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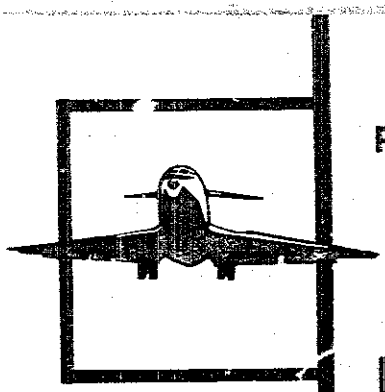

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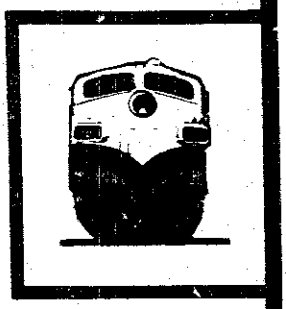
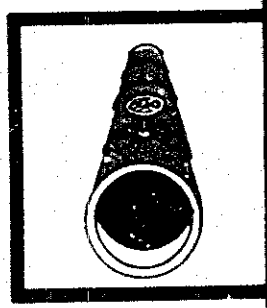
# NATIONAL TRANSPORTATION SAFETY BOARD



WASHINGTON, D.C 205[illegible]

# ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA

## U.S. AIR CARRIER OPERATIONS CALENDAR YEAR 1981



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16. Abstract

This publication presents the record of aviation accidents involving revenue operations of U.S. Air Carriers for calendar year 1981. Accidents involving Commuter Air Carriers and On Demand Air Taxis are included 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 divided further 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 1981 accidents to enable comparison with prior years.

| 17. Key Words | 18. Distribution Statement | |
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(With Page Numbers)

## INTRODUCTION

This report presents a compilation and statistical review of accidents which occurred in 1981, involving operations under 14 CFR 121 (and 14 CFR 127 for helicopters), or 14 CFR 135. Briefs of the accidents reviewed in this report can be found in "Briefs of U.S. Air Carrier Accidents - Calendar Year 1981," NTSB/ARC-85/03. As in the 1980 report, only accidents occurring during the revenue operations of air carriers and commercial operators of large aircraft are reported in this document. Those accidents occurring during non-revenue operations (e.g. training, ferrying) are reported in the Safety Board's 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 report the federal regulation under which each operation was being conducted at the time an accident occurred. The applicable 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. The Summary of Losses gives an overview of accidents, consequences, and rates for 1981, 1980, and 1979. The Detailed Review presents tabulations of a number of accident and aircraft parameters for 1981 accidents. The Historical Comparison presents data for 1981 and for the 6-year period 1975 through 1980.

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. Similarly, care should be taken in comparing numbers and percentages of accidents between two time periods when the number of accidents is small. The reader should avoid placing undue significance upon a change which may be due primarily to chance.

## 14 CFR 121

In 1981, U.S. air carriers were involved in 26 accidents while operating under 14 CFR 121. Although four of these accidents resulted in fatalities, none of them involved an airplane crash; one passenger fell off of a mobile airstair; a flight attendant was crushed in a galley elevator; and a mechanic and a ground crewman were killed in separate ground accidents. The six accidents which involved encounters with turbulence, resulted in serious injuries.

SUMMARY OF LOSSES

Degree of injury, number of fatalities, and extent of aircraft damage are presented in Table 1 for 1981 and the two preceding years. There were slightly more accidents in 1981 than in 1980, however the number of fatalities still was substantially fewer than in 1979.

Table 1 - SUMMARY OF LOSSES

| Accidents | 1981 | 1980 | 1979 |
|---|---|---|---|
| Fatal | 4 | 1 | 5 |
| Involved Serious Injury | 11 | 11 | 9 |
| Involved Minor or No Injury | 11 | 7 | 15 |
| Total | 26 | 19 | 29 |
| **Fatalities** | | | |
| Passenger | 1 | 0 | 323 |
| Crew | 1 | 0 | 28 |
| Other Persons | 2 | 1 | 3 |
| Total | 4 | 1 | 354 |
| **Aircraft Damage (14 CFR 121)** | | | |
| Destroyed | 1 | 2 | 6 |
| Substantial | 12 | 9 | 16 |
| Minor | 1 | 2 | 0 |
| None | 12 | 6 | 8 |
| Total | 26 | 19 | 30 |
| **Aircraft Damage (Other)*** | | | |
| Destroyed | 0 | 0 | 1 |
| Substantial | 0 | 1 | 0 |
| Total | 0 | 1 | 1 |

* Other aircraft are those aircraft not operated under 14 CFR 121 that were involved in on-ground or in-flight collisions with aircraft operated under 14 CFR 121.

Three measures of activity under 14 CFR 121 (miles, hours, and departures flown) and accident rates computed using each, are presented in Table 2 for 1981, 1980, and 1979. In all three activity categories, 1981 shows a decrease to levels below those in 1979.

Table 2 - ACCIDENT RATES

| | 1981 | 1980 | 1979 |
|---|---|---|---|
| Aircraft Miles Flown (Thousands) | 2,798,575 | 2,924,234 | 2,922,226 |
| Aircraft Hours Flown | 6,810,255 | 7,067,468 | 7,038,059 |
| Departures Flown | 5,329,049 | 5,479,452 | 5,532,202 |
| **Accident Rates** | | | |
| Per Million Miles Flown | 0.0093 | 0.0065 | 0.0099 |
| Per Hundred Thousand Hours Flown | 0.382 | 0.269 | 0.412 |
| Per Hundred Thousand Departures Flown | 0.488 | 0.347 | 0.524 |
| **Fatal Accident Rates** | | | |
| Per Million Miles Flown | 0.0014 | 0.0003 | 0.0017 |
| Per Hundred Thousand Hours Flown | 0.059 | 0.014 | 0.071 |
| Per Hundred Thousand Departures Flown | 0.075 | 0.018 | 0.090 |

DETAILED REVIEW

The 1981 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.

Table 3 - 14 CFR 121 ACCIDENTS

| Date | Location | Type of Operation | Air Carrier | Acft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|---|
| 1/16 | Gambell,AK | Sch Cargo | Northern Air Cargo | DC-6A | Substantial | None | Collision with Ground/Water - Controlled |
| 1/31 | Flushing,NY | Sch Pass | Eastern | B-727 | Substantial | Minor | Gear Retracted |
| 2/06 | Miami,FL | Sch Pass | Eastern | A300 | None | Fatal (1) | Mechanic Killed by Landing Gear Door |
| 2/10 | Newport News,VA | Sch Pass | United | B-737 | None | Serious | Turbulence |
| 2/11 | Fargo,ND | Sch Pass | Northwest | B-747 | Substantial | None | Collision with Other |
| 2/12 | Jamaica,NY | Sch Pass | Pan American World | B-727 | None | Serious | Passenger Fell From Jetway |
| 2/17 | Santa Ana,CA | Sch Pass | Air California | B-737 | Destroyed | Serious | Wheels-up Landing |
| 4/03 | Hannibal,MO | Sch Pass | United | DC-10 | Minor | Serious | Turbulence |
| 4/18 | Sand Point,AK | Sch Pass | Reeve Aleutian | YS-11A | Substantial | None | Bird Strike |
| 5/18 | New Orleans,LA | Sch Pass | Delta | DC-9 | None | Serious | Turbulence |
| 5/20 | Miami,FL | Sch Pass | Pan American World | DC-10 | None | Fatal (1) | Ground Crewman Run Over During Pushback |
| 6/03 | St. Louis,MO | Sch Pass | Trans World | B-707 | None | Serious | Ground Crewman Caught in Landing Gear Door |
| 6/05 | Columbus,OH | Sch Pass | United | B-727 | None | Serious | Turbulence |
| 6/30 | Pittsburgh,PA | Sch Pass | U. S. Air | BAC 1-11 | None | Serious | Turbulence |
| 8/13 | St. Louis,MO | Sch Pass | Ozark | DC-9 | Substantial | Serious | Struck by Ground Power Unit |
| 8/17 | Ft. Lauderdale,FL | Sch Pass | Pan American World | B-727 | Substantial | Minor | Engine Failure or Malfunction |
| 8/25 | Chicago,IL | Sch Pass | Air Illinois | HS-748 | Substantial | None | Collision with Other |
| 9/03 | Yakutat,AK | Nonsch Cargo | Alaska Int'l Air | L-382 | Substantial | None | Fire or Explosion on Ground |
| 9/07 | Salt Lake City,UT | Sch Pass | American | DC-10 | None | Fatal (1) | Passenger Fell From Airstair |
| 9/20 | N Atlantic Ocean | Sch Pass | World | DC-10 | None | Fatal (1) | Flight Attendant Crushed by Galley Lift |
| 9/22 | Miami,FL | Sch Pass | Air Florida | DC-10 | Substantial | None | Engine Failure or Malfunction |
| 9/22 | Colts Neck,NJ | Sch Pass | Eastern | L-1011 | Substantial | None | Engine Failure or Malfunction |
| 10/12 | St. Louis,MO | Sch Pass | Eastern | B-727 | Substantial | None | Collision with Automobile |
| 10/13 | DFW Airport,TX | Sch Pass | American | B-727 | None | Serious | Flight Attendant Fell From Jet Bridge |
| 10/23 | DFW Airport,TX | Sch Pass | U. S. Air | B-727 | N- | Serious | Turbulence |
| 12/30 | San Juan,PR | Sch Cargo | Caribbean Air | C-46 | Substantial | None | Ground-Water Loop-Swerve |

Table 4 presents accidents and activity for operations conducted under 14 CFR 121 in 1981, as a function of the type of operation. The four fatal accidents occurred during scheduled operations. Only one accident occurred during a non-scheduled operation. The overall accident rates for departures flown in non-scheduled operations is almost twice that of scheduled operations.

Table 4 - ACCIDENTS AND RATES BY TYPE OF OPERATION

| | Type of Operation | | | | |
|---|---|---|---|---|---|
| | Scheduled | | | | |
| | Passenger/ Cargo | All Cargo | All | All Non-Scheduled | All |
| Accidents | 23 | 2 | 25 | 1 | 26 |
| Fatal Accidents | 4 | 0 | 4 | 0 | 4 |
| Aircraft Miles Flown (Thousands) | 2,630,495 | 72,724 | 2,703,219 | 95,356 | 2,798,575 |
| Aircraft Hours Flown | n/a* | n/a | 6,571,288 | 238,967 | 6,810,255 |
| Departures Flown | n/a | n/a | 5,211,867 | 117,182 | 5,329,049 |
| Accidents Rates | | | | | |
| Per Million Miles Flown | 0.0087 | 0.0275 | 0.0092 | 0.0105 | 0.0093 |
| Per Hundred Thousand Hours Flown | n/a | n/a | 0.380 | 0.418 | 0.382 |
| Per Hundred Thousand Departures Flown | n/a | n/a | 0.480 | 0.853 | 0.488 |
| Fatal Accident Rates | | | | | |
| Per Million Miles Flown | 0.0015 | 0 | 0.0015 | 0 | 0.0014 |
| Per Hundred Thousand Hours Flown | n/a | 0 | 0.061 | 0 | 0.059 |
| Per Hundred Thousand Departures Flown | n/a | 0 | 0.077 | 0 | 0.075 |

* Data not available from CAB.

Table 5 is a cross-tabulation of the degree of injury sustained with the different categories of persons involved in the accidents. During 1981, only 2.5 percent of passengers aboard aircraft involved in accidents while operating under 14 CFR 121, received injuries of any extent. Further, only 0.5 percent of the passengers aboard sustained serious or fatal injuries. This is an improvement over the 1980 figures of 8.4 and 1.1 percent, respectively. This resulted in a rate of 1 serious or fatal passenger injury per 20 billion revenue passenger-miles, based on the CAB-published figure of 260 billion revenue passenger-miles reported by certificated air carriers for 1981. It is interesting to note that 16 percent of the flight attendants aboard the accident aircraft received injuries; 7 percent of these being serious or fatal. This is consistent with the 1980 figures of 16.7 and 7.6 percents, respectively.

Table 5 - PERSONS BY ROLE AND DEGREE OF INJURY

| | Degree of Injury | | | | |
|---|---|---|---|---|---|
| | Fatal | Serious | Minor | None | Total |
| Pilot-in-Command | 0 | 0 | 0 | 26 | 26 |
| Co-Pilot | 0 | 0 | 0 | 26 | 26 |
| Check Pilot | 0 | 0 | 0 | 1 | 1 |
| Flight Engineer/Navigator | 0 | 0 | 0 | 18 | 18 |
| Extra Crew | 0 | 0 | 0 | 4 | 4 |
| Flight Attendant | 1 | 7 | 10 | 94 | 112 |
| Passenger | 1 | 12 | 50 | 2,448 | 2,511 |
| Person on Ground | 2 | 2 | 0 | 0 | 4 |
| Total | 4 | 21 | 60 | 2,617 | 2,702 |

In 1981, the predominant type of Part 121 accident was that classified as miscellaneous. It included various ground accidents involving airline or airport personnel, and three passenger boarding accidents. Also included was the accident in which a flight attendant received fatal injuries in a galley service elevator. These accidents accounted for 30.8 percent of all accidents, and 100 percent of the fatal accidents.* Turbulence accidents were the next most common type of accident, accounting for 23.1 percent of all accidents and 40 percent of accidents resulting in serious or fatal injuries. The miscellaneous and turbulence accident types accounted for 9[illegible] percent of all serious and fatal injuries in 1981. The remainder of the accidents were distributed over eight general accident types, one of which resulted in a serious injury and two of which resulted in minor injuries.

Table 6 - ACCIDENTS BY TYPE AND DEGREE OF INJURY

| | Degree Of Injury | | | | Accidents | |
|---|---|---|---|---|---|---|
| Type Of Accident | Fatal | Serious | Minor | None | No. | Percent |
| Birdstrike | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Collided with Objects | 0 | 0 | 0 | 3 | 3 | 11.5 |
| Controlled Collision with Grnd/Wtr | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Engine Failure or Malfunction | 0 | 0 | 1 | 2 | 3 | 11.5 |
| Fire on Ground | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Gear Retracted | 0 | 0 | 1 | 0 | 1 | 3.8 |
| Ground-Water Loop-Swerve | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Miscellaneous | 4 | 4 | 0 | 0 | 8 | 30.8 |
| Turbulence | 0 | 6 | 0 | 0 | 6 | 23.1 |
| Wheels-up Landing | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Accidents - Number | 4 | 11 | 2 | 9 | 26 | |
| - Percent | 15.4 | 42.3 | 7.7 | 34.6 | | |

* It is pointed out earlier in this report that none of the fatal Part 121 accidents involved a crash of an airplane.

Table 7 presents a cross tabulation of aircraft damage by accident type. Of the 26 total aircraft, 13, or 50 percent, sustained substantial damage or were destroyed. Of the aircraft involved in the miscellaneous and turbulence type accidents, the most prevalent types, 12 of 14 received no damage.

Table 7 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

| | Aircraft Damage | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|
| Type of Accident | Des | Sub | Minor | None | No. | Percent |
| Birdstrike | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Collided with Objects | 0 | 3 | 0 | 0 | 3 | 11.5 |
| Controlled Collision with Grnd/Wtr | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Engine Failure or Malfunction | 0 | 3 | 0 | 0 | 3 | 11.5 |
| Fire on Ground | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Gear Retracted | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Ground-Water Loop-Swerve | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Miscellaneous | 0 | 1 | 0 | 7 | 8 | 30.8 |
| Turbulence | 0 | 0 | 1 | 5 | 6 | 23.1 |
| Wheels-up Landing | 1 | 0 | 0 | 0 | 1 | 3.8 |
| Part 121 Aircraft - Number | 1 | 12 | 1 | 12 | 26 | |
| - Percent | 3.8 | 46.2 | 3.8 | 46.2 | | |

In Table 8, a cross tabulation of the phase of operation in which the accident occurred and the degree of injury is presented. Forty percent of the aircraft involved in accidents producing a fatal or serious injury were in the static phase of operation.

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

| | Degree of Injury | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|
| Phase of Operation | Fatal | Serious | Minor | None | No. | Percent |
| Static | 2 | 4 | 0 | 0 | 6 | 23.1 |
| Taxi | | | | | | |
| To Takeoff | 0 | 0 | 0 | 2 | 2 | 7.7 |
| From Landing, Other | 1 | 0 | 0 | 2 | 3 | 11.5 |
| Takeoff | | | | | | |
| Run | 0 | 0 | 1 | 1 | 2 | 7.7 |
| In Flight | | | | | | |
| Climb to Cruise | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Normal Cruise | 1 | 3 | 0 | 1 | 5 | 19.2 |
| Descent | 0 | 3 | 0 | 0 | 3 | 11.5 |
| Landing | | | | | | |
| Final Approach (VFR) | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Roll | 0 | 0 | 1 | 1 | 2 | 7.7 |
| Go-around | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Part 121 Aircraft - Number | 4 | 11 | 2 | 9 | 26 | |
| - Percent | 15.4 | 42.3 | 7.7 | 34.6 | | |

More than 19 percent of all aircraft involved in accidents received substantial damage while operating in the static or taxi phases (see Table 9). These accounted for 38 percent of all aircraft destroyed or substantially damaged.

Table 9 - AIRCRAFT BY PHASE OF OPERATION AND AIRCRAFT DAMAGE

| | Aircraft Damage | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|
| Phase of Operation | Des | Sub | Minor | None | No. | Percent |
| Static | 0 | 1 | 0 | 5 | 6 | 23.1 |
| Taxi | | | | | | |
| To Takeoff | 0 | 2 | 0 | 0 | 2 | 7.7 |
| From Landing, Other | 0 | 2 | 0 | 1 | 3 | 11.5 |
| Takeoff | | | | | | |
| Run | 0 | 2 | 0 | 0 | 2 | 7.7 |
| In Flight | | | | | | |
| Climb To Cruise | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Normal Cruise | 0 | 1 | 1 | 3 | 5 | 19.2 |
| Descent | 0 | 0 | 0 | 3 | 3 | 11.5 |
| Landing | | | | | | |
| Final Approach (VFR) | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Roll | 0 | 2 | 0 | 0 | 2 | 7.7 |
| Go-around | 1 | 0 | 0 | 0 | 1 | 3.8 |
| Part 121 Aircraft - Number | 1 | 12 | 1 | 12 | 26 | |
| - Percent | 3.8 | 46.2 | 3.8 | 46.2 | | |

Table 10 presents a cross tabulation of accident type with phase of operation. The greatest proportion of accidents, 34.6 percent, occurred during the inflight phase of operation. Two-thirds of these were turbulence accidents.

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

| | Phase of Operation | | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|---|
| Type of Accident | Static | Taxi | Takeoff | Inflight | Landing | Number | Percent |
| Birdstrike | 0 | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Controlled Collision with Grnd/Wtr | 0 | 0 | 0 | 1 | 0 | 1 | 3.8 |
| Collided with Objects | 0 | 3 | 0 | 0 | 0 | 3 | 11.5 |
| Engine Failure | 0 | 0 | 2 | 1 | 0 | 3 | 11.5 |
| Fire or Explosion on Ground | 0 | 1 | 0 | 0 | 0 | 1 | 3.8 |
| Gear Retracted | 0 | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Ground-Water Loop-Swerve | 0 | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Miscellaneous Other | 6 | 1 | 0 | 1 | 0 | 8 | 30.8 |
| Turbulence | 0 | 0 | 0 | 6 | 0 | 6 | 23.1 |
| Wheels-up Landing | 0 | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Part 121 Aircraft - Number | 6 | 5 | 2 | 9 | 4 | 26 | |
| - Percent | 23.1 | 19.2 | 7.7 | 34.6 | 15.4 | | |

As can be seen in Table 11, 12, or more than 46 percent of the accidents occurred in daylight under VFR conditions. No indications of light or weather conditions were recorded for 3 of the 26 accidents.

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

| | Type of Weather Condition | | | Accidents | |
|---|---|---|---|---|---|
| Condition of Light | VFR | IFR | Unk/NR | No. | Percent |
| Daylight | 12 | 4 | 1 | 17 | 65.4 |
| Dusk (Twilight) | 1 | 0 | 0 | 1 | 3.8 |
| Night (Dark) | 4 | 1 | 2 | 7 | 26.9 |
| Night (Moonlight-Bright) | 0 | 1 | 0 | 1 | 3.8 |
| Accidents - Number | 17 | 6 | 3 | 26 | |
| - Percent | 65.4 | 23.1 | 11.5 | | |

Table 12 presents aircraft damage as a function of the degree of injury sustained in the accident. It is important to note that the NTSB classifies as incidents those occurrences resulting in both damage and injury no more severe than "minor", and as such, they are not included in this report. Therefore, although Table 12 shows that accidents which resulted in no aircraft damage accounted for all of the fatal and 72.7 percent of the serious injury accidents, and that 11 of the 13 accidents which resulted in at least substantial aircraft damage caused minor or no injuries, no inferences can be made concerning all injury- or damage-producing occurrences.

Table 12 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

| | Degree of Injury | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|
| Aircraft Damage | Fatal | Serious | Minor | None | No. | Percent |
| Destroyed | 0 | 1 | 0 | 0 | 1 | 3.8 |
| Substantial | 0 | 1 | 2 | 9 | 12 | 46.2 |
| Minor | 0 | 1 | 0 | 0 | 1 | 3.8 |
| None | 4 | 8 | 0 | 0 | 12 | 46.2 |
| Part 121 Aircraft - Number | 4 | 11 | 2 | 9 | 26 | |
| - Percent | 15.4 | 42.3 | 7.7 | 34.6 | | |

A cross tabulation of the type of operation in which each aircraft was engaged and the degree of injury produced by the accident is presented in Table 13. All of the 15 accidents which resulted in serious or fatal injuries were scheduled passenger operations.

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

| | Degree of Injury | | | | Part 121 Aircraft | |
|---|---|---|---|---|---|---|
| Type of Operation | Fatal | Serious | Minor | None | No. | Percent |
| Scheduled Domestic Passenger | 1 | 11 | 2 | 4 | 18 | 69.2 |
| Scheduled International Passenger | 3 | 0 | 0 | 2 | 5 | 19.2 |
| Scheduled Domestic Cargo | 0 | 0 | 0 | 2 | 2 | 7.7 |
| Non-Scheduled Charter Revenue Cargo | 0 | 0 | 0 | 1 | 1 | 3.8 |
| Part 121 Aircraft - Number | 4 | 11 | 2 | 9 | 26 | |
| - Percent | 15.4 | 42.3 | 7.7 | 34.6 | | |

Of the 26 accidents involving aircraft operating under 14 CFR 121, 17 occurred on the airport (see Table 14). All six of the turbulence accidents occurred beyond 5 miles from the airport.

Table 14 - ACCIDENTS BY TYPE AND PROXIMITY TO AIRPORT

| | Proximity to Airport | | | Accidents | |
|---|---|---|---|---|---|
| Type of Accident | On Airport | Beyond 5 Miles | Unk/NR | No. | Percent |
| Birdstrike | 1 | 0 | 0 | 1 | 3.8 |
| Collided with Objects | 3 | 0 | 0 | 3 | 11.5 |
| Controlled Colllision with Grnd/Wtr | 0 | 1 | 0 | 1 | 3.8 |
| Engine Failure | 2 | 0 | 1 | 3 | 11.5 |
| Gear Retracted | 1 | 0 | 0 | 1 | 3.8 |
| Ground-Water Loop-Swerve | 1 | 0 | 0 | 1 | 3.8 |
| Onground Fire | 1 | 0 | 0 | 1 | 3.8 |
| Miscellaneous | 7 | 1 | 0 | 8 | 30.8 |
| Turbulence | 0 | 6 | 0 | 6 | 23.1 |
| Wheels-up Landing | 1 | 0 | 0 | 1 | 3.8 |
| Accidents - Number | 17 | 8 | 1 | 26 | |
| - Percent | 65.4 | 30.8 | 3.8 | | |

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 B contains a detailed cause/factor listing for 14 CFR 121 accidents which occurred in 1981. A tabulation of the specific causes and factors grouped into major categories and the numbers of Part 121 accidents for each broad cause and/or factor are presented in Table 15. As was the case in 1980, personnel (e.g., maintenance, weather, traffic control) was the category cited most frequently as both a cause and as a factor.

Table 15 - BROAD CAUSE/FACTOR ASSIGNMENTS*

| | Cited as a Cause | | Cited as a Factor | | Cited as Either a Cause or a Factor (or Both) | |
|---|---|---|---|---|---|---|
| Cause/Factor | Fatal Accidents | All Accidents | Fatal Accidents | All Accidents | Fatal Accidents | All Accidents |
| Personnel | 3 | 14 | 2 | 4 | 4 | 17 |
| Pilot | 0 | 9 | 0 | 1 | 0 | 9 |
| Weather | 0 | 5 | 0 | 3 | 0 | 7 |
| Miscellaneous | 0 | 5 | 0 | 0 | 0 | 5 |
| Powerplant | 0 | 3 | 0 | 1 | 0 | 4 |
| Airport/Airways/Facilities | 0 | 0 | 0 | 2 | 0 | 2 |
| Systems | 1 | 1 | 0 | 1 | 1 | 2 |
| Landing Gear | 0 | 1 | 0 | 0 | 0 | 1 |
| Instruments/Equipment/ Accessories | 1 | 1 | 0 | 0 | 1 | 1 |
| Number of Accidents with Cause(s) Assigned | | | | | 4 | 26 |

* Multiple causes and factor may be assigned in an accident.

HISTORICAL COMPARISON

A series of tables which facilitates the comparison of accidents involving aircraft operated under Part 121 between 1981 and the 5-year base period 1976-1980, is presented in this subsection. In those tables in which statistics are tabulated for the entire base period, the values listed are arthmetic means obtained by dividing the number of occurrences in the period by five (the number of years in the period), thus allowing a more direct comparison between the 1981 statistics and those for the base period.

Table 16 lists the numbers of accidents, fatal accidents, and fatalities, and the rates for accidents and fatal accidents, in this case, for the years 1975 through 1981. As can be seen, the statistics vary greatly from year to year. For the period presented (and historically), 1980 was the safest year. This 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 |
| 1981 | 26 | 4 | 4 | 2 |

| | | 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 |
| 1981 | 6,810,255 | 0.382 | 0.059 |

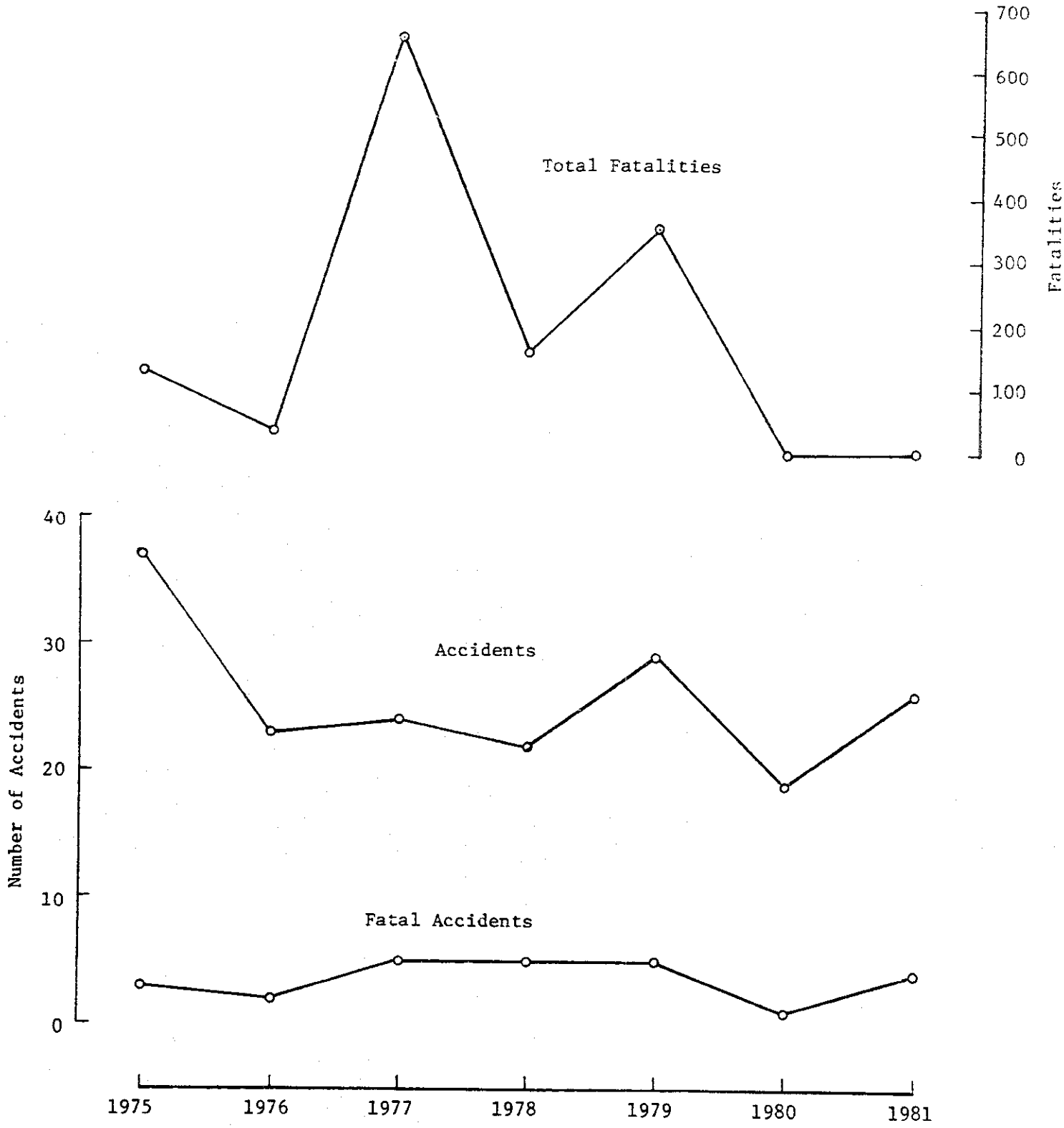


Figure 1 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

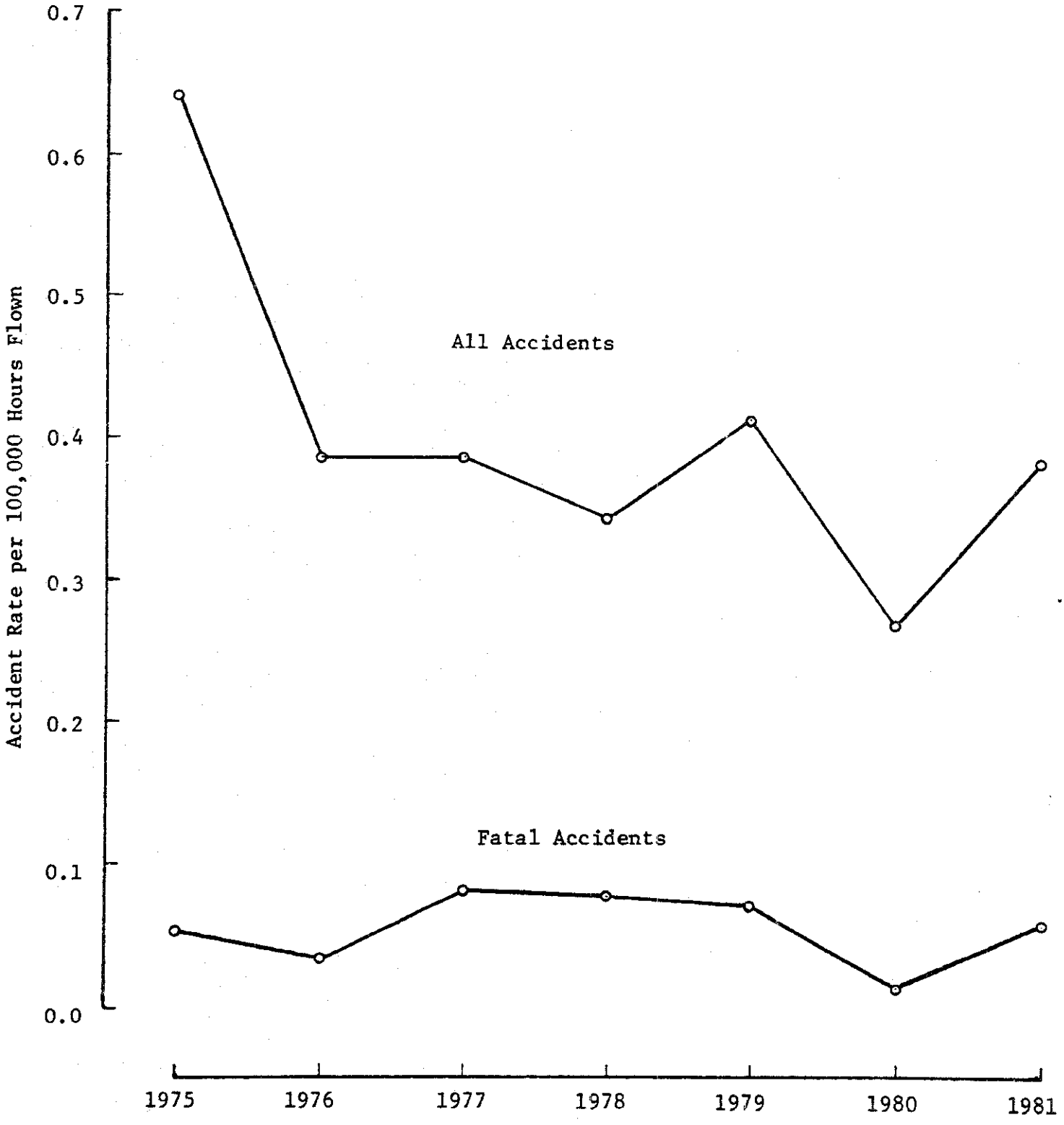


Figure 2 - ACCIDENT RATES

Table 17 lists the most prevalent accident types for the base period 1976-1980 (those which constituted at least 2 percent of the total) with the number and percent of accidents of each in 1981 and in the base period. The two leading accident types, turbulence and miscellaneous, when combined, averaged 8.8 accidents per year, for the base period, but accounted for 13 accidents in 1981. The accident types "Engine Failure or Malfunction" and "Collision with Trees, Wires, Objects" had more than twice as many accidents in 1981 as their averages for the preceding five years.

Table 17 - MOST PREVALENT TYPES OF ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Turbulence | 6 | 23.1 | 6.2 | 26.5 |
| Miscellaneous/Other | 7 | 26.9 | 2.6 | 11.1 |
| Engine Failure or Malfunction | 3 | 11.5 | 1.4 | 6.0 |
| Collision with Trees, Wires, Objects | 3 | 11.5 | 1.4 | 6.0 |
| Landing Gear Collapsed | 0 | 0.0 | 1.4 | 6.0 |
| Collision Between Aircraft | 0 | 0.0 | 1.4 | 6.0 |
| Overshoot | 0 | 0.0 | 1.2 | 5.1 |
| Ground-Water Loop-Swerve | 1 | 3.8 | 1.2 | 5.1 |
| Fire or Explosion on Ground | 1 | 3.8 | 0.6 | 2.6 |
| Airframe Failure In Flight | 0 | 0.0 | 0.6 | 2.6 |
| Controlled Collision with Grnd/Wtr | 1 | 3.8 | 0.6 | 2.6 |
| Undershoot | 0 | 0.0 | 0.6 | 2.6 |
| Uncontrolled Collision with Grnd/Wtr | 0 | 0.0 | 0.4 | 1.7 |
| Hard Landing | 0 | 0.0 | 0.4 | 1.7 |
| Evasive Maneuver | 0 | 0.0 | 0.4 | 1.7 |
| (All Other Types) | 4 | 15.4 | 3.0 | 12.8 |
| Total | 26 | 100.0 | 23.4 | 100.0 |

Similar in structure to Table 17, Table 18 contains statistics only on fatal accidents. Although there is no predominant type of fatal accident in the base period, it can be seen that the "Miscellaneous/Other" accident type has occurred slightly more often. All of the 1981 fatal accidents are of this type.

Table 18 - MOST PREVALENT TYPES OF FATAL ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Miscellaneous/Other | 4 | 100.0 | 0.6 | 16.7 |
| Controlled Collision with Grnd/Wtr | 0 | 0.0 | 0.4 | 11.1 |
| Engine Failure or Malfunction | 0 | 0.0 | 0.4 | 11.1 |
| Overshoot | 0 | 0.0 | 0.4 | 11.1 |
| Collision Between Aircraft | 0 | 0.0 | 0.4 | 11.1 |
| Uncontrolled Collision with Grnd/Wtr | 0 | 0.0 | 0.2 | 5.6 |
| Collision with Trees, Wire, Objects | 0 | 0.0 | 0.2 | 5.6 |
| Landing Gear Collapsed | 0 | 0.0 | 0.2 | 5.6 |
| Undershoot | 0 | 0.0 | 0.2 | 5.6 |
| Engine Tearaway | 0 | 0.0 | 0.2 | 5.6 |
| Propeller Failure | 0 | 0.0 | 0.2 | 5.6 |
| Rotor Failure | 0 | 0.0 | 0.2 | 5.6 |
| Total | 4 | 100.0 | 3.6 | 100.0 |

Tables 19 and 20 present the numbers of Part 121 accidents and fatal accidents, respectively, by the phase of operation during which they occurred. For 1981, the number of fatal accidents occuring during the static phase of operation is 10 times the average for the base period.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| In Flight | 9 | 34.6 | 9.0 | 37.8 |
| Landing | 4 | 15.4 | 6.2 | 26.1 |
| Taxi | 5 | 19.2 | 3.6 | 15.1 |
| Takeoff | 2 | 7.7 | 2.8 | 11.8 |
| Static | 6 | 23.1 | 2.0 | 8.4 |
| Unknown/Not Reported | 0 | 0.0 | 0.2 | 0.8 |
| Total 14 CFR 121 Aircraft | 26 | 100.0 | 23.8 | 100.0 |

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| In Flight | 1 | 25.0 | 1.2 | 33.3 |
| Landing | 0 | 0.0 | 1.0 | 27.8 |
| Takeoff | 0 | 0.0 | 0.8 | 22.2 |
| Taxi | 1 | 25.0 | 0.4 | 11.1 |
| Static | 2 | 50.0 | 0.2 | 5.6 |
| Total 14 CFR 121 Aircraft | 4 | 100.0 | 3.6 | 100.0 |

Tables 21 and 22 present tabulations of the numbers of accidents and fatal accidents, respectively, for each of the cause/factors cited in 1981 and in the base period. "Personnel" showed an increase in frequency over the base period in both accident categories. "Powerplant" and "Miscellaneous" also were cited more in 1981 than the average for the base period.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factor | No. | Percent | Mean | Percent |
| Personnel | 17 | 65.4 | 13.2 | 61.7 |
| Weather | 7 | 26.9 | 8.8 | 41.1 |
| Pilot | 9 | 34.6 | 8.2 | 38.3 |
| Landing Gear | 1 | 3.8 | 2.4 | 11.2 |
| Airport/Airways/Facilities | 2 | 7.7 | 2.0 | 9.3 |
| Powerplant | 4 | 15.4 | 1.8 | 8.4 |
| Miscellaneous | 5 | 19.2 | 1.4 | 6.5 |
| Systems | 2 | 7.7 | 0.6 | 2.8 |
| Airframe | 0 | 0.0 | 0.6 | 2.8 |
| Instruments/Equipment & Accessories | 1 | 3.8 | 0.4 | 1.9 |
| Terrain | 0 | 0.0 | 0.2 | 0.9 |
| Rotorcraft | 0 | 0.0 | 0.2 | 0.9 |
| Number of Accidents with Cause(s) Assigned | 26 | | 21.4 | |

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

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factors | No. | Percent | Mean | Percent |
| Pilot | 0 | 0.0 | 2.2 | 61.1 |
| Personnel | 4 | 100.0 | 2.2 | 61.1 |
| Weather | 0 | 0.0 | 1.4 | 38.9 |
| Landing Gear | 0 | 0.0 | 0.6 | 16.7 |
| Airport/Airways/Facilities | 0 | 0.0 | 0.4 | 11.1 |
| Powerplant | 0 | 0.0 | 0.4 | 11.1 |
| Systems | 1 | 25.0 | 0.4 | 11.1 |
| Airframe | 0 | 0.0 | 0.2 | 5.6 |
| Rotorcraft | 0 | 0.0 | 0.2 | 5.6 |
| Instruments/Equipment/Accessories | 1 | 25.0 | 0.0 | 0.0 |
| Number of Accidents with Cause(s) Assigned | 4 | | 3.6 | |

* The table presents the number of fatal accidents for which each cause/factor was cited. 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 for the years 1976-1981. The models listed are those for which at least one accident occurred in the years 1976 through 1981, 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. Table 23 also lists 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 92.5 percent of the hours flown under 14 CFR 121 and 90.3 percent of the aircraft involved in accidents between 1976 and 1981.

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 |
| A-300 | 143,976 | 1 | 1 | 0 | 0 | 0.695 | 0.695 | 0.0 | 0.0 |
| BAC 1-11 | 422,892 | 2 | 0 | 0 | 1 | 0.473 | 0.0 | 0.0 | 0.236 |
| B-707 | 2,955,922 | 8 | 0 | 0 | 2 | 0.271 | 0.0 | 0.0 | 0.068 |
| B-727 | 15,252,197 | 39 | 4 | 7 | 13 | 0.256 | 0.026 | 0.046 | 0.085 |
| B-737 | 2,430,070 | 8 | 0 | 1 | 3 | 0.329 | 0.0 | 0.041 | 0.123 |
| B-747 | 2,651,579 | 8 | 1 | 2 | 4 | 0.302 | 0.038 | 0.075 | 0.151 |
| CV* | 734,591 | 8 | 0 | 1 | 3 | 1.089 | 0.0 | 0.136 | 0.408 |
| DC-8 | 2,028,334 | 13 | 2 | 6 | 4 | 0.641 | 0.099 | 0.296 | 0.197 |
| DC-9 | 5,803,746 | 15 | 1 | 2 | 5 | 0.258 | 0.017 | 0.034 | 0.086 |
| DC-10 | 2,261,128 | 13 | 6 | 6 | 2 | 0.575 | 0.265 | 0.265 | 0.088 |
| L-188 | 80,783 | 7 | 2 | 4 | 4 | 8.665 | 2.476 | 4.952 | 4.952 |
| L-1011 | 1,554,499 | 7 | 1 | 2 | 0 | 0.450 | 0.064 | 0.129 | 0.0 |
| YS-11 | 238,045 | 2 | 0 | 0 | 1 | 0.840 | 0.0 | 0.0 | 0.420 |

* CV - 340, 440, 580, 600, 640

## 14 CFR 135

U.S. air carriers operating under 14 CFR 135 in 1981, were involved in 188 accidents, 49 of which caused fatalities. One accident involved a collision between two aircraft operating under Part 135, so that the number of involved aircraft was 189.

### SUMMARY OF LOSSES

Table 24 presents a comparison of the number of accidents and their associated losses in 1981 and the two preceding years, for all Part 135 accidents. The remainder of this section is divided into two parts -- scheduled and nonscheduled Part 135 operations.

Table 24 - SUMMARY OF LOSSES

| Accidents | 1981 | 1980 | 1979 |
|---|---|---|---|
| Fatal | 49 | 53 | 45 |
| Involved Serious Injury | 17 | 19 | 24 |
| Involved Minor or No Injury | 122 | 136 | 143 |
| Total | 188 | 208 | 212 |
| **Fatalities** | | | |
| Passenger | 78 | 89 | 89 |
| Crew | 46 | 49 | 50 |
| Other Persons | 4 | 2 | 4 |
| Total | 128 | 140 | 143 |
| **Aircraft Damage - (14 CFR 135)** | | | |
| Destroyed | 63 | 60 | 60 |
| Substantial | 122 | 145 | 150 |
| Minor | 3 | 1 | 1 |
| None | 0 | 4 | 2 |
| Unknown | 1 | 0 | 0 |
| Total | 189 | 210 | 213 |
| **Aircraft Damage - (Other*)** | | | |
| Destroyed | 2 | 2 | 2 |
| Substantial | 2 | 1 | 2 |
| Minor | 0 | 0 | 2 |
| Total | 4 | 3 | 6 |

* Other aircraft are those aircraft not operated under 14 CFR 135 that were involved in on-ground or in-flight collisions with aircraft operated under 14 CFR 135.

## SCHEDULED 14 CFR 135

Thirty-one accidents occurred during scheduled Part 135 operations in 1981. Of these, nine were fatal accidents. Two collisions occurred between aircraft in which only one of the aircraft was conducting a scheduled 14 CFR 135 operation. One of those collisions resulted in 13 fatalities on the Part 135 aircraft. With the exception of "summary of losses" tables (e.g., Table 25), the other aircraft and their associated losses are not included in this review, since they were not air carrier aircraft.

## SUMMARY OF LOSSES

When 1981 is compared to the two preceding years in Table 25, it can be seen that there were slightly fewer accidents. However, the percentage of accidents resulting in fatalities was greater (29 percent) than in 1980 (21.1 percent) and almost the same as in 1979 (28.9 percent). The percentage of scheduled Part 135 aircraft destroyed in accidents in 1981 was 32.3 percent, somewhat greater than the 23.1 percent for 1980, and approaching the 38.5 percent for 1979.

Table 25 - SUMMARY OF LOSSES

| Accidents | 1981 | 1980 | 1979 |
|---|---|---|---|
| Fatal | 9 | 8 | 15 |
| Involved Serious Injury | 4 | 6 | 8 |
| Involved Minor or No Injury | 18 | 24 | 29 |
| Total | 31 | 38 | 52 |
| **Fatalities** | | | |
| Passenger | 21 | 27 | 50 |
| Crew | 11 | 10 | 16 |
| Other Persons | 2 | 0 | 0 |
| Total | 34 | 37 | 66 |
| **Aircraft Damaged - (Scheduled 14 CFR 135)** | | | |
| Destroyed | 10 | 9 | 20 |
| Substantial | 20 | 27 | 32 |
| Minor | 1 | 1 | 0 |
| None | 0 | 2 | 0 |
| Total | 31 | 39 | 52 |
| **Aircraft Damaged - (Other*)** | | | |
| Destroyed | 1 | 0 | 0 |
| Substantial | 1 | 0 | 1 |
| Total | 2 | 0 | 1 |

* Other aircraft are those aircraft not operated under 14 CFR 135 that were involved in on-ground or in-flight collisions with aircraft operated under 14 CFR 135.

Table 26 shows scheduled Part 135 activity in terms of miles, hours, and departures, with the computed accident rates. Activity in 1981 surpassed that in 1980 and 1979 in both miles and hours flown. The 1981 departures were substantially higher than 1980, but were below the 1979 level. The overall accident rates in each category showed continued improvement, however, the rates for fatal accidents were slightly higher than the 1980 levels.

Table 26 - ACCIDENT RATES

| | 1981 | 1980 | 1979 |
|---|---|---|---|
| Aircraft Miles Flown (Thousands) | 193,001 | 192,200 | 192,493 |
| Aircraft Hours Flown | 1,240,764 | 1,175,588 | 1,169,921 |
| Departures Flown | 1,835,144 | 1,776,999 | 1,883,705 |
| **Accident Rates** | | | |
| Per Million Miles Flown | 0.1606 | 0.1977 | 0.2701 |
| Per Hundred Thousand Hours Flown | 2.498 | 3.232 | 4.445 |
| Per Hundred Thousand Departures Flown | 1.689 | 2.138 | 2.761 |
| **Fatal Accidents** | | | |
| Per Million Miles Flown | 0.0466 | 0.0416 | 0.0779 |
| Per Hundred Thousand Hours Flown | 0.725 | 0.681 | 1.282 |
| Per Hundred Thousand Departures Flown | 0.490 | 0.450 | 0.796 |

DETAILED REVIEW

The 31 accidents occurring during scheduled 14 CFR 135 operations in 1981 are listed in Table 27. Cargo flights were involved in 42 percent of the accidents; passenger flights in 58 percent.

Table 27 - SCHEDULED 14 CFR 135 ACCIDENTS

| Date | Location | Type of Operation | Aircraft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|
| 1/02 | Elkhart Lake,WI | Cargo | Beech 58TC | Substantial | None | Engine Failure or Malfunction |
| 1/09 | Chicago,IL | Cargo | Beech H18S | Substantial | None | Propeller/Jet/Rotor Blast |
| 1/20 | Spokane,WA | Passenger | Beech 99A | Destroyed | Fatal (7) | Collision with Ground/Water - Controlled |
| 1/22 | Mt Shasta,CA | Cargo | Piper PA-31 | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 1/28 | San Juan,PR | Passenger | Beech G18S | Substantial | None | Ground-Water Loop-Swerve |
| 2/02 | Roebuck,SC | Cargo | Piper PA-28R | Substantial | None | Engine Failure or Malfunction |
| 2/10 | Prescott,AZ | Passenger | Piper PA-31 | Substantial | Serious | Stall |
| 2/11 | Tebbetts,MO | Passenger | Cessna 402B | Substantial | None | Engine Failure or Malfunction |
| 2/13 | Grand Island,NE | Passenger | Beech 99 | Substantial | None | Wheels-up Landing |
| 2/18 | Lubbock,TX | Cargo | Beech E18S | Substantial | None | Ground-Water Loop-Swerve |
| 2/22 | Avalon,CA | Passenger | Sikorsky S-62A | Destroyed | Fatal (2) | Collision with Ground/Water - Uncontrolled |
| 2/25 | North Canton,OH | Cargo | Piper PA-31 | Substantial | None | Ground-Water Loop-Swerve |
| 3/02 | Fallon,NV | Passenger | Cessna T210N | Destroyed | Fatal (2) | Collision with Ground/Water - Controlled |
| 3/04 | Kirksville,MO | Passenger | Piper PA-31 | Substantial | Minor | Collision with Ground/Water - Controlled |
| 3/11 | Hazelton,PA | Passenger | Beech H18 | Substantial | Minor | Stall/Mush |
| 3/26 | Eau Claire,WI | Cargo | Beech 95-C55 | Destroyed | Serious | Collision with Trees |
| 4/17 | Loveland,CO | Passenger | Handly Page HP-137 | Destroyed | Fatal (15) | Collision Between Aircraft - Both in Flight |
| 4/26 | Houston,TX | Passenger | Piper PA-31 | Substantial | Serious | Engine Failure or Malfunction |
| 5/09 | Marshall,AK | Passenger | Cessna 207A | Substantial | None | Overshoot |
| 6/16 | Abilene,TX | Cargo | Cessna R182 | Substantial | None | Wheels-up Landing |
| 6/26 | St.Croix,VI | Passenger | Beech 65-80 | Substantial | None | Wheels-up Landing |
| 7/23 | St.Thomas,VI | Passenger | Piper PA-23 | Destroyed | Fatal (1) | Undetermined |
| 7/29 | Louisville,KY | Cargo | Aero Comdr 500B | Substantial | None | Wheels-up Landing |
| 8/04 | Dillingham,AK | Cargo | Cessna 207A | Destroyed | Fatal (1) | Stall/Spin |
| 8/10 | Wenatchee,WA | Cargo | Piper PA-34 | Substantial | None | Gear Collapsed |
| 8/23 | Washington,DC | Passenger | Beech 99 | Minor | Serious | Prop Rotor Accident to Person |
| 9/24 | Flagstaff,AZ | Passenger | Swearingen SA266 | Substantial | None | Collision Between Aircraft - Both on Ground |
| 9/26 | Miami,FL | Passenger | Cessna 402B | Substantial | None | Collision with Automobile |
| 11/07 | Savoonga,AK | Cargo | Aero Comdr 680E | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 11/30 | Columbia,SC | Cargo | Piper PA-32 | Substantial | None | Struck by Ground Vehicle |
| 12/31 | Durango,CO | Passenger | Piper PA-31 | Destroyed | Fatal (4) | Collision with Ground/Water - Controlled |

Table 28 presents accidents and activity for scheduled Part 135 operations as a function of the type of operation. Although the combined passenger/cargo operations had the highest percentage of fatal accidents, this type of operation had significantly lower accident rates for accidents and fatal accidents in each activity category.

Table 28 - ACCIDENTS AND RATES BY TYPE OF OPERATION

| | Type of Operation | | |
|---|---|---|---|
| | Passenger/ Cargo | All Cargo | All |
| Accidents | 18 | 13 | 31 |
| Fatal Accidents | 6 | 3 | 9 |
| Aircraft Miles Flown (Thousands) | 178,204 | 14,797 | 193,001 |
| Aircraft Hours Flown | 1,157,470 | 83,294 | 1,240,764 |
| Departures Flown | 1,744,481 | 90,663 | 1,835,144 |
| Accident Rates | | | |
| Per Million Miles Flown | 0.1010 | 0.8786 | 0.1606 |
| Per Hundred Thousand Hours Flown | 1.555 | 15.607 | 2.498 |
| Per Hundred Thousand Departures Flown | 1.032 | 14.339 | 1.689 |
| Fatal Accident Rates | | | |
| Per Million Miles Flown | 0.0337 | 0.2027 | 0.0466 |
| Per Hundred Thousand Hours Flown | 0.518 | 3.602 | 0.725 |
| Per Hundred Thousand Departures Flown | 0.344 | 3.309 | 0.490 |

As can be seen from Table 29, of the 165 persons involved in accidents during scheduled Part 135 operations, 58 (or 35.2 percent) received fatal or serious injuries. Of the 114 revenue passengers on these flights, 18.4 percent were fatally injured, and 15.8 percent were seriously injured. Commuter air carriers reported a total of 1.375 billion revenue passenger miles to CAB in 1981. This results in a rate of 1 serious or fatal passenger injury per 35.3 million passenger miles, equal to that of 1980.

Table 29 - PERSONS BY ROLE AND DEGREE OF INJURY

| | Degree of Injury | | | | |
|---|---|---|---|---|---|
| | Fatal | Serious | Minor | None | Total |
| Pilot-in-Command | 8 | 2 | 2 | 19 | 31 |
| Co-Pilot | 2 | 0 | 0 | 7 | 9 |
| Flight Engineer | 1 | 0 | 0 | 0 | 1 |
| Cabin Attendant | 0 | 1 | 0 | 0 | 1 |
| Passenger | 21 | 18 | 3 | 72 | 114 |
| Other Aircraft | 2 | 3 | 1 | 2 | 8 |
| Person on Ground | 0 | 0 | 0 | 1 | 1 |
| Total | 34 | 24 | 6 | 101 | 165 |

The types of accidents and their resulting degree of injury are listed in Table 30. Engine failure or malfunction accidents represent only 12.9 percent of the total and zero percent of the fatal accidents, in contrast to 1980, when 26.3 percent of the total and 37.5 percent of the fatal accidents resulted from engine failure or malfunction.

Table 30 - ACCIDENTS BY TYPE AND DEGREE OF INJURY

| | Degree of Injury | | | | Accidents | |
|---|---|---|---|---|---|---|
| Type of Accident | Fatal | Serious | Minor | None | No. | Percent |
| Collision Both Aircraft in Flight | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Collision Both Aircraft on Ground | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Controlled Collision with Grnd/Wtr | 5 | 0 | 1 | 0 | 6 | 19.4 |
| Uncontrolled Collision with Grnd/Wtr | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Collided with Objects | 0 | 1 | 0 | 1 | 2 | 6.5 |
| Engine Failure or Malfunction | 0 | 1 | 0 | 3 | 4 | 12.9 |
| Ground-Water Loop-Swerve | 0 | 0 | 0 | 3 | 3 | 9.7 |
| Landing Gear Collapsed | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Miscellaneous/Other | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Overshoot | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Propeller/Jet Blast | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Propeller/Rotor Accident to Person | 0 | 1 | 0 | 0 | 1 | 3.2 |
| Stall | 1 | 1 | 1 | 0 | 3 | 9.7 |
| Undetermined | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Wheels-up Landing | 0 | 0 | 0 | 4 | 4 | 12.9 |
| Accidents - Number | 9 | 4 | 2 | 16 | 31 | |
| - Percent | 29.0 | 12.9 | 6.5 | 51.6 | | |

Table 31 presents a tabulation of the number of scheduled Part 135 aircraft involved in accidents by type of accident and extent of damage. Of the 31 aircraft involved in these accidents, 30 (96.8 percent) were destroyed or sustained substantial damage. The other aircraft sustained minor damage when a propeller struck a person.

Table 31 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

| | Aircraft Damage | | | Scheduled Part 135 Aircraft | |
|---|---|---|---|---|---|
| Type of Accident | Des | Sub | Minor | No. | Percent |
| Collision Both Aircraft in Flight | 1 | 0 | 0 | 1 | 3.2 |
| Collision Both Aircraft on Ground | 0 | 1 | 0 | 1 | 3.2 |
| Controlled Collision with Grnd/Wtr | 5 | 1 | 0 | 6 | 19.4 |
| Uncontrolled Collision with Grnd/Wtr | 1 | 0 | 0 | 1 | 3.2 |
| Collided with Objects | 1 | 1 | 0 | 2 | 6.5 |
| Engine Failure or Malfunction | 0 | 4 | 0 | 4 | 12.9 |
| Ground-Water Loop-Swerve | 0 | 3 | 0 | 3 | 9.7 |
| Landing Gear Collapsed | 0 | 1 | 0 | 1 | 3.2 |
| Miscellaneous/Other | 0 | 1 | 0 | 1 | 3.2 |
| Overshoot | 0 | 1 | 0 | 1 | 3.2 |
| Propeller/Jet Blast | 0 | 1 | 0 | 1 | 3.2 |
| Propeller/Rotor Accident to Person | 0 | 0 | 1 | 1 | 3.2 |
| Stall | 1 | 2 | 0 | 3 | 9.7 |
| Undetermined | 1 | 0 | 0 | 1 | 3.2 |
| Wheels-up Landing | 0 | 4 | 0 | 4 | 12.9 |
| Scheduled Part 135 Aircraft | | | | | |
| - Number | 10 | 20 | 1 | 31 | |
| - Percent | 32.3 | 64.5 | 3.2 | | |

A tabulation of accident-involved aircraft by the phase of operation in which the accident occurred and the degree of injury, is presented in Table 32. Aircraft in the level off/touchdown phase accounted for 19.4 percent of the total, but no injuries resulted from these accidents. Accidents occurring in normal cruise accounted for 16.1 percent of the total and 33.3 percent of the fatal accidents.

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 | No. | Percent |
| Static | | | | | | |
| Idling Engine(s) | 0 | 1 | 0 | 1 | 2 | 6.5 |
| Parked, Engine Not Operating | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Taxi | | | | | | |
| From Landing - Fixed Wing | 0 | 0 | 0 | 2 | 2 | 6.5 |
| Takeoff | | | | | | |
| Run | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Initial Climb | 0 | 2 | 1 | 0 | 3 | 9.7 |
| In Flight | | | | | | |
| Normal Cruise | 3 | 0 | 0 | 2 | 5 | 16.1 |
| Descent | 1 | 0 | 0 | 1 | 2 | 6.5 |
| Other | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Landing | | | | | | |
| Final Approach (VFR) | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Final Approach - From FAF (IFR) | 1 | 0 | 1 | 0 | 2 | 6.5 |
| Level Off/Touchdown | 0 | 0 | 0 | 6 | 6 | 19.4 |
| Roll | 0 | 0 | 0 | 2 | 2 | 6.5 |
| Missed Appraoch (IFR) | 1 | 1 | 0 | 0 | 2 | 6.5 |
| Unknown | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Scheduled Part 135 Aircraft - Number | 9 | 4 | 2 | 16 | 31 | |
| Scheduled Part 135 Aircraft - Percent | 29.0 | 12.9 | 6.5 | 51.6 | | |

Aircraft involved in accidents during either normal cruise or level off/touchdown accounted for 36.7 percent of the aircraft destroyed or receiving substantial damage. (see Table 33).

Table 33 - AIRCRAFT BY PHASE OF OPERATION AND AIRCRAFT DAMAGE

| | Aircraft Damage | | | Scheduled Part 135 Aircraft | |
|---|---|---|---|---|---|
| Phase of Operation | Des | Sub | Minor | No. | Percent |
| Static | | | | | |
| Idling Engine(s) | 0 | 1 | 1 | 2 | 6.5 |
| Parked, Engine Not Operating | 0 | 1 | 0 | 1 | 3.2 |
| Taxi | | | | | |
| From Landing - Fixed Wing | 0 | 2 | 0 | 2 | 6.5 |
| Takeoff | | | | | |
| Run | 0 | 1 | 0 | 1 | 3.2 |
| Initial Climb | 0 | 3 | 0 | 3 | 9.7 |
| In Flight | | | | | |
| Normal Cruise | 3 | 2 | 0 | 5 | 16.1 |
| Descent | 1 | 1 | 0 | 2 | 6.5 |
| Other | 1 | 0 | 0 | 1 | 3.2 |
| Landing | | | | | |
| Final Approach (VFR) | 1 | 0 | 0 | 1 | 3.2 |
| Final Approach - From FAF (IFR) | 1 | 1 | 0 | 2 | 6.5 |
| Level Off/Touchdown | 0 | 6 | 0 | 6 | 19.4 |
| Roll | 0 | 2 | 0 | 2 | 6.5 |
| Missed Approach (IFR) | 2 | 0 | 0 | 2 | 6.5 |
| Unknown | 1 | 0 | 0 | 1 | 3.2 |
| Scheduled Part 135 Aircraft | | | | | |
| - Number | 10 | 20 | 1 | 31 | |
| - Percent | 32.3 | 64.5 | 3.2 | | |

Table 34 is a cross tabulation of type of accident by the phase of operation in which it occurred. About 42 percent of the accidents occurred during the landing phase of operation. The most prevalent type of accident in this phase (30.8 percent) were wheels up landings.

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

| | Phase of Operation | | | | | | Scheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|---|---|
| Type of Accident | Static | Taxi | Takeoff | Inflight | Landing | Unknown | No. | Percent |
| Collision Both Aircraft Inflight | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3.2 |
| Collision Both Aircraft on Ground | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3.2 |
| Controlled Collision with Ground/Water | 0 | 0 | 0 | 3 | 3 | 0 | 6 | 19.4 |
| Uncontrolled Collision with Ground/Water | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3.2 |
| Collided with Objects | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 6.5 |
| Engine Failure or Malfunction | 0 | 0 | 1 | 3 | 0 | 0 | 4 | 12.9 |
| Ground-Water Loop-Swerve | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 9.7 |
| Landing Gear Collapsed | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3.2 |
| Miscellaneous/Other | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3.2 |
| Overshoot | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3.2 |
| Propeller/Jet Blast | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 3.2 |
| Propeller/Rotor Accident to Person | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3.2 |
| Stall | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 9.7 |
| Undetermined | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3.2 |
| Wheels-up Landing | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 12.9 |
| Scheduled Part 135 Aircraft - Number | 3 | 2 | 4 | 8 | 13 | 1 | 31 | |
| Scheduled Part 135 Aircraft - Percent | 9.7 | 6.5 | 12.9 | 25.8 | 41.9 | 3.2 | | |

A cross tabulation of accidents by light and weather conditions is presented in Table 35. Of all scheduled Part 135 accidents, 67.7 percent occurred under VFR conditions; 66.7 percent of these were in daylight conditions.

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

| | Type of Weather Condition | | Accidents | |
|---|---|---|---|---|
| Condition of Light | VFR | IFR | No. | Percent |
| Daylight | 14 | 6 | 20 | 64.5 |
| Dusk (Twilight) | 3 | 0 | 3 | 9.7 |
| Night (Dark) | 3 | 4 | 7 | 22.6 |
| Night (Moonlight) | 1 | 0 | 1 | 3.2 |
| Accidents - Number | 21 | 10 | 31 | |
| - Percent | 67.7 | 32.3 | | |

Table 36 presents the number of accident-involved aircraft by the extent of damage and degree of injury in the accident. In all fatal accidents, the aircraft was destroyed. Of the accidents resulting in substantial damage to the aircraft, 90 percent resulted in minor or no injuries to occupants. The serious injury accident which produced only minor aircraft damage resulted from a person being struck by a propeller.

Table 36 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

| | Degree of Injury | | | | Scheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|
| Aircraft Damage | Fatal | Serious | Minor | None | No. | Percent |
| Destroyed | 9 | 1 | 0 | 0 | 10 | 32.3 |
| Substantial | 0 | 2 | 2 | 16 | 20 | 64.5 |
| Minor | 0 | 1 | 0 | 0 | 1 | 3.2 |
| Scheduled Part 135 Aircraft - Number | 9 | 4 | 2 | 16 | 31 | |
| - Percent | 29.0 | 12.9 | 6.5 | 51.6 | | |

A tabulation of scheduled 14 CFR 135 accident-involved aircraft by type of operation and degree of injury is presented in Table 37. Passenger operations accounted for 58.1 percent of the accidents and 66.7 percent of the 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 | No. | Percent |
| Domestic Passenger | 5 | 3 | 2 | 6 | 16 | 51.6 |
| International Passenger | 1 | 0 | 0 | 1 | 2 | 6.5 |
| Domestic Cargo | 3 | 1 | 0 | 9 | 13 | 41.9 |
| Scheduled Part 135 Aircraft | | | | | | |
| - Number | 9 | 4 | 2 | 16 | 31 | |
| - Percent | 29.0 | 12.9 | 6.5 | 51.6 | | |

Seventeen of the 31 accident aircraft (or 54.8 percent) were involved in accidents on the airport (see Table 38). Forty-seven percent of these, and about 48 percent of all 31 accident aircraft were operating under IFR flight plans.

Table 38 AIRCRAFT BY PROXIMITY TO AIRPORT AND FLIGHT PLAN

| | Flight Plan | | | | | Scheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|---|
| Proximity to Airport | None | VFR | IFR | Other | Unknown | No. | Percent |
| On Airport | 4 | 3 | 8 | 1 | 1 | 17 | 54.8 |
| Miles from Airport | | | | | | | |
| Within 1/4 | 0 | 0 | 0 | 1 | 0 | 1 | 3.2 |
| 3/4 to 1 | 0 | 0 | 2 | 0 | 0 | 2 | 6.5 |
| 2+ to 3 | 0 | 1 | 0 | 0 | 0 | 1 | 3.2 |
| 4+ to 5 | 0 | 0 | 1 | 0 | 0 | 1 | 3.2 |
| Beyond 5 | 0 | 4 | 3 | 1 | 0 | 8 | 25.8 |
| Unknown | 0 | 0 | 1 | 0 | 0 | 1 | 3.2 |
| Scheduled Part 135 Aircraft | | | | | | | |
| - Number | 4 | 8 | 15 | 3 | 1 | 31 | |
| - Percent | 12.9 | 25.8 | 48.4 | 9.7 | 3.2 | | |

The pilot and personnel were the cause/factors cited most often (16 and 14 accidents, respectively) for all scheduled Part 135 accidents. (See Table 39). For fatal accidents, the pilot was again cited most often (6 accidents), however, weather (4 accidents) replaced personnel (2 accidents) as the cause/factor cited next most often. Appendix C contains a detailed cause/factor listing for scheduled 14 CFR 135 accidents which occurred in 1981.

Table 39 - BROAD CAUSE/FACTOR ASSIGNMENTS*

| | Cited as a Cause | | Cited as a Factor | | Cited as Either a Cause or a Factor (or Both) | |
|---|---|---|---|---|---|---|
| Cause/Factor | Fatal Accidents | All Accidents | Fatal Accidents | All Accidents | Fatal Accidents | All Accidents |
| Pilot | 6 | 16 | 1 | 3 | 6 | 16 |
| Personnel | 1 | 12 | 2 | 4 | 2 | 14 |
| Weather | 0 | 0 | 4 | 10 | 4 | 10 |
| Landing Gear | 0 | 4 | 0 | 0 | 0 | 4 |
| Airport/Airways/Facilities | 0 | 0 | 0 | 3 | 0 | 3 |
| Powerplant | 0 | 2 | 0 | 1 | 0 | 3 |
| Terrain | 0 | 0 | 0 | 2 | 0 | 2 |
| Undetermined | 2 | 2 | 0 | 0 | 2 | 2 |
| Rotorcraft | 1 | 1 | 0 | 0 | 1 | 1 |
| Miscellaneous | 0 | 1 | 0 | 0 | 0 | 1 |
| Airframe | 0 | 1 | 0 | 0 | 0 | 1 |
| Instruments/Equipment/ Accessories | 0 | 0 | 1 | 1 | 1 | 1 |
| Systems | 0 | 1 | 0 | 0 | 0 | 1 |
| Number of Accidents with Cause(s) Assigned | | | | | 9 | 31 |

* 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 1981 are tabulated in Table 40, and are presented in graphic form in Figures 3 and 4. A continued decrease in the number of fatalities in scheduled Part 135 operations can be seen for 1981 (34, compared to an average of 39.7 for the period 1975-1980). An improvement also can be seen in the accident rate for 1981 (2.498, the lowest in the base period) over the 1980 rate (3.232). Although there were fewer fatalities in 1981, the fatal accident rate is up slightly over the 1980 rate (0.725 and 0.681, respectively).

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

| | | | Fatalities | |
|---|---|---|---|---|
| Year | Accidents | Fatal Accidents | Total | 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 |
| 1981 | 31 | 9 | 34 | 32 |

| | | Accident Rate per 100,000 Aircraft Hours Flown | |
|---|---|---|---|
| Year | Hours Flown | Total | 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 |
| 1981 | 1,240,764 | 2.498 | 0.725 |

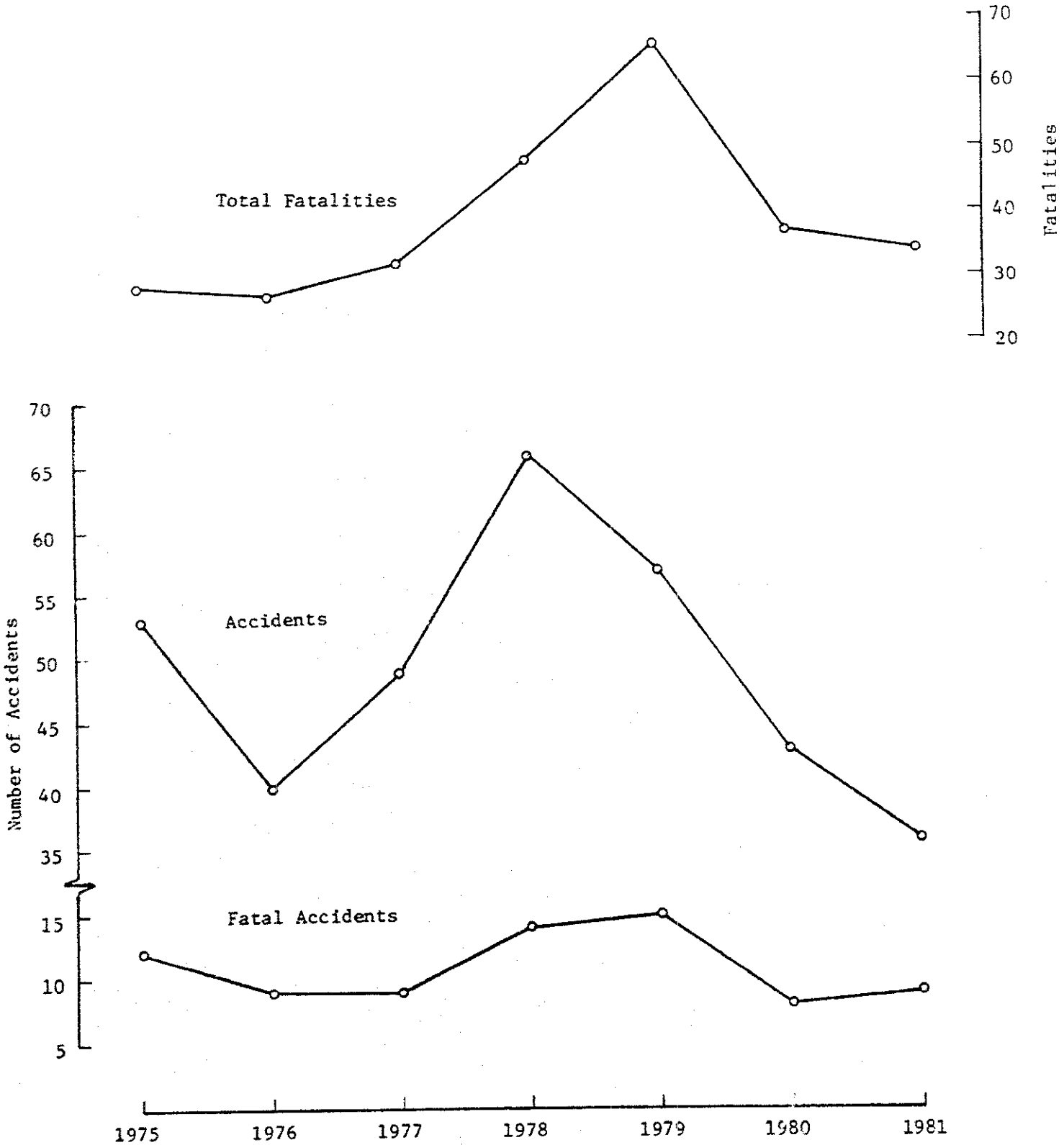


Figure 3 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

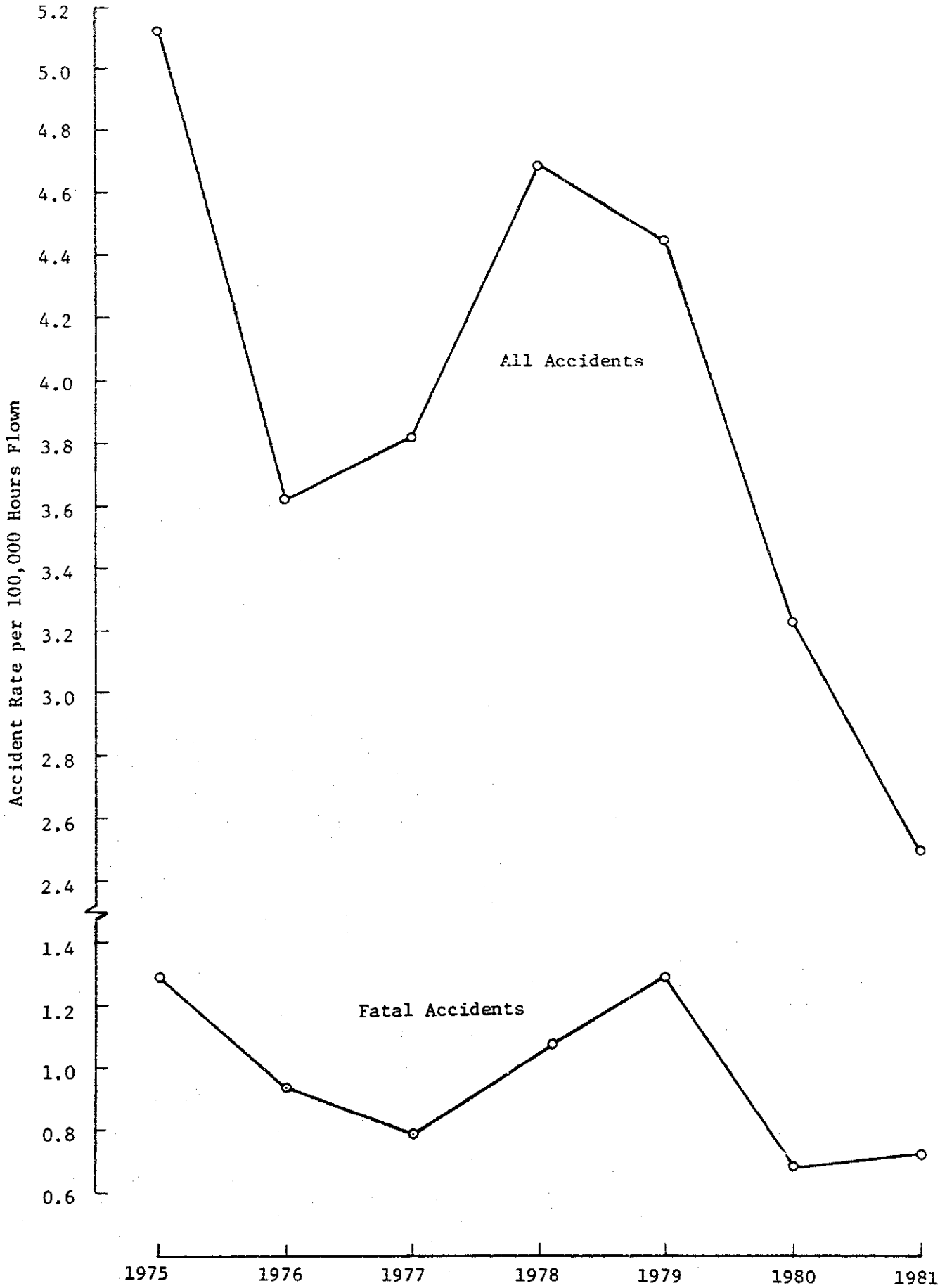


Figure 4 - ACCIDENT RATES

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-year base period between 1976 and 1980, as well as the numbers of such accidents in 1981. Controlled collision with ground or water was the accident type cited most often for both accidents and fatal accidents, with the number of 1981 occurrences substantially higher than the mean for the base period. Engine failure or malfunction, the perennial leader in both accidents and fatal accidents, was cited in about 13 percent of the accidents, as was wheels up landing. Significantly, engine failure or malfunction was not cited in any of the 1981 fatal accidents, and was cited in substantially fewer of all the accidents in 1981 than in the mean number of the preceding 5 years.

Table 41 - MOST PREVALENT TYPES OF ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Engine Failure or Malfunction | 4 | 12.9 | 12.2 | 26.5 |
| Collision with Trees, Wires, Objects | 2 | 6.5 | 6.4 | 13.9 |
| Ground-Water Loop-Swerve | 3 | 9.7 | 4.4 | 9.6 |
| Controlled Collision with Grnd/Wtr | 6 | 19.4 | 2.6 | 5.7 |
| Stall | 3 | 9.7 | 1.8 | 3.9 |
| Wheels-up Landing | 4 | 12.9 | 1.8 | 3.9 |
| Landing Gear Collapsed | 1 | 3.2 | 1.4 | 3.0 |
| Landing Gear Retracted | 0 | 0.0 | 1.4 | 3.0 |
| Hard Landing | 0 | 0.0 | 1.4 | 3.0 |
| Overshoot | 1 | 3.2 | 1.4 | 3.0 |
| Fire or Explosion in Flight | 0 | 0.0 | 1.2 | 2.6 |
| Uncontrolled Collision with Grnd/Wtr | 1 | 3.2 | 1.2 | 2.6 |
| Collision Between Aircraft | 2 | 6.5 | 1.2 | 2.6 |
| Undershoot | 0 | 0.0 | 1.0 | 2.2 |
| (All Other Types) | 4 | 12.9 | 6.6 | 14.4 |
| Total | 31 | 100.0 | 46.0 | 100.0 |

Table 42 - MOST PREVALENT TYPES OF FATAL ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Engine Failure or Malfunction | 0 | 0.0 | 3.4 | 30.9 |
| Controlled Collision with Grnd/Wtr | 5 | 55.6 | 2.0 | 18.2 |
| Collision with Trees, Wires, Objects | 0 | 0.0 | 1.0 | 9.1 |
| Stall | 1 | 11.1 | 1.0 | 9.1 |
| Uncontrolled Collision with Grnd/Wtr | 1 | 11.1 | 1.0 | 9.1 |
| Airframe Failure in Flight | 0 | 0.0 | 0.4 | 3.6 |
| Fire or Explosion in Flight | 0 | 0.0 | 0.4 | 3.6 |
| Missing Aircraft | 0 | 0.0 | 0.4 | 3.6 |
| Collision Between Aircraft | 1 | 11.1 | 0.2 | 1.8 |
| (All Other Types) | 1 | 11.1 | 1.2 | 10.9 |
| Total | 9 | 100.0 | 11.0 | 100.0 |

Tables 43 and 44 present the phases of operation for accident-involved and fatal accident-involved scheduled Part 135 aircraft. Accidents occurring during takeoff (4) dropped substantially in 1981 from the base mean of 11.6.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| Landing | 13 | 41.9 | 16.8 | 36.2 |
| Takeoff | 4 | 12.9 | 11.6 | 25.0 |
| In Flight | 8 | 25.8 | 10.6 | 22.8 |
| Taxi | 2 | 6.5 | 6.2 | 13.4 |
| Static | 3 | 9.7 | 1.2 | 2.6 |
| Unknown | 1 | 3.2 | 0.0 | 0.0 |
| Total Scheduled Part 135 Aircraft | 31 | 100.0 | 46.4 | 100.0 |

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| In Flight | 5 | 55.6 | 4.8 | 43.6 |
| Landing | 3 | 33.3 | 3.4 | 30.9 |
| Takeoff | 0 | 0.0 | 2.6 | 23.6 |
| Static | 0 | 0.0 | 0.2 | 1.8 |
| Unknown | 1 | 11.1 | 0.0 | 0.0 |
| Total Scheduled Part 135 Aircraft | 9 | 100.0 | 11.0 | 100.0 |

Table 45 shows that the pilot was cited most frequently as a cause or factor in 1981 and in the base period in scheduled 14 CFR 135 aircraft accidents. However, for 1981, the number of times the pilot was cited was substantially below the base period mean. Powerplant also was cited substantially less often in 1981 than for the base period.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factor | No. | Percent | Mean | Percent |
| Pilot | 16 | 51.6 | 30.8 | 67.5 |
| Weather | 10 | 32.3 | 13.8 | 30.3 |
| Personnel (non-pilot) | 14 | 45.2 | 13.2 | 29.0 |
| Powerplant | 3 | 9.7 | 9.6 | 21.1 |
| Airport/Airways/Facilities | 3 | 9.7 | 7.2 | 15.8 |
| Terrain | 2 | 6.5 | 5.4 | 11.8 |
| Landing Gear | 4 | 12.9 | 4.0 | 8.8 |
| Systems | 1 | 3.2 | 2.0 | 4.8 |
| Miscellaneous | 1 | 3.2 | 2.2 | 4.4 |
| Undetermined | 2 | 6.5 | 1.0 | 2.2 |
| Airframe | 1 | 3.2 | 0.8 | 1.8 |
| Instruments/Equipment & Accessories | 1 | 3.2 | 0.0 | 0.0 |
| Rotorcraft | 1 | 3.2 | 0.0 | 0.0 |
| Number of Accidents with Causes(s) Assigned | 31 | | 45.6 | |

* 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, 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.

For fatal accidents, the pilot and weather were cited most often, consistent with the base period. The number and percent for these cause/factors were similar to those for the base period.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factor | No. | Percent | Mean | Percent |
| Pilot | 6 | 66.7 | 8.8 | 81.5 |
| Weather | 4 | 44.4 | 4.4 | 40.7 |
| Personnel | 2 | 22.2 | 3.2 | 29.6 |
| Powerplant | 0 | 0.0 | 2.6 | 24.1 |
| Terrain | 0 | 0.0 | 1.2 | 11.1 |
| Systems | 0 | 0.0 | 1.0 | 9.3 |
| Undetermined | 2 | 22.2 | 0.8 | 7.4 |
| Miscellaneous | 0 | 0.0 | 0.6 | 5.6 |
| Airframe | 0 | 0.0 | 0.2 | 1.9 |
| Airport/Airways/Facilities | 0 | 0.0 | 0.2 | 1.9 |
| Instruments/Equipment & Accessories | 1 | 11.1 | 0.0 | 0.0 |
| Rotorcraft | 1 | 11.1 | 0.0 | 0.0 |
| Number of Accidents with Causes(s) Assigned | 9 | | 10.8 | |

* 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, 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

In 1981, there were 157 accidents involving aircraft operating nonscheduled flights under 14 CFR 135. Of these, 40 were fatal accidents, including a midair collision between two nonscheduled Part 135 aircraft.

## SUMMARY OF LOSSES

Statistics which describe the number and severity of accidents during nonscheduled operations under 14 CFR 135, for the years 1979, 1980, and 1981, are presented in Table 47. The numbers of accidents, fatal accidents, and fatalities in 1981 were lower than those in 1980, but the number of fatal accidents and fatalities was greater than in 1979. More aircraft were destroyed in 1981 than in either 1980 or 1979, but the total number of aircraft damaged was lower than in 1980 or 1979.

Table 47 - SUMMARY OF LOSSES

| Accidents | 1981 | 1980 | 1979 |
|---|---|---|---|
| Fatal | 40 | 46 | 30 |
| Involved Serious Injury | 13 | 13 | 16 |
| Involved Minor or No Injury | 104 | 112 | 114 |
| Total | 157 | 171 | 160 |
| **Fatalities** | | | |
| Passenger | 57 | 62 | 39 |
| Crew | 35 | 41 | 34 |
| Other Persons | 2 | 2 | 4 |
| Total | 94 | 105 | 77 |
| **Aircraft Damaged - (14 CFR 135)** | | | |
| Destroyed | 54 | 52 | 40 |
| Substantial | 102 | 118 | 118 |
| Minor | 2 | 0 | 1 |
| None | 0 | 2 | 2 |
| Total | 158 | 172 | 161 |
| **Aircraft Damaged - (Other*)** | | | |
| Destroyed | 1 | 2 | 2 |
| Substantial | 1 | 1 | 1 |
| Minor | 0 | 0 | 2 |
| Total | 2 | 3 | 5 |

* Other aircraft are those aircraft not operated under 14 CFR 135 that were involved in on-ground or in-flight collisions with aircraft operated under 14 CFR 135.

On-demand air taxis operating under Part 135, unlike the certificated route air carriers and commuter airlines, are not required to report miles, hours, and departures to CAB. Therefore, in order to develop accident rates, flight hours were estimated from data collected by FAA in its General Aviation Activity Surveys. Estimated flight hours and accident rates for nonscheduled Part 135 operations for the years 1981, 1980, and 1979, are presented in Table 48. The estimated activity in 1981 was substantially lower, but, in spite of fewer accidents for the year, both the accident and fatal accident rates for 1981 are higher than for the preceding two years.

Table 48 - ACCIDENT RATES

| | 1981 | 1980 | 1979 |
|---|---|---|---|
| Hours Flown | 2,895,827 | 3,617,724 | 3,684,321 |
| Accident Rates* | | | |
| All Accidents | 5.422 | 4.727 | 4.343 |
| Fatal Accidents | 1.381 | 1.272 | 0.814 |

* Per Hundred Thousand Hours Flown

## DETAILED REVIEW

The accidents which occurred in 1981 during nonscheduled 14 CFR 135 operations are listed in Table 49. Alaska, with 31.9 percent of the accidents, and Louisiana with 7.6 percent of the accidents, were the most frequent accident locations. However, the 1981 percents were slightly lower than the 1980 levels of 34.1 and 11.2 percent, respectively. Alaska and Louisiana accounted for 30 percent of the fatal accidents during nonscheduled operations.

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS

| Date | Location | Type of Operation | Aircraft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|
| 1/06 | Vernal,UT | Passenger | Bell 206B | Substantial | Minor | Collision with Ground/Water - Controlled |
| 1/08 | Chillicothe,OH | Cargo | Piper PA-28 | Substantial | None | Collision with Ditches |
| 1/12 | Lansing,MI | Cargo | Cessna 402 | Substantial | None | Wheels-up Landing |
| 1/15 | Midland,TX | Passenger | Cessna T210 | Substantial | None | Wheels-up Landing |
| 1/16 | Russian Mtn,AK | Passenger | Cessna 185F | Substantial | None | Ground-Water Loop-Swerve |
| 1/21 | Patterson,LA | Passenger | Bell 222 | Substantial | None | Collision with Airport Hazard |
| 1/21 | Springfield,MO | Cargo | Aero Comdr 500S | Destroyed | Fatal (2) | Collision with Trees |
| 1/22 | Coalville,UT | Cargo | Aerospatiale SA316B | Substantial | None | Collision with Fence, Fenceposts |
| 1/23 | Dutch Harbor,AK | Passenger | Grumman G-21A | Destroyed | Fatal (2) | Undetermined |
| 1/25 | Anchorage,AK | Passenger | Enstrom F28C | Substantial | None | Roll Over |
| 1/26 | Clarks Point,AK | Passenger | Cessna U206 | Substantial | None | Stall |
| 1/27 | Winnemucca,NV | Passenger | Aero Comdr 681 | Destroyed | Fatal (2) | Collision with Ground/Water - Controlled |
| 1/28 | Newhall,CA | Cargo | Beech H18 | Destroyed | Fatal (2) | Engine Failure or Malfunction |
| 2/02 | Dillsburg,PA | Cargo | Beech C-45H | Destroyed | Serious | Engine Failure or Malfunction |
| 2/06 | Karluk Lake,AK | Passenger | Cessna U206G | Substantial | Fatal (2) | Collision with Other |
| 2/10 | Jamestown,NY | Cargo | Cessna 206 | Substantial | None | Ground-Water Loop-Swerve |
| 2/10 | Houma,LA | Passenger | Cessna 310R | Destroyed | Fatal (4) | Collision with Trees |
| 2/18 | Fort Wayne,IN | Cargo | Piper PA-28R | Destroyed | Fatal (1) | Collision with Trees |
| 2/18 | Logansport,IN | Cargo | Piper PA-32 | Destroyed | Fatal (1) | Collision with Trees |
| 2/19 | Batavia,NY | Cargo | Piper PA-44 | Destroyed | Fatal (2) | Collision with Ground/Water - Controlled |
| 2/23 | Seattle,WA | Passenger | Cessna 172 | Substantial | Minor | Collision with Parked Aircraft (Unattended) |
| 2/25 | North Adams,MA | Passenger | Cessna 310R | Destroyed | Fatal (2) | Stall |
| 3/07 | Cordova,AK | Passenger | Cessna 185 | Substantial | None | Nose Over/Down |
| 3/08 | Miami,FL | Passenger | Piper PA-31 | Substantial | None | Collision with Other |
| 3/16 | Heber City,UT | Passenger | Aerospatiale SA315B | Substantial | None | Collision with Ground/Water - Uncontrolled |
| 3/16 | Evanston,WY | Passenger | Bell 206A | Substantial | None | Engine Failure or Malfunction |
| 3/17 | Houma,LA | Passenger | Cessna 402B | Substantial | None | Bird Strike |
| 3/19 | Teller,AK | Passenger | Cessna 207A | Substantial | Minor | Collision with Ground/Water - Controlled |
| 3/20 | Jefferson,OH | Passenger | Bell 206B | Substantial | Minor | Roll Over |
| 3/24 | Cameron,LA | Passenger | Bell 206L-1 | Destroyed | Minor | Roll Over |
| 3/25 | Gulf of Mexico | Passenger | Bell 206L-1 | Substantial | Minor | Engine Failure or Malfunction |
| 3/26 | Alton,UT | Cargo | Piper PA-28 | Destroyed | Minor | Collision with Trees |
| 3/27 | Galena,AK | Passenger | Piper PA-31 | Destroyed | Fatal (4) | Engine Failure or Malfunction |
| 4/02 | Albuquerque,NM | Passenger | Aero Comdr 690A | Substantial | None | Gear Collapsed |
| 4/10 | Wsthampton Bch,NY | Passenger | Cessna U206 | Substantial | Minor | Undershoot |
| 4/11 | Edmond,OK | Passenger | Aerospatiale AS350D | Substantial | Minor | Engine Failure or Malfunction |
| 4/13 | Hopkins,MO | Passenger | Piper PA-28R | Substantial | None | Hail Damage to Aircraft |
| 4/18 | Kipnuk,AK | Cargo | C.A.S.A. C-212 | Substantial | None | Gear Collapsed |
| 4/20 | Las Vegas,NV | Passenger | Hughes 369D | Destroyed | None | Engine Failure or Malfunction |
| 4/20 | Burbank,CA | Cargo | Cessna 404 | Minor | Serious | Prop Rotor Accident to Person |
| 4/21 | Red Mountain,AK | Passenger | Bell 206B | Substantial | Minor | Collision with Ground/Water - Uncontrolled |

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

| Date | Location | Type of Operation | Aircraft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|
| 4/25 | Leeville,LA | Cargo | Bell 206L-1 | Substantial | Minor | Engine Failure or Malfunction |
| 5/01 | Nome,AK | Passenger | Cessna 185 | Substantial | None | Ground-Water Loop-Swerve |
| 5/04 | Thompson Falls,MT | Passenger | Bell 47G-3B | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 5/04 | Gulf of Mexico | Cargo | Aerospatiale AS350D | Substantial | None | Tail Rotor Failure |
| 5/06 | Orlando,FL | Cargo | Aerostar 600 | Substantial | None | Gear Retracted |
| 5/07 | San Angelo,TX | Passenger | Piper PA-60 | Substantial | Serious | Airframe Failure in Flight |
| 5/08 | Klawock,AK | Passenger | DeHavilland DHC-2 | Substantial | None | Collision with Trees |
| 5/15 | Slate Creek,AK | Cargo | Short SC7 | Substantial | Minor | Hard Landing |
| 5/16 | Decorah,IA | Passenger | Piper PA-32 | Substantial | None | Overshoot |
| 5/18 | Spencer,IA | Passenger | Cessna 421 | Substantial | None | Gear Retracted |
| 5/18 | Evanston,WY | Passenger | Bell 206B | Substantial | Fatal (1) | Engine Failure or Malfunction |
| 5/19 | Gulf of Mexico | Passenger | Bell 206B | Substantial | None | Roll Over |
| 5/22 | Govt Camp,OR | Passenger | Bell 206B | Substantial | Fatal (1) | Prop Rotor Accident to Person |
| 5/23 | Alexander Lake,AK | Cargo | Short Bros SC7 | Substantial | None | Ground-Water Loop-Swerve |
| 5/23 | Ocean City,MD | Passenger | Cessna 337F | Substantial | None | Engine Failure or Malfunction |
| 5/23 | Hyannis,MA | Cargo | Beech G18S | Destroyed | Fatal (2) | Collision with Ground/Water - Uncontrolled |
| 5/24 | Grand Canyon,AZ | Passenger | Cessna T207A | Substantial | Fatal (1) | Engine Failure or Malfunction |
| 5/28 | Avalon,CA | Passenger | Beech 58 | Destroyed | Fatal (2) | Collision with Ground/Water - Controlled |
| 5/29 | Beaumont,CA | Passenger | Sikorsky S-55 | Destroyed | Fatal (6) | Collision with Ground/Water - Controlled |
| 5/31 | Cameron,LA | Passenger | Aerospatiale AS-350 | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 6/02 | Nassau,Bahamas | Passenger | Britten Norman BN-2A | Destroyed | Minor | Engine Failure or Malfunction |
| 6/04 | Anvik,AK | Cargo | Beech G18S | Destroyed | Fatal (1) | Stall/Mush |
| 6/06 | Meeteetse,WY | Passenger | Aerospatiale SA315B | Substantial | Minor | Hard Landing |
| 6/08 | Dallas,TX | Cargo | Piper PA-31P | Substantial | None | Engine Failure or Malfunction |
| 6/11 | Napaskiak,AK | Passenger | Cessna 172 | Substantial | None | Engine Failure or Malfunction |
| 6/12 | New Cumberland,PA | Cargo | Beech G18S | Substantial | None | Engine Failure or Malfunction |
| 6/16 | Sioux Falls,SD | Passenger | Cessna T210L | Substantial | Fatal (1) | Engine Failure or Malfunction |
| 6/18 | Cisco,UT | Passenger | Cessna TU206C | Substantial | None | Engine Failure or Malfunction |
| 6/19 | Juneau,AK | Passenger | DeHavilland DHC-2 | Substantial | None | Collision with Other |
| 6/19 | Tanacross,AK | Passenger | Hughes 369D | Substantial | Minor | Engine Failure or Malfunction |
| 6/21 | Bliss,ID | Passenger | Piper PA-28 | Destroyed | Fatal (3) | Collision Between Aircraft - Both in Flight |
| 6/22 | Mt Denali,AK | Passenger | Cessna 207 | Destroyed | Fatal (5) | Collision with Ground/Water - Controlled |
| 6/30 | Anchorage,AK | Passenger | DeHavilland DHC-2 | Substantial | Serious | Stall |
| 6/30 | Muskegon,MI | Passenger | Cessna 401 | Destroyed | Fatal (5) | Engine Failure or Malfunction |
| 6/30 | Farewell,AK | Passenger | Hughes 500D | Destroyed | None | Engine Failure or Malfunction |
| 7/02 | Franklin,LA | Passenger | Bell 206B | Substantial | None | Engine Failure or Malfunction |
| 7/02 | Nightmute,AK | Passenger | Cessna 185 | Substantial | None | Ground-Water Loop-Swerve |
| 7/04 | South Naknek,AK | Cargo | DeHavilland DHC-3 | Substantial | None | Ground-Water Loop-Swerve |
| 7/07 | Anchorage,AK | Passenger | Cessna 177RG | Substantial | None | Collision with Other |

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

| Date | Location | Type of Operation | Aircraft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|
| 7/09 | Port O'Connor,TX | Passenger | Cessna 402C | Substantial | None | Ground-Water Loop-Swerve |
| 7/09 | Morgan City,LA | Cargo | Cessna 180J | Substantial | None | Collision with Wires/Poles |
| 7/21 | Uniat,AK | Passenger | Hughes 369D | Substantial | Minor | Collision with Ground/Water - Uncontrolled |
| 7/22 | Tusayan,AZ | Passenger | Piper PA-31 | Substantial | None | Gear Collapsed |
| 7/23 | Kansas City,KS | Passenger | Beech 58TC | Destroyed | Fatal (4) | Collision with Ground/Water - Uncontrolled |
| 7/30 | Tobin Creek,AK | Passenger | Beech E18S | Substantial | None | Ground-Water Loop-Swerve |
| 7/30 | Ninilchik,AK | Passenger | Robertson 207A | Substantial | None | Stall |
| 8/01 | Livengood,AK | Cargo | Beech C-45H | Destroyed | Fatal (1) | Collision with Trees |
| 8/07 | Leeville,LA | Passenger | Bell 206L | Destroyed | Serious | Collision with Ground/Water - Uncontrolled |
| 8/07 | Ketchikan,AK | Passenger | DeHavilland DHC-2 | Destroyed | Serious | Collision with Ground/Water - Uncontrolled |
| 8/08 | Ketchikan,AK | Passenger | Hughes 369HS | Substantial | None | Engine Failure or Malfunction |
| 8/11 | Skagway,AK | Passenger | Piper PA-32 | Destroyed | Fatal (6) | Collision with Ground/Water - Controlled |
| 8/12 | Healy,AK | Passenger | Aero Comdr 500S | Destroyed | Minor | Collision with Trees |
| 8/12 | Alpine,WY | Passenger | Aerospatiale 316B | Substantial | Fatal (1) | Roll Over |
| 8/18 | Escalante,UT | Passenger | Bell 206B | Substantial | Minor | Collision with Ground/Water - Uncontrolled |
| 8/19 | Riggins,ID | Passenger | Soloy UH-12E | Destroyed | Fatal (3) | Collision with Ground/Water - Controlled |
| 8/20 | Alpine,WY | Passenger | Bell 206-B3 | Destroyed | Serious | Collision with Ground/Water - Controlled |
| 8/21 | Cordova,AK | Passenger | DeHavilland DHC-2 | Substantial | None | Nose Over/Down |
| 8/21 | Casper,WY | Cargo | Cessna T207 | Destroyed | Fatal (1) | Engine Failure or Malfunction |
| 8/25 | Cleveland,OH | Cargo | Cessna 310R | Substantial | None | Collision with Airport Hazard |
| 8/27 | Afton,WY | Passenger | Hughes 369D | Substantial | Minor | Engine Failure or Malfunction |
| 8/27 | Lk Minchumina,AK | Passenger | Hughes 369D | Destroyed | Minor | Engine Failure or Malfunction |
| 8/28 | Happy Camp,CA | Passenger | Piper PA-32RT | Destroyed | Fatal (4) | Collision with Trees |
| 8/30 | Driggs,ID | Cargo | Aerospatiale SA316B | Substantial | None | Tail Rotor Failure |
| 9/01 | Cantwell,AK | Passenger | Cessna U206F | Substantial | None | Engine Failure or Malfunction |
| 9/01 | Big River,AK | Cargo | Cessna U206 | Substantial | None | Ground-Water Loop-Swerve |
| 9/01 | Ltl Diomede Is,AK | Passenger | Piper PA-23 | Destroyed | Fatal (3) | Collision with Ground/Water - Controlled |
| 9/02 | Lk Clark Pass,AK | Passenger | Piper PA-32 | Substantial | None | Propeller Failure |
| 9/04 | Lake Charles,LA | Passenger | Piper PA-32R | Substantial | None | Collision with Ditches |
| 9/04 | Golovin,AK | Passenger | Cessna 207A | Substantial | None | Collision with Ground/Water - Controlled |
| 9/07 | Anchorage,AK | Passenger | Cessna 206 | Substantial | None | Collision with Other |
| 9/07 | Driggs,ID | Cargo | Aerospatiale SA315B | Destroyed | Serious | Collision with Ground/Water - Uncontrolled |
| 9/13 | Dikeman,AK | Cargo | Cessna U206F | Substantial | None | Collision with Other |
| 9/16 | Grand Isle,LA | Passenger | Cessna 185 | Substantial | None | Wheels-down Landing in Water |
| 9/16 | Kilauea,HI | Passenger | Bell 206B | Destroyed | Serious | Roll Over |
| 9/20 | Iowa City,IA | Passenger | Aerospatiale AS350D | Substantial | None | Propeller/Rotor Failure |
| 9/22 | Waialae Falls,HI | Passenger | Bell 206L-1 | Substantial | None | Roll Over |
| 9/23 | Kayenta,AZ | Passenger | Cessna 402B | Substantial | Minor | Gear Collapsed |
| 9/23 | E.Rutherford,NJ | Passenger | Piper PA-34 | Destroyed | Fatal (2) | Collision Between Aircraft - Both in Flight |
| " | " " | Passenger | Bell 206B | Destroyed | | " " " " " " |

Table 49 - NONSCHEDULED 14 CFR 135 ACCIDENTS (Continued)

| Date | Location | Type of Operation | Aircraft Type | Aircraft Damage | Degree of Injury | Type of Accident |
|---|---|---|---|---|---|---|
| 10/07 | Dallas,TX | Cargo | Beech V35A | Substantial | None | Engine Failure or Malfunction |
| 10/12 | Akaichak,AK | Passenger | Cessna 207 | Substantial | Serious | Stall/Mush |
| 10/12 | Houma,LA | Passenger | Aerospatiale AS350D | Substantial | None | Engine Failure or Malfunction |
| 10/12 | Rochester,NY | Cargo | Piper PA-32R | Substantial | None | Wheels-up Landing |
| 10/12 | Jacksonville,FL | Cargo | Beech G18S | Substantial | None | Wheels-up Landing |
| 10/13 | Champaign,IL | Passenger | Piper PA-60 | Substantial | None | Wheels-up Landing |
| 10/14 | Waycross,GA | Passenger | Cessna 340 | Minor | None | Collision Between Aircraft - Both in Flight |
| 10/16 | Quinhagak,AK | Passenger | Beech A36 | Substantial | Minor | Collision with Snowbank |
| 10/17 | Port Heiden,AK | Passenger | Piper PA-32 | Substantial | Serious | Collision with Ground/Water - Controlled |
| 10/19 | Sabine,TX | Passenger | Bell 206L-1 | Substantial | Minor | Engine Failure or Malfunction |
| 10/20 | Springville,UT | Passenger | Aerospatiale SA315B | Substantial | Minor | Main Rotor Failure |
| 10/27 | Selma,AL | Passenger | Beech 58 | Substantial | None | Propeller Failure |
| 10/27 | Marlborough,NY | Cargo | Beech 36 | Destroyed | Minor | Engine Failure or Malfunction |
| 10/30 | Ingleside,TX | Passenger | Bell 206L-1 | Destroyed | Serious | Collision with Ground/Water - Uncontrolled |
| 11/02 | Ohatchee,AL | Cargo | Beech 18 | Substantial | None | Collision with Wires/Poles |
| 11/04 | Hazard,KY | Passenger | Cessna 172N | Destroyed | Minor | Overshoot |
| 11/11 | Hidden Falls,AK | Cargo | Cessna 185 | Substantial | None | Wheels-down Landing in Water |
| 11/11 | Millinocket,ME | Passenger | Cessna 180 | Destroyed | Minor | Collision with Trees |
| 11/15 | Mount Pocono,PA | Passenger | Piper PA-32 | Destroyed | Fatal (4) | Collision with Trees |
| 11/18 | Natchez,MS | Passenger | Cessna 425 | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 11/18 | Dickinson,ND | Passenger | Cessna 402C | Substantial | Minor | Stall |
| 11/20 | Cokeville,WY | Passenger | Aerospatiale SA316B | Substantial | None | Hard Landing |
| 11/27 | Fort Yukon,AK | Passenger | Cessna 185 | Substantial | None | Hard Landing |
| 11/29 | Addison,TX | Cargo | Beech V35A | Destroyed | Fatal (2) | Collision with Wires/Poles |
| 12/03 | Fruitland,UT | Cargo | Bell 206B | Substantial | None | Roll Over |
| 12/03 | Syracuse,NY | Passenger | Piper PA-28R | Substantial | Minor | Collision with Building/s |
| 12/03 | Gulf of Mexico | Passenger | Bell 206B | Substantial | None | Engine Failure or Malfunction |
| 12/04 | Tuntutuliak,AK | Passenger | Piper PA-32 | Substantial | None | Engine Failure or Malfunction |
| 12/05 | Gulf of Mexico | Passenger | Bell 206L-1 | Substantial | None | Engine Failure or Malfunction |
| 12/10 | McCook,NE | Passenger | Cessna 402C | Substantial | None | Collision with Ground/Water - Controlled |
| 12/10 | Tyonek,AK | Passenger | Cessna 207A | Destroyed | Fatal (4) | Undetermined |
| 12/15 | Glen Burnie,MD | Cargo | Beech E18S | Substantial | Minor | Engine Failure or Malfunction |
| 12/15 | Mt McKinley,AK | Passenger | Cessna 185 | Substantial | Fatal (2) | Collision with Ground/Water - Controlled |
| 12/21 | Gulf of Mexico | Passenger | Bell 206L-1 | Destroyed | Serious | Collision with Other |
| 12/24 | Gulf of Mexico | Passenger | Aerospatiale AS350D | Destroyed | Fatal (1) | Engine Failure or Malfunction |
| 12/28 | Pullman,WA | Cargo | Cessna 402C | Destroyed | Fatal (1) | Collision with Ground/Water - Controlled |
| 12/31 | Big Pt Walter,AK | Passenger | DeHavilland DHC-2 | Destroyed | None | Stall/Mush |
| 12/31 | Pueblo,CO | Passenger | Cessna 340A | Destroyed | Minor | Engine Failure or Malfunction |

In 1981 nonscheduled Part 135 operations, 484 persons were involved in accidents. Table 50 presents the number of persons involved in accidents, cross-tabulated by their role in the accident and the degree of injury. The percent of fatal injuries in nonscheduled operations (19.4) compares closely with that in scheduled operations (20.6) for 1981. The percentages of seriously injured persons are 7.6 (nonscheduled) and 14.6 (scheduled), and for persons receiving minor or no injuries, the percentages are 72.9 (nonscheduled) and 64.9 (scheduled).

Table 50 - PERSONS BY ROLE AND DEGREE OF INJURY

| | Degree of Injury | | | | |
|---|---|---|---|---|---|
| | Fatal | Serious | Minor | None | Total |
| Pilot-in-Command | 32 | 13 | 23 | 90 | 158 |
| Co-Pilot | 2 | 0 | 2 | 6 | 10 |
| Extra Crew | 1 | 0 | 0 | 0 | 1 |
| Cabin Attendant | 0 | 0 | 0 | 1 | 1 |
| Passenger | 57 | 24 | 53 | 176 | 310 |
| Person Aboard Other Aircraft | 2 | 0 | 0 | 1 | 3 |
| Person on Ground | 0 | 0 | 1 | 0 | 1 |
| Total | 94 | 37 | 79 | 274 | 484 |

Three accident types, controlled collision with ground or water, collisions with objects, and engine failure or malfunction, accounted for over half of the 1981 nonscheduled Part 135 accidents, and three-quarters of the fatal accidents (see Table 51). Controlled collision with ground or water accounted for 12.1 percent of the accidents, but 32.5 percent of the fatal accidents.

Table 51 ACCIDENTS BY TYPE AND DEGREE OF INJURY

| | Degree of Injury | | | | Accidents | |
|---|---|---|---|---|---|---|
| Type of Accident | Fatal | Serious | Minor | None | No. | Percent |
| Airframe Failure in Flight | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Birdstrike | 0 | 0 | 0 | 1 | 1 | 0.6 |
| Collision Both Aircraft in Flight | 2 | 0 | 0 | 1 | 3 | 1.9 |
| Controlled Collision with Grnd/Wtr | 13 | 2 | 2 | 2 | 19 | 12.1 |
| Uncontrolled Collision with Grnd/Wtr | 2 | 4 | 3 | 1 | 10 | 6.4 |
| Collided with Objects | 9 | 1 | 6 | 13 | 29 | 18.5 |
| Engine Failure or Malfunction | 8 | 1 | 11 | 16 | 36 | 22.9 |
| Ground-Water Loop-Swerve | 0 | 0 | 0 | 9 | 9 | 5.7 |
| Hail Damage to Aircraft | 0 | 0 | 0 | 1 | 1 | 0.6 |
| Hard Landing | 0 | 0 | 2 | 2 | 4 | 2.5 |
| Landing Gear Collapsed | 0 | 0 | 1 | 3 | 4 | 2.5 |
| Landing Gear Retracted | 0 | 0 | 0 | 2 | 2 | 1.3 |
| Main Rotor Failure | 0 | 0 | 1 | 0 | 1 | 0.6 |
| Nose Over/Down | 0 | 0 | 0 | 2 | 2 | 1.3 |
| Overshoot | 0 | 0 | 1 | 1 | 2 | 1.3 |
| Propeller | 0 | 0 | 0 | 2 | 2 | 1.3 |
| Propeller/Rotor Accident to Person | 1 | 1 | 0 | 0 | 2 | 1.3 |
| Propeller/Rotor Failure | 0 | 0 | 0 | 1 | 1 | 0.6 |
| Roll Over | 1 | 1 | 2 | 4 | 8 | 5.1 |
| Stall | 1 | 1 | 1 | 2 | 5 | 3.2 |
| Stall-Mush | 1 | 1 | 0 | 1 | 3 | 1.9 |
| Tail Rotor Failure | 0 | 0 | 0 | 2 | 2 | 1.3 |
| Undershoot | 0 | 0 | 1 | 0 | 1 | 0.6 |
| Undetermined | 2 | 0 | 0 | 0 | 2 | 1.3 |
| Wheels-Down Landing in Water | 0 | 0 | 0 | 2 | 2 | 1.3 |
| Wheels-Up Landing | 0 | 0 | 0 | 5 | 5 | 3.2 |
| Accidents - Number | 40 | 13 | 31 | 73 | 157 | |
| - Percent | 25.5 | 8.3 | 19.7 | 46.5 | | |

Of the aircraft involved in accidents during nonscheduled Part 135 operations, all but two were destroyed or damaged substantially (see Table 52). Aircraft involved in controlled collisions with ground or water, collisions with objects, and engine failure or malfunction, accounted for 68.5 percent of the aircraft that were destroyed.

Table 52 - AIRCRAFT BY ACCIDENT TYPE AND DAMAGE

| | Aircraft Damage | | | Nonscheduled Part 135 Aircraft | |
|---|---|---|---|---|---|
| Type of Accident | Des | Sub | Minor | No. | Percent |
| Airframe Failure in Flight | 0 | 1 | 0 | 1 | 0.6 |
| Birdstrike | 0 | 1 | 0 | 1 | 0.6 |
| Collision both Aircraft in Flight | 3 | 0 | 1 | 4 | 2.5 |
| Controlled Collision with Grnd/Wtr | 13 | 6 | 0 | 19 | 12.0 |
| Uncontrolled Collision with Grnd/Wtr | 6 | 4 | 0 | 10 | 6.3 |
| Collided with Objects | 12 | 17 | 0 | 29 | 18.4 |
| Engine Failure or Malfunction | 12 | 24 | 0 | 36 | 22.8 |
| Ground-Water Loop-Swerve | 0 | 9 | 0 | 9 | 5.7 |
| Hail Damage to Aircraft | 0 | 1 | 0 | 1 | 0.6 |
| Hard Landing | 0 | 4 | 0 | 4 | 2.5 |
| Landing Gear Collapsed | 0 | 4 | 0 | 4 | 2.5 |
| Landing Gear Retracted | 0 | 2 | 0 | 2 | 1.3 |
| Main Rotor Failure | 0 | 1 | 0 | 1 | 0.6 |
| Nose Over/Down | 0 | 2 | 0 | 2 | 1.3 |
| Overshoot | 1 | 1 | 0 | 2 | 1.3 |
| Propeller | 0 | 2 | 0 | 2 | 1.3 |
| Propeller/Rotor Accident to Person | 0 | 1 | 1 | 2 | 1.3 |
| Propeller/Rotor Failure | 0 | 1 | 0 | 1 | 0.6 |
| Roll Over | 2 | 6 | 0 | 8 | 5.1 |
| Stall | 1 | 4 | 0 | 5 | 3.2 |
| Stall-Mush | 2 | 1 | 0 | 3 | 1.9 |
| Tail Rotor Failure | 0 | 2 | 0 | 2 | 1.3 |
| Undershoot | 0 | 1 | 0 | 1 | 0.6 |
| Undetermined | 2 | 0 | 0 | 2 | 1.3 |
| Wheels-down Landing in Water | 0 | 2 | 0 | 2 | 1.3 |
| Wheels-up Landing | 0 | 5 | 0 | 5 | 3.2 |
| Nonscheduled Part 135 Aircraft - Number | 54 | 102 | 2 | 158 | |
| Nonscheduled Part 135 Aircraft - Percent | 34.2 | 64.6 | 1.3 | | |

Aircraft in the initial climb and normal cruise phases of operation each accounted for 13.3 percent of the accident-involved aircraft in nonscheduled Part 135 operations. (See Table 53). Aircraft in the landing phases accounted for 39.9 percent of the total. Those in the takeoff phases accounted for 25.3 percent of the total, up from the 1980 figure of 19.3 percent.

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 | No. | Percent |
| Static | | | | | | |
| Idling Engine(s) | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Idling Rotors | 0 | 0 | 0 | 1 | 1 | 0.6 |
| Engine Runup | 1 | 0 | 0 | 0 | 1 | 0.6 |
| Taxi | | | | | | |
| To Takeoff-Fixed Wing | 0 | 0 | 0 | 2 | 2 | 1.3 |
| From Landing-Fixed Wing | 0 | 0 | 0 | 4 | 4 | 2.5 |
| Other-Fixed Wing | 0 | 0 | 2 | 0 | 2 | 1.3 |
| Takeoff | | | | | | |
| Run | 0 | 0 | 1 | 5 | 6 | 3.8 |
| Initial Climb | 9 | 5 | 1 | 6 | 21 | 13.3 |
| Vertical | 0 | 1 | 6 | 3 | 10 | 6.3 |
| Aborted-Fixed Wing | 0 | 0 | 1 | 2 | 3 | 1.9 |
| In Flight | | | | | | |
| Climb to Cruise | 1 | 0 | 1 | 3 | 5 | 3.2 |
| Normal Cruise | 6 | 1 | 6 | 8 | 21 | 13.3 |
| Descent | 0 | 0 | 1 | 4 | 5 | 3.2 |
| Hover | 0 | 0 | 2 | 1 | 3 | 1.9 |
| Buzzing | 1 | 0 | 0 | 0 | 1 | 0.6 |
| Uncontrolled Descent | 1 | 2 | 0 | 0 | 3 | 1.9 |
| Low Pass | 1 | 0 | 0 | 0 | 1 | 0.6 |
| Other | 4 | 1 | 0 | 0 | 5 | 3.2 |
| Landing | | | | | | |
| Traffic Pattern-Circling | 0 | 0 | 0 | 1 | 1 | 0.6 |
| Final Approach (VFR) | 4 | 0 | 4 | 3 | 11 | 7.0 |
| Initial Approach | 0 | 0 | 1 | 0 | 1 | 0.6 |
| Final Approach (IFR) | 8 | 0 | 0 | 1 | 9 | 5.7 |
| Level-off/Touchdown | 2 | 1 | 3 | 8 | 14 | 8.9 |
| Roll-Fixed Wing | 0 | 0 | 0 | 12 | 12 | 7.6 |
| Power-on Landing-Rotorcraft | 1 | 1 | 1 | 5 | 8 | 5.1 |
| Go-around (VFR) | 1 | 0 | 1 | 4 | 6 | 3.8 |
| Unknown | 1 | 0 | 0 | 0 | 1 | 0.6 |
| Nonscheduled Part 135 Aircraft - Number | 41 | 13 | 31 | 73 | 158 | |
| - Percent | 25.9 | 8.2 | 19.6 | 46.2 | | |

Most (64.6 percent) of the 158 aircraft involved in accidents received substantial damage. (See Table 54) Aircraft involved in accidents during initial climb were destroyed in 11 of 21 cases (52.4 percent). In the remaining 10 cases, the aircraft received substantial damage.

Table 54 - AIRCRAFT BY PHASE OF OPERATION AND AIRCRAFT DAMAGE

| | Aircraft Damage | | | Nonscheduled Part 135 Aircraft | |
|---|---|---|---|---|---|
| Phase of Operation | Des | Sub | Minor | No. | Percent |
| Static | | | | | |
| Idling Engine(s) | 0 | 0 | 1 | 1 | 0.6 |
| Idling Rotors | 0 | 1 | 0 | 1 | 0.6 |
| Engine Runup | 0 | 1 | 0 | 1 | 0.6 |
| Taxi | | | | | |
| To Takeoff-Fixed Wing | 0 | 2 | 0 | 2 | 1.3 |
| From Landing-Fixed Wing | 0 | 4 | 0 | 4 | 2.5 |
| Other-Fixed Wing | 0 | 2 | 0 | 2 | 1.3 |
| Takeoff | | | | | |
| Run | 0 | 6 | 0 | 6 | 3.8 |
| Initial Climb | 11 | 10 | 0 | 21 | 13.3 |
| Vertical | 2 | 8 | 0 | 10 | 6.3 |
| Aborted-Fixed Wing | 0 | 3 | 0 | 3 | 1.9 |
| In Flight | | | | | |
| Climb to Cruise | 1 | 4 | 0 | 5 | 3.2 |
| Normal Cruise | 9 | 11 | 1 | 21 | 13.3 |
| Descent | 1 | 4 | 0 | 5 | 3.2 |
| Hover | 0 | 3 | 0 | 3 | 1.9 |
| Buzzing | 1 | 0 | 0 | 1 | 0.6 |
| Uncontrolled Descent | 3 | 0 | 0 | 3 | 1.9 |
| Low Pass | 1 | 0 | 0 | 1 | 0.6 |
| Other | 3 | 2 | 0 | 5 | 3.2 |
| Landing | | | | | |
| Traffic Pattern-Circling | 0 | 1 | 0 | 1 | 0.6 |
| Final Appoach (VFR) | 6 | 5 | 0 | 11 | 7.0 |
| Initial Approach | 1 | 0 | 0 | 1 | 0.6 |
| Final Approach (IFR) | 8 | 1 | 0 | 9 | 5.7 |
| Level-off/Touchdown | 3 | 11 | 0 | 14 | 8.9 |
| Roll-Fixed Wing | 0 | 12 | 0 | 12 | 7.6 |
| Power-on Landing-Rotorcraft | 1 | 7 | 0 | 8 | 5.1 |
| Go-around (VFR) | 2 | 4 | 0 | 6 | 3.8 |
| Unknown | 1 | 0 | 0 | 1 | 0.6 |
| Nonscheduled 14 CFR 135 Aircraft | | | | | |
| - Number | 54 | 102 | 2 | 158 | |
| - Percent | 34.2 | 64.6 | 1.3 | | |

In Table 55, the accident-involved aircraft are cross-tabulated by accident type and the general phase of operation during which the accident occurred. Almost 23 percent of the aircraft were involved in an engine failure or malfunction type of accident. Of the 36 aircraft involved in this type accident, 26 (72.2 percent) were single engine aircraft. Seventeen of those 26 (65.4 percent) were helicopters.

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

| | Phase of Operation | | | | | | Nonscheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|---|---|
| Type of Accident | Static | Taxi | Takeoff | Inflight | Landing | Unknown | Number | Percent |
| Airframe Failure in Flight | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.6 |
| Birdstrike | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Collision Both Aircraft InFlight | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 2.5 |
| Controlled Collision with Ground/Water | 0 | 0 | 1 | 9 | 9 | 0 | 19 | 12.0 |
| Uncontrolled Collision with Ground/Water | 0 | 0 | 4 | 5 | 1 | 0 | 10 | 6.3 |
| Collided with Objects | 0 | 7 | 5 | 5 | 12 | 0 | 29 | 18.4 |
| Engine Failure or Malfunction | 0 | 0 | 13 | 16 | 7 | 0 | 36 | 22.8 |
| Ground-Water Loop-Swerve | 0 | 0 | 2 | 0 | 7 | 0 | 9 | 5.7 |
| Hail Damage to Aircraft | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Hard Landing | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 2.5 |
| Landing Gear Collapsed | 0 | 1 | 1 | 0 | 2 | 0 | 4 | 2.5 |
| Landing Gear Retracted | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1.3 |
| Main Rotor Failure | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Nose Over/Down | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1.3 |
| Overshoot | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1.3 |
| Propeller | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1.3 |
| Propeller/Rotor Accident to Person | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1.3 |
| Propeller/Rotor Failure | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 |
| Roll over | 1 | 0 | 4 | 0 | 3 | 0 | 8 | 5.1 |
| Stall | 0 | 0 | 3 | 0 | 2 | 0 | 5 | 3.2 |
| Stall-Mush | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 1.9 |
| Tail Rotor Failure | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1.3 |
| Undershoot | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.6 |
| Undetermined | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1.3 |
| Wheels-down Landing in Water | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1.3 |
| Wheels-up Landing | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 3.2 |
| Nonscheduled Part 135 Aircraft - Number | 3 | 8 | 40 | 44 | 62 | 1 | 158 | |
| - Percent | 1.9 | 5.1 | 25.3 | 27.8 | 39.2 | 0.6 | | |

Table 56 is a summary of the light and weather conditions at the time of occurrence of the nonscheduled Part 135 accidents. Most of the accidents occurred under VFR in daylight 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 | Unknown | No. | Percent |
| Daylight | 101 | 19 | 1 | 3 | 124 | 79.0 |
| Dusk | 2 | 2 | 0 | 0 | 4 | 2.5 |
| Night (Dark) | 11 | 9 | 3 | 1 | 24 | 15.3 |
| Night (Moonlight-Bright) | 4 | 0 | 1 | 0 | 5 | 3.2 |
| Accidents - Number | 118 | 30 | 5 | 4 | 157 | |
| - Percent | 75.2 | 19.1 | 3.2 | 2.5 | | |

The number of aircraft by damage and degree of injury are presented in Table 57. As could be expected, a high degree of correlation exists between aircraft that are destroyed and fatal accidents. The aircraft was destroyed in 82.9 percent of the fatal accidents. However, the most frequently occurring combination of aircraft damage and degree of injury was substantial damage and no injury. which occurred in 69 accidents (43.7 percent).

Table 57 - AIRCRAFT BY DAMAGE AND DEGREE OF INJURY

| | Degree of Injury | | | | Nonscheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|
| Aircraft Damage | Fatal | Serious | Minor | None | No. | Percent |
| Destroyed | 34 | 8 | 9 | 3 | 54 | 34.2 |
| Substantial | 7 | 4 | 22 | 69 | 102 | 64.6 |
| Minor | 0 | 1 | 0 | 1 | 2 | 1.3 |
| Nonscheduled Part 135 Aircraft - Number | 41 | 13 | 31 | 73 | 158 | |
| - Percent | 25.9 | 8.2 | 19.6 | 46.2 | | |

It can be seen in Table 58 that aircraft operated in passenger service constituted 74 percent of the accident-involved aircraft in nonscheduled Part 135 operations and 73.2 percent of the aircraft in fatal accidents. Accidents involving passenger operations accounted for 80 fatalities (83.3 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 | No. | Percent |
| Domestic Passenger | 30 | 10 | 25 | 51 | 116 | 73.4 |
| Domestic Cargo | 11 | 2 | 5 | 21 | 39 | 24.7 |
| Military Contract Cargo | 0 | 1 | 0 | 1 | 2 | 1.3 |
| International Passenger | 0 | 0 | 1 | 0 | 1 | 0.6 |
| Nonscheduled Part 135 Aircraft - Number | 41 | 13 | 31 | 73 | 158 | |
| - Percent | 25.9 | 8.2 | 19.6 | 46.2 | | |

Table 59 presents a cross-tabulation of the accident-involved aircraft by proximity to the airport and the type of flight plan filed. When compared to data for scheduled Part 135 operations, as presented in Table 38, it can be seen that the greatest percentage differences in the type of flight plan are in the categories "None" (38.0 percent for nonscheduled and 12.9 percent for scheduled), and "IFR" (20.3 percent for nonscheduled compared to 48.4 percent for scheduled). Just over half of the accidents involving scheduled operations occurred on the airport, while most of the accidents (44.3 percent) involving nonscheduled operations occurred beyond 5 miles from the airport.

## Table 59 AIRCRAFT BY PROXIMITY TO AIRPORT AND FLIGHT PLAN

| Proximity to Airport | Flight Plan | | | | | | Nonscheduled Part 135 Aircraft | |
|---|---|---|---|---|---|---|---|---|
| | None | VFR | IFR | VFR Flight Follow | Special VFR | Other | No. | Percent |
| On Airport | 13 | 10 | 12 | 1 | 0 | 5 | 41 | 25.9 |
| On Seaplane Base | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 1.9 |
| On Heliport | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0.6 |
| On Barge/Ship Platform | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1.3 |
| In Traffic Pattern | 1 | 4 | 0 | 1 | 0 | 1 | 7 | 4.4 |
| Miles from Airport | | | | | | | | |
| Within 1/4 | 2 | 1 | 5 | 0 | 0 | 2 | 10 | 6.3 |
| 1/4+ to 1/2 | 1 | 0 | 4 | 0 | 0 | 1 | 6 | 3.8 |
| 1/2+ to 3/4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1.3 |
| 3/4+ to 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0.6 |
| 1+ to 2 | 1 | 1 | 5 | 0 | 0 | 0 | 7 | 4.4 |
| 2+ to 3 | 2 | 0 | 3 | 0 | 1 | 1 | 7 | 3.8 |
| 3+ to 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0.6 |
| Beyond 5 | 34 | 14 | 3 | 4 | 0 | 15 | 70 | 44.3 |
| Unknown/Not Reported | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0.6 |
| Nonscheduled Part 135 Aircraft - Number | 60 | 33 | 32 | 7 | 1 | 25 | 158 | |
| - Percent | 38.0 | 20.9 | 20.3 | 4.4 | 0.6 | 15.8 | | |

As can be seen from Table 60, the pilot was cited as a cause or factor in 75.2 percent of the accidents of nonscheduled 14 CFR 135 operations; the pilot was cited in 80 percent of the fatal accidents. The cause/factor cited next most often was weather -- in 36.9 percent of the accidents, and 55 percent of the fatal accidents. Appendix D contains a detailed cause/factor listing for accidents involving nonscheduled 14 CFR 135 operations.

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 | 31 | 117 | 9 | 18 | 32 | 118 |
| Weather | 1 | 2 | 21 | 56 | 22 | 58 |
| Powerplant | 7 | 32 | 0 | 3 | 7 | 34 |
| Personnel | 6 | 27 | 3 | 8 | 8 | 33 |
| Terrain | 0 | 0 | 3 | 33 | 5 | 33 |
| Airport/Airways/Facilites | 0 | 2 | 0 | 15 | 0 | 17 |
| Systems | 1 | 4 | 0 | 5 | 1 | 9 |
| Rotorcraft | 0 | 6 | 0 | 2 | 0 | 8 |
| Landing Gear | 1 | 6 | 0 | 1 | 1 | 7 |
| Miscellaneous | 0 | 3 | 0 | 3 | 0 | 6 |
| Undetermined | 2 | 3 | 0 | 0 | 2 | 3 |
| Airframe | 0 | 1 | 0 | 0 | 0 | 1 |
| Number of Accidents with Cause(s) Assigned | | | | | 40 | 157 |

* 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, 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

In terms of accidents and fatal accidents, 1981 had a slightly better record than 1980. (See Table 61). However, in comparing accident rates, 1981 was worse that 1980 and three of the five other base period years for total accidents. The 1981 fatal accident rate also was up from 1980, and was worse than four of the five remaining base period years. The statistics from Table 61 are presented graphically in Figures 5 and 6.

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

| Year | Accidents | Fatal Accidents | Fatalities | |
|---|---|---|---|---|
| | | | 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 | 171 | 46 | 105 | 101 |
| 1981 | 157 | 40 | 94 | 92 |

| Year | Hours Flown | Accident Rate per 100,000 Aircraft 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 | 4.727 | 1.272 |
| 1981 | 2,895,827 | 5.422 | 1.381 |

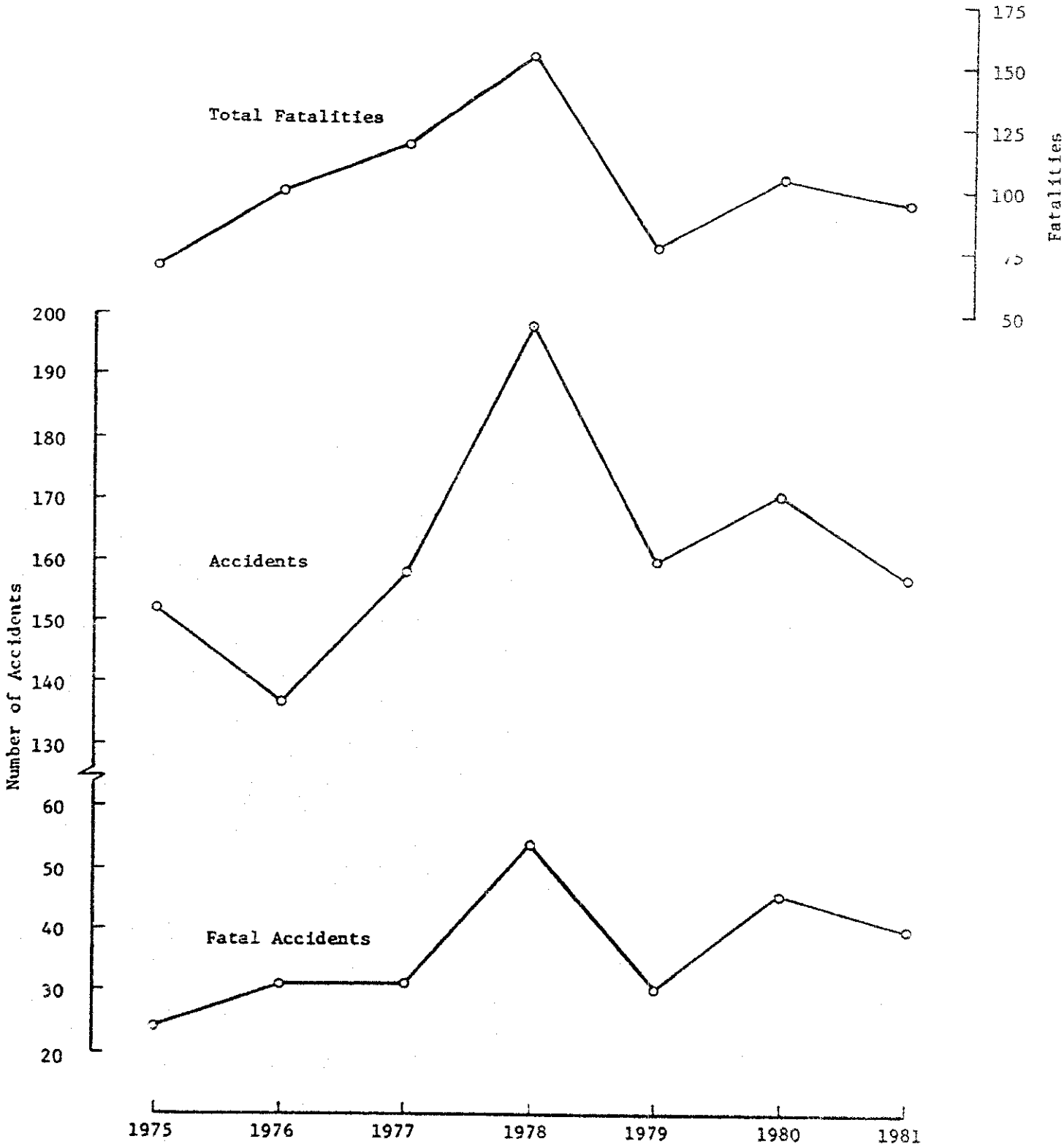


Figure 5 - ACCIDENTS, FATAL ACCIDENTS, AND FATALITIES

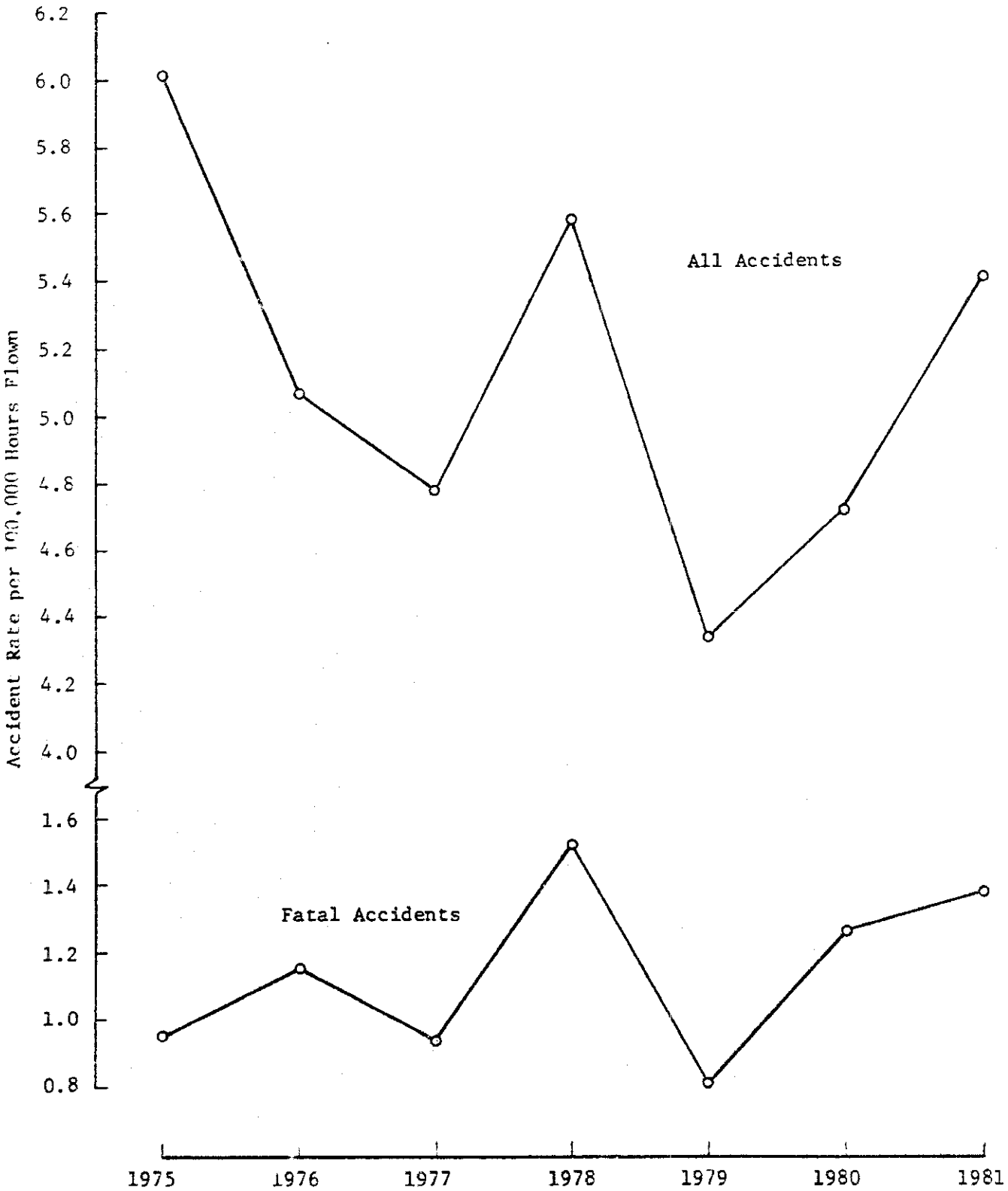


**Figure 6 - ACCIDENT RATES**

Engine failure or malfunction was, once again, the most frequently occurring accident type in nonscheduled Part 135 operations, representing 22.9 percent of the total. Collisions with trees, wires, and other objects, and controlled collisions with the ground or water, accounted for an additional 30.6 percent of the accident types. As can be seen in Table 62, these numbers compare closely with the mean for the base period. Both overshoot and nose over/down accident types in 1981 were considerably below the mean. The number of rotorcraft roll overs, however, increased to eight from the 5-year mean of 3.4.

Table 62 - MOST PREVALENT TYPES OF ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Engine Failure or Malfunction | 36 | 22.9 | 34.8 | 21.1 |
| Collision with Trees, Wires, Objects | 29 | 18.5 | 27.4 | 16.6 |
| Controlled Collision with Grnd/Wtr | 19 | 12.1 | 16.0 | 9.7 |
| Ground-Water Loop-Swerve | 9 | 5.7 | 13.6 | 8.3 |
| Stall | 8 | 5.1 | 8.4 | 5.1 |
| Uncontrolled Collision with Grnd/Wtr | 10 | 6.4 | 7.0 | 4.2 |
| Hard Landing | 4 | 2.5 | 7.0 | 4.2 |
| Overshoot | 2 | 1.3 | 6.0 | 3.6 |
| Nose Over/Down | 2 | 1.3 | 5.4 | 3.3 |
| Rotor Failure | 3 | 1.9 | 4.8 | 2.9 |
| Landing Gear Collapsed | 4 | 2.5 | 4.0 | 2.4 |
| Collision Between Aircraft | 3 | 1.9 | 4.0 | 2.4 |
| Gear Retracted | 2 | 1.3 | 3.6 | 2.2 |
| Roll Over-Rotorcraft | 8 | 5.1 | 3.4 | 2.1 |
| Undershoot | 1 | 0.6 | 2.6 | 1.6 |
| (All Other Types) | 17 | 10.8 | 16.8 | 10.2 |
| Total | 157 | 100.0 | 164.8 | 100.0 |

As shown in Table 63, three accident types accounted for 75 percent of fatal accidents in 1981, but only 53.1 percent during the base period. These accident types, controlled collision with ground or water, collision with trees, wires and other objects, and engine failure or malfunction, occurred in numbers substantially above their means for the base period. Fatal uncontrolled collisions with the ground or water occurred less than half as often as the mean for the base period.

Table 63 MOST PREVALENT TYPES OF FATAL ACCIDENTS

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Type of Accident | No. | Percent | Mean | Percent |
| Controlled Collision with Grnd/Wtr | 13 | 32.5 | 9.8 | 25.5 |
| Uncontrolled Collision with Grnd/Wtr | 2 | 5.0 | 5.4 | 14.1 |
| Collision with Trees, Wires, Objects | 9 | 22.5 | 5.6 | 14.6 |
| Engine Failure or Malfunction | 8 | 20.0 | 5.0 | 13.0 |
| Stall | 2 | 5.0 | 3.4 | 8.9 |
| Airframe Failure in Flight | 0 | 0.0 | 1.6 | 4.2 |
| Collision Between Aircraft | 2 | 5.0 | 1.6 | 4.2 |
| Rotor Failure | 0 | 0.0 | 1.4 | 3.6 |
| Missing Aircraft/Not Recovered | 0 | 0.0 | 0.8 | 2.1 |
| Turbulence | 0 | 0.0 | 0.8 | 2.1 |
| Undetermined | 2 | 5.0 | 0.8 | 2.1 |
| (All Other Types) | 2 | 5.0 | 2.2 | 5.7 |
| Total | 40 | 100.0 | 38.4 | 100.0 |

In 1981, as in the preceding 5 years, accidents occurred most often in the landing phase of operation. This was also true for fatal accidents, the number of which was almost double that of the mean for the base period. (See Tables 64 and 65). The accidents and fatal accidents occurring during the in flight phase of operation in 1981 fell below the base period mean.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| Landing | 62 | 39.2 | 62.6 | 37.8 |
| In Flight | 44 | 27.8 | 53.2 | 32.1 |
| Takeoff | 40 | 25.3 | 35.4 | 21.4 |
| Taxi | 8 | 5.1 | 9.8 | 5.9 |
| Static | 3 | 1.9 | 3.2 | 1.9 |
| Unknown | 1 | 0.6 | 1.6 | 1.0 |
| Total Nonscheduled Part 135 Aircraft | 158 | 100.0 | 165.8 | 100.0 |

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Phase of Operation | No. | Percent | Mean | Percent |
| In Flight | 14 | 34.1 | 21.2 | 54.9 |
| Landing | 16 | 39.0 | 8.4 | 21.8 |
| Takeoff | 9 | 22.0 | 6.4 | 16.6 |
| Unknown | 1 | 2.4 | 1.6 | 4.1 |
| Static | 1 | 2.4 | 0.6 | 1.6 |
| Taxi | 0 | 0.0 | 0.4 | 1.0 |
| Total Nonscheduled Part 135 Aircraft | 41 | 100.0 | 38.6 | 100.0 |

The broad cause/factors and their frequency of citation for accidents and fatal accidents are listed in Tables 66 and 67, respectively. Rotorcraft, which was cited as a cause/factor in 3.2 percent of all accidents for the base period, was cited in 5.1 percent of the 1981 nonscheduled Part 135 accidents. For fatal accidents, rotorcraft was cited 9.9 percent of the time during the base period, but jumped to 17.5 percent in 1981.

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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factor | No. | Percent | Mean | Percent |
| Pilot | 118 | 75.2 | 124.0 | 75.4 |
| Weather | 58 | 36.9 | 51.8 | 31.5 |
| Terrain | 33 | 21.0 | 33.0 | 20.1 |
| Personnel | 33 | 21.0 | 30.8 | 18.7 |
| Powerplant | 34 | 21.7 | 25.6 | 15.6 |
| Airport/Airways/Facilities | 17 | 10.8 | 18.6 | 11.3 |
| Landing Gear | 7 | 4.5 | 11.4 | 6.9 |
| Miscellaneous | 6 | 3.8 | 6.6 | 4.0 |
| Rotorcraft | 8 | 5.1 | 5.2 | 3.2 |
| Undetermined | 3 | 1.9 | 4.0 | 2.4 |
| Systems | 9 | 5.7 | 3.2 | 1.9 |
| Airframe | 1 | 0.6 | 2.0 | 1.2 |
| Instruments/Equipment & Accessories | 0 | 0.0 | 2.0 | 1.2 |
| Number of Accidents with Cause(s) Assigned | 157 | | 164.4 | |

* 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, 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

| | 1981 | | 1976-1980 | |
|---|---|---|---|---|
| Cause/Factor | No. | Percent | Mean | Percent |
| Pilot | 32 | 80.0 | 31.8 | 83.2 |
| Weather | 22 | 55.0 | 19.6 | 51.3 |
| Personnel | 8 | 20.0 | 7.6 | 19.9 |
| Terrain | 5 | 12.5 | 5.8 | 15.2 |
| Powerplant | 7 | 17.5 | 3.8 | 9.9 |
| Undetermined | 2 | 5.0 | 2.8 | 7.3 |
| Rotorcraft | 0 | 0.0 | 2.0 | 5.2 |
| Miscellaneous | 0 | 0.0 | 1.8 | 4.7 |
| Instruments/Equipment & Accessories | 0 | 0.0 | 1.0 | 2.6 |
| Airframe | 0 | 0.0 | 0.8 | 2.1 |
| Airport/Airways/Facilities | 0 | 0.0 | 0.6 | 1.6 |
| Systems | 1 | 2.5 | 0.6 | 1.6 |
| Landing Gear | 1 | 2.5 | 0.2 | 0.5 |
| Number of Accidents with Cause(s) Assigned | 40 | | 38.2 | |

* 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, 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.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ Jim Burnett
Chairman

/s/ Patricia A. Goldman
Vice Chairman

/s/ G.H. Patrick Bursley
Member

# APPENDIX A

## EXPLANATORY NOTES

## EXPLANATORY NOTES

AIRCRAFT ACCIDENT: The accidents included herein are the occurrences incident to flight in which, "as a result of the operation of an aircraft, any person (occupant or nonoccupant) receives fatal or serious injury or any aircraft receives substantial damage." The definition of substantial damage is:

(1) Substantial damage means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

(2) Engine failure, damage limited to an engine, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage."

AIRCRAFT-MILES: The distance flown by aircraft in terms of great circle airport-to-airport distances measured in statute miles.

CAUSES AND RELATED FACTORS: In determining probable cause(s) of an accident, all facts, conditions, and circumstances are considered. The objective is to ascertain those cause and effect relationships in the accident sequence about which something can be done to prevent recurrence of the type of accident under consideration. Accordingly, for statistical purposes, where there are two or more causes of an accident, each is recorded and no attempt is made to establish a primary cause. Therefore, in the cause and related factor table, the figures shown in the columns dealing with cause will exceed the total number of accidents. The term "factor" is used, in general, to denote those elements of an accident that further explain or supplement the probable cause(s); this provides a means for collecting essential items of information that could not be readily categorized elsewhere in the system.

COLLISION BETWEEN AIRCRAFT: Collisions between aircraft are so classified only when both aircraft are occupied. This includes collisions wherein both aircraft are airborne (midair); one is airborne, the other on the ground; and both are on the ground. A collision with a parked, unoccupied aircraft is classified under the broad category of collision with objects.

FATAL INJURY: Any injury which results in death within 30 days of the accident.

INJURY INDEX: Injury index refers to the highest degree of personal injury sustained as a result of the accident.

NONSCHEDULED SERVICE: Revenue flights that are not operated in regular scheduled service, such as charter flights, and all nonrevenue flights incident to such flights.

PASSENGER-MILES: One passenger transported 1 mile. Passenger-miles are computed by the summation of the products of the aircraft-miles flown on each inter-airport flight multiplied by the number of passengers carried on the flight.

PERSONNEL (NON-PILOT): As defined for the Broad Cause/Factor tables may include any of the following personnel:

Rules, Regulations, Standards Personnel
Maintenance, Servicing, Inspection Personnel
Weather Service Personnel
Airport Management
Production-Design Personnel
Ground Signalman
Passenger
Driver of Vehicle
Flight Engineer
Radio Operator
Other Flight Personnel
Flight Instructor on Ground
Operational Supervisory Personnel
Air Traffic Control Personnel
Airways Facilities Personnel
Pilot of Another Aircraft
Ground Crewman
Spectator
Third Pilot
Navigator
Flight Attendant
Dispatching Personnel

PHASE OF OPERATION: The particular phase of the flight or operation will be that phase of flight in which the first accident type or circumstance occurred. In the event that both the first and second type of accident occur in one operational phase, the same phase is recorded twice.

REVENUE PASSENGER: A person receiving air transportation from an air carrier for which remuneration is received by the air carrier. Air carrier employees and others receiving air transportation for which a token service charge is levied are considered nonrevenue passengers.

REVENUE PLANE-MILES: The total plane-miles flown in revenue service.

ROTORCRAFT (BROAD CAUSE/FACTOR): When any part, assembly, or system which is unique to rotorcraft is cited as a cause or factor, then "Rotorcraft" is considered a broad cause or factor in that accident.

SERIOUS INJURY: Any injury which 1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; 2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); 3) involves lacerations which cause severe hemorrhages, nerve, muscle, or tendon damage; 4) involves injury to any internal organ; or 5) involves second- or third-degree burns, or any burns affecting more than 5 percent of body surface.

TYPE OF ACCIDENT: The type of accident relates to the circumstances involved in the accident; it indicates what happened. Two separate types may be recorded for one accident. The selection of first and second type is made according to the sequence in which the circumstances occurred.

TYPES OF WEATHER CONDITIONS: The types of weather conditions (VMC/IMC) are determined in accordance with the prescribed minima in Part 91 of the Federal Aviaiton Regulations. These minima pertain to the ceiling and visibility, in conjunction with the type of airspace at the accident site. Type of weather conditions are based on surface weather as determined from officially recognized sources. Weather conditions encountered in flight are not necessarily representative of the flight plan classifications VFR/IFR as carried under Type of Weather Conditions.

# APPENDIX B

## CAUSE/FACTOR TABLE
## 14 CFR 121 ACCIDENTS

CAUSE/FACTOR TABLE - 14 CFR 121 ACCIDENTS - 1981

(EXCLUDES ACCIDENTS WITHOUT CAUSAL ASSIGNMENT)

INVOLVES 26 TOTAL ACCIDENTS
INVOLVES 4 FATAL ACCIDENTS

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| ** PILOT ** | | | | | | |
| PILOT IN COMMAND | | | | | | |
| CONTINUED VFR FLIGHT,INTO ADVERSE WEATHER CONDITIONS | | | | 1 | | 1 |
| DELAYED IN INITIATING GO-AROUND | | | | 1 | | 1 |
| RETRACTED GEAR PREMATURELY | | | | 1 | | 1 |
| FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC | | | | 1 | | 1 |
| IMPROPER OPERATION OF BRAKES AND/OR FLIGHT CONTROLS | | | | 1 | | 1 |
| INADEQUATE SUPERVISION OF FLIGHT | | | | 1 | | 1 |
| TAXIED/PARKED WITHOUT PROPER ASSISTANCE | | | | | 1 | 1 |
| MISJUDGED DISTANCE AND ALTITUDE | | | | 1 | | 1 |
| MISJUDGED ALTITUDE AND CLEARANCE | | | | 1 | | 1 |
| MISJUDGED CLEARANCE | | | | 1 | | 1 |
| FAILED TO MAINTAIN DIRECTIONAL CONTROL | | | | 1 | | 1 |
| SUBTOTAL | | | | 10 | 1 | 11 |
| COPILOT | | | | | | |
| MISJUDGED CLEARANCE | | | | 2 | | 2 |
| SUBTOTAL | | | | 2 | | 2 |
| ** PERSONNEL ** | | | | | | |
| RULES, REGULATIONS, STANDARDS PERSONNEL | | | | | | |
| FLIGHT INSTRUCTOR | | | | | | |
| MAINTENANCE, SERVICING, INSPECTION | | | | | | |
| INADEQUATE INSPECTION OF AIRCRAFT(MAINTENANCE PERSONNEL | | 1 | 1 | 1 | 1 | 2 |
| INADEQUATE MAINTENANCE AND INSPECTION | | | | 1 | | 1 |
| OTHER | 1 | | 1 | 1 | | 1 |
| OPERATIONAL SUPERVISORY PERSONNEL | | | | | | |
| FAILURE TO PROVIDE ADEQ DIRECTIVES, MANUALS, EQUIPMENT | | 1 | 1 | | 1 | 1 |
| WEATHER PERSONNEL | | | | | | |
| TRAFFIC CONTROL PERSONNEL | | | | | | |
| AIRPORT SUPERVISORY PERSONNEL | | | | | | |
| AIRWAYS FACILITIES PERSONNEL | | | | | | |
| PRODUCTION DESIGN PERSONNEL | | | | | | |
| POOR/INADEQUATE DESIGN | | 1 | 1 | | 2 | 2 |

PERSONNEL (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| OTHER | | 1 | 1 | | 1 | 1 |
| MISCELLANEOUS-PERSONNEL | | | | | | |
| GROUND CREWMAN | 1 | | 1 | 3 | | 3 |
| PASSENGER | 1 | | 1 | 3 | | 3 |
| DRIVER OF VEHICLE | | | | 1 | | 1 |
| OTHER | | | | 1 | | 1 |
| THIRD PILOT | 1 | | 1 | 1 | | 1 |
| FLIGHT ENGINEER | | | | | | |
| FLIGHT PERSONNEL | | | | | | |
| FLIGHT ATTENDANT | | | | 6 | 1 | 7 |
| DISPATCHING (AIR CARRIER ONLY) | | | | | | |
| SUBTOTAL | 4 | 4 | 8 | 18 | 6 | 24 |

** AIRFRAME **

| | | | | | | |
|---|---|---|---|---|---|---|
| WINGS | | | | | | |
| FUSELAGE | | | | | | |
| LANDING GEAR | | | | | | |
| NORMAL RETRACTION/EXTENSION ASSEMBLY | | | | 1 | | 1 |
| FLIGHT CONTROL SURFACES | | | | | | |

** POWERPLANT **

| | | | | | | |
|---|---|---|---|---|---|---|
| ENGINE STRUCTURE | | | | | | |
| IGNITION SYSTEM | | | | | | |
| FUEL SYSTEM | | | | | | |
| LUBRICATING SYSTEM | | | | | | |
| COOLING SYSTEM | | | | | | |
| PROPELLER AND ACCESSORIES | | | | | | |
| EXHAUST SYSTEM | | | | | | |
| ENGINE ACCESSORIES | | | | | | |
| ENGINE CONTROLS | | | | | | |
| POWERPLANT-INSTRUMENTS | | | | | | |
| MISCELLANEOUS | | | | | | |
| POWERPLANT FAILURE FOR UNDETERMINED REASONS | | | | 1 | 1 | 2 |
| COMPRESSOR STALLS | | | | 1 | | 1 |
| REDUCTION GEAR ASSEMBLY | | | | | | |
| COMPRESSOR ASSEMBLY | | | | | | |
| BEARING, ROTOR SHAFT | | | | 1 | | 1 |
| COMBUSTION ASSEMBLY | | | | | | |
| TURBINE ASSEMBLY | | | | | | |
| WHEEL, TURBINE | | | | 1 | | 1 |

POWERPLANT (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| ACCESSORY DRIVE ASSEMBLY | | | | | | |
| LUBRICATING SYSTEM | | | | | | |
| FUEL SYSTEM | | | | | | |
| 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 | | | | 5 | 1 | 6 |
| ** SYSTEMS ** | | | | | | |
| ELECTRICAL SYSTEM | | | | | | |
| SWITCHES | 1 | | 1 | 1 | | 1 |
| HYDRAULIC SYSTEM | | | | | | |
| FLIGHT CONTROL SYSTEMS | | | | | | |
| ANTI-ICING, DE-ICING SYSTEMS | | | | | | |
| AIR CONDITION, HEATING AND PRESSURIZATION | | | | | | |
| AUTO PILOT | | | | | | |
| FIRE WARNING SYSTEM | | | | | | |
| POWERPLANT | | | | | 1 | 1 |
| FIRE EXTINGUISHER SYSTEM | | | | | | |
| OXYGEN SYSTEM | | | | | | |
| OTHER SYSTEMS | | | | | | |
| SUBTOTAL | 1 | | 1 | 1 | 1 | 2 |
| ** INSTRUMENTS/EQUIPMENT AND ACCESSORIES ** | | | | | | |
| FLIGHT AND NAVIGATION INSTRUMENTS | | | | | | |
| COMMUNICATIONS AND NAVIGATION EQUIPMENT | | | | | | |
| MISCELLANEOUS EQUIPMENT | | | | | | |
| OTHER | 1 | | 1 | 1 | | 1 |
| ** AIRPORTS/AIRWAYS/FACILITIES ** | | | | | | |

AIRPORTS/AIRWAYS/FACILITIES (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FACTOR | TOTAL | ALL ACCIDENTS CAUSE | FACTOR | TOTAL |
|---|---|---|---|---|---|---|
| AIRPORT FACILITIES | | | | | | |
| AIRPORT CONDITIONS | | | | | | |
| WET RUNWAY | | | | | 1 | 1 |
| OTHER | | | | | 2 | 2 |
| AIRWAYS FACILITIES | | | | | | |
| SUBTOTAL | 1 | | 1 | 1 | 3 | 4 |
| ** WEATHER ** | | | | | | |
| LOW CEILING | | | | | 1 | 1 |
| RAIN | | | | | 1 | 1 |
| ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC | | | | | 1 | 1 |
| UNFAVORABLE WIND CONDITIONS | | | | | 1 | 1 |
| TURBULENCE IN FLIGHT, CLEAR AIR | | | | 1 | | 1 |
| TURBULENCE ASSOCIATED WITH CLOUDS AND/OR THUNDERSTORMS | | | | 4 | | 4 |
| THUNDERSTORM ACTIVITY | | | | | 1 | 1 |
| SUBTOTAL | | | | 5 | 5 | 10 |
| ** MISCELLANEOUS ** | | | | | | |
| BIRD COLLISION | | | | 1 | | 1 |
| VORTEX TURBULENCE | | | | 1 | | 1 |
| FOREIGN OBJECT DAMAGE | | | | 3 | | 3 |
| FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS | | | | 1 | | 1 |
| SUBTOTAL | | | | 6 | | 6 |
| GRAND TOTAL | 6 | 4 | 10 | 48 | 17 | 65 |
| ** MISCELLANEOUS ACTS, CONDITIONS ** | | | | | | |
| CREW COORDINATION-POOR | | | | | 1 | 1 |
| IMPROPER EMERGENCY PROCEDURES | | | | 1 | | 1 |
| INSTRUCTIONS-MISINTERPRETED | | | | 1 | | 1 |
| SEAT BELT NOT FASTENED | | | | 5 | 1 | 6 |
| FATIGUE FRACTURE | | | | 1 | | 1 |
| RPM-UNCONTROLLABLE-OVERSPEED | | | | 1 | | 1 |
| WINDSHIELD, DIRTY, FOGGY, ETC-RESTRICTED VISION | | | | | 1 | 1 |
| FIRE IN ENGINE | | | | 1 | | 1 |
| FIRE IN BRAKES/ WHEEL ASSEMBLY/ WHEEL WELL | | | | | 1 | 1 |
| ICE-WINDSHIELD | | | | 1 | | 1 |

MISCELLANEOUS ACTS, CONDITIONS (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| INTERFERENCE WITH FLIGHT CONTROLS | | | | | 1 | 1 |
| LACK OF LUBRICATION-SPECIFIC PART, NOT SYSTEM | | | | 1 | | 1 |
| SEAT BELT SIGN OFF | | | | | 1 | 1 |
| MATERIAL FAILURE | 1 | | 1 | 3 | 1 | 4 |
| LEAK/LEAKAGE | | | | 1 | | 1 |
| DOWNWIND | | | | | 1 | 1 |
| BINDING | 1 | | 1 | 1 | | 1 |
| BURST | | | | 1 | | 1 |
| ERRATIC | 1 | | 1 | 1 | | 1 |
| OVERHEATED | | | | 1 | | 1 |
| SEAT BELT SIGN ON | | | | | 5 | 5 |
| RAN OFF END OF RUNWAY | | | | | 1 | 1 |

DIRECT ENTRY CAUSES

PERSONNEL-FAILED TO FOLLOW SAFETY PROCEDURES.

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

# APPENDIX C

## CAUSE/FACTOR TABLE
## SCHEDULED 14 CFR 135 ACCIDENTS

CAUSE/FACTOR TABLE - SCHEDULED 14 CFR 135 ACCIDENTS - 1981

(EXCLUDES ACCIDENTS WITHOUT CAUSAL ASSIGNMENT)

INVOLVES 31 TOTAL ACCIDENTS
INVOLVES 9 FATAL ACCIDENTS

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| ** PILOT ** | | | | | | |
| PILOT IN COMMAND | | | | | | |
| BECAME LOST/DISORIENTED | 1 | | 1 | 1 | | 1 |
| CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS | 3 | | 3 | 3 | | 3 |
| DELAYED IN INITIATING GO-AROUND | | | | 1 | 1 | 2 |
| FAILED TO SEE AND AVOID OTHER AIRCRAFT | 1 | | 1 | 1 | | 1 |
| FAILED TO OBTAIN/MAINTAIN FLYING SPEED | 1 | | 1 | 1 | | 1 |
| FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC | | 1 | 1 | | 1 | 1 |
| IMPROPER IFR OPERATION | 1 | | 1 | 3 | | 3 |
| IMPROPER IN-FLIGHT DECISIONS OR PLANNING | 1 | | 1 | 1 | | 1 |
| INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING | | | | 3 | | 3 |
| MISMANAGEMENT OF FUEL | | | | 1 | | 1 |
| MISJUDGED DISTANCE AND SPEED | | | | 1 | | 1 |
| MISUSED OR FAILED TO USE FLAPS | | | | | 1 | 1 |
| FAILED TO MAINTAIN DIRECTIONAL CONTROL | | | | 3 | | 3 |
| SUBTOTAL | 8 | 1 | 9 | 19 | 3 | 22 |
| COPILOT | | | | | | |
| INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING | | | | 1 | | 1 |
| ** PERSONNEL ** | | | | | | |
| RULES, REGULATIONS, STANDARDS PERSONNEL | | 1 | 1 | | 1 | 1 |
| FLIGHT INSTRUCTOR | | | | | | |
| MAINTENANCE, SERVICING, INSPECTION | | | | | | |
| IMPROPER MAINTENANCE(MAINTENANCE PERSONNEL) | | | | 1 | | 1 |
| IMPROPERLY SERVICED AIRCRAFT(GROUND CREW) | | | | 1 | | 1 |
| INADEQUATE MAINTENANCE AND INSPECTION | | | | 3 | | 3 |
| OPERATIONAL SUPERVISORY PERSONNEL | | | | | | |
| DEFICIENCY, COMPANY MAINTAINED COMM, SERV, REGULATIONS | | | | 2 | | 2 |
| WEATHER PERSONNEL | | | | | | |
| TRAFFIC CONTROL PERSONNEL | | | | | | |
| OTHER | 1 | | 1 | 1 | | 1 |
| AIRPORT SUPERVISORY PERSONNEL | | | | | | |
| FAILURE TO NOTIFY OF UNSAFE COND/AND OR FAILURE TO MAKE | | | | | 1 | 1 |
| AIRWAYS FACILITIES PERSONNEL | | | | | | |

PERSONNEL (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FACTOR | TOTAL | ALL ACCIDENTS CAUSE | FACTOR | TOTAL |
|---|---|---|---|---|---|---|
| OTHER | | | | | 1 | 1 |
| PRODUCTION-DESIGN-PERSONNEL | | | | | | |
| POOR/INADEQUATE DESIGN | | 1 | 1 | | 1 | 1 |
| OTHER | | | | 1 | | 1 |
| MISCELLANEOUS-PERSONNEL | | | | | | |
| PILOT OF OTHER AIRCRAFT | 1 | | 1 | 2 | | 2 |
| PASSENGER | | | | 1 | | 1 |
| DRIVER OF VEHICLE | | | | 2 | | 2 |
| THIRD PILOT | | | | | | |
| FLIGHT ENGINEER | | | | | | |
| FLIGHT PERSONNEL | | | | | | |
| DISPATCHING (AIR CARRIER ONLY) | | | | | | |
| SUBTOTAL | 2 | 2 | 4 | 15 | 4 | 19 |
| ** AIRFRAME ** | | | | | | |
| WINGS | | | | | | |
| FUSELAGE | | | | | | |
| LANDING GEAR | | | | | | |
| MAIN GEAR-SHOCK ABSORBING ASSY, STRUTS, ATTACHMENTS, ET | | | | 1 | | 1 |
| NORMAL RETRACTION/EXTENSION ASSEMBLY | | | | 3 | | 3 |
| EMERGENCY/EXTENSION ASSEMBLY | | | | 1 | | 1 |
| FLIGHT CONTROL SURFACES | | | | | | |
| ELEVATOR, ASSEMBLY ATTACHMENTS | | | | 1 | | 1 |
| SUBTOTAL | | | | 6 | | 6 |
| ** POWERPLANT ** | | | | | | |
| ENGINE STRUCTURE | | | | | | |
| IGNITION SYSTEM | | | | | | |
| FUEL SYSTEM | | | | | | |
| FILTERS, STRAINERS, SCREENS | | | | 1 | | 1 |
| LUBRICATING SYSTEM | | | | | | |
| LINES, HOSES, FITTINGS | | | | 1 | | 1 |
| COOLING SYSTEM | | | | | | |
| PROPELLER AND ACCESSORIES | | | | | | |
| EXHAUST SYSTEM | | | | | | |
| ENGINE ACCESSORIES | | | | | | |
| ENGINE CONTROLS | | | | | | |
| POWERPLANT-INSTRUMENTS | | | | | | |
| FUEL QUANTITY GAUGE | | | | | 1 | 1 |
| MISCELLANEOUS | | | | | | |

POWERPLANT (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FATAL ACCIDENTS FACTOR | FATAL ACCIDENTS TOTAL | ALL ACCIDENTS CAUSE | ALL ACCIDENTS FACTOR | ALL ACCIDENTS TOTAL |
|---|---|---|---|---|---|---|
| REDUCTION GEAR ASSEMBLY | | | | | | |
| COMPRESSOR ASSEMBLY | | | | | | |
| COMBUSTION ASSEMBLY | | | | | | |
| TURBINE ASSEMBLY | | | | | | |
| ACCESSORY DRIVE ASSEMBLY | | | | | | |
| LUBRICATING SYSTEM | | | | | | |
| FUEL SYSTEM | | | | | | |
| 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 | | | | 2 | 1 | 3 |
| ** SYSTEMS ** | | | | | | |
| ELECTRICAL SYSTEM | | | | | | |
| HYDRAULIC SYSTEM | | | | | | |
| RESERVOIR, LINES, FITTINGS | | | | 1 | | 1 |
| FLIGHT CONTROL SYSTEMS | | | | | | |
| ANTI-ICING, DE-ICING SYSTEMS | | | | | | |
| AIR CONDITION, HEATING AND PRESSURIZATION | | | | | | |
| AUTO PILOT | | | | | | |
| FIRE WARNING SYSTEM | | | | | | |
| FIRE EXTINGUISHER SYSTEM | | | | | | |
| OXYGEN SYSTEM | | | | | | |
| OTHER SYSTEMS | | | | | | |
| ** INSTRUMENTS/EQUIPMENT AND ACCESSORIES ** | | | | | | |
| FLIGHT AND NAVIGATION INSTRUMENTS | | | | | | |
| COMMUNICATIONS AND NAVIGATION EQUIPMENT | | | | | | |
| DME | 1 | 1 | | | 1 | 1 |
| MISCELLANEOUS EQUIPMENT | | | | | | |
| SUBTOTAL | 1 | 1 | | 1 | 1 | 2 |

CAUSE/FACTOR TABLE - SCHEDULED 14 CFR 135 ACCIDENTS - 1981

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FACTOR | TOTAL | ALL ACCIDENTS CAUSE | FACTOR | TOTAL |
|---|---|---|---|---|---|---|
| ** ROTORCRAFT ** | | | | | | |
| ROTOR ASSEMBLIES | | | | | | |
| MAIN ROTOR BRAKE ASSEMBLY | 1 | | 1 | 1 | | 1 |
| TRANSMISSION ROTOR DRIVE SYSTEM | | | | | | |
| FLIGHT CONTROL SYSTEMS | | | | | | |
| MISCELLANEOUS UNITS AND ASSEMBLIES | | | | | | |
| ** AIRPORTS/AIRWAYS/FACILITIES ** | | | | | | |
| AIRPORT FACILITIES | | | | | | |
| AIRPORT CONDITIONS | | | | | | |
| SNOW ON RUNWAY | | | | | 1 | 1 |
| POORLY MAINTAINED RUNWAY SURFACE | | | | | 1 | 1 |
| ICE/SLUSH ON RAMP/TAXIWAY | | | | | 1 | 1 |
| AIRWAYS FACILITIES | | | | | | |
| SUBTOTAL | 1 | | 1 | 1 | 3 | 4 |
| ** WEATHER ** | | | | | | |
| LOW CEILING | | 4 | 4 | | 6 | 6 |
| RAIN | | 1 | 1 | | 1 | 1 |
| FOG | | 4 | 4 | | 7 | 7 |
| SNOW | | 2 | 2 | | 4 | 4 |
| ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC | | 1 | 1 | | 1 | 1 |
| UNFAVORABLE WIND CONDITIONS | | | | | 2 | 2 |
| TURBULENCE ASSOCIATED WITH CLOUDS AND/OR THUNDERSTORMS | | 1 | 1 | | 1 | 1 |
| DOWNDRAFTS, UPDRAFTS | | | | | 1 | 1 |
| ADVERSE WINDS ALOFT | | 1 | 1 | | 1 | 1 |
| SUBTOTAL | | 14 | 14 | | 24 | 24 |
| ** TERRAIN ** | | | | | | |
| SNOW-COVERED | | | | | 2 | 2 |
| ROUGH/UNEVEN | | | | | 1 | 1 |
| SUBTOTAL | | | | | 3 | 3 |
| ** MISCELLANEOUS ** | | | | | | |
| PRO. JET/ROTOR BLAST | | | | 1 | | 1 |
| UNDETERMINED | 2 | | 2 | 2 | | 2 |
| SUBTOTAL | 2 | | 2 | 3 | | 3 |
| GRAND TOTAL | 13 | 19 | 31 | 47 | 39 | 86 |

## CAUSE/FACTOR TABLE - SCHEDULED 14 CFR 135 ACCIDENTS - 1981

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| ** MISCELLANEOUS ACTS, CONDITIONS ** | | | | | | |
| INSTRUMENTS-MISREAD OR FAILED TO READ | 1 | | 1 | 1 | | 1 |
| IMPROPERLY SECURED | | | | 1 | | 1 |
| FATIGUE FRACTURE | 1 | | 1 | 2 | | 2 |
| FUEL GRADE-IMPROPER | | | | | 1 | 1 |
| HYDRAULIC FAILURE | | | | 2 | | 2 |
| FAILURE OF TWO OR MORE ENGINES | | | | | 3 | 3 |
| CORRODED/CORROSION | | | | 1 | | 1 |
| FUEL EXHAUSTION | | | | 1 | | 1 |
| ICE-IN FUEL | | | | 1 | | 1 |
| AIRFRAME ICE | | | | 1 | | 1 |
| IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG | | | | 1 | | 1 |
| OIL EXHAUSTION-ENGINE LUBRICATION SYSTEM | | | | 1 | | 1 |
| AIRCRAFT CAME TO REST IN WATER | | 1 | 1 | | 1 | 1 |
| MISSING | | | | 1 | | 1 |
| OVERLOAD FAILURE | | | | | 1 | 1 |
| MATERIAL FAILURE | | | | 3 | | 3 |
| LEAK/LEAKAGE | | | | 2 | | 2 |
| OVER TORQUED | | | | 1 | | 1 |
| DISCONNECTED | | | | 1 | | 1 |
| ERRATIC | | | | | 1 | 1 |
| OBSTRUCTED | | | | 1 | | 1 |
| INTENTIONAL WHEELS UP | | | | 1 | 3 | 4 |
| RAN OFF END OF RUNWAY | | | | | 1 | 1 |

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

# APPENDIX D

## CAUSE/FACTOR TABLE
## NONSCHEDULED 14 CFR 135 ACCIDENTS

CAUSE/FACTOR TABLE - NONSCHEDULED 14 CFR 135 ACCIDENTS - 1981

(EXCLUDES ACCIDENTS WITHOUT CAUSAL ASSIGNMENT)

INVOLVES 157 TOTAL ACCIDENTS
INVOLVES 40 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 | | | | 2 | 1 | 3 |
| ATTEMPTED OPERATION BEYOND EXPERIENCE/ABILITY LEVEL | | | | 1 | | 1 |
| BECAME LOST/DISORIENTED | | | | 1 | | 1 |
| CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS | 4 | | 4 | 10 | 1 | 11 |
| DELAYED ACTION IN ABORTING TAKEOFF | | | | 2 | | 2 |
| DELAYED IN INITIATING GO-AROUND | | | | 3 | | 3 |
| DIVERTED ATTENTION FROM OPERATION OF AIRCRAFT | 1 | | 1 | 4 | | 4 |
| FAILED TO EXTEND LANDING GEAR | | | | 1 | | 1 |
| FAILED TO RETRACT LANDING GEAR | | | | 1 | | 1 |
| INADVERTENTLY RETRACTED GEAR | | | | 1 | | 1 |
| FAILED TO SEE AND AVOID OTHER AIRCRAFT | 3 | | 3 | 4 | | 4 |
| FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS | | | | 5 | | 5 |
| FAILED TO OBTAIN/MAINTAIN FLYING SPEED | 2 | | 2 | 6 | | 6 |
| MISJUDGED, SPEED, ALTITUDE OR CLEARANCE | 3 | | 3 | 3 | | 3 |
| FAILED TO USE OR INCORRECTLY USED MISC EQUIPMENT | | 1 | 1 | 1 | 1 | 2 |
| FAILED TO FOLLOW APPROVED PROCEDURES, DIRECTIVES ETC | 2 | 2 | 4 | 10 | 2 | 12 |
| IMPROPER OPERATION OF POWERPLANT & POWERPLANT CONTROLS | 1 | | 1 | 2 | 1 | 3 |
| IMPROPER OPERATION OF BRAKES AND/OR FLIGHT CONTROLS | | | | 1 | | 1 |
| IMPROPER OPERATION OF FLIGHT CONTROLS | | 1 | 1 | 1 | 1 | 2 |
| PREMATURE LIFT OFF | | | | 2 | | 2 |
| IMPROPER LEVEL OFF | | | | 2 | | 2 |
| IMPROPER IFR OPERATION | 8 | | 8 | 8 | | 8 |
| IMPROPER IN-FLIGHT DECISIONS OR PLANNING | 3 | | 3 | 11 | 2 | 13 |
| IMPROPER COMPENSATION FOR WIND CONDITIONS | | | | 2 | | 2 |
| INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING | 2 | 1 | 3 | 14 | 2 | 16 |
| LACK OF FAMILIARITY WITH AIRCRAFT | | | | | 1 | 1 |
| MISMANAGEMENT OF FUEL | | | | 2 | | 2 |
| EXERCISED POOR JUDGMENT | 1 | | 1 | 3 | | 3 |
| SELECTED UNSUITABLE TERRAIN | 3 | | 3 | 14 | | 14 |
| STARTED ENGINE WITHOUT PROPER ASSISTANCE/EQUIPMENT | | | | 1 | | 1 |
| FAILED TO ASSURE THE GEAR WAS DOWN AND LOCKED | | | | 1 | | 1 |
| INITIATED FLIGHT IN ADVERSE WEATHER CONDITIONS | 1 | | 1 | 3 | | 3 |
| MISJUDGED DISTANCE, SPEED, AND ALTITUDE | | | | 1 | | 1 |
| MISJUDGED DISTANCE AND SPEED | | | | 1 | | 1 |
| MISJUDGED DISTANCE AND ALTITUDE | | | | 2 | | 2 |

PILOT (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FACTOR | TOTAL | ALL ACCIDENTS CAUSE | FACTOR | TOTAL |
|---|---|---|---|---|---|---|
| MISJUDGED ALTITUDE AND CLEARANCE | 2 | | 2 | 2 | | 2 |
| MISJUDGED CLEARANCE | 2 | | 2 | 7 | | 7 |
| IMPROPER RECOVERY FROM BOUNCED LANDING | | | | 1 | | 1 |
| PHYSICAL IMPAIRMENT | | 2 | 2 | | 2 | 2 |
| SPATIAL DISORIENTATION | | | | 5 | | 5 |
| MISUSED OR FAILED TO USE FLAPS | | 1 | 1 | | 3 | 3 |
| LEFT AIRCRAFT UNATTENDED ENGINE RUNNING | | | | 1 | | 1 |
| FAILED TO MAINTAIN DIRECTIONAL CONTROL | | | | 4 | | 4 |
| FAILED TO ABORT TAKEOFF | 1 | | 1 | 4 | 1 | 5 |
| FAILED TO INITIATE GO-AROUND | | | | 1 | | 1 |
| DIRECT ENTRIES | | 2 | 2 | | 2 | 2 |
| SUBTOTAL | 39 | 10 | 49 | 151 | 20 | 171 |
| ** PERSONNEL ** | | | | | | |
| RULES, REGULATIONS, STANDARDS PERSONNEL | | 2 | 2 | | 2 | 2 |
| FLIGHT INSTRUCTOR | | | | | | |
| MAINTENANCE, SERVICING, INSPECTION | | | | | | |
| IMPROPER MAINTENANCE(MAINTENANCE PERSONNEL) | | | | 5 | | 5 |
| INADEQUATE INSPECTION OF AIRCRAFT(MAINTENANCE PERSONNEL | | | | 1 | | 1 |
| INADEQUATE INSPECTION OF ACFT(OWNER-PILOT PERSONNEL) | | | | 1 | | 1 |
| INADEQUATE MAINTENANCE AND INSPECTION | 2 | | 2 | 6 | 2 | 8 |
| OPERATIONAL SUPERVISORY PERSONNEL | | | | | | |
| FAILURE TO PROVIDE ADEQ DIRECTIVES, MANUALS, EQUIPMENT | | | | 1 | | 1 |
| DEFICIENCY, COMPANY MAINTAINED EQMT, SERV, REGULATIONS | | | | | 1 | 1 |
| WEATHER PERSONNEL | | | | | | |
| INADEQUATE/INCORRECT WEATHER BRIEFING | | 1 | 1 | | 1 | 1 |
| TRAFFIC CONTROL PERSONNEL | | | | | | |
| FAILURE TO ADVISE OF UNSAFE AIRPORT CONDITION | | 1 | 1 | | 1 | 1 |
| FAILURE TO ADVISE OF OTHER TRAFFIC | 2 | | 2 | 2 | | 2 |
| AIRPORT SUPERVISORY PERSONNEL | | | | | | |
| FAILURE TO NOTIFY OF UNSAFE COND/AND OR FAILURE TO MARK | | | | 1 | | 1 |
| OTHER | | | | 1 | | 1 |
| AIRWAYS FACILITIES PERSONNEL | | | | | | |
| PRODUCTION-DESIGN-PERSONNEL | | | | | | |
| SUBSTANDARD QUALITY CONTROL | | | | 1 | | 1 |
| INCORRECT FACTORY INSTALLATION | 1 | | 1 | 1 | 1 | 2 |
| POOR/INADEQUATE DESIGN | 1 | | 1 | 2 | 1 | 3 |
| MISCELLANEOUS-PERSONNEL | | | | | | |
| PILOT OF OTHER AIRCRAFT | 3 | | 3 | 4 | | 4 |
| PASSENGER | 1 | | 1 | 5 | | 5 |
| DRIVER OF VEHICLE | | | | 1 | | 1 |
| OTHER | | | | 1 | | 1 |

PERSONNEL (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| THIRD PILOT | | | | | | |
| FLIGHT ENGINEER | | | | | | |
| FLIGHT PERSONNEL | | | | | | |
| DISPATCHING (AIR CARRIER ONLY) | | | | | | |
| SUBTOTAL | 10 | 4 | 14 | 33 | 9 | 42 |
| ** AIRFRAME ** | | | | | | |
| WINGS | | | | | | |
| FUSELAGE | | | | | | |
| DOORS, DOOR FRAMES | | | | 1 | | 1 |
| LANDING GEAR | | | | | | |
| NORMAL RETRACTION/EXTENSION ASSEMBLY | | | | 3 | 1 | 4 |
| TAILWHEEL ASSEMBLIES | | | | 1 | | 1 |
| FLOAT ASSEMBLIES | 1 | | 1 | 1 | | 1 |
| BRAKING SYSTEM (NORMAL) | | | | 1 | | 1 |
| OTHER | | | | 1 | | 1 |
| FLIGHT CONTROL SURFACES | | | | | | |
| SUBTOTAL | 1 | | 1 | 8 | 1 | 9 |
| ** POWERPLANT ** | | | | | | |
| ENGINE STRUCTURE | | | | | | |
| VALVE ASSEMBLIES | | | | | 1 | 1 |
| BLOWER, IMPELLER ASSEMBLY | | | | 1 | | 1 |
| IGNITION SYSTEM | | | | | | |
| MAGNETOES | | | | | 1 | 1 |
| SPARK PLUG | | | | | 1 | 1 |
| LEADS | | | | 1 | 1 | 2 |
| FUEL SYSTEM | | | | | | |
| VENTS, DRAINS, TANK CAPS | | | | 1 | | 1 |
| RAM AIR ASSEMBLY | | | | 1 | | 1 |
| OTHER | 2 | | 2 | 3 | | 3 |
| LUBRICATING SYSTEM | | | | | | |
| COOLING SYSTEM | | | | | | |
| PROPELLER AND ACCESSORIES | | | | | | |
| BLADES | | | | 1 | | 1 |
| HUBS | | | | 1 | | 1 |
| EXHAUST SYSTEM | | | | | | |
| MUFFLERS | | | | 1 | | 1 |
| CLAMPS | | | | 1 | | 1 |
| STACKS | | | | 1 | | 1 |

POWERPLANT (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| ENGINE ACCESSORIES | | | | | | |
| ENGINE CONTROLS | | | | | | |
| THROTTLE-POWER LEVER ASSEMBLIES | | | | 1 | | 1 |
| POWERPLANT-INSTRUMENTS | | | | | | |
| FUEL QUANTITY GAUGE | | | | | 1 | 1 |
| MISCELLANEOUS | | | | | | |
| POWERPLANT FAILURE FOR UNDETERMINED REASONS | 4 | | 4 | 8 | | 8 |
| DIRECT ENTRIES | | | | 1 | | 1 |
| REDUCTION GEAR ASSEMBLY | | | | | | |
| COMPRESSOR ASSEMBLY | | | | | | |
| CASTING | | | | 1 | | 1 |
| STATOR VANE | | | | 3 | | 3 |
| DISC, COMPRESSOR ROTOR | | | | 1 | | 1 |
| OTHER | | | | 2 | | 2 |
| COMBUSTION ASSEMBLY | | | | | | |
| TURBINE ASSEMBLY | | | | | | |
| SUPPORT, GUIDE VANE | | | | 1 | | 1 |
| BEARING, SHAFT | | | | 1 | | 1 |
| OTHER | | | | 1 | | 1 |
| ACCESSORY DRIVE ASSEMBLY | | | | | | |
| LUBRICATING SYSTEM | | | | | | |
| FUEL SYSTEM | | | | | | |
| FUEL CONTROL | | | | 1 | | 1 |
| OTHER | 1 | | 1 | 2 | | 2 |
| 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 | | | | | | |
| TACHOMETER | | | | 1 | | 1 |
| ENGINE INSTALLATION | | | | | | |
| SUBTOTAL | 7 | | 7 | 36 | 5 | 41 |

** SYSTEMS **

ELECTRICAL SYSTEM

SYSTEMS (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FATAL ACCIDENTS FACTOR | FATAL ACCIDENTS TOTAL | ALL ACCIDENTS CAUSE | ALL ACCIDENTS FACTOR | ALL ACCIDENTS TOTAL |
|---|---|---|---|---|---|---|
| BATTERIES | | | | | 1 | 1 |
| RELAYS AND WIRING | | | | | 1 | 1 |
| HYDRAULIC SYSTEM | | | | | | |
| HYDRAULIC PUMPS | | | | 1 | | 1 |
| HYDRAULIC MOTORS | | | | | 1 | 1 |
| FLIGHT CONTROL SYSTEMS | | | | | | |
| ELEVATOR AND ELEVATOR TAB CONTROL SYSTEM | 1 | | 1 | 1 | | 1 |
| ANTI-ICING, DE-ICING SYSTEMS | | | | | | |
| WING ANTI-ICING, DE-ICING SYSTEMS | | | | | 1 | 1 |
| CARBURETOR DE-ICING SYSTEM | | | | 1 | | 1 |
| AIR CONDITION, HEATING AND PRESSURIZATION | | | | | | |
| OTHER | | | | | 1 | 1 |
| AUTO PILOT | | | | | | |
| FIRE WARNING SYSTEM | | | | | | |
| FIRE EXTINGUISHER SYSTEM | | | | | | |
| OXYGEN SYSTEM | | | | | | |
| OTHER SYSTEMS | | | | | | |
| OTHER | | | | 1 | | 1 |
| SUBTOTAL | 1 | | 1 | 4 | 5 | 9 |
| ** ROTORCRAFT ** | | | | | | |
| ROTOR ASSEMBLIES | | | | | | |
| BEARINGS | | | | | 1 | 1 |
| TRANSMISSION ROTOR DRIVE SYSTEM | | | | | | |
| ENGINE DRIVE SHAFT | | | | 1 | | 1 |
| TAIL ROTOR DRIVE SHAFT ASSEMBLY | | | | 1 | | 1 |
| CLUTCH ASSEMBLY | | | | 1 | | 1 |
| FLIGHT CONTROL SYSTEMS | | | | | | |
| CYCLIC PITCH CONTROL SYSTEM | | | | 1 | | 1 |
| TAIL ROTOR PITCH CONTROL SYSTEM | | | | 1 | | 1 |
| MISCELLANEOUS UNITS AND ASSEMBLIES | | | | | | |
| EMERGENCY FLOTATION GEAR | | | | 2 | | 2 |
| TAIL BOOMS/PYLONS/CONES | | | | | 1 | 1 |
| SUBTOTAL | | | | 7 | 2 | 9 |
| ** AIRPORTS/AIRWAYS/FACILITIES ** | | | | | | |
| AIRPORT FACILITIES | | | | | | |
| TAXIWAY LIGHTING AND MARKING | | | | | 1 | 1 |
| OTHER | | | | | 1 | 1 |
| AIRPORT CONDITIONS | | | | | | |

AIRPORTS/AIRWAYS/FACILITIES (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| WET RUNWAY | | | | | 1 | 1 |
| ICE/SLUSH ON RUNWAY | | | | | 2 | 2 |
| SNOW ON RUNWAY | | | | | 1 | 1 |
| SNOW WINDROWS | | | | | 3 | 3 |
| UNMARKED OBSTRUCTIONS | | | | 1 | | 1 |
| SOFT SHOULDERS (RUNWAY) | | | | | 2 | 2 |
| HIGH VEGETATION | | | | | 1 | 1 |
| HIDDEN HAZARD | | | | | 1 | 1 |
| POORLY MAINTAINED RUNWAY SURFACE | | | | | 3 | 3 |
| SOFT RUNWAY | | | | | 2 | 2 |
| SNOW ON RAMP/TAXIWAY | | | | | 1 | 1 |
| OTHER | | | | 1 | 5 | 6 |
| AIRWAYS FACILITIES | | | | | | |
| SUBTOTAL | | | | 2 | 24 | 26 |
| ** WEATHER ** | | | | | | |
| LOW CEILING | 1 | 10 | 11 | 1 | 20 | 21 |
| RAIN | | 4 | 4 | | 7 | 7 |
| FOG | | 9 | 9 | | 18 | 18 |
| SNOW | | 4 | 4 | | 14 | 14 |
| HAIL | | | | | 1 | 1 |
| ICING CONDITIONS-INCLUDES SLEET, FREEZING RAIN, ETC | | 1 | 1 | | 5 | 5 |
| CONDITIONS CONDUCIVE TO CARB/INDUCTION SYSTEM ICING | | 1 | 1 | | 3 | 3 |
| UNFAVORABLE WIND CONDITIONS | | 2 | 2 | 1 | 13 | 14 |
| WIND SHEAR | 1 | 1 | 2 | 1 | 1 | 2 |
| SUDDEN WINDSHIFT | | | | | 1 | 1 |
| TURBULENCE ASSOCIATED WITH CLOUDS AND/OR THUNDERSTORMS | | 1 | 1 | | 3 | 3 |
| DOWNDRAFTS, UPDRAFTS | | 1 | 1 | | 3 | 3 |
| LOCAL WHIRLWIND | 1 | | 1 | 1 | | 1 |
| HIGH TEMPERATURE | | | | | 1 | 1 |
| OBSTRUCTIONS TO VISION | | 1 | 1 | | 4 | 4 |
| HIGH DENSITY ALTITUDE | | 4 | 4 | | 10 | 10 |
| THUNDERSTORM ACTIVITY | | 1 | 1 | | 3 | 3 |
| OTHER | | 1 | 1 | | 1 | 1 |
| SUBTOTAL | 3 | 41 | 44 | 4 | 108 | 112 |
| ** TERRAIN ** | | | | | | |
| WET, SOFT GROUND | | | | | 2 | 2 |
| SNOW-COVERED | | | | | 5 | 5 |
| ICY | | | | | 1 | 1 |

TERRAIN (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS CAUSE | FACTOR | TOTAL | ALL ACCIDENTS CAUSE | FACTOR | TOTAL |
|---|---|---|---|---|---|---|
| HIGH VEGETATION | | | | | 2 | 2 |
| HIDDEN OBSTRUCTIONS | | | | | 2 | 2 |
| ROUGH/UNEVEN | | 3 | 3 | | 13 | 13 |
| ROUGH WATER | | 1 | 1 | | 2 | 2 |
| GLASSY WATER | | 1 | 1 | | 3 | 3 |
| HIGH OBSTRUCTIONS | | | | | 7 | 7 |
| LOOSE GRAVEL | | | | | 1 | 1 |
| SANDY | | | | | 2 | 2 |
| OTHER | | | | | 3 | 3 |
| SUBTOTAL | | 5 | 5 | | 43 | 43 |
| ** MISCELLANEOUS ** | | | | | | |
| BIRD COLLISION | | | | 1 | | 1 |
| VORTEX TURBULENCE | | | | | 1 | 1 |
| EVASIVE MANEUVER TO AVOID COLLISION | | | | 1 | 1 | 2 |
| SMOKE IN COCKPIT | | | | | 1 | 1 |
| FOREIGN MATERIAL AFFECTING NORMAL OPERATIONS | | | | 1 | | 1 |
| UNDETERMINED | 2 | | 2 | 3 | | 3 |
| SUBTOTAL | 2 | | 2 | 6 | 3 | 9 |
| GRAND TOTAL | 63 | 60 | 123 | 251 | 220 | 471 |
| ** MISCELLANEOUS ACTS, CONDITIONS ** | | | | | | |
| ALTIMETER SETTING-INCORRECT | | 1 | 1 | | 1 | 1 |
| ANTI-ICING/DEICING EQUIP-IMPROPER OPER. OF/FAILED TO US | 1 | 1 | 2 | 2 | 1 | 3 |
| CHECKLIST-FAILED TO USE | | | | | 1 | 1 |
| IMPROPER EMERGENCY PROCEDURES | 2 | | 2 | 10 | | 10 |
| INSTRUCTIONS-MISINTERPRETED | | | | 1 | | 1 |
| INSTRUMENTS-MISREAD OR FAILED TO READ | | | | 1 | | 1 |
| NOT ALLIGNED WITH RUNWAY/INTENDED LANDING AREA | | | | 1 | | 1 |
| UNWARRANTED LOW FLYING | 1 | 1 | 2 | 1 | 2 | 3 |
| INATTENTIVE TO FUEL SUPPLY | | | | 1 | | 1 |
| FLEW INTO BLIND CANYON | 1 | 1 | 2 | 2 | 1 | 3 |
| POORLY PLANNED APPROACH | | | | 1 | | 1 |
| IMPROPERLY SECURED | | | | 2 | | 2 |
| ELECTRICAL FAILURE | | | | | 2 | 2 |
| FATIGUE FRACTURE | | | | 10 | | 10 |
| HYDRAULIC FAILURE | | | | | 1 | 1 |
| WINDSHIELD, DIRTY, FOGGY, ETC RESTRICTED VISION | | 1 | 1 | | 2 | 2 |

MISCELLANEOUS ACTS, CONDITIONS (CONTINUED)

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| WRONG PART | | | | 1 | | 1 |
| IMPROPER ALIGNMENT/ADJUSTMENT | | | | 1 | 1 | 2 |
| FAILURE OF TWO OR MORE ENGINES | | | | | 2 | 2 |
| SEPARATION IN FLIGHT | | | | | 1 | 1 |
| CARGO SHIFTED | | 1 | 1 | | 1 | 1 |
| PILOT FATIGUE | | 1 | 1 | | 1 | 1 |
| FUEL EXHAUSTION | | | | 2 | | 2 |
| ALCOHOLIC IMPAIRMENT OF EFFICIENCY AND JUDGMENT | | 1 | 1 | | 1 | 1 |
| ICE-ENGINE | | | | 1 | | 1 |
| ICE-CARBURETOR | 1 | | 1 | 2 | | 2 |
| AIRFRAME ICE | | 1 | 1 | | 5 | 5 |
| ICE-WINDSHIELD | | | | | 3 | 3 |
| IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR CG | 2 | 1 | 3 | 2 | 2 | 4 |
| INTERFERENCE WITH FLIGHT CONTROLS | | | | 2 | | 2 |
| WHITEOUT | | | | 1 | 2 | 3 |
| SUNGLARE | | 1 | 1 | | 2 | 2 |
| LACK OF LUBRICATION-SPECIFIC PART, NOT SYSTEM | | | | 3 | | 3 |
| WATER IN FUEL | | | | 1 | | 1 |
| AIRCRAFT CAME TO REST IN WATER | | 5 | 5 | | 21 | 21 |
| TOUCH AND GO LANDING | | | | | 1 | 1 |
| OVERLOAD FAILURE | | | | 3 | 4 | 7 |
| MATERIAL FAILURE | 1 | | 1 | 8 | 4 | 12 |
| FUEL STARVATION | 1 | | 1 | 3 | | 3 |
| POOR WELD | | | | 1 | | 1 |
| LEAK/LEAKAGE | 1 | | 1 | 2 | 1 | 3 |
| LOW FLUID LEVEL | | | | 1 | 1 | 2 |
| RUNWAY CLOSED | | 1 | 1 | | 1 | 1 |
| DOWNWIND | | | | | 5 | 5 |
| UNDER TORQUED | 1 | | 1 | 1 | | 1 |
| FEMALE PILOT | 1 | | 1 | 2 | | 2 |
| DISCONNECTED | | | | 2 | | 2 |
| EXCESSIVE-WEAR/PLAY | | | | 3 | 1 | 4 |
| ERRATIC | | | | | 1 | 1 |
| GROUNDED | | | | 1 | | 1 |
| IMPROPERLY INSTALLED | 1 | | 1 | 3 | | 3 |
| JAMMED | | | | 1 | | 1 |
| OBSTRUCTED | | | | 3 | | 3 |
| SHEARED | | | | 1 | | 1 |
| VIBRATION, EXCESSIVE | | | | | 1 | 1 |
| WARPED | | | | 1 | | 1 |
| FIRE IN WING | | | | | 1 | 1 |
| INTENTIONAL WHEELS UP | | | | 2 | 1 | 3 |
| RAN OFF END OF RUNWAY | | | | | 4 | 4 |

CAUSE/FACTOR TABLE - NONSCHEDULED 14 CFR 135 ACCIDENTS - 1981

| DETAILED CAUSE/FACTOR | FATAL ACCIDENTS | | | ALL ACCIDENTS | | |
|---|---|---|---|---|---|---|
| | CAUSE | FACTOR | TOTAL | CAUSE | FACTOR | TOTAL |
| DIRECT ENTRY CAUSES | | | | | | |
| PWR PLT-3RD STAGE STATOR VANES ERODED. | | | | | | |
| PILOT-INACCURATE POSITION REPORT | | | | | | |
| PILOT-FAILED TO ACTIVATE MARKER BEACON RECEIVER | | | | | | |

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