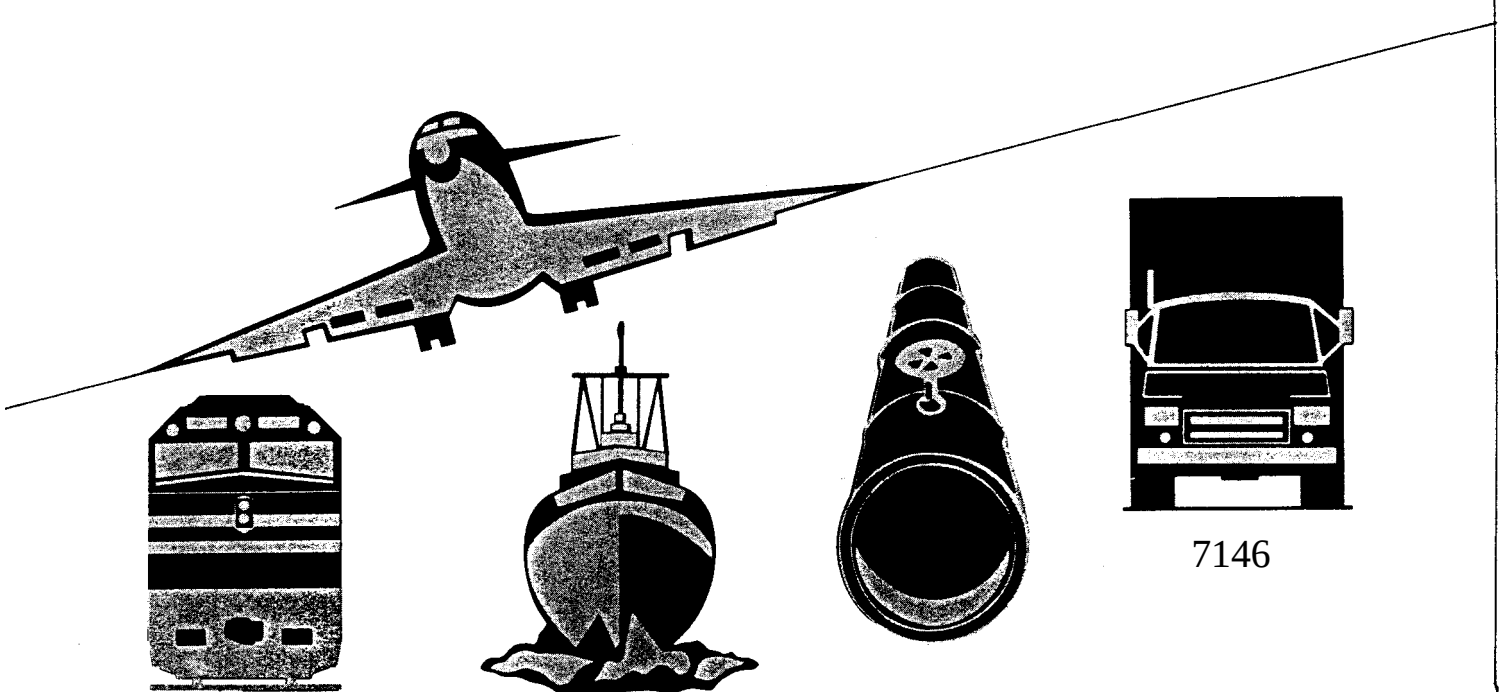
PB99-144230
NTSB/ARG-99/01

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA

U.S. GENERAL AVIATION
CALENDAR YEAR 1996



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U.S. GENERAL AVIATION, CALENDAR YEAR 1996

Annual Review of Aircraft Accident Data

NTSB/ARG-99/01
Notation 7146

National Transportation
Safety Board

Washington, D.C.
May 1999

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Contents

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Highlights

A total of 1,935 U.S. registered general aviation aircraft were involved in 1,907 accidents[1] during calendar year 1996. Of these 1,907 accidents, 360 accidents (involving 366 aircraft) resulted in fatal injuries. This report presents a statistical review of these accidents, all involving U.S. registered aircraft that were **not** conducting air carrier revenue operations under Title 14 *Code of Federal Regulations* (14 CFR) Parts 121 or 135.

The accident data on which this review is based were extracted from the Safety Board's automated Aviation Accident Data System. The Federal Aviation Administration's Statistics and Forecast Branch, Planning Analysis Division, Office of Aviation Policy and Plans publishes the "General Aviation and Air Taxi Survey," which is the source of flight hours used in this report. To conduct its annual survey, the FAA mails questionnaires to owners of a statistically selected sample of aircraft. An analysis of returned questionnaires enables the FAA to estimate hours of aircraft usage by purpose and type aircraft.

General Aviation Accident Trends

General aviation accidents decreased by 7 percent from the 2,053 accidents reported in calendar year 1995. Chart 1 shows an apparent leveling off of the downward trend in the number of aircraft accidents since 1975, when commuter and air taxi operations (covered by 14 CFR Part 135) were first excluded from general aviation accident statistics. The overall accident rate decreased from 1995 to 1996, from 8.23 to 7.66 accidents per 100,000 hours flown.

The number of persons killed decreased to 632 (615 aircraft occupants) from the 734 who were killed in 1995. The fatal accident rate (1.45 fatal accidents per 100,000 hours flown) was lower than the 1.64 reported for 1995.

Type of Aircraft

Airplanes with a single piston engine accounted for 78 percent of general aviation accidents in calendar year 1996. A total of 1,493 accidents, 259 fatal accidents, and 421 fatalities resulted in an accident rate of 8.67 and a fatal accident rate of 1.50 per 100,000 hours flown in this aircraft type.

[1] A collision between aircraft is counted as one accident for the purpose of this report. There were 17 accidents in which two general aviation aircraft collided in the air and 11 on the ground.

Piston-powered rotorcraft experienced a 21-year low of 79 accidents with an accident rate of 13.84 per 100,000 hours flown. These aircraft were involved in 14 fatal accidents (2.45 per 100,000 hours flown) with 19 fatalities. Turbine-powered rotorcraft were involved in 89 accidents (7.65 per 100,000 hours flown), 15 of which were fatal (1.29 per 100,000 hours flown) with 25 fatalities.

Purpose of Flight

Personal flying was involved in 1,179 accidents, 246 fatal accidents, and 413 fatalities. Business flying accounted for 93 accidents, 19 fatal accidents, with 44 fatalities. Exposure data (number of flying hours) do not reliably distinguish between personal and business flying; consequently, individual accident rates cannot be calculated. The combined personal/business accident rate was 10.34 accidents per 100,000 hours flown, and the combined fatal accident rate was 2.16 per 100,000 hours flown. Aerial application operations accounted for 134 accidents (7.82 per 100,000 hours flown), 10 fatal accidents (0.58 per 100,000 hours flown), and 10 fatalities. Instructional flying accounted for 246 accidents (5.17 accidents per 100,000 hours flown), 18 fatal accidents (0.38 per 100,000 hours flown), and 40 fatalities.

Amateur-Built Aircraft

Information about amateur-built aircraft is included in this report to provide an insight into their accident performance. In 1996, amateur-built aircraft accounted for 2 percent of the aircraft hours flown in general aviation but made up 10 percent of the accidents. Chart 6 shows that an increasing percentage of general aviation accidents involve amateur-built aircraft.

Type of Flight

Accident-involved aircraft were fairly evenly divided between local flights (47 percent) and point-to-point flights (53 percent). Fewer than 28 percent of accident-involved pilots flying point-to-point had filed flight plans.

Weather Conditions

More than 90 percent of accidents occur in visual meteorological conditions (VMC). Accidents in instrument meteorological conditions (IMC) are generally much more serious than those in VMC—63 percent of accidents in IMC resulted in fatalities, compared to 15 percent of accidents in VMC.

The specific weather conditions cited most frequently in nonfatal accidents were “crosswind,” “gusts,” and “tailwind.” “Low ceiling,” “fog,” “clouds,” and “icing conditions” were the most cited weather factors in fatal accidents.

First Occurrence and Phase of Operation

Safety Board investigations of aircraft accidents identify one or more occurrences that describe the accident sequence of events. The first occurrence is the event that initiates the accident sequence.

Collisions in-flight were the first occurrence in more than 25 percent of fatal accidents, and loss of control in 31 percent. Partial or total loss of engine power was the first occurrence in 29 percent of aircraft involved in all accidents. Collisions in-flight and on-ground were cited in 21 percent of accidents, but only 2 percent involved mid-air collisions. Loss of control, either in-flight (by 13 percent of the accident-involved pilots) or on the ground (by 11 percent of the pilots) was another prevalent first occurrence.

Thirty-nine percent of accident-involved aircraft were on approach or landing, and 19 percent were taking off at the time of the first occurrence. In fatal accidents, the most frequently cited accident phases were maneuvering (27 percent), approach and landing (18 percent), and cruise (30 percent).

Causes of Accidents

Safety Board investigations of aircraft accidents frequently cite multiple causes and contributing factors; thus, the analysis of the probable cause often identifies the combined influence of more than one factor.

Pilots were cited as either a cause or contributing factor in 77 percent of accidents and 83 percent in fatal accidents. The environment (including weather, light, objects, and terrain conditions) was cited for 45 percent of accident-involved aircraft and 40 percent of those in fatal accidents. Environmental conditions are rarely cited as an accident cause. More than 96 percent of the environment citations are as contributing factors. Aircraft was found to be a cause or contributing factor in 32 percent of accidents and 30 percent in fatal accidents.

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Terminology Used in the Data

Aircraft Accident: The accidents included in this report are the occurrences associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. The Safety Board's definition of substantial damage, as stated in 49 CFR 830.2 is:

> *Substantial damage* means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin of fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage."

Causes and Related Factors: In determining probable cause(s) of an accident, all facts, conditions, and circumstances are considered. The objective is to ascertain the cause-and-effect relationships in the accident sequence about which something can be done to prevent recurrence of a similar accident. For statistical purposes, when two or more causes are cited in an accident, each is recorded and no attempt is made to establish a primary cause. Therefore, in charts that identify causes and related factors cited in accidents, the number of causes exceeds the total number of accidents. The term "factor" is used, in general, to denote those elements of an accident that further explain or supplement the probable cause(s). This provides a means for collecting essential information that could not readily be categorized elsewhere in the system.

Collision Between Aircraft: An accident is classified as a collision only when both aircraft are occupied. This classification includes collisions between two aircraft that are airborne (midair), between an aircraft that is airborne and another that is on the ground, and between two aircraft that are on the ground. A collision with a parked, unoccupied aircraft is classified under the broad category "collision with object."

Injury: *Injury index* refers to the highest degree of personal injury sustained as a result of the accident. *Serious injury* refers to any injury that (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves injury to any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of body surface (49 CFR 830.2). *Fatal injury* refers to any injury that results in death within 30 days of the accident.

Purpose of Flight: The purpose for which the aircraft was being operated at the time of the accident. In this report, accident data are presented for five purposes of flight:

> *Personal.* Flying by individuals in their own or rented aircraft for pleasure, or for personal transportation not in furtherance of their occupation or company business. This category includes practice flying (for the purpose of increasing or maintaining proficiency) not performed under supervision of an accredited instructor, and not part of an approved flight training program.
>
> *Business.* The use of aircraft by pilots (not receiving direct salary or compensation for piloting) in connection with their occupation or in the furtherance of a private business.
>
> *Corporate/Executive.* The use of aircraft owned or leased, and operated by a corporate or business firm for the transportation of personnel or cargo in furtherance of the corporation's or firm's business, and that are flown by professional pilots receiving a direct salary or compensation for piloting.
>
> *Aerial Application.* The operation of aircraft for the purpose of dispensing any substance for plant nourishment, soil treatment, propagation of plant life, pest control, or fire control, including flying to and from the application site.
>
> *Instructional.* Flying accomplished in supervised training under the direction of a certificated instructor.

Phase of Operation: The phase of the flight or operation in which the first occurrence or circumstance happened. If more than one occurrence is cited for a given phase of operation, that phase is recorded for each occurrence.

Occurrence: The concept of sequence of events as a method of accident classification was introduced in 1982 to describe the circumstances in an accident. A maximum of five occurrences may be used. Typically each occurrence is further described by one or more "findings," which, when presented chronologically, depict the accident scenario from beginning to end. The findings are developed by Safety Board analysts from a menu of words and phrases, and are the most detailed means of classifying an accident. The findings are also used to describe the probable cause of and related factors in an accident. The example below illustrates the relationship between occurrences and findings.

```
Occurrence              IN FLIGHT COLLISION WITH TERRAIN
Phase of Operation      LANDING – FLARE/TOUCHDOWN

Finding(s)
      1. WHEELS UP LANDING – INADVERTENT – PILOT IN COMMAND
      2. IMPROPER USE OF PROCEDURE, DIVERTED ATTENTION – PILOT IN COMMAND
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Weather Condition: Weather condition is described as visual meteorological conditions (VMC) or instrument meteorological conditions (IMC) and is expressed in terms of visibility, distance from clouds, and ceilings in accordance with Part 91 of the Federal Aviation Regulations.

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Historical View of General Aviation Accidents

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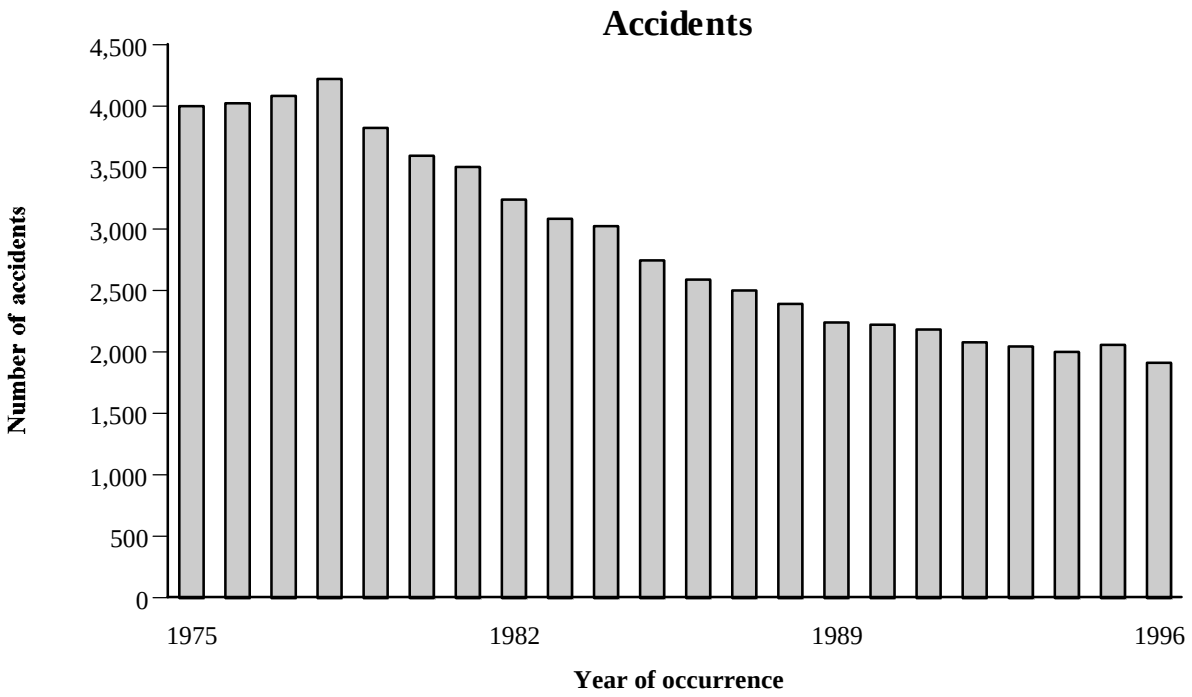


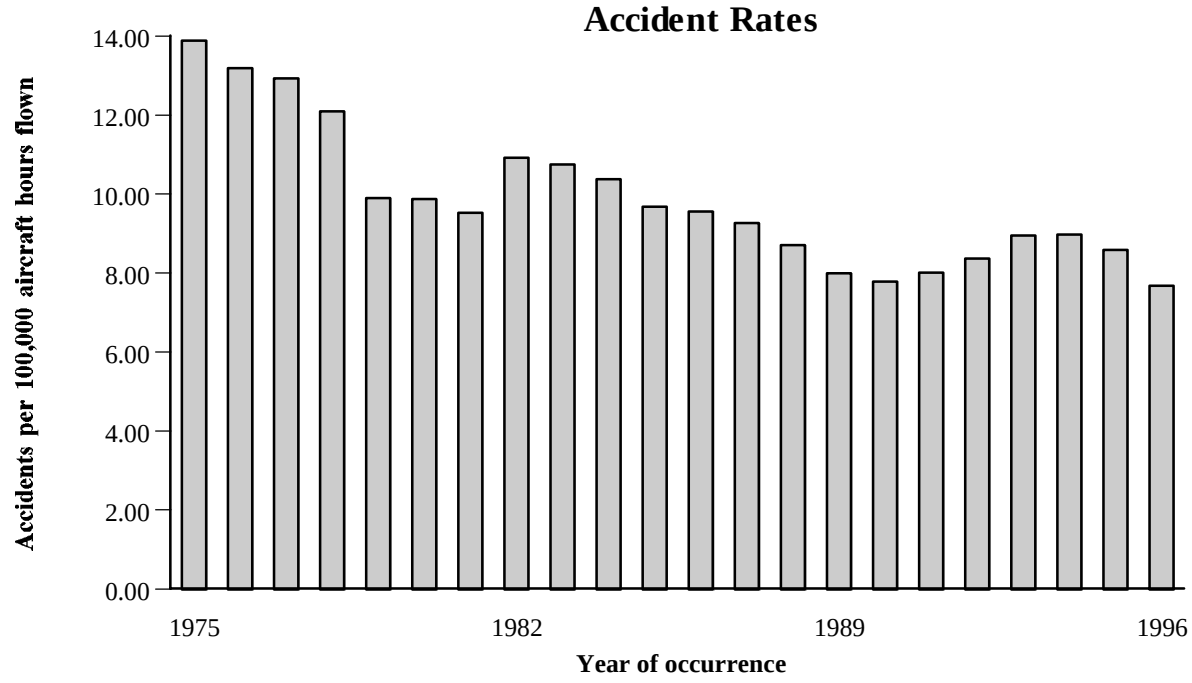
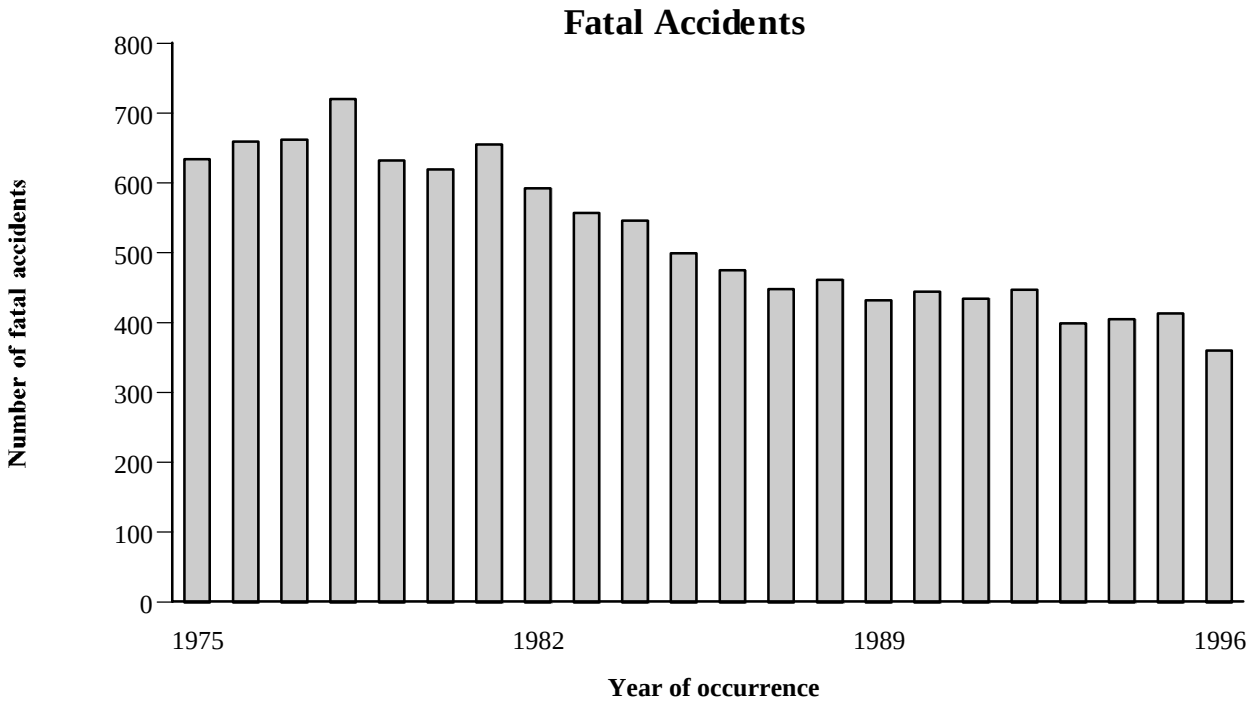


Chart 1. Number of accidents (top) and accident rates (bottom), 1975 through 1996. (See Chart 27 in the appendix.)



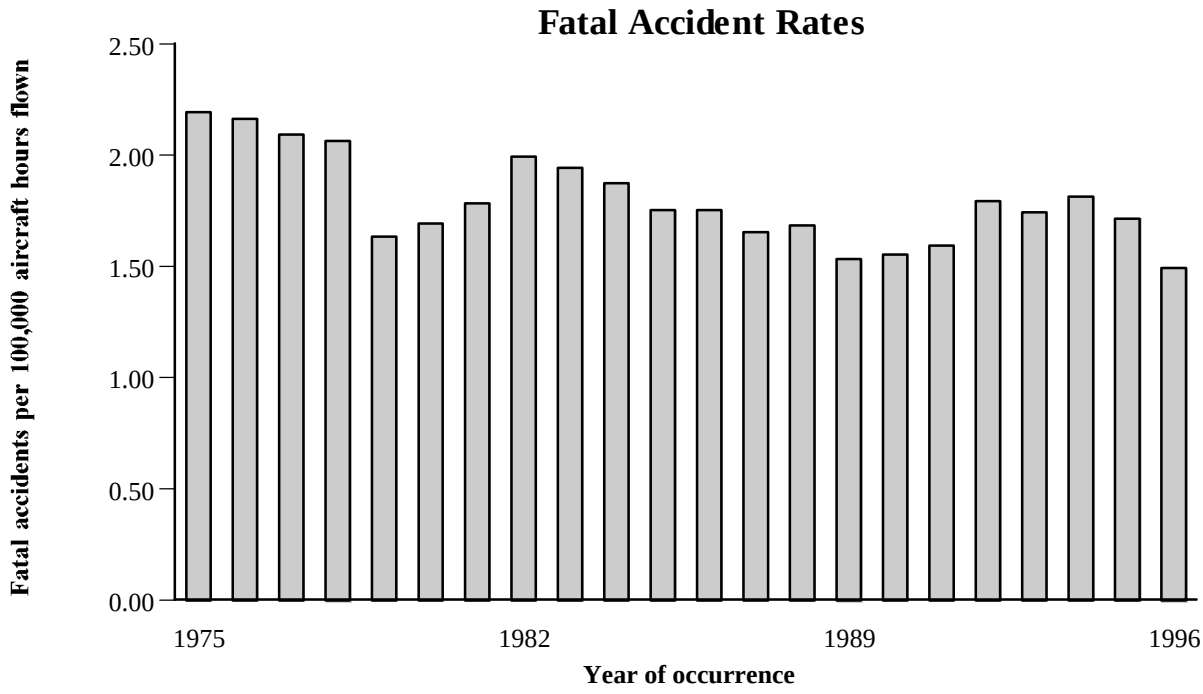


Chart 2. Number of fatal accidents (top) and fatal accident rates (bottom), 1975 through 1996. (See Chart 27 in the appendix.)

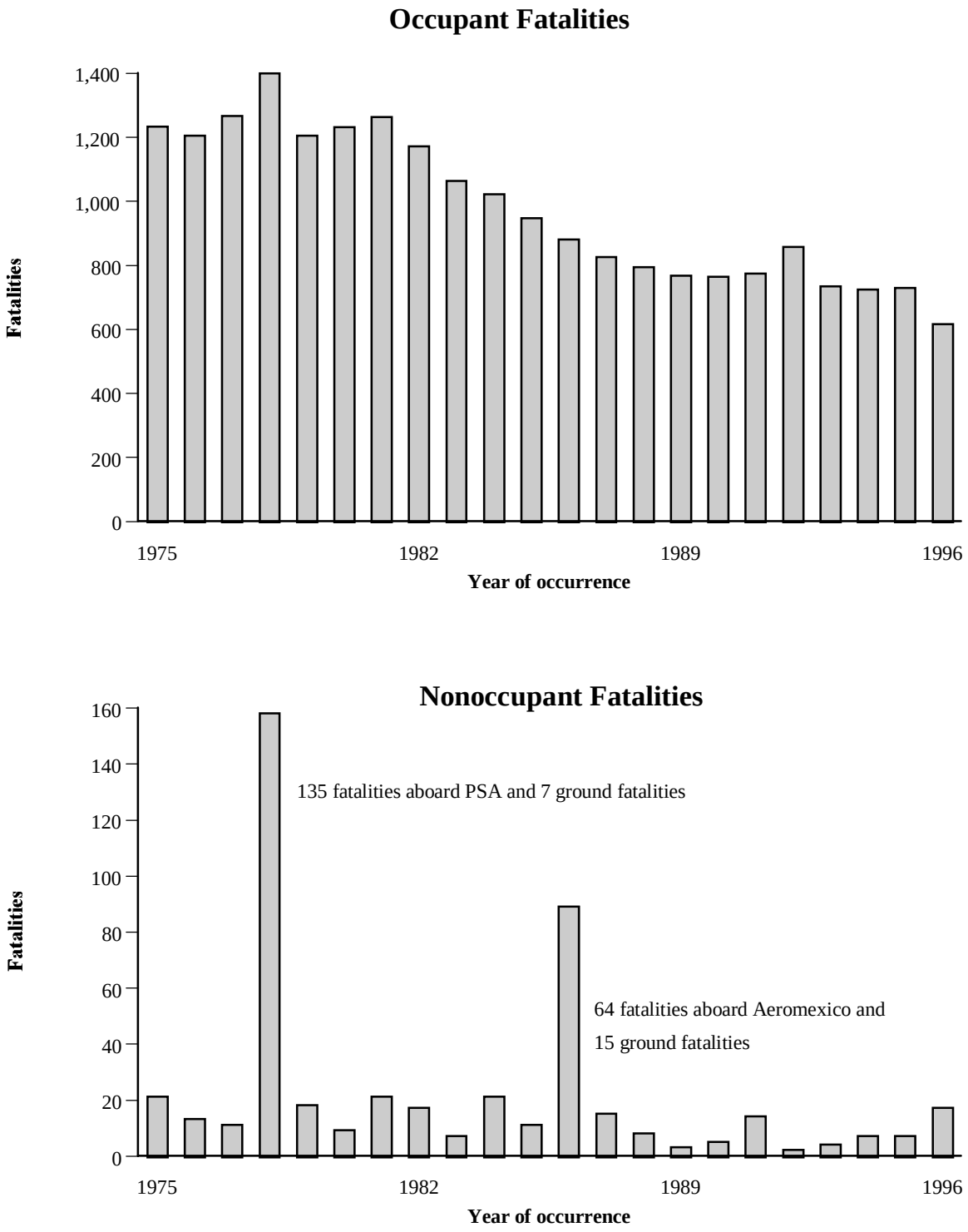


Chart 3. Number of occupant fatalities (top) and nonoccupant fatalities (which includes fatalities on the ground and fatalities that result from collision with non-general aviation aircraft) (bottom), 1975 to 1996. (See Chart 27 in the appendix.)

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General

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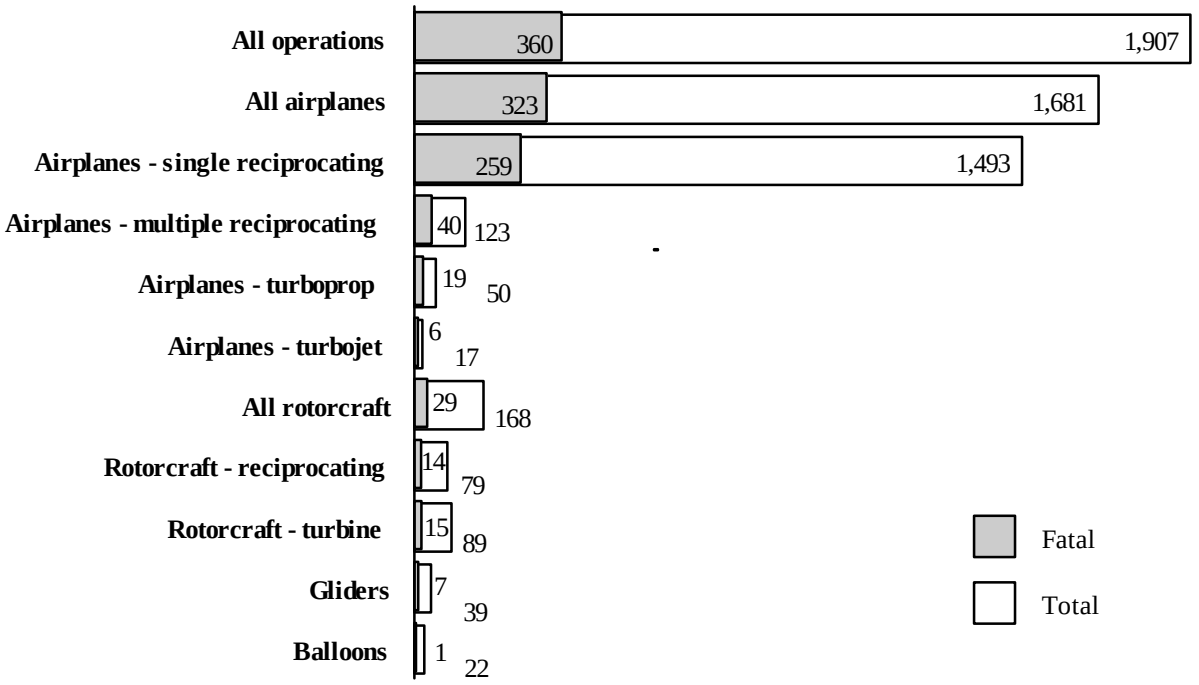
Accidents by Aircraft Type



Accident Rates by Aircraft Type

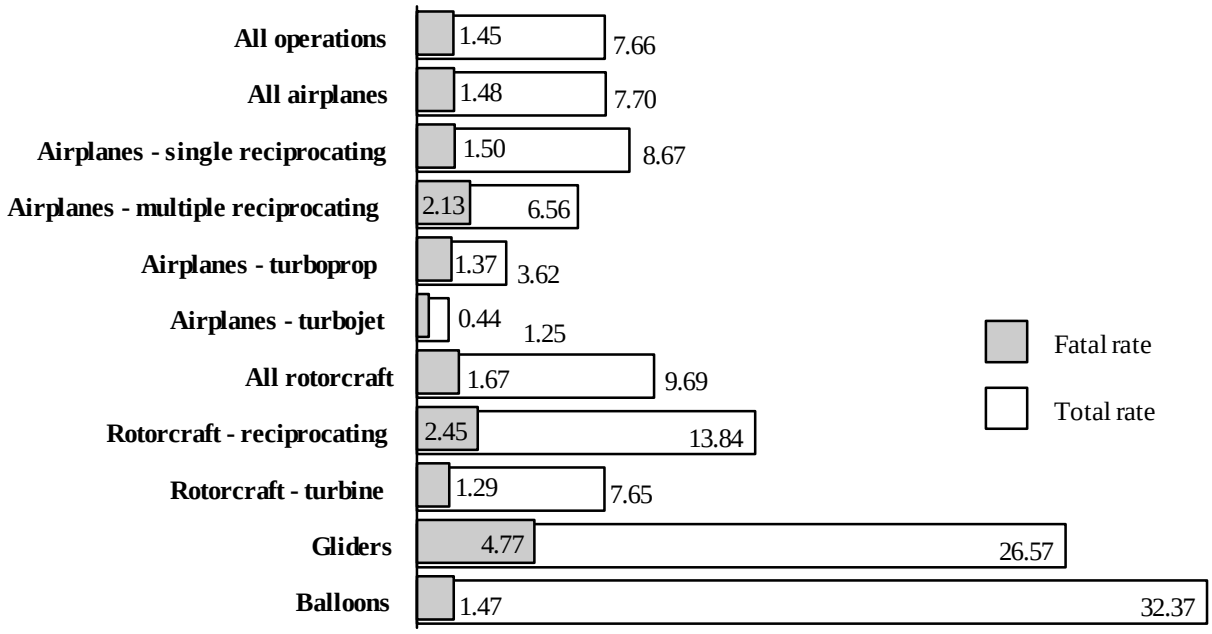
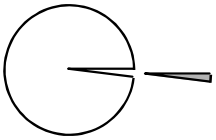


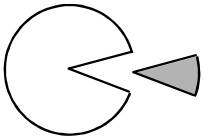
Chart 4. Number of accidents and fatal accidents (top), accident rates and fatal rates per 100,000 aircraft hours flown (bottom), 1996. (See Charts 28 through 37 in the appendix.)

Amateur-Built Aircraft

Amateur-built aircraft accounted for 2% of the aircraft hours flown in general aviation flying in 1996. . . . . but made up 10% of the accidents.

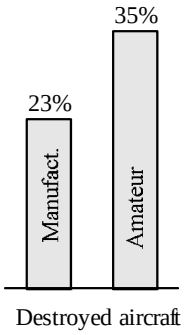


Hours flown



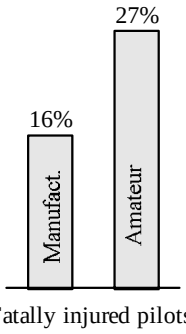
Accidents

Amateur-built aircraft involved in accidents were destroyed 52% more often than were manufactured aircraft . . . . . and pilots were killed 69% more often.



Destroyed aircraft

(Percentage of accident-involved aircraft that were destroyed.)



Fatally injured pilots

(Percentage of accident-involved pilots who were fatally injured.)

Chart 5. Highlights regarding amateur-built aircraft involved in accidents, 1996.

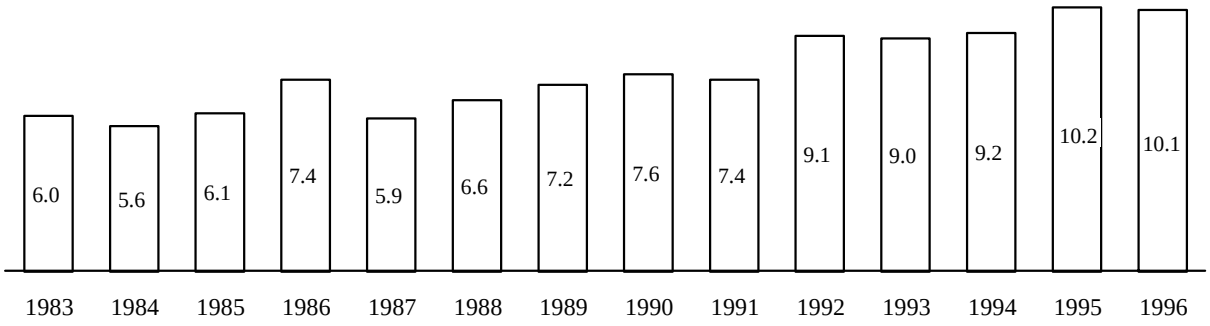


Chart 6. The percentage of general aviation accidents that involved amateur-built aircraft, 1983 through 1996.

Aircraft Occupant Injuries

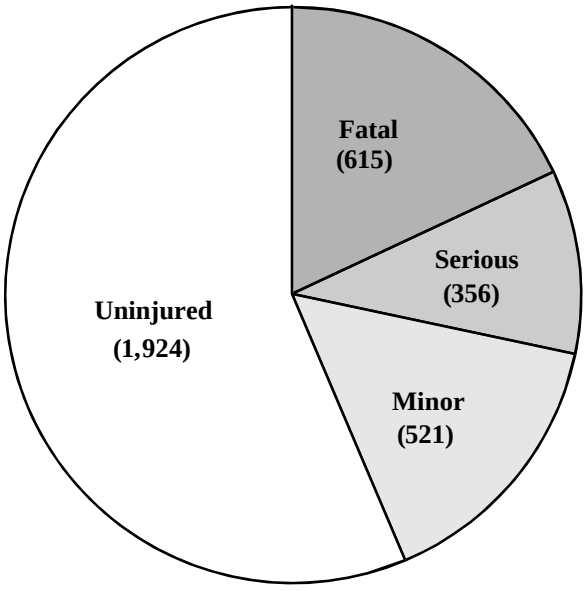


Chart 7. Severity of injuries sustained by the 3,416 occupants of accident-involved aircraft, 1996.

Type of Accident As First Occurrence, All

Chart 8. Number and percentage of accident-involved aircraft by type of accident as a first occurrence, 1996.

Type of accident as a first occurrence	Number of aircraft	Percent of aircraft
Collision, in-flight: (See Charts 12 and 13)	**314**	**16.2**
Midair collision between aircraft	35	1.8
Collision with object	141	7.3
Collision with terrain or water	105	5.4
Dragged wing, rotor, pod, float, or tail/skid	7	.4
Undershoot	26	1.3
Noncollision, in-flight:	**466**	**24.1**
Near collision between aircraft	0	0
Encounter with weather	87	4.5
Encounter with vortex turbulence	3	.2
Loss of control	255	13.2
Uncontrolled altitude deviation	2	.1
Abrupt maneuver	8	.4
Airframe, component, system failure, malfunction	106	5.5
Decompression	0	0
Ditching	2	.1
Forced landing	3	.2
Collision, on-ground or on-water:	**101**	**5.2**
Collision between aircraft	23	1.2
Collision with object	43	2.2
Encounter with terrain or water	33	1.7
Dragged wing, rotor, pod, float, or tail/skid	2	.1
Noncollision, on-ground or on-water:	**422**	**21.8**
Near collision between aircraft	0	0
Encounter with weather	5	.3
Loss of control	213	11.0
Nose down	1	0
Nose over	24	1.2
Rollover	10	.5
Propeller blast or jet exhaust/suction	1	0
Propeller/rotor contact to person	4	.2
Hard landing	112	5.8
Overrun	52	2.7
Power-related accident: (See Charts 14 and 15)	**564**	**29.1**
Engine tearaway	0	0
Propeller failure or malfunction	6	.3
Rotor failure or malfunction	2	.1

(continued)

Type of Accident As First Occurrence, All

Chart 8. Number and percentage of accident-involved aircraft by type of accident as a first occurrence, 1996.

Type of accident as a first occurrence	Number of aircraft	Percent of aircraft
(continued)		
Loss of engine power—	174	9.0
Total loss from mechanical failure or malfunction	111	5.7
Partial loss from mechanical failure or malfunction	36	1.9
Total loss from nonmechanical failure or malfunction	210	10.9
Partial loss from nonmechanical failure or malfunction	25	1.3
Landing gear-related accident:	**32**	**1.7**
Gear collapsed	7	.4
Main gear collapsed	5	.3
Nose gear collapsed	4	.2
Tail gear collapsed	0	0
Complete gear collapsed	0	0
Other gear collapsed	1	0
Gear not extended	0	0
Gear not retracted	0	0
Gear retraction on ground	4	.2
Wheels-up landing	9	.5
Wheels-down landing in water	2	.1
Miscellaneous accident:	**33**	**1.7**
Cargo shift	0	0
Fire	8	.4
Explosion	0	0
Fire/explosion	0	0
Hazardous materials leak/spill (fumes/smoke)	0	0
Miscellaneous/other	25	1.3
First occurrence not determined:	**3**	**.2**
Undetermined	1	0
Aircraft missing (not located or not recoverable)	2	.1
Number of aircraft	1,935	100.0

Type of Accident As First Occurrence, Fatal

Chart 9. Number and percentage of fatal accident-involved aircraft by type of accident as a first occurrence, 1996.

Type of fatal accident as a first occurrence	Number of aircraft	Percent of aircraft
Collision, in-flight: (See Chart 11)	**94**	**25.7**
Midair collision between aircraft	12	3.3
Collision with object	39	10.6
Collision with terrain or water	41	11.2
Dragged wing, rotor, pod, float, or tail/skid	1	.3
Undershoot	1	.3
Noncollision, in-flight:	**192**	**52.5**
Encounter with weather	49	13.4
Loss of control	115	31.4
Abrupt maneuver	2	.5
Airframe, component, system failure, malfunction	25	6.8
Forced landing	1	.3
Collision, on-ground or on-water	**2**	**.5**
Collision between aircraft	1	.3
Collision with object	1	.3
Noncollision, on-ground or on-water:	**12**	**3.3**
Loss of control	6	1.6
Nose over	1	.3
Propeller/rotor contact to person	2	.5
Hard landing	2	.5
Overrun	1	.3
Power-related accident: (See Chart 13)	**56**	**15.3**
Propeller failure or malfunction	1	.3
Rotor failure or malfunction	1	.3
Loss of engine power—	21	5.7
Total loss from mechanical failure or malfunction	8	2.2
Partial loss from mechanical failure or malfunction	6	1.6
Total loss from nonmechanical failure or malfunction	17	4.6
Partial loss from nonmechanical failure or malfunction	2	.5
Miscellaneous accident:	**7**	**1.9**
Fire	4	1.1
Miscellaneous/other	3	.8
First occurrence not determined:	**3**	**.8**
Undetermined	1	.3
Aircraft missing (not located or not recoverable)	2	.5
Number of aircraft	366	100.0

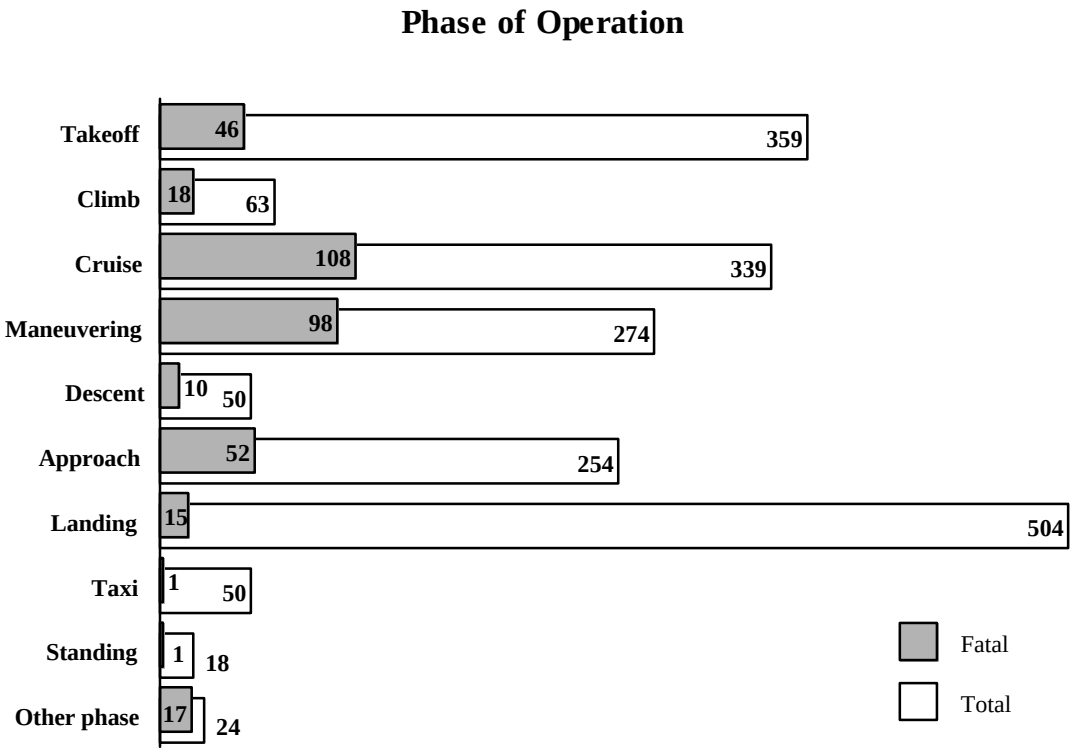
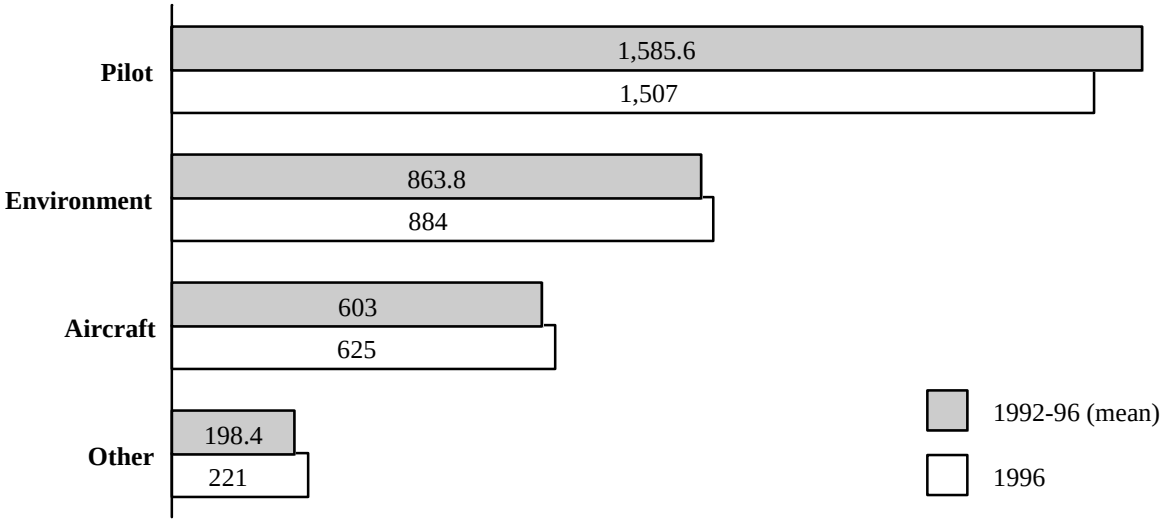


Chart 10. A breakdown of the 1,935 total and 366 fatal accident-involved aircraft by first phase of operation, 1996.

General Causes or Contributing Factors in Accidents



General Causes or Contributing Factors in Fatal Accidents

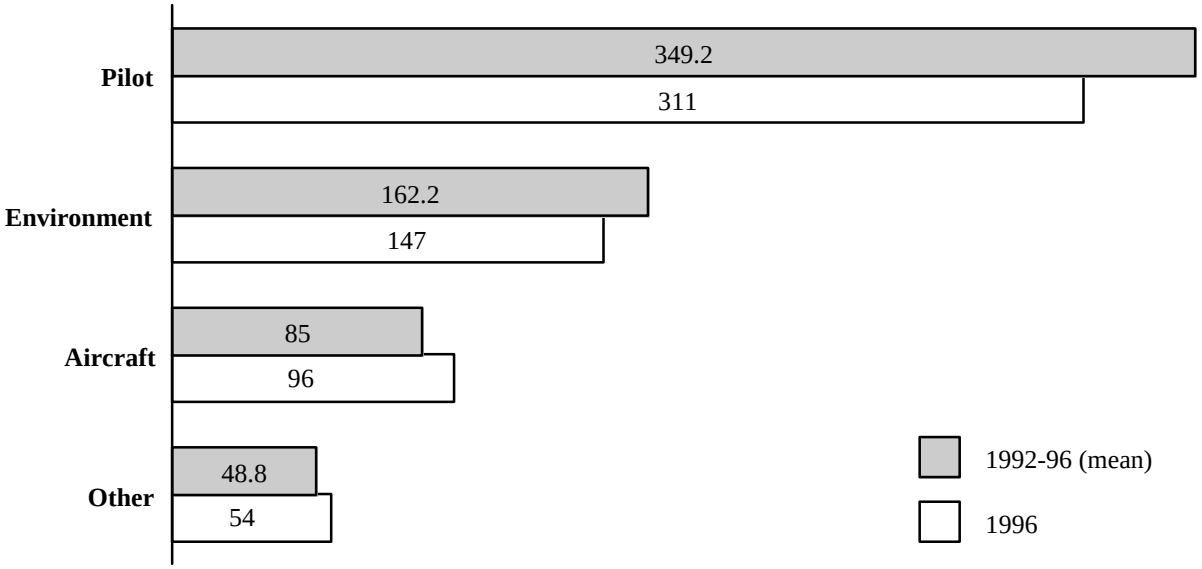


Chart 11. General causes or contributing factors cited for accident-involved aircraft (top) and fatal accident-involved aircraft (bottom), 1996 and 1992 through 1996. (Multiple causes and factors may be cited in an accident.) In 1996, there were 1,935 accident-involved aircraft and 366 fatal accident-involved aircraft; for 1992 to 1996, the mean was 2,036 accident-involved aircraft and 411.2 fatal accident-involved aircraft.

In-Flight Collision as First Occurrence

Chart 12. Number of aircraft involved in a first occurrence in-flight collision, by the object struck, 1996.

Object struck	Number of nonfatal and fatal occurrences	Number of fatal occurrences
Aircraft	35	12
Airport sign/marker	3	0
Animals	3	0
Antenna	3	2
Bird(s)	2	0
Bridge/overpass	1	1
Fence	12	1
Hangar/airport building	1	0
Pole	3	1
Residence	2	0
Terrain	138	46
Tower	5	4
Tree(s)	56	17
Utility pole	4	0
Vehicle	6	0
Wall/barricade	1	1
Wind sock/indicator	1	0
Wire(s)	48	11

Number by Phase of Operation

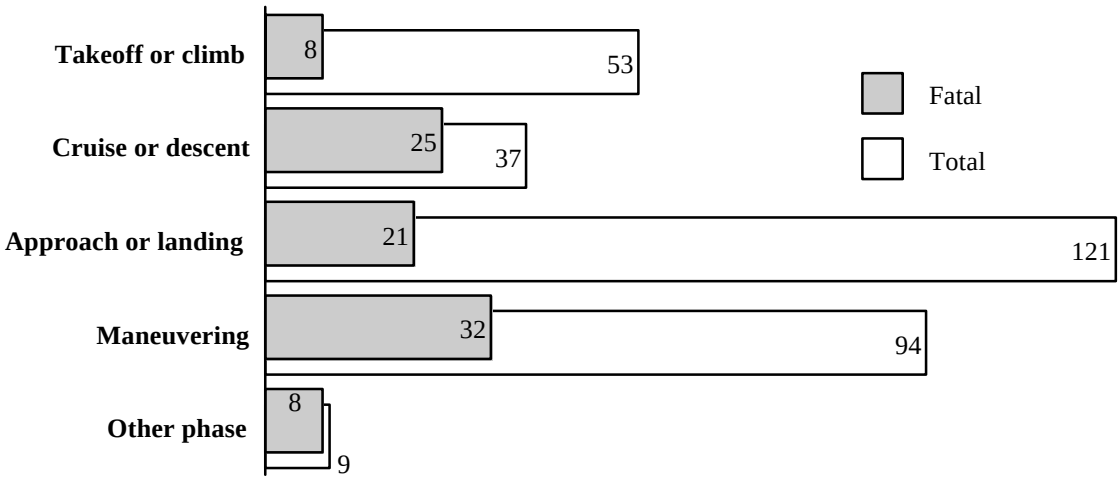


Chart 13. Aircraft involved in 314 total and 94 fatal first occurrence in-flight collisions, 1996.

Causes or Contributing Factors, Loss of Engine Power

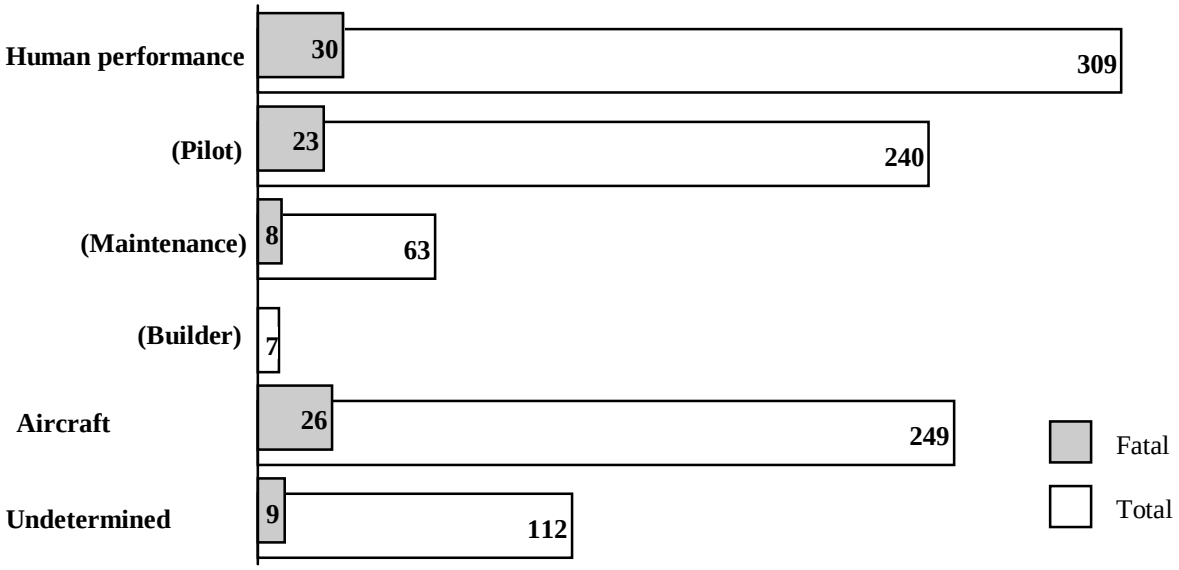


Chart 14. Causes or contributing factors in 544 accident-involved aircraft with loss of engine power as a first occurrence, 1996. (Multiple causes and factors may be cited in an accident.)

Phase of Operation, Loss of Engine Power

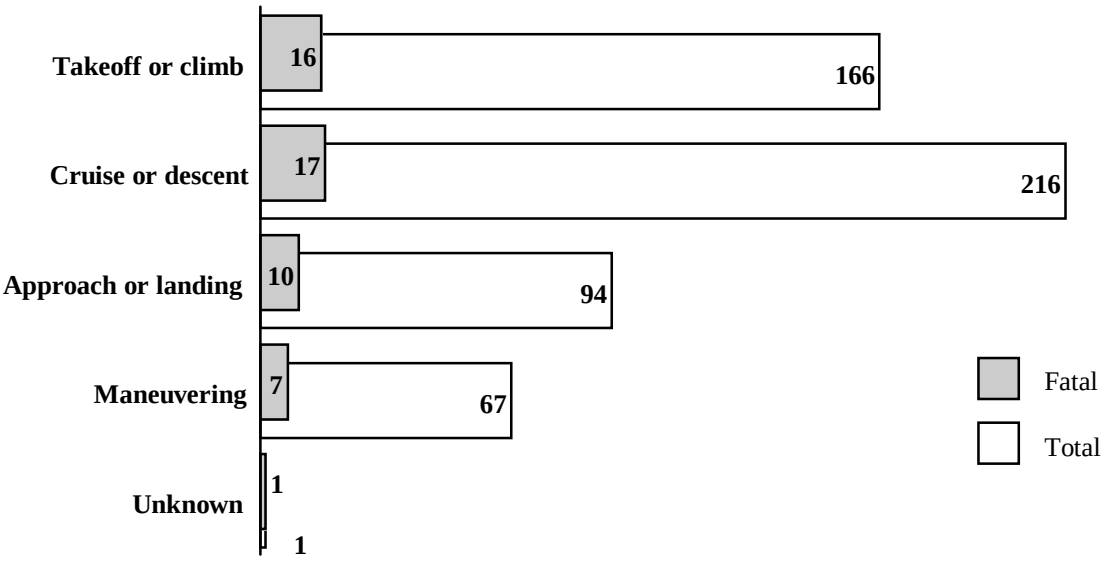


Chart 15. First phase of operation for the 544 aircraft that experienced loss of engine power, 1996.

Aircraft Operations

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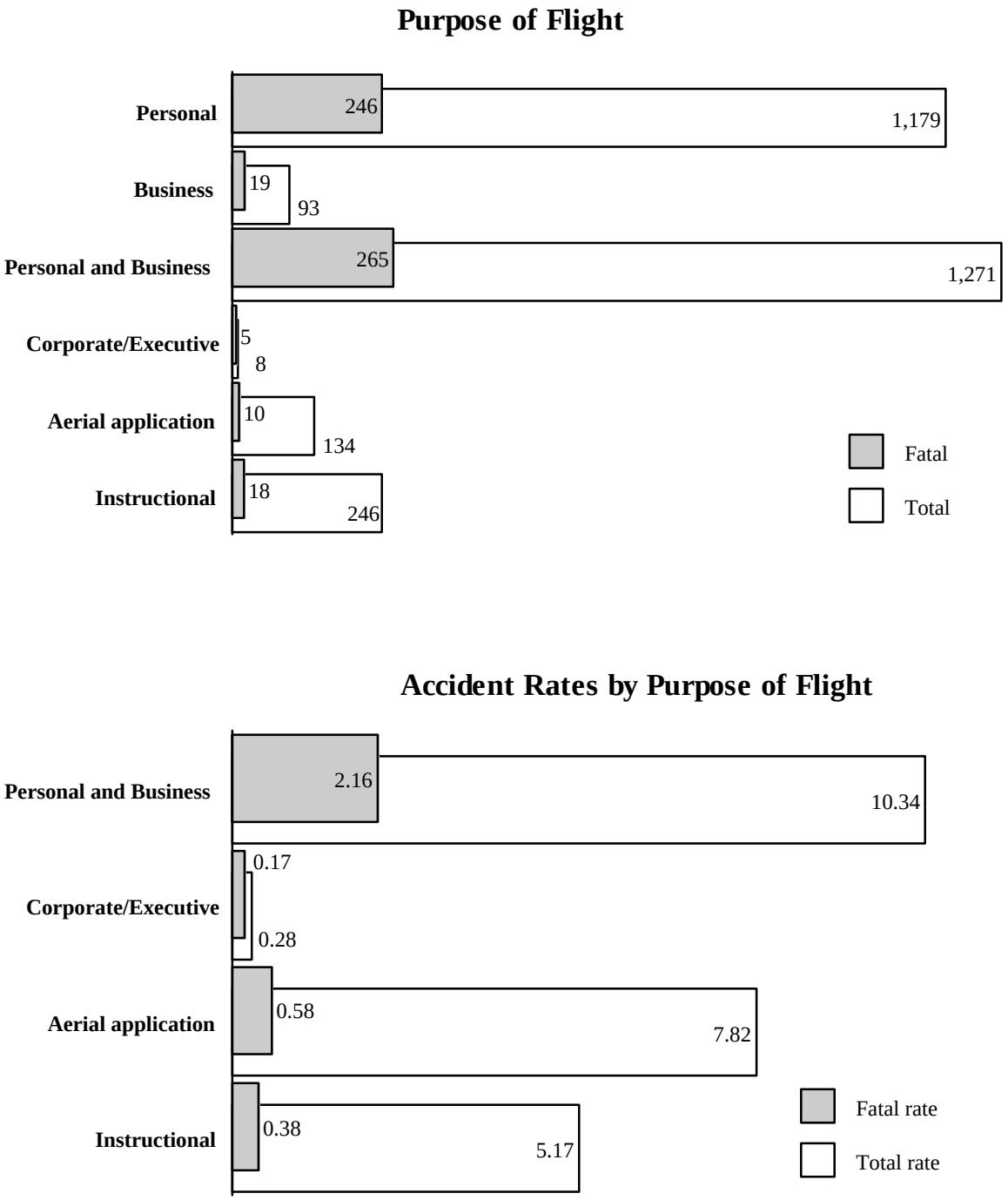

Chart 16. Number of accidents and fatal accidents (top); accident rates and fatal accident rates per 100,000 aircraft hours flown (bottom), 1996. (See Charts 37 through 42 in the appendix.) (Note that the accident rate is presented as a combination of personal flying and businesss flying until exposure data are available that divide flying hours between the two categories.)

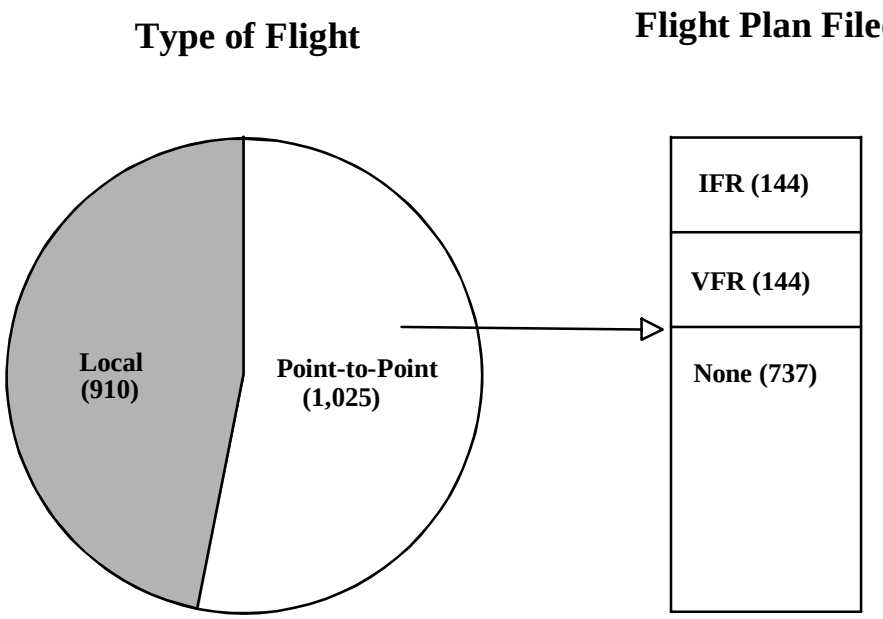

Chart 17. Type of flight for the total 1,935 accident-involved aircraft, and the type of flight plan filed for the 1,025 point-to-point flights, 1996.

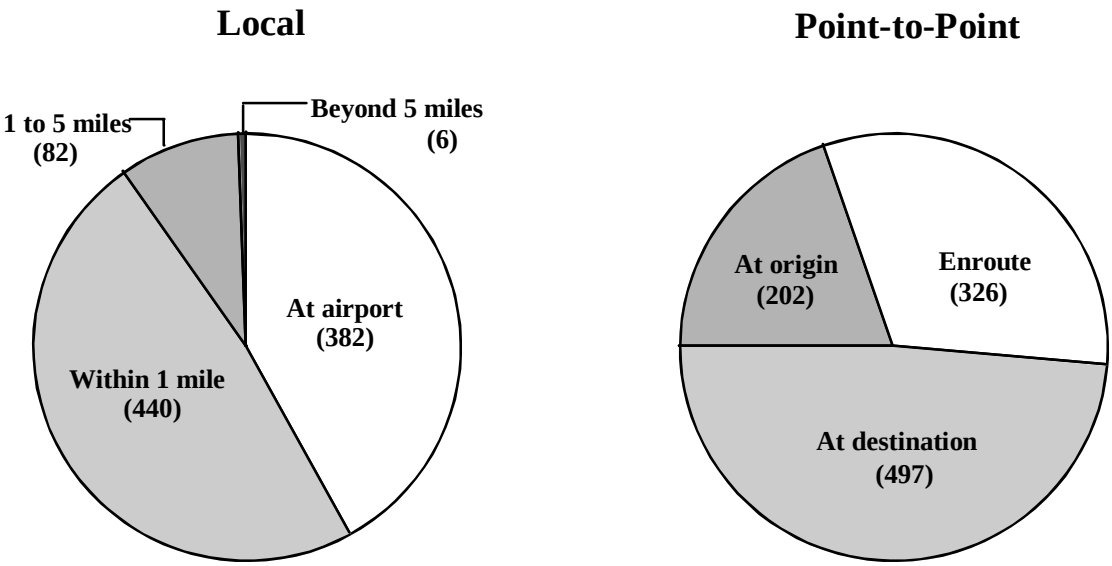

Chart 18. Accident location for the 910 aircraft on a local flight and 1,025 on a point-to-point flight, 1996.

Accident Environment

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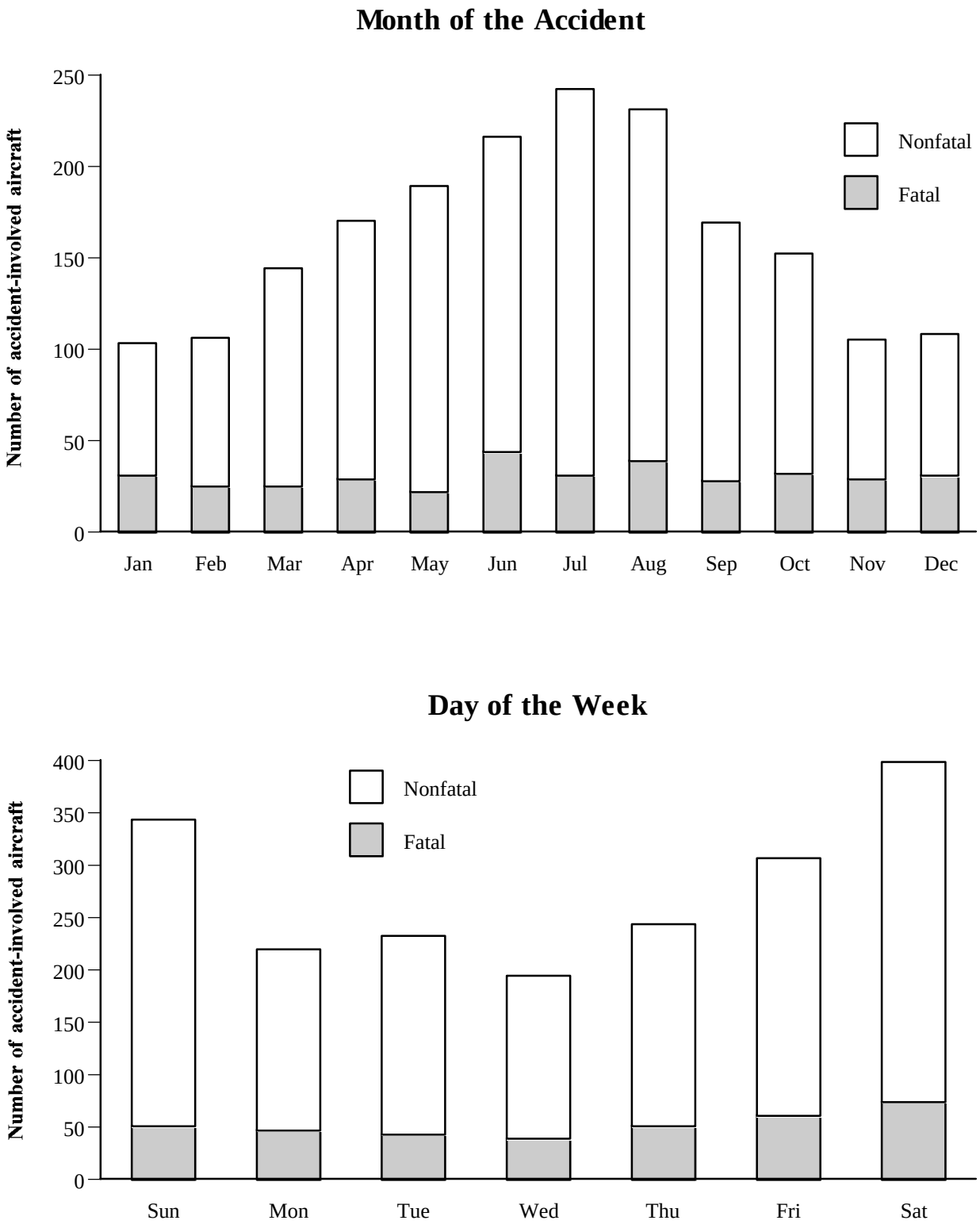

Chart 19. Number of accident-involved aircraft by the month (top) and day of week (bottom) the accident occurred, 1996.

Injuries to Onboard Occupants

Chart 20. Number of accident-involved aircraft and the injuries to onboard occupants by location, 1996.

Location	Number of accident-involved aircraft		Number of injured occupants aboard aircraft		
	Fatal accidents	Total	Fatally injured	Seriously injured	Total
Alabama	8	32	15	5	59
Alaska	13	119	20	6	183
Arizona	12	65	25	23	150
Arkansas	6	44	14	8	68
California	47	218	79	36	363
Colorado	15	79	24	9	154
Connecticut	2	14	5	3	29
Delaware	0	1	0	2	2
Florida	27	129	46	25	218
Georgia	10	47	15	7	80
Hawaii	1	9	5	4	22
Idaho	7	30	16	4	55
Illinois	14	43	21	9	72
Indiana	7	27	10	2	48
Iowa	1	13	1	3	18
Kansas	1	29	2	4	47
Kentucky	1	14	1	3	25
Louisiana	10	37	14	8	55
Maine	4	14	6	0	23
Maryland	2	24	5	4	45
Massachusetts	4	27	5	1	41
Michigan	13	50	17	12	104
Minnesota	5	40	8	7	68
Mississippi	2	20	3	4	28
Missouri	5	28	11	8	56
Montana	5	20	9	2	40
Nebraska	3	14	6	1	25
Nevada	3	23	3	10	42
New Hampshire	3	11	7	2	20
New Jersey	7	33	10	10	61
New Mexico	4	37	10	10	78
New York	6	37	13	6	63
North Carolina	6	30	10	3	55
North Dakota	1	15	1	0	24
Ohio	11	39	18	12	65

(continued)

Injuries to Onboard Occupants

Chart 20. Number of accident-involved aircraft and the injuries to onboard occupants by location, 1996.

Location	Number of accident-involved aircraft		Number of injured occupants aboard aircraft		
	Fatal accidents	Total	Fatally injured	Seriously injured	Total
(continued)					
Oklahoma	6	36	11	4	57
Oregon	7	56	11	8	98
Pennsylvania	5	34	7	23	63
Rhode Island	0	3	0	4	8
South Carolina	5	17	7	7	26
South Dakota	2	11	2	0	17
Tennessee	4	29	4	5	49
Texas	18	128	25	19	217
Utah	5	26	8	0	47
Vermont	0	2	0	0	3
Virginia	6	24	13	7	65
Washington	10	61	12	8	97
West Virginia	6	12	11	1	26
Wisconsin	5	33	5	7	53
Wyoming	4	14	6	1	20
Atlantic Ocean	2	2	2	0	2
Gulf of Mexico	0	0	0	0	0
Pacific Ocean	1	2	1	0	2
Canada	1	3	1	2	9
Mexico	0	1	0	0	1
Puerto Rico	1	5	3	3	9
Guam	1	1	0	0	1
Virgin Island	1	1	3	0	3
Other foreign	10	22	28	4	57
Unknown	0	0	0	0	0
Total	366	1,935	615	356	3,416

Weather Conditions

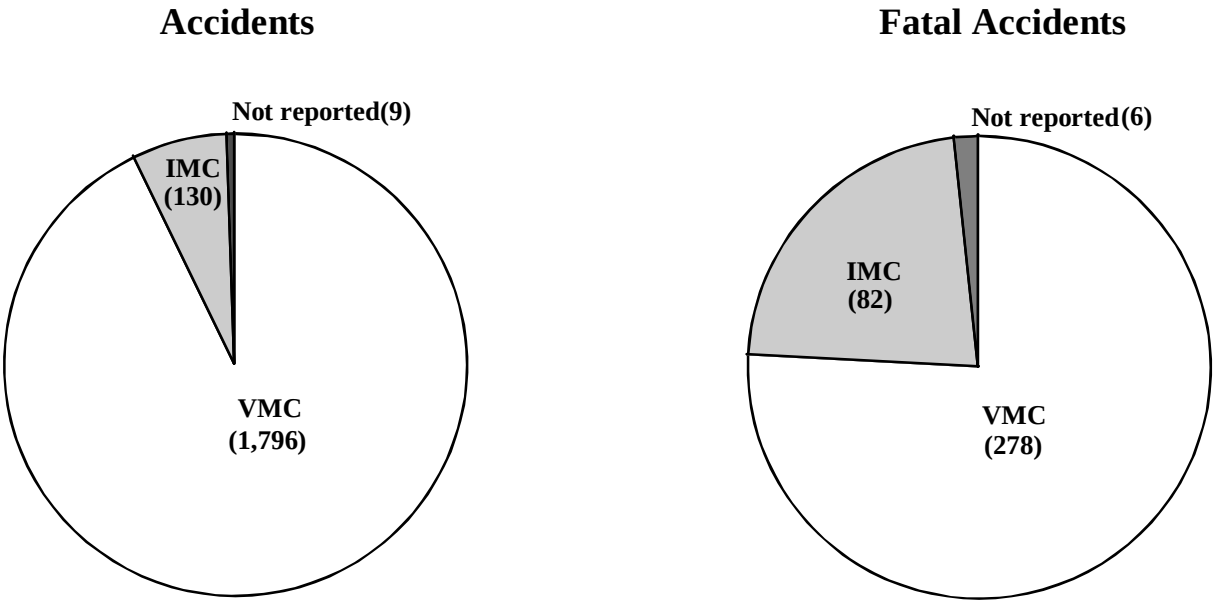

Chart 21. Accident and fatal accident flights flown in visual meteorological conditions and instrument meteorological conditions (IMC),

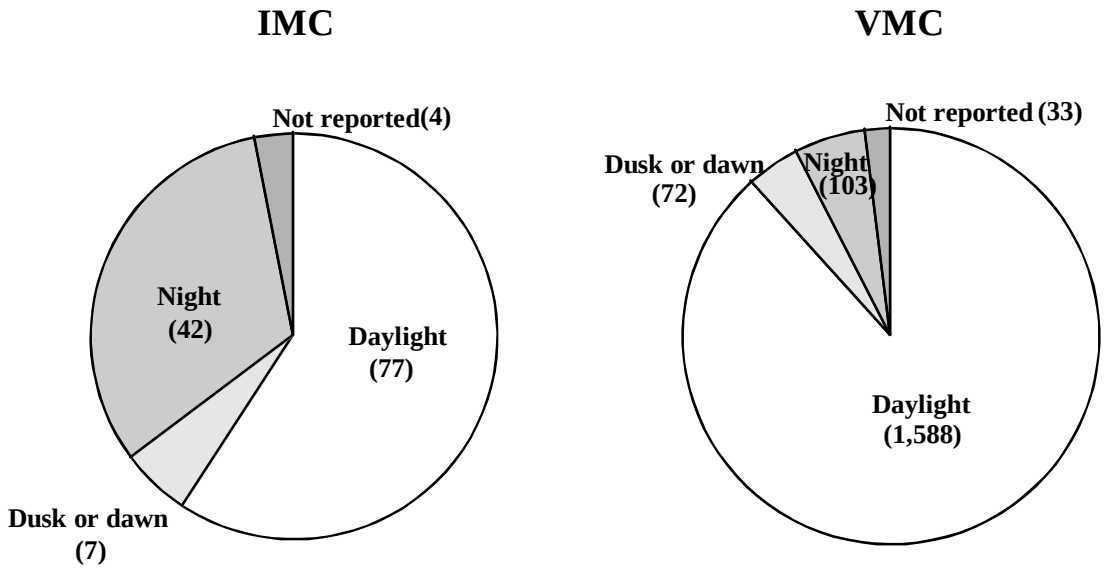

Chart 22. Accident-involved aircraft by weather and light conditions when the accident occurred, 1996.

Weather as a Cause/Factor

Chart 23. Number of accident-involved aircraft in which weather was cited as a cause or contributing factor, by weather condition, 1996.

Weather condition	Number in nonfatal accidents	Number in fatal accidents	Total
Below approach/landing minimums	6	4	10
Carburetor icing conditions	16	1	17
Clouds	5	11	16
Crosswind	116	7	123
Downdraft	20	2	22
Drizzle	2	2	4
Dust devil/whirlwind	5	0	5
Fog	7	30	37
Gusts	96	9	105
Hail	1	1	2
Haze/smoke	3	0	3
High density altitude	27	9	36
High wind	29	7	36
Icing conditions	7	11	18
Low ceiling	11	34	45
Mountain wave	0	1	1
No thermal lift	3	1	4
Obscuration	2	5	7
Rain	1	6	7
Snow	3	8	11
Static discharge	0	1	1
Sudden windshift	6	0	6
Tailwind	29	7	36
Temperature (high)	4	0	4
Thermal lift	1	0	1
Thunderstorm	4	8	12
Thunderstorm (outflow)	1	0	1
Turbulence	7	3	10
Turbulence in clouds	0	1	1
Turbulence (thunderstorms)	1	4	5

(continued)

Weather as a Cause/Factor

Chart 23. Number of accident-involved aircraft in which weather was cited as a cause or contributing factor, by weather condition, 1996.

Weather condition	Number in nonfatal accidents	Number in fatal accidents	Total
(continued)			
Turbulence (clear air)	2	1	3
Turbulence (terrain induced)	2	3	5
Unfavorable wind	12	2	14
Variable wind	11	0	11
Windshear	8	1	9
Number involving weather	333 (21%)	109 (30%)	442 (23%)
Number of aircraft	1,569	366	1,935

Pilot Information

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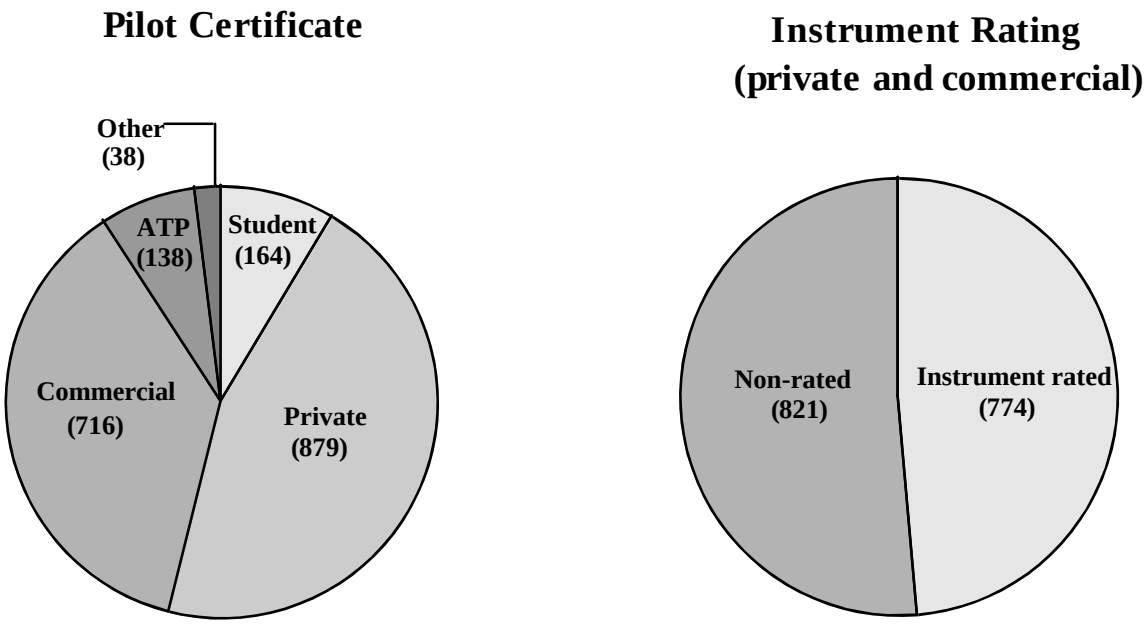

Chart 24. The highest certificates held by the 1,935 accident-involved pilots and the instrument ratings for 1,595 private and commercial certificate holders only. "Other" includes none and unknown; ATP=airline transport pilot.

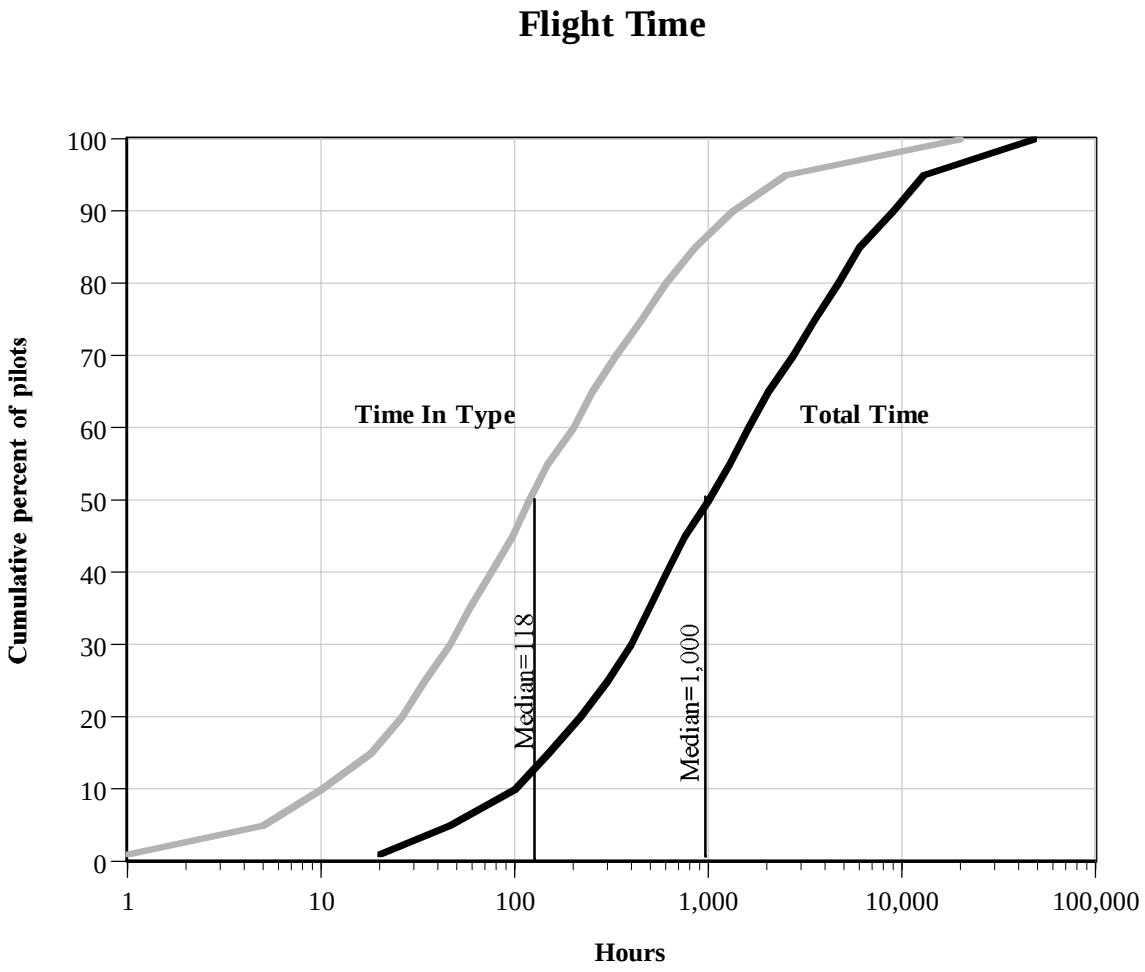

Chart 25. The total hours and hours in aircraft type for the 1,868 pilots whose flight times were reported, 1996. (Note that the hours are graphed on a logarithmic scale.)

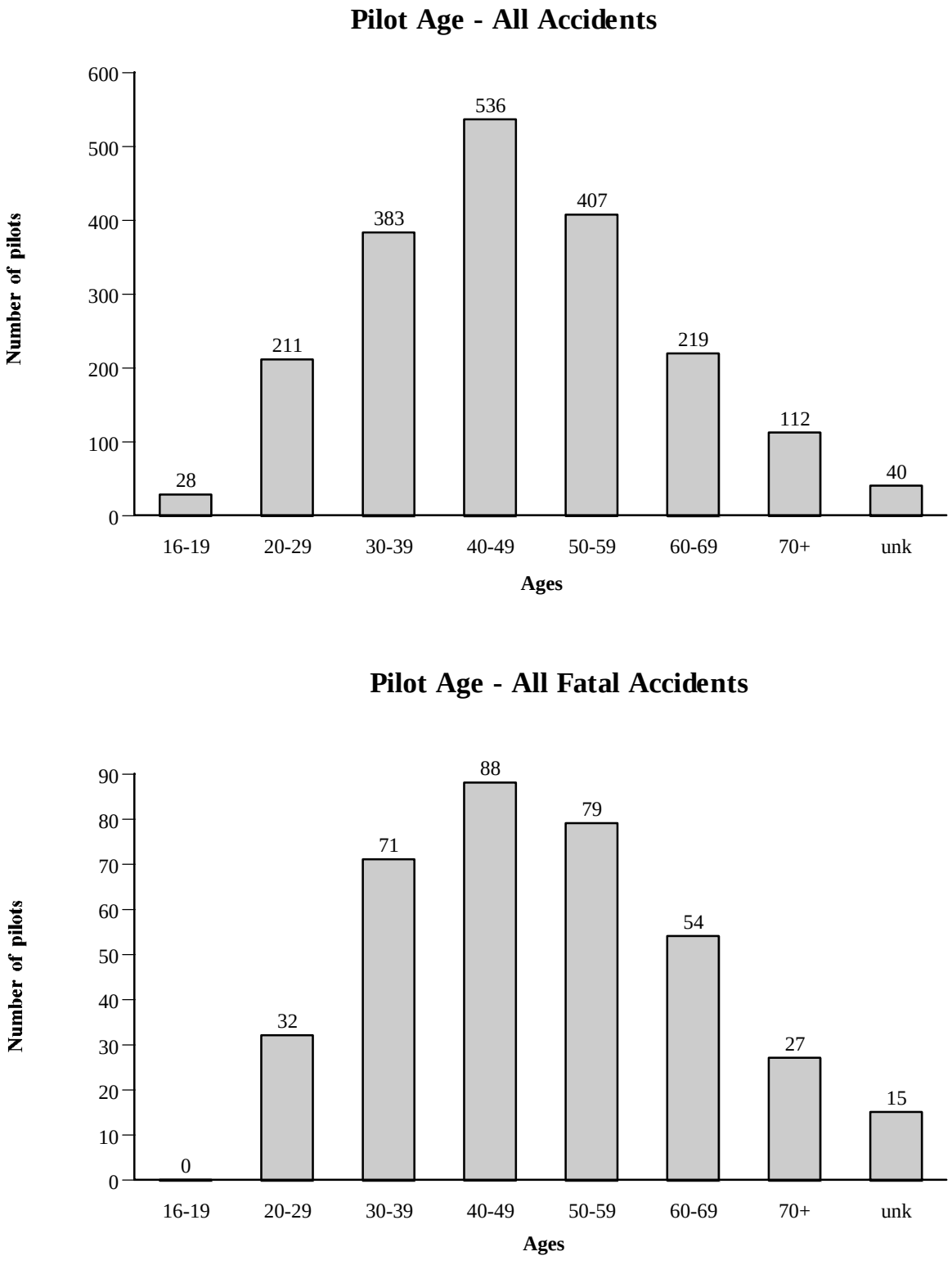

Chart 26. Age group of the 1,935 accident-involved pilots (top) and 366 fatal accident-involved pilots (bottom), 1996.

By the National Transportation Safety Board

James E. Hall
Chairman

Robert T. Francis II
Vice Chairman

John A. Hammerschmidt
Member

John Goglia
Member

George W. Black, Jr.
Member

Adopted: May 7, 1999

Appendix

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All Operations

Chart 27. Number of accidents, fatalities, and accident rates, all operations, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	3,995	633	1,252	1,231	28.799	13.87 (2)	2.19 (2)
1976	4,018	658	1,216	1,203	30.476	13.17 (4)	2.16 (1)
1977	4,079	661	1,276	1,265	31.578	12.91 (1)	2.09 (1)
1978	4,216	719	1,556	1,398	34.887	12.08 (2)	2.06 (2)
1979	3,818	631	1,221	1,203	38.641	9.88	1.63
1980	3,590	618	1,239	1,230	36.402	9.86 (1)	1.69 (1)
1981	3,500	654	1,282	1,261	36.803	9.51	1.78
1982	3,233	591	1,187	1,170	29.640	10.90 (3)	1.99
1983	3,077	556	1,069	1,062	28.673	10.73 (1)	1.94
1984	3,017	545	1,042	1,021	29.099	10.36 (3)	1.87 (2)
1985	2,739	498	956	945	28.322	9.66 (3)	1.75 (2)
1986	2,582	474	967	879	27.073	9.54	1.75
1987	2,495	447	838	823	26.972	9.25 (1)	1.65 (1)
1988	2,385	460	800	792	27.446	8.69 (1)	1.68
1989	2,233	431	768	765	27.920	7.98 (5)	1.53 (4)
1990	2,215	443	767	762	28.510	7.77 (1)	1.55
1991	2,175	433	786	772	27.678	7.85 (3)	1.56 (2)
1992	2,073	446	857	855	24.800	8.36 (1)	1.80 (1)
1993	2,039	398	736	732	22.796	8.94 (1)	1.74 (1)
1994	1,995	404	730	723	22.235	8.96 (2)	1.81 (2)
1995	2,053	412	734	727	24.906	8.23 (4)	1.64 (3)
1996	1,907	360	632	615	24.881	7.66	1.45

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

All Airplanes

Chart 28. Number of accidents, fatalities, and accident rates, all airplanes, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	3,644	609	1,216	1,193	28.393	12.83 (1)	2.14 (1)
1976	3,695	624	1,168	1,154	29.202	12.64 (4)	2.13 (1)
1977	3,745	632	1,240	1,230	30.166	12.41 (1)	2.09 (1)
1978	3,850	670	1,487	1,335	33.162	11.60 (2)	2.01 (2)
1979	3,477	592	1,155	1,142	36.760	9.46	1.61
1980	3,233	569	1,168	1,162	34.145	9.47 (1)	1.66 (1)
1981	3,161	610	1,208	1,190	34.113	9.27	1.79
1982	2,886	540	1,106	1,095	27.780	10.38 (2)	1.94
1983	2,735	505	997	992	26.709	10.24 (1)	1.89
1984	2,703	498	972	953	27.297	9.89 (3)	1.82 (2)
1985	2,466	455	897	888	26.364	9.34 (3)	1.72 (2)
1986	2,301	427	903	807	25.149	9.15	1.70
1987	2,249	411	786	770	25.306	8.89 (1)	1.62 (1)
1988	2,131	427	760	752	25.069	8.50 (1)	1.70
1989	2,000	397	719	715	25.855	7.72 (5)	1.52 (4)
1990	1,955	408	725	721	26.606	7.34 (1)	1.53
1991	1,945	395	729	722	25.091	7.74 (3)	1.57 (2)
1992	1,833	395	774	772	22.733	8.06 (1)	1.73 (1)
1993	1,827	364	679	674	20.414	8.94 (1)	1.78 (1)
1994	1,739	354	651	645	19.648	8.85 (1)	1.80 (1)
1995	1,840	382	688	681	21.930	8.38 (3)	1.73 (3)
1996	1,681	323	578	562	21.833	7.70	1.48

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Airplanes With A Single Reciprocating Engine

Chart 29. Number of accidents, fatalities, and accident rates, airplanes with a single reciprocating engine, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	3,305	514	972	949	22.881	14.44 (1)	2.24 (1)
1976	3,319	510	899	887	23.442	14.15 (2)	2.17 (1)
1977	3,383	542	996	987	23.798	14.21 (1)	2.27 (1)
1978	3,440	544	1,150	997	26.556	12.95 (2)	2.04 (2)
1979	3,071	471	869	856	29.128	10.54	1.62
1980	2,854	459	876	864	26.876	10.62 (1)	1.70 (1)
1981	2,819	496	918	906	26.347	10.70	1.88
1982	2,459	456	863	848	21.412	11.48 (1)	2.13
1983	2,448	421	780	772	20.470	11.95 (1)	2.06
1984	2,395	406	767	750	20.988	11.40 (3)	1.92 (2)
1985	2,180	368	677	667	20.317	10.72 (2)	1.81 (1)
1986	2,061	359	715	625	19.333	10.66	1.86
1987	2,016	347	631	613	19.635	10.26 (1)	1.76 (1)
1988	1,941	346	597	592	19.607	9.89 (1)	1.76
1989	1,813	339	592	586	19.867	9.11 (4)	1.69 (4)
1990	1,756	351	599	594	21.310	8.24 (1)	1.65
1991	1,749	329	568	561	20.187	8.65 (3)	1.62 (2)
1992	1,628	324	565	559	18.238	8.92 (1)	1.77 (1)
1993	1,613	301	514	504	16.264	9.91 (1)	1.84 (1)
1994	1,540	281	494	491	15.576	9.88 (1)	1.80 (1)
1995	1,602	297	493	489	17.461	9.16(3)	1.68 (3)
1996	1,493	259	421	416	17.219	8.67	1.50

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Airplanes with Multiple Reciprocating Engines

Chart 30. Number of accidents, fatalities, and accident rates, airplanes with multiple reciprocating engines, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	312	84	208	208	3.918	7.96	2.14
1976	346	103	238	231	4.085	8.42 (2)	2.52
1977	324	73	173	166	4.320	7.50	1.69
1978	367	112	295	292	4.496	8.16	2.49
1979	358	108	258	247	5.098	7.02	2.12
1980	330	99	262	256	4.491	7.35	2.20
1981	289	94	220	218	4.833	5.98	1.94
1982	343	88	254	247	3.709	9.22 (1)	2.37
1983	245	74	193	188	3.533	6.94	2.09
1984	260	76	168	166	3.552	7.32	2.14
1985	231	68	164	160	3.362	6.84 (1)	1.99 (1)
1986	190	54	122	121	3.230	5.88	1.67
1987	196	51	124	118	3.124	6.27	1.63
1988	162	67	134	129	2.780	5.83	2.41
1989	146	43	92	91	3.030	4.75 (1)	1.39
1990	144	35	78	77	2.812	5.12	1.24
1991	156	49	110	108	2.897	5.39	1.69
1992	141	49	130	130	2.405	5.86	2.04
1993	161	46	115	114	2.049	7.86	2.25
1994	138	55	125	122	1.990	6.93	2.76
1995	177	66	161	159	1.912	9.26	3.45
1996	123	40	91	187	1.875	6.56	2.13

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Turboprop Airplanes

Chart 31. Number of accidents, fatalities, and accident rates, turboprop airplanes, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	16	10	35	35	0.900	1.78	1.11
1976	22	8	19	18	0.901	2.44	0.89
1977	29	14	61	59	1.093	2.65	1.28
1978	28	11	32	31	1.056	2.65	1.04
1979	42	14	31	30	1.375	3.05	1.02
1980	41	11	38	35	1.524	2.69	0.72
1981	49	17	61	48	1.606	3.05	1.06
1982	37	9	37	33	1.396	2.65	0.64
1983	33	11	27	26	1.345	2.45	0.82
1984	38	11	22	22	1.556	2.44	0.71
1985	46	17	55	51	1.310	3.51	1.30
1986	31	12	57	51	1.242	2.50	0.97
1987	33	10	28	27	1.300	2.54	0.77
1988	24	10	19	19	1.311	1.83	0.76
1989	35	15	37	34	1.638	2.14	0.92
1990	38	13	29	28	1.226	3.10	1.06
1991	35	11	22	21	0.944	3.71	1.16
1992	55	20	74	72	1.117	4.92	1.79
1993	48	16	46	45	1.030	4.66	1.55
1994	45	13	25	25	0.920	4.89	1.41
1995	46	14	19	18	1.226	3.75	1.14
1996	50	19	54	41	1.382	3.62	1.37

Turbojet Airplanes

Chart 32. Number of accidents, fatalities, and accident rates, turbojet airplanes, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	13	1	1	1	0.687	1.89	0.15
1976	13	5	19	18	0.752	1.73	0.66
1977	13	5	18	18	0.943	1.38	0.53
1978	20	5	17	15	1.061	1.89	0.47
1979	13	3	9	9	1.120	1.16	0.27
1980	12	3	7	7	1.244	0.96	0.24
1981	7	4	17	17	1.318	0.53	0.30
1982	9	1	4	4	1.242	0.72	0.08
1983	13	3	8	6	1.338	0.97	0.22
1984	13	5	15	15	1.200	1.08	0.42
1985	16	5	15	10	1.375	1.16	0.36
1986	13	3	10	10	1.344	0.97	0.22
1987	10	6	12	12	1.248	0.80	0.48
1988	8	5	12	12	1.371	0.58	0.36
1989	9	2	4	4	1.320	0.68	0.15
1990	18	10	22	22	1.259	1.43	0.79
1991	10	7	32	32	1.063	0.94	0.66
1992	11	3	11	11	1.030	1.07	0.29
1993	9	3	11	11	1.070	0.84	0.28
1994	16	5	7	7	1.162	1.38	0.43
1995	19	5	15	15	1.331	1.43	0.38
1996	17	6	18	18	1.361	1.25	0.44

All Rotorcraft

Chart 33. Number of accidents, fatalities, and accident rates, all rotorcraft, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	264	18	30	28	0.974	27.10	1.85
1976	248	25	38	38	1.103	22.48	2.27
1977	246	22	28	25	1.170	21.03	1.88
1978	283	39	56	48	1.397	20.26	2.79
1979	265	33	56	51	1.522	17.41	2.17
1980	261	40	60	57	1.891	13.80	2.12
1981	257	30	55	52	2.303	11.16	1.30
1982	255	41	66	62	1.500	16.93 (1)	2.73
1983	234	35	55	53	1.575	14.86	2.22
1984	224	38	61	59	1.474	15.20	2.58
1985	205	36	50	47	1.576	13.01	2.28
1986	190	39	81	59	1.560	12.18	2.50
1987	180	29	45	45	1.282	14.05	2.26
1988	180	21	27	27	1.809	9.95	1.16
1989	187	30	44	41	1.693	11.05	1.77
1990	194	25	28	27	1.573	12.33	1.59
1991	170	30	51	44	2.126	8.00	1.41
1992	178	41	72	72	1.641	10.85	2.50
1993	162	33	53	50	1.419	11.42	2.33
1994	190	43	67	65	1.516	12.54	2.84
1995	152	23	38	38	1.637	9.23 (1)	1.40
1996	168	29	44	43	1.733	9.69	1.67

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Rotorcraft with Reciprocating Engine(s)

Chart 34. Number of accidents, fatalities, and accident rates, rotorcraft with reciprocating engine(s), 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	217	12	16	16	0.623	34.83	1.93
1976	209	17	24	24	0.680	30.74	2.50
1977	190	14	17	17	0.571	33.27	2.45
1978	223	28	40	33	0.766	29.11	3.66
1979	185	20	30	25	0.859	21.54	2.33
1980	181	22	25	24	0.719	25.17	3.06
1981	178	21	32	29	0.878	20.27	2.39
1982	157	20	24	24	0.525	29.72 (1)	3.81
1983	139	18	22	22	0.522	26.65	3.45
1984	128	22	29	28	0.532	24.04	4.13
1985	118	12	14	13	0.514	22.94	2.33
1986	118	21	24	22	0.728	16.20	2.88
1987	118	19	26	26	0.597	19.77	3.18
1988	118	17	21	21	0.527	22.38	3.22
1989	121	14	18	17	0.673	17.97	2.08
1990	134	16	19	19	0.715	18.74	2.24
1991	125	19	23	23	0.591	21.15	3.21
1992	120	22	31	31	0.405	29.60	5.43
1993	102	19	30	27	0.357	28.55	5.32
1994	106	21	26	25	0.331	32.03	6.35
1995	87	8	11	11	0.331	26.31	2.42
1996	79	14	19	19	0.571	13.84	2.45

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Rotorcraft with Turbine Engine(s)

Chart 35. Number of accidents, fatalities, and accident rates, rotorcraft with turbine engine(s), 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	47	6	14	12	0.351	13.39	1.71
1976	39	8	14	14	0.423	9.22	1.89
1977	56	8	11	8	0.599	9.35	1.34
1978	60	11	16	15	0.631	9.51	1.74
1979	80	13	26	26	0.663	12.07	1.96
1980	80	18	35	33	1.172	6.83	1.54
1981	79	9	23	23	1.424	5.55	0.63
1982	98	21	42	38	0.978	10.02	2.15
1983	95	17	33	31	1.053	9.02	1.61
1984	96	16	32	31	0.941	10.20	1.70
1985	87	24	36	34	1.062	8.19	2.26
1986	72	18	57	37	0.832	8.66	2.16
1987	62	10	19	19	0.684	9.06	1.46
1988	62	4	6	6	1.282	4.84	0.31
1989	66	16	26	24	1.000	6.60	1.60
1990	61	9	9	8	0.858	7.11	1.05
1991	45	11	28	21	1.535	2.93	0.72
1992	58	19	41	41	1.236	4.69	1.54
1993	60	14	23	23	1.062	5.65	1.32
1994	84	22	41	40	1.184	7.09	1.86
1995	65	15	27	27	1.306	4.90 (1)	1.15
1996	89	15	25	24	1.163	7.65	1.29

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Gliders

Chart 36. Number of accidents, fatalities, and accident rates, gliders, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	82	7	11	9	—	—	—
1976	64	8	9	8	—	—	—
1977	78	7	8	8	—	—	—
1978	66	10	14	10	—	—	—
1979	55	3	3	3	—	—	—
1980	62	7	7	7	—	—	—
1981	59	12	13	13	—	—	—
1982	51	6	6	5	—	—	—
1983	69	11	11	11	—	—	—
1984	54	10	10	9	—	—	—
1985	43	5	6	6	—	—	—
1986	68	9	10	10	—	—	—
1987	36	4	4	4	—	—	—
1988	45	12	13	13	—	—	—
1989	26	3	3	3	—	—	—
1990	40	5	5	5	—	—	—
1991	42	5	5	5	—	—	—
1992	44	8	8	8	—	—	—
1993	28	0	0	0	0.142	1.97	.00
1994	38	5	5	5	0.245	15.53	2.04
1995	36	2	2	2	0.151	23.91	1.33
1996	39	7	8	6	0.147	26.57	4.77

— Data not available.

Balloons

Chart 37. Number of accidents, fatalities, and accident rates, balloons, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	8	1	1	1	—	—	—
1976	13	3	6	6	—	—	—
1977	12	1	2	2	—	—	—
1978	19	1	3	3	—	—	—
1979	21	3	7	7	—	—	—
1980	34	2	4	4	—	—	—
1981	23	2	6	6	—	—	—
1982	29	2	7	7	—	—	—
1983	29	2	3	3	—	—	—
1984	33	0	0	0	—	—	—
1985	24	1	1	1	—	—	—
1986	23	1	2	2	—	—	—
1987	27	3	3	3	—	—	—
1988	25	0	0	0	—	—	—
1989	21	3	6	6	—	—	—
1990	26	4	8	8	—	—	—
1991	16	2	2	0	—	—	—
1992	15	2	3	3	—	—	—
1993	21	2	8	8	0.106	19.86	1.89
1994	19	0	0	0	0.979	19.40	.00
1995	20	2	3	3	0.750	26.67	2.67
1996	22	1	2	2	0.680	32.37	1.47

— Data not available.

Personal and Business Flying

Chart 38. Number of accidents, fatalities, and accident rates, personal and business flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	2,545	478	995	981	15.832	16.06 (2)	3.01 (2)
1976	2,629	490	950	933	16.850	15.58 (3)	2.90 (1)
1977	2,579	487	973	963	16.727	15.42	2.91
1978	2,656	522	1,066	1,055	19.322	13.74 (2)	2.69 (2)
1979	2,461	470	932	917	20.638	11.92	2.28
1980	2,285	450	924	915	19.374	11.79 (1)	2.32 (1)
1981	2,220	456	892	883	18.323	12.12	2.49
1982	2,194	471	979	965	13.850	15.84	3.40
1983	2,165	450	889	884	13.299	16.28	3.38
1984	2,158	442	870	865	13.863	15.54 (3)	3.17 (2)
1985	2,001	391	762	751	13.783	14.50 (2)	2.83 (1)
1986	1,834	387	821	722	14.768	12.42	2.62
1987	1,772	351	669	665	15.237	11.62 (1)	2.30 (1)
1988	1,678	373	673	665	14.609	11.49	2.55
1989	1,514	315	595	586	13.867	10.89 (4)	2.24 (4)
1990	1,502	330	577	570	13.691	10.96 (1)	2.41
1991	1,499	339	617	613	13.727	10.92	2.47
1992	1,449	350	661	655	12.165	11.90 (1)	2.87 (1)
1993	1,386	287	536	530	11.552	11.99 (1)	2.48 (1)
1994	1,297	288	534	523	11.260	11.51 (1)	2.55 (1)
1995	1,381	309	556	548	12.994	10.60 (3)	2.35 (3)
1996	1,271	265	457	437	12.300	10.34	2.16

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Personal Flying

Chart 39. Number of accidents and fatalities, personal flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities	
			All fatalities	Aircraft occupants
1975	2,228	414	875	861
1976	2,334	428	844	829
1977	2,280	437	889	874
1978	2,376	460	957	946
1979	2,206	414	820	807
1980	2,040	389	808	799
1981	1,958	383	749	738
1982	1,906	398	826	809
1983	1,892	398	775	770
1984	1,909	365	711	704
1985	1,741	327	642	635
1986	1,640	328	682	589
1987	1,590	303	566	564
1988	1,507	324	585	577
1989	1,366	274	509	501
1990	1,354	290	492	497
1991	1,353	292	536	532
1992	1,352	322	609	603
1993	1,274	258	476	466
1994	1,185	258	474	463
1995	1,284	278	488	476
1996	1,179	246	413	405

Business

Chart 40. Number of accidents and fatalities, business flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities	
			All fatalities	Aircraft occupants
1975	318	64	120	120
1976	298	62	106	104
1977	302	53	95	89
1978	281	62	109	109
1979	255	56	112	110
1980	246	62	126	116
1981	264	74	145	145
1982	292	74	157	156
1983	276	52	114	114
1984	251	78	161	161
1985	261	64	120	116
1986	194	59	139	133
1987	184	49	107	101
1988	172	49	88	88
1989	149	42	90	85
1990	149	40	80	78
1991	146	47	81	81
1992	97	28	52	52
1993	115	30	65	64
1994	114	30	60	60
1995	99	32	73	72
1996	93	19	44	32

Corporate/Executive Flying

Chart 41. Number of accidents, fatalities, and accident rates, corporate/executive flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	63	17	44	44	3.262	1.93	0.52
1976	56	14	42	38	3.396	1.65	0.41
1977	59	18	51	49	3.501	1.69	0.51
1978	88	24	70	67	4.898	1.80	0.49
1979	78	15	57	51	5.022	1.55	0.30
1980	96	21	66	63	5.351	1.79	0.39
1981	84	30	99	99	6.209	1.35	0.48
1982	39	6	21	20	4.589	0.85	0.13
1983	39	6	23	23	4.829	0.81	0.12
1984	25	4	8	8	4.396	0.57	0.09
1985	37	13	37	32	3.856	0.96	0.34
1986	20	3	11	11	3.491	0.57	0.09
1987	19	4	10	7	3.143	0.60	0.13
1988	10	2	3	3	3.472	0.29	0.06
1989	11	4	15	15	3.453	0.32	0.12
1990	14	5	21	21	2.913	0.48	0.17
1991	12	5	24	19	2.486	0.48	0.20
1992	15	4	13	12	2.251	0.67	0.18
1993	15	4	13	13	2.635	0.57	0.15
1994	8	3	5	5	2.486	0.32	0.12
1995	15	5	15	15	3.069	0.49	0.16
1996	8	5	20	20	2.898	0.28	0.17

Aerial Application Flying

Chart 42. Number of accidents, fatalities, and accident rates, aerial application flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	432	34	35	35	1.876	23.03	1.81
1976	434	40	44	42	2.136	20.27 (1)	1.87
1977	455	31	35	34	2.072	21.96	1.50
1978	457	28	28	27	2.082	21.95	1.34
1979	395	27	27	25	2.393	16.51	1.13
1980	363	25	32	28	2.063	17.60	1.21
1981	378	30	36	34	2.466	15.33	1.22
1982	272	17	18	15	1.882	14.45	0.90
1983	254	15	15	15	1.623	15.65	0.92
1984	245	20	21	20	1.849	13.25	1.08
1985	167	9	9	9	2.002	8.34	0.45
1986	193	19	22	20	1.833	10.53	1.04
1987	175	11	11	10	1.539	11.37	0.71
1988	170	12	13	13	1.842	9.23	0.65
1989	157	24	25	24	1.868	8.40	1.28
1990	152	16	17	17	1.872	8.12	0.85
1991	158	13	13	12	1.935	8.17	0.67
1992	142	9	9	9	1.370	10.36	0.66
1993	142	14	14	14	1.283	11.07	1.09
1994	153	17	17	17	1.364	11.22	1.25
1995	153	15	15	14	1.526	10.26	0.98
1996	134	10	10	9	1.713	7.82	0.58

[a] The numbers in parentheses are the number of accidents that involved suicide or sabotage, which are excluded from the total and fatal accident rates.

Instructional Flying

Chart 43. Number of accidents, fatalities, and accident rates, instructional flying, 1975 through 1996.

Year	Number of accidents	Number of fatal accidents	Number of fatalities		Aircraft hours flown (millions)	Accident rate per 100,000 aircraft hours flown[a]	
			All fatalities	Aircraft occupants		All accidents	Fatal accidents
1975	587	43	77	60	5.882	9.98	0.73
1976	541	55	97	87	6.102	8.87	0.90
1977	572	48	68	64	7.646	7.48	0.63
1978	604	62	243	92	6.322	9.55	0.98
1979	516	39	59	51	8.144	6.34	0.48
1980	461	41	73	70	7.315	6.30	0.56
1981	428	40	70	63	7.104	6.02	0.56
1982	411	22	38	36	4.535	9.04 (1)	0.49
1983	379	26	41	40	4.482	8.46	0.58
1984	354	25	54	37	4.193	8.44	0.60
1985	314	27	52	40	3.938	7.97	0.69
1986	317	23	41	37	4.319	7.34	0.53
1987	342	33	72	61	4.529	7.55	0.73
1988	336	32	49	47	4.917	6.81 (1)	0.65
1989	306	28	50	43	5.993	5.11	0.47
1990	315	33	62	56	7.243	4.35	0.46
1991	339	31	63	52	6.160	5.50	0.50
1992	271	29	49	46	5.485	4.94	0.53
1993	286	27	50	48	4.626	6.18	0.58
1994	301	23	47	39	4.382	6.87	0.52
1995	268	23	44	40	4.410	6.08	0.52
1996	246	18	40	36	4.759	5.17	0.38