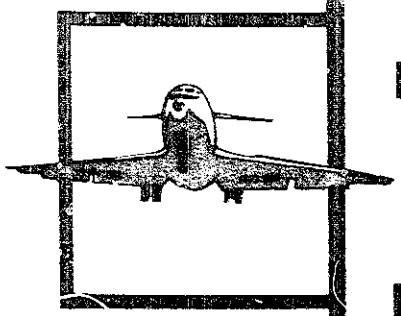

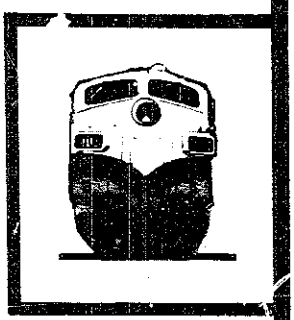

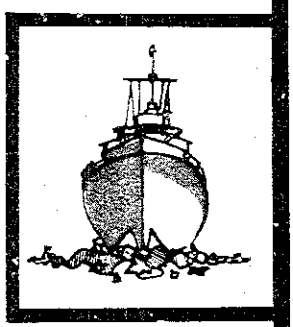

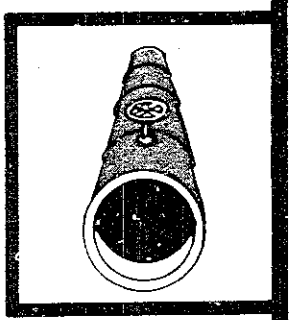

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NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA

U.S. AIR CARRIERS CALENDAR YEAR 1980

NTSB/ARC-83/01

UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

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15. Supplementary Notes

16. Abstract

This publication presents the record of aviation accidents involving revenue operations of U.S. Air Carriers for calendar year 1980. Accidents involving Commuter Air Carriers and On Demand Air Taxis are reported in this publication. In 1979 and prior years, these accidents were reported in annual reviews of general aviation accidents.

The report is divided into two sections according to the federal regulations under which the flight was conducted - 14 CFR 121 or 14 CFR 135. For 14 CFR 135 accidents, the report is further divided by the type of service provided - scheduled or nonscheduled. In each section of the report, tables are presented to describe the losses and characteristics of 1980 accidents and to enable comparison with prior years.

17. Key Words	18. Distribution Statement
Aviation, Air Carrier, Commuter, On Demand Air Taxi, Accident, Accident Rates, 14 CFR 121, 14 CFR 135	This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161 (Always refer to number listed in item 2).

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INTRODUCTION

This report presents a compilation and statistical review of accidents which occurred in 1980 and involved operations under 14 CFR 121 (and 14 CFR 127 for helicopters) or 14 CFR 135. In years prior to 1980, the National Transportation Safety Board has reported, in its annual reviews of U.S. air carrier operations, all accidents involving aircraft operated by air carriers and (since 1975) by commercial operators of large aircraft. For 1980, only the revenue operations of these operators are reported in this document, while accidents during non-revenue operations (e.g., training, ferrying) will be reported in the Safety Board's annual review of general aviation accidents.

This review of U.S. air carrier accidents includes those involving revenue operations of commuter air carriers and on-demand air taxi operator, since these operators are air carriers in that they must have FAA air carrier operating certificates. In past years, such accidents have been summarized in the annual review of general aviation accidents.

Accident data upon which this review is based have been extracted from the Safety Board's automated Aviation Accident System. It should be noted that the accident records contained in that system do not explicitly contain the federal regulation under which each operation was being conducted at the time an accident occurred. The regulation was determined from other information contained in the system and in some cases from a review of the accident docket.

Exposure data (flight hours, miles, and departures) used to compute accident rates for Part 121 and scheduled Part 135 operations were obtained from the Civil Aeronautics Board (CAB). Flight hours for non-scheduled Part 135 operations were estimated from data obtained by the Federal Aviation Administration (FAA) in its general aviation activity surveys.

This report is divided into two major sections: 14 CFR 121 accidents, and 14 CFR 135 accidents. The 14 CFR 135 section is further divided into two subsections, scheduled and nonscheduled operations. For each of these three accident categories, three general types of information are presented. A Summary of Losses gives an overview of accidents, consequences, and rates for 1980, 1979, and 1978. A Detailed Review presents tabulations of a number of accident and aircraft parameters for 1980 accidents. An Historical Comparison presents data for 1980 and for the 5-year period 1975 through 1979.

It should be noted that in many of the tables presented in this report (such as in Table 4), the number of accidents in a given category is small, and even a small change in the number of accidents would result in a significant change in the accident rate. Therefore, caution should be exercised in the use of these rates.

14 CFR 121

In 1980, U.S. air carriers were involved in 19 accidents while operating under 14 CFR 121. Only one of the 19 accidents resulted in a fatality (a parachutist struck by an air carrier aircraft). One air carrier operating under Part 121 collided with a general aviation aircraft resulting in only minor damage to, and no injuries aboard the air carrier aircraft. Both aircraft were on the ground when they collided.

SUMMARY OF LOSSES

Degree of injury, number of fatalities, and extent of aircraft damage are presented in Table 1 for 1980 and the two preceding years. There were fewer accidents in 1980, and substantially fewer fatal accidents and fatalities than in either of the two prior years.

Table 1 - SUMMARY OF LOSSES

Accidents	1980	1979	1978
Fatal	1	5	5
Involved Serious Injury	11	9	13
Involved Minor or No Injury	7	15	4
Total	19	29	22
Fatalities			
Passenger	0	323	141
Crew	0	28	9
Other Persons	1	3	10
Total	1	354	160
Aircraft Damaged - No. of 14 CFR 121 Aircraft			
Destroyed	2	6	2
Substantial	9	16	8
Minor	2	0	4
None	6	8	8
Total	19	30	22
Aircraft Damaged - No. of Other Aircraft			
Destroyed	0	1	1
Substantial	1	0	1
Total	1	1	2

Table 2 presents, for 1980, 1979, and 1978, three measures of activity under 14 CFR 121 (miles, hours, and departures flown) and accident rates computed using each. Except for a small decrease from 1979 in the number of departures flown, activity in 1980 exceeded that for 1979 and 1978. This increased activity coupled with decreases in accidents and fatal accidents resulted in lower accident rates and considerably lower fatal accident rates in 1980 when compared to the two preceding years.

Table 2 - ACCIDENT RATES

	1980	1979	1978
Miles Flown (Thousands)	2,924,234	2,922,226	2,678,308
Accident Rates (Per Million Miles Flown)			
All Accidents	0.0065	0.0099	0.0082
Fatal Accidents	0.0003	0.0017	0.0019
Hours Flown	7,067,468	7,038,059	6,414,096
Accident Rates (Per Hundred Thousand Hours Flown)			
All Accidents	0.269	0.412	0.343
Fatal Accidents	0.014	0.071	0.078
Departures Flown	5,479,452	5,532,202	5,164,290
Accident Rates (Per Hundred Thousand Departures Flown)			
All Accidents	0.347	0.524	0.426
Fatal Accidents	0.018	0.090	0.097

DETAILED REVIEW

The 1980 accidents which occurred during operations under 14 CFR 121 are described in Table 3. The remainder of this subsection presents tabulations of the operational factors, losses, environmental conditions, and causes of these accidents.

Accidents and activity for operations conducted under 14 CFR 121 in 1980 are shown as a function of type of operation in Table 4. The only fatal accident occurred on a non-scheduled operation. The accident rates for all non-scheduled operations are higher than those for all scheduled operations by factors ranging from 6.7 to 11.3. Within the category "scheduled operations," the accident rate per million miles flown for all-cargo operations was 4.9 times the rate for combined passenger/cargo operations.

Table 3 - 14 CFR 121 ACCIDENTS

Date	Location	Type of Operation	Air Carrier	Acft Type	Acft Damage	Degree of Injury	Type of Accident
1/18	Syracuse,NY	Mil Cargo	Zantop Air Transp't	L-188	Subst'l	Minor	Airframe Failure - In Flight
1/19	Las Vegas,NV	Sch Pass	Air California	B-737	Subst'l	Serious	Landing Gear Collapsed
1/23	Chicago,IL	Sch Cargo	Flying Tiger	DC-8	Subst'l	Minor	Landing Gear Collapsed
3/17	Baton Rouge,LA	Sch Pass	Texas International	DC-9	Subst'l	Serious	Overshoot
4/04	Southeast,PA	Sch Pass	Eastern	DC-9	None	Serious	Turbulence
4/21	Fillmore,CA	Sch Pass	Trans World	B-707	None	Serious	Turbulence
6/07	Santa Ana,CA	Sch Pass	Hughes Airwest	DC9-30	Minor	None	Coll btw Aircraft - On Ground
6/10	Indianapolis,IN	Nonsch Cargo	Zantop Int'l	DC-6	Subst'l	None	Airframe Failure - On Ground
6/19	Atlanta,GA	Sch Cargo	Airborne Express	SE-210	Destr'd	None	Turbulence
7/15	Tampa,FL	Sch Pass	Delta	DC-9	None	Serious	Turbulence
8/23	Otay,CA	Mil Cargo	Trans-International	L-382	Minor	Fatal (1)	Miscellaneous
9/03	S.Jose,Costa Rica	Sch Pass	Pan American World	B-727	Subst'l	Minor	Undershoot
9/12	Nassau,Bahamas	Sch Pass	Delta	L-1011	None	Serious	Turbulence
9/16	London,England	Sch Pass	Pan American World	DC-10	Subst'l	Serious	Airframe Failure - On Ground
10/06	Port Au Prince,Haiti	Sch Pass	Air Florida	B-737	Subst'l	None	Ground-Water Loop-Swerve
10/17	Kingston,Jamaica	Sch Pass	American	B-707	None	Serious	Turbulence
11/11	Newark,NJ	Sch Pass	Braniff	B-727	None	Serious	Ground-Water Loop-Swerve
11/21	Yap,West Carolina Isl	Sch Pass	Continental	B-727	Destr'd	Serious	Undershoot
12/29	Phoenix,AZ	Nonsch Pass	United	DC-8	Subst'l	Serious	Landing Gear Collapsed

Table 4 - ACCIDENTS AND RATES BY TYPE OF OPERATION

	Type of Operation				
	Scheduled			All Non-Scheduled	All
	Passenger/ Cargo	All Cargo	All		
Accidents	13	2	15	4	19
Fatal Accidents	0	0	0	1	1
Aircraft Miles Flown (Thousands)	2,732,826	84,948	2,816,303*	107,931	2,924,234
Aircraft Hours Flown	n/a**	n/a	6,797,578	269,890	7,067,468
Departures Flown	n/a	n/a	5,352,927	126,425	5,479,452
Accidents Rates					
Per Million Miles Flown	0.0048	0.0235	0.0053	0.0371	0.0065
Per Hundred Thousand Hours Flown	n/a	n/a	0.221	1.482	0.269
Per Hundred Thousand Departures Flown	n/a	n/a	0.280	3.164	0.347
Fatal Accident Rates					
Per Million Miles Flown	0	0	0	0.0093	0.0003
Per Hundred Thousand Hours Flown	0	0	0	0.371	0.014
Per Hundred Thousand Departures Flown	0	0	0	0.791	0.018

* The figures for aircraft miles flown in scheduled operations are presented as published by CAB. The subcategories do not total correctly, presumably due to editing of the data by CAB. Discrepancies in accident rates computed from these data are negligible.

** Data not available from CAB.

Table 5 is a cross-tabulation of the degree of injury sustained with the various categories of persons involved in the accidents. It is worthy of note that only 8.4 percent of passengers aboard aircraft operating under 14 CFR 121 and involved in an accident, received any injuries at all. Further, only 1.1 percent of all accident-involved passengers were seriously injuried. This resulted in a rate of 1 serious passenger injury per 20.6 billion passenger-miles based on the CAB-published figure of 267.7 billion revenue passenger-miles reported by certificated air carriers for 1980.

Table 5 - PERSONS BY ROLE AND DEGREE OF INJURY

	Degree of Injury				
	Fatal	Serious	Minor	None	Total
Pilot-in-Command	0	1	2	16	19
Co-Pilot	0	0	0	19	19
Flight Engineer/Navigator	0	0	0	12	12
Extra Crew	0	0	1	4	5
Cabin Attendant	0	5	6	55	66
Passenger	0	13	84	1,058	1,155
Person Aboard (or From) Other Aircraft	1	0	0	1	2
Total	1	19	93	1,165	1,278

In 1980, the predominant type of Part 121 accident were those involving turbulence. These accounted for 31.6 percent of all accidents and 41.7 percent of the accidents which resulted in serious or fatal injuries. Accidents not related to turbulence were distributed over eight general accident types (see Table 6). Overall, 12 of the 19 accidents (63.2 percent) resulted in serious or fatal injuries. In the one collision between aircraft (one of which was not operating under 14 CFR 121), no one aboard either aircraft was injured.

Table 6 - ACCIDENTS BY TYPE AND DEGREE OF INJURY

	Degree Of Injury				Accidents	
Type Of Accident	Fatal	Serious	Minor	None	Number	Percent
Airframe Failure In Flight	0	0	1	0	1	5.3
Airframe Failure On Ground	0	1	0	1	2	10.5
Collision, Both Aircraft On Ground	0	0	0	1	1	5.3
Ground-Water Loop-Swerve	0	1	0	1	2	10.5
Landing Gear Collapsed	0	2	1	0	3	15.8
Miscellaneous (Struck Parachutist)	1	0	0	0	1	5.3
Overshoot	0	1	0	0	1	5.3
Turbulence	0	5	0	1	6	31.6
Undershoot	0	1	1	0	2	10.5
Accidents - Number	1	11	3	4	19	
- Percent	5.3	57.9	15.8	21.1		

In Table 7, aircraft damage is cross tabulated by accident type. Of the total of 19 aircraft, 11 (or 57.9 percent) sustained substantial damage or were destroyed. Turbulence accidents, the most frequent type in 1980, resulted in no aircraft damage in five out of six cases.

Table 7 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

	Aircraft Damage				Part 121 Aircraft	
Type of Accident	Destroyed	Substantial	Minor	None	Number	Percent
Airframe Failure In Flight	0	1	0	0	1	5.3
Airframe Failure On Ground	0	2	0	0	2	10.5
Collision, Both Aircraft On Ground	0	0	1	0	1	5.3
Ground-Water Loop-Swerve	0	1	0	1	2	10.5
Landing Gear Collapsed	0	3	0	0	3	15.8
Miscellaneous (Struck Parachutist)	0	0	1	0	1	5.3
Overshoot	0	1	0	0	1	5.3
Turbulence	1	0	0	5	6	31.6
Undershoot	1	1	0	0	2	10.5
Part 121 Aircraft - Number	2	9	2	6	19	
- Percent	10.5	47.4	10.5	31.6		

Table 8 is a cross tabulation of the phase of operation in which the accident occurred and the degree of injury. One-third of the accidents which resulted in serious or fatal injuries occurred during descent.

Table 8 - AIRCRAFT BY PHASE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Part 121 Aircraft	
Phase of Operation	Fatal	Serious	Minor	None	Number	Percent
Taxi						
To Takeoff	0	2	1	1	4	21.1
Takeoff						
Run	0	1	0	0	1	5.3
In Flight						
Climb to Cruise	0	1	0	0	1	5.3
Normal Cruise	0	1	1	0	2	10.5
Descent	1	3	0	0	4	21.1
Landing						
Final Approach (VFR)	0	1	1	0	2	10.5
Level-off/Touchdown	0	1	0	1	2	10.5
Roll	0	1	0	2	3	15.8
Part 121 Aircraft - Number	1	11	3	4	19	
- Percent	5.3	57.9	15.8	21.1		

Six of the 11 aircraft which were destroyed or substantially damaged were in the landing phase of flight at the time the accident occurred (see Table 9). Of the seven accidents which occurred during the in-flight phase of operation, five caused no damage to the aircraft, and another resulted in only minor damage.

Table 9 - AIRCRAFT BY PHASE OF OPERATION AND AIRCRAFT DAMAGE

Phase of Operation	Aircraft Damage				Part 121 Aircraft	
	Destroyed	Substantial	Minor	None	Number	Percent
Taxi						
To Takeoff	0	3	1	0	4	21.1
Takeoff						
Run	0	1	0	0	1	5.3
In Flight						
Climb To Cruise	0	0	0	1	1	5.3
Normal Cruise	0	1	0	1	2	10.5
Descent	0	0	1	3	4	21.1
Landing						
Final Approach (VFR)	1	1	0	0	2	10.5
Level-off/Touchdown	1	1	0	0	2	10.5
Roll	0	2	0	1	3	15.8
Part 121 Aircraft - Number	2	9	2	6	19	
- Percent	10.5	47.4	10.5	31.6		

Table 10 is a cross tabulation of accident type with the phase of operation. All three of the "Landing Gear Collapsed" accidents occurred during taxi to takeoff. Three of the six turbulence accidents occurred in the descent phase of operation.

Table 10 - AIRCRAFT BY TYPE OF ACCIDENT AND PHASE OF OPERATION

Type of Accident	Phase of Operation								Part 121 Aircraft	
	Taxi To Takeoff	Takeoff Run	Climb To Cruise	Normal Cruise	Descent	Final Approach (VFR)	Level Off/ Touchdown	Landing Roll	Number	Percent
Airframe Failure In Flight	0	0	0	1	0	0	0	0	1	5.3
Airframe Failure On Ground	0	1	0	0	0	0	0	1	2	10.5
Collision, Both Aircraft On Ground	1	0	0	0	0	0	0	0	1	5.3
Ground-Water Loop-Swerve	0	0	0	0	0	0	0	2	2	10.5
Landing Gear Collapsed	3	0	0	0	0	0	0	0	3	15.8
Miscellaneous (Struck Parachutist)	0	0	0	0	1	0	0	0	1	5.3
Overshoot	0	0	0	0	0	0	1	0	1	5.3
Turbulence	0	0	1	1	3	0	1	0	6	31.6
Undershoot	0	0	0	0	0	2	0	0	2	10.5
Part 121 Aircraft - Number	4	1	1	2	4	2	2	3	19	
- Percent	21.1	5.3	5.3	10.5	21.1	10.5	10.5	15.8		

At least eight of the accidents occurred in daylight and VFR weather conditions (see Table 11). For three of the 19 accidents, either the condition of light or the weather conditions, or both, were not reported. Six (or 35.3 percent) of the 17 accidents for which weather conditions were reported occurred in IFR weather.

Table 11 - ACCIDENTS BY CONDITION OF LIGHT AND TYPE OF WEATHER CONDITION

	Type of Weather Condition			Accidents	
Condition of Light	VFR	IFR	Unk/NR	Number	Percent
Daylight	8	5	1	14	73.7
Dusk (Twilight)	1	0	0	1	5.3
Night (Dark)	1	0	0	1	5.3
Night (Moonlight-Bright)	1	0	0	1	5.3
Unknown/Not Reported	0	1	1	2	10.5
Accidents - Number	11	6	2	19	
- Percent	57.9	31.6	10.5		

Table 12 presents aircraft damage as a function of the degree of injury sustained in the accident. It must be understood that occurrences resulting in both damage and injury no more severe than "minor" are classified by NTSB as incidents and are not included in this report. Therefore, although Table 12 shows that all of the accidents in 1980 which resulted in no aircraft damage produced serious personal injury, and that six of the seven accidents which produced minor or no injuries caused at least substantial aircraft damage, no inferences can be made concerning all injury- or damage-producing occurrences.

Table 12 presents aircraft damage only to aircraft operating under 14 CFR 121. The one accident in the no-injury, minor damage category was an on-ground collision in which the non-Part 121 aircraft sustained substantial damage.

Table 12 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

	Degree of Injury				Part 121 Aircraft	
Aircraft Damage	Fatal	Serious	Minor	None	Number	Percent
Destroyed	0	1	0	1	2	10.5
Substantial	0	4	3	2	9	47.4
Minor	1	0	0	1	2	10.5
None	0	6	0	0	6	31.6
Part 121 Aircraft						
Number	1	11	3	4	19	
Percent	5.3	57.9	15.8	21.1		

The type of operation in which each aircraft was engaged and the degree of injury produced by the accident are cross tabulated in Table 13. Of the 12 accidents which produced serious or fatal injuries, 11 involved passenger operations, 10 of which were scheduled passenger service.

Table 13 - AIRCRAFT BY TYPE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Part 121 Aircraft	
Type of Operation	Fatal	Serious	Minor	None	Number	Percent
Scheduled Domestic Passenger	0	5	0	0	5	26.3
Scheduled International Passenger	0	5	1	2	8	42.1
Scheduled Domestic Cargo	0	0	1	1	2	10.5
Non-Scheduled Domestic Passenger	0	1	0	0	1	5.3
Non-Scheduled Domestic Cargo	0	0	0	1	1	5.3
Military Contract Domestic Cargo	1	0	1	0	2	10.5
Part 121 Aircraft - Number	1	11	3	4	19	
- Percent	5.3	57.9	15.8	21.1		

Thirteen of the 19 accidents involving aircraft operating under 14 CFR 121 occurred on the airport (see Table 14). Only one of the six turbulence accidents occurred on the airport. Four turbulence accidents occurred more than 5 miles out. The airport proximity was not reported for one turbulence accident in 1980.

Table 14 - ACCIDENTS BY TYPE AND PROXIMITY TO AIRPORT

	Proximity to Airport			Accidents	
Type of Accident	On Airport	Beyond 5 Miles	Unk/NR	Number	Percent
Airframe Failure In Flight	1	0	0	1	5.3
Airframe Failure On Ground	2	0	0	2	10.5
Collision, Both Aircraft On Ground	1	0	0	1	5.3
Ground-Water Loop-Swerve	2	0	0	2	10.5
Landing Gear Collapsed	3	0	0	3	15.8
Miscellaneous (Struck Parachutist)	0	1	0	1	5.3
Overshoot	1	0	0	1	5.3
Turbulence	1	4	1	6	31.6
Undershoot	2	0	0	2	10.5
Accidents - Number	13	5	1	19	
- Percent	68.4	26.3	5.3		

The National Transportation Safety Board investigates aviation accidents in order to determine their cause or probable cause. In the course of the investigation and the subsequent analysis of factual data, the Safety Board also notes accident factors, which are conditions which existed or events which occurred coincident with the causal condition(s) or event(s). Unlike causes, factors may or may not have contributed significantly to the accident.

Individual causes and factors assigned by the Safety Board are very specific. Appendix A contains a detailed cause/factor listing for 14 CFR 121 accidents which occurred in 1980. In Table 15, the specific causes and factors are grouped into major categories and the numbers of Part 121 accidents for each broad cause and/or factor are tabulated. Personnel (e.g., maintenance, weather, traffic control) was the most frequently cited category of causes in accidents and the only category cited in the one Part 121 fatal accident in 1980.

Table 15 - BROAD CAUSE/FACTOR ASSIGNMENTS*

Cause/Factor	Cited as a Cause		Cited as a Factor		Cited as Either a Cause or a Factor (or Both)	
	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents
Personnel	1	6	0	2	1	8
Weather	0	4	0	5	0	6
Pilot	0	5	0	1	0	5
Landing Gear	0	3	0	0	0	3
Airport/Airways/ Facilities	0	0	0	2	0	2
Airframe	0	1	0	0	0	1
Miscellaneous	0	1	0	0	0	1
Number of Accidents with Cause(s) Assigned					1	18

* The table presents the number of accidents for which each cause/factor was cited. One accident is still under investigation by a foreign government. In the one collision accident between an air carrier aircraft operating under 14 CFR 121 and another aircraft not operating under 14 CFR 121, causes and factors for the other aircraft are not included in the table. Multiple causes and factors may be assigned in an accident.

HISTORICAL COMPARISON

This subsection presents a series of tables which facilitate the comparison of accidents of aircraft operated under 14 CFR 121 between 1980 and the 5-year base period 1975-1979. In those tables in which statistics are tabulated for the entire base period, the values listed are arithmetic means obtained by dividing the number of occurrences in the period by five (the number of years in the period). This format enables a more direct comparison between the 1980 statistics and those for the base period.

Table 16 lists, for the years 1975 through 1980, the numbers of accidents, fatal accidents, and fatalities, as well as accident and fatal accident rates. As shown in Table 16, all of these accident statistics vary substantially from year to year. By any measure in the table, the year 1980 was the safest in the 6-year period. This fact is further illustrated in Figures 1 and 2 in which the accident statistics are depicted graphically.

Table 16 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES

			Fatalities	
Year	Accidents	Fatal Accidents	Total	Aboard Part 121 Aircraft
1975	37	3	124	124
1976	23	2	38	38
1977	24	5	655	398
1978	22	5	160	150
1979	29	5	354	351
1980	19	1	1	0

		Accident Rates Per 100,000 Aircraft Hours Flown	
Year	Hours Flown	Total	Fatal
1975	5,771,048	0.641	0.052
1976	5,963,985	0.386	0.034
1977	6,211,160	0.386	0.081
1978	6,414,096	0.343	0.078
1979	7,038,059	0.412	0.071
1980	7,067,468	0.269	0.014

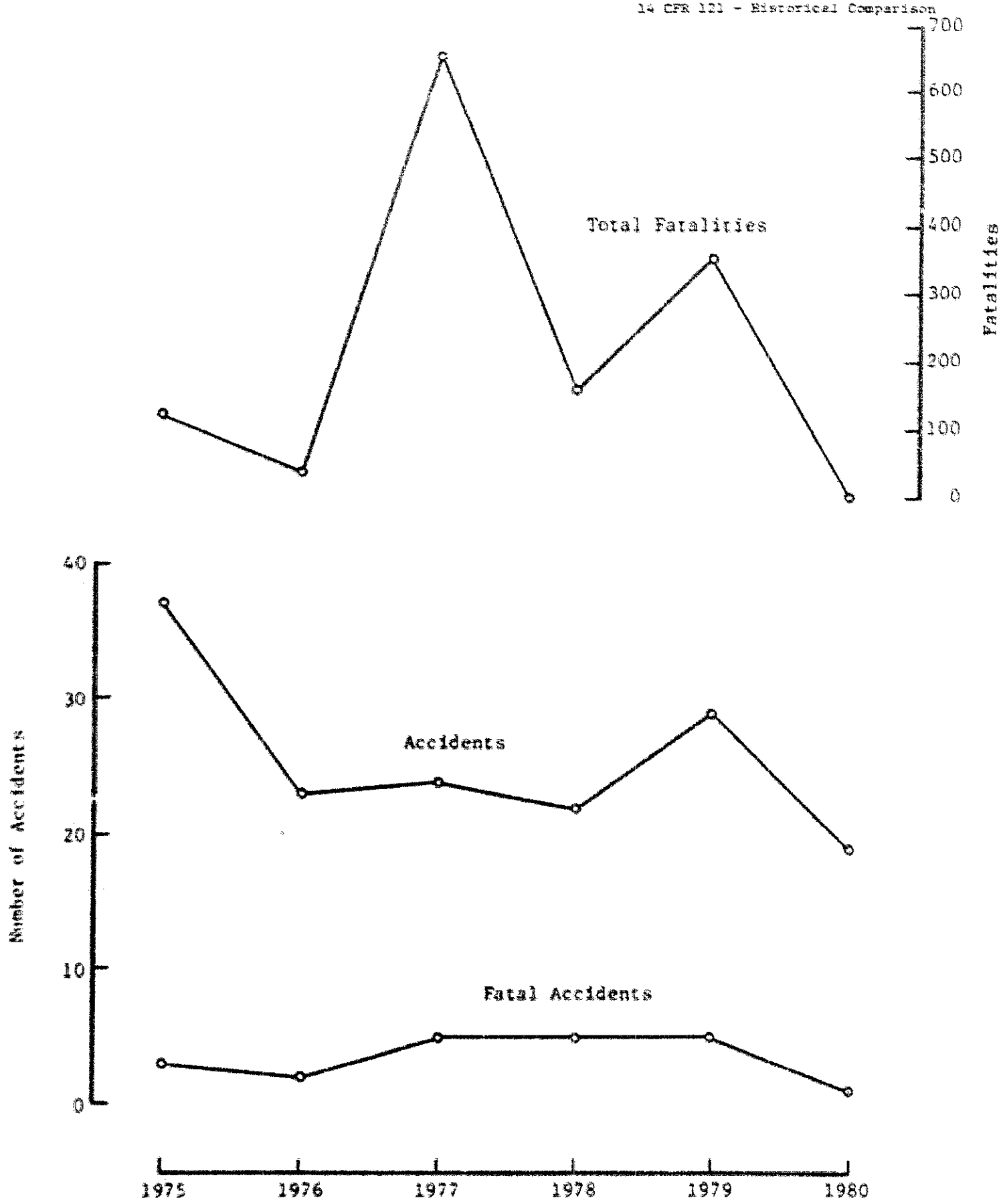

Figure 1 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

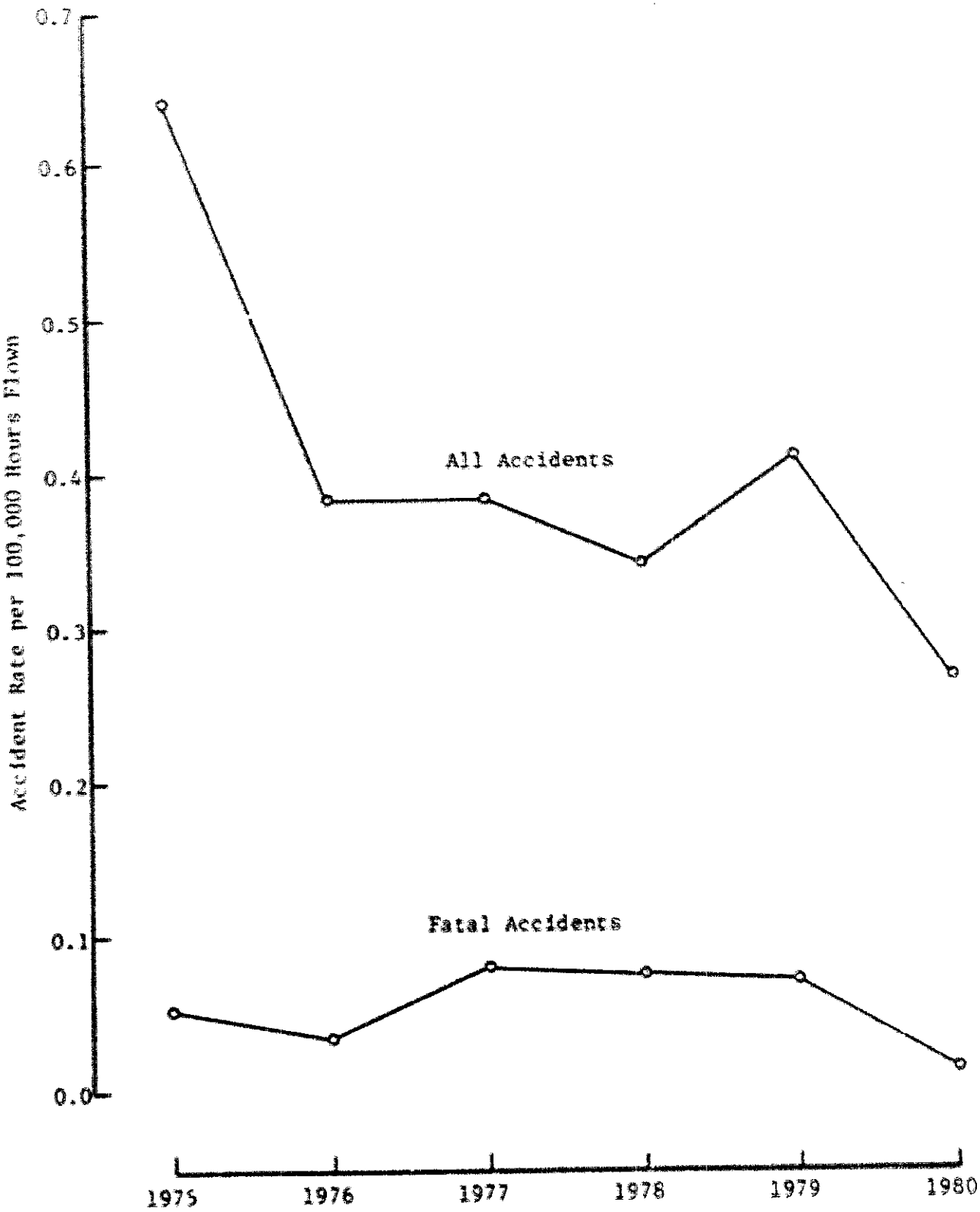

Figure 2 - ACCIDENT RATES

The most prevalent types of accidents (those which constituted at least 2 percent of the total in the base period 1975 to 1979) are listed in Table 17 with the number and percent of accidents of that type in 1980 and the base period. The four leading accident types which, when combined, averaged 13.6 accidents per year in the base period, accounted for only 7 accidents in 1980. In 1980, the accident types "Landing Gear Collapsed" and "Undershoot" each had more than twice as many accidents as their averages for the preceding five years.

Table 17 - MOST PREVALENT TYPES OF ACCIDENTS

	1980		1975-1979	
Type of Accident	No.	Percent	Mean	Percent
Turbulence	6	31.6	7.4	27.4
Miscellaneous/Other	1	5.3	2.6	9.6
Engine Failure or Malfunction	0	0.0	2.0	7.4
Collision With Trees, Wires, Objects	0	0.0	1.6	5.9
Landing Gear Collapsed	3	15.8	1.4	5.2
Overshoot	1	5.3	1.4	5.2
Fire or Explosion on Ground	0	0.0	1.4	5.2
Collision Between Aircraft	1	5.3	1.2	4.4
Ground-Water Loop-Swerve	2	10.5	1.0	3.7
Collision with Ground/Water - Controlled	0	0.0	1.0	3.7
Undershoot	2	10.5	0.8	3.0
Collision with Ground/Water - Uncontrolled	0	0.0	0.6	2.2
Airframe Failure In Flight	1	5.3	0.6	2.2
Hard Landing	0	0.0	0.6	2.2
Evasive Maneuver	0	0.0	0.6	2.2
(All Other Types)	2	10.5	2.8	10.4
Total	19	100.0	27.0	100.0

Table 18 is similar in structure to Table 17, but contains statistics only on fatal accidents. Unlike all accidents (for which "Turbulence" accounts for 27.4 percent of the accident types), there is no predominant type of fatal accident in the base period; this is not unexpected since the number of fatal accidents is so small.

Table 18 - TYPES OF FATAL ACCIDENTS

	1980		1975-1979	
Type of Accident	No.	Percent	Mean	Percent
Collision With Ground/Water - Controlled	0	0.0	0.6	15.0
Engine Failure or Malfunction	0	0.0	0.6	15.0
Miscellaneous/Other	1	100.0	0.4	10.0
Overshoot	0	0.0	0.4	10.0
Collision Between Aircraft	0	0.0	0.4	10.0
Collision With Ground/Water - Uncontrolled	0	0.0	0.2	5.0
Collision With Trees, Wire, Objects	0	0.0	0.2	5.0
Landing Gear Collapsed	0	0.0	0.2	5.0
Undershoot	0	0.0	0.2	5.0
Airframe Failure on Ground	0	0.0	0.2	5.0
Engine Tearaway	0	0.0	0.2	5.0
Propeller Failure	0	0.0	0.2	5.0
Rotor Failure	0	0.0	0.2	5.0
Total	1	100.0	4.0	100.0

Tables 19 and 20 present, respectively, the numbers of Part 121 aircraft grouped by their general phase of operation at the time of the accident. The only phase of operation which had a higher number of accidents in 1980 than the average for the base period was the "Taxi" phase.

Table 19 - PHASE OF OPERATION FOR ACCIDENT-INVOLVED 14 CFR 121 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
In Flight	7	36.8	10.6	38.7
Landing	7	36.8	7.2	26.3
Takeoff	1	5.3	3.6	13.1
Taxi	4	21.1	3.4	12.4
Static	0	0.0	2.4	8.8
Unknown/Not Reported	0	0.0	0.2	0.7
Total 14 CFR 121 Aircraft	19	100.0	27.4	100.0

Table 20 - PHASE OF OPERATION FOR FATAL ACCIDENT-INVOLVED 14 CFR 121 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
Landing	0	0.0	1.4	35.0
In Flight	1	100.0	1.0	25.0
Takeoff	0	0.0	1.0	25.0
Taxi	0	0.0	0.4	10.0
Static	0	0.0	0.2	5.0
Total 14 CFR 121 Aircraft	1	100.0	4.0	100.0

Tables 21 and 22 tabulate the numbers of accidents and fatal accidents, respectively, for which each of the listed cause/factors were cited in 1980 and in the base period. Only "Landing Gear" and "Airframe" showed any increase in frequency in 1980 when compared to the 1975-1979 mean, and these increases were small.

Table 21 - BROAD CAUSE/FACTOR ASSIGNMENTS* - ALL ACCIDENTS

	1980		1975-1979	
Cause/Factor	No.	Percent	Mean	Percent
Personnel	8	44.4	15.2	60.3
Weather	6	33.3	11.8	46.8
Pilot	5	27.8	10.4	41.3
Airport/Airways/Facilities	2	11.1	3.0	11.9
Landing Gear	3	16.7	2.6	10.3
Powerplant	0	0.0	2.0	7.9
Miscellaneous	1	5.6	1.4	5.6
Systems	0	0.0	1.0	4.0
Airframe	1	5.6	0.8	3.2
Instruments/Equipment & Accessories	0	0.0	0.6	2.4
Terrain	0	0.0	0.4	1.6
Rotorcraft	0	0.0	0.2	0.8
Number of Accidents With Cause(s) Assigned	18		25.2	

* The table presents the number of accidents for which each cause/factor was cited. In the case of collisions between an aircraft operating under 14 CFR 121 and another aircraft not operating under 14 CFR 121 (one accident in 1980 and a mean of 0.8 accidents per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

Table 22 - BROAD CAUSE/FACTOR ASSIGNMENTS* - FATAL ACCIDENTS

	1980		1975-1979	
Cause/Factors	No.	Percent	Mean	Percent
Pilot	0	0.0	2.8	70.0
Personnel	1	100.0	2.4	60.0
Weather	0	0.0	1.8	45.0
Airport/Airways/Facilities	0	0.0	0.6	15.0
Landing Gear	0	0.0	0.6	15.0
Powerplant	0	0.0	0.4	10.0
Systems	0	0.0	0.4	10.0
Terrain	0	0.0	0.2	5.0
Airframe	0	0.0	0.2	5.0
Rotorcraft	0	0.0	0.2	5.0
Instruments/Equipment & Accessories	0	0.0	0.0	0.0
Miscellaneous	0	0.0	0.0	0.0
Number of Accidents With Cause(s) Assigned	1		4.0	

* The table presents the number of fatal accidents for which each cause/factor was cited. In the case of collisions between an aircraft operating under 14 CFR 121 and another aircraft not operating under 14 CFR 121 (none in 1980 and a mean of 0.4 per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

Table 23 presents hours flown, accidents and rates for the aircraft models most commonly used in Part 121 operations. The models listed are those for which at least one accident occurred in the years 1975 through 1980, and for which at least 50,000 flight hours were reported to CAB by U.S. certificated route air carriers in that 6-year period. Also listed in Table 23 are the numbers of accidents and the corresponding accident rates in which the aircraft and the pilot were cited as a cause or factor in the accident. Aircraft-related factors are those in one of the five categories: airframe, powerplant, systems, instruments/equipment and accessories, and rotorcraft. The 13 aircraft models in Table 23 accounted for 93.6 percent of the hours flown under 14 CFR 121 and 90.9 percent of the aircraft involved in accidents between 1975 and 1980.

Table 23 - ACCIDENTS AND RATES BY AIRCRAFT MODEL

Aircraft Model	Hours Flown	Accidents				Accident Rates Per 100,000 Hours Flown			
				With Cause/Factor				With Cause/Factor	
		All	Fatal	Aircraft	Pilot	All	Fatal	Aircraft	Pilot
BAC 1-11	442,436	1	0	0	1	.226	0	0	.226
B-707	3,615,678	11	0	0	3	.304	0	0	.083
B-727	14,415,394	39	5	8	15	.271	.035	.055	.104
B-737	2,123,285	7	0	1	3	.330	0	.047	.141
B-747	2,473,881	10	1	3	3	.404	.040	.121	.121
CV-340, 440, 580, 600, 640	809,323	9	0	1	3	1.112	0	.124	.371
DC-8	2,279,682	18	2	6	6	.790	.088	.263	.263
DC-9	5,619,851	13	1	2	4	.231	.018	.036	.071
DC-10	2,169,694	13	3	6	2	.599	.138	.277	.092
F-27, FH-227	266,456	2	1	0	2	.751	.375	0	.751
L-188	88,912	8	2	4	4	8.998	2.249	4.499	4.499
L-1011	1,407,139	8	1	3	0	.569	.071	.213	0
YS-11	276,568	1	0	0	0	.362	0	0	0

14 CFR 135

In 1980, U.S. air carriers operating under 14 CFR 135 were involved in 208 accidents, 53 of which caused fatal injuries. Two accidents involved collisions between aircraft being operated under Part 135. Therefore, the number of Part 135 aircraft involved in accidents was 210.

SUMMARY OF LOSSES

Table 24 provides a comparison of the number of accidents and the resulting losses in 1980 and the two previous years. The remainder of this section is divided into two parts -- scheduled and nonscheduled operations under 14 CFR 135.

Table 24 - SUMMARY OF LOSSES

Accidents	1980	1979	1978
Fatal	53	45	68
Involved Serious Injury	19	24	28
Involved Minor or No Injury	136	143	163
Total	208	212	259
Fatalities			
Passenger	89	89	133
Crew	49	50	67
Other Persons	2	4	3
Total	140	143	203
Aircraft Damaged - No. of 14 CFR 135 Aircraft			
Destroyed	60	60	94
Substantial	145	150	166
Minor	1	1	1
None	4	2	0
Total	210	213	261
Aircraft Damaged - No. of Other Aircraft			
Destroyed	2	2	0
Substantial	1	2	3
Minor	0	2	0
Total	3	6	3

SCHEDULED 14 CFR 135

Thirty-eight accidents occurred during scheduled Part 135 operations in 1980. There were eight fatal accidents among the 38. A collision occurred between two aircraft conducting scheduled 14 CFR 135 operations. There were no injuries as a result of this collision.

SUMMARY OF LOSSES

When compared to the two preceding years, 1980 was characterized by fewer accidents and generally less severe accidents (see Table 25). In 1980, 21.1 percent of the accidents caused fatal injuries, compared to 28.8 percent in 1979 and 23.0 percent in 1978. The percentages of accident-involved scheduled Part 135 aircraft destroyed were 23.1 for 1980, 38.5 for 1979, and 32.8 for 1978.

Table 25 - SUMMARY OF LOSSES

Accidents	1980	1979	1978
Fatal	8	15	14
Involved Serious Injury	6	8	5
Involved Minor or No Injury	24	29	42
Total	38	52	61
Fatalities			
Passenger	27	50	34
Crew	10	16	14
Other Persons	0	0	0
Total	37	66	48
Aircraft Damaged - No. of Scheduled 14 CFR 135 Aircraft			
Destroyed	9	20	20
Substantial	27	32	41
Minor	1	0	0
None	2	0	0
Total	39	52	61
Aircraft Damaged - No. of Other Aircraft			
Substantial	0	1	0
Total	0	1	0

Scheduled 14 CFR 135 activity (in terms of miles, hours, and departure) is shown in Table 26, along with computed accident rates. Accident rates and fatal accident rates were lower in 1980 than in either 1979 or 1978. A comparison of the 1980 accident rates for Scheduled 14 CFR 135 operations with those for Scheduled 14 CFR 121 operations (from Table 4) reveals that the Part 135 rates per mile, hour, and departure are higher than the Part 121 rates by factors of 37.3, 14.6, and 7.6, respectively.

Table 26 - ACCIDENT RATES

	1980	1979	1978
Miles Flown (Thousands)	192,200	192,493	226,187
Accident Rates (per Million Miles Flown)			
All Accidents	0.1977	0.2701	0.2697
Fatal Accidents	0.0416	0.0779	0.0619
Hours Flown	1,175,588	1,169,921	1,302,136
Accident Rates (per Hundred Thoudsand Hours Flown			
All Accidents	3.232	4.445	4.685
Fatal Accidents	0.681	1.282	1.075
Departures Flown	1,776,999	1,883,705	1,995,728
Accident Rates (per Hundred Thousand Departures Flown)			
All Accidents	2.138	2.761	3.057
Fatal Accidents	0.450	0.796	0.701

DETAILED REVIEW

The 38 accidents which occurred during scheduled 14 CFR 135 operations are listed in Table 27. Three states account for 42 percent of the accidents in this category - Alaska with seven accidents, Texas with five, and California with four.

Table 27 - SCHEDULED 14 CFR 135 ACCIDENTS

Date	Location	Type of Operation	Aircraft Type	Aircraft Damage	Degree of Injury	Type of Accident
1/17	La Crosse,WI	Passenger	Beech 99	Subst'l	None	Wheels-Up Landing
1/18	St.Croix,VI	Passenger	Piper PA-31	Destr'd	Serious	Engine Failure or Malfunction
1/28	San Juan,PR	Passenger	Douglas DC-3	Subst'l	None	Coll btw Aircraft - On Ground
"	" " "	Passenger	Dehavilland DH-114	Subst'l		" " " " "
2/07	College Sta,TX	Passenger	Dehavilland DHC-6	Subst'l	None	Landing Gear Collapsed
2/08	Saugus,CA	Passenger	Nord-Avion 262	None	Serious	Turbulence
2/29	St.Louis,MO	Cargo	Beech E18S	Subst'l	None	Coll w/ Other
2/29	Moab,UT	Passenger	Piper PA-31	Subst'l	Minor	Engine Failure or Malfunction
3/06	South Naknek, AK	Cargo	Cessna 207	Destr'd	Serious	Coll w/ Dirt Bank
3/21	Houston,TX	Passenger	Piper PA-31	Destr'd	Fatal (7)	Engine Failure or Malfunction
3/26	Kariuk,AK	Passenger	Grumman G-21	Subst'l	None	Ground-Water Loop-Swerve
4/07	Tulsa,OK	Cargo	Beech 95-C55	Subst'l	None	Fire or Explosion - On Ground
4/07	St.Croix,VI	Passenger	Grumman G-73	Subst'l	Minor	Fire or Explosion - On Ground
4/18	McLouth,KS	Passenger	Cessna 207	Subst'l	None	Engine Failure or Malfunction
4/24	Cedar Rapids,IA	Cargo	Beech 18S	Subst'l	None	Dressed Winglip, Pod, Float
5/12	Fort Worth,TX	Cargo	Piper PA-31	Subst'l	Minor	Coll w/ Trees
5/18	Savoy,IL	Passenger	Cessna 402	Subst'l	None	Landing Gear Retracted
6/03	Allentown,PA	Passenger	Short Bros SD3-30	Subst'l	Minor	Miscellaneous
6/12	Vallew,ME	Passenger	Swearingen 226TC	Destr'd	Fatal (13)	Engine Failure or Malfunction
6/18	Alder Creek,AK	Passenger	Cessna 207	Subst'l	Serious	Coll w/ Trees
7/07	Jackson,MS	Cargo	Aero Comdr 680V	Destr'd	Fatal (1)	Turbulence
7/21	Tusayan,AZ	Passenger	Cessna 404	Destr'd	Fatal (8)	Engine Failure or Malfunction
7/25	Morgan Hill,CA	Cargo	Piper PA-31	Subst'l	None	Engine Failure or Malfunction
7/25	Philadelphia,PA	Passenger	Piper PA-31	Destr'd	Fatal (3)	Turbulence
8/20	Hartford,CT	Passenger	Piper PA-23	Subst'l	None	Overshoot
8/21	Kariuk,AK	Passenger	Grumman G-21A	Subst'l	None	Coll w/ Other
8/24	Killeen,TX	Passenger	Swearingen SA226	Subst'l	None	Undershoot
8/27	Denver,CO	Passenger	Piper PA-32	Subst'l	None	Coll w/ Automobile
8/29	Patterson,LA	Passenger	Piper PA-31	Subst'l	None	Wheels-Up Landing
9/03	San Francisco,CA	Passenger	Cessna 402C	None	Serious	Turbulence
9/12	Fairbanks,AK	Passenger	Cessna 207	Subst'l	Serious	Engine Failure or Malfunction
9/18	Paducah,KY	Cargo	Piper PA-31	Subst'l	None	Dressed Winglip, Pod, Float
9/21	Wichita Falls,TX	Passenger	Dehavilland DHC-6	Subst'l	None	Uncontrolled Coll w/ Ground/Water
9/29	Levelock,AK	Passenger	Cessna 207	Subst'l	Minor	Engine Failure or Malfunction
9/30	Magdelena,Mexico	Passenger	Piper PA-31	Destr'd	Fatal (2)	Fire or Explosion - In Flight
10/16	Cedar Rapids,IA	Cargo	Cessna 207	Destr'd	Fatal (2)	Uncontrolled Coll w/ Ground/Water
10/31	Oakland,CA	Cargo	Piper PA-31	Subst'l	None	Engine Failure or Malfunction
11/25	Binghamton,NY	Passenger	Swearingen SA226	Subst'l	Minor	Wheels-Up Landing
12/30	Gambell,AK	Passenger	Aero Comdr 680-FL	Minor	Fatal (1)	Propeller Accident to Person

Table 28 presents accidents, activity, and rates for scheduled Part 135 operations. As was the case for scheduled Part 121 operations, all-cargo operations had significantly higher accident rates than did combined passenger/cargo operations.

Table 28 - ACCIDENTS AND RATES BY TYPE OF OPERATION

	Type of Operation		
	Passenger/ Cargo	All Cargo	All
Accidents	28	10	38
Fatal Accidents	6	2	8
Aircraft Miles Flown (Thousands)	175,412	16,788	192,200
Aircraft Hours Flown	1,061,899	113,689	1,175,588
Departures Flown	1,662,849	114,150	1,776,999
Accident Rates			
Per Million Miles Flown	0.1596	0.5957	0.1977
Per Hundred Thousand Hours Flown	2.637	8.796	3.232
Per Hundred Thousand Departures Flown	1.684	8.760	2.138
Fatal Accident Rates			
Per Million Miles Flown	0.0342	0.1191	0.0416
Per Hundred Thousand Hours Flown	0.565	1.759	0.681
Per Hundred Thousand Departures Flown	0.361	1.752	0.450

Of the 240 persons involved in accidents during scheduled operations under Part 135, 51 (or 21.3 percent) sustained fatal or serious injury (see Table 29). Revenue passengers fared only slightly better with 14.9 percent fatally injured and 4.4 percent seriously injured. Commuter air carriers reported to CAB a total of 1.235 billion revenue passenger miles in 1980. The resulting rate, 1 serious or fatal passenger injury per 35.3 million passenger miles is approximately 583 times the 1980 rate for passenger operations conducted under 14 CFR 121.

Table 29 - PERSONS BY ROLE AND DEGREE OF INJURY

	Degree of Injury				
	Fatal	Serious	Minor	None	Total
Pilot-in-Command	6	5	1	27	39
Co-Pilot	2	0	0	11	13
Extra Crew	2	0	0	0	2
Cabin Attendant	0	1	1	1	3
Passenger	27	8	20	126	181
Person on Ground	0	0	0	2	2
Total	37	14	22	167	240

Table 30 lists the types of accidents and their resulting degree of injury. Engine failure or malfunction accidents represent 26.3 percent of the total and 37.5 percent of the fatal accidents. Nearly half of all accidents resulted in no personal injury.

Table 30 - ACCIDENTS BY TYPE AND DEGREE OF INJURY

Type of Accident	Degree of Injury				Accidents	
	Fatal	Serious	Minor	None	Number	Percent
Collision, Both Aircraft on Ground	0	0	0	1	1	2.6
Collision with Ground/Water - Uncontrolled	1	0	0	1	2	5.3
Collision with Objects	0	2	1	3	6	15.8
Dragged Wingtip, Pod, or Float	0	0	0	2	2	5.3
Engine Failure or Malfunction	3	2	2	3	10	26.3
Fire in Flight	1	0	0	0	1	2.6
Fire on Ground	0	0	1	1	2	5.3
Ground-Water Loop-Swerve	0	0	0	1	1	2.6
Landing Gear Collapsed	0	0	0	1	1	2.6
Landing Gear Retracted	0	0	0	1	1	2.6
Miscellaneous/Other	0	0	1	0	1	2.6
Overshoot	0	0	0	1	1	2.6
Propeller/Rotor Accident to Person	1	0	0	0	1	2.6
Turbulence	2	2	0	0	4	10.5
Undershoot	0	0	0	1	1	2.6
Wheels-up Landing	0	0	1	2	3	7.9
Accidents - Number	8	6	6	18	38	
- Percent	21.1	15.8	15.8	47.4		

The number of scheduled Part 135 aircraft involved in accidents are tabulated by type of accident and extent of damage in Table 31. In 1980, 36 of the 39 accident-involved aircraft (92.3 percent) sustained at least substantial damage. Four of the 10 engine failure or malfunction accidents resulted in destruction of the aircraft, while the remaining 6 caused substantial damage.

Table 31 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

Type of Accident	Aircraft Damage				Scheduled Part 135 Aircraft	
	Destroyed	Substantial	Minor	None	Number	Percent
Collision, Both Aircraft on Ground	0	2	0	0	2	5.1
Collision with Ground/Water - Uncontrolled	1	1	0	0	2	5.1
Collision with Objects	1	5	0	0	6	15.4
Dragged Wingtip, Pod, or Float	0	2	0	0	2	5.1
Engine Failure or Malfunction	4	6	0	0	10	25.6
Fire in Flight	1	0	0	0	1	2.6
Fire on Ground	0	2	0	0	2	5.1
Ground-Water Loop-Swerve	0	1	0	0	1	2.6
Landing Gear Collapsed	0	1	0	0	1	2.6
Landing Gear Retracted	0	1	0	0	1	2.6
Miscellaneous/Other	0	1	0	0	1	2.6
Overshoot	0	1	0	0	1	2.6
Propeller/Rotor Accident to Person	0	0	1	0	1	2.6
Turbulence	2	0	0	2	4	10.3
Undershoot	0	1	0	0	1	2.6
Wheels-up Landing	0	3	0	0	3	7.7
Scheduled Part 135 Aircraft - Number	9	27	1	2	39	
Scheduled Part 135 Aircraft - Percent	23.1	69.2	2.6	5.1		

Table 32 tabulates accident-involved aircraft by the phase of operation in which the accident occurred and the degree of injury. Aircraft in the initial climb phase accounted for 20.5 percent of the total and for 28.6 percent of the aircraft involved in accidents which resulted in serious or fatal injury. Scheduled Part 135 aircraft involved in accidents during level off and touchdown constituted 15.4 percent of the total, but none of these accidents produced more than minor injury.

Table 32 - AIRCRAFT BY PHASE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Scheduled Part 135 Aircraft	
Phase of Operation	Fatal	Serious	Minor	None	Number	Percent
Static						
Idling Engine(s)	1	0	0	1	2	5.1
Parked, Engine Not Operating	0	0	1	0	1	2.6
Taxi						
To Takeoff - Fixed Wing	0	0	0	4	4	10.3
From Landing - Fixed Wing	0	0	0	2	2	5.1
Other - Fixed Wing	0	0	0	1	1	2.6
To Takeoff - Ground Taxi - Rotorcraft	0	0	0	1	1	2.6
Takeoff						
Run	0	0	0	1	1	2.6
Initial Climb	2	2	3	1	8	20.5
Abort	0	1	0	0	1	2.6
In Flight						
Normal Cruise	1	0	0	2	3	7.7
Descent	0	1	0	0	1	2.6
Uncontrolled Descent	1	0	0	0	1	2.6
Other	1	0	0	0	1	2.6
Landing						
Traffic Pattern - Circling (VFR)	0	1	0	0	1	2.6
Final Approach (VFR)	1	0	0	1	2	5.1
Final Approach - From FAF (IFR)	1	0	0	0	1	2.6
Level Off/Touchdown	0	0	2	4	6	15.4
Roll	0	0	0	1	1	2.6
Go-around - Aborted (VFR)	0	1	0	0	1	2.6
Scheduled Part 135 Aircraft - Number	8	6	6	19	39	
Scheduled Part 135 Aircraft - Percent	20.5	15.4	15.4	48.7		

Scheduled Part 135 aircraft involved in accidents during initial climb accounted for 33.3 percent of the aircraft destroyed (see Table 33). In the one collision accident between aircraft, both were taxiing, one to takeoff and the other from landing. Both aircraft received substantial damage.

Table 33 - AIRCRAFT BY PHASE OF OPERATION AND DAMAGE

Phase of Operation	Aircraft Damage				Scheduled Part 135 Aircraft	
	Destroyed	Substantial	Minor	None	Number	Percent
Static						
Idling Engine(s)	0	1	1	0	2	5.1
Parked, Engine Not Operating	0	1	0	0	1	2.6
Taxi						
To Takeoff - Fixed Wing	0	4	0	0	4	10.3
From Landing - Fixed Wing	0	2	0	0	2	5.1
Other - Fixed Wing	0	1	0	0	1	2.6
To Takeoff - Ground Taxi - Rotorcraft	0	1	0	0	1	2.6
Takeoff						
Run	0	1	0	0	1	2.6
Initial Climb	3	5	0	0	8	20.5
Abort	0	1	0	0	1	2.6
In Flight						
Normal Cruise	1	2	0	0	3	7.7
Descent	0	0	0	1	1	2.6
Uncontrolled Descent	1	0	0	0	1	2.6
Other	1	0	0	0	1	2.6
Landing						
Traffic Pattern - Circling (VFR)	0	0	0	1	1	2.6
Final Approach (VFR)	1	1	0	0	2	5.1
Final Approach - From FAF (IFR)	1	0	0	0	1	2.6
Level Off/Touchdown	0	6	0	0	6	15.4
Roll	0	1	0	0	1	2.6
Go-around - Aborted (VFR)	1	0	0	0	1	2.6
Scheduled Part 135 Aircraft						
- Number	9	27	1	2	39	
- Percent	23.1	69.2	2.6	5.1		

Table 34 tabulates accident-involved aircraft by type of accident and the phase of operation in which it occurred. All 10 of the engine failure or malfunction accidents resulted in subsequent accidents, 8 of which occurred during a landing operation following the engine failure or malfunction. Seven of the 10 aircraft were twin-engined, while 3 were single engine aircraft.

Table 34 - AIRCRAFT BY TYPE OF ACCIDENT AND PHASE OF OPERATION

Type of Accident	Phase of Operation					Scheduled Part 135 Aircraft	
	Static	Taxi	Takeoff	In Flight	Landing	Number	Percent
Collision, Both Aircraft on Ground	0	2	0	0	0	2	5.1
Collision with Ground/Water - Uncontrolled	0	0	1	1	0	2	5.1
Collision with Objects	0	3	2	0	1	6	15.4
Dragged Wingtip, Pod, or Float	0	0	0	0	2	2	5.1
Engine Failure or Malfunction	0	0	7	3	0	10	25.6
Fire in Flight	0	0	0	1	0	1	2.6
Fire on Ground	1	0	0	0	1	2	5.1
Ground-Water Loop-Swerve	0	1	0	0	0	1	2.6
Landing Gear Collapsed	0	1	0	0	0	1	2.6
Landing Gear Retracted	0	1	0	0	0	1	2.6
Miscellaneous/Other	1	0	0	0	0	1	2.6
Overshoot	0	0	0	0	1	1	2.6
Propeller/Rotor Accident to Person	1	0	0	0	0	1	2.6
Turbulence	0	0	0	1	3	4	10.3
Undershoot	0	0	0	0	1	1	2.6
Wheels-up Landing	0	0	0	0	3	3	7.7
Scheduled Part 135 Aircraft - Number	3	8	10	6	12	39	
Scheduled Part 135 Aircraft - Percent	7.7	20.5	25.6	15.4	30.8		

Overall, 76.3 percent of the accidents occurred in VFR weather. Of these, 72.4 percent were in daylight. One accident, a collision with a dirt bank during an aborted landing attempt, occurred in weather conditions below minimums for the airport. Table 35 cross-tabulates accidents by light and weather conditions.

Table 35 - ACCIDENTS BY CONDITION OF LIGHT AND TYPE OF WEATHER CONDITION

	Type of Weather Condition			Accidents	
Condition of Light	VFR	IFR	Below Minimums	Number	Percent
Dawn	0	2	0	2	5.3
Daylight	21	2	1	24	63.2
Dusk (Twilight)	2	0	0	2	5.3
Night (Dark)	6	4	0	10	26.3
Accidents - Number	29	8	1	38	
- Percent	76.3	21.1	2.6		

The number of accident-involved aircraft are presented in Table 36 by extent of damage to the aircraft and degree of injury for the accident. The table shows a high correspondence between degree of injury and extent of damage only for the most severe consequences -- seven fatal accidents out of nine in which the aircraft was destroyed, and seven accidents in which the aircraft was destroyed among the eight fatal accidents. The fatal accident which produced only minor aircraft damage occurred when a passenger walked into a propeller. Twenty-five of the 27 accidents (92.6 percent) which substantially damaged the aircraft resulted in minor or no personal injury.

Table 36 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

	Degree of Injury				Scheduled Part 135 Aircraft	
Aircraft Damage	Fatal	Serious	Minor	None	Number	Percent
Destroyed	7	2	0	0	9	23.1
Substantial	0	2	6	19	27	69.2
Minor	1	0	0	0	1	2.6
None	0	0	0	0	2	5.1
Scheduled Part 135 Aircraft						
- Number	8	6	6	19	39	
- Percent	20.5	15.4	15.4	48.7		

Table 37 is a tabulation of accident-involved scheduled 14 CFR 135 aircraft by the type of operation in which they were involved and the degree of injury for the accident. Passenger operations accounted for 74.4 percent of all accidents and 75.0 percent of fatal accidents.

Table 37 - AIRCRAFT BY TYPE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Scheduled Part 135 Aircraft	
Type of Operation	Fatal	Serious	Minor	None	Number	Percent
Domestic Passenger	5	5	5	13	28	71.8
International Passenger	1	0	0	0	1	2.6
Domestic Cargo	2	1	1	6	10	25.6
Scheduled Part 135 Aircraft						
- Number	8	6	6	19	39	
- Percent	20.5	15.4	15.4	48.7		

Twenty-five of the aircraft (or 64.1 percent) were on the airport or seaplane base when involved in an accident (see Table 38). No flight plan was filed for 15.4 percent of the accident-involved aircraft.

Table 38 AIRCRAFT BY PROXIMITY TO AIRPORT AND FLIGHT PLAN

	Flight Plan				Scheduled Part 135 Aircraft	
Proximity to Airport	None	VFR	IFR	Other	Number	Percent
On Airport	5	4	14	0	23	59.0
On Seaplane Base	0	0	0	2	2	5.1
In Traffic Pattern	0	0	1	0	1	2.6
Miles from Airport						
Within 1/4	0	1	1	1	3	7.7
1+ to 2	0	2	1	0	3	7.7
2+ to 3	0	0	3	0	3	7.7
Beyond 5	1	0	3	0	4	10.3
Scheduled Part 135 Aircraft						
- Number	6	7	23	3	39	
- Percent	15.4	17.9	59.0	7.7		

The most frequently cited causes among scheduled Part 135 accidents were the pilot (25 accidents) and personnel (11 accidents). (See Table 39). Although weather was a cause in only two accidents, it was a factor in 13 other accidents. A detailed cause/factor listing is included as Appendix B.

Table 39 - BROAD CAUSE/FACTOR ASSIGNMENTS*

Cause/Factor	Cited as a Cause		Cited as a Factor		Cited as Either a Cause or a Factor (or Both)	
	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents
Pilot	7	25	3	4	7	25
Weather	0	2	4	13	4	15
Personnel	2	11	2	4	3	13
Powerplant	3	7	0	0	3	7
Terrain	0	0	0	5	0	5
Airport/Airways/Facilities	0	0	0	4	0	4
Miscellaneous	3	4	0	0	3	4
Landing Gear	0	3	0	0	0	3
Systems	0	1	1	2	1	3
Number of Accidents with Cause(s) Assigned					8	38

* The table presents the number of accidents for which each cause/factor was cited. Multiple causes and factors may be assigned in an accident.

HISTORICAL COMPARISON

Accidents, fatalities and accident rates for the years 1975 through 1980 are tabulated in Table 40 and graphed in Figures 3 and 4. In terms of fatalities resulting from accidents in scheduled Part 135 operations, 1980 was only slightly better than the average of 40.2 fatalities per year for the preceeding five years. However, all of the other statistics presented in Table 40 portray the year 1980 in a more positive light -- the lowest number of fatal accidents and the second lowest number of accidents overall among the 6 years. Both the accident rate and the fatal accident rate are also the lowest in the 6-year period.

Table 40 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES

Year	Accidents	Fatal Accidents	Fatalities Total	Fatalities Aboard Scheduled Part 135 Aircraft
1975	48	12	28	26
1976	35	9	27	23
1977	44	9	32	32
1978	61	14	48	48
1979	52	15	66	66
1980	38	8	37	37

Year	Hours Flown	Accident Rate per 100,000 Aircraft Hours Flown: Total	Accident Rate per 100,000 Aircraft Hours Flown: Fatal
1975	936,312	5.126	1.282
1976	965,296	3.626	0.932
1977	1,150,250	3.825	0.782
1978	1,302,136	4.685	1.075
1979	1,169,921	4.445	1.282
1980	1,175,588	3.232	0.681

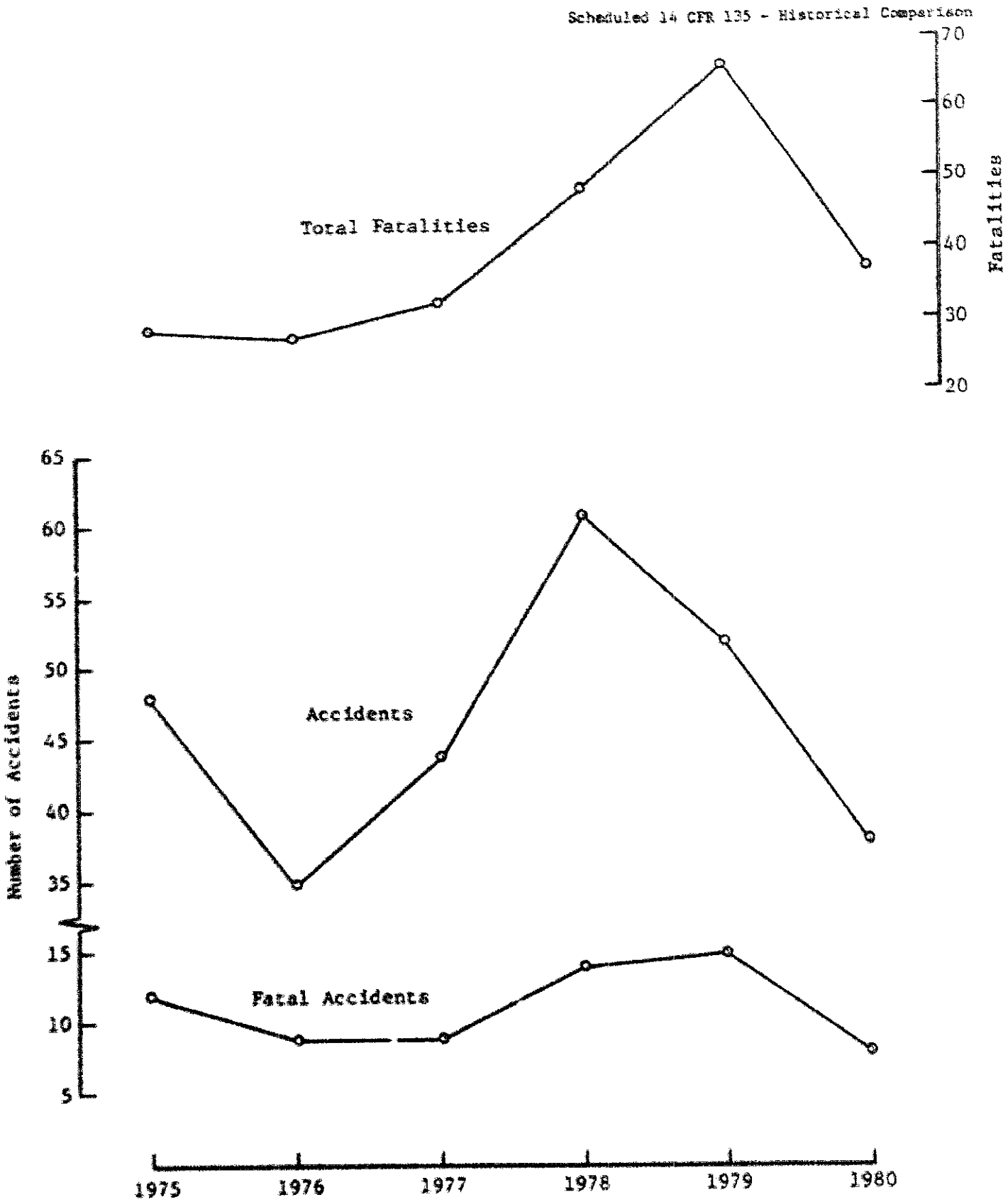

Figure 3 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

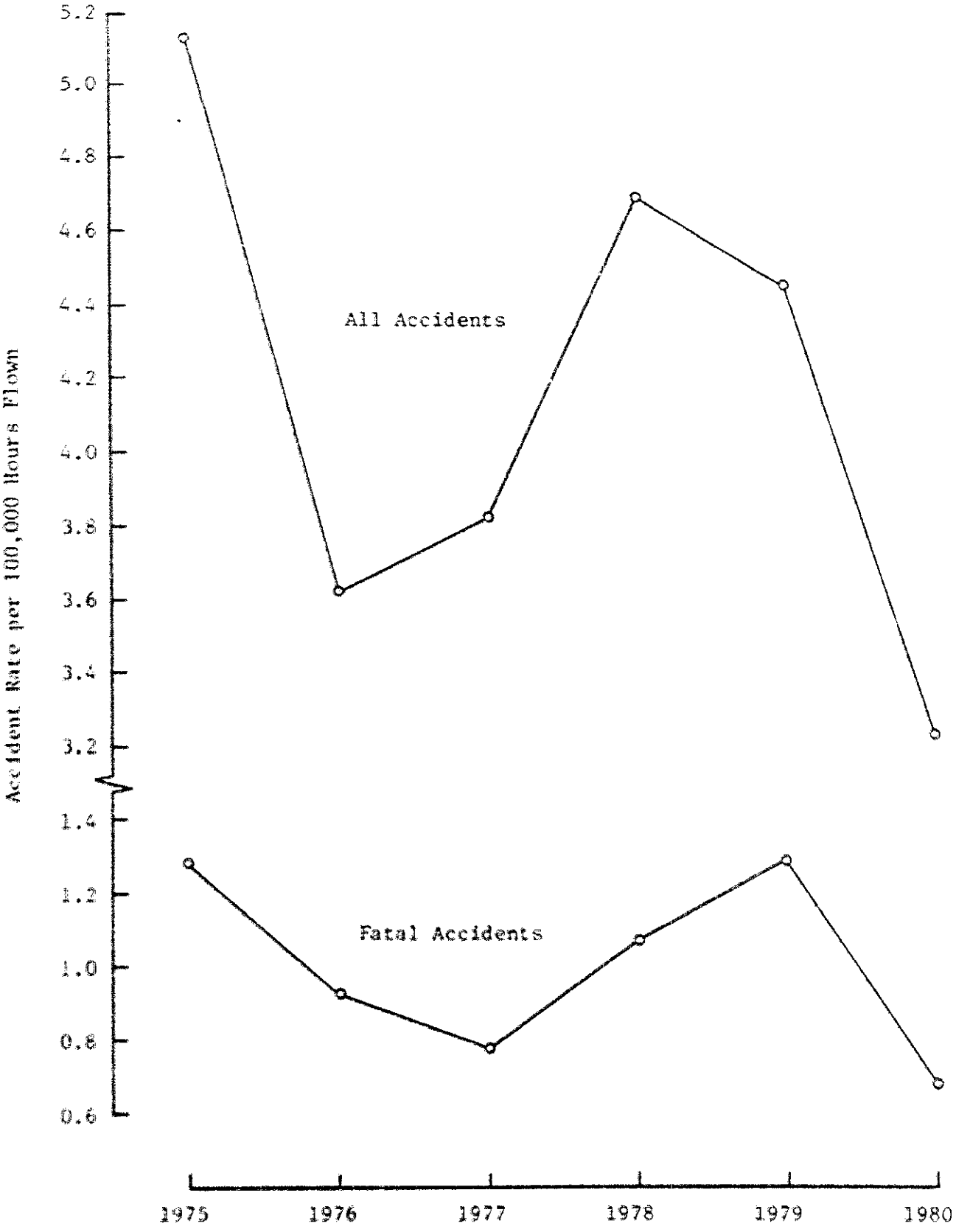

Figure 4 - ACCIDENT RATES

Tables 41 and 42 list the types and the mean numbers of accidents and fatal accidents, respectively, which account for 2 percent or more of the accidents (or fatal accidents) in the 5 years between 1975 and 1979, as well as the numbers of such accidents in 1980. Engine failure or malfunction, the leading type of accident and fatal accident, shows little deviation in frequency for 1980. Three types of accidents showed substantially decreased frequency of occurrence - ground-water loop-swerve, controlled collision with ground or water, and stall. There were three wheels up landings in 1980 compared to a mean of 1.6 for the base period. Turbulence accidents (grouped under "All Other Types") accounted for 10.3 percent of all scheduled Part 135 accidents. There were two fatal turbulence accidents in 1980. There had been only one in the 5 prior years.

Table 41 - MOST PREVALENT TYPES OF ACCIDENTS

	1980		1975-1979	
Type of Accident	No.	Percent	Mean	Percent
Engine Failure or Malfunction	10	26.3	11.6	24.2
Collision with Trees, Wires, Objects	6	15.8	7.0	14.6
Ground-Water Loop-Swerve	1	2.6	5.2	10.8
Collision with Ground/Water - Controlled	0	0.0	3.4	7.1
Stal	0	0.0	2.6	5.4
Landing Gear Collapsed	1	2.6	1.6	3.3
Landing Gear Retracted	1	2.6	1.6	3.3
Wheels-up Landing	3	7.9	1.6	3.3
Fire or Explosion in Flight	1	2.6	1.4	2.9
Hard Landing	0	0.0	1.4	2.9
Collision with Ground/Water - Uncontrolled	2	5.3	1.2	2.5
Overshoot	1	2.6	1.2	2.5
Collision Between Aircraft	1	2.6	1.2	2.5
Undershoot	1	2.6	1.2	2.5
(All Other Types)	10	26.3	5.8	12.1
Total	38	100.0	48.0	100.0

Table 42 - MOST PREVALENT TYPES OF FATAL ACCIDENTS

Type of Accident	1980 No.	1980 Percent	1975-1979 Mean	1975-1979 Percent
Engine Failure or Malfunction	3	37.5	3.4	28.8
Collision with Ground/Water - Controlled	0	0.0	2.6	22.0
Collision with Trees, Wires, Objects	0	0.0	1.4	11.9
Stall	0	0.0	1.2	10.2
Collision with Ground/Water - Uncontrolled	1	12.5	1.0	8.5
Airframe Failure in Flight	0	0.0	0.4	3.4
Collision Between Aircraft	0	0.0	0.4	3.4
Fire or Explosion in Flight	1	12.5	0.4	3.4
Missing Aircraft	0	0.0	0.4	3.4
(All Other Types)	3	37.5	0.6	5.1
Total	8	100.0	11.8	100.0

The phases of operation for accident-involved and fatal accident-involved scheduled Part 135 aircraft are given in Tables 43 and 44. The numbers of accidents occurring during taxi and static operations increased, while landing and in-flight phase accidents decreased substantially from the base period.

Table 43 - PHASE OF OPERATION FOR ACCIDENT-INVOLVED SCHEDULED 14 CFR 135 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
Landing	12	30.8	18.2	37.8
In Flight	6	15.4	12.0	24.9
Takeoff	10	25.6	11.6	24.1
Taxi	8	20.5	5.8	12.0
Static	3	7.7	0.6	1.2
Total Scheduled Part 135 Aircraft	39	100.0	48.2	100.0

Table 44 - PHASE OF OPERATION FOR FATAL ACCIDENT-INVOLVED SCHEDULED 14 CFR 135 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
In Flight	3	37.5	6.0	50.8
Landing	2	25.0	3.4	28.8
Takeoff	2	25.0	2.4	20.3
Taxi	0	0.0	0.0	0.0
Static	1	12.5	0.0	0.0
Total Scheduled Part 135 Aircraft	8	100.0	11.8	100.0

The pilot was cited most frequently as a cause or factor in 1980 and in the base period in scheduled 14 CFR 135 aircraft accidents. The percentage of accidents in which the pilot was cited was approximately the same in both periods (see Table 45). The cause/factor categories "systems" and "miscellaneous" showed the largest relative increases.

Table 45 - BROAD CAUSE/FACTOR ASSIGNMENTS* - ALL ACCIDENTS

	1980		1975-1979	
Cause/Factor	No.	Percent	Mean	Percent
Pilot	25	65.8	31.8	67.1
Weather	15	39.5	13.4	28.3
Personnel	13	34.2	12.6	26.6
Powerplant	7	18.4	10.2	21.5
Airport/Airways/Facilities	4	10.5	8.6	18.1
Terrain	5	13.2	5.8	12.2
Landing Gear	3	7.9	4.6	9.7
Systems	3	7.9	1.8	3.8
Undetermined	0	0.0	1.6	3.4
Miscellaneous	4	10.5	1.6	3.4
Airframe	0	0.0	0.8	1.7
Instruments/Equipment & Accessories	0	0.0	0	0.0
Rotorcraft	0	0.0	0	0.0
Number of Accidents with Causes(s) Assigned	38		47.4	

* The table presents the number of accidents for which each cause/factor was cited. In the case of collisions between scheduled Part 135 aircraft and other aircraft (none in 1980 and a mean of 1.0 accidents per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

Among fatal accidents, the three most frequently cited cause/factors, pilot, weather, and personnel, were cited in fewer accidents than average for the preceding 5 years (see Table 46). For all three of these categories, however, the percentage of fatal accidents was higher than in the base period.

Table 46 - BROAD CAUSE/FACTOR ASSIGNMENTS* - FATAL ACCIDENTS

	1980		1975-1979	
Cause/Factor	No.	Percent	Mean	Percent
Pilot	7	87.5	9.2	79.3
Weather	4	50.0	4.8	41.4
Personnel	3	37.5	3.2	27.6
Powerplant	3	37.5	2.6	22.4
Terrain	0	0.0	2.0	17.2
Undetermined	0	0.0	1.2	10.3
Systems	1	12.5	.8	6.9
Airframe	0	0.0	.2	1.7
Airport/Airways/Facilities	0	0.0	.2	1.7
Landing Gear	0	0.0	0	0.0
Instruments/Equipment & Accessories	0	0.0	0	0.0
Rotorcraft	0	0.0	0	0.0
Miscellaneous	3	37.5	0	0.0
Number of Accidents with Causes(s) Assigned	8		11.6	

* The table presents the number of fatal accidents for which each cause/factor was cited. In the case of collisions between scheduled Part 135 aircraft and other aircraft (none in 1980 and a mean of 0.4 fatal accidents per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

NONSCHEDULED 14 CFR 135

There were 170 accidents involving aircraft operating nonscheduled flights under 14 CFR 135 in 1980. Forty-five of those, including a midair collision between two nonscheduled Part 135 aircraft, were fatal accidents.

SUMMARY OF LOSSES

Table 47 presents, for the years 1978, 1979, and 1980, statistics which describe the number and severity of accidents during nonscheduled operations under 14 CFR 135. The numbers of accidents, fatal accidents, fatalities, and aircraft destroyed were lower in 1980 than in 1978, but higher than in 1979.

Table 47 - SUMMARY OF LOSSES

	1980	1979	1978
Accidents			
Fatal	45	30	54
Involved Serious Injury	13	16	23
Involved Minor or No Injury	112	114	121
Total	170	160	198
Fatalities			
Passenger	62	39	99
Crew	39	34	53
Other Persons	2	4	3
Total	103	77	155
Aircraft Damaged - No. of Nonscheduled 14 CFR 135 Aircraft			
Destroyed	51	40	74
Substantial	118	118	125
Minor	0	1	1
None	2	2	0
Total	171	161	200
Aircraft Damaged - No. of Other Aircraft			
Destroyed	2	2	0
Substantial	1	1	3
Minor	0	2	0
Total	3	5	3

Unlike the certificated route air carriers and the commuter airlines, operators providing on-demand air taxi service (under Part 135) are not required to report miles, hours, and departures to CAB. In order to develop accident rates, flight hours were estimated from data collected by FAA in its General Aviation Activity Surveys. Table 48 presents estimated flight hours and accident rates for nonscheduled operations under 14 CFR 135 for 1980 and the two preceding years. Since activity over the 3 years remained essentially constant (less than 4 percent deviation between any 2 years), the accident rates given in Table 48 mirror very closely the variations in number of accidents.

Table 48 - ACCIDENT RATES

	1980	1979	1978
Hours Flown	3,617,724	3,684,321	3,545,753
Accident Rates (per Hundred Thousand Hours Flown)			
All Accidents	4.699	4.343	5.584
Fatal Accidents	1.244	0.814	1.523

DETAILED REVIEW

Table 49 lists the accidents which occurred in 1980 during nonscheduled 14 CFR 135 operations. Alaska, with 34.1 percent of the accidents, and Louisiana with 11.2 percent, were the most frequent accident locations. Alaska and Louisiana were each the site of eight fatal accidents (for a combined total of 35.6 percent) which accounted for 54 (or 52.4 percent) of the fatalities in 1980.

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS

Date	Location	Type of Operation	Aircraft Type	Aircraft Damage	Degree of Injury	Type of Accident
1/03	Montegut,LA	Passenger	Bell 206B	Destr'd	Fatal (1)	Collision btw Aircraft - In Flight
1/06	Kasigluk,AK	Passenger	Cessna 172	Subst'l	None	Nose Over/Down
1/08	Honolulu,HI	Cargo	Beech D18S	Destr'd	Fatal (2)	Coll w/ Wires/Poles
1/11	Mobile,AL	Cargo	Piper PA-23	Subst'l	None	Ground-Water Loop-Swerve
1/14	Streator,IL	Passenger	Piper PA-34	Subst'l	Minor	Overshoot
1/14	Shungnak,AK	Passenger	Cessna 185	Destr'd	Fatal (7)	Controlled Coll w/ Ground/Water
1/15	Petersburg,AK	Passenger	Hughes 369D	Subst'l	Minor	Engine Failure or Malfunction
1/15	Goldsboro,MD	Cargo	Aero Comdr 690	Destr'd	Serious	Engine Tearaway
1/19	Honolulu,HI	Passenger	Bell 206	Destr'd	None	Roll Over
1/19	Moab,UT	Passenger	Bell 206B	Subst'l	None	Engine Failure or Malfunction
1/20	June Lakes,CA	Passenger	Hughes 369D	Destr'd	Minor	Engine Failure or Malfunction
1/21	Chignik Lake,AK	Passenger	Piper PA-32	Subst'l	None	Landing Gear Collapsed
1/22	Kenai,AK	Passenger	Dehavilland DHC-6	Subst'l	Minor	Controlled Coll w/ Ground/Water
1/23	Roswell,NM	Passenger	Piper PA-34	Subst'l	None	Lightning Strike
1/24	Columbus,OH	Cargo	Cessna 411	Destr'd	Fatal (1)	Engine Failure or Malfunction
1/26	Carson City,NV	Passenger	Cessna 206	Destr'd	Fatal (1)	Controlled Coll w/ Ground/Water
2/08	Grand Isle,LA	Passenger	Bell 206B	Subst'l	Fatal (1)	Rotor Accident to Person
2/08	Atkasuk,AK	Passenger	Cessna 207	Subst'l	None	Controlled Coll w/ Ground/Water
2/09	Friendswood,TX	Passenger	Bell 206B	Destr'd	Fatal (1)	Collision btw Aircraft - In Flight
"	"	"	Passenger	Bell 206B	Subst'l	" " " " "
2/09	Ketchikan,AK	Passenger	Cessna 185	Subst'l	None	Ground-Water Loop-Swerve
2/13	Mt Village,AK	Passenger	Cessna 185F	Subst'l	None	Ground-Water Loop-Swerve
2/14	Creston,IA	Passenger	Beech A35	Destr'd	Serious	Stall
2/15	Princeton,NJ	Passenger	Cessna 340	Subst'l	None	Hard Landing
2/15	Kendallville,IN	Passenger	Cessna 310Q	Subst'l	None	Hard Landing
2/15	Olathe,KS	Cargo	Beech H18	Destr'd	Fatal (1)	Stall
2/18	West Dease,AK	Passenger	Pilatus PC6B1H	Subst'l	Fatal (3)	Stall
2/21	Leeville,LA	Passenger	Sikorsky S-62A	Destr'd	Fatal (6)	Engine Failure or Malfunction
2/22	San Diego,CA	Passenger	Aero Comdr 500A	Subst'l	None	Coll w/ Automobile
2/22	Reno,NV	Passenger	Cessna T337G	Destr'd	Fatal (1)	Controlled Coll w/ Ground/Water
2/23	Jacksonville,FL	Cargo	Cessna 210N	Destr'd	Fatal (2)	Coll w/ Wires/Poles
2/24	Platinum,AK	Passenger	Cessna 185	Subst'l	None	Coll w/ Snowbank
2/25	Lexington,KY	Cargo	Cessna 404	Subst'l	None	Ground-Water Loop-Swerve
2/29	Appomattox,VA	Passenger	Piper PA-31	Destr'd	Minor	Engine Failure or Malfunction
3/03	Arlington,TX	Cargo	Cessna U206	Subst'l	Minor	Engine Failure or Malfunction
3/03	Webster City,IA	Passenger	Aerospatiale AS350D	Destr'd	Fatal (3)	Engine Failure or Malfunction
3/09	Dillingham,AK	Cargo	Cessna 206	Subst'l	Serious	Controlled Coll w/ Ground/Water
3/13	Utica,NE	Passenger	Piper PA-31	Subst'l	None	Engine Failure or Malfunction
3/16	Daytona Beach,FL	Passenger	Piper PA-23	Subst'l	None	Wheels-Up Landing
3/17	East Freedom,PA	Passenger	Piper PA-24	Destr'd	Fatal (2)	Coll w/ Trees
3/20	Charlotte,NC	Passenger	Piper PA-30	Destr'd	Fatal (1)	Coll w/ Trees
3/20	Terre Haute,IN	Passenger	Cessna 421B	Subst'l	None	Landing Gear Retracted
3/29	Huntington Bch,CA	Passenger	Hiller FH1100	Destr'd	Fatal (2)	Uncontrolled Coll w/ Ground/Water

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

Date	Location	Type of Operation	Aircraft Type	Aircraft Damage	Degree of Injury	Type of Accident
4/10	Hartford,CT	Cargo	Beech 95-C55	Subst'l	None	Coll w/ Trees
4/11	Holly Beach,LA	Cargo	Bell 206L-1	Destr'd	Serious	Engine Failure or Malfunction
4/12	Carlon,CA	Passenger	Cessna 337D	Destr'd	Minor	Engine Failure or Malfunction
4/12	Wales,AK	Passenger	Cessna A185F	Subst'l	None	Engine Failure or Malfunction
4/20	Jackson,NH	Passenger	Enstrom 280C	Subst'l	None	Hard Landing
4/23	Stebbins,AK	Passenger	Cessna 207A	Subst'l	None	Ground-Water Loop-Swerve
4/24	Farson,WY	Passenger	Cessna TU206G	Subst'l	Minor	Overshoot
4/25	Kodiak,AK	Passenger	Bellanca 8GCBC	Subst'l	None	Stall - Mush
4/30	Vernal,UT	Cargo	Bell 47G3B1	Subst'l	None	Hard Landing
5/06	Gibson,LA	Passenger	Bell 206L-1	Destr'd	Fatal (2)	Engine Failure or Malfunction
5/06	Richmond,VA	Passenger	Lear Jet 23	Destr'd	Fatal (2)	Controlled Coll w/ Ground/Water
5/09	Intracstl Cy,LA	Passenger	Bell 206B	Subst'l	Fatal (1)	Roll Over
5/09	Brighton,UT	Passenger	Bell 206B	Subst'l	None	Engine Failure or Malfunction
5/16	Pineville,LA	Cargo	Piper PA-32RT	Subst'l	None	Overshoot
5/19	Nunavarchuk,AK	Passenger	Piper PA-32	Subst'l	Minor	Coll w/ Parked Aircraft
5/21	Minster,OH	Cargo	Cessna U206F	Destr'd	Minor	Engine Failure or Malfunction
5/23	Los Angeles,CA	Cargo	Cessna T206	Subst'l	None	Turbulence
5/29	Lanai,HI	Cargo	Beech E18S	Subst'l	None	Ground-Water Loop-Swerve
6/01	Intercstl City,LA	Passenger	Bell 206B	Subst'l	None	Tail Rotor Failure
6/03	Morgan City,LA	Passenger	Cessna 185	Subst'l	None	Coll w/ Trees
6/08	Intracstl City,LA	Passenger	Bell 212	None	Fatal (1)	Rotor Accident to Person
6/08	Talkeetna,AK	Passenger	Cessna 180	Subst'l	None	Nose Over/Down
6/11	Jackson,WY	Cargo	Aerospatiale SA315B	Subst'l	None	Engine Failure or Malfunction
6/13	Mountain View,WY	Cargo	Cessna 210L	Subst'l	Minor	Engine Failure or Malfunction
6/15	Lihue,HI	Passenger	Piper PA-34	Destr'd	Fatal (2)	Controlled Coll w/ Ground/Water
6/17	Iliamna,AK	Passenger	Cessna 185	Subst'l	Minor	Engine Failure or Malfunction
6/18	Ely,MN	Passenger	Cessna A185F	Destr'd	None	Engine Failure or Malfunction
6/19	Talkeetna,AK	Passenger	Enstrom F-28-C	Subst'l	None	Tail Rotor Failure
6/22	Omaha,NE	Cargo	Aero Comdr 500B	Subst'l	None	Landing Gear Retracted
6/24	St Michael,AK	Passenger	Piper PA-34	Subst'l	None	Landing Gear Collapsed
6/25	Patten,ME	Passenger	Piper PA-18	Destr'd	Serious	Stall - Mush
7/01	Toolak,AK	Passenger	Piper PA-32	Subst'l	Minor	Controlled Coll w/ Ground/Water
7/02	Tyone Creek,AK	Passenger	Cessna 185	Subst'l	None	Ground-Water Loop-Swerve
7/07	Egisik,AK	Passenger	Piper PA-32	Subst'l	None	Engine Failure or Malfunction
7/09	Talkeetna,AK	Passenger	Bell 206B	Subst'l	Minor	Roll Over
7/10	Nelson Lagoon,AK	Passenger	Cessna 185	Subst'l	None	Ground-Water Loop-Swerve
7/11	False Island,AK	Passenger	Cessna A185F	Destr'd	Serious	Coll w/ Trees
7/11	Rochester,NY	Cargo	Beech TC-45J	Subst'l	None	Landing Gear Collapsed
7/11	False Pass,AK	Passenger	Piper PA-23	Subst'l	Fatal (1)	Stall
7/12	Pinedale,WY	Passenger	Aerospatiale SA315B	Subst'l	None	Hard Landing
7/12	Golovin,AK	Passenger	Cessna 402B	Destr'd	Fatal (8)	Controlled Coll w/ Ground/Water
7/13	Cleveland,OH	Passenger	Bell 47J2	Subst'l	None	Engine Failure or Malfunction
7/14	Miami,FL	Passenger	Bell 47G-2	Subst'l	None	Tail Rotor Failure

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

Date	Location	Type of Operation	Aircraft Type	Aircraft Damage	Degree of Injury	Type of Accident
7/18	Collinsville,AK	Passenger	Cessna 185	Subst'l	None	Ground-Water Loop-Swerve
7/18	Arcola,TX	Passenger	Bell 205A-1	Destr'd	Fatal (1)	Airframe Failure - In Flight
7/20	Juneau,AK	Passenger	Grumman G-21A	Subst'l	Serious	Hard Landing
7/21	Pilot Station,AK	Passenger	Cessna 207	Subst'l	None	Coll w/ Other
7/23	Deadhorse,AK	Passenger	Bell 206B	Subst'l	None	Engine Failure or Malfunction
7/23	Kenai,AK	Passenger	Cessna 207	Subst'l	None	Hard Landing
7/24	Bethel,AK	Passenger	Evangel-Air 4500	Subst'l	None	Ground-Water Loop-Swerve
7/25	Queens Cannery,AK	Passenger	Cessna 180J	Subst'l	None	Controlled Coll w/ Ground/Water
7/28	Dell,MT	Cargo	Aerospatiale 315B	Subst'l	Fatal (1)	Tail Rotor Failure
7/28	Kenai,AK	Cargo	Cessna U206	Subst'l	Minor	Hard Landing
7/30	Cordova,AK	Cargo	Dehavilland DHC-2	Subst'l	Minor	Engine Failure or Malfunction
7/30	Clayton,NM	Passenger	Cessna 310	Subst'l	None	Landing Gear Retracted
7/30	Paducah,KY	Passenger	Lear Jet 25	Subst'l	None	Engine Failure or Malfunction
8/01	Meeteetse,WY	Passenger	Aerospatiale SA315	Destr'd	Fatal (2)	Controlled Coll w/ Ground/Water
8/02	Kivalina,AK	Passenger	Hughes 369	Subst'l	None	Engine Failure or Malfunction
8/02	Dell,MT	Cargo	Aerospatiale 315B	Subst'l	Minor	Engine Failure or Malfunction
8/03	Tosiak,AK	Passenger	Dehavilland DHC-3	Destr'd	Fatal (2)	Controlled Coll w/ Ground/Water
8/04	Santa Rosa,CA	Cargo	Piper PA-34	Subst'l	None	Ground-Water Loop-Swerve
8/06	Gulkana,AK	Passenger	Aerospatiale SA341G	Subst'l	None	Hard Landing
8/06	Houma,LA	Passenger	Bell 205A-1	Destr'd	Fatal (13)	Uncontrolled Coll w/ Ground/Water
8/08	Greybull,WY	Passenger	Hiller UH-12E	Subst'l	None	Controlled Coll w/ Ground/Water
8/11	Salmon,ID	Cargo	Cessna T207	Destr'd	Fatal (2)	Stall
8/11	Lovington,NM	Cargo	Piper PA-28R	Destr'd	Fatal (1)	Controlled Coll w/ Ground/Water
8/12	Sitka,AK	Passenger	Hughes 500C	Subst'l	Minor	Hard Landing
8/12	Tewksbury,MA	Passenger	Cessna 401B	Destr'd	Fatal (2)	Coll w/ Electronic Towers
8/14	Ekuk,AK	Passenger	Piper PA-32	Subst'l	None	Landing Gear Collapsed
8/14	Eek,AK	Passenger	Cessna 185	Subst'l	None	Overshoot
8/15	Ruidoso,NM	Passenger	Beech 65-90	Subst'l	None	Ground-Water Loop-Swerve
8/16	Dunwood,NY	Passenger	Cessna 206F	Subst'l	None	Nose Over/Down
8/19	Cortez,CO	Passenger	Bell 206L	Subst'l	None	Hard Landing
8/26	Gulf Coast,TX	Passenger	Bell 206L1	Subst'l	None	Main Rotor Failure
8/26	Kukaklek Lake,AK	Passenger	Dehavilland DHC-2	Subst'l	None	Coll w/ Dirt Bank
8/26	Las Vegas,NV	Passenger	Hughes 369HS	Subst'l	Fatal (1)	Controlled Coll w/ Ground/Water
8/27	Paimuit,AK	Cargo	Cessna 207	Destr'd	None	Engine Failure or Malfunction
8/29	Deadhorse,AK	Passenger	Bell 206B	Subst'l	None	Engine Failure or Malfunction
8/29	Intracstl Cty,LA	Passenger	Bell 206L-1	Subst'l	None	Engine Failure or Malfunction
8/29	Sacramento,CA	Passenger	Cessna 414	Destr'd	Serious	Engine Failure or Malfunction
8/30	Red Lodge,MT	Passenger	Bell 206A/B	Destr'd	Fatal (3)	Uncontrolled Coll w/ Ground/Water
9/01	Houma,LA	Passenger	Cessna 185	Subst'l	None	Coll w/ Dirt Bank
9/01	Red Lodge,MT	Passenger	Bell UH-1B	Subst'l	None	Coll w/ Other
9/03	Patterson,LA	Passenger	Sikorsky S-76	Destr'd	Minor	Roll Over
9/03	Chicago,IL	Cargo	Aero Comdr 680FL	Destr'd	Fatal (1)	Engine Failure or Malfunction
9/03	Patterson,LA	Passenger	Aerospatiale AS350	Subst'l	None	Engine Failure or Malfunction

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

Date	Location	Type of Operation	Aircraft Type	Aircraft Damage	Degree of Injury	Type of Accident
9/04	Grassy Butte,ND	Passenger	Bell 206B	Subst'l	Fatal (1)	Coll w/ Wires/Poles
9/06	Nondalton,AK	Passenger	Cessna U206	Subst'l	None	Coll w/ Trees
9/08	Abilene,TX	Cargo	Beech C-45G	Destr'd	None	Ground-Water Loop-Swerve
9/10	Culpeper,VA	Passenger	Piper PA-31	Destr'd	Fatal (1)	Engine Failure or Malfunction
9/12	Houma,LA	Passenger	Cessna 180K	Subst'l	Fatal (1)	Collision btw Aircraft - In Flight
9/15	Karluk,AK	Passenger	Cessna 207A	Subst'l	Minor	Stall - Mush
9/15	Shedidan,AR	Cargo	Piper PA-32	Destr'd	None	Engine Failure or Malfunction
9/16	Waukegan,IL	Passenger	Lear Jet 23	Subst'l	None	Coll w/ Other
9/16	Intracstl Cy,LA	Passenger	Bell 206B	Subst'l	None	Coll w/ Other
9/24	Creole,LA	Passenger	Bell 206L-1	Subst'l	None	Engine Failure or Malfunction
9/26	Austin,TX	Cargo	Cessna U206	Subst'l	None	Engine Failure or Malfunction
9/28	Nikiski,AK	Passenger	Robertson 207A	Destr'd	Serious	Coll w/ Trees
9/29	Tatitna,AK	Passenger	Dehavilland DHC-2	Subst'l	None	Ground-Water Loop-Swerve
10/01	Hilo,HI	Cargo	Beech 3NM	Subst'l	None	Engine Failure or Malfunction
10/02	Dallas,TX	Cargo	Beech 18	Subst'l	None	Landing Gear Collapsed
10/04	Aspen,CO	Passenger	Lear Jet 25	Subst'l	None	Ground-Water Loop-Swerve
10/04	Silverton,CO	Passenger	Hughes 369HS	Subst'l	Fatal (3)	Coll w/ Wires/Poles
10/05	Panguitch,UT	Passenger	Aerospatiale SA315B	Subst'l	Serious	Hard Landing
10/06	Le Duc Lake,AK	Passenger	Cessna 185F	Subst'l	Fatal (1)	Controlled Coll w/ Ground/Water
10/08	Moab,UT	Passenger	Cessna TU206G	Subst'l	None	Ground-Water Loop-Swerve
10/11	Fort Yukon,AK	Passenger	Cessna 170B	Subst'l	None	Coll w/ Other
10/11	Pilot Point,AK	Passenger	Cessna 206	Subst'l	Minor	Stall - Mush
10/19	Deadhorse,AK	Passenger	Cessna U20GF	Destr'd	Fatal (2)	Coll w/ Other
10/24	Gainesville,FL	Passenger	Beech E18S	Destr'd	Fatal (3)	Engine Failure or Malfunction
10/26	Galveston,TX	Cargo	Bell 212	Subst'l	Serious	Engine Failure or Malfunction
10/27	Alma,CO	Passenger	Hughes 369D	Subst'l	None	Controlled Coll w/ Ground/Water
10/29	Canisteo,NY	Cargo	Beech 95-C55	Destr'd	Fatal (1)	Airframe Failure - In Flight
11/02	Kauai,HI	Passenger	Bell 206L	Subst'l	Minor	Hard Landing
11/04	Richmond,VA	Passenger	Cessna 182P	Subst'l	None	Coll w/ Trees
11/10	Atmauthluk,AK	Cargo	Bell 206L	Subst'l	None	Airframe Failure - In Flight
11/18	Troxelville,PA	Cargo	Beech H18	Destr'd	Fatal (1)	Uncontrolled Coll w/ Ground/Water
11/20	Oakley,ID	Cargo	Piper PA-32RT	Subst'l	None	Engine Failure or Malfunction
11/26	Fort Yukon,AK	Passenger	Cessna 185	Subst'l	None	Engine Failure or Malfunction
12/07	Michigan City,IN	Passenger	Beech E90	Destr'd	Fatal (4)	Uncontrolled Coll w/ Ground/Water
12/12	Cold Bay,AK	Passenger	Piper PA-32	Destr'd	Fatal (4)	Controlled Coll w/ Ground/Water
12/13	Cameron,LA	Passenger	Aerospatiale AS350	Subst'l	None	Main Rotor Failure
12/18	Pilot Station,AK	Passenger	Cessna 207	None	Serious	Propeller Accident to Person
12/18	Kasigluk,AK	Cargo	Cessna 185	Subst'l	None	Ground-Water Loop-Swerve
12/22	Miami,FL	Passenger	Douglas DC-3A	Subst'l	Serious	Stall
12/22	Norfolk,VA	Cargo	Beech E18S	Subst'l	None	Collision btw Aircraft - On Ground
12/30	Kenosha,WI	Passenger	Cessna U206G	Subst'l	None	Coll w/ Snowbank
12/31	Patterson,LA	Passenger	Bell 206B	Subst'l	None	Engine Failure or Malfunction

In Table 50, all persons aboard or otherwise associated with accident-involved nonscheduled Part 135 aircraft are cross-tabulated by their role in the accident and the degree of injury sustained. Overall, the distribution of degree of injury is comparable to, but shifted slightly toward, more severe injury than the distribution for persons involved in scheduled Part 135 accidents. The percentages of persons fatally injured are 17.8 (nonscheduled) and 15.4 (scheduled), while seriously injured persons accounted for 7.4 percent (nonscheduled) and 5.8 percent (scheduled) of all persons involved.

Table 50 - PERSONS BY ROLE AND DEGREE OF INJURY

	Degree of Injury				
	Fatal	Serious	Minor	None	Total
Pilot-in-Command	34	16	18	103	171
Co-Pilot	2	0	1	9	12
Extra Crew	1	0	0	1	2
Cabin Attendant	2	0	1	0	3
Passenger	62	25	40	260	387
Person Aboard Other Aircraft	2	0	0	1	3
Person on Ground	0	2	0	0	2
Total	103	43	60	374	580

More than two-thirds of the accidents in 1980 were of one of five types -- engine failure or malfunction, collisions with objects, controlled collision with ground or water, ground-water loop-swerve, or hard landing (see Table 51). Among these five predominant accident types, only controlled collision with ground or water and collisions with objects had higher percentages of accidents producing fatal injuries (63.2 percent and 32.0 percent, respectively) than did all accident types together (26.5 percent).

Table 51 ACCIDENTS BY TYPE AND DEGREE OF INJURY

	Degree of Injury				Accidents	
Type of Accident	Fatal	Serious	Minor	None	Number	Percent
Airframe Failure in Flight	2	0	0	1	3	1.8
Collision, Both Aircraft in Flight	3	0	0	0	3	1.8
Collision, Both Aircraft on Ground	0	0	0	1	1	0.6
Collision with Ground/Water - Controlled	12	1	2	4	19	11.2
Collision with Ground/Water - Uncontrolled	5	0	0	0	5	2.9
Collision with Objects	8	2	1	14	25	14.7
Engine Failure or Malfunction	7	3	10	22	42	24.7
Engine Tearaway	0	1	0	0	1	0.6
Ground-Water Loop-Swerve	0	0	0	17	17	10.0
Hard Landing	0	2	3	8	13	7.6
Landing Gear Collapsed	0	0	0	5	5	2.9
Landing Gear Retracted	0	0	0	3	3	1.8
Lightning Strike	0	0	0	1	1	0.6
Main Rotor Failure	0	0	0	2	2	1.2
Nose Over/Down	0	0	0	3	3	1.8
Overshoot	0	0	2	2	4	2.4
Propeller/Rotor Accident to Person	2	1	0	0	3	1.8
Roll Over	1	0	2	1	4	2.4
Stall	4	2	0	0	6	3.5
Stall - Mush	0	1	2	1	4	2.4
Tail Rotor Failure	1	0	0	3	4	2.4
Turbulence	0	0	0	1	1	0.6
Wheels-Up Landing	0	0	0	1	1	0.6
Accidents - Number	45	13	22	90	170	
- Percent	26.5	7.6	12.9	52.9		

Table 52 shows that 98.8 percent of the nonscheduled 14 CFR 135 aircraft involved in accidents were destroyed or substantially damaged. Exactly one-half of the aircraft destroyed were involved in either controlled collisions with ground or water, or engine failure or malfunction accidents.

Table 52 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

Type of Accident	Aircraft Damage				Nonscheduled Part 135 Aircraft	
	Destroyed	Substantial	Minor	None	Number	Percent
Airframe Failure in Flight	2	1	0	0	3	1.8
Collision, Both Aircraft in Flight	3	1	0	0	4	2.3
Collision Both Aircraft on Ground	0	1	0	0	1	0.6
Collision with Ground/Water - Controlled	10	9	0	0	19	11.1
Collision with Ground/Water - Uncontrolled	5	0	0	0	5	2.9
Collision with Objects	8	17	0	0	25	14.6
Engine Failure or Malfunction	16	26	0	0	42	24.6
Engine Tearaway	1	0	0	0	1	0.6
Ground-Water Loop-Swerve	1	16	0	0	17	9.9
Hard Landing	0	13	0	0	13	7.6
Landing Gear Collapsed	0	5	0	0	5	2.9
Landing Gear Retracted	0	3	0	0	3	1.8
Lightning Strike	0	1	0	0	1	0.6
Main Rotor Failure	0	2	0	0	2	1.2
Nose Over/Down	0	3	0	0	3	1.8
Overshoot	0	4	0	0	4	2.3
Propeller/Rotor Accident to Person	0	1	0	2	3	1.8
Roll Over	2	2	0	0	4	2.3
Stall	3	3	0	0	6	3.5
Stall - Mush	1	3	0	0	4	2.3
Tail Rotor Failure	0	4	0	0	4	2.3
Turbulence	0	1	0	0	1	0.6
Wheels-up Landing	0	1	0	0	1	0.6
Nonscheduled Part 135 Aircraft - Number	52	117	0	2	171	
Nonscheduled Part 135 Aircraft - Percent	30.4	68.4	0.0	1.2		

Nonscheduled Part 135 aircraft in the "normal cruise" phase of operation constitute 20.5 percent of accident-involved aircraft and 26.1 percent of those involved in fatal accidents (see Table 53). Aircraft in the landing phases account for 39.8 percent of the total, while those in the takeoff phases represent 19.3 percent of the accident-involved aircraft.

Table 53 - AIRCRAFT BY PHASE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Nonscheduled Part 135 Aircraft	
Phase of Operation	Fatal	Serious	Minor	None	Number	Percent
Static						
Idling Engine(s)	0	1	0	1	2	1.2
Idling Rotors	2	0	0	0	2	1.2
Taxi						
To Takeoff - Fixed Wing	0	0	0	2	2	1.2
From Landing - Fixed Wing	0	0	0	3	3	1.8
Other - Fixed Wing	1	0	0	0	1	0.6
Ground Taxi - Rotorcraft	0	0	1	0	1	0.6
Aerial Taxi - Rotorcraft	0	0	0	1	1	0.6
Takeoff						
Run	0	0	0	5	5	2.9
Initial Climb	6	4	4	5	19	11.1
Vertical	3	0	0	2	5	2.9
Aborted - Fixed Wing	0	0	0	2	2	1.2
Aborted - Rotorcraft	0	0	0	2	2	1.2
In Flight						
Climb to Cruise	2	0	1	2	5	2.9
Normal Cruise	12	4	5	14	35	20.5
Descent	1	0	1	2	4	2.3
Hover	0	0	0	1	1	0.6
Power-on Descent - Rotorcraft	0	0	0	2	2	1.2
Uncontrolled Descent	4	0	0	0	4	2.3
Low Pass	1	0	0	1	2	1.2
Other	2	0	2	1	5	2.9
Landing						
Traffic Pattern - Circling	0	2	1	0	3	1.8
Final Approach (VFR)	3	0	1	2	6	3.5
Initial Approach	0	0	1	1	2	1.2
Final Approach (IFR)	5	0	0	3	8	4.7
Level-off/Touchdown	1	1	5	12	19	11.1
Roll - Fixed Wing	0	0	0	22	22	12.9
Power-on Landing - Rotorcraft	0	1	0	3	4	2.3
Go-around (VFR)	0	0	0	1	1	0.6
Missed Approach (IFR)	2	0	0	0	2	1.2
Other	1	0	0	0	1	0.6
Nonscheduled Part 135 Aircraft - Number	46	13	22	90	171	
Nonscheduled Part 135 Aircraft - Percent	26.9	7.6	12.9	52.6		

Table 54 presents the phase of operation in which the accident occurred by damage to the aircraft. Normal cruise was the most frequent phase of operation. Seventeen of 35 aircraft (48.6 percent) involved in accidents during the normal cruise phase of operation were destroyed.

Table 54 - AIRCRAFT BY PHASE OF OPERATION AND DAMAGE

	Aircraft Damage				Nonscheduled Part 135 Aircraft	
Phase of Operation	Destroyed	Substantial	Minor	None	Number	Percent
Static						
Idling Engine(s)	0	1	0	1	2	1.2
Idling Rotors	1	0	0	1	2	1.2
Taxi						
To Takeoff - Fixed Wing	0	2	0	0	2	1.2
From Landing - Fixed Wing	0	3	0	0	3	1.8
Other - Fixed Wing	0	1	0	0	1	0.6
Ground Taxi - Rotorcraft	1	0	0	0	1	0.6
Aerial Taxi - Rotorcraft	0	1	0	0	1	0.6
Takeoff						
Run	1	4	0	0	5	2.9
Initial Climb	6	13	0	0	19	11.1
Vertical	1	4	0	0	5	2.9
Aborted - Fixed Wing	0	2	0	0	2	1.2
Aborted - Rotorcraft	0	2	0	0	2	1.2
In Flight						
Climb to Cruise	3	2	0	0	5	2.9
Normal Cruise	17	18	0	0	35	20.5
Descent	2	2	0	0	4	2.3
Hover	0	1	0	0	1	0.6
Power-on Descent - Rotorcraft	0	2	0	0	2	1.2
Uncontrolled Descent	4	0	0	0	4	2.3
Low Pass	0	2	0	0	2	1.2
Other	1	4	0	0	5	2.9
Landing						
Traffic Pattern - Circling	2	1	0	0	3	1.8
Final Appoach (VFR)	3	3	0	0	6	3.5
Initial Approach	0	2	0	0	2	1.2
Final Approach (IFR)	5	3	0	0	8	4.7
Level-off/Touchdown	2	17	0	0	19	11.1
Roll - Fixed Wing	0	22	0	0	22	12.9
Power-on Landing - Rotorcraft	0	4	0	0	4	2.3
Go-around (VFR)	0	1	0	0	1	0.6
Missed Approach (IFR)	2	0	0	0	2	1.2
Other	1	0	0	0	1	0.6
Nonscheduled 14 CFR 135 Aircraft - Number	52	117	0	2	171	
- Percent	30.4	68.4	0.0	1.2		

The accident-involved nonscheduled Part 135 aircraft are cross-tabulated by accident type and the general phase of operation in which the accident occurred in Table 55. In all engine failure or malfunction accidents, a second type of accident occurred also. Thirty-eight of the 42 second accidents (or 90.5 percent) occurred during attempted landings. The most frequent types of second accident were collision with trees, wires, poles, etc. (12 accidents) and hard landing (10 accidents). All of the second accidents in the hard landing category involved helicopters. Engine failure or malfunction accidents involved 23 fixed wing aircraft and 19 helicopters. Of the fixed wing aircraft, 13 had a single engine and 10 had twin engines. Only one of the helicopters was a twin-engine type.

Table 55 - AIRCRAFT BY TYPE OF ACCIDENT AND PHASE OF OPERATION

Type of Accident	Phase of Operation					Nonscheduled Part 135 Aircraft	
	Static	Taxi	Takeoff	In Flight	Landing	Number	Percent
Airframe Failure in Flight	0	0	0	3	0	3	1.8
Collision, Both Aircraft in Flight	0	0	0	3	1	4	2.3
Collision, Both Aircraft on Ground	1	0	0	0	0	1	0.6
Collision with Ground/Water - Controlled	0	0	5	8	6	19	11.1
Collision with Ground/Water - Uncontrolled	0	0	0	4	1	5	2.9
Collision with Objects	0	2	7	6	10	25	14.6
Engine Failure or Malfunction	1	0	7	26	8	42	24.6
Engine Tearaway	0	0	0	1		1	0.6
Ground-Water Loop-Swerve	0	1	2	0	14	17	9.9
Hard Landing	0	0	2	0	11	13	7.6
Landing Gear Collapsed	0	1	1	0	3	5	2.9
Landing Gear Retracted	0	1	0	0	2	3	1.8
Lightning Strike	0	0	0	0	1	1	0.6
Main Rotor Failure	0	0	0	2	0	2	1.2
Nose Over/Down	0	0	1	0	2	3	1.8
Overshoot	0	0	0	0	4	4	2.3
Propeller/Rotor Accident to Person	2	1	0	0	0	3	1.8
Roll over	0	1	1	0	2	4	2.3
Stall	0	0	2	2	2	6	3.5
Stall - Mush	0	0	3	1	0	4	2.3
Tail Rotor Failure	0	0	2	2	0	4	2.3
Turbulence	0	1	0	0	0	1	0.6
Wheels-up Landing	0	0	0	0	1	1	0.6
Nonscheduled Part 135 Aircraft - Number	4	8	33	58	68	171	
Nonscheduled Part 135 Aircraft - Percent	2.3	4.7	19.3	33.9	39.8		

Table 56 summarizes the light and weather conditions at the time of occurrence of accidents involving nonscheduled Part 135 operations. Most accidents (64.1 percent) occurred in daylight and VFR weather conditions.

Table 56 - ACCIDENTS BY CONDITION OF LIGHT AND TYPE OF WEATHER CONDITIONS

	Type of Weather Conditions			Accidents	
Condition of Light	VFR	IFR	Below Minimums	Number	Percent
Dawn	2	0	0	2	1.2
Daylight	109	24	1	134	78.8
Dusk	4	0	0	4	2.4
Night (Dark)	13	13	2	28	16.5
Night (Moonlight-Bright)	2	0	0	2	1.2
Accidents - Number	130	37	3	170	
- Percent	76.5	21.8	1.8		

The most frequently occurring combination of aircraft damage and degree of injury was substantial damage and no injury (for 49.7 percent of the nonscheduled Part 135 aircraft). Table 57 shows that among the 169 aircraft which were substantially damaged or destroyed, the degree of injury was minor or none in 112 cases (or 66.3 percent).

Table 57 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

	Degree of Injury				Nonscheduled Part 135 Aircraft	
Aircraft Damage	Fatal	Serious	Minor	None	Number	Percent
Destroyed	35	7	5	5	52	30.4
Substantial	10	5	17	85	117	68.4
Minor	0	0	0	0	0	0.0
None	1	1	0	0	2	1.2
Nonscheduled Part 135 Aircraft - Number	46	13	22	90	171	
- Percent	26.9	7.6	12.9	52.6		

Table 58 shows that aircraft conducting passenger operations constitute 76.0 percent of all accident-involved nonscheduled Part 135 aircraft and 78.3 percent of those involved in fatal accidents. Accidents involving passenger operations accounted for 90 fatalities (or 87.4 percent of the total).

Table 58 - AIRCRAFT BY TYPE OF OPERATION AND DEGREE OF INJURY

	Degree of Injury				Nonscheduled Part 135 Aircraft	
Type of Operation	Fatal	Serious	Minor	None	Number	Percent
Domestic Passenger	36	8	16	69	129	75.4
Domestic Cargo	10	4	6	21	41	24.0
International Passenger	0	1	0	0	1	0.6
Nonscheduled Part 135 Aircraft - Number	46	13	22	90	171	
- Percent	26.9	7.6	12.9	52.6		

Table 59 presents a cross-tabulation of the accident-involved aircraft by proximity to the airport and the type of flight plan filed. The same type of information is presented for scheduled Part 135 aircraft in Table 38. Comparing the two tables reveals substantial differences in the accident locations and types of flight plan filed. The greatest percentage differences in type of flight plan exist in the categories "None" (32.2 percent of nonscheduled versus 15.4 percent of scheduled) and "IFR" (19.9 percent of nonscheduled versus 59.0 percent of scheduled). Flight plans (VFR or IFR) were filed for almost 80 percent of the accident flights involving scheduled operations under 14 CFR 135, while flight plans were filed for less than 47 percent of the accident flights for the nonscheduled operations. The percentage of nonscheduled aircraft involved in accidents more than 5 miles from the airport is more than four times the percentage for scheduled aircraft.

The pilot was the accident cause most frequently cited by the Safety Board - 79.2 percent of accidents and 82.2 percent of fatal accidents involving nonscheduled 14 CFR 135 operations (see Table 60). Weather was cited as a factor in 37.1 percent of all accidents and in 57.8 percent of fatal accidents. Appendix C contains a detailed cause/factor listing for accidents involving nonscheduled 14 CFR 135 operations.

Table 59 AIRCRAFT BY PROXIMITY TO AIRPORT AND FLIGHT PLAN

Proximity to Airport	Flight Plan							Nonscheduled Part 135 Aircraft	
	None	VFR	IFR	IFR/VFR on Top	VFR Flight Follow	Special VFR	Other	Number	Percent
On Airport	10	23	15	0	0	0	8	56	32.7
On Heliport	0	1	0	0	0	0	2	3	1.8
On Barge/Ship Platform	0	0	0	0	0	0	2	2	1.2
In Traffic Pattern	3	0	0	0	0	0	0	3	1.8
Miles from Airport									
Within 1/4	0	1	3	0	0	0	1	5	2.9
1/4+ to 1/2	2	3	2	0	0	1	2	10	5.8
1/2+ to 3/4	0	0	1	0	0	0	0	1	0.6
3/4+ to 1	1	1	1	0	0	0	0	3	1.8
1+ to 2	1	2	1	0	0	0	0	4	2.3
2+ to 3	2	0	1	0	0	1	0	4	2.3
3+ to 4	0	0	3	0	1	0	0	4	2.3
Beyond 5	34	15	7	1	3	0	12	72	42.1
Unknown/Not Reported	2	0	0	0	0	0	2	4	2.3
Nonscheduled Part 135 Aircraft - Number	55	46	34	1	4	2	29	171	
- Percent	32.2	26.9	19.9	0.6	2.3	1.2	17.0		

Table 60 - BROAD CAUSE/FACTOR ASSIGNMENTS*

Cause/Factor	Cited as a Cause		Cited as a Factor		Cited as Either a Cause or a Factor (or Both)	
	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents	Fatal Accidents	All Accidents
Pilot	37	124	10	18	38	127
Weather	1	4	26	63	26	64
Personnel	7	21	6	13	12	32
Powerplant	7	29	1	5	7	31
Airport/Airways/Facilites	0	1	0	22	0	23
Terrain	0	1	1	20	1	21
Landing Gear	1	10	0	2	1	12
Rotorcraft	1	7	1	1	2	8
Miscellaneous	0	5	2	2	2	7
Systems	0	3	1	3	1	6
Instrument/Equipment & Accessories	0	0	2	3	2	3
Airframe	1	2	0	0	1	2
Undetermined	1	2	0	0	1	2
Number of Accidents with Cause(s) Assigned	45	170	45	170	45	170

* The table presents the number of accidents for which each Cause/Factor was cited. In the three collisions between nonscheduled Part 135 aircraft and other aircraft, causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

HISTORICAL COMPARISON

When compared to the years 1975 through 1979, 1980 had, in terms of accidents and fatal accidents, a worse record than 4 of those 5 years (see Table 61). The same is true of the fatal accident rate. The total accident rate in 1980, however, was only 8.2 percent higher than the 1979 rate, the lowest in the 1975 to 1979 period. The 1980 fatality total is approximately equal to the average for the preceding 5 years, 103.8 fatalities per year. The statistics of Table 61 are depicted in Figures 5 and 6.

Table 61 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES

			Fatalities	
Year	Accidents	Fatal Accidents	Total	Aboard Nonscheduled 14 CFR 135 Aircraft
1975	152	24	69	69
1976	137	31	100	97
1977	158	31	118	115
1978	198	54	155	152
1979	160	30	77	73
1980	170	45	103	101

		Accident Rate per 100,000 Aircraft Hours Flown	
Year	Hours Flown	Total	Fatal
1975	2,526,271	6.017	0.950
1976	2,703,203	5.068	1.147
1977	3,304,220	4.782	0.938
1978	3,545,753	5.584	1.523
1979	3,684,321	4.343	0.814
1980	3,617,724	4.699	1.244

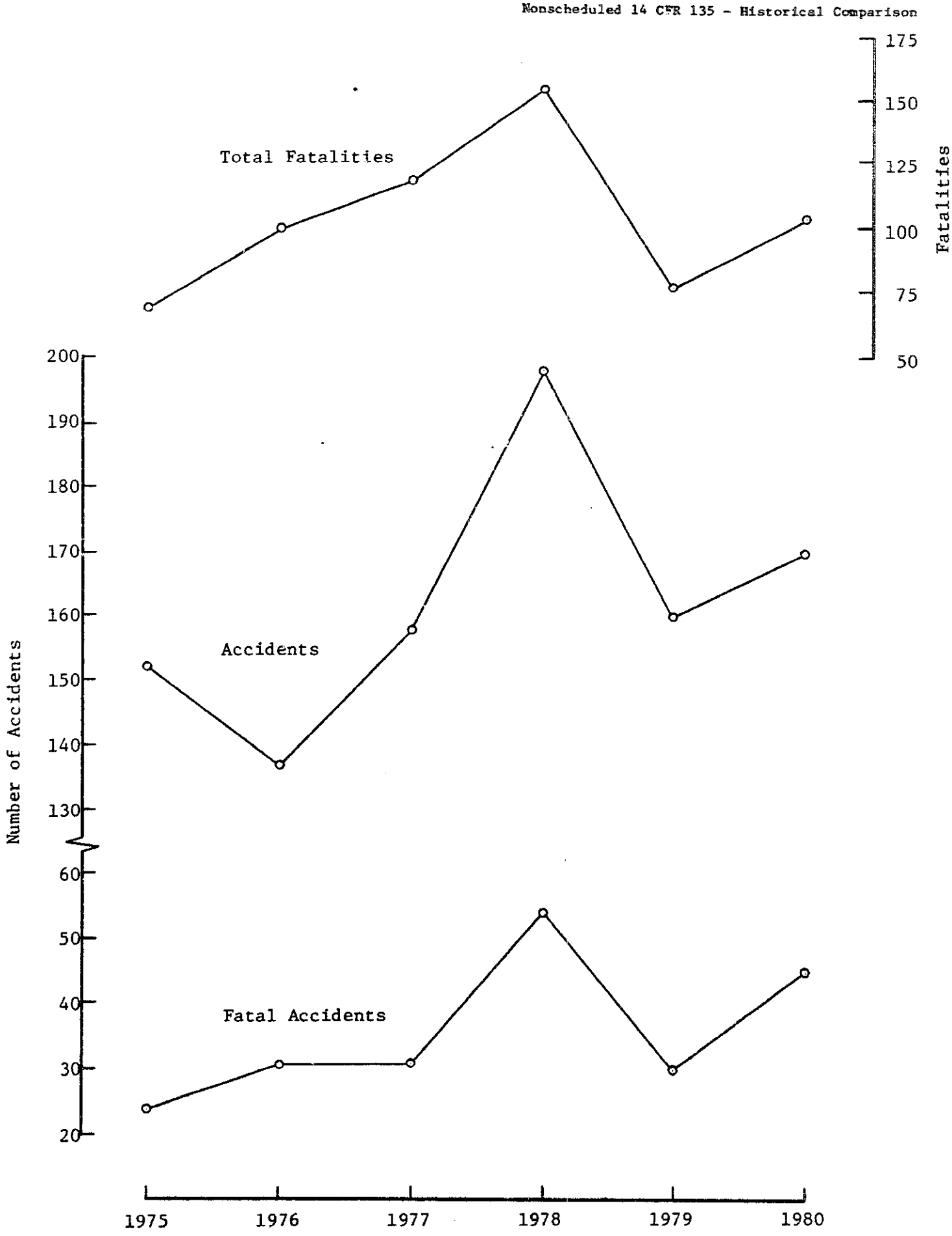

Figure 5 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

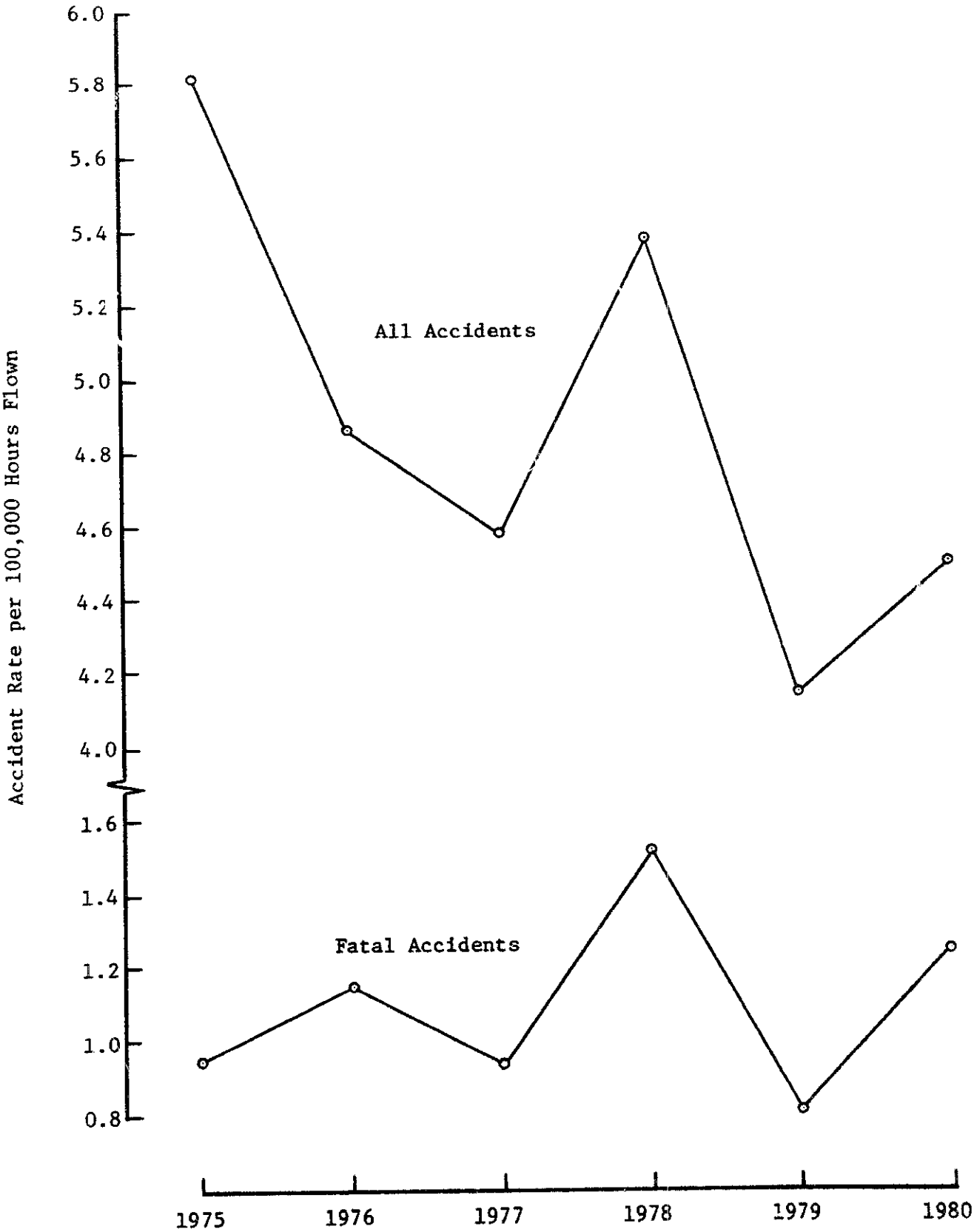

Figure 6 - ACCIDENT RATES

The four most frequent types of accidents in 1980 correspond in order to the four most prevalent accident types in the prior 5 years (see Table 62). These four types account for 103 accidents compared to a mean of 89.0 accidents in the base period. The number of hard landing accidents more than doubled in 1980 from the 5-year mean of 6.0.

Table 62 - MOST PREVALENT TYPES OF ACCIDENTS

	1980		1975-1979	
Type of Accident	No.	Percent	Mean	Percent
Engine Failure or Malfunction	42	24.7	32.8	20.4
Collision with Trees, Wires, Objects	25	14.7	27.8	17.3
Collision with Ground/Water - Controlled	19	11.2	15.2	9.4
Ground-Water Loop-Swerve	17	10.0	13.2	8.2
Stall	10	5.9	8.0	5.0
Collision with Ground/Water - Uncontrolled	5	2.9	6.8	4.2
Overshoot	4	2.4	6.2	3.9
Hard Landing	13	7.6	6.0	3.7
Nose Over/Down	3	1.8	5.6	3.5
Rotor Failure	6	3.5	4.4	2.7
Landing Gear Collapsed	5	2.9	4.2	2.6
Collision Between Aircraft	4	2.4	3.6	2.2
Gear Retracted	3	1.8	3.6	2.2
Roll Over - Rotorcraft	4	2.4	3.4	2.1
Undershoot	0	0.0	3.2	2.0
(All Other Types)	10	5.9	17.0	10.6
Total	170	100.0	161.0	100.0

Five accident types account for 75.9 percent of fatal accidents in the 1975 through 1979 period and 80.0 percent of those in 1980 (see Table 63). The number of accidents in four of those five categories increased in 1980 from the mean for the base period. The greatest relative increases were in collisions with trees, wires or other objects, and in engine failure or malfunction accidents. There were three fatal collisions between aircraft in 1980 compared to a mean of 1.0 per year in the preceding 5-year period. From Table 63, it can be seen that there was an increase in fatal accidents in 1980 of almost one-third over the mean number of fatal accidents during the 1975-1979 period.

Table 63 MOST PREVALENT TYPES OF FATAL ACCIDENTS

	1980		1975-1979	
Type of Accident	No.	Percent	Mean	Percent
Collision with Ground/Water Controlled	12	26.7	9.0	26.5
Collision with Ground/Water Uncontrolled	5	11.1	5.2	15.3
Collision with Trees, Wires, Objects	8	17.8	4.6	13.5
Engine Failure or Malfunction	7	15.6	4.0	11.8
Stall	4	8.9	3.0	8.8
Rotor Failure	1	2.2	1.6	4.7
Airframe Failure in Flight	2	4.4	1.2	3.5
Collision Between Aircraft	3	6.7	1.0	2.9
Missing Aircraft/Not Recovered	0	0.0	1.0	2.9
Turbulence	0	0.0	0.8	2.4
Undetermined	0	0.0	0.8	2.4
(All Other Types)	3	6.7	1.8	5.3
Total	45	100.0	34.0	100.0

Tables 64 and 65 illustrate that in 1980, as in the preceding 5-year period, the most frequent phase of operation for all accidents was landing, while the in-flight phase predominated among fatal accidents. In 1980, 16.4 percent of accidents which occurred during landing resulted in fatalities, up from 10.7 percent in the base period. The proportion of fatal accidents among all accidents in the in-flight phase of operation remained relatively stable in 1980 (39.0 percent versus 39.4 percent in 1975 through 1979).

Table 64 PHASE OF OPERATION FOR ACCIDENT-INVOLVED NONSCHEDULED 14 CFR 135 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
Landing	67	39.2	61.8	38.2
In Flight	59	34.5	49.8	30.8
Takeoff	33	19.3	36.4	22.5
Taxi	9	5.3	9.4	5.8
Static	3	1.8	2.6	1.6
Unknown	0	0.0	1.8	1.1
Total Nonscheduled Part 135 Aircraft	171	100.0	161.8	100.0

Table 65 - PHASE OF OPERATION FOR FATAL ACCIDENT-INVOLVED NONSCHEDULED 14 CFR 135 AIRCRAFT

	1980		1975-1979	
Phase of Operation	No.	Percent	Mean	Percent
In Flight	23	50.0	19.6	57.6
Landing	11	23.9	6.6	19.4
Takeoff	9	19.6	5.6	16.5
Unknown	0	0.0	1.8	5.3
Static	2	4.3	0.2	0.6
Taxi	1	2.2	0.2	0.6
Total Nonscheduled Part 135 Aircraft	46	100.0	34.0	100.0

Tables 66 and 67 lists the broad accident cause/factors and their frequency of citation in 1980 and the base period in all accidents and in fatal accidents respectively. Terrain, which was a cause or factor in 24.5 percent of all accidents in the base period was cited in only 12.4 percent of nonscheduled Part 135 accidents in 1980. Terrain was cited in only one fatal accident in 1980, compared to a mean of 7.6 per year in 1975 through 1979. Both personnel and powerplant increased substantially in the percentage of fatal accidents in which they were cited in 1980.

Table 66 - BROAD CAUSE/FACTOR ASSIGNMENTS* - ALL ACCIDENTS

	1980		1975-1979	
Cause/Factor	No.	Percent	Mean	Percent
Pilot	127	74.7	121.8	76.0
Weather	64	37.6	48.4	30.2
Terrain	21	12.4	39.2	24.5
Personnel	32	18.8	27.4	17.1
Powerplant	31	18.2	23.8	14.9
Airport/Airways/Facilities	23	13.5	19.0	11.9
Landing Gear	12	7.1	12.0	7.5
Miscellaneous	7	4.1	6.0	3.7
Rotorcraft	8	4.7	4.8	3.0
Undetermined	2	1.2	4.2	2.6
Systems	6	3.5	3.0	1.9
Airframe	2	1.2	1.8	1.1
Instruments/Equipment & Accessories	3	1.8	0.8	0.5
Number of Accidents with Cause(s) Assigned	170		160.2	

* The table presents the number of accidents for which each cause/factor was cited. In the case of collisions between nonscheduled Part 135 aircraft and other aircraft (three accidents in 1980 and a mean of 2.8 accidents per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

Table 67 - BROAD CAUSE/FACTOR ASSIGNMENTS* - FATAL ACCIDENTS

	1980		1975-1979	
Cause/Factor	No.	Percent	Mean	Percent
Pilot	38	84.4	27.6	82.1
Weather	26	57.8	16.2	48.2
Terrain	1	2.2	7.6	22.6
Personnel	12	26.7	5.4	16.1
Undetermined	1	2.2	3 2	9.5
Powerplant	7	15.6	2.6	7.7
Rotorcraft	2	4.4	2.2	6.5
Miscellaneous	2	4.4	1.6	4.8
Airport/Airways/Facilities	0	0.0	0.6	1.8
Airframe	1	2.2	0.6	1.8
Instruments/Equipment & Accessories	2	4.4	0.6	1.8
Systems	1	2.2	0.4	1.2
Landing Gear	1	2.2	0.0	0.0
Number of Accidents with Cause(s) Assigned	45		33.6	

* The table presents the number of fatal accidents for which each Cause/Factor was cited. In the case of collisions between nonscheduled Part 135 aircraft and other aircraft (two fatal accidents in 1980 and a mean of 1.0 fatal accidents per year in the base period), causes and factors for the other aircraft and their personnel are not included in the table. Multiple causes and factors may be assigned in an accident.

APPENDIX C

CAUSE/FACTOR TABLE

NONSCHEDULED 14 CFR 135 ACCIDENTS

CAUSE/FACTOR TABLE - NON-SCHEDULED 14 CFR 135 ACCIDENTS - 1980

(EXCLUDES ACCIDENTS WITHOUT CAUSAL ASSIGNMENT)

INVOLVES 170 TOTAL ACCIDENTS
INVOLVES 45 FATAL ACCIDENTS

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
** PILOT **						
PILOT IN COMMAND						
ATTEMPTED OPERATION W/KNOWN DEFICIENCIES IN EQUIPMENT	1	1	2	2	2	4
ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL				1		1
CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS	7	2	9	15	2	17
DELAYED ACTION IN ABORTING TAKEOFF				1		1
DELAYED IN INITIATING GO-AROUND				2		2
DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT	1	1	2	1	2	3
FAILED TO SEE AND AVOID OTHER AIRCRAFT	2		2	3		3
FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS	3		3	4		4
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	5		5	11		11
MISJUDGED, SPEED, ALTITUDE OR CLEARANCE				1		1
FAILED TO MAINTAIN ADEQUATE ROTOR RPM				1		1
FAILED TO USE OR INCORRECTLY USED MISC EQUIPMENT				1		1
FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC	4		4	9	1	10
IMPROPER OPERATION OF POWERPLANT + POWERPLANT CONTROLS	1		1	2		2
IMPROPER OPERATION OF BRAKES AND/OR FLIGHT CONTROLS				2		2
IMPROPER OPERATION OF FLIGHT CONTROLS				1		1
PREMATURE LIFT OFF				2		2
IMPROPER LEVEL OFF				4		4
IMPROPER IFR OPERATION	4	1	5	8	1	9
IMPROPER IN-FLIGHT DECISIONS OR PLANNING	3		3	9	1	10
IMPROPER COMPENSATION FOR WIND CONDITIONS				4		4
INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING	6	4	10	21	7	28
INADEQUATE SUPERVISION OF FLIGHT	1		1	1		1
MISMANAGEMENT OF FUEL				11		11
EXERCISED POOR JUDGMENT	1		1	1		1
SELECTED UNSUITABLE TERRAIN				13		13
FAILED TO ASSURE THE GEAR WAS DOWN AND LOCKED				1		1
INITIATED FLIGHT IN ADVERSE WEATHER CONDITIONS	2		2	2		2
MISJUDGED DISTANCE, SPEED, AND ALTITUDE	1		1	2		2
MISJUDGED DISTANCE AND SPEED				4		4
MISJUDGED DISTANCE AND ALTITUDE	1		1	4		4
MISJUDGED SPEED AND ALTITUDE				2		2
MISJUDGED ALTITUDE AND CLEARANCE	1		1	1		1
MISJUDGED ALTITUDE	1		1	2		2
MISJUDGED CLEARANCE				2		2

IMPROPER RECOVERY FROM BOUNCED LANDING (CONTINUED)

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS CAUSE	FACTOR	TOTAL	ALL ACCIDENTS CAUSE	FACTOR	TOTAL
IMPROPER RECOVERY FROM BOUNCED LANDING		1	1	1	1	2
PHYSICAL IMPAIRMENT				1		1
SPATIAL DISORIENTATION	2		2	2		2
MISUSED OR FAILED TO USE FLAPS				3	1	4
LEFT AIRCRAFT UNATTENDED ENGINE RUNNING				1		1
FAILED TO MAINTAIN DIRECTIONAL CONTROL				9		9
SELECTED WRONG RUNWAY RELATIVE TO EXISTING WIND				2		2
FAILED TO ABORT TAKEOFF	1		1	3	1	4
FAILED TO INITIATE GO-AROUND				4	1	5
SUBTOTAL	48	10	58	177	20	197
COPILOT						
DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT		1	1		1	1
FAILED TO OBTAIN/MAINTAIN FLYING SPEED	1		1	1		1
IMPROPER OPERATION OF FLIGHT CONTROLS	1		1	1		1
LACK OF FAMILIARITY WITH AIRCRAFT		1	1		1	1
SUBTOTAL	2	2	4	2	2	4
** PERSONNEL **						
RULES, REGULATIONS, STANDARDS PERSONNEL						
FLIGHT INSTRUCTOR						
MAINTENANCE, SERVICING, INSPECTION						
IMPROPER MAINTENANCE(MAINTENANCE PERSONNEL)	1		1	1		1
INADEQUATE MAINTENANCE AND INSPECTION	1	1	2	8	3	11
OTHER				2		2
OPERATIONAL SUPERVISORY PERSONNEL						
INADEQUATE SUPERVISION OF FLIGHT CREW				1	2	3
INADEQUATE SUPERVISION/TRAINING OF RAMP CREWS					1	1
FAILURE TO PROVIDE ADEQ DIRECTIVES, MANUALS, EQUIPMENT		1	1		1	1
DEFICIENCY, COMPANY MAINTAINED EQMT, SERV, REGULATIONS	1	1	2	1	1	2
WEATHER PERSONNEL						
TRAFFIC CONTROL PERSONNEL						
ISSUED IMPROPER OR CONFLICTING INSTRUCTIONS					1	1
OTHER		4	4		4	4
AIRPORT SUPERVISORY PERSONNEL						
FAILURE TO NOTIFY OF UNSAFE COND/AND OR FAILURE TO MARK				1		1
AIRWAYS FACILITIES PERSONNEL						
OTHER					1	1
PRODUCTION-DESIGN-PERSONNEL						
POOR/INADEQUATE DESIGN				1	1	2
MISCELLANEOUS-PERSONNEL						

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS CAUSE	FATAL ACCIDENTS FACTOR	FATAL ACCIDENTS TOTAL	ALL ACCIDENTS CAUSE	ALL ACCIDENTS FACTOR	ALL ACCIDENTS TOTAL
PERSONNEL (CONTINUED)						
PILOT OF OTHER AIRCRAFT	3		3	3		3
PASSENGER	1		1	2		2
OTHER				1		1
THIRD PILOT						
FLIGHT ENGINEER						
FLIGHT PERSONNEL						
DISPATCHING (AIR CARRIER ONLY)						
SUBTOTAL	7	7	14	21	15	36
** AIRFRAME **						
WINGS						
FUSELAGE				1		1
SEATS						
LANDING GEAR				1		1
MAIN GEAR-SHOCK ABSORBING ASSY, STRUTS, ATTACHMENTS, ETC				1		1
NORMAL RETRACTION/EXTENSION ASSEMBLY				2		2
TAILWHEEL ASSEMBLIES					1	1
NOSEWHEEL ASSEMBLIES				2		2
FLOAT ASSEMBLIES				1		1
SKID ASSEMBLY	1		1	2	1	3
BRAKING SYSTEM (NORMAL)				1		1
GEAR LOCKING MECHANISM				1		1
SWITCHES, LEVERS, CRANKING MECHANISM, ETC						
FLIGHT CONTROL SURFACES						
ELEVATOR, ASSEMBLY ATTACHMENTS	1		1	1		1
SUBTOTAL	2		2	13	2	15
** POWERPLANT **						
ENGINE STRUCTURE						
VALVE ASSEMBLIES	1		1	1		1
MOUNT AND VIBRATION ISOLATORS				1		1
OTHER				1		1
IGNITION SYSTEM						
FUEL SYSTEM						
SELECTOR VALVES					1	1
FILTERS, STRAINERS, SCREENS		1	1		1	1
PUMPS	1		1	1		1
LUBRICATING SYSTEM						
PUMP-PRESSURE				1		1
COOLING SYSTEM						

POWERPLANT (CONTINUED)

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS CAUSE	FACTOR	TOTAL	ALL ACCIDENTS CAUSE	FACTOR	TOTAL
PROPELLER AND ACCESSORIES						
GOVERNORS					1	1
EXHAUST SYSTEM						
ENGINE ACCESSORIES						
ENGINE CONTROLS						
THROTTLE-POWER LEVER ASSEMBLIES				3		3
MIXTURE CONTROL ASSEMBLIES				1		1
POWERPLANT-INSTRUMENTS						
FUEL QUANTITY GAUGE					2	2
MISCELLANEOUS						
POWERPLANT FAILURE FOR UNDETERMINED REASONS	3		3	9		9
COMPRESSOR STALLS				1		1
OTHER	1		1	1		1
REDUCTION GEAR ASSEMBLY						
BEARING, REDUCTION GEAR	1		1	1		1
COMPRESSOR ASSEMBLY						
COMBUSTION ASSEMBLY						
TURBINE ASSEMBLY						
WHEEL, TURBINE	1		1	2		2
BLADE, TURBINE WHEEL				4		4
BEARING, SHAFT				1		1
ACCESSORY DRIVE ASSEMBLY						
BEARING, ACCESSORY DRIVE SHAFT				1		1
LUBRICATING SYSTEM						
FUEL SYSTEM						
FUEL CONTROL				3		3
SAFETY SYSTEM						
IGNITION SYSTEM						
TORQUEMETER						
AIR BLEED						
EXHAUST SYSTEM						
THRUST REVERSER						
PROPELLER SYSTEM						
CONSTANT SPEED DRIVE						
POWER LEVER						
PROPELLER LEVER						
REVERSE THRUST LEVER						
ENGINE INDICATING EQUIPMENT						
ENGINE INSTALLATION						
SUBTOTAL	8	1	9	32	5	37

** SYSTEMS **

CAUSE/FACTOR TABLE - NON-SCHEDULED 14 CFR 135 ACCIDENTS - 1980

SYSTEMS (CONTINUED)

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS CAUSE	FATAL ACCIDENTS FACTOR	FATAL ACCIDENTS TOTAL	ALL ACCIDENTS CAUSE	ALL ACCIDENTS FACTOR	ALL ACCIDENTS TOTAL
ELECTRICAL SYSTEM						
GENERATORS/ALTERNATORS				1		1
RELAYS AND WIRING				1		1
PROTECTIVE DEVICES					1	1
HYDRAULIC SYSTEM						
RESERVOIR, LINES, FITTINGS				1		1
FLIGHT CONTROL SYSTEMS						
ANTI-ICING, DE-ICING SYSTEMS						
EMPENNAGE ANTI-ICING, DE-ICING SYSTEMS					1	1
OTHER		1	1		1	1
AIR CONDITION, HEATING AND PRESSURIZATION						
AUTO PILOT						
FIRE WARNING SYSTEM						
FIRE EXTINGUISHER SYSTEM						
OXYGEN SYSTEM						
OTHER SYSTEMS						
OTHER				1		1
SUBTOTAL		1	1	4	3	7
** INSTRUMENTS/EQUIPMENT AND ACCESSORIES **						
FLIGHT AND NAVIGATION INSTRUMENTS						
BANK AND TURN		1	1		1	1
ATTITUDE GYRO		1	1		1	1
COMMUNICATIONS AND NAVIGATION EQUIPMENT						
TRANSMITTERS AND/OR RECEIVERS		1	1		1	1
ILS RECEIVERS					1	1
MISCELLANEOUS EQUIPMENT						
SUBTOTAL		3	3		4	4
** ROTORCRAFT **						
ROTOR ASSEMBLIES						
MAIN ROTOR BLADES		1	1		1	1
TRANSMISSION ROTOR DRIVE SYSTEM						
ENGINE DRIVE SHAFT				1		1
MAIN ROTOR GEAR BOX				1		1
TAIL ROTOR DRIVE SHAFT ASSEMBLY	1		1	1		1
TAIL ROTOR GEAR BOX				2		2
OTHER				1		1
FLIGHT CONTROL SYSTEMS						
MISCELLANEOUS UNITS AND ASSEMBLIES						

CAUSE/FACTOR TABLE - NON-SCHEDULED 14 CFR 135 ACCIDENTS - 1980

ROTORCRAFT (CONTINUED)	FATAL ACCIDENTS			ALL ACCIDENTS		
DETAILED CAUSE/FACTOR	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
EMERGENCY FLOTATION GEAR				1		1
SUBTOTAL	1	1	2	7	1	8
** AIRPORTS/AIRWAYS/FACILITIES **						
AIRPORT FACILITIES					1	1
INSTRUMENT LANDING SYSTEM						
AIRPORT CONDITIONS					7	7
WET RUNWAY					3	3
ICE/SLUSH ON RUNWAY					3	3
SNOW ON RUNWAY					3	3
SNOW WINDROWS					1	1
UNMARKED OBSTRUCTIONS					1	1
ROUGH WATER				1	2	3
POORLY MAINTAINED RUNWAY SURFACE					4	4
SOFT RUNWAY					1	1
OTHER						
AIRWAYS FACILITIES						
SUBTOTAL				1	26	27
** WEATHER **						
LOW CEILING		12	12		19	19
RAIN		6	6		10	10
FOG		10	10		17	17
SNOW		2	2		6	6
ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC		4	4	1	7	8
UNFAVORABLE WIND CONDITIONS		4	4		18	18
SUDDEN WINDSHIFT					2	2
TURBULENCE IN FLIGHT, CLEAR AIR		1	1		1	1
TURBULENCE ASSOCIATED WITH CLOUDS AND/OR THUNDERSTORMS		1	1		1	1
DOWNDRAFTS, UPDRAFTS	1	2	3	2	4	6
LIGHTNING STRIKE				1		1
OBSTRUCTIONS TO VISION		1	1		3	3
HIGH DENSITY ALTITUDE		3	3		11	11
THUNDERSTORM ACTIVITY		3	3		5	5
SUBTOTAL	1	49	50	4	104	108
** TERRAIN **						
WET, SOFT GROUND					2	2

TERRAIN (CONTINUED)

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS CAUSE	FATAL ACCIDENTS FACTOR	FATAL ACCIDENTS TOTAL	ALL ACCIDENTS CAUSE	ALL ACCIDENTS FACTOR	ALL ACCIDENTS TOTAL
SNOW-COVERED					1	1
HIGH VEGETATION					2	2
ROUGH/UNEVEN					6	6
ROUGH WATER					1	1
HIGH OBSTRUCTIONS		1	1		7	7
OTHER				1	3	4
SUBTOTAL		1	1	1	22	23
** MISCELLANEOUS **						
PROP/JET/ROTOR BLAST				1		1
EVASIVE MANEUVER TO AVOID COLLISION		1	1	1	1	2
SMOKE IN COCKPIT		1	1		1	1
FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS				3		3
UNDETERMINED	1		1	2		2
SUBTOTAL	1	2	3	7	2	9
GRAND TOTAL	70	77	147	269	206	475
** MISCELLANEOUS ACTS, CONDITIONS **						
ALTIMETER SETTING-INCORRECT		2	2		2	2
CHECKLIST-FAILED TO USE					1	1
IMPROPER EMERGENCY PROCEDURES	1		1	3	1	4
NOT ALLIGNED WITH RUNWAY/INTENDED LANDING AREA					1	1
UNWARRANTED LOW FLYING		1	1		1	1
FAILED TO USE ALL AVAILABLE RUNWAY		1	1	2	1	3
INATTENTIVE TO FUEL SUPPLY				2		2
POORLY PLANNED APPROACH				1		1
MISCALCULATED FUEL CONSUMPTION				2		2
JETTISONED LOAD		1	1		2	2
IMPROPERLY SECURED	1		1	2		2
COMMUNICATIONS FAILURE		1	1		1	1
ELECTRICAL FAILURE				1		1
FATIGUE FRACTURE	2		2	4	1	5
HYDRAULIC FAILURE				1		1
RPM-UNCONTROLLABLE-OVERSPEED	1		1	2	1	3
WINDSHIELD, DIRTY, FOGGY, ETC-RESTRICTED VISION		1	1		1	1
IMPROPER ALIGNMENT/ADJUSTMENT				1	1	2
FAILURE OF TWO OR MORE ENGINES				1	4	5
SEPARATION IN FLIGHT		2	2		3	3

MISCELLANEOUS ACTS, CONDITIONS (CONTINUED)

DETAILED CAUSE/FACTOR	FATAL ACCIDENTS			ALL ACCIDENTS		
	CAUSE	FACTOR	TOTAL	CAUSE	FACTOR	TOTAL
FIRE IN CABIN/ COCKPIT/ BAGGAGE COMPARTMENT		1	1		1	1
FIRE IN ENGINE		1	1		2	2
LATERAL IMBALANCE	1		1	1		1
PILOT FATIGUE				1		1
FUEL EXHAUSTION				9		9
FUEL CONTAMINATION-EXCLUSIVE OF WATER IN FUEL				1		1
ICE-ENGINE				1		1
ICE-PROPELLER	1		1	1		1
AIRFRAME ICE	2	1	3	3	3	6
ICE-WINDSHIELD					1	1
IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG		3	3		4	4
WHITEOUT				2		2
SUNGLARE		1	1		2	2
LACK OF LUBRICATION-SPECIFIC PART, NOT SYSTEM				2		2
WATER IN FUEL				1		1
AIRCRAFT CAME TO REST IN WATER		5	5		16	16
MISSING	1	1	2	4	1	5
HYDROPLANING ON WET RUNWAY					3	3
OVERLOAD FAILURE	1	2	3	2	13	15
MATERIAL FAILURE	1		1	19	2	21
FUEL STARVATION				4		4
CIRCUIT BREAKER POPPED					1	1
RUNWAY CLOSED				1	1	2
DOWNWIND					5	5
CARBON DEPOSITS				1		1
UNDER TORQUED	1		1	1		1
LOOSE, PART/FITTING	2		2	4		4
BINDING	1		1	1	1	2
BURST	1		1	1		1
CHAFFED				1		1
DISCONNECTED				3		3
ERRATIC					1	1
IMPROPERLY INSTALLED				2		2
OVERHEATED				2		2
PRESSURE TOO LOW				1		1
SHEARED	1		1	1		1
EXCESSIVE TEMPERATURE				2		2
LOAD NOT JETTISONED					1	1
INTENTIONAL GROUND-WATER LOOP-SWERVE					1	1
RAN OFF END OF RUNWAY					7	7

DIRECT ENTRY CAUSES ARE CARRIED UNDER THEIR APPROPRIATE CAUSAL CATEGORIES AND ARE INCLUDED IN THE TOTALS

END
DATE
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