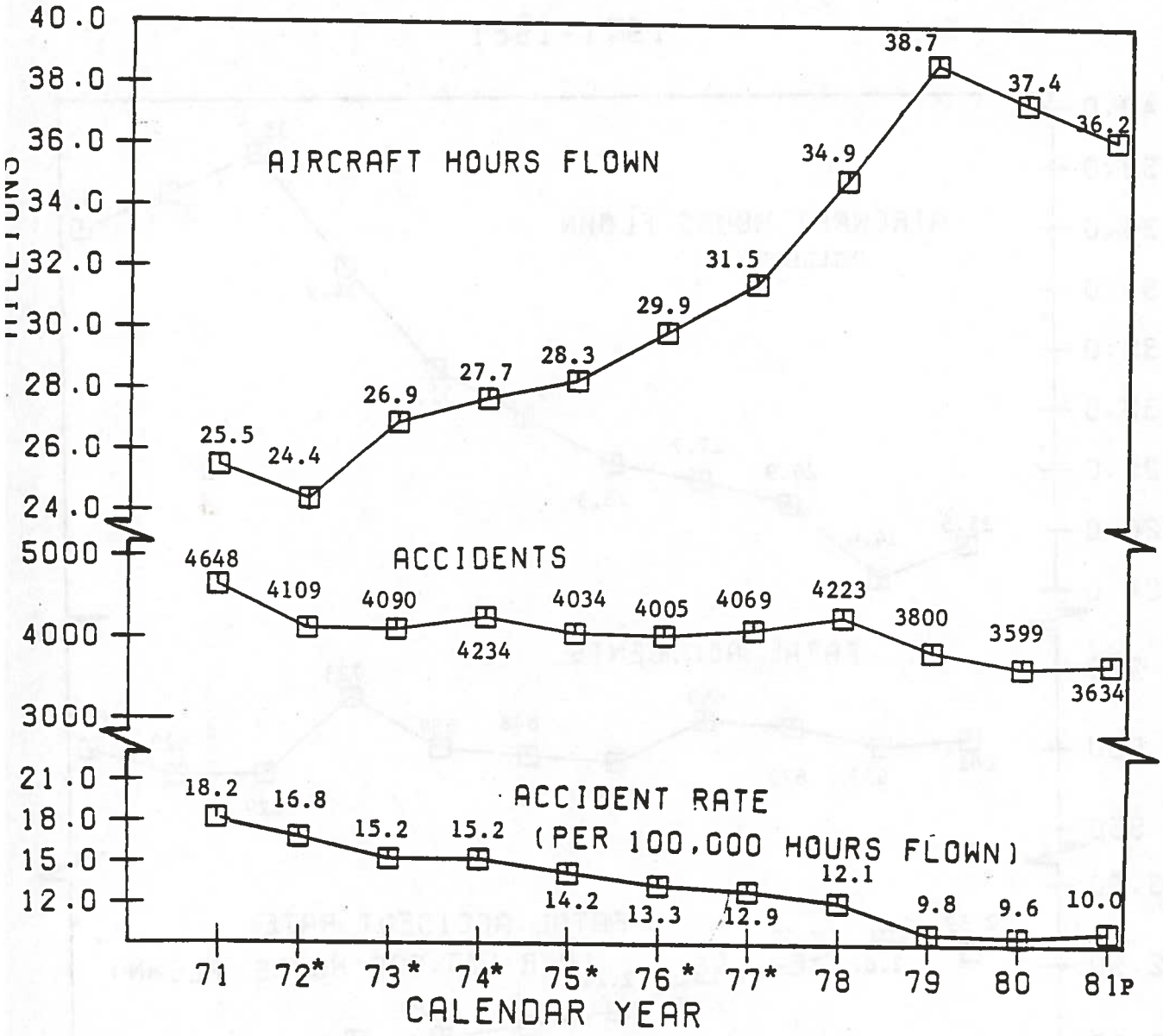
GENERAL AVIATION ACCIDENTS, FATALITIES, AND FATAL ACCIDENTS, 1971-1981



NOTE: All 1972-1980 data has been revised to exclude Commuter and Air Taxi operations operating under 14 CFR 135.
P = preliminary.
SOURCE: NTSB, TE-50.

CHART 17.

U.S. GENERAL AVIATION ACCIDENT RATES, 1971-1981



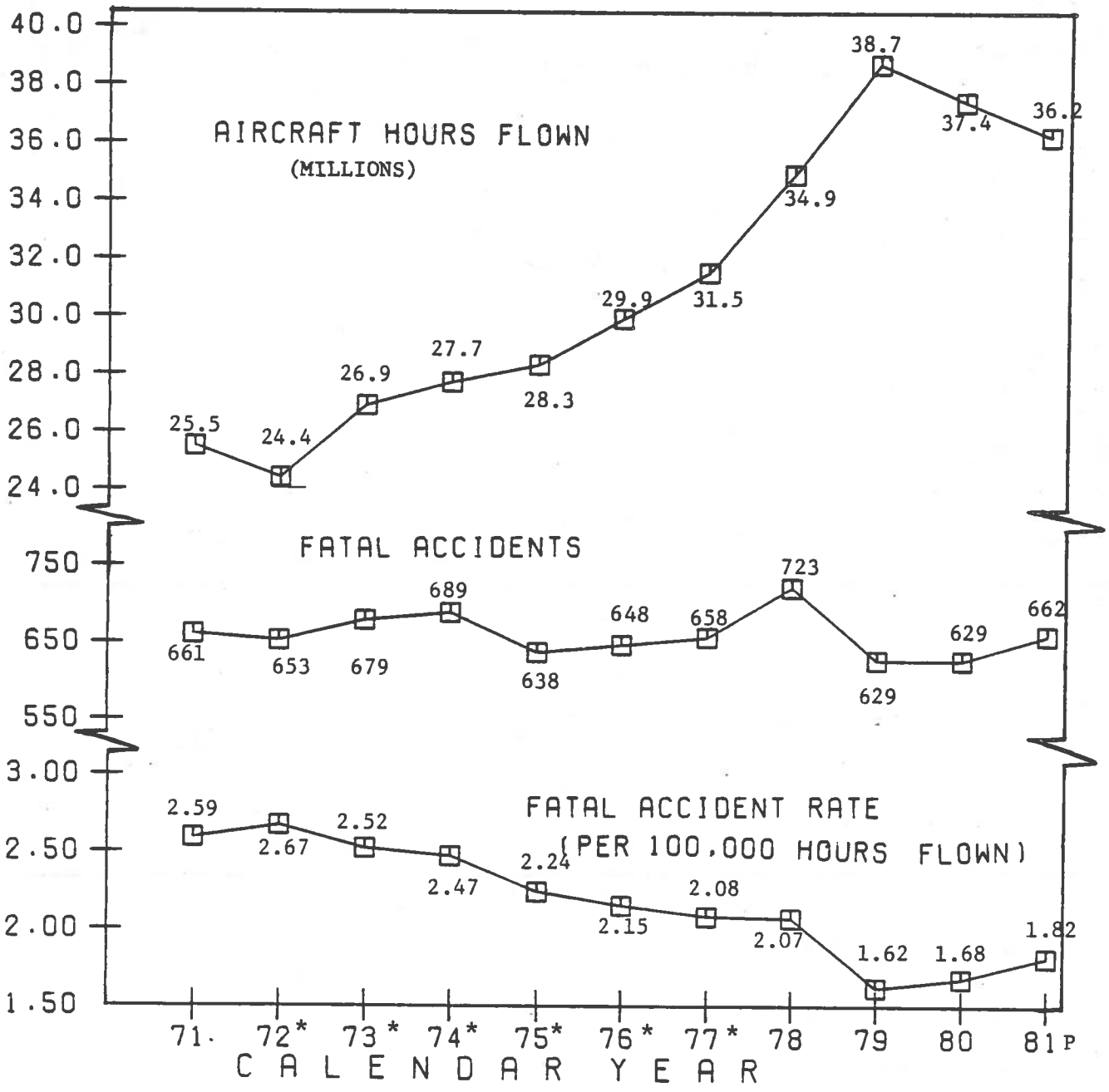
NOTE: All 1972-1980 data has been revised to exclude Air Taxi.
* Suicide/sabotage accidents not included in rate computation.

P = Preliminary.

SOURCE: NTSB, TE-50.

CHART 18.

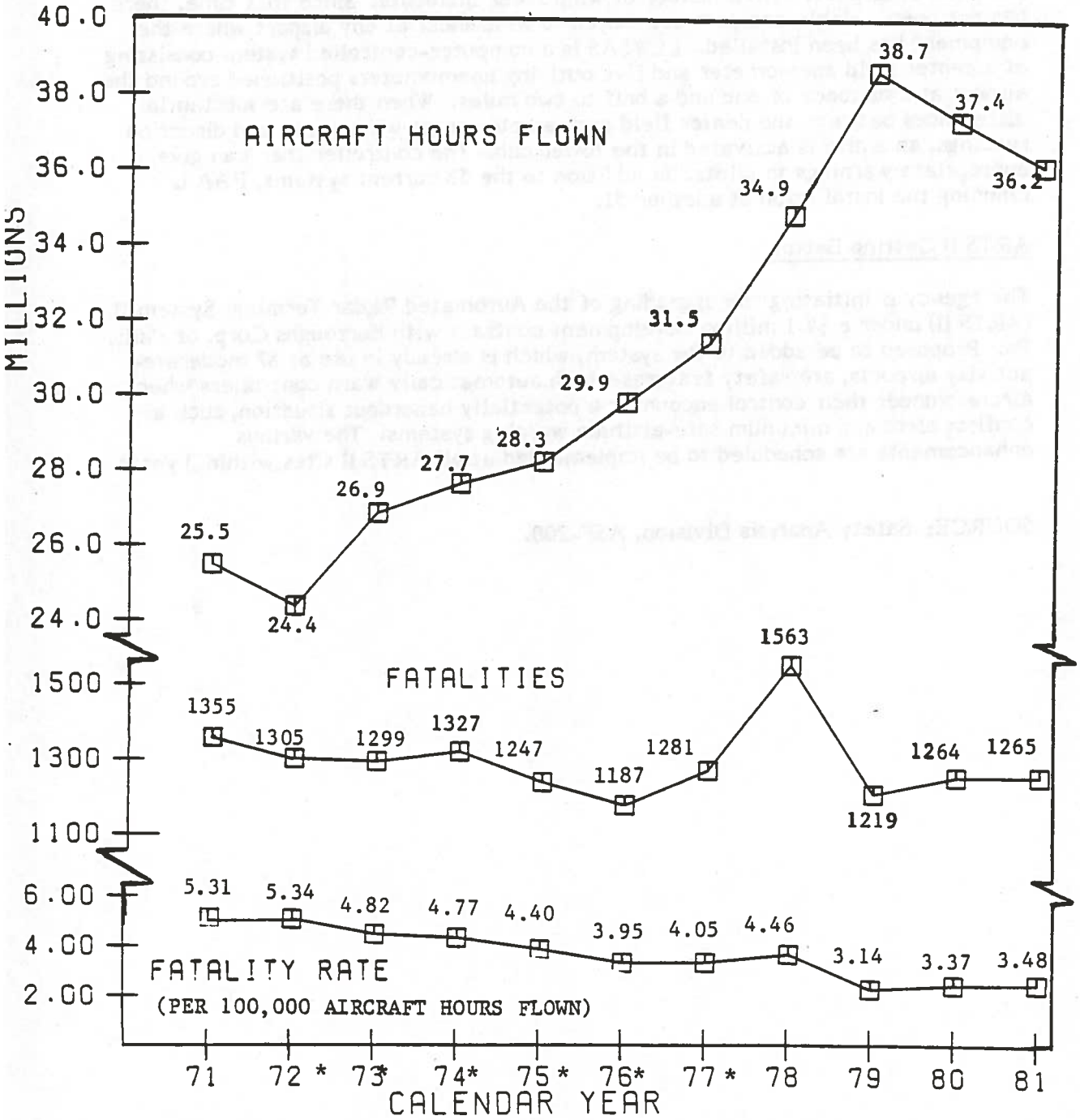
U.S. GENERAL AVIATION FATAL ACCIDENT RATES, 1971-1981



NOTE: All 1972-1980 data has been revised to exclude Air Taxi.
* Suicide/sabotage accidents not included in rate computations.
P = Preliminary.
SOURCE: NTSB, TE-50.

CHART 19.

U.S. GENERAL AVIATION FATALITY RATES, 1971-1981



NOTE: All 1972-1980 data has been revised to exclude Air Taxi.
P = Preliminary.
* Suicide/sabotage accidents not included in rate computation.
SOURCE: NTSB, TE-50.

SAFETY PROGRAM HIGHLIGHTS

Wind Shear Alert Program Has "No Accident" Record

The Low Level Wind Shear Alert System (LLWSAS) program continues to make air transportation safer for U.S. passengers. So far 55 LLWSASs are operational at U.S. airports, and the 58th is scheduled to be put in at San Juan International this month. The wind shear alert program began in 1978 when six systems were installed at airports with a history of wind shear incidents. Since that time, there has not been a single accident attributed to wind shear at any airport where the equipment has been installed. LLWSAS is a computer-controlled system consisting of a center field anemometer and five outlying anemometers positioned around the airport at a distance of one and a half to two miles. When there are substantial differences between the center field and remote sensor wind-speed and direction readings, an alarm is activated in the tower cab. The controller then can give appropriate warnings to pilots. In addition to the 58 current systems, FAA is planning the installation of another 51.

ARTS II Getting Better

The agency is initiating the upgrading of the Automated Radar Terminal System II (ARTS II) under a $4.1 million development contract with Burroughs Corp. of Paili, Pa. Proposed to be added to the system, which is already in use at 87 moderate-activity airports, are safety features which automatically warn controllers when aircraft under their control encounter a potentially hazardous situation, such as conflict alert and minimum safe-altitude warning systems. The various enhancements are scheduled to be implemented at all ARTS II sites within 3 years.

SOURCE: Safety Analysis Division, ASF-200.

MARINE

WATERBORNE

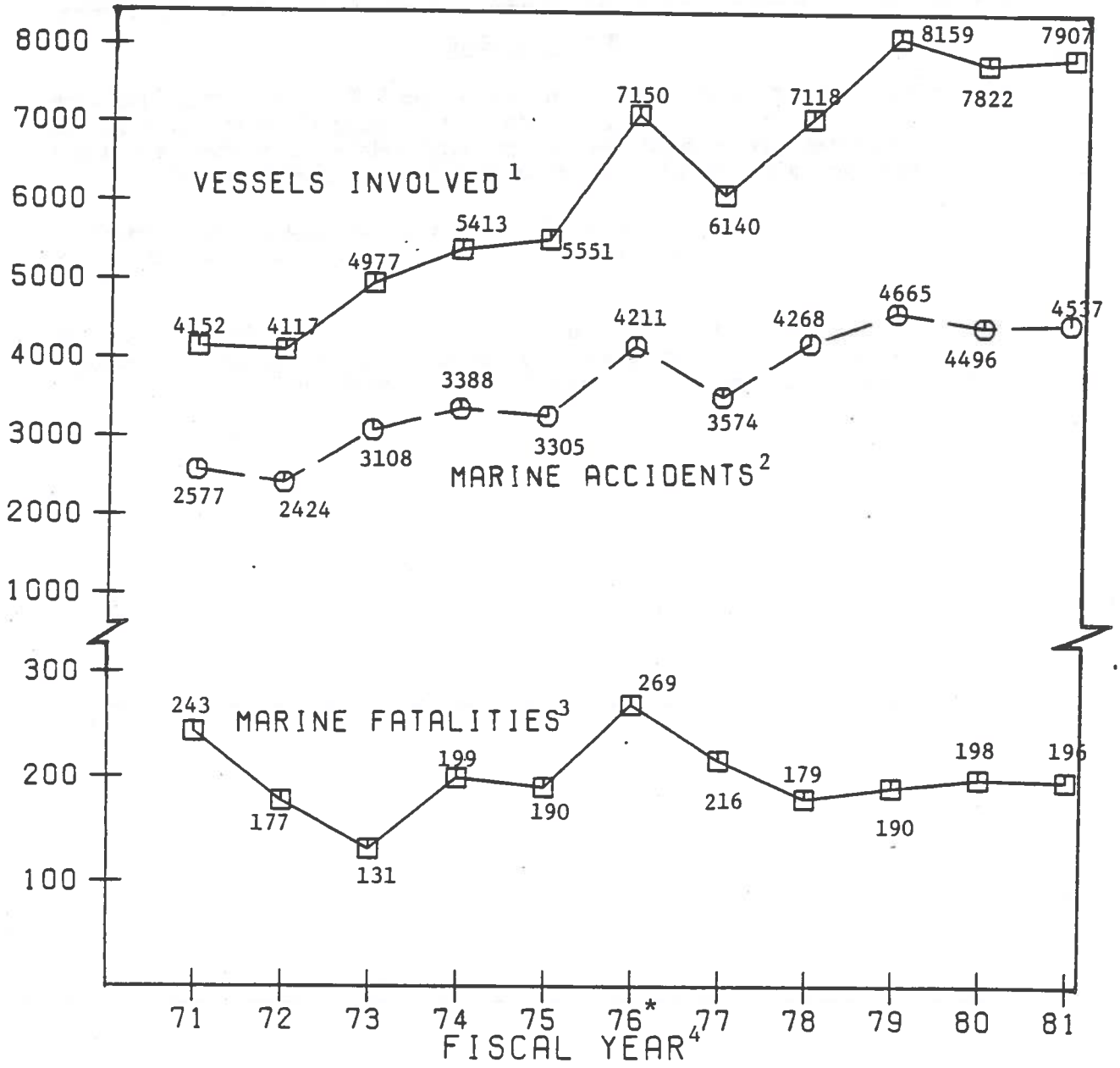
- In fiscal year 1981, Waterborne fatalities totaled 548. Of this total, 196 were classified as vessel casualty related with the remaining 352 deaths classified as non-vessel casualty related (vessel casualty related fatalities are those resulting from a vessel casualty such as a collision, fire or explosion).

- Of the total fatalities that occurred, 357 deaths occurred on board vessels of the uninspected fleet as opposed to 191 that occurred on board vessels of the inspected fleet.

- The total number of personnel injuries estimated for fiscal 1981 is 1627. This estimate shows a slight increase over 1980. Of the total injuries, 121 resulted from vessel casualties and 1506 from non-vessel casualties.

CHART 20.

WATERBORNE ACCIDENTS AND FATALITIES, 1971-1981



NOTE: 1981 data are estimated.

* FY 76 covers 15 months (FY 76 and a transition quarter).

[1] More than one vessel may be involved in a Marine accident.

[2] Casualties to commercial vessels under USCG jurisdiction.

[3] Fatalities due to vessel casualties only.

[4] Data on Marine accidents and fatalities are kept on a fiscal-year basis.

SOURCE: USCG, Office of Marine Safety, G-MA/83.

CHART 21. WATERBORNE TRANSPORTATION FATALITIES, VESSEL-CASUALTY-RELATED, 1971-1981

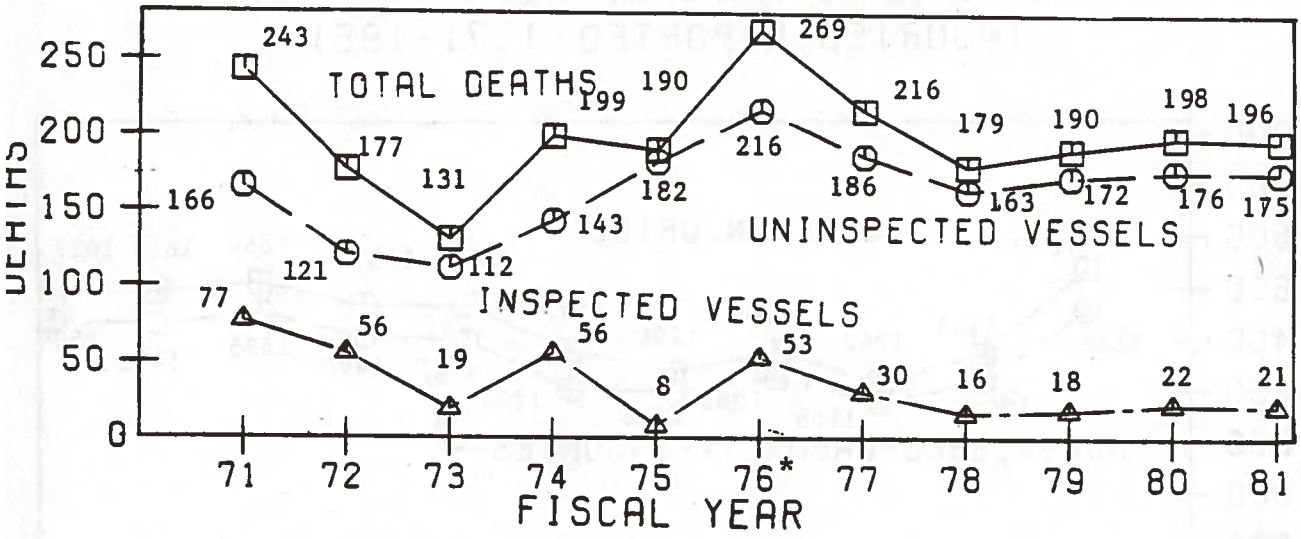
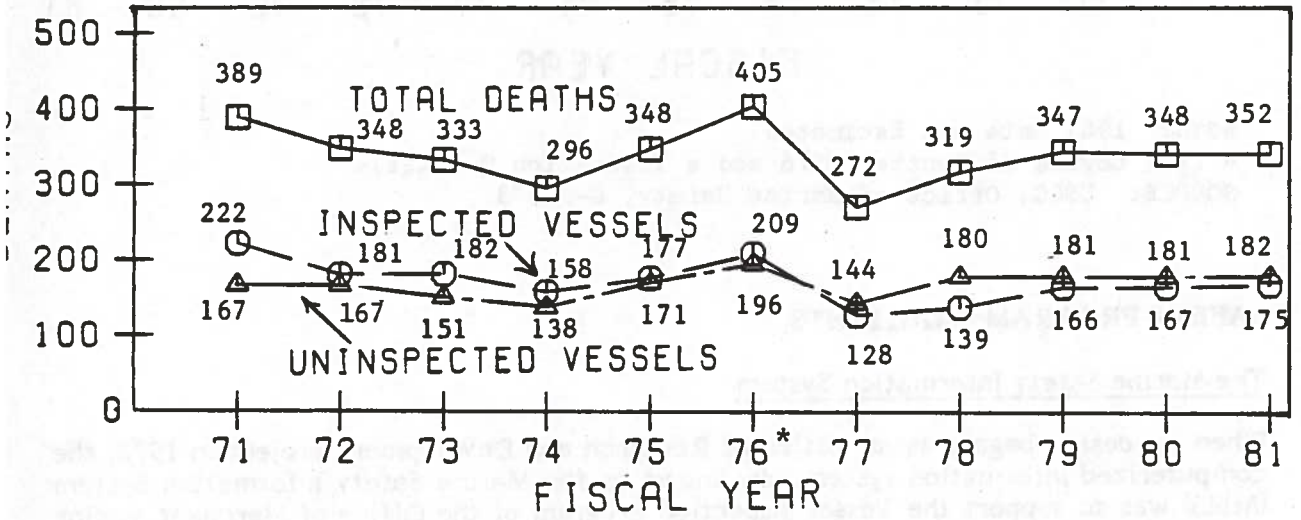


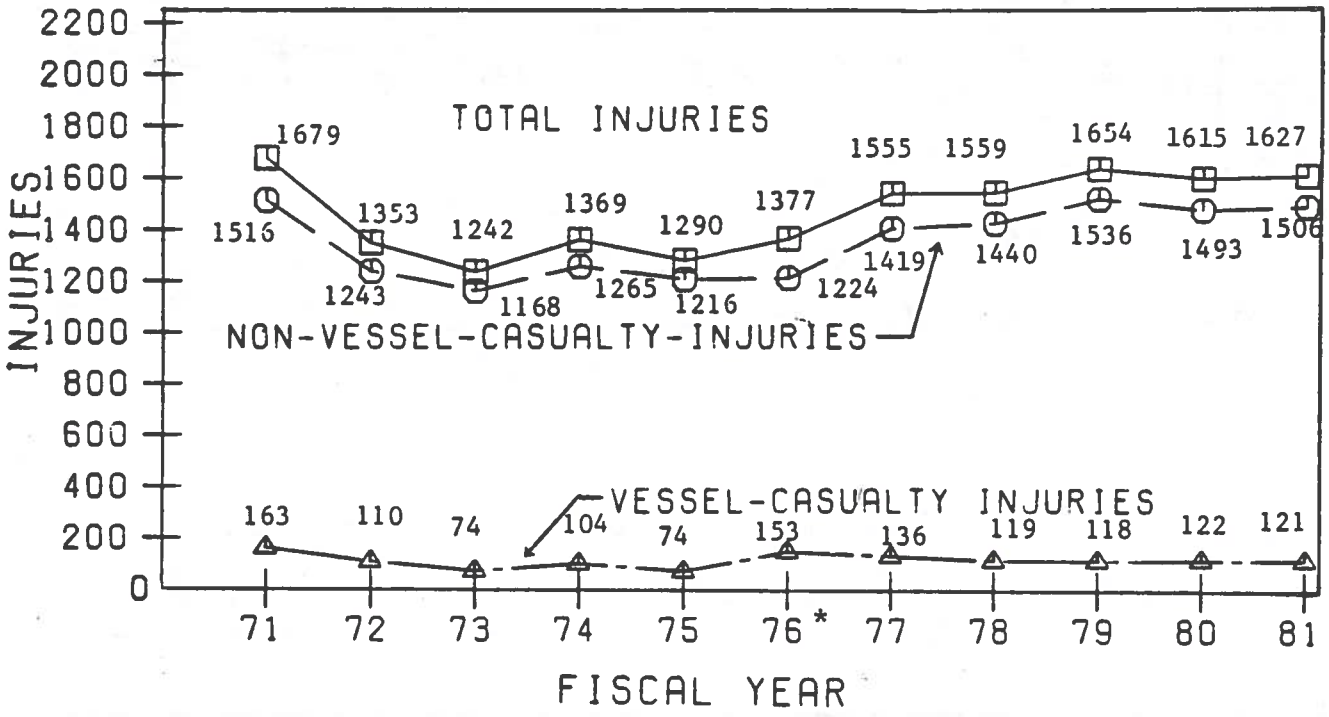
CHART 22. WATERBORNE TRANSPORTATION FATALITIES, NON VESSEL-CASUALTY-RELATED, 1971-1981



NOTE: 1981 Data are Estimated.
* FY76 Covers 15 Months (FY76 and a Transition Quarter).
SOURCE: USCG, Office of Marine Safety, G-MA/83.

CHART 23.

WATERBORNE TRANSPORTATION PERSONNEL
INJURIES REPORTED 1971-1981



NOTE: 1981 Data are Estimated.
* FY76 Covers 15 Months (FY76 and a Transition Quarter).
SOURCE: USCG, Office of Marine Safety, G-MA/83.

SAFETY PROGRAM HIGHLIGHTS

The Marine Safety Information System

When its design began, as an Office of Research and Development project in 1972, the computerized information system now known as the Marine Safety Information System (MSIS) was to support the Vessel Inspection Program of the Office of Merchant Marine Safety. Its purpose was to consolidate and make instantly available to all offices the complete history and characteristics of vessels under the scrutiny of the Vessel Inspection Program while eliminating the vast majority of paperwork associated with that program.

The design of the system has since been expanded to accomodate all responsibilities of Marine Safety Offices in one computerized data base. This brought the Office of Marine Environment and Systems into the project.

The cost of design and development has been relatively small. The prototype is nearing completion in the Eighth District, and is performing well using the contractor's equipment. Personnel in the Eighth are entering massive amounts of data regarding their "fleet" of inspected vessels into the system and the Office of Merchant Marine Safety is keeping inspection data current in the system for the remainder of the Coast Guard. Selection boards, supervised by the Office of the Comptroller, have completed their work, and funds have been allocated for the purchase of the computers, terminals, and the telecommunications network. The Office of Operations has begun implementation of an Operational Computer Center on Governors Island, a possible home for MSIS. The contractor has proposed a facilities management contract to move from the laboratory to a turnkey system.

If and when fully implemented, MSIS will be a great benefit to personnel who perform any of the functions in the area of marine safety, from field inspector - Coast Guard or otherwise - through analysts preparing reports for the Department, IMCO, or Congress.

All form letters will be automatically generated, properly addressed and ready for printing. All follow-ups or newly initiated activities by any other office will automatically be posted to any office's records. Many time-dependent actions will be tracked automatically, and a more thorough profile than ever before will be kept on any vessel, facility, involved party or class of vessel which comes under USCG purview in regard to Marine Safety activities.

MSIS will manage the information needed for efficient and effective execution of marine safety programs directed by law, treaty, executive order, Federal regulation, and policy. It will also provide the data for analysis to allow regulation and enforcement streamlining, thus making the marine safety programs less intrusive and more cost effective, while maintaining the same or higher degree of safety.

MSIS is now a collection of parts ready to be assembled. The Commandant has been convinced that the assembly of this system, as well as those which can follow, requires extraordinary cooperation of all Program Managers. This has resulted in "assembling" being identified as a separate "Program." Therefore the Office of Command, Control and Communications has been created and an MSIS project officer has been assigned.

Foreign Tank Vessel Examination Program

The U.S. Coast Guard expanded the scope of the tank vessel examination program in January 1977 with initial emphasis on the examination of cargo venting and handling systems and proper transfer procedures. The program includes an examination to ensure that each foreign flag vessel entering U.S. waters is in compliance with the general safety controls of SOLAS 60, the applicable international Load Line Convention, and all applicable U.S. regulations. The vessel's safety and pollution prevention equipment and operations must be proven satisfactorily to the United States.

In 1980, the U.S. Coast Guard examined 402 foreign tankers. The age distribution for the 414 tankers examined in 1981 is shown in Table 16. This distribution shows that 76% of the foreign tankers examined are 15 years old or younger; compared to 1980, this shows an increase of 10% towards a younger fleet of tankers visiting U.S. ports. The data in the table show that for tankers 15 years old or less, 27% are 5 years old or younger and 32% are between 11 and 15 years old.

TABLE 16. NUMBER OF TANKERS EXAMINED BY AGE

Age Class (yrs)	No. of Tankers	Percent
0-5	83	20.1
6-10	131	31.6
11-15	99	23.9
16-20	66	15.9
Other	35	8.5
1981 Total	414	100.0

TABLE 17. NUMBER OF TANKERS EXAMINED BY FLAG

Flag	No. of Tankers	Percent
Liberia	146	35.3
Greece	58	14.0
United Kingdom	32	7.7
Panama	39	9.4
Norway	37	8.9
Japan	13	3.1
Singapore	21	5.1
Italy	6	1.5
France	2	0.5
Germany	7	1.7
Other	53	12.8
1981 Total	414	100.0

The distribution of the number of tankers examined by flag is shown in Table 17. Compared to 1980, 12 additional tankers were examined in 1981. The proportion of tankers examined for each flag in 1981 was approximately the same as for 1980. About half of the tankers examined fly either a Liberian or Greek flag; the major portion of these being Liberian by a ratio of 2.5 to 1.

The United Kingdom, Panama and Norway comprised 26% of the tankers examined. The number of tankers involved for these flags were about evenly distributed.

These data show that about 75% of the tankers examined in 1980 and again in 1981 flew a Liberian, Greek, British, Panamanian or Norwegian flag. The distribution of the tanker examinations by flag are shown in Table 18. A total of 571 examinations were performed in 1981. This gives an average of 1.4 examinations per tanker as compared with 1980 which was an average of 1.3 examinations per tanker.

Liberia and Greek flags dominated the examination activity since 53% of the examinations involved either of these two flags. The United Kingdom, Panama and Norway flags involved 25% of the examinations.

Comparison of the distributions of examinations by flag for 1980 and 1981 shows that there was an increase of examination activity in 1981 for the United Kingdom and Panama.

TABLE 18. NUMBER OF EXAMINATIONS BY FLAG

Flag	No. of Examinations	Percent
Liberia	219	38.4
United Kingdom	39	6.8
Greece	81	14.2
Panama	60	10.5
Norway	43	7.5
Japan	16	2.8
Singapore	34	6.0
Italy	6	1.1
France	3	0.5
Germany	8	1.4
Other	62	10.8
1981 Total	571	100.0

The distribution of the number of deficiencies by flag in 1981 is shown in Table 19. A comparison of this distribution with the distribution obtained in 1980 shows there has been considerable improvement in the inspection results for both Liberia and Greek flag tankers. The opposite is true for tankers flying the Panamanian and United Kingdom flags; here there has been a degradation in performance since the proportion of deficiencies found on tankers flying these two flags doubled in 1981.

A more absolute comparison of performance by flag can be obtained by computing a rate based on the average number of deficiencies per examination for each flag. The rates computed for 1981 are shown in Table 20. A comparison of these rates with those for 1980 shows that the performance for those tankers flying the Liberian flag has improved from a rate which was above the average for all flags in 1980 to a rate which is below the average for 1981. This comparison also shows that the performance for Panama and Norway has degraded in 1981 so that their deficiency rate is above the group average.

TABLE 19. NUMBER OF DEFICIENCIES BY FLAG

Flag	No. of Deficiencies	Percent
Liberia	294	36.0
United Kingdom	49	6.0
Greece	125	15.3
Panama	89	10.9
Norway	71	8.7
Japan	19	2.3
Singapore	26	3.2
Italy	10	1.2
France	5	0.6
Germany	11	1.4
Other	118	14.4
1981 Total	817	100.0

In 1981 the deficiency rates for Greece, Panama, Norway, Italy and France were greater than the average rate for all tankers. Greece, Italy and France, also had a rate above the average in 1980.

TABLE 20. DEFICIENCY RATE BY FLAG

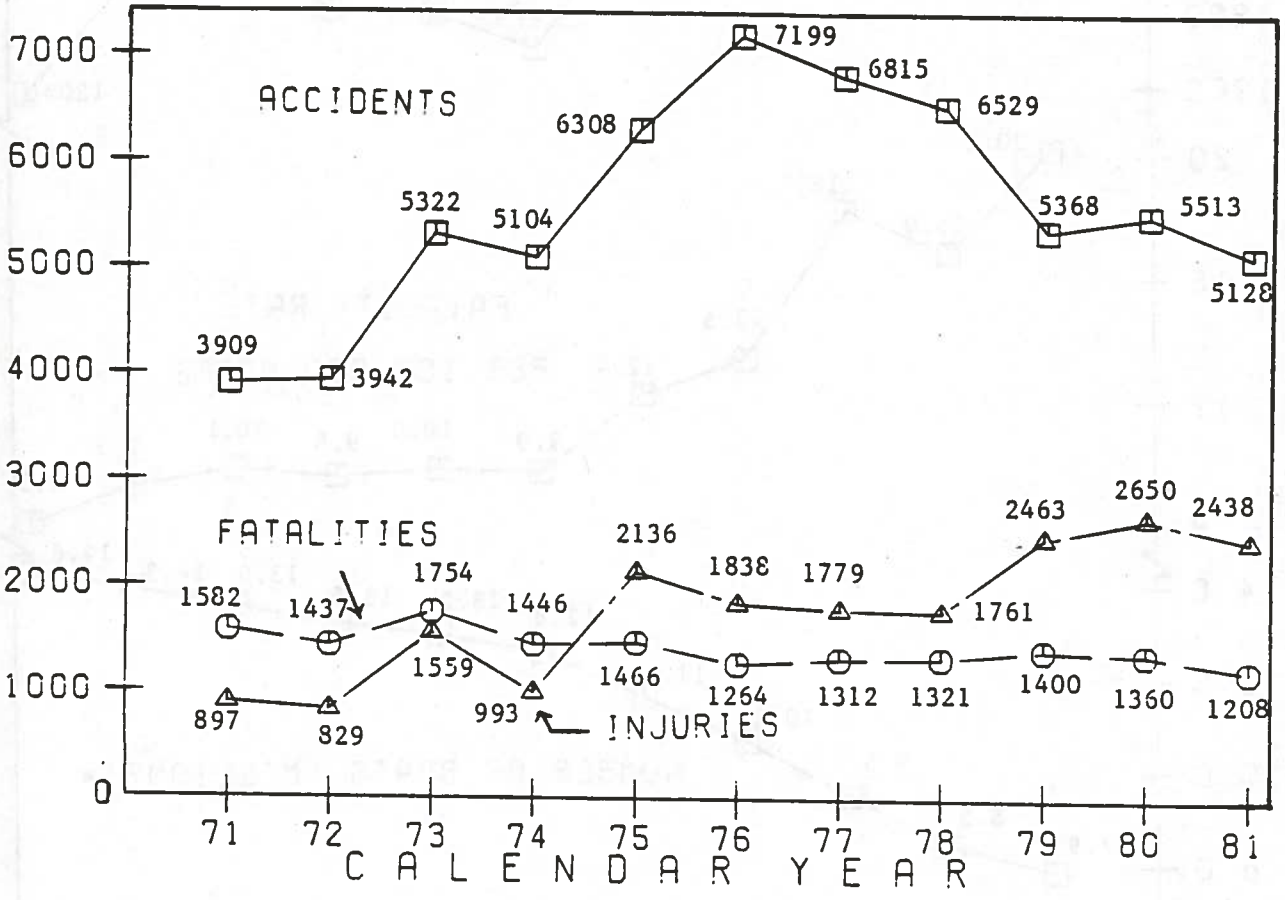
Flag	No. of Exams	No. of Def's.	Rate
Liberia	219	294	1.34
United Kingdom	39	49	1.26
Greece	81	125	1.54
Panama	60	89	1.48
Norway	43	71	1.65
Japan	16	19	1.19
Singapore	34	26	0.77
Italy	6	10	1.67
France	3	5	1.67
Germany	8	11	1.38
Other	62	118	1.90
1981 Total	571	817	1.43

RECREATIONAL BOATING

- A record low of 1208 fatalities was reported for Recreational Boating in 1981, a decrease of 11.2% from the 1360 fatalities in 1980.
- Fatality rates decreased from 9.5 per 100,000 boats in 1980 to a record low of 8.3 in 1981.
- Injuries and accidents also showed decreases of 8% and 7%, respectively, in 1981.

CHART 24.

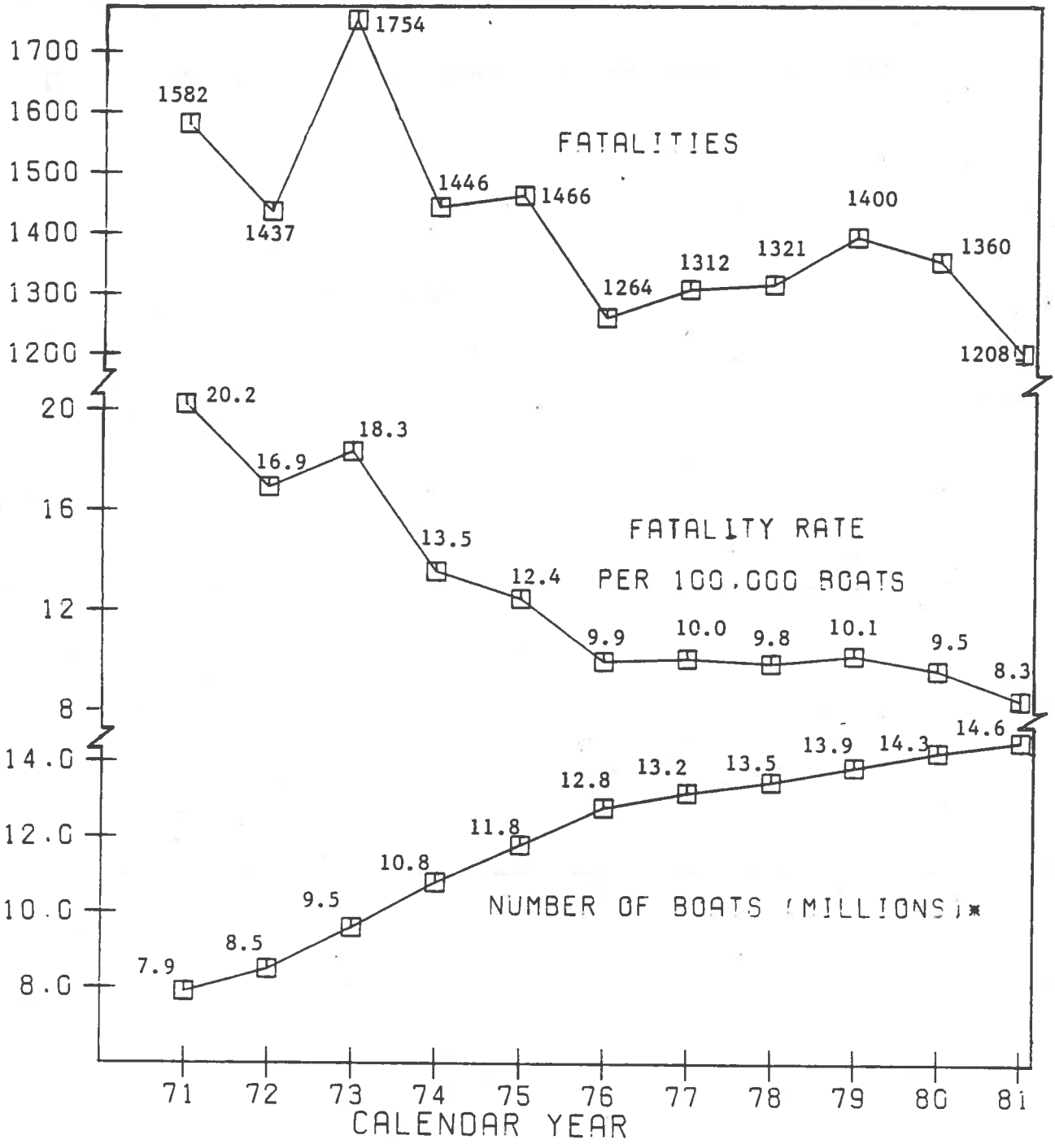
RECREATIONAL BOATING FATALITIES, INJURIES, AND ACCIDENTS, 1971-1981



SOURCE: USCG, Office of Public and Consumer Affairs, G-BP-1.

CHART 25.

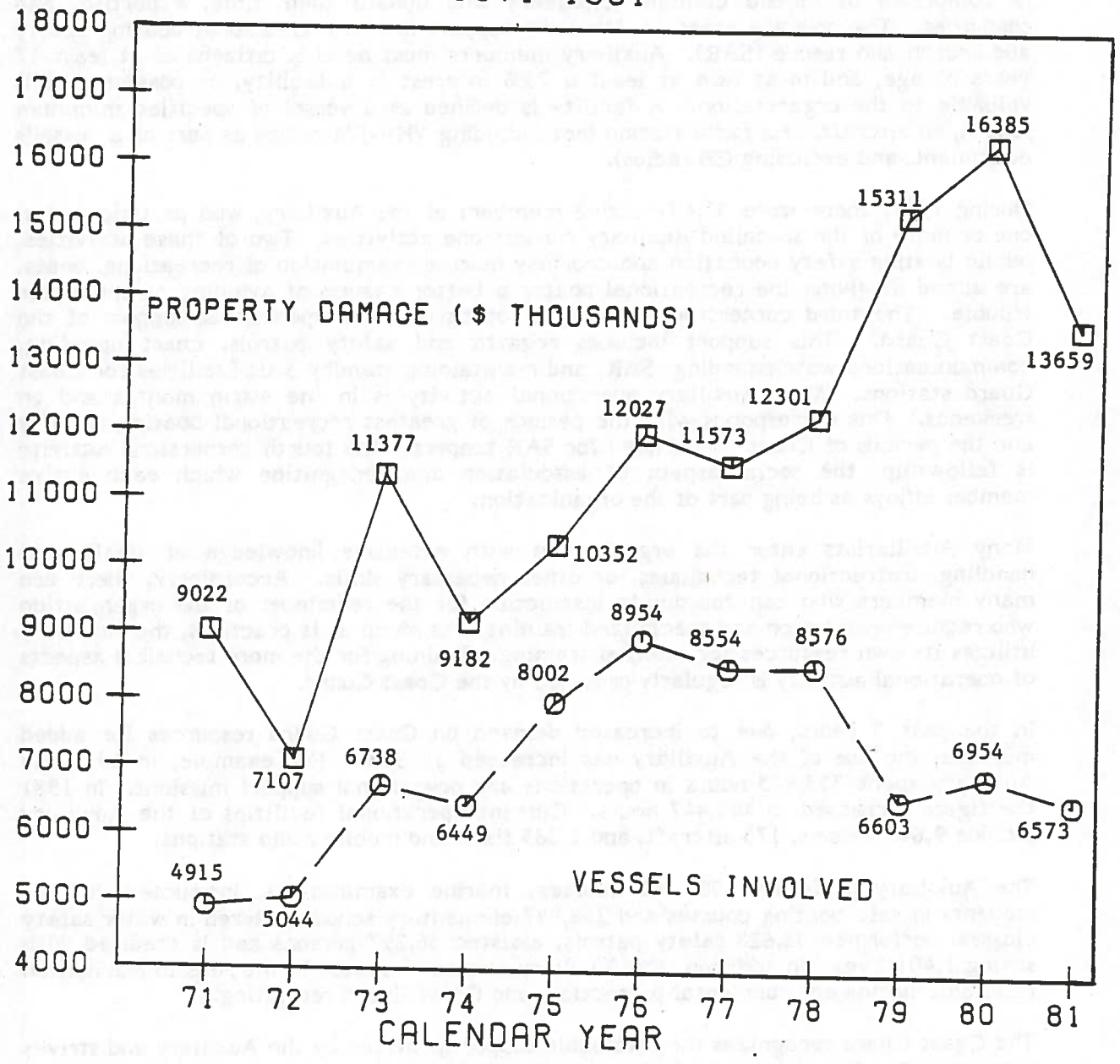
RECREATIONAL BOATING FATALITY RATES, 1971-1981



* The Total Number of Boats are Estimated by the USCG Each Year.
SOURCE: USCG, Office of Public and Consumer Affairs, G-BP-1.

CHART 26.

REPORTED PROPERTY DAMAGE AND VESSELS INVOLVED IN RECREATIONAL BOATING ACCIDENTS, 1971-1981



SOURCE: USCG, Office of Public and Consumer Affairs, G-BP-1.

SAFETY PROGRAM HIGHLIGHTS

Coast Guard Auxiliary

The Coast Guard Auxiliary is an organization chartered by Congress in 1939 for the purpose of supporting the missions of the United States Coast Guard. The organization is comprised of unpaid civilian volunteers who donate their time, expertise, and resources. The primary areas of Auxiliary support are in recreational boating safety and search and rescue (SAR). Auxiliary members must be U.S. citizens of at least 17 years of age, and must own at least a 25% interest in a facility, or possess a skill valuable to the organization. A facility is defined as a vessel of specified minimum length, an aircraft, or a radio station (not including VHF-FM radios as part of a vessel's equipment, and excluding CB radios).

During 1981, there were 35,454 active members of the Auxiliary, who participated in one or more of the so-called Auxiliary cornerstone activities. Two of these activities, public boating safety education and courtesy marine examination of recreational boats, are aimed at giving the recreational boater a better chance of avoiding on-the-water trouble. The third cornerstone activity is operations and operational support of the Coast Guard. This support includes regatta and safety patrols, chart updating, communications watchstanding, SAR, and maintaining standby SAR facilities for Coast Guard stations. Most Auxiliary operational activity is in the warm months and on weekends. This corresponds with the periods of greatest recreational boating activity and the periods of Coast Guard need for SAR support. The fourth cornerstone activity is fellowship, the social aspect of association and recognition which each active member enjoys as being part of the organization.

Many Auxiliarists enter the organization with extensive knowledge of small boat handling, instructional techniques, or other necessary skills. Accordingly, there are many members who can coordinate instruction for the remainder of the organization who require orientation and specialized training. As much as is practical, the Auxiliary utilizes its own resources for internal training. Training for the more technical aspects of operational activity is regularly provided by the Coast Guard.

In the past 5 years, due to increased demand on Coast Guard resources for added missions, the use of the Auxiliary has increased by 30%. For example, in 1977 the Auxiliary spent 353,675 hours in operations and operational support missions. In 1981 the figure increased to 444,447 hours. Current operational facilities of the Auxiliary include 9,648 vessels, 173 aircraft, and 1,285 fixed and mobile radio stations.

The Auxiliary performed 307,192 courtesy marine examinations, instructed 205,984 students in safe boating courses and 258,947 elementary school children in water safety classes, performed 38,628 safety patrols, assisted 56,297 persons and is credited with saving 1,401 lives. In addition, the Auxiliary also participated in the Aids to Navigation Program, marine environmental protection, and Coast Guard recruiting.

The Coast Guard recognizes the invaluable support provided by the Auxiliary and strives to support the organization in the services it provides.

Boating Safety is no Accident

There are approximately 63 million boaters and 14.6 million boats in the United States today. Given these figures, it is not surprising that boating accidents are a common occurrence. During 1981, there were more than 5128 reported boating accidents resulting in 1208 fatalities, 2438 injuries, and 14 million dollars in property damage.

What causes boating accidents? How can they be prevented? Here are the major types of accidents involving recreational boats, and what can be done about them.

CAPSIZING, SWAMPING, FLOODING and SINKING: About half of all small boat fatalities result from these types of accidents. If a boat is overloaded or there are high waves, even a slight shift in weight can precipitate disaster. Improper loading and overloading are the chief factors in capsizing. Boating accidents reported to the Coast Guard are full of instances in which a group of six or seven people set out in a boat that is designed to carry three people; one person moves, and the boat turns over.

COLLISION: Most boating injuries result from one craft striking another craft, a floating or fixed object, or a person. A primary reason for such collisions is that many boat operators do not watch where they are going and many do not know the "rules of the road".

FALLS OVERBOARD: This type of accident accounts for about 300 drownings every year. People slip while refueling, pulling up anchors, pulling in fish, shooting guns or just standing up. Many of these accidents can be prevented by heeding the simple rule: never stand up in a small boat.

UNSAFE BOATS: Although about one half of all boating fatalities are listed on the boating accident reports as "fault of operator," the mechanical condition of the boat may also be an underlying cause. Boats wear out and break down just like automobiles and many accidents are attributable to such malfunctions as stalled engines, broken steering cables, and fuel line problems. Boat operators should make thorough mechanical inspections of their craft before each trip and be especially careful when handling gasoline. One cupful of vaporized gasoline in a confined compartment has the explosive force of 15 sticks of dynamite.

UNUSED LIFESAVING DEVICES: The primary cause of drownings from boat accidents is failure to use lifesaving devices, known as personal flotation devices or "PFD's". These include buoyant vests, life preservers, buoyant cushions, and ring buoys. All children, invalids, the elderly and non-swimmers should wear PFD's on board and others should put them on at the slightest sign of emergency.

Although boating accidents differ in cause and kind, most are united by one common factor: ignorance. A Coast Guard survey indicated that 73.5 percent of all boaters never had any kind of formal boating safety education, and as with automobiles, alcohol is frequently a causal factor. It is estimated that alcoholic beverages are carried on approximately 40 percent of all boat outings.

The Coast Guard strives to reach the public to make recreational boating safer for all through its public safety messages, law enforcement activities, and education courses presented in conjunction with the Coast Guard Auxiliary. However, it is up to individual boaters to inform themselves, obey the law, and take personal responsibility for their actions on the water.

Hypothermia

During the past several years, a frequently studied phenomenon associated with cold-water accidents is the condition known as hypothermia. The human body is an electrochemical device which can function properly only within a very narrow internal temperature range centering on 37.6 degrees Celsius. Any increase, and the person has a fever. A few degrees' decrease and the person is hypothermic.

When the TITANIC went down, hundreds of people were found dead floating in their life jackets. The death certificates showed drowning, but the people were floating with their heads out of the water. Most probably did not drown, but died from hypothermia.

Hypothermia is not always easy to spot. Generally, one of the first symptoms is violent shivering, which is an attempt by the body to create heat by exercise. Mental disorientation is another symptom: the person may be forgetful or confused, exhibit personality changes, be unable to make decisions or make the wrong decisions. Hypothermia victims tend to be clumsy and lose manual dexterity and coordination. As the hypothermia deepens, shivering gives way to muscle spasms, muscle rigidity and loss of the use of arms and legs. In the most advanced stages the victim appears drunk or drugged, loses consciousness, and finally appears dead. Unless steps are taken to stop and reverse the hypothermia, the victim dies.

Hypothermia may be separated into two broad categories: chronic (slow-onset) hypothermia and acute (rapid-onset) hypothermia. Chronic hypothermia usually results from exposure to cold weather for a few hours to several days. It generally is caused by inadequate preparation and an overestimation of one's ability to withstand cold. Acute hypothermia is generally associated with immersion in cold water. Depending on water temperatures and other conditions acute hypothermia can develop in as little as 10 to 15 minutes or take several hours.

In most cases, the phenomena associated with cold water accidents are not separate and distinct. A drowning victim may be hypothermic, or a hypothermia victim may drown. For many years, it has been thought that a drowning victim who has been in the water for more than five minutes has suffered irreversible brain damage. Research and rescue cases have shown this to be wrong, expecially when the accident takes place in cold water. Drowning and hypothermia victims who have been immersed for up to an hour should be treated as rescues.

The Coast Guard is very much aware of problems associated with hypothermia and has participated in much research. Some results of that effort can be seen in a Coast Guard sponsored slide show and two booklets which are available to the public for boating safety education.

Solid Propellant Inflator for PFD's

The Coast Guard received the final report on a contracted research and development project examining a solid propellant inflator (SPI) system for personal flotation devices (PFD's) for possible use by passengers on recreational boats. The purpose of the project was to indicate whether inflatable PFD's could be made more reliable, and because of their greater likelihood of being worn, offer their users safety equivalent to presently approved, inherently buoyant types. Inflatable PFD's are not presently approved by the Coast Guard.

The conventional method of inflating inflatable PFD's is a carbon dioxide cartridge system. This method of inflating PFD's has left serious questions about reliability unanswered. Problems of the carbon dioxide gas cylinder inflator system include the slow discharge of gas in a cold environment, undetected gas leakage over long term periods of storage and the inability to determine if the gas cartridge has been previously fired without removing the cylinder for visual inspection. Conversely, the SPI inflator system offers rapid and reliable inflation in temperature zones outside those of the conventional carbon dioxide system, is uncomplicated in construction and has the same operational simplicity.

The technology for a SPI system for PFD's is a direct result of research and development performed for aircraft escape slides and automobile passive restraint (airbags) systems. Special testing for using the SPI system for PFD's included random vibration, humidity, salt fog, and temperature cycling.

The Coast Guard is continuing to evaluate this type of inflation method and will thoroughly analyze all aspects of this and other PFD systems before any determinations are made on the approval of inflatable PFD's for users of recreational boats.

MATERIALS TRANSPORT

PIPELINES

- The number of gas and liquid pipeline fatalities rose from 14 in 1980 to 22 in 1981. Gas pipeline fatalities were 17, while liquid pipeline fatalities totaled 5 in 1981.

- The number of reported gas pipeline leaks/failures decreased from 1,996 in 1980 to 1,695 in 1981, a drop of 15%. Liquid pipeline leaks/failures rose from 219 in 1980 to 239 in 1981.

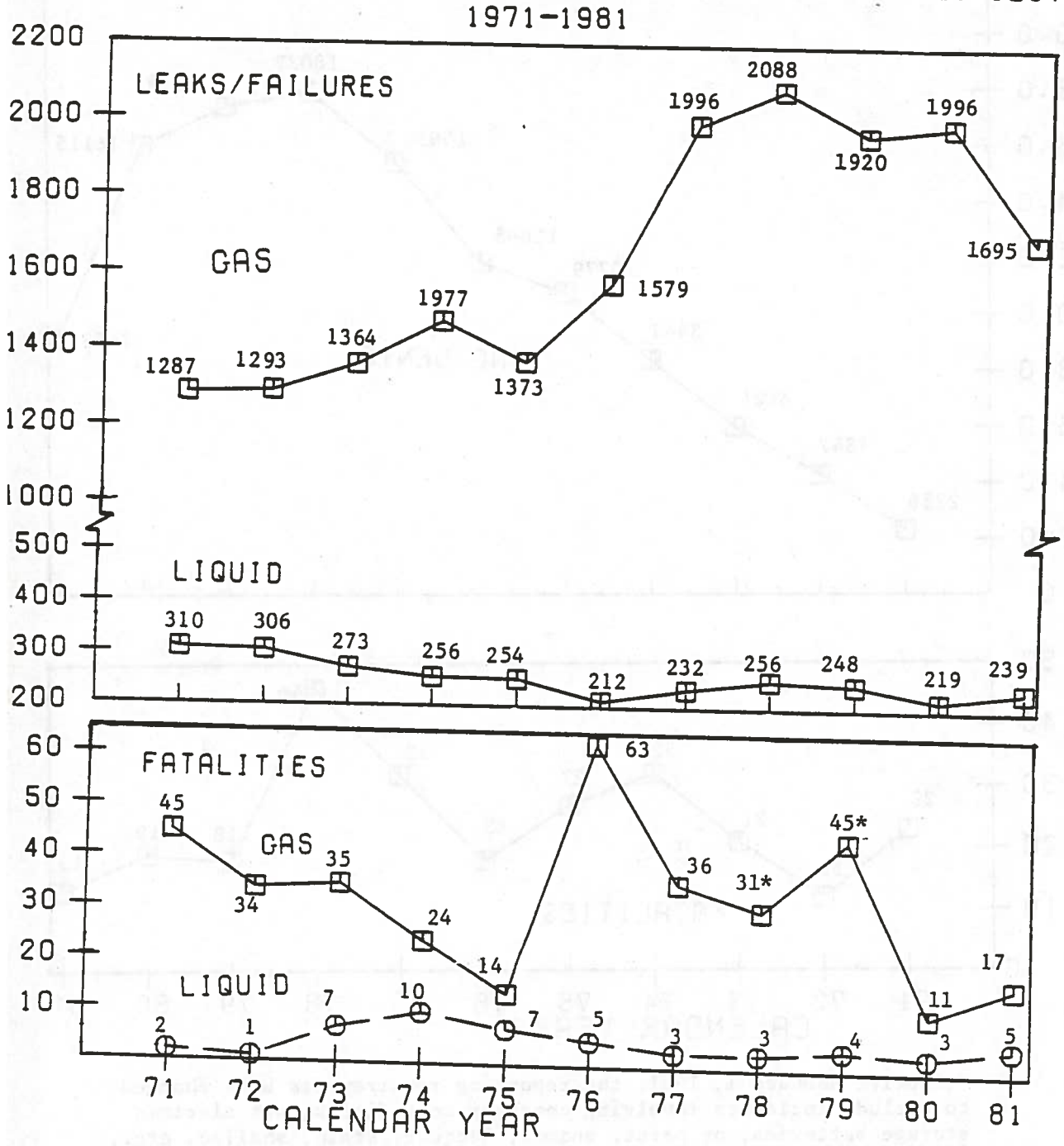
HAZARDOUS MATERIALS

- Hazardous Materials incidents reported declined from 16,115 in 1980 to 9,163 in 1981. Changes in reporting requirements, effective January 1, 1981, exclude, with some exceptions, incidents involving consumer comodities, wet storage batteries, or paint, enamel, lacquer, stain, shellac, etc., in packaging of five gallons or less.

- Hazardous Materials related fatalities declined from 19 in 1980 to 13 in 1981.

CHART 27.

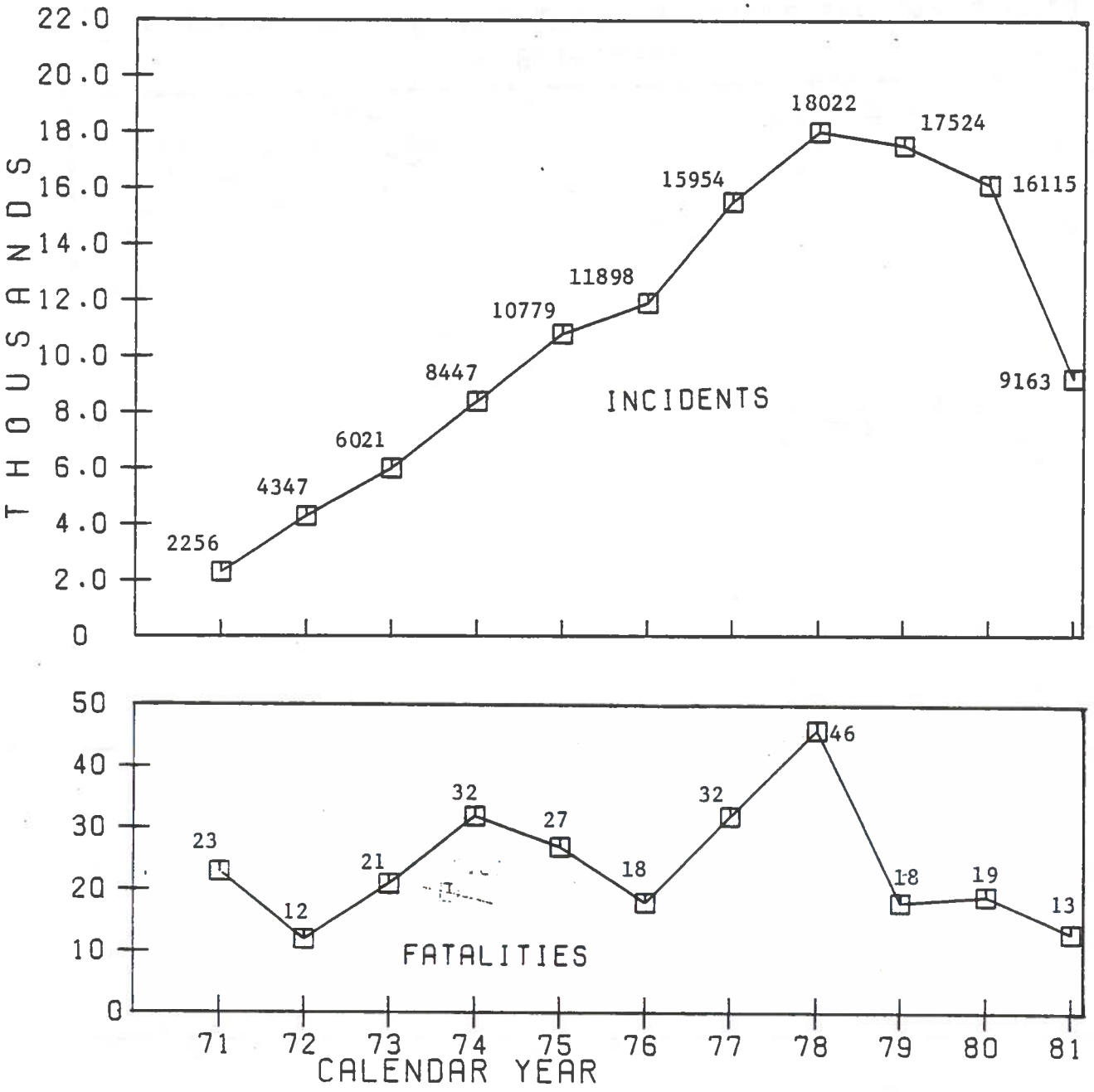
LIQUID AND GAS PIPELINE LEAKS/FAILURES AND FATALITIES, 1971-1981



* Includes preliminary notification of Pipeline leaks via telephonic reports.

SOURCE: Liquid Pipeline: DOT F7000-1 Pipeline carrier accident report.
Gas Pipeline: DOT F7100.1, F7100.2 and telephone reports.
RSPA, DPB-21.

CHART 28.
HAZARDOUS MATERIALS
INCIDENTS AND FATALITIES, 1971-1981*

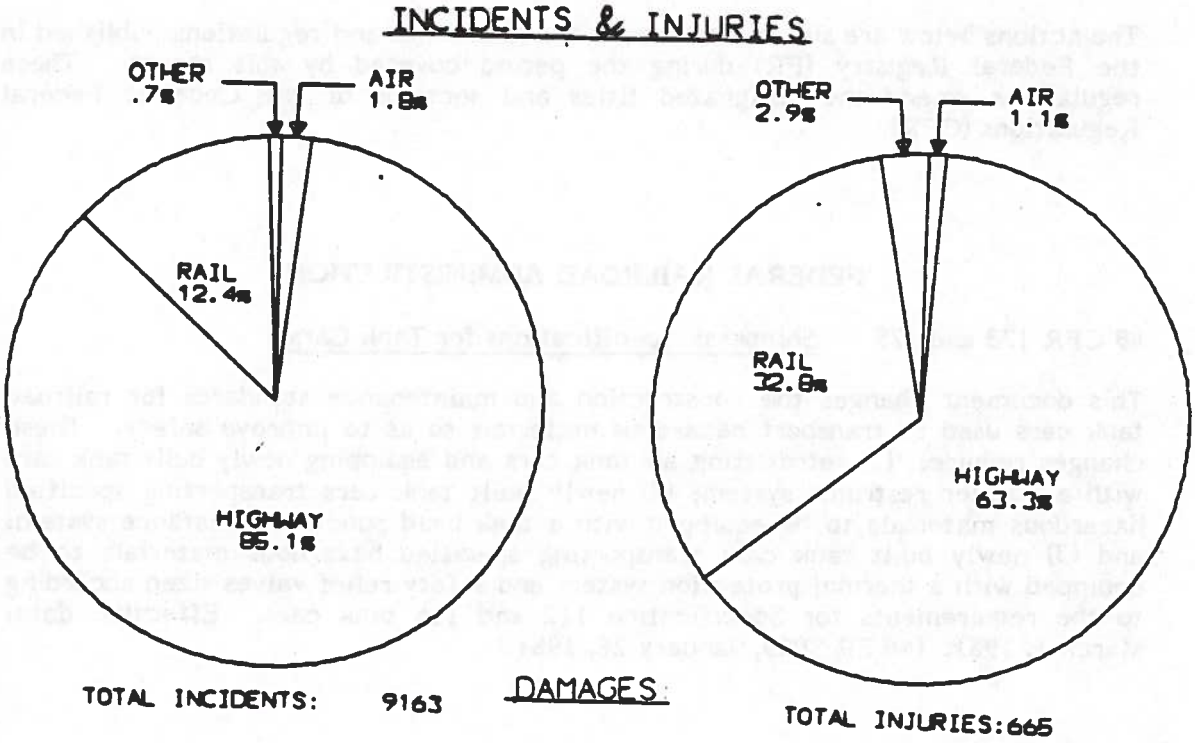


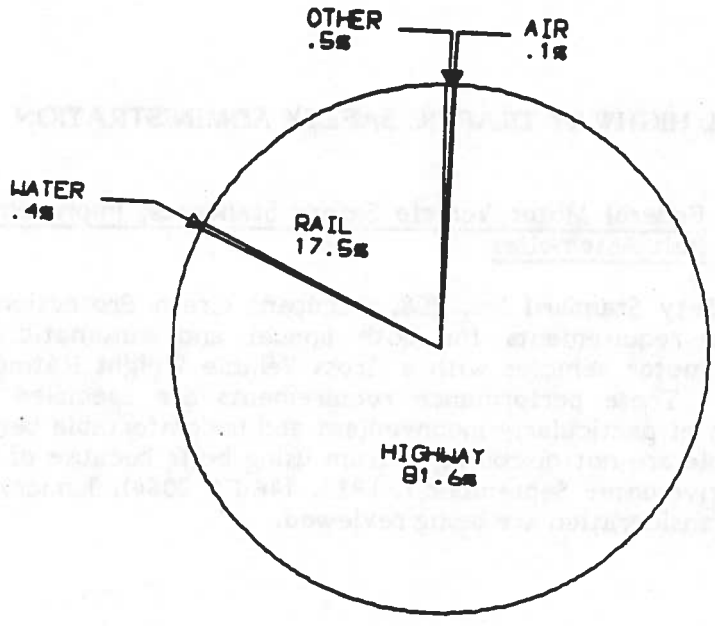
* Effective January 1, 1981, the reporting requirements were changed to exclude incidents involving consumer commodities, wet electric storage batteries, or paint, enamel, lacquer, stain, shellac, etc., in packaging of 5 gallons or smaller unless the incident results in death, injury or property damage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

SOURCE: RSPA, DPB-21.

CHART 29.

HAZARDOUS MATERIALS INCIDENTS, INJURIES, AND DAMAGES BY MODE, 1981





SOURCE: RSPA,DPB-21.

MAJOR DOT SAFETY REGULATIONS

Jan. 1, 1981 - Dec. 31, 1981

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

FEDERAL RAILROAD ADMINISTRATION

49 CFR 173 and 179 Shippers: Specifications for Tank Cars

This document changes the construction and maintenance standards for railroad tank cars used to transport hazardous materials so as to improve safety. These changes require: (1) retrofitting all tank cars and equipping newly built tank cars with a coupler restraint system; (2) newly built tank cars transporting specified hazardous materials to be equipped with a tank head puncture resistance system; and (3) newly built tank cars transporting specified hazardous materials to be equipped with a thermal protection system and safety relief valves sized according to the requirements for Specification 112 and 114 tank cars. Effective date: March 1, 1981. (46 FR 8005, January 26, 1981.)

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

49 CFR Part 571 Federal Motor Vehicle Safety Standards; Improvement of Seat Belt Assemblies

This notice amends Safety Standard No. 208, Occupant Crash Protection, to specify additional performance requirements for both annual and automatic safety belt assemblies installed in motor vehicles with a Gross Vehicle Weight Rating (GVWR) of 10,000 pounds or less. These performance requirements are specified in order to prevent the installation of particularly inconvenient and uncomfortable belt assemblies and to ensure that people are not discouraged from using belts because of their design or performance. Effective date: September 1, 1983. (46 FR 2064), January 8, 1981)
Note: Petitions for reconsideration are being reviewed.

FEDERAL AVIATION ADMINISTRATION

14 CFR Part 21 — Type Certification Procedures for Gliders

This amendment provides a revision to the procedural rules for the type certification of gliders (including sailplanes) to permit equivalency findings with respect to the applicable airworthiness standards as is now permitted in the type certification of other aircraft. These procedural rules would also be applicable to the type certification of fixed-wing, self-launching (powered) gliders. This updating of the Federal Aviation Regulations eliminates an inconsistency in the regulations and, without any derogation of safety, an unnecessary economic burden which was previously imposed on this segment of sport aviation. (46 FR 3494 January 15, 1981.)

14 CFR Parts 121, 135 — Proposed Elimination of Duties and Activities of Flight Crewmembers Not Required for Safe Operation of Aircraft

These amendments prohibit performance of nonessential duties and activities by flight crewmembers during critical phases of flight which are not required for the safe operation of aircraft. Non-essential flight crewmember duties and activities can create distractions in flightcrew compartment. These amendments require aircraft operators and flight crewmembers to assure an environment in the flightcrew compartment that is free from such potentially dangerous distractions. (46 FR 32863 June 25, 1981.)

14 CFR Part 135 — Pilot in Command Qualifications and Instrument Proficiency Check Requirements

Part 135, effective December 1, 1978, required all pilots in command to hold instrument ratings. It also required pilots to satisfactorily demonstrate instrument approach procedures using certain navigational facilities. These requirements are unduly restrictive for some certificate holders. This amendment provides that pilots are not required to hold instrument ratings when operating in day, visual flight rule conditions in certain isolated areas when conducting air taxi or commercial operations. It also provides that only those instrument procedures which the certificate holder desires to be used are required to be demonstrated. This amendment reduces burdens on certain air taxi and commercial operators and is consistent with Executive Order 12291 and the Regulatory Flexibility Act. (46 FR 30967 June 11, 1981.)

14 CFR Part 21 — Special Flight Permits

This amendment extends the eligibility for special flight permits with continuing authorization to all aircraft operated under Part 135 that are maintained under continuous airworthiness maintenance programs. This action further implements the recent major change to Part 135 which requires certain aircraft to be maintained under continuous airworthiness maintenance programs and grants to Part 135 operators the same benefits already accorded to certificate holders under Parts 121 and 127. Under the amended rule, operators of affected aircraft under Part 135 will be relieved of many economic burdens associated with excessive maintenance downtime and of administrative burdens imposed by the prior requirements for individual flight permits or regulatory exemptions. This regulatory change is in full accord with Executive Order 12291 in reducing the burden of existing and future regulations. (46 FR 37876 July 23, 1981.)

14 CFR Part 121 Emergency Evacuation Demonstration

This amendment allows a Part 121 certificate holder to use the results of a successful emergency evacuation demonstration conducted either by a manufacturer under Part 25 or by another Part 121 certificate holder and to conduct a partial demonstration of emergency evacuation procedures, if certain conditions are met. This amendment reduces the number of demonstrations, reduces the exposure to injury of participants required in those demonstrations, and still maintains the highest level of safety in air transportation. In addition, it reduces burdens on air carrier certificate holders and, therefore, is consistent with Executive Order 12291 and the Regulatory Flexibility Act. (46 FR 61450 December 17, 1981.)

14 CFR Parts 107, 108, 121, 129, 135 Airplane and Airport Operator Security Rules

As a result of changes in the aviation industry, there are an increased number of passenger-carrying aircraft which are subject to the threat of criminal violence and air piracy against both scheduled and public charter U.S. air carrier and foreign air carrier operations. In order to ensure the required level of security, this rule extends FAA security regulations, already applicable to domestic air carriers, to certain air taxi operators and small airplane operations conducted by U.S. and foreign air carriers. This rule also consolidates and simplifies existing security regulations into a new Part of the Federal Aviation Regulations, thus facilitating public access to aviation security regulations. (46 FR 3782 January 15, 1981.)

14 CFR Parts 121, 127, 135, 145 Extend the Effectivity of Special Federal Aviation Regulation 36 (Development of Major Repair Data)

This amendment extends the effectivity of Special Federal Aviation Regulation (SFAR) No. 36 which provides that repair stations, air carriers, air taxis, and commercial operators of large aircraft may accomplish major repairs using self-developed repair data which have not been specifically approved by the FAA. On September 2, 1981, a determination was made to take rulemaking action to consolidate certain authorizations along with those issued under SFAR 36 into Part 183. To allow time for completion of that rule change, it was necessary to extend the effectivity of SFAR 36 for an additional 2 years to January 23, 1984. (46 FR 58651 December 3, 1981.)

14 CFR Part 21 Export Airworthiness Approvals

This amendment provides for the issuance of special export certificates of airworthiness for restricted category aircraft. As amended, the rule now permits an exporter to obtain such a certificate for a restricted category aircraft under the same procedures and with the same privileges applicable to aircraft under the same procedures and with the same priviliges applicable to exporters of restricted category aircraft. This amendment facilitates foreign sale demonstration tours and gives potential for increased export sales. Under the new rule, upon the sale of an aircraft in a foreign country, exporters will be relieved of any costs associated with having to return the aircraft to the United States or applying to an overseas FAA office to obtain an export certificate of airworthiness or, alternatively, having to seek relief via the exemption process. This amendment is in response to the petition of a manufacturer who cites the burden imposed upon it and persons similarly situated under the preexisting rule. By easing the burden imposed on exporters of U.S.-manufactured restricted category aircraft, the revised rule is in full accord with Executive Order 12291. (46 FR 44735 September 8, 1981.)

14 CFR Parts 121, 125, 135 Pilot Heat Indication Systems

These amendments relieve general aviation operators of transport category airplanes that are operated under Part 91 from the requirement to install pilot heat indication systems to indicate to the flightcrew when the pilot heating system is not operating. The amendments are based on a study which indicates that there have not been any general aviation transport category airplane accidents that could be attributed to a pilot heating system failure. The rule change is also in response to a petition for rulemaking dated January 26, 1979, from the National Business Aircraft Association (NBAA). (46 FR 43804 August 31, 1981.)

14 CFR Part 121 Exclusive-Use Requirements: Supplemental Air Carriers and Commercial Operators

This amendment deletes the provisions in S 121.155 of the Federal Aviation Regulations that a supplemental air carrier or commercial operator may not use any aircraft that it does not have the sole possession, control, and use of for flight for at least 6 months. This updating of the Federal Aviation Regulations eliminates, without any derogation in safety, an unnecessary economic burden which the present rule imposes on this segment of aviation. (46 FR 35611 July 9, 1981.)

14 CFR Part 121 Carry-on Baggage: Flexible Travel Canes

This amendment provides special rules for the storage of flexible travel canes used by blind passengers. Under current regulations, these canes must be placed in storage bins which are not readily accessible to blind passengers. This amendment provides methods by which flexible travel canes may be stored safely within reach of blind passengers. The amendment further provides that the certificate holder must make available to the public any procedure it establishes relating to the air carriage of persons who may need evacuation assistance. The amendment is necessary since some passengers have experienced difficulty in determining what procedures apply to their use of air transportaion. This amendment provides that certificate holders must make such procedures available to the public at airports which the certificate holder serves. (46 FR 38048 July 23, 1981.)

14 CFR Part 45 Size of Registration Marks

The amendments require the display of registration marks, N-numbers, at least 12 inches high on certain fixed-wing aircraft in place of the smaller marks previously allowed by Federal Aviation Regulations. The amendments are needed to provide better visual identification of those aircraft. The rule is intended to improve air traffic flow at airports, discourage violations, and improve enforcement of Federal Aviation Regulations regarding low-flying aircraft. To avoid undue cost of compliance to aircraft owners and manufacturers, an aircraft displaying small marks before the effective date of the amendments and aircraft manufactured after November 2, 1981, but before January 1, 1983, will be allowed to continue to display those marks until the aircraft is repainted or the marks are restored, repainted, or changed. These amendments do not change existing rules on the use of special marking procedures for: 1) small aircraft used for exhibition purposes; 2) small aircraft built at least 30 years ago; 3) unusually configured aircraft; and 4) aircraft issued an experimental certificate for operating as either exhibition or amateur-built aircraft. (46 FR 48600 October 1, 1981.)

Boeing Model 707/720 Airplanes

This amendment, which was previously issued in telegraphic form, requires a one time visual inspection of the wing station 733 production brake rib lower outboard and inboard chord for cracks and repair, as necessary, on Boeing Model 707/720 airplanes. The AD is necessary to prevent loss of structural integrity of the outboard wing, which could result in loss of the outboard wing panel. Effective date: May 18, 1981.

Lockheed-California Model L-1011 Airplanes

This amendment requires inspection of the Lockheed L-1011 airplane main landing gear wheels for cracks in the wheel bead seat radius area, and replacement if cracks are found. The AD is necessary to prevent wheel failure, which could result in structural damage and possible decompression. Effective date: April 15, 1981.

McDonnell Douglas Model DC-9-81 Airplanes

This amendment, which was previously issued in telegraphic form, requires disengagement of the autothrottle during approach prior to reaching 50 feet AGL, placarding each aircraft with disengagement instructions, and amendment to the FAA Approved Flight Manual on McDonnell Douglas Model DC-9-81 airplanes. The AD is necessary to prevent unscheduled deployment of thrust reversers during approach prior to touchdown. Effective date: May 14, 1981.

McDonnell Douglas Model DC-9-80 Airplanes

This amendment requires inspection and modification of the wing slat drive mechanism for incorrectly installed parts on the McDonnell Douglas Model DC-9-80 Airplanes. The AD is necessary because improperly installed components could result in excessive loads on the slat drive cylinders which may cause slat malfunction and potential inflight controllability problems. Effective date: November 5, 1981.

Beech Model 99, 99A, A99A, A99 and B99 Airplanes

This amendment requires deletion of the Minimum Equipment List (MEL) and Configuration Deviation List (CDL) from the FAA Approved Flight Manual (AFM) and insertion of a new document entitled Kinds of Operating Equipment List (KOEL) on Beech Model 99, 99A, A99A, A99 and B99 airplanes. The new list cites the kinds of operations for which the airplanes were type certificated and lists of systems and equipment that must be installed and operable for each kind of operation. Effective date: December 2, 1981, later extended to February 16, 1982.

Sikorsky S-76A Helicopters

This amendment, which supersedes an earlier AD, requires replacement of the main rotor blade tip plate retention bolts and subsequent torque inspections on Sikorsky S-76A helicopters. The AD is necessary to prevent loss of the tip plate and tip cap, resulting in loss of the main rotor blade. Effective date: May 7, 1981.

Gates Learjet Models 24E/F and 25 D/F Airplanes

This amendment requires installation of an improved pitch trim actuator, trim-in-motion warning, redesigned pitch axis master interrupt, autopilot roll monitor, and several other associated alterations, adds Airplane Flight Manual (AFM) procedures for the above changes, and sets forth certain operational limitations until the flight control systems have been further tested and modified on Gates Learjet Models 24 E/F and 25 D/F airplanes. The AD is necessary to provide limitations for the safe operation of the airplane and to reduce the possibility of an unsafe condition resulting from a system's malfunction. Effective date: July 31, 1981, later extended to May 31, 1982.

General Electric Model CF6-6 Series Engines

This amendment reduces the life limits of certain low pressure turbine rotor stage 2 disks. The AD is necessary to prevent possible low cycle fatigue failures. Effective date: August 21, 1981.

McDonnell Douglas Model DC-9 and Military C-9 Airplanes

This amendment requires inspection and repair, as necessary, of the wing rear spar lower "tee" caps located near the inboard flap hinge fitting station XRS 164.00, on McDonnell Douglas Model DC-9 and Military C-9 Airplanes. The AD is necessary to detect and repair cracks which could result in loss of structural integrity of the spar lower "tee" cap and resulting loss of spar strength. Effective date: June 25, 1981.

GLOSSARY

HIGHWAY

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

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

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

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

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

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

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

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

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

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

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

RAIL AND RAIL RAPID TRANSIT

Rail/Highway Grade-Crossing - is a location where one or more railroad tracks cross a public highway, road, or street or a private roadway at grade, including sidewalks and pathways at, or associated with, the crossing.

Rail Equipment Accident - is a collision, derailment, fire, explosion, act of God, or other event involving operation of railroad on-track equipment which, while it does not necessarily result in a reportable death, injury, or illness, results in more than $2,900 in damages to railroad on-track equipment, signals, track, track structures, or roadbed. Prior to 1979, this threshold stood at $2,300; prior to 1977, at $1,750; and prior to 1975, at $750.

Rail/Highway Grade-Crossing Accident/Incident - is any impact between

railroad on-track equipment and an automobile, bus, truck, motorcycle, bicycle, farm vehicle, or pedestrian, at a rail/highway grade crossing.

Train Incident - is a collision, derailment, fire, explosion, act of God, or other event involving operation of railroad on-track equipment, which results in a reportable death, injury, or illness, but involves less than $2,900 in damages to railroad on-track equipment, signals, track, track structures, or roadbed. Prior to 1979, this threshold stood at $2,300; prior to 1977, at $1,750; and prior to 1975, at $750.

Nontrain Incident - is any event arising from the operation of a railroad, but not from the movement of equipment, which results in a reportable death, injury or illness.

Fatality -

(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;

Injury -

(1) Injury to any person other than a railroad employee that requires medical treatment;

(2) Injury to a railroad employee that requires medical treatment or results in restriction of work or motion for one or more workdays, one or more lost workdays, termination of employment, transfer to another job, or loss of consciousness; or

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

Nontrespassers - are persons who are lawfully on that part of railroad property which is used in railroad operation and persons adjacent to railroad premises and injured as the result of the operation of a railroad.

Trespassers - are persons who are on that part of railroad property used in railroad operation, and whose presence is prohibited, forbidden, or unlawful. A person on a rail-highway grade crossing is classified as a trespasser if the crossing is protected by gates or other similar barriers which were closed when the person entered the crossing. He is also a trespasser if he attempts to pass over or under trains or cars at the crossings.

WATERBORNE TRANSPORTATION

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

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

a. Actual physical damage to property in excess of $1500.

b. Material damage affecting the sea-worthiness 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.

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

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

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

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

RECREATIONAL BOATING

Accident - occurrences involving recreational vessels or their equipment are required to be reported whenever they result in any of the following:

a. A death;

b. A person is injured and requires medical treatment beyond first aid;

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.

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

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

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

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

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.

General Aviation - refers to all civil aircraft operations except those classified as air carrier operations.

General Aviation Flying:

- Personal - any use of an aircraft for personal purposes not associated with business or profession, and not for hire. This includes maintenance of pilot proficiency.
- Business - any use of an aircraft, not for compensation or hire, by an individual for the purposes of transporation required by a business in which he is engaged.
- Commuter operator - any operator who performs, pursuant to published schedule, at least five round trips per week between two or more points, or carries mail on contract.
- Executive - any use of an aircraft by a corporation, a company or other organization for the purposes of transporting its employees and/or property not for compensation or hire and employing professional pilots for the operation of the aircraft.
- Air Taxi - any use of an aircraft by the holder of an air taxi operating certificate which is authorized by that certificate.
- Instructional - any use of an aircraft for the purposes of formal flight instruction with or without the flight instructor aboard.
- Aerial Application - any use of an aircraft in agriculture to discharge material in flight and to perform activities such as antifrost agitation, agitating fruit trees, chasing birds from crops, checking crops, restocking of fish, animal and other wildlife, etc.
- Other - any use of an aircraft not specified in the preceding uses. It includes research and development, demonstration, sport parachuting, ferry flight, and industrial/special.

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.

Fatal Injury - is any injury which results in death within 7 days of the accident.

Serious injury - an injury on an Air Carrier which:

(1) requires hospitalization for more than 48 hours commencing within 7 days from the date when the injury was received;

(2) results in a fracture of any bone except fractures of fingers, toes, or nose;

(3) involves a laceration which causes a severe hemorrhage, nerve, tendon, or muscle damage;

(4) involves injury to any external organ; and

(5) involves second or third degree burns or any burn affecting more than 50 percent of the body surface.

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 ft. 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 ft. 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.

PIPELINES

Gas Distribution - refers to pipelines transporting natural gas, flammable gas, or gas which is toxic or corrosive in distribution operations. (Injury, fatality, or accident definitions as shown under "Gas Transmission" below.)

Gas Transmission - refers to pipelines transporting natural gas, flammable gas, or gas which is toxic or corrosive in transmission or gathering operations.

- Injury - refers to an injury involving lost time or other than onsite medical treatment.
- Fatality - is a death resulting from the failure or escape of gas.
- Accident - is a leak requiring immediate repair or other emergency action.

Liquid Transmission - refers to pipelines carrying hazardous material, petroleum, and petroleum products in liquid form.

- Injury - refers to an injury requiring medical treatment other than onsite first aid.
- Fatality - is a death resulting form the escape of liquid.
- Accident - is a release of the commodity transported as presented in 49 CFR Section 195.50.

HAZARDOUS MATERIALS

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

Fatality - the information received indicated that the death was due to the hazardous material involved.

Injury - the information received indicated that the injury required professional medical treatment and was due to the hazardous material involved.