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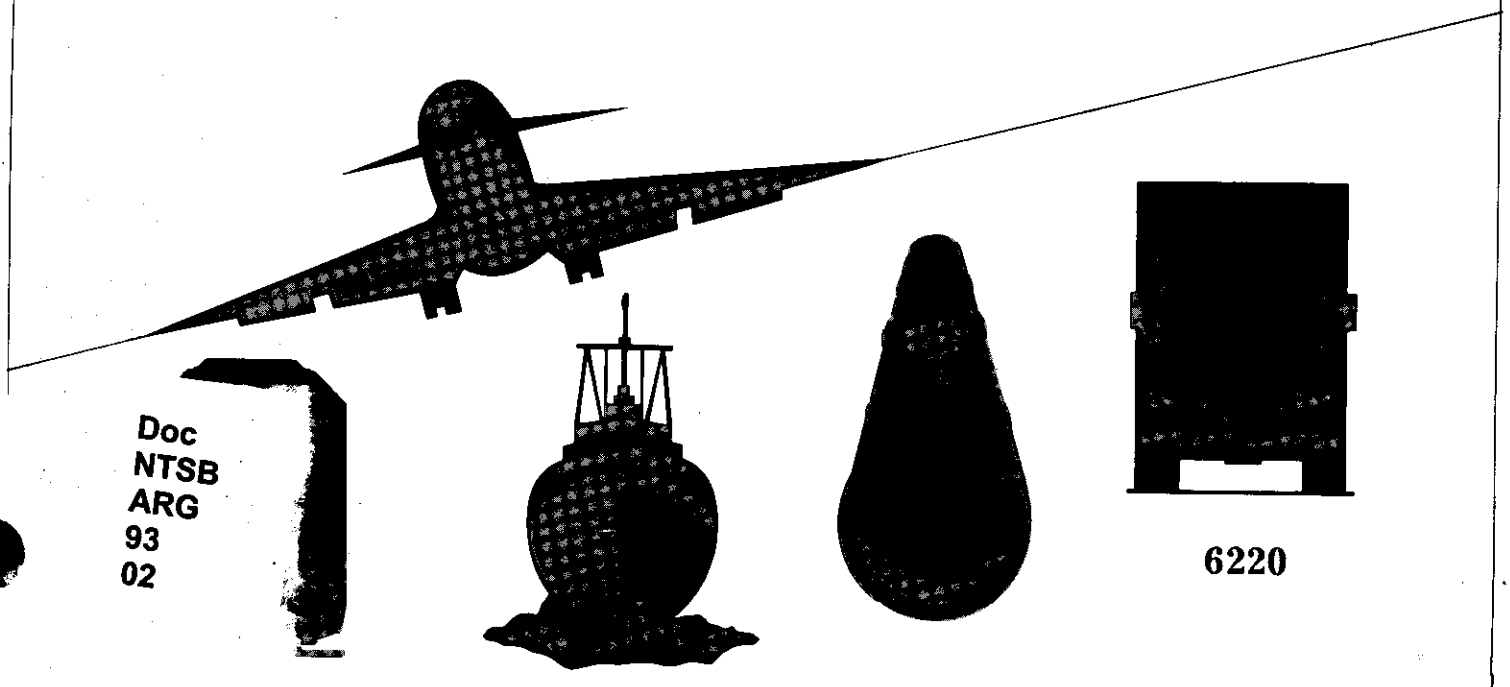
NTSB/ARG-93/02

[IONAL TRANSPORTATION SAFETY BOARD

ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA

U.S. GENERAL AVIATION
CALENDAR YEAR 1990



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16. Abstract

This report presents a statistical compilation and review of general aviation accidents which occurred in 1990 in the United States, its territories and possessions, and in international waters. The accidents reported are all those involving U.S. registered aircraft not conducting operations under 14 CFR 121, 14 CFR 125, 14 CFR 127, or 14 CFR 135.

This report is divided into five sections: All Accidents; Fatal Accidents; Serious Injury Accidents; Property Damage Accidents and Midair Collision Accidents. Several tables present accident parameters for 1990 accidents only, and each section includes tabulations which present comparative statisticscs for 1990 and for the five-year period 1985-1989.

17. Key Words General Aviation, Accident, Accident Rates, Rotorcraft, Glider, Personal, Business, Corporate/Executive, Aerial Application, Instructional		18. Distribution Statement	
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INTRODUCTION

In 1990, a total of 2,240 U.S. registered general aviation aircraft were involved in 2,214 accidents.[1] This report presents a statistical compilation and review of those accidents, all involving U.S. registered aircraft not conducting air carrier revenue operations under 14 CFR 121, 14 CFR 125. 14 CFR 127, or 14 CFR 135.

The total number of accidents in 1990 decreased by about one percent from 1989. The number of fatal accidents increased by 2.5 percent from the 1989 total, with a 0.3 percent decrease in the number of fatalities from 1989. The 1990 total accident rate decreased 2.6 percent from the 1989 rate with a slight decrease of 1.3 percent in the fatal accident rate.

The lowest accident rates (total and fatal) among aircraft types were recorded for turbojet airplanes (1.38 total accidents and 0.76 fatal accidents per 100,000 hours flown). The highest total accident rate was for reciprocating engine powered rotorcraft (19.14 accidents per 100,000 hours flown). Reciprocating engine powered rotorcraft also had the highest fatal accident rate among the aircraft types (2.29 fatal accidents per 100,000 hours flown).

Safety Board reports also specify the purpose of the accident flight. The highest accident rates recorded (total and fatal) were for personal/business purposes. During 1990, 68.4 percent of aircraft involved in general aviation accidents and 75.6 percent of aircraft involved in fatal accidents were operating in the personal/business category.

In 1990, 37 percent of the total accidents occurred during the approach or landing phase of flight. Twenty-one percent of fatal accidents occurred during these phases of flight. Takeoff accidents accounted for 22 percent of the year's total and 18 percent of the fatal accidents.

The pilot was cited as causing or contributing to the cause of 87 percent of the fatal

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[1] Since a collision between aircraft is counted as one accident for the purposes of this report, and since there were 18 accidents in which two general aviation aircraft collided in the air and 8 on the ground, the number of accidents in 1990 was 2,214.

general aviation accidents in 1990, while weather conditions were a factor in approximately 26 percent of fatal accidents. The incidence of pilot error and weather was somewhat lower among total accidents - 80 percent and 22 percent respectively. Note that multiple causes and related factors may be cited in any given accident. This should be taken into account in any interpretation of the tabulations involving accident causes/factors.

Accident data upon which this review is based have been extracted from the Safety Board's automated Aviation Accident System. Flight hours used for computing accident rates were estimated using data provided by the Federal Aviation Administration.

The review is divided into five sections. The first section presents a wide range of information on all general aviation accidents, including historical comparison data for similar types of aircraft, and aircraft being operated for particular purposes. The four remaining sections contain information on fatal accidents, serious injury accidents, property damage accidents and midair collision accidents, respectively. Tables that list occurrences or phase of operation are based on the first in the accident sequence. Appendix A provides an explanation of terms used in this report. Appendix B contains a tabulation of cause and factor assignments for all 1990 accidents. Appendix C is a copy of NTSB Form 6120.4 (Factual Aviation Accident/Incident Report Form), the source of data upon which this review is based.

Table 1 - SUMMARY OF LOSSES
ALL OPERATIONS
1986 - 1990

	1986	1987	1988	1989	1990
Accidents					
Fatal	474	447	460	431	442
Involved Serious Injury	317	290	296	245	242
Involved Minor Injury	404	361	392	365	333
Involved No Injury	1387	1396	1238	1189	1197
Total	2582	2494	2386	2230	2214
Fatalities					
Passenger	395	353	315	312	303
Crew	483	470	475	453	458
Other Persons	89	15	10	3	5
Total	967	838	800	768	766
Aircraft Damage*					
Destroyed	748	689	683	615	613
Substantial	1832	1798	1703	1617	1595
Minor	17	22	17	14	14
None	18	12	12	12	18
Total	2615	2521	2415	2258	2240

*Number of General Aviation Aircraft

Table 2 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES ABOARD, AND RATES
BY TYPE OF AIRCRAFT AND BY KIND OF FLYING
ALL OPERATIONS
1990

Type of Aircraft	Accidents	Fatal Accidents	Fatalities Aboard	Accident Rate per 100,000 Aircraft Hours Flown	
				Total	Fatal
Fixed Wing	1954	408	721	7.34	1.53
Single Recip. Engine	1755	351	594	8.23	1.65
Multiple Recip. Engine	144	35	77	5.14	1.25
Turboprop	38	13	28	3.17	1.08
Turbojet	18	10	22	1.38	0.76
Rotorcraft	194	25	27	12.13	1.56
Recip. Engine(s)	134	16	19	19.14	2.29
Turbine Powered	61	9	8	7.63	1.13
Gliders	40	5	5	N/A	N/A
Balloons	26	4	8	N/A	N/A
Kind of Flying					
Personal	1366	294	499	11.05*	2.44*
Business	149	40	78		
Corporate/Executive	15	5	21	0.51	0.17
Aerial Application	152	16	17	8.12	0.85
Instructional	314	33	56	4.33	0.46
All Aircraft	2214	442	761	7.76	1.55

* The accident rate per 100,000 flying hours is presented for the combination of personal flying and business flying and not for each category separately. The NTSB has previously stated its objections to presenting separate rates until exposure date are available which depict a more credible division of flying hours between the two categories.

Table 3 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
ALL OPERATIONS
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	3500	654	1282	1261	36,803,000	9.51	1.78
1982	3233	591	1187	1170	29,640,000	10.90	1.99
1983	3077	556	1069	1062	28,673,000	10.73	1.94
1984	3016	545	1042	1021	29,099,000	10.35	1.87
1985	2738	498	955	944	28,322,000	9.66	1.75
1986	2582	474	967	878	27,073,000	9.54	1.75
1987	2494	447	838	823	26,972,000	9.24	1.65
1988	2386	460	800	792	27,446,000	8.69	1.68
1989	2230	431	768	765	27,920,000	7.97	1.53
1990	2214	442	766	761	28,510,000	7.76	1.55

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (3), 1983 (1), 1984 (3), 1985 (3), 1987 (1), 1988 (1), 1989 (5), 1990 (1)
Fatal - 1984 (2), 1985 (2), 1987 (1), 1989 (4)

Figure 1 - ACCIDENTS PER 100,000 HOURS FLOWN
ALL OPERATIONS

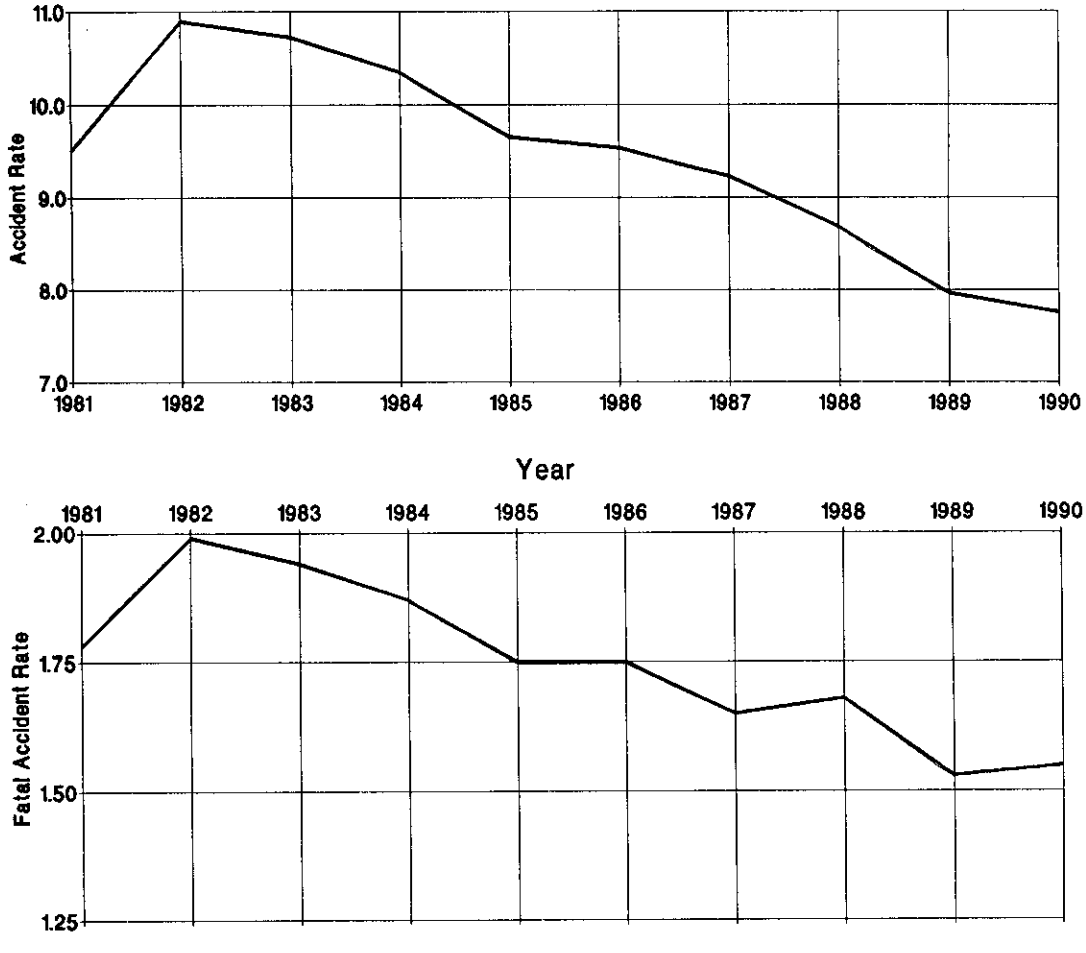

Table 4 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
ALL FIXED WING AIRCRAFT
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	3161	610	1208	1190	34,113,000	9.27	1.79
1982	2886	540	1106	1095	27,800,000	10.37	1.94
1983	2735	505	997	992	26,800,000	10.20	1.88
1984	2702	498	972	953	27,400,000	9.85	1.81
1985	2465	455	897	888	26,300,000	9.36	1.72
1986	2301	427	903	807	25,100,000	9.17	1.70
1987	2248	412	787	771	25,200,000	8.92	1.63
1988	2110	419	745	737	25,000,000	8.44	1.68
1989	1998	396	718	714	25,900,000	7.69	1.51
1990	1954	408	725	721	26,600,000	7.34	1.53

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (2), 1983 (1), 1984 (3), 1985 (3), 1987 (1), 1988 (1), 1989 (5), 1990 (1)
Fatal - 1984 (2), 1985 (2), 1987 (1), 1989 (4)

Figure 2 - ACCIDENTS PER 100,000 HOURS FLOWN
ALL FIXED WING AIRCRAFT

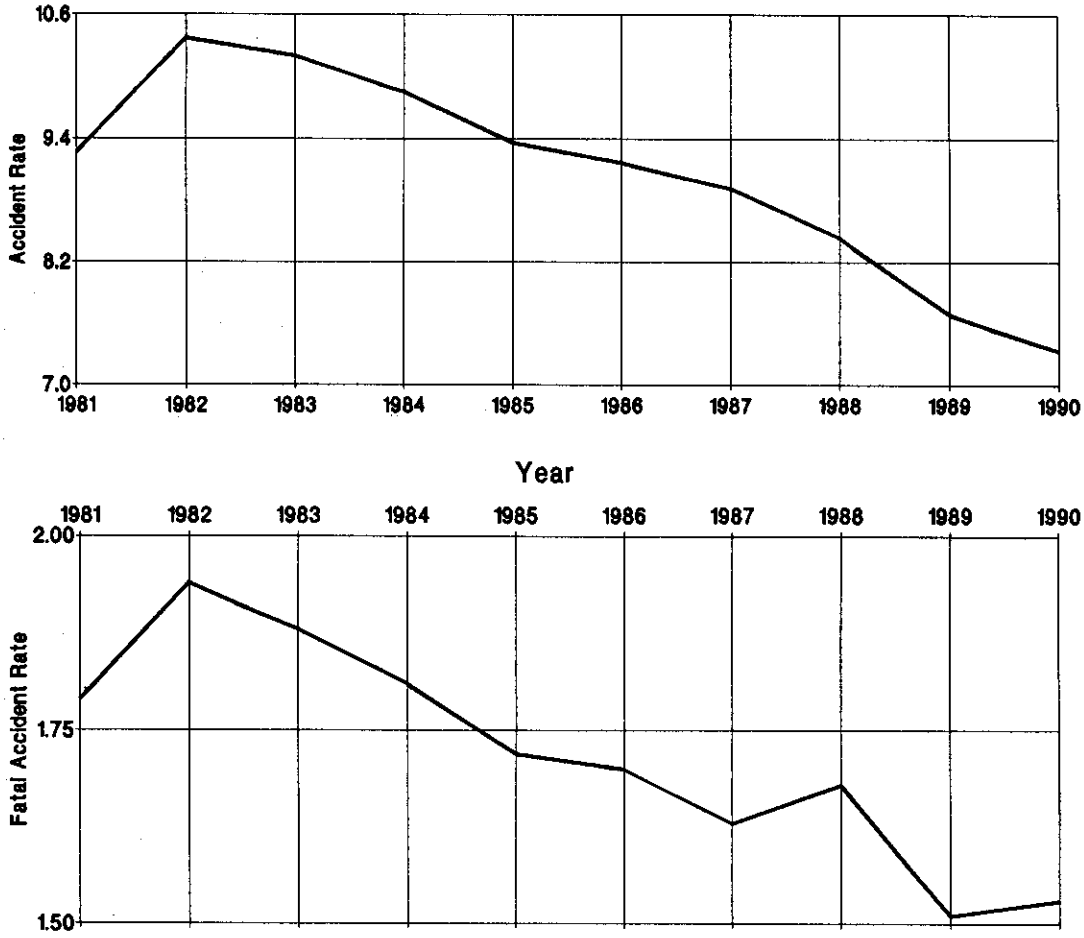

Table 5 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
FIXED WING AIRCRAFT - SINGLE RECIPROCATING ENGINE
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	2819	496	918	906	26,347,000	10.70	1.88
1982	2459	456	863	848	21,500,000	11.43	2.12
1983	2449	421	780	772	20,500,000	11.94	2.05
1984	2395	406	767	750	21,100,000	11.34	1.91
1985	2180	368	677	667	20,300,000	10.73	1.81
1986	2069	359	715	625	19,300,000	10.72	1.86
1987	2017	348	632	614	19,600,000	10.29	1.77
1988	1932	343	594	589	19,600,000	9.85	1.75
1989	1812	339	592	586	19,900,000	9.09	1.68
1990	1755	351	599	594	21,300,000	8.23	1.65

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (1), 1983 (1), 1984 (3), 1985 (2), 1987 (1), 1988 (1), 1989 (4), 1990 (1)
Fatal - 1984 (2), 1985 (1), 1987 (1), 1989 (4)

Figure 3 - ACCIDENTS PER 100,000 HOURS FLOWN
FIXED WING AIRCRAFT - SINGLE RECIPROCATING ENGINE

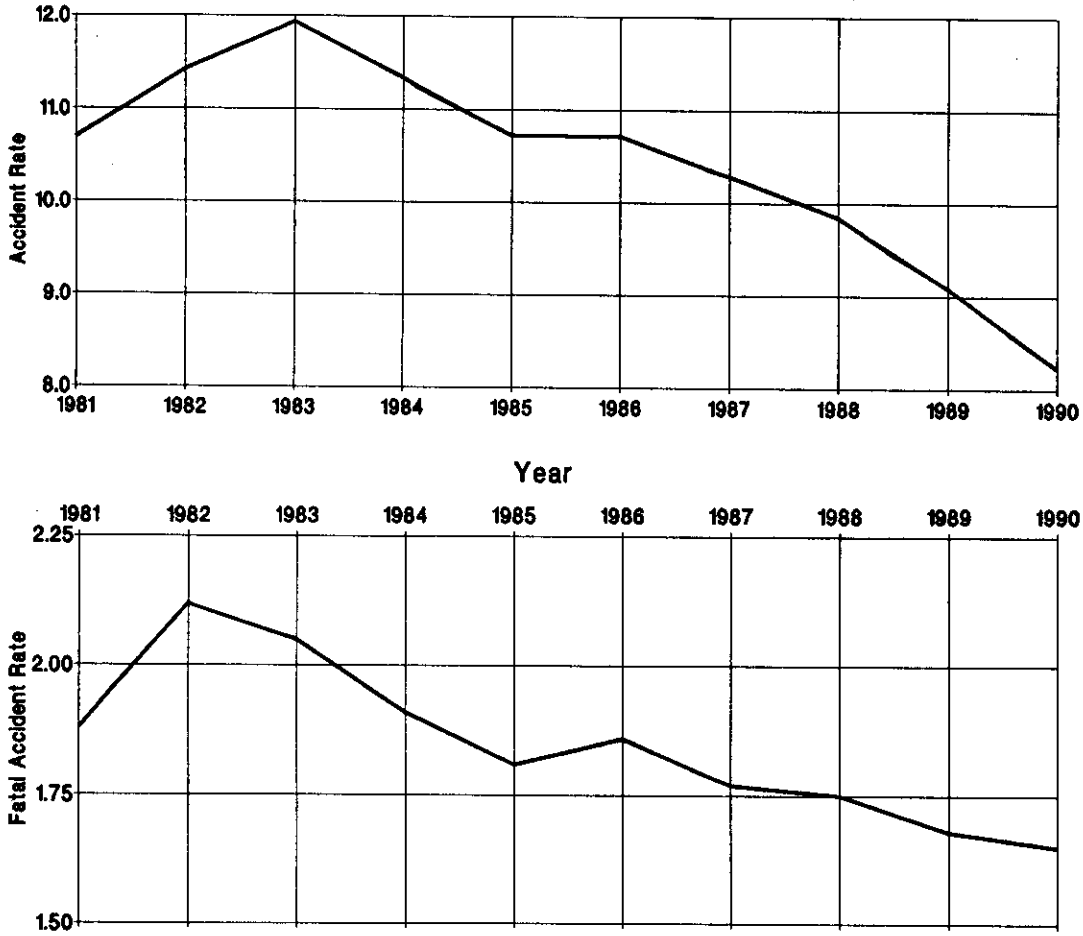

Table 6 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
FIXED WING AIRCRAFT - MULTIPLE RECIPROCATING ENGINE
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	289	94	220	218	4,833,000	5.98	1.94
1982	343	88	254	247	3,800,000	9.00	2.32
1983	244	74	193	188	3,500,000	6.97	2.11
1984	259	76	168	166	3,600,000	7.19	2.11
1985	230	68	164	160	3,300,000	6.94	2.03
1986	190	54	122	121	3,200,000	5.94	1.69
1987	194	51	124	118	3,100,000	6.26	1.65
1988	151	63	124	119	2,700,000	5.59	2.33
1989	145	42	91	90	3,000,000	4.80	1.40
1990	144	35	78	77	2,800,000	5.14	1.25

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (1), 1985 (1), 1989 (1)
Fatal - 1985 (1)

Figure 4 - ACCIDENTS PER 100,000 HOURS FLOWN
FIXED WING AIRCRAFT - MULTIPLE RECIPROCATING ENGINE

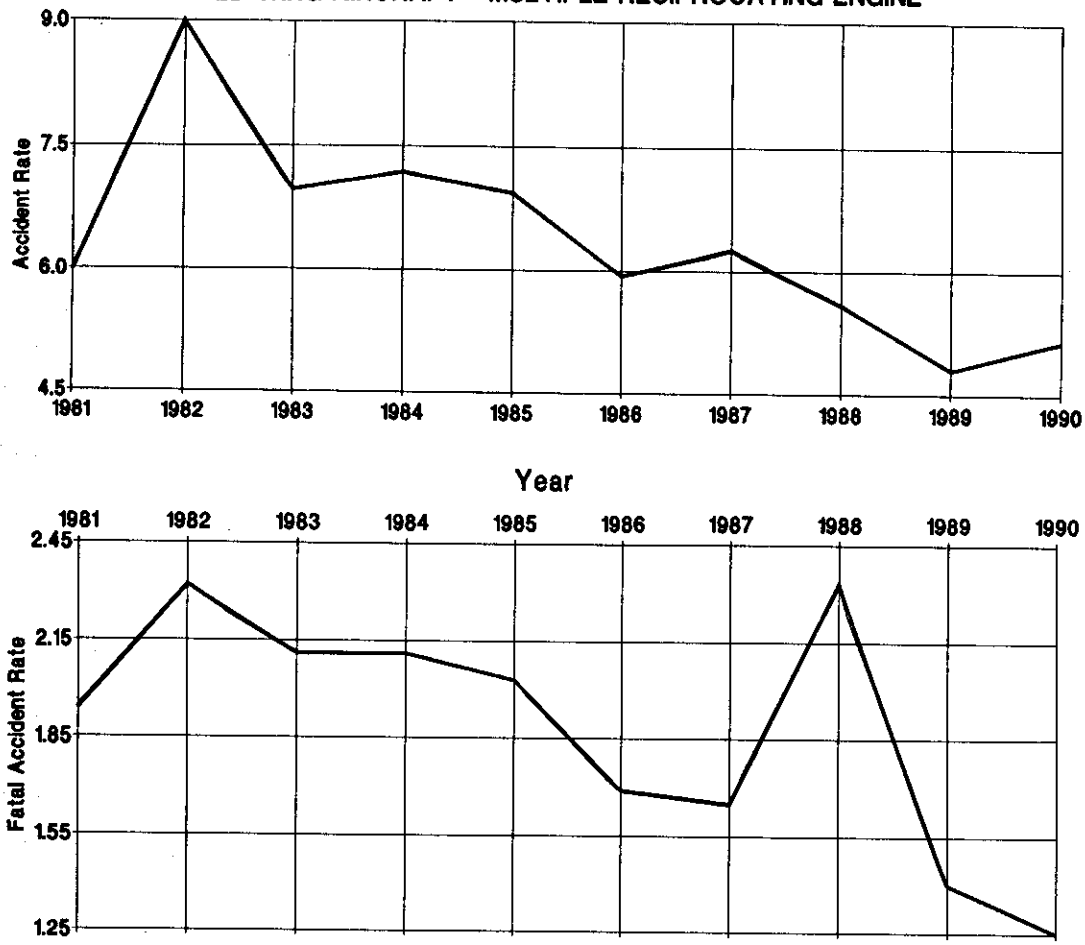

Table 7 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
FIXED WING AIRCRAFT - TURBOPROP
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	49	17	61	48	1,606,000	3.05	1.06
1982	37	9	37	33	1,400,000	2.64	0.64
1983	33	11	27	26	1,400,000	2.36	0.79
1984	38	11	22	22	1,600,000	2.38	0.69
1985	46	17	55	51	1,300,000	3.53	1.30
1986	31	12	57	51	1,300,000	2.38	0.92
1987	33	10	28	27	1,300,000	2.54	0.77
1988	24	10	19	19	1,400,000	1.71	0.71
1989	35	15	37	34	1,600,000	2.19	0.94
1990	38	13	29	28	1,200,000	3.17	1.08

Figure 5 - ACCIDENTS PER 100,000 HOURS FLOWN
FIXED WING AIRCRAFT - TURBOPROP

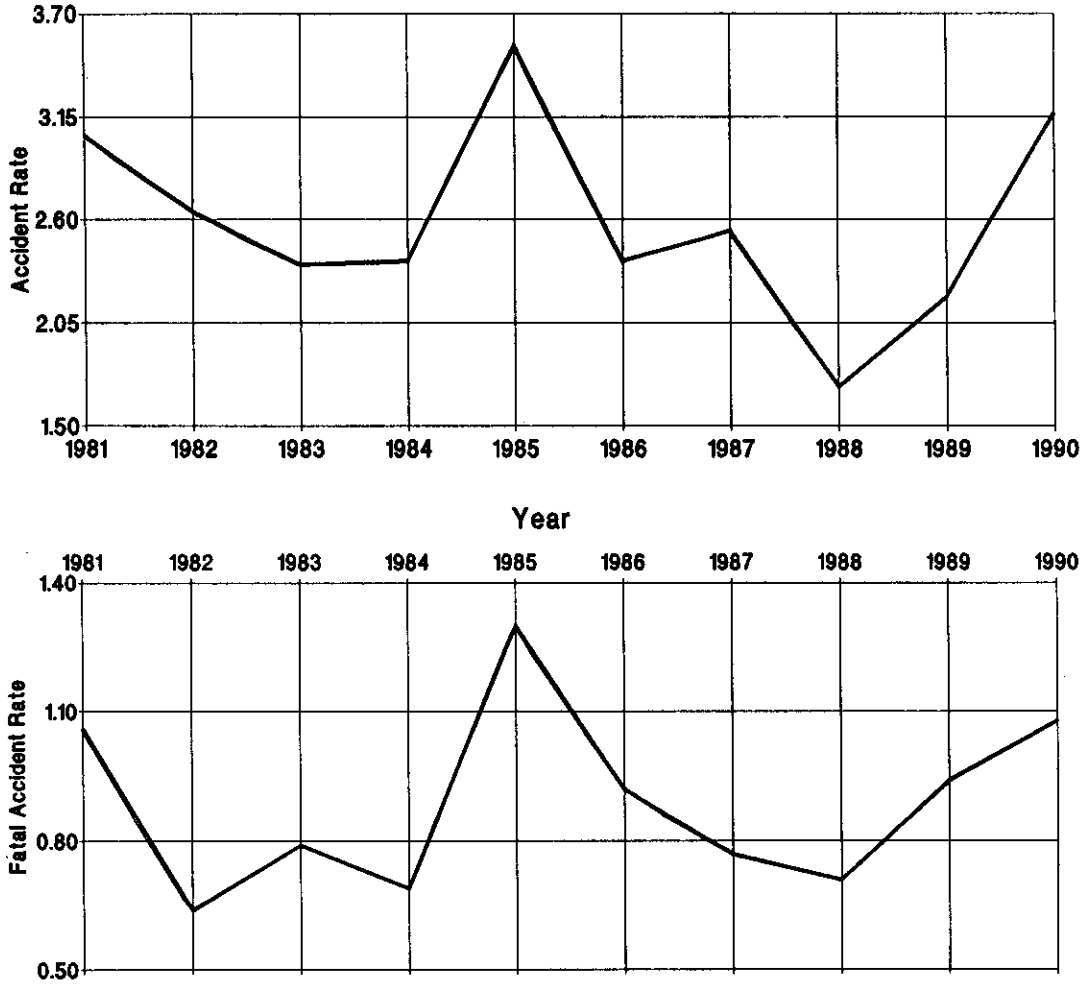

Table 8 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
FIXED WING AIRCRAFT - TURBOJET
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	7	4	17	17	1,318,000	0.53	0.30
1982	9	1	4	4	1,300,000	0.69	0.08
1983	13	3	8	6	1,400,000	0.93	0.21
1984	13	5	15	15	1,200,000	1.08	0.42
1985	16	5	15	10	1,400,000	1.14	0.36
1986	13	3	10	10	1,400,000	0.93	0.21
1987	10	6	12	12	1,200,000	0.83	0.50
1988	7	4	10	10	1,400,000	0.50	0.29
1989	9	2	4	4	1,400,000	0.64	0.14
1990	18	10	22	22	1,300,000	1.38	0.76

Figure 6 - ACCIDENTS PER 100,000 HOURS FLOWN
FIXED WING AIRCRAFT - TURBOJET

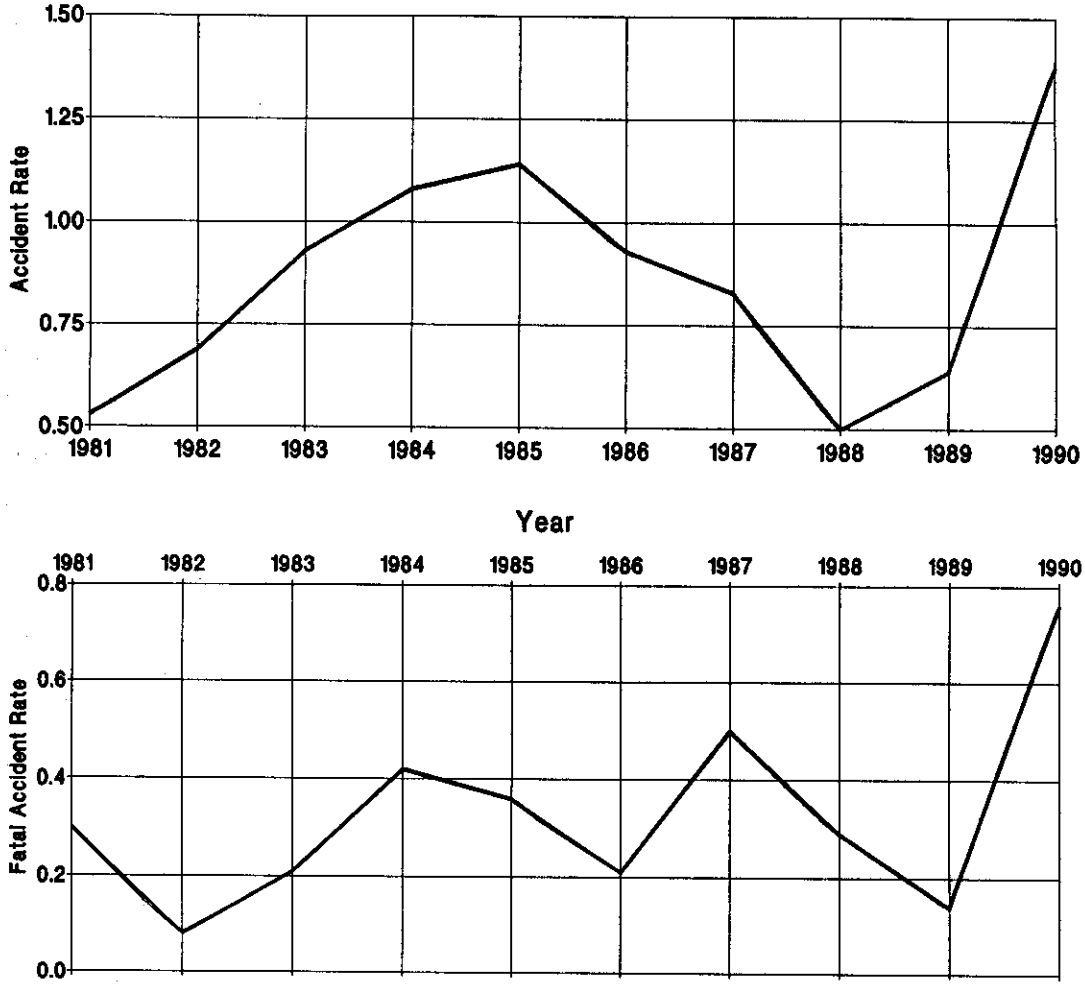

Table 9 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
ALL ROTORCRAFT
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities Total	Fatalities Aboard Aircraft In This Category	Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown Total	Accident Rate per 100,000* Aircraft Hours Flown Fatal
1981	257	30	55	52	2,303,000	11.16	1.30
1982	255	41	66	62	1,600,000	15.88	2.56
1983	234	35	55	53	1,700,000	13.76	2.06
1984	224	38	61	59	1,500,000	14.93	2.53
1985	205	36	50	47	1,700,000	12.06	2.12
1986	190	39	81	59	1,600,000	11.88	2.44
1987	180	28	44	44	1,300,000	13.85	2.15
1988	179	21	27	27	1,800,000	9.94	1.17
1989	186	30	44	41	1,700,000	10.94	1.76
1990	194	25	28	27	1,600,000	12.13	1.56

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (1)
Fatal - None

Figure 7 - ACCIDENTS PER 100,000 HOURS FLOWN ALL ROTORCRAFT

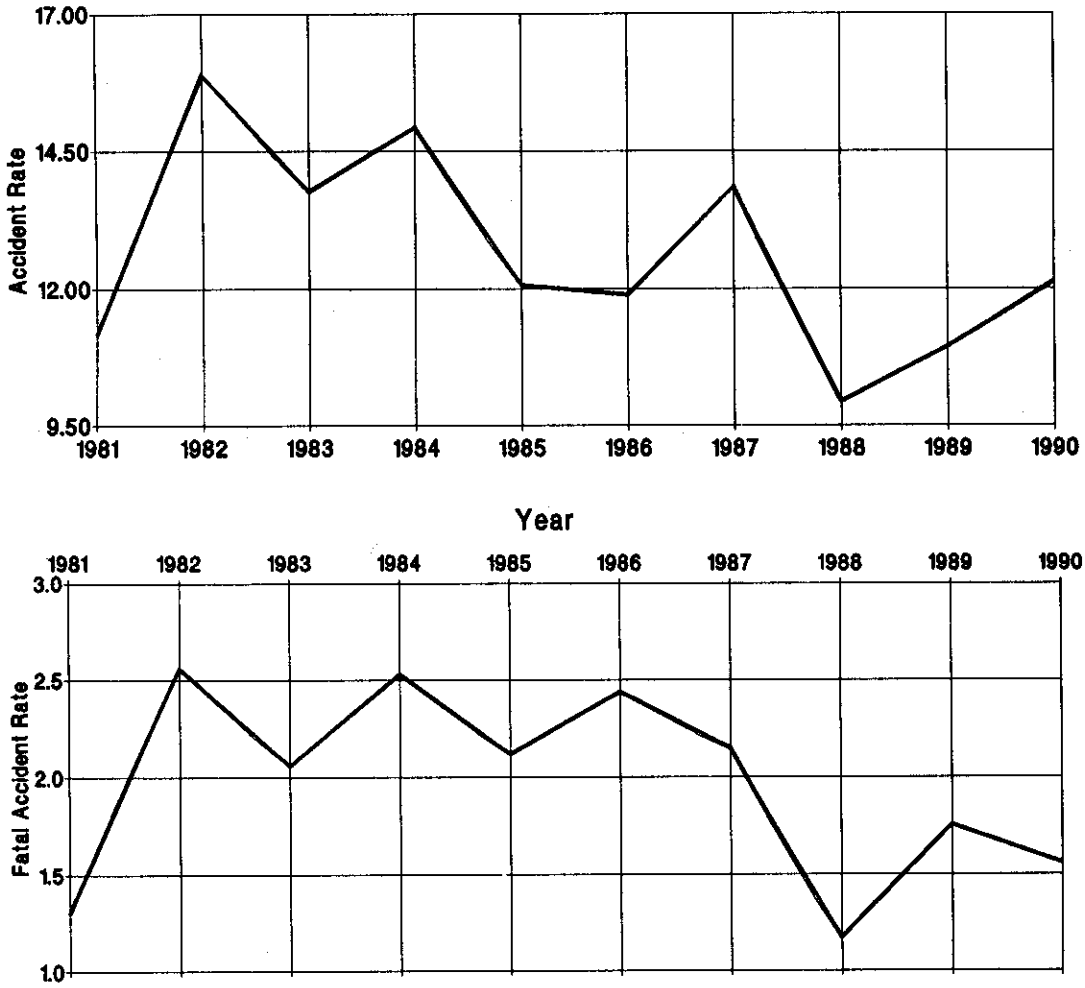

Table 10 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
ROTORCRAFT - RECIPROCATING ENGINE(S)
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	178	21	32	29	878,000	20.27	2.39
1982	157	20	24	24	600,000	26.00	3.33
1983	139	18	22	22	600,000	23.17	3.00
1984	128	22	29	28	500,000	25.60	4.40
1985	118	12	14	13	600,000	19.67	2.00
1986	118	21	24	22	700,000	16.85	3.00
1987	117	18	25	25	600,000	19.50	3.00
1988	118	17	21	21	600,000	19.67	2.83
1989	121	14	18	17	600,000	20.17	2.33
1990	134	16	19	19	700,000	19.14	2.29

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (1)
Fatal - None

Figure 8 - ACCIDENTS PER 100,000 HOURS FLOWN
ROTORCRAFT - RECIPROCATING ENGINE(S)

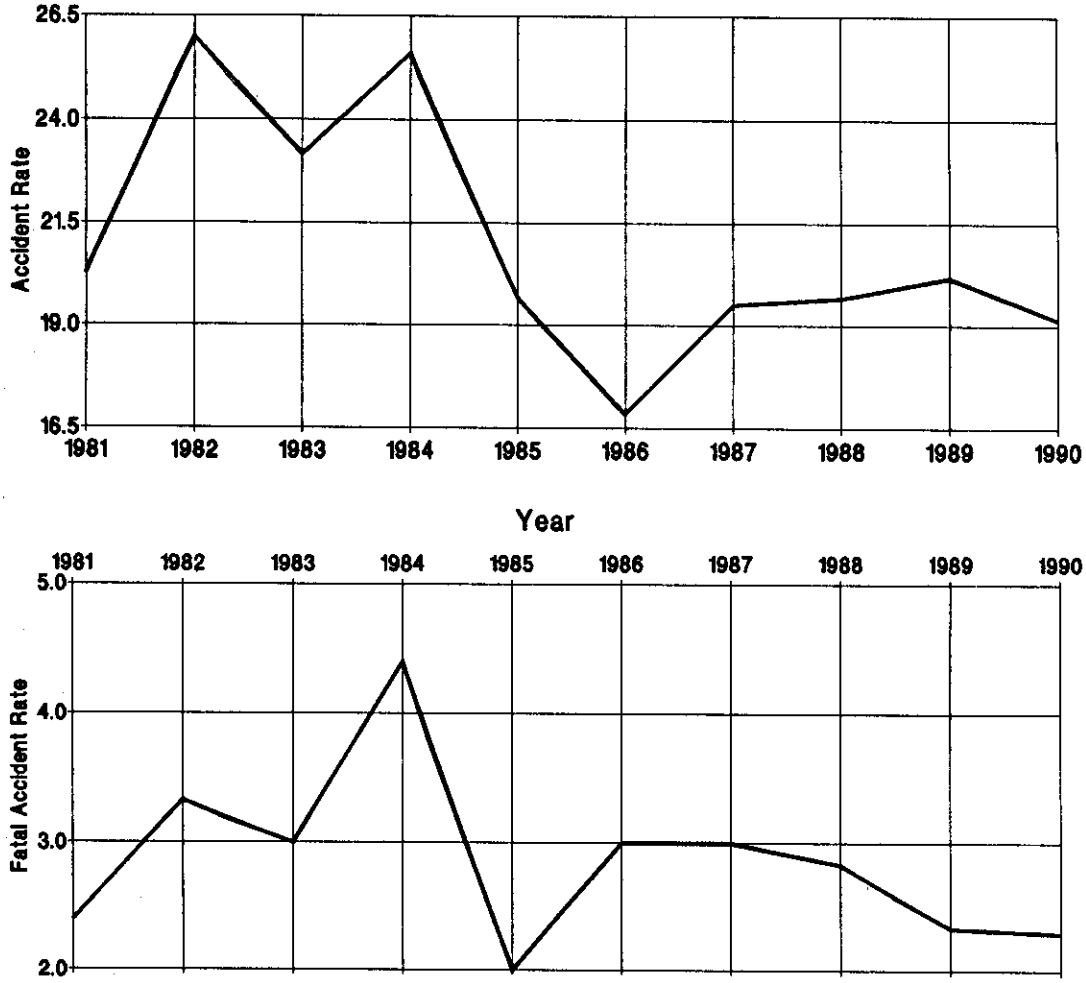

Table 11 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
ROTORCRAFT - TURBINE POWERED
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	79	9	23	23	1,424,000	5.55	0.63
1982	98	21	42	38	1,000,000	9.80	2.10
1983	95	17	33	31	1,100,000	8.64	1.55
1984	96	16	32	31	900,000	10.67	1.78
1985	87	24	36	34	1,100,000	7.91	2.18
1986	72	18	57	37	800,000	9.00	2.25
1987	63	10	19	19	600,000	10.50	1.67
1988	61	4	6	6	1,300,000	4.69	0.31
1989	65	16	26	24	1,000,000	6.50	1.60
1990	61	9	9	8	800,000	7.63	1.13

Figure 9 - ACCIDENTS PER 100,000 HOURS FLOWN
ROTORCRAFT - TURBINE POWERED

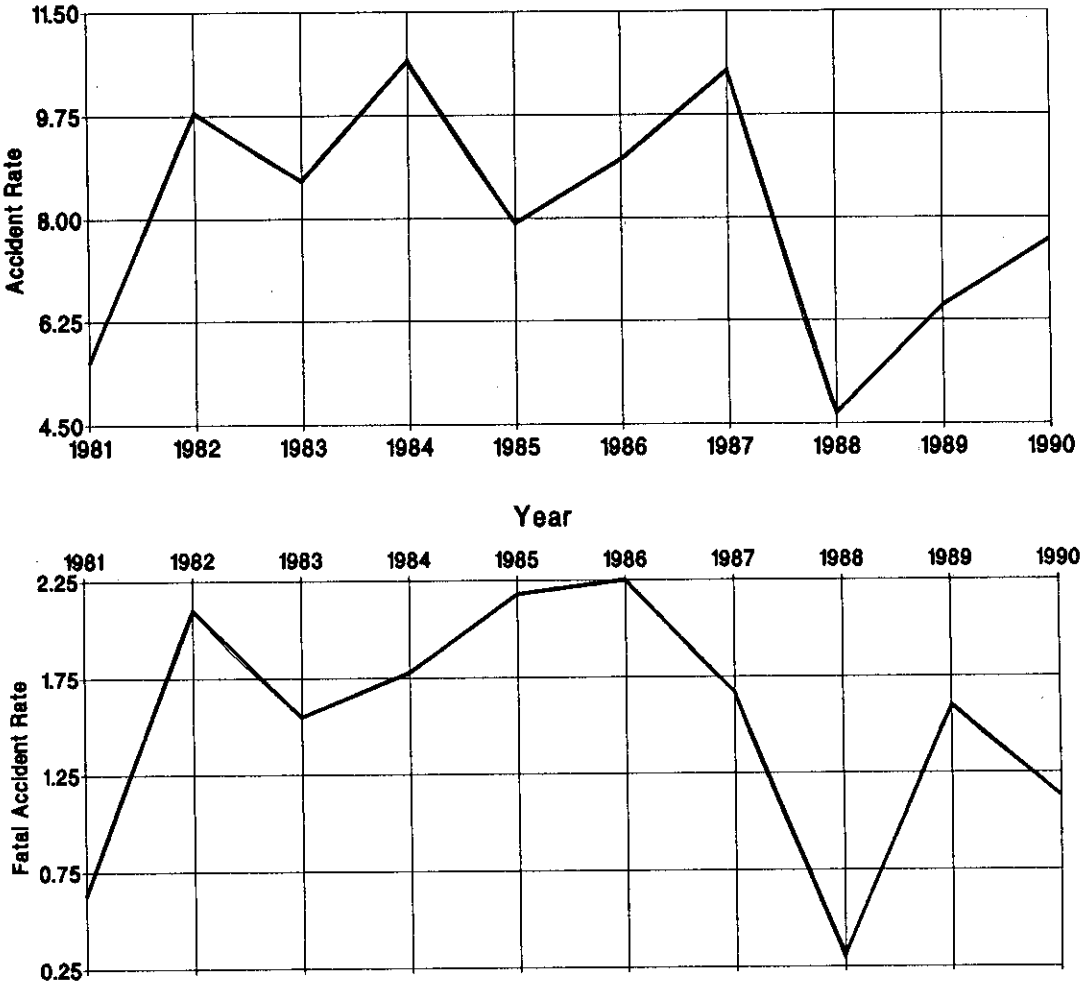

Table 12 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
PERSONAL AND BUSINESS FLYING COMBINED
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	2220	456	892	883	18,323,000	12.12	2.49
1982	2185	469	975	961	16,584,000	13.17	2.82
1983	2166	450	889	884	15,676,000	13.81	2.87
1984	2158	442	870	865	16,537,000	13.04	2.67
1985	2001	391	762	751	13,784,000	14.50	2.83
1986	1836	387	821	722	14,768,000	12.43	2.62
1987	1772	351	669	665	15,237,000	11.62	2.30
1988	1678	373	673	663	14,609,000	11.49	2.55
1989	1514	315	595	586	13,867,000	10.89	2.24
1990	1514	334	584	577	13,693,000	11.05	2.44

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1984 (3), 1985 (2), 1987 (1), 1989 (4), 1990 (1)
Fatal - 1984 (2), 1985 (1), 1987 (1), 1989 (4)

Figure 10 - ACCIDENTS PER 100,000 HOURS FLOWN
PERSONAL AND BUSINESS FLYING COMBINED

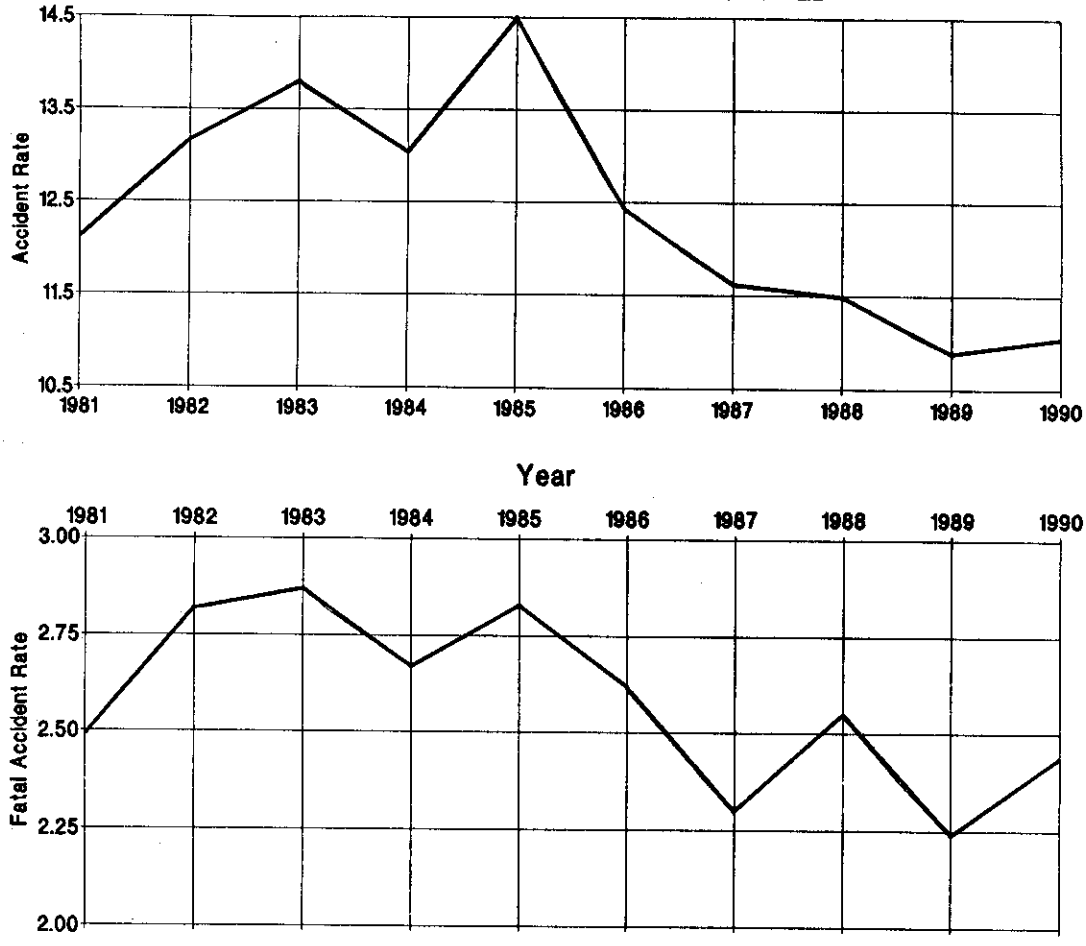

Table 13 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
CORPORATE/EXECUTIVE FLYING
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	84	30	99	99	6,209,000	1.35	0.48
1982	39	6	21	20	4,998,000	0.78	0.12
1983	39	6	23	23	5,253,000	0.74	0.11
1984	25	4	8	8	4,788,000	0.52	0.08
1985	37	13	37	32	3,857,000	0.96	0.34
1986	20	3	11	11	3,491,000	0.57	0.09
1987	19	4	10	7	3,143,000	0.60	0.13
1988	10	2	3	3	3,472,000	0.29	0.06
1989	11	4	15	15	3,453,000	0.32	0.12
1990	15	5	21	21	2,913,000	0.51	0.17

Figure 11 - ACCIDENTS PER 100,000 HOURS FLOWN
CORPORATE/EXECUTIVE FLYING

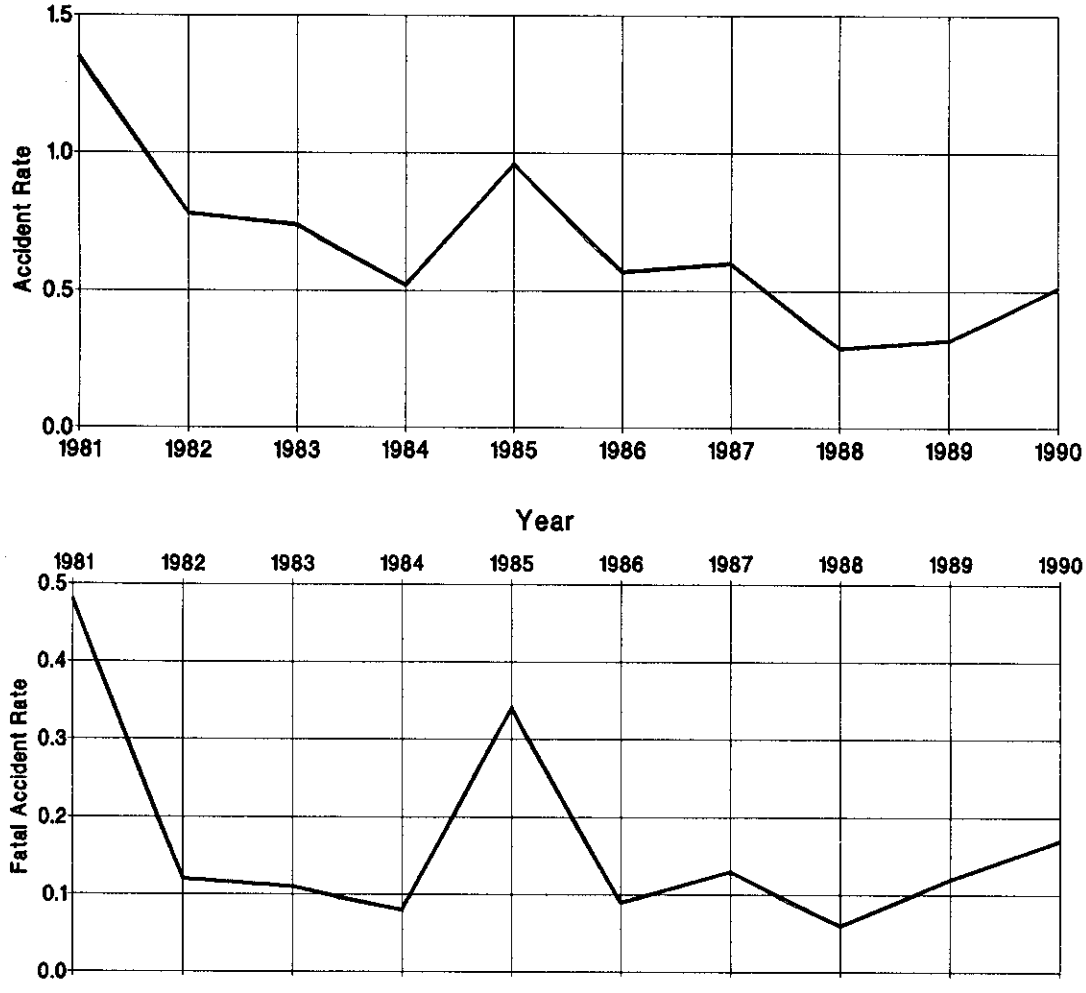

Table 14 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
AERIAL APPLICATION FLYING
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	378	30	36	34	2,466,000	15.33	1.22
1982	272	17	18	15	2,058,000	13.22	0.83
1983	254	15	15	15	1,774,000	14.32	0.85
1984	245	20	21	20	2,022,000	12.12	0.99
1985	167	9	9	9	2,002,000	8.34	0.45
1986	193	19	22	20	1,833,000	10.53	1.04
1987	175	11	11	10	1,538,000	11.38	0.72
1988	170	12	13	13	1,842,000	9.23	0.65
1989	158	24	25	24	1,868,000	8.46	1.28
1990	152	16	17	17	1,872,000	8.12	0.85

Figure 12 - ACCIDENTS PER 100,000 HOURS FLOWN AERIAL APPLICATION

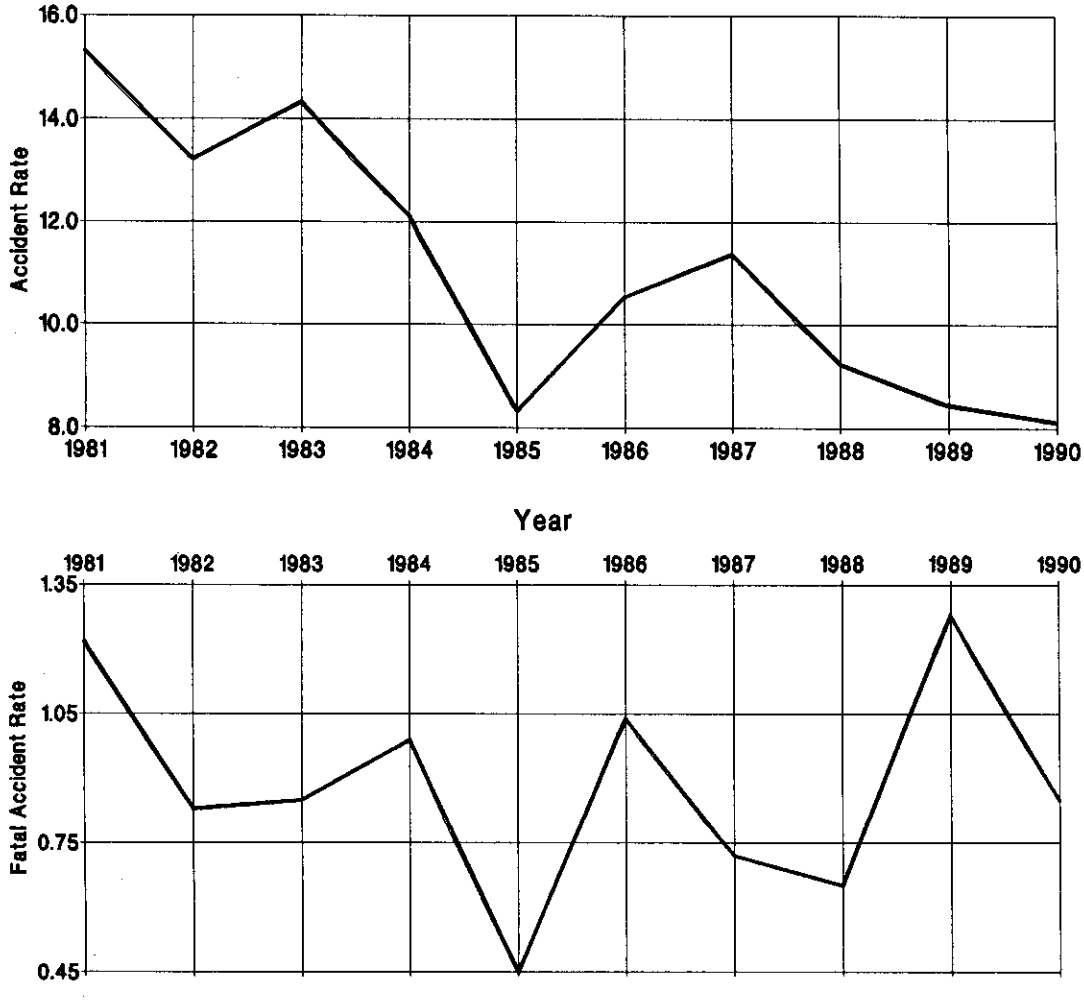

Table 15 - ACCIDENTS, FATAL ACCIDENTS, FATALITIES, AND RATES
INSTRUCTIONAL FLYING
1981 - 1990

Year	Accidents	Fatal Accidents	Fatalities		Hours Flown	Accident Rate per 100,000* Aircraft Hours Flown	
			Total	Aboard Aircraft In This Category		Total	Fatal
1981	428	40	70	63	7,104,000	6.02	0.56
1982	411	22	38	36	4,393,000	8.30	0.45
1983	379	26	41	40	5,820,000	6.51	0.45
1984	354	25	54	37	5,694,000	6.21	0.44
1985	314	27	52	40	3,938,000	7.97	0.69
1986	314	23	41	37	4,677,000	6.71	0.49
1987	342	33	72	61	4,529,000	7.55	0.73
1988	336	32	49	47	4,917,000	6.81	0.65
1989	306	28	50	43	5,993,000	5.11	0.47
1990	314	33	62	56	7,244,000	4.33	0.46

* Suicide and sabotage accidents excluded from rates as follows :
Total - 1982 (1), 1988 (1)
Fatal - None

Figure 13 - ACCIDENTS PER 100,000 HOURS FLOWN
INSTRUCTIONAL

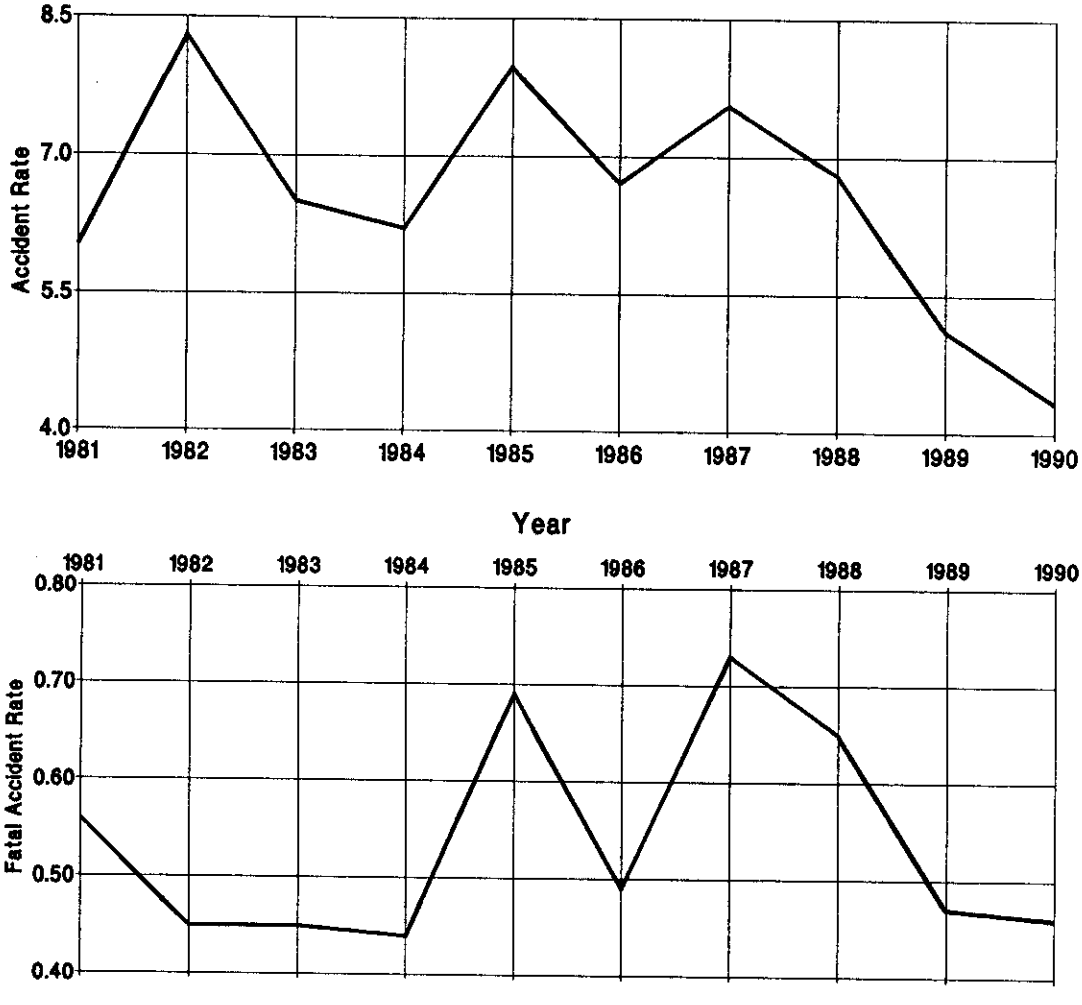

Table 16 - ACCIDENTS, FATAL ACCIDENTS AND FATALITIES
GLIDERS
1981 - 1990

Year	Accidents*	Fatal Accidents*	Fatalities	
			Total	Aboard Aircraft In This Category
1981	59	12	13	13
1982	51	6	6	5
1983	69	11	11	11
1984	54	10	10	9
1985	43	5	6	6
1986	68	9	10	10
1987	36	4	4	4
1988	44	12	13	13
1989	26	3	3	3
1990	40	5	5	5

Table 17 - ACCIDENTS, FATAL ACCIDENTS AND FATALITIES
BALLOONS
1981 - 1990

Year	Accidents*	Fatal Accidents*	Fatalities	
			Total	Aboard Aircraft In This Category
1981	23	2	6	6
1982	29	2	7	7
1983	29	2	3	3
1984	33	0	0	0
1985	24	1	1	1
1986	23	1	2	2
1987	27	3	3	3
1988	25	0	0	0
1989	21	3	6	6
1990	26	4	8	8

Table 18 - ACCIDENTS, FATAL ACCIDENTS AND FATALITIES
PERSONAL FLYING
1981 - 1990

Year	Accidents*	Fatal Accidents*	Fatalities	
			Total	Aboard Aircraft In This Category
1981	1958	383	749	738
1982	1906	398	826	809
1983	1893	398	775	770
1984	1909	365	711	704
1985	1741	327	642	635
1986	1641	328	682	589
1987	1590	303	566	564
1988	1507	324	585	577
1989	1366	274	509	501
1990	1366	294	504	499

* The yearly accident counts include suicide and sabotage accidents as follows :
Total - 1984 (3), 1985 (2), 1987 (1), 1989 (4), 1990 (1)
Fatal - 1984 (2), 1985 (1), 1987 (1), 1989 (4)

Table 19 - ACCIDENTS, FATAL ACCIDENTS AND FATALITIES
BUSINESS FLYING
1981 - 1990

Year	Accidents*	Fatal Accidents*	Fatalities	
			Total	Aboard Aircraft In This Category
1981	264	74	145	145
1982	292	74	157	156
1983	276	52	114	114
1984	251	78	161	161
1985	261	64	120	116
1986	195	59	139	133
1987	184	49	107	101
1988	172	49	88	86
1989	149	42	90	85
1990	149	40	80	78

Table 20 - MOST PREVALENT FIRST OCCURRENCES
ALL ACCIDENTS
1990 AND 1985 - 1989

Type of Occurrence	1990		1985 - 1989	
	No.	Percent	Mean	Percent
Loss of control - in flight	339	15.1	347.8	13.8
Loss of engine power(total) - non-mechanical	310	13.8	295.0	11.7
Loss of control - on ground	262	11.7	279.0	11.1
In flight collision with object	169	7.5	195.6	7.8
In flight encounter with weather	133	5.9	163.4	6.5
Loss of engine power	110	4.9	153.0	6.1
Airframe/component/system failure/malfunction	99	4.4	132.4	5.3
In flight collision with terrain/water	129	5.8	128.8	5.1
Loss of engine power(total) - mech failure/malf	93	4.2	124.2	4.9
Hard landing	82	3.7	115.4	4.6
On ground collision with object	61	2.7	66.0	2.6
Loss of engine power(partial) - mech failure/malf	72	3.2	65.2	2.6
Overrun	62	2.8	64.8	2.6
Loss of engine power(partial) - non-mechanical	46	2.1	52.8	2.1
Midair collision	39	1.7	42.0	1.7
On ground collision with terrain/water	30	1.3	37.6	1.5
Undershoot	22	1.0	33.8	1.3
Miscellaneous/other	23	1.0	32.2	1.3
(All other types)	159	7.1	186.2	7.4
Number of Aircraft	2240	100.0	2515.4	100.0

Table 21 - MOST PREVALENT FIRST PHASES OF OPERATION
ALL ACCIDENTS
1990 AND 1985 - 1989

	1990		1985 - 1989	
Phase of Operation	No.	Percent	Mean	Percent
Landing	524	23.4	610.8	24.3
Takeoff	484	21.6	514.8	20.5
Cruise	369	16.5	427.0	17.0
Maneuvering	303	13.5	346.4	13.8
Approach	311	13.9	324.2	12.9
Descent	62	2.8	81.0	3.2
Climb	56	2.5	78.6	3.1
Taxi	61	2.7	63.6	2.5
Standing	23	1.0	35.8	1.4
Other	28	1.3	27.2	1.1
Not reported	19	0.8	6.0	0.2
Number of Aircraft	2240	100.0	2515.4	100.0

Table 22 - BROAD CAUSE/FACTOR ASSIGNMENTS
ALL ACCIDENTS
1990 AND 1985 - 1989

	1990		1985 - 1989	
Broad Cause/Factor	No.	Percent	Mean	Percent
Pilot	1800	80.4	2103.4	83.6
Terrain/Runway Condition	454	20.3	694.2	27.6
Weather	485	21.7	627.0	24.9
Propulsion System and Controls	486	21.7	582.2	23.1
Object (tree, wires, etc)	187	8.3	464.2	18.5
Other Person (Not Aboard)	176	7.9	229.4	9.1
Light Conditions	127	5.7	186.2	7.4
Landing Gear	68	3.0	123.8	4.9
Systems/Equipment/Instruments	83	3.7	122.4	4.9
Airframe	37	1.7	54.0	2.1
Flight Control System	43	1.9	42.0	1.7
Airport/Airways Facilities, Aids	14	0.6	23.8	0.9
Other Person (Aboard)	16	0.7	14.2	0.6
Number of Aircraft	2240		2515.4	

Table 23 - PERSONS BY ROLE AND DEGREE OF INJURY
ALL ACCIDENTS
1990

Role of Person	Degree of Injury				
	Fatal	Serious	Minor	None	Total
Pilot	413	212	308	1303	2236
Copilot	20	5	6	25	56
Dual student	18	5	23	89	135
Check pilot	0	1	4	10	15
Flight engineer	0	1	0	0	1
Cabin attendants	0	1	0	1	2
Other crew	7	2	1	15	25
Passenger	303	173	276	937	1689
Total aboard	761	400	618	2380	4159
Other aircraft*	2	0	1	167	170
Other ground	3	2	9	0	14
Grand total	766	402	628	2547	4343
Percent	17.6	9.3	14.5	58.6	

* Injuries carried opposite Other aircraft are injuries occurring in aircraft that are not part of this tabulation, but which were involved in collisions with aircraft which are a part of this tabulation.

Table 24 - PERSONS ABOARD BY KIND OF FLYING AND DEGREE OF INJURY
ALL ACCIDENTS
1990

Kind of Flying	Degree of Injury				
	Fatal	Serious	Minor	None	Total
Personal	496	254	384	1456	2590
Business	78	36	44	173	331
Corporate/Executive	21	5	20	29	75
Aerial application	17	17	26	95	155
Instructional	56	26	60	342	484
Other	91	62	83	288	524
Total	759	400	617	2383	4159
Percent	18.2	9.6	14.8	57.3	

Table 25 - PERSONS ABOARD BY TYPE OF AIRCRAFT AND DEGREE OF INJURY
ALL ACCIDENTS
1990

Type of Aircraft	Degree of Injury				
	Fatal	Serious	Minor	None	Total
All Fixed Wing	718	337	516	2069	3640
Fixed Wing Single Recip.Engine	591	284	450	1748	3073
Fixed Wing Multi Recip. Engine	77	37	45	219	378
Fixed Wing Turboprop	28	12	14	79	133
Fixed Wing Turbojet	22	4	7	23	56
All Rotorcraft	28	34	59	229	350
Rotorcraft, Reciprocating Engine	19	18	33	139	209
Rotorcraft, Turbine Engine	9	16	26	90	141
All Gliders	5	9	15	17	46
All Balloons	8	20	27	64	119
Other	0	0	0	4	4
Total	759	400	617	2383	4159
Percent	18.2	9.6	14.8	57.3	

Table 26 - AIRCRAFT BY STATE AND KIND OF FLYING
ALL ACCIDENTS
1990

State	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Alabama	17	0	0	4	2	7	30	1.3
Alaska	118	18	0	6	0	9	151	6.7
Arizona	39	2	0	11	2	4	58	2.6
Arkansas	22	6	1	1	31	3	64	2.9
California	186	18	0	57	14	33	308	13.8
Colorado	42	7	0	12	3	6	70	3.1
Connecticut	11	3	1	1	0	1	17	0.8
Delaware	1	0	0	0	0	0	1	0.0
Florida	64	1	1	33	5	19	123	5.5
Georgia	34	5	2	3	2	2	48	2.1
Hawaii	3	1	1	1	0	4	10	0.4
Idaho	15	1	0	4	2	1	23	1.0
Illinois	44	1	1	9	2	3	60	2.7
Indiana	21	3	1	12	0	2	39	1.7
Iowa	14	3	0	1	3	2	23	1.0
Kansas	20	5	0	5	3	0	33	1.5
Kentucky	6	1	2	2	1	4	16	0.7
Louisiana	20	1	0	2	8	8	39	1.7
Maine	9	0	0	0	0	2	11	0.5
Maryland	14	0	0	10	0	3	27	1.2
Massachusetts	31	1	0	2	3	5	42	1.9
Michigan	50	2	0	17	3	5	77	3.4
Minnesota	31	0	0	5	4	1	41	1.8
Mississippi	4	3	0	2	8	2	19	0.8
Missouri	24	4	0	6	4	1	39	1.7
Montana	21	0	0	1	2	5	29	1.3
Nebraska	8	0	0	0	4	0	12	0.5
Nevada	17	2	0	3	0	4	26	1.2
New Hampshire	6	1	0	0	0	2	9	0.4
New Jersey	17	0	0	7	0	1	25	1.1
New Mexico	21	2	0	2	1	3	29	1.3
New York	28	2	0	12	2	10	54	2.4
North Carolina	30	5	1	4	2	2	44	2.0
North Dakota	7	0	0	2	7	1	17	0.8
Ohio	36	1	0	9	1	2	49	2.2
Oklahoma	16	1	0	3	3	5	28	1.3
Oregon	38	3	0	1	1	4	47	2.1
Pennsylvania	38	5	0	9	4	4	60	2.7
Puerto Rico	5	0	0	2	0	1	8	0.4
Rhode Island	3	1	0	2	0	0	6	0.3
South Carolina	9	3	0	1	2	4	19	0.8
South Dakota	6	0	0	1	7	2	16	0.7
Tennessee	13	3	0	6	1	3	26	1.2
Texas	65	14	1	26	11	19	136	6.1
Utah	18	1	0	4	0	7	30	1.3
Vermont	1	0	0	1	0	0	2	0.1
Virginia	21	7	0	4	0	1	33	1.5
Virgin Islands	1	0	1	0	0	0	2	0.1
Washington	48	2	0	4	4	7	65	2.9
West Virginia	6	2	1	2	1	2	14	0.6
Wisconsin	30	2	0	3	1	8	44	2.0
Wyoming	11	2	1	0	0	1	15	0.7
Gulf of Mexico	1	0	0	0	0	1	2	0.1
Caribbean	1	0	0	0	0	0	1	0.0
Pacific Ocean	0	0	0	0	0	2	2	0.1
Other foreign	9	4	0	0	0	5	18	0.8
Atlantic Ocean	2	0	0	0	0	0	2	0.1
Unknown	0	0	0	1	0	0	1	0.0
Aircraft Number -	1373	149	15	316	154	233	2240	
Aircraft Percent -	61.3	6.7	0.7	14.1	6.9	10.4		

Table 29 - AIRCRAFT BY FIRST PHASE OF OPERATION AND TYPE OF AIRCRAFT
ALL ACCIDENTS
1990

Phase of Operation	Type of Aircraft											Aircraft	
	All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	No.	Pct
Standing	1	1	0	0	0	1	0	1	0	0	0	2	0.1
Standing - starting engine(s)	8	8	0	0	0	0	0	0	0	0	0	8	0.4
Standing - engine(s) operating	7	7	0	0	0	1	1	0	0	0	0	8	0.4
Standing - idling rotors	0	0	0	0	0	5	4	1	0	0	0	5	0.2
Taxi	11	10	0	1	0	0	0	0	0	0	0	11	0.5
Taxi - to takeoff	26	22	3	1	0	1	1	0	0	0	0	27	1.2
Taxi - from landing	19	16	2	0	1	0	0	0	0	0	0	19	0.8
Taxi - aerial	1	1	0	0	0	3	1	2	0	0	0	4	0.2
Takeoff	38	33	3	1	1	12	8	4	1	1	0	52	2.3
Takeoff - ground run	81	74	3	3	1	0	0	0	3	0	0	84	3.8
Takeoff - initial climb	294	271	16	5	2	17	13	4	6	2	0	319	14.2
Climb	20	18	2	0	0	0	0	0	0	1	0	21	0.9
Climb - to cruise	34	25	6	0	3	1	0	1	0	0	0	35	1.6
Cruise	133	126	4	3	0	25	14	11	2	10	1	171	7.6
Cruise - normal	176	158	14	4	0	19	16	3	0	2	0	197	8.8
Descent	14	13	0	1	0	2	2	0	0	0	0	16	0.7
Descent - normal	35	34	0	1	0	0	0	0	1	0	0	36	1.6
Descent - emergency	1	1	0	0	0	2	2	0	1	0	0	4	0.2
Descent - uncontrolled	4	4	0	0	0	2	2	0	0	0	0	6	0.3
Approach	31	23	8	0	0	2	1	1	1	0	0	34	1.5
Approach - VFR pattern - downwind	30	25	5	0	0	2	1	1	0	0	0	32	1.4
Approach - VFR pattern - base turn	15	14	1	0	0	0	0	0	1	0	0	16	0.7
Approach - VFR pattern - base to final	21	19	1	0	1	1	1	0	1	0	0	23	1.0
Approach - VFR pattern - final approach	118	105	7	4	2	7	5	2	7	1	0	133	5.9
Approach - go-around (VFR)	41	34	6	1	0	2	2	0	0	0	0	43	1.9
Approach - IAF to FAF/outer marker (IFR)	8	5	1	2	0	0	0	0	0	0	0	8	0.4
Approach - FAF/outer marker to threshold (IFR)	15	9	4	0	2	0	0	0	0	0	0	15	0.7
Approach - circling(IFR)	2	1	1	0	0	0	0	0	0	0	0	2	0.1
Approach - missed approach (IFR)	5	3	2	0	0	0	0	0	0	0	0	5	0.2
Landing	25	21	3	1	0	9	5	4	2	2	0	38	1.7
Landing - flare/touchdown	162	148	12	2	0	14	10	4	3	6	0	185	8.3
Landing - roll	265	240	20	3	2	1	1	0	4	0	0	270	12.1
Maneuvering	147	140	4	0	3	24	15	9	5	0	0	176	7.9
Maneuvering - aerial application	59	56	1	2	0	16	13	3	0	0	0	75	3.3
Maneuvering - turn to reverse direction	24	24	0	0	0	2	2	0	1	0	0	27	1.2
Maneuvering - turn to landing	2	2	0	0	0	0	0	0	1	0	0	3	0.1
Hover	0	0	0	0	0	22	13	9	0	0	0	22	1.0
Other	66	60	5	1	0	1	0	1	0	1	0	68	3.0
Unknown	21	18	2	1	0	0	0	0	0	0	0	21	0.9
Not reported	17	8	8	1	0	2	1	1	0	0	0	19	0.8
Aircraft													
Number -	1977	1777	144	38	18	196	134	62	40	26	1	2240	
Percent -	88.3	79.3	6.4	1.7	0.8	8.8	6.0	2.8	1.8	1.2	.0		

Table 30 - AIRCRAFT BY FIRST PHASE OF OPERATION AND KIND OF FLYING
ALL ACCIDENTS
1990

Phase of Operation	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Standing	1	0	0	0	0	1	2	0.1
Standing - starting engine(s)	6	1	0	0	0	1	8	0.4
Standing - engine(s) operating	3	1	0	3	0	1	8	0.4
Standing - idling rotors	2	1	0	1	0	1	5	0.2
Taxi	9	0	0	1	0	1	11	0.5
Taxi - to takeoff	18	2	0	3	0	4	27	1.2
Taxi - from landing	15	2	1	1	0	0	19	0.8
Taxi - aerial	1	0	1	1	0	1	4	0.2
Takeoff	28	6	0	5	4	9	52	2.3
Takeoff - ground run	54	4	0	15	5	6	84	3.8
Takeoff - initial climb	226	11	3	25	24	30	319	14.2
Climb	14	4	0	1	0	2	21	0.9
Climb - to cruise	23	2	2	1	0	7	35	1.6
Cruise	98	25	0	13	8	27	171	7.6
Cruise - normal	138	19	1	13	2	24	197	8.8
Descent	11	0	0	4	0	1	16	0.7
Descent - normal	26	2	0	2	1	5	36	1.6
Descent - emergency	2	0	0	2	0	0	4	0.2
Descent - uncontrolled	4	1	0	0	1	0	6	0.3
Approach	25	2	0	4	0	3	34	1.5
Approach - VFR pattern - downwind	22	4	0	4	0	2	32	1.4
Approach - VFR pattern - base turn	6	4	0	5	0	1	16	0.7
Approach - VFR pattern - base base to final	13	1	0	4	0	5	23	1.0
Approach - VFR pattern - final approach	84	5	2	31	3	8	133	5.9
Approach - go-around (VFR)	31	3	0	9	0	0	43	1.9
Approach - IAF to FAF/outer marker (IFR)	4	4	0	0	0	0	8	0.4
Approach - FAF/outer marker to threshold (IFR)	9	3	1	1	0	1	15	0.7
Approach - circling(IFR)	0	2	0	0	0	0	2	0.1
Approach - missed approach (IFR)	4	0	0	1	0	0	5	0.2
Landing	19	2	0	13	1	3	38	1.7
Landing - flare/touchdown	106	5	1	57	5	11	185	8.3
Landing - roll	191	13	3	43	10	10	270	12.1
Maneuvering	93	8	0	29	4	42	176	7.9
Maneuvering - aerial application	1	1	0	0	72	1	75	3.3
Maneuvering - turn to reverse	10	0	0	2	13	2	27	1.2
Maneuvering - turn to landing area (emergency)	2	0	0	1	0	0	3	0.1
Hover	5	0	0	7	0	10	22	1.0
Other	44	6	0	12	0	6	68	3.0
Unknown	16	1	0	1	0	3	21	0.9
Not reported	9	4	0	1	1	4	19	0.8
Aircraft								
Number -	1373	149	15	316	154	233	2240	
Percent -	61.3	6.7	0.7	14.1	6.9	10.4		

Table 31 - AIRCRAFT BY BROAD CAUSE/FACTOR AND TYPE OF AIRCRAFT
ALL ACCIDENTS
1990

Broad Cause:	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Aircraft	491	432	47	11	1	58	41	17	5	8	1	563	25.1
Propulsion System and Controls	381	351	23	6	1	38	25	13	0	1	1	421	18.8
Flight Control System	23	18	4	1	0	9	7	2	3	0	0	35	1.6
Airframe	15	9	4	2	0	3	2	1	0	0	0	18	0.8
Landing Gear	48	36	11	1	0	3	2	1	0	0	0	51	2.3
Systems/Equipment/ Instruments	35	23	9	3	0	4	3	1	2	2	0	43	1.9
Environment	80	70	7	2	1	5	4	1	3	6	0	94	4.2
Weather	36	33	1	1	1	3	2	1	1	6	0	46	2.1
Object (trees,wires,etc)	16	14	1	1	0	1	1	0	1	0	0	18	0.8
Airport/Airways Facilities Aids	1	0	1	0	0	0	0	0	0	0	0	1	0.0
Terrain/Runway Condition	28	24	4	0	0	2	2	0	2	0	0	32	1.4
Personnel	1623	1463	111	33	16	150	102	48	34	20	0	1827	81.6
Pilot	1549	1401	106	28	14	131	92	39	32	17	0	1729	77.2
Others (Aboard)	8	6	2	0	0	4	2	2	0	2	0	14	0.6
Others (Not Aboard)	113	93	10	8	2	20	11	9	2	2	0	137	6.1
Broad Factor:													
Aircraft	155	128	17	8	2	12	8	4	1	3	0	171	7.6
Propulsion System and Controls	81	67	9	4	1	8	5	3	0	0	0	89	4.0
Flight Control System	9	8	1	0	0	2	2	0	0	0	0	11	0.5
Airframe	18	16	1	1	0	1	0	1	0	0	0	19	0.8
Landing Gear	19	14	4	0	1	0	0	0	0	0	0	19	0.8
Systems/Equipment/ Instruments	36	30	3	3	0	1	0	1	1	3	0	41	1.8
Environment	824	756	49	11	8	69	47	22	16	14	1	924	41.3
Weather	394	360	23	8	3	27	19	8	11	10	1	443	19.8
Light Conditions	120	100	14	2	4	7	5	2	0	0	0	127	5.7
Object (trees,wires,etc)	140	132	7	1	0	21	14	7	6	3	0	170	7.6
Airport/Airways Facilities, Aids	13	10	2	0	1	0	0	0	0	0	0	13	0.6
Terrain/Runway Condition	390	365	20	2	3	26	17	9	6	5	0	427	19.1
Personnel	669	603	44	15	7	53	31	22	15	3	0	740	33.0
Pilot	629	569	41	13	6	48	30	18	14	3	0	694	31.0
Others (Aboard)	4	3	1	0	0	0	0	0	0	0	0	4	0.2
Others (Not Aboard)	53	43	5	4	1	13	6	7	2	0	0	68	3.0
Either Broad Cause or Factor:													
Aircraft	604	523	61	17	3	68	48	20	6	11	1	690	30.8
Propulsion System and Controls	438	397	30	9	2	46	30	16	0	1	1	486	21.7
Flight Control System	30	24	5	1	0	10	8	2	3	0	0	43	1.9
Airframe	33	25	5	3	0	4	2	2	0	0	0	37	1.7
Landing Gear	65	48	15	1	1	3	2	1	0	0	0	68	3.0
Systems/Equipment/ Instruments	70	53	11	6	0	5	3	2	3	5	0	83	3.7
Environment	881	807	53	12	9	71	49	22	17	16	1	986	44.0
Weather	427	390	24	9	4	30	21	9	11	16	1	485	21.7
Light Conditions	120	100	14	2	4	7	5	2	0	0	0	127	5.7
Object (trees,wires,etc)	155	145	8	2	0	22	15	7	7	3	0	187	8.3
Airport/Airways Facilities, Aids	14	10	3	0	1	0	0	0	0	0	0	14	0.6
Terrain/Runway Condition	415	387	23	2	3	27	18	9	7	5	0	454	20.3
Personnel	1682	1522	111	33	16	156	106	50	34	20	0	1892	84.5
Pilot	1612	1464	105	29	14	139	97	42	32	17	0	1800	80.4
Others (Aboard)	10	8	2	0	0	4	2	2	0	2	0	16	0.7
Others (Not Aboard)	144	120	13	9	2	27	14	13	3	2	0	176	7.9
Aircraft													
Number -	1977	1777	144	38	18	196	134	62	40	26	1	2240	
Percent -	88.3	79.3	6.4	1.7	0.8	8.8	6.0	2.8	1.8	1.2	.0		

Table 32 - AIRCRAFT BY BROAD CAUSE/FACTOR AND KIND OF FLYING
ALL ACCIDENTS
1990

Broad Cause:	Kind of Flying: Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	Aircraft: No.	Pct
Aircraft	342	41	5	46	49	80	563	25.1
Propulsion System and Controls	257	32	4	37	37	54	421	18.8
Flight Control System	20	3	0	0	6	6	35	1.6
Airframe	7	4	0	1	1	5	18	0.8
Landing Gear	36	2	1	5	2	5	51	2.3
Systems/Equipment/Instruments	21	4	0	3	3	12	43	1.9
Environment	59	12	1	8	4	10	94	4.2
Weather	22	8	1	6	2	7	46	2.1
Object (trees, wires, etc.)	15	0	0	2	0	1	18	0.8
Airport/Airways Facilities, Aids	1	0	0	0	0	0	1	0.0
Terrain/Runway Condition	23	4	0	0	3	2	32	1.4
Personnel	1140	117	11	277	102	180	1827	81.6
Pilot	1090	111	9	263	96	160	1729	77.2
Others (Aboard)	5	2	0	1	0	6	14	0.6
Others (Not Aboard)	65	8	2	22	12	28	137	6.1
Broad Factor:								
Aircraft	109	20	3	7	8	24	171	7.6
Propulsion System and Controls	57	10	0	3	5	14	89	4.0
Flight Control System	8	1	0	0	1	1	11	0.5
Airframe	12	2	1	1	1	2	19	0.8
Landing Gear	13	3	1	1	0	1	19	0.8
Systems/Equipment/Instruments	22	7	1	3	2	6	41	1.8
Environment	604	65	5	110	63	77	924	41.3
Weather	311	37	2	51	15	27	443	19.8
Light Conditions	85	13	4	6	2	17	127	5.7
Object (trees, wires, etc.)	110	13	0	16	10	21	170	7.6
Airport/Airways Facilities, Aids	9	1	1	2	0	0	13	0.6
Terrain/Runway Condition	281	23	1	54	41	27	427	19.1
Personnel	467	41	5	134	19	74	740	33.0
Pilot	440	39	3	130	16	66	694	31.0
Others (Aboard)	3	0	0	1	0	0	4	0.2
Others (Not Aboard)	31	5	2	13	3	14	68	3.0
Either Broad Cause or Factor:								
Aircraft	423	55	8	50	55	99	690	30.8
Propulsion System and Controls	299	38	4	39	42	64	486	21.7
Flight Control System	26	4	0	0	6	7	43	1.9
Airframe	19	6	1	2	2	7	37	1.7
Landing Gear	47	5	2	6	2	6	68	3.0
Systems/Equipment/Instruments	43	10	1	6	5	18	83	3.7
Environment	642	75	6	115	65	83	986	44.0
Weather	330	44	3	57	17	34	485	21.7
Light Conditions	85	13	4	6	2	17	127	5.7
Object (trees, wires, etc.)	125	13	0	17	10	22	187	8.3
Airport/Airways Facilities, Aids	10	1	1	2	0	0	14	0.6
Terrain/Runway Condition	301	27	1	54	42	29	454	20.3
Personnel	1187	119	11	281	107	187	1892	84.5
Pilot	1137	113	9	273	99	169	1800	80.4
Others (Aboard)	7	2	0	1	0	6	16	0.7
Others (Not Aboard)	84	10	3	29	15	35	176	7.9
Aircraft								
Number -	1373	149	15	316	154	233	2240	
Percent -	61.3	6.7	0.7	14.1	6.9	10.4		

Table 33 - AIRCRAFT BY KIND OF FLYING AND TYPE OF AIRCRAFT
ALL ACCIDENTS
1990

Kind of Flying	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Personal	1279	1192	76	6	5	54	44	10	30	10	0	1373	61.3
Business	128	93	21	12	2	18	9	9	0	2	1	149	6.7
Corporate/Executive	14	2	4	3	5	1	0	1	0	0	0	15	0.7
Instructional	271	254	15	2	0	36	32	4	9	0	0	316	14.1
Aerial Application	128	122	1	5	0	26	24	2	0	0	0	154	6.9
Other	157	114	27	10	6	61	25	36	1	14	0	233	10.4
Aircraft													
Number -	1977	1777	144	38	18	196	134	62	40	26	1	2240	
Percent -	88.3	79.3	6.4	1.7	0.8	8.8	6.0	2.8	1.8	1.2	.0		

Table 34 - PILOTS BY TOTAL TIME AND TIME IN TYPE
ALL ACCIDENTS
1990

Total time (hours)	Time in type (hours): 0-49	50-99	100-499	500-999	1000-4999	5000-9999	10000 or more	Not reptd	Pilots: No.	Pilots: Percent
0 - 49	117	0	0	0	0	0	0	8	125	4.4
50 - 99	73	56	0	0	0	0	0	6	135	6.0
100 - 499	207	99	191	0	0	0	0	66	563	25.1
500 - 999	55	41	138	52	0	0	0	46	332	14.8
1000 - 4999	108	52	168	80	120	0	0	85	613	27.4
5000 - 9999	28	10	42	21	59	15	0	20	195	8.7
1000 or more	15	7	35	16	50	31	6	19	179	8.0
Not reported	1	0	3	1	1	0	0	92	98	4.4
Pilots										
Number	604	265	577	170	230	46	6	342	2240	
Percent	27.0	11.8	26.7	7.6	10.3	2.0	0.3	15.3		

Table 35 - PILOTS BY AGE AND KIND OF FLYING
ALL ACCIDENTS
1990

Pilot age	Kind of Flying						Pilots	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
15 - 19	7	0	0	15	1	1	24	1.1
20 - 24	61	1	0	54	5	9	130	5.8
25 - 29	95	4	1	56	12	24	192	8.6
30 - 34	146	14	0	44	17	31	252	11.3
35 - 39	174	23	0	39	30	29	295	13.2
40 - 44	187	22	4	33	26	46	318	14.2
45 - 49	179	29	1	23	14	25	271	12.1
50 - 54	126	13	3	16	14	21	193	8.6
55 - 59	124	16	3	11	18	12	184	8.2
60 - 64	112	8	1	5	12	11	149	6.6
65 - 69	74	6	1	7	3	8	99	4.4
70 or older	53	4	0	2	0	4	63	2.8
Not reported	35	9	1	11	2	12	70	3.1
Pilots								
Number -	1373	149	15	316	154	233	2240	
Percent -	61.3	6.7	0.7	14.1	6.9	10.4		

Table 36 - MOST PREVALENT FIRST OCCURRENCES
FATAL ACCIDENTS
1990 AND 1985 - 1989

Type of Occurrence	1990		1985 - 1989	
	No.	Percent	Mean	Percent
Loss of control - in flight	129	28.5	124.6	26.3
In flight encounter with weather	56	12.4	90.0	19.0
In flight collision with object	56	12.4	54.2	11.5
In flight collision with terrain/water	67	14.8	48.8	10.3
Airframe/component/system failure/malfunction	19	4.2	24.8	5.2
Loss of engine power(total) - non-mechanical	21	4.6	24.6	5.2
Midair collision	22	4.9	23.4	4.9
Loss of engine power	19	4.2	15.4	3.3
Loss of engine power(total) - mech failure/malf	9	2.0	10.8	2.3
Abrupt maneuver	7	1.5	9.4	2.0
Loss of engine power(partial) - mech failure/malf	12	2.7	7.4	1.6
Missing aircraft	4	0.9	6.4	1.4
Miscellaneous/other	5	1.1	6.2	1.3
Loss of engine power(partial) - non-mechanical	2	0.4	5.8	1.2
(All other types)	24	5.3	21.4	4.5
Number of Aircraft	452	100.0	473.2	100.0

Table 37 - MOST PREVALENT FIRST PHASES OF OPERATION
FATAL ACCIDENTS
1990 AND 1985 - 1989

	1990		1985 - 1989	
Phase of Operation	No.	Percent	Mean	Percent
Maneuvering	129	28.5	133.6	28.2
Cruise	80	17.7	110.8	23.4
Takeoff	81	17.9	72.4	15.3
Approach	84	18.6	70.2	14.8
Climb	21	4.6	27.2	5.7
Other	22	4.9	21.2	4.5
Descent	16	3.5	20.4	4.3
Landing	10	2.2	9.8	2.1
Standing	1	0.2	3.2	0.7
Not reported	6	1.3	2.4	0.5
Taxi	2	0.4	2.0	0.4
Number of Aircraft	452	100.0	473.2	100.0

Table 38 - BROAD CAUSE/FACTOR ASSIGNMENTS
FATAL ACCIDENTS
1990 AND 1985 - 1989

	1990		1985 - 1989	
Broad Cause/Factor	No.	Percent	Mean	Percent
Pilot	395	87.4	426.2	90.1
Weather	117	25.9	162.0	34.2
Terrain/Runway Condition	62	13.7	86.8	18.3
Object (tree, wires, etc)	25	5.5	76.2	16.1
Light Conditions	64	14.2	75.8	16.0
Propulsion System and Controls	55	12.2	60.6	12.8
Other Person (Not Aboard)	45	10.0	51.2	10.8
Systems/Equipment/Instruments	23	5.1	22.4	4.7
Airframe	17	3.8	20.6	4.4
Flight Control System	10	2.2	12.6	2.7
Airport/Airways Facilities, Aids	4	0.9	5.2	1.1
Other Person (Aboard)	4	0.9	3.6	0.8
Landing Gear	0	0.0	1.8	0.4
Number of Aircraft	452		473.2	

Table 39 - AIRCRAFT BY FIRST OCCURRENCE AND TYPE OF AIRCRAFT
FATAL ACCIDENTS
1990

Type of First Occurrence	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Abrupt maneuver	7	6	0	0	1	0	0	0	0	0	0	7	1.5
Airframe/component/ system failure/malf.	14	10	1	1	2	5	4	1	0	0	0	19	4.2
Dragged wing, rotor, pod, or float	0	0	0	0	0	1	1	0	0	0	0	1	0.2
Fire	1	1	0	0	0	0	0	0	0	1	0	2	0.4
Gear not extended	1	1	0	0	0	0	0	0	0	0	0	1	0.2
Hard landing	2	1	1	0	0	1	1	0	0	0	0	3	0.7
In flight collision w/obj	47	40	6	0	1	5	3	2	2	2	0	56	12.4
In flight collision w/ter	66	57	6	1	2	1	0	1	0	0	0	67	14.8
In flight encounter w/wx	53	47	5	1	0	2	0	2	0	1	0	56	12.4
Loss of control - in flight	121	110	6	1	4	5	3	2	3	0	0	129	28.5
Loss of control - on ground	3	3	0	0	0	0	0	0	0	0	0	3	0.7
Midair collision	22	21	1	0	0	0	0	0	0	0	0	22	4.9
On ground collision w/obj	2	1	0	1	0	0	0	0	0	0	0	2	0.4
On ground collision w/ter	1	1	0	0	0	0	0	0	0	0	0	1	0.2
Overrun	2	2	0	0	0	0	0	0	0	0	0	2	0.4
Loss of power	18	15	1	2	0	1	1	0	0	0	0	19	4.2
Loss of power(total) - mech failure/malfunction	9	7	1	1	0	0	0	0	0	0	0	9	2.0
Loss of power(partial) - mech failure/malfunction	11	7	2	2	0	1	1	0	0	0	0	12	2.7
Loss of power(total) - non-mechanical	20	18	1	1	0	1	1	0	0	0	0	21	4.6
Loss of power(partial) - non-mechanical	2	2	0	0	0	0	0	0	0	0	0	2	0.4
Propeller/rotor contact	1	0	0	1	0	1	1	0	0	0	0	2	0.4
Undershoot	1	1	0	0	0	0	0	0	0	0	0	1	0.2
Missing aircraft	4	3	1	0	0	0	0	0	0	0	0	4	0.9
Miscellaneous/other	4	3	1	0	0	1	0	1	0	0	0	5	1.1
Not reported	6	3	2	1	0	0	0	0	0	0	0	6	1.3
Aircraft Number -	418	360	35	13	10	25	16	9	5	4	0	452	
Aircraft Percent -	92.5	79.6	7.7	2.9	2.2	5.5	3.5	2.0	1.1	0.9	.0		

Table 40 - AIRCRAFT BY FIRST OCCURRENCE AND KIND OF FLYING
FATAL ACCIDENTS
1990

Type of First Occurrence	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Abrupt maneuver	6	0	0	0	0	1	7	1.5
Airframe/component/system failure/malfunction	8	2	0	3	1	5	19	4.2
Dragged wing, rotor, pod, or float	0	0	0	0	0	1	1	0.2
Fire	0	1	0	0	0	1	2	0.4
Gear not extended	1	0	0	0	0	0	1	0.2
Hard landing	3	0	0	0	0	0	3	0.7
In flight collision with object	35	3	0	4	7	7	56	12.4
In flight collision with terrain	46	8	1	2	3	7	67	14.8
In flight encounter with weather	39	10	0	1	0	6	56	12.4
Loss of control - in flight	91	7	1	13	2	15	129	28.5
Loss of control - on ground	3	0	0	0	0	0	3	0.7
Midair collision	6	1	0	7	4	4	22	4.9
On ground collision with object	2	0	0	0	0	0	2	0.4
On ground collision with terrain	1	0	0	0	0	0	1	0.2
Overrun	2	0	0	0	0	0	2	0.4
Loss of power	13	2	1	0	0	3	19	4.2
Loss of power(total) - mech failure/malfunction	5	2	0	0	1	1	9	2.0
Loss of power(partial) - mech failure/malfunction	8	1	1	1	0	1	12	2.7
Loss of power(total) - non-mechanical	15	1	1	2	0	2	21	4.6
Loss of power(partial) - non-mechanical	2	0	0	0	0	0	2	0.4
Propeller/rotor contact	2	0	0	0	0	0	2	0.4
Undershoot	1	0	0	0	0	0	1	0.2
Missing aircraft	3	0	0	1	0	0	4	0.9
Miscellaneous/other	1	1	0	0	0	3	5	1.1
Not reported	3	1	0	0	0	2	6	1.3
Aircraft								
Number -	296	40	5	34	18	59	452	
Percent -	65.5	8.8	1.1	7.5	4.0	13.1		

Table 41 - AIRCRAFT BY FIRST PHASE OF OPERATION AND TYPE OF AIRCRAFT
FATAL ACCIDENTS
1990

Phase of Operation	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct.
Standing - idling rotors	0	0	0	0	0	1	1	0	0	0	0	1	0.2
Taxi	2	1	0	1	0	0	0	0	0	0	0	2	0.4
Takeoff	8	5	1	1	1	2	0	2	0	0	0	10	2.2
Takeoff - ground run	5	3	0	1	1	0	0	0	0	0	0	5	1.1
Takeoff - initial climb	61	54	4	1	2	4	2	2	0	1	0	66	14.6
Climb	7	6	1	0	0	0	0	0	0	1	0	8	1.8
Climb - to cruise	13	11	1	0	1	0	0	0	0	0	0	13	2.9
Cruise	38	36	2	0	0	6	4	2	0	1	0	45	10.0
Cruise - normal	34	29	4	1	0	1	1	0	0	0	0	35	7.7
Descent	5	4	0	1	0	0	0	0	0	0	0	5	1.1
Descent - normal	9	9	0	0	0	0	0	0	0	0	0	9	2.0
Descent - uncontrolled	2	2	0	0	0	0	0	0	0	0	0	2	0.4
Approach	13	8	5	0	0	0	0	0	0	0	0	13	2.9
Approach - VFR pattern - downwind	12	11	1	0	0	0	0	0	0	0	0	12	2.7
Approach - VFR pattern - base turn	5	4	1	0	0	0	0	0	0	0	0	5	1.1
Approach - VFR pattern - base to final	6	6	0	0	0	0	0	0	0	0	0	6	1.3
Approach - VFR pattern - final approach	21	17	1	3	0	0	0	0	1	0	0	22	4.9
Approach - go-around (VFR	7	7	0	0	0	0	0	0	0	0	0	7	1.5
Approach - IAF to FAF/ outer marker (IFR)	5	3	1	1	0	0	0	0	0	0	0	5	1.1
Approach - FAF/outer marker to threshold	9	5	2	0	2	0	0	0	0	0	0	9	2.0
Approach - circling(IFR)	1	0	1	0	0	0	0	0	0	0	0	1	0.2
Approach - missed approach (IFR)	4	3	1	0	0	0	0	0	0	0	0	4	0.9
Landing	1	1	0	0	0	0	0	0	0	0	0	1	0.2
Landing - flare/touchdown	3	2	1	0	0	1	1	0	0	0	0	4	0.9
Landing - roll	2	1	0	1	0	0	0	0	0	0	0	2	0.4
Maneuvering	91	86	2	0	3	5	5	0	3	0	0	99	21.9
Maneuvering - aerial application	11	9	1	1	0	2	1	1	0	0	0	13	2.9
Maneuvering - turn to reverse direction	11	11	0	0	0	0	0	0	1	0	0	12	2.7
Maneuvering - turn to landing area (emergency)	2	2	0	0	0	0	0	0	0	0	0	2	0.4
Hover	0	0	0	0	0	3	1	2	0	0	0	3	0.7
Other	6	4	2	0	0	0	0	0	0	1	0	7	1.5
Unknown	18	17	1	0	0	0	0	0	0	0	0	18	4.0
Not reported	6	3	2	1	0	0	0	0	0	0	0	6	1.3
Aircraft Number -	418	360	35	13	10	25	16	9	5	4	0	452	
Aircraft Percent -	92.5	79.6	7.7	2.9	2.2	5.5	3.5	2.0	1.1	0.9	.0		

Table 42 - AIRCRAFT BY FIRST PHASE OF OPERATION AND KIND OF FLYING
FATAL ACCIDENTS
1990

Phase of Operation	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Standing - idling rotors	1	0	0	0	0	0	1	0.2
Taxi	2	0	0	0	0	0	2	0.4
Takeoff	4	3	0	1	0	2	10	2.2
Takeoff - ground run	3	0	0	0	0	2	5	1.1
Takeoff - initial climb	54	1	3	2	1	5	66	14.6
Climb	5	2	0	0	0	1	8	1.8
Climb - to cruise	10	0	0	1	0	2	13	2.9
Cruise	25	8	0	2	0	10	45	10.0
Cruise - normal	24	9	0	1	0	1	35	7.7
Descent	4	0	0	1	0	0	5	1.1
Descent - normal	6	1	0	0	0	2	9	2.0
Descent - uncontrolled	1	1	0	0	0	0	2	0.4
Approach	12	1	0	0	0	0	13	2.9
Approach - VFR pattern - downwind	8	2	0	2	0	0	12	2.7
Approach - VFR pattern - base turn	3	2	0	0	0	0	5	1.1
Approach - VFR pattern - base to final	4	0	0	1	0	1	6	1.3
Approach - VFR pattern - final approach	14	1	1	5	0	1	22	4.9
Approach - go-around (VFR)	7	0	0	0	0	0	7	1.5
Approach - IAF to FAF/outer marker (IFR)	3	2	0	0	0	0	5	1.1
Approach - FAF/outer marker to threshold	7	1	1	0	0	0	9	2.0
Approach - circling(IFR)	0	1	0	0	0	0	1	0.2
Approach - missed approach (IFR)	4	0	0	0	0	0	4	0.9
Landing	1	0	0	0	0	0	1	0.2
Landing - flare/touchdown	4	0	0	0	0	0	4	0.9
Landing - roll	2	0	0	0	0	0	2	0.4
Maneuvering	60	2	0	14	1	22	99	21.9
Maneuvering - aerial application	1	0	0	0	12	0	13	2.9
Maneuvering - turn to reverse direction	5	0	0	1	4	2	12	2.7
Maneuvering - turn to landing area (emergency)	1	0	0	1	0	0	2	0.4
Hover	0	0	0	0	0	3	3	0.7
Other	4	1	0	1	0	1	7	1.5
Unknown	14	1	0	1	0	2	18	4.0
Not reported	3	1	0	0	0	2	6	1.3
Aircraft								
Number -	296	40	5	34	18	59	452	
Percent -	65.5	8.8	1.1	7.5	4.0	13.1		

Table 43 - AIRCRAFT BY BROAD CAUSE/FACTOR AND TYPE OF AIRCRAFT
FATAL ACCIDENTS
1990

Broad Cause:	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Aircraft	59	50	4	5	0	7	5	2	0	1	0	67	14.
Propulsion System and Controls	39	35	2	2	0	4	3	1	0	0	0	43	9.
Flight Control System	6	5	0	1	0	2	1	1	0	0	0	8	1.
Airframe	11	7	2	2	0	1	1	0	0	0	0	12	2
Systems/Equipment/ Instruments	11	8	2	1	0	1	1	0	0	1	0	13	2
Environment	12	9	2	1	0	0	0	0	0	0	0	12	2
Weather	4	4	0	0	0	0	0	0	0	0	0	4	0
Object (trees,wires,etc)	1	0	0	1	0	0	0	0	0	0	0	1	0
Airport/Airways Facilities, Aids	1	0	1	0	0	0	0	0	0	0	0	1	0
Terrain/Runway Condition	7	6	1	0	0	0	0	0	0	0	0	7	1
Personnel	370	321	28	11	10	22	14	8	4	4	0	400	88
Other	33	27	5	1	0	2	1	1	1	0	0	36	8
Broad Factor:													
Aircraft	29	23	3	2	1	0	0	0	1	0	0	30	6
Propulsion System and Controls	15	10	3	1	1	0	0	0	0	0	0	15	3
Flight Control System	2	2	0	0	0	0	0	0	0	0	0	2	0
Airframe	5	5	0	0	0	0	0	0	0	0	0	5	1
Systems/Equipment/ Instruments	9	8	0	1	0	0	0	0	1	0	0	10	2
Environment	168	140	20	4	4	9	5	4	2	2	0	181	40
Weather	107	88	14	3	2	3	1	2	2	2	0	114	25
Light Conditions	62	50	9	1	2	2	1	1	0	0	0	64	14
Object (trees,wires,etc)	18	15	3	0	0	3	2	1	1	2	0	24	5
Airport/Airways Facilities, Aids	3	1	1	0	1	0	0	0	0	0	0	3	0
Terrain/Runway Condition	51	45	5	1	0	4	2	2	0	0	0	55	12
Personnel													
Pilot													
Other	235	207	14	9	5	16	11	5	2	2	0	255	56
Either Broad Cause or Factor:													
Aircraft	84	69	7	7	1	7	5	2	1	1	0	93	20
Propulsion System and Controls	51	42	5	3	1	4	3	1	0	0	0	55	12
Flight Control System	8	7	0	1	0	2	1	1	0	0	0	10	2
Airframe	16	12	2	2	0	1	1	0	0	0	0	17	3
Systems/Equipment/ Instruments	20	16	2	2	0	1	1	0	1	1	0	23	5
Environment	177	148	21	4	4	9	5	4	2	2	0	190	42
Weather	110	91	14	3	2	3	1	2	2	2	0	117	25
Light Conditions	62	50	9	1	2	2	1	1	0	0	0	64	14
Object (trees,wires,etc)	19	15	3	1	0	3	2	1	1	2	0	25	5
Airport/Airways Facilities, Aids	4	1	2	0	1	0	0	0	0	0	0	4	0
Terrain/Runway Condition	58	51	6	1	0	4	2	2	0	0	0	62	13
Personnel													
Pilot													
Other	197	177	10	5	5	10	7	3	2	1	0	210	46
Aircraft													
Number -	418	360	35	13	10	25	16	9	5	4	0	452	
Percent -	92.5	79.6	7.7	2.9	2.2	5.5	3.5	2.0	1.1	0.9	.0		

Table 44 - AIRCRAFT BY BROAD CAUSE/FACTOR AND KIND OF FLYING
FATAL ACCIDENTS
1990

Broad Cause:	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Pct
Aircraft	38	10	2	5	2	10	67	14.8
Propulsion System and Controls	26	5	2	4	1	5	43	9.5
Flight Control System	6	2	0	0	0	0	8	1.8
Airframe	5	3	0	1	1	2	12	2.7
Systems/Equipment/Instruments	5	3	0	0	0	5	13	2.9
Environment	8	3	0	1	0	0	12	2.7
Weather	1	2	0	1	0	0	4	0.9
Object (trees, wires, etc.)	1	0	0	0	0	0	1	0.2
Airport/Airways Facilities, Aids	1	0	0	0	0	0	1	0.2
Terrain/Runway Condition	6	1	0	0	0	0	7	1.5
Personnel	262	33	4	33	17	52	401	88.7
Pilot	256	33	4	28	16	47	384	85.0
Others (Aboard)	1	0	0	0	0	3	4	0.9
Others (Not Aboard)	14	3	0	7	5	9	38	8.4
Broad Factor:								
Aircraft	20	6	0	0	0	4	30	6.6
Propulsion System and Controls	10	3	0	0	0	2	15	3.3
Flight Control System	2	0	0	0	0	0	2	0.4
Airframe	3	2	0	0	0	0	5	1.1
Systems/Equipment/Instruments	6	2	0	0	0	2	10	2.2
Environment	127	22	1	8	2	21	181	40.0
Weather	82	17	1	5	0	9	114	25.2
Light Conditions	45	7	0	3	0	9	64	14.2
Object (trees, wires, etc.)	17	1	0	0	1	5	24	5.3
Airport/Airways Facilities, Aids	2	0	1	0	0	0	3	0.7
Terrain/Runway Condition	42	8	0	1	1	3	55	12.2
Personnel	134	17	1	16	2	23	193	42.7
Pilot	128	16	1	15	2	21	183	40.5
Others (Aboard)	1	0	0	0	0	0	1	0.2
Others (Not Aboard)	9	3	0	5	0	5	22	4.9
Either Broad Cause or Factor:								
Aircraft	56	14	2	5	2	14	93	20.6
Propulsion System and Controls	35	6	2	4	1	7	55	12.2
Flight Control System	8	2	0	0	0	0	10	2.2
Airframe	8	5	0	1	1	2	17	3.8
Systems/Equipment/Instruments	11	5	0	0	0	7	23	5.1
Environment	133	24	1	9	2	21	190	42.0
Weather	83	18	1	6	0	9	117	25.9
Light Conditions	45	7	0	3	0	9	64	14.2
Object (trees, wires, etc.)	18	1	0	0	1	5	25	5.5
Airport/Airways Facilities, Aids	3	0	1	0	0	0	4	0.9
Terrain/Runway Condition	48	9	0	1	1	3	62	13.7
Personnel	268	34	4	33	17	52	408	90.3
Pilot	262	33	4	32	16	48	395	87.4
Others (Aboard)	1	0	0	0	0	3	4	0.9
Others (Not Aboard)	16	4	0	8	5	12	45	10.0
Aircraft								
Number -	296	40	5	34	18	59	452	
Percent -	65.5	8.8	1.1	7.5	4.0	13.1		

Table 45 - AIRCRAFT BY KIND OF FLYING AND TYPE OF AIRCRAFT
FATAL ACCIDENTS
1990

Kind of Flying	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Gliders	Balloons	Oth	Aircraft No.	Aircraft Pct.
Personal	281	249	25	4	3	9	7	2	4	2	0	296	65.5
Business	39	32	3	3	1	1	0	1	0	0	0	40	8.8
Corporate/Executive	5	1	1	2	1	0	0	0	0	0	0	5	1.1
Instructional	31	28	2	1	0	2	2	0	1	0	0	34	7.5
Aerial Application	16	14	1	1	0	2	1	1	0	0	0	18	4.0
Other	46	36	3	2	5	11	6	5	0	2	0	59	13.1
Aircraft													
Number -	418	360	35	13	10	25	16	9	5	4	0	452	
Percent -	92.5	79.6	7.7	2.9	2.2	5.5	3.5	2.0	1.1	0.9	.0		

Table 46 - PILOTS BY TOTAL TIME AND TIME IN TYPE
FATAL ACCIDENTS
1990

Total time (hours)	Time in type (hours): 0-49	50-99	100-499	500-999	1000-4999	5000-9999	10000 or more	Not reptd	Pilots: No.	Pilots: Percent
0 - 49	6	0	0	0	0	0	0	1	7	1.5
50 - 99	11	6	0	0	0	0	0	2	19	4.2
100 - 499	35	14	27	0	0	0	0	27	103	22.8
500 - 999	11	7	25	8	0	0	0	27	78	17.3
1000 - 4999	15	11	26	15	16	0	0	55	138	30.5
5000 - 9999	6	1	6	2	8	2	0	12	37	8.2
1000 or more	3	1	4	2	8	2	1	14	35	7.7
Not reported	0	0	1	0	0	0	0	34	35	7.7
Pilots										
Number	87	40	89	27	32	4	1	172	452	
Percent	19.2	8.8	19.7	6.0	7.1	0.9	0.2	38.0		

Table 47 - PILOTS BY AGE AND KIND OF FLYING
FATAL ACCIDENTS
1990

Pilot age	Kind of Fling: Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	Pilots: No.	Pilots: Percent
15 - 19	1	0	0	3	0	0	4	0.9
20 - 24	18	0	0	6	0	2	26	5.8
25 - 29	13	1	0	6	0	7	27	6.0
30 - 34	27	2	0	6	2	7	44	9.7
35 - 39	31	4	0	6	5	3	49	10.8
40 - 44	35	7	0	1	3	8	54	11.9
45 - 49	34	5	1	2	0	12	54	11.9
50 - 54	31	4	1	0	1	8	45	10.0
55 - 59	29	5	2	0	2	2	40	8.8
60 - 64	34	4	1	2	3	4	48	10.6
65 - 69	17	4	0	2	2	2	27	6.0
70 or older	18	1	0	0	0	0	19	4.2
Not reported	8	3	0	0	0	4	15	3.3
Pilots								
Number -	296	40	5	34	18	59	452	
Percent -	65.5	8.8	1.1	7.5	4.0	13.1		

Table 48 - AIRCRAFT BY FIRST OCCURRENCE AND TYPE OF AIRCRAFT
SERIOUS INJURY ACCIDENTS
1990

Type of First Occurrence	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Abrupt maneuver	0	0	0	0	0	0	0	0	1	0	0	1	0.4
Airframe/component/system failure/malfunction	5	5	0	0	0	4	3	1	0	1	0	10	4.1
Dragged wing, rotor, pod, or float	0	0	0	0	0	0	0	0	1	0	0	1	0.4
Fire/explosion	1	1	0	0	0	0	0	0	0	0	0	1	0.4
Fire	1	1	0	0	0	0	0	0	0	0	0	1	0.4
Hard landing	3	2	1	0	0	0	0	0	1	4	0	8	3.3
Hazardous materials leak/spill (fumes/smoke)	1	1	0	0	0	0	0	0	0	0	0	1	0.4
In flight collision w/obj.	22	21	0	1	0	3	3	0	1	1	0	27	11.2
In flight collision w/ter.	12	11	0	1	0	2	1	1	0	1	0	15	6.2
In flight encounter w/wx.	12	10	0	1	1	1	1	0	0	8	0	21	8.7
Loss of control - in flight	43	37	6	0	0	2	1	1	4	0	0	49	20.2
Loss of control - on ground	6	6	0	0	0	0	0	0	0	1	0	7	2.9
Nose over	1	1	0	0	0	0	0	0	0	0	0	1	0.4
On ground collision w/obj.	1	1	0	0	0	0	0	0	0	0	0	1	0.4
On ground collision w/ter.	2	2	0	0	0	0	0	0	0	1	0	3	1.2
Overrun	3	2	1	0	0	0	0	0	0	0	0	3	1.2
Loss of power	9	8	0	1	0	3	1	2	0	0	0	12	5.0
Loss of power(total) - mech failure/malfunction	10	8	2	0	0	0	0	0	0	0	0	10	4.1
Loss of power(partial) - mech failure/malfunction	5	5	0	0	0	2	1	1	0	0	0	7	2.9
Loss of power(total) - non-mechanical	43	39	4	0	0	2	0	2	0	0	0	45	18.6
Loss of power(partial) - non-mechanical	6	6	0	0	0	1	0	1	0	0	0	7	2.9
Propeller/rotor contact	2	2	0	0	0	2	1	1	0	0	0	4	1.7
Roll over	0	0	0	0	0	1	1	0	0	0	0	1	0.4
Undershoot	2	2	0	0	0	0	0	0	0	0	0	2	0.8
Miscellaneous/other	1	1	0	0	0	2	1	1	0	0	0	3	1.2
Not reported	1	0	1	0	0	0	0	0	0	0	0	1	0.4
Aircraft Number -	192	172	15	4	1	25	14	11	8	17	0	242	
Percent -	79.3	71.1	6.2	1.7	0.4	10.3	5.8	4.5	3.3	7.0	.0		

Table 49 - AIRCRAFT BY FIRST OCCURRENCE AND KIND OF FLYING
SERIOUS INJURY ACCIDENTS
1990

Type of First Occurrence	Kind of Flying						Aircraft	
	Personal	Business	Corp/Exec.	Instruct.	Aer. App.	Other	No.	Percent
Abrupt maneuver	1	0	0	0	0	0	1	0.4
Airframe/component/system failure/malfunction	6	0	0	0	1	3	10	4.1
Dragged wing, rotor, pod, or float	1	0	0	0	0	0	1	0.4
Fire/explosion	1	0	0	0	0	0	1	0.4
Fire	1	0	0	0	0	0	1	0.4
Hard landing	4	0	0	1	0	3	8	3.3
Hazardous materials leak/spill (fumes/smoke)	0	0	0	0	1	0	1	0.4
In flight collision with object	13	1	0	3	6	4	27	11.2
In flight collision with terrain	10	1	0	0	1	3	15	6.2
In flight encounter with weather	9	0	1	2	0	9	21	8.7
Loss of control - in flight	28	5	0	8	1	7	49	20.2
Loss of control - on ground	7	0	0	0	0	0	7	2.9
Nose over	1	0	0	0	0	0	1	0.4
On ground collision with object	1	0	0	0	0	0	1	0.4
On ground collision with terrain	2	0	0	0	0	1	3	1.2
Overrun	3	0	0	0	0	0	3	1.2
Loss of power	6	3	0	1	1	1	12	5.0
Loss of power(total) - mech failure/malfunction	6	1	0	0	2	1	10	4.1
Loss of power(partial) - mech failure/malfunction	3	0	0	0	1	3	7	2.9
Loss of power(total) - non-mechanical	35	3	0	2	1	4	45	18.6
Loss of power(partial) - non-mechanical	2	2	0	0	1	2	7	2.9
Propeller/rotor contact	2	2	0	0	0	0	4	1.7
Roll over	0	0	0	0	0	1	1	0.4
Undershoot	2	0	0	0	0	0	2	0.8
Miscellaneous/other	0	0	0	0	0	3	3	1.2
Not reported	0	1	0	0	0	0	1	0.4
Aircraft								
Number -	144	19	1	17	16	45	242	
Percent -	59.5	7.9	0.4	7.0	6.6	18.6		

Table 50 - AIRCRAFT BY FIRST PHASE OF OPERATION AND TYPE OF AIRCRAFT
SERIOUS INJURY ACCIDENTS
1990

Phase of Operation	Type of Aircraft											Aircraft	
	All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	No.	Pct
Standing	1	1	0	0	0	1	0	1	0	0	0	2	0.8
Standing - starting engine(s)	1	1	0	0	0	0	0	0	0	0	0	1	0.4
Standing - engine(s) operating	1	1	0	0	0	1	1	0	0	0	0	2	0.8
Standing - idling rotors	0	0	0	0	0	2	1	1	0	0	0	2	0.8
Takeoff	8	7	1	0	0	2	1	1	0	1	0	11	4.5
Takeoff - ground run	3	3	0	0	0	0	0	0	0	0	0	3	1.2
Takeoff - initial climb	60	56	2	2	0	1	1	0	3	1	0	65	26.9
Climb	5	5	0	0	0	0	0	0	0	0	0	5	2.1
Climb - to cruise	7	5	1	0	1	0	0	0	0	0	0	7	2.9
Cruise	16	16	0	0	0	3	2	1	0	8	0	27	11.2
Cruise - normal	13	12	1	0	0	2	2	0	0	0	0	15	6.2
Descent	1	1	0	0	0	0	0	0	0	0	0	1	0.4
Descent - normal	5	5	0	0	0	0	0	0	0	0	0	5	2.1
Descent - uncontrolled	0	0	0	0	0	1	1	0	0	0	0	1	0.4
Approach	3	2	1	0	0	1	0	1	0	0	0	4	1.7
Approach - VFR pattern - downwind	2	1	1	0	0	0	0	0	0	0	0	2	0.8
Approach - VFR pattern base turn	1	1	0	0	0	0	0	0	1	0	0	2	0.8
Approach - VFR pattern - base to final	3	3	0	0	0	0	0	0	0	0	0	3	1.2
Approach - VFR pattern - final approach	9	8	1	0	0	1	1	0	1	0	0	11	4.5
Approach - go-around (VFR)	8	5	3	0	0	0	0	0	0	0	0	8	3.3
Approach - IAF to FAF/ outer marker (IFR)	1	0	0	1	0	0	0	0	0	0	0	1	0.4
Approach - circling(IFR)	1	1	0	0	0	0	0	0	0	0	0	1	0.4
Landing	2	2	0	0	0	0	0	0	1	1	0	4	1.7
Landing - flare/touchdown	6	5	1	0	0	0	0	0	2	6	0	14	5.8
Landing - roll	6	5	1	0	0	0	0	0	0	0	0	6	2.5
Maneuvering	13	12	1	0	0	1	0	1	0	0	0	14	5.8
Maneuvering - aerial application	6	5	0	1	0	3	2	1	0	0	0	9	3.7
Maneuvering - turn to reverse direction	4	4	0	0	0	1	1	0	0	0	0	5	2.1
Hover	0	0	0	0	0	4	1	3	0	0	0	4	1.7
Other	5	5	0	0	0	1	0	1	0	0	0	6	2.5
Not reported	1	0	1	0	0	0	0	0	0	0	0	1	0.4
Aircraft Number -	192	172	15	4	1	25	14	11	8	17	0	242	
Percent -	79.3	71.1	6.2	1.7	0.4	10.3	5.8	4.5	3.3	7.0	.0		

Table 51 - AIRCRAFT BY FIRST PHASE OF OPERATION AND KIND OF FLYING
SERIOUS INJURY ACCIDENTS
1990

Phase of Operation	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Standing	1	0	0	0	0	1	2	0.8
Standing - starting engine(s)	1	0	0	0	0	0	1	0.4
Standing - engine(s) operating	1	1	0	0	0	0	2	0.8
Standing - idling rotors	0	1	0	0	0	1	2	0.8
Takeoff	8	0	0	0	0	3	11	4.5
Takeoff - ground run	3	0	0	0	0	0	3	1.2
Takeoff - initial climb	45	5	0	3	3	9	65	26.9
Climb	3	1	0	0	0	1	5	2.1
Climb - to cruise	4	1	1	0	0	1	7	2.9
Cruise	14	3	0	0	1	9	27	11.2
Cruise - normal	11	0	0	1	1	2	15	6.2
Descent	0	0	0	1	0	0	1	0.4
Descent - normal	4	0	0	0	0	1	5	2.1
Descent - uncontrolled	1	0	0	0	0	0	1	0.4
Approach	2	0	0	0	0	2	4	1.7
Approach - VFR pattern - downwind	1	0	0	0	0	1	2	0.8
Approach - VFR pattern - base turn	1	0	0	1	0	0	2	0.8
Approach - VFR pattern - base to final	2	0	0	1	0	0	3	1.2
Approach - VFR pattern - final approach	6	1	0	2	0	2	11	4.5
Approach - go-around (VFR)	6	1	0	1	0	0	8	3.3
Approach - IAF to FAF/outer marker (IFR)	0	1	0	0	0	0	1	0.4
Approach - circling(IFR)	0	1	0	0	0	0	1	0.4
Landing	3	0	0	1	0	0	4	1.7
Landing - flare/touchdown	8	0	0	1	0	5	14	5.8
Landing - roll	6	0	0	0	0	0	6	2.5
Maneuvering	8	1	0	4	0	1	14	5.8
Maneuvering - aerial application	0	0	0	0	9	0	9	3.7
Maneuvering - turn to reverse direction	3	0	0	0	2	0	5	2.1
Hover	0	0	0	0	0	4	4	1.7
Other	2	1	0	1	0	2	6	2.5
Not reported	0	1	0	0	0	0	1	0.4
Aircraft								
Number -	144	19	1	17	16	45	242	
Percent -	59.5	7.9	0.4	7.0	6.6	18.6		

Table 52 - AIRCRAFT BY KIND OF FLYING AND TYPE OF AIRCRAFT
SERIOUS INJURY ACCIDENTS
1990

Kind of Flying	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Personal	131	125	6	0	0	3	3	0	5	5	0	144	59.5
Business	15	12	2	1	0	3	1	2	0	1	0	19	7.9
Corporate/Executive	1	0	0	0	1	0	0	0	0	0	0	1	0.4
Instructional	14	12	2	0	0	0	0	0	3	0	0	17	7.0
Aerial Application	12	10	0	2	0	4	3	1	0	0	0	16	6.6
Other	19	13	5	1	0	15	7	8	0	11	0	45	18.6
Aircraft													
Number -	192	172	15	4	1	25	14	11	8	17	0	242	
Percent -	79.3	71.1	6.2	1.7	0.4	10.3	5.8	4.5	3.3	7.0	.0		

Table 53 - PILOTS BY TOTAL TIME AND TIME IN TYPE
SERIOUS INJURY ACCIDENTS
1990

Total time (hours)	Time in type (hours): 0-49	50-99	100-499	500-999	1000-4999	5000-9999	10000 or more	Not reptd	Pilots: No.	Pilots: Percent
0 - 49	6	0	0	0	0	0	0	1	7	2.9
50 - 99	6	2	0	0	0	0	0	0	8	3.3
100 - 499	27	12	23	0	0	0	0	9	71	29.3
500 - 999	4	2	10	9	0	0	0	7	32	13.2
1000 - 4999	14	8	19	9	16	0	0	8	74	30.6
5000 - 9999	3	0	1	4	5	0	0	1	14	5.8
1000 or more	3	0	3	1	7	3	2	3	22	9.1
Not reported	0	0	0	1	0	0	0	13	14	5.8
Pilots										
Number	63	24	56	24	28	3	2	42	242	
Percent	26.0	9.9	23.1	9.9	11.6	1.2	0.8	17.4		

Table 54 - PILOTS BY AGE AND KIND OF FLYING
SERIOUS INJURY ACCIDENTS
1990

Pilot age	Kind of Flying						Pilots	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
15 - 19	1	0	0	0	0	1	2	0.8
20 - 24	3	0	0	4	0	1	8	3.3
25 - 29	13	1	0	1	1	2	18	7.0
30 - 34	16	1	0	2	2	7	28	11.6
35 - 39	17	3	0	2	0	6	28	11.6
40 - 44	19	3	0	1	5	13	41	16.9
45 - 49	20	3	0	2	1	3	29	12.0
50 - 54	10	2	0	1	2	4	19	7.9
55 - 59	12	2	0	1	3	3	21	8.7
60 - 64	12	1	0	0	0	1	14	5.8
65 - 69	8	1	0	0	1	1	11	4.5
70 or older	8	1	0	1	0	1	11	4.5
Not reported	5	1	1	2	1	2	12	5.0
Pilots								
Number -	144	19	1	17	16	45	242	
Percent -	59.5	7.9	0.4	7.0	6.6	18.6		

Table 55 - AIRCRAFT BY FIRST OCCURRENCE AND TYPE OF AIRCRAFT
PROPERTY DAMAGE ACCIDENTS
1990

Type of First Occurrence	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Abrupt maneuver	5	4	1	0	0	1	1	0	0	0	0	6	0.4
Altitude deviation, uncontrolled	1	1	0	0	0	0	0	0	0	0	0	1	0.1
Airframe/component/system failure/malfunction	51	42	8	1	0	16	14	2	3	0	0	70	4.5
Dragged wing, rotor, pod, or float	4	2	0	1	1	1	1	0	0	0	0	5	0.3
Fire/explosion	1	1	0	0	0	0	0	0	0	0	0	1	0.1
Fire	6	6	0	0	0	1	0	1	0	0	0	7	0.5
Forced landing	0	0	0	0	0	2	1	1	0	0	0	2	0.1
Gear collapsed	6	3	3	0	0	0	0	0	0	0	0	6	0.4
Main gear collapsed	12	5	6	1	0	0	0	0	0	0	0	12	0.8
Nose gear collapsed	6	4	2	0	0	0	0	0	0	0	0	6	0.4
Complete gear collapsed	2	1	1	0	0	0	0	0	0	0	0	2	0.1
Gear not extended	10	6	2	2	0	0	0	0	0	0	0	10	0.6
Hard landing	66	61	3	2	0	5	3	2	0	0	0	71	4.6
In flight collision w/obj.	63	62	1	0	0	15	8	7	7	1	0	86	5.6
In flight collision w/ter.	38	37	1	0	0	9	9	0	0	0	0	47	3.0
In flight encounter w/wx.	43	37	4	1	1	5	2	3	5	3	0	56	3.6
Loss of control-in flight	132	124	5	3	0	27	22	5	2	0	0	161	10.4
Loss of control-on ground	245	237	7	1	0	5	4	1	2	0	0	252	16.3
Midair collision	12	11	0	1	0	5	1	4	0	0	0	17	1.1
Near collision between aircraft	1	1	0	0	0	0	0	0	0	0	0	1	0.1
Nose over	23	23	0	0	0	1	1	0	0	0	0	24	1.6
On ground collision w/obj.	55	51	3	0	1	0	0	0	3	0	0	58	3.8
On ground collision w/ter.	26	22	2	1	1	0	0	0	0	0	0	26	1.7
On ground encounter w/wx.	17	17	0	0	0	0	0	0	0	0	0	17	1.1
Overrun	57	49	7	0	1	0	0	0	0	0	0	57	3.7
Loss of power	69	60	8	1	0	9	8	1	0	1	0	79	5.1
Loss of power(total) - mech failure/malfunction	63	59	3	0	1	10	6	4	0	0	1	74	4.8
Loss of power(partial) - mech failure/malfunction	49	44	4	1	0	4	4	0	0	0	0	53	3.4
Loss of power(total) - non-mechanical	230	211	16	3	0	14	8	6	0	0	0	244	15.8
Loss of power(partial) - non-mechanical	33	32	0	1	0	4	3	1	0	0	0	37	2.4
Propeller blast or jet exhaust/suction	2	1	0	1	0	0	0	0	0	0	0	2	0.1
Roll over	0	0	0	0	0	7	6	1	0	0	0	7	0.5
Undershoot	16	13	2	0	1	1	0	1	2	0	0	19	1.2
Vortex turbulence encountered	3	3	0	0	0	0	0	0	0	0	0	3	0.2
Miscellaneous/other	10	10	0	0	0	2	1	1	3	0	0	15	1.0
Not reported	10	5	5	0	0	2	1	1	0	0	0	12	0.8
Aircraft Number -	1367	1245	94	21	7	146	104	42	27	5	1	1546	
Aircraft Percent -	88.4	80.5	6.1	1.4	0.5	9.4	6.7	2.7	1.7	0.3	0.1		

Table 56 - AIRCRAFT BY FIRST OCCURRENCE AND KIND OF FLYING
PROPERTY DAMAGE ACCIDENTS
1990

Type of First Occurrence	Kind of Flying						Aircraft	
	Personal	Business	Corp/Exec.	Instruct.	Aer. App.	Other	No.	Percent
Abrupt maneuver	4	1	0	0	0	1	6	0.4
Altitude deviation,uncontrolled	1	0	0	0	0	0	1	0.1
Airframe/component/system failure/malfunction	39	4	0	6	11	10	70	4.5
Dragged wing, rotor, pod, or float	4	1	0	0	0	0	5	0.3
Fire/explosion	0	0	0	0	0	1	1	0.1
Fire	4	2	0	0	1	0	7	0.5
Forced landing	0	0	0	1	0	1	2	0.1
Gear collapsed	3	3	0	0	0	0	6	0.4
Main gear collapsed	7	0	1	3	0	1	12	0.8
Nose gear collapsed	3	0	0	2	0	1	6	0.4
Complete gear collapsed	1	0	0	1	0	0	2	0.1
Gear not extended	5	1	1	1	0	2	10	0.6
Hard landing	36	4	1	28	2	0	71	4.6
In flight collision with object	52	3	0	7	15	9	86	5.6
In flight collision with terrain	24	2	0	6	13	2	47	3.0
In flight encounter with weather	35	5	1	11	1	3	56	3.6
Loss of control - in flight	97	4	1	39	10	10	161	10.4
Loss of control - on ground	169	8	0	57	7	11	252	16.3
Midair collision	6	1	0	5	0	5	17	1.1
Near collision between aircraft	1	0	0	0	0	0	1	0.1
Nose over	19	1	0	1	3	0	24	1.6
On ground collision with object	39	4	1	10	0	4	58	3.8
On ground collision with terrain	9	4	1	3	5	4	26	1.7
On ground encounter with weather	14	1	0	2	0	0	17	1.1
Overrun	42	4	0	8	0	3	57	3.7
Loss of power	39	3	0	12	14	11	79	5.1
Loss of power(total) - mech failure/malfunction	42	5	1	5	9	12	74	4.8
Loss of power(partial) - mech failure/malfunction	29	2	0	6	13	3	53	3.4
Loss of power(total) - non-mechanical	159	18	1	32	12	22	244	15.8
Loss of power(partial) - non-mechanical	19	4	0	5	3	6	37	2.4
Propeller blast or jet exhaust/suction	1	0	0	0	0	1	2	0.1
Roll over	2	1	0	3	0	1	7	0.5
Undershoot	10	2	0	6	0	1	19	1.2
Vortex turbulence encountered	3	0	0	0	0	0	3	0.2
Miscellaneous/other	9	0	0	4	0	2	15	1.0
Not reported	6	2	0	1	1	2	12	0.8
Aircraft								
Number -	933	90	9	265	120	129	1546	
Percent -	60.3	5.8	0.6	17.1	7.8	8.3		

Table 57 - AIRCRAFT BY FIRST PHASE OF OPERATION AND TYPE OF AIRCRAFT
PROPERTY DAMAGE ACCIDENTS
1990

Phase of Operation	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Standing - starting engine(s)	7	7	0	0	0	0	0	0	0	0	0	7	0.5
Standing - engine(s) operating	6	6	0	0	0	0	0	0	0	0	0	6	0.4
Standing - idling rotors	0	0	0	0	0	2	2	0	0	0	0	2	0.1
Taxi	9	9	0	0	0	0	0	0	0	0	0	9	0.6
Taxi - to takeoff	26	22	3	1	0	1	1	0	0	0	0	27	1.7
Taxi - from landing	19	16	2	0	1	0	0	0	0	0	0	19	1.2
Taxi - aerial	1	1	0	0	0	3	1	2	0	0	0	4	0.3
Takeoff	22	21	1	0	0	8	7	1	1	0	0	31	2.0
Takeoff - ground run	73	68	3	2	0	0	0	0	3	0	0	76	4.9
Takeoff - initial climb	173	161	10	2	0	12	10	2	3	0	0	188	12.2
Climb	8	7	1	0	0	0	0	0	0	0	0	8	0.5
Climb - to cruise	14	9	4	0	1	1	0	1	0	0	0	15	1.0
Cruise	79	74	2	3	0	16	8	8	2	1	1	99	6.4
Cruise - normal	129	117	9	3	0	16	13	3	0	2	0	147	9.5
Descent	8	8	0	0	0	2	2	0	0	0	0	10	0.6
Descent - normal	21	20	0	1	0	0	0	0	1	0	0	22	1.4
Descent - emergency	1	1	0	0	0	2	2	0	1	0	0	4	0.3
Descent - uncontrolled	2	2	0	0	0	1	1	0	0	0	0	3	0.2
Approach	15	13	2	0	0	1	1	0	1	0	0	17	1.1
Approach - VFR pattern - downwind	16	13	3	0	0	2	1	1	0	0	0	18	1.2
Approach - VFR pattern - base turn	9	9	0	0	0	0	0	0	0	0	0	9	0.6
Approach - VFR pattern - base to final	12	10	1	0	1	1	1	0	1	0	0	14	0.9
Approach - VFR pattern - final approach	88	80	5	1	2	6	4	2	5	1	0	100	6.5
Approach - go-around (VFR)	26	22	3	1	0	2	2	0	0	0	0	28	1.8
Approach - IAF to FAF/ outer marker (IFR)	2	2	0	0	0	0	0	0	0	0	0	2	0.1
Approach - FAF/outer marker to threshold (IFR)	6	4	2	0	0	0	0	0	0	0	0	6	0.4
Approach - missed approach (IFR)	1	0	1	0	0	0	0	0	0	0	0	1	0.1
Landing	22	18	3	1	0	9	5	4	1	1	0	33	2.1
Landing - flare/ touchdown	153	141	10	2	0	13	9	4	1	0	0	167	10.8
Landing - roll	257	234	19	2	2	1	1	0	4	0	0	262	16.9
Maneuvering	43	42	1	0	0	18	10	8	2	0	0	63	4.1
Maneuvering - aerial application	42	42	0	0	0	11	10	1	0	0	0	53	3.4
Maneuvering - turn to reverse direction	9	9	0	0	0	1	1	0	0	0	0	10	0.6
Maneuvering - turn to landing area (emergency)	0	0	0	0	0	0	0	0	1	0	0	1	0.1
Hover	0	0	0	0	0	15	11	4	0	0	0	15	1.0
Other	55	51	3	1	0	0	0	0	0	0	0	55	3.6
Unknown	3	1	1	1	0	0	0	0	0	0	0	3	0.2
Not reported	10	5	5	0	0	2	1	1	0	0	0	12	0.8
Aircraft Number -	1367	1245	94	21	7	146	104	42	27	5	1	1546	
Aircraft Percent -	88.4	80.5	6.1	1.4	0.5	9.4	6.7	2.7	1.7	0.3	0.1		

Table 58 - AIRCRAFT BY FIRST PHASE OF OPERATION AND KIND OF FLYING
PROPERTY DAMAGE ACCIDENTS
1990

Phase of Operation	Kind of Flying						Aircraft	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
Standing - starting engine(s)	5	1	0	0	0	1	7	0.5
Standing - engine(s) operating	2	0	0	3	0	1	6	0.4
Standing - idling rotors	1	0	0	1	0	0	2	0.1
Taxi	7	0	0	1	0	1	9	0.6
Taxi - to takeoff	18	2	0	3	0	4	27	1.7
Taxi - from landing	15	2	1	1	0	0	19	1.2
Taxi - aerial	1	0	1	1	0	1	4	0.3
Takeoff	16	3	0	4	4	4	31	2.0
Takeoff - ground run	48	4	0	15	5	4	76	4.9
Takeoff - initial climb	127	5	0	20	20	16	188	12.2
Climb	6	1	0	1	0	0	8	0.5
Climb - to cruise	9	1	1	0	0	4	15	1.0
Cruise	59	14	0	11	7	8	99	6.4
Cruise - normal	103	10	1	11	1	21	147	9.5
Descent	7	0	0	2	0	1	10	0.6
Descent - normal	16	1	0	2	1	2	22	1.4
Descent - emergency	2	0	0	2	0	0	4	0.3
Descent - uncontrolled	2	0	0	0	1	0	3	0.2
Approach	11	1	0	4	0	1	17	1.1
Approach - VFR pattern - downwind	13	2	0	2	0	1	18	1.2
Approach - VFR pattern - base turn	2	2	0	4	0	1	9	0.6
Approach - VFR pattern - base to final	7	1	0	2	0	4	14	0.9
Approach - VFR pattern - final approach	64	3	1	24	3	5	100	6.5
Approach - go-around (VFR)	18	2	0	8	0	0	28	1.8
Approach - IAF to FAF/outer marker (IFR)	1	1	0	0	0	0	2	0.1
Approach - FAF/outer marker to threshold (IFR)	2	2	0	1	0	1	6	0.4
Approach - missed approach (IFR)	0	0	0	1	0	0	1	0.1
Landing	15	2	0	12	1	3	33	2.1
Landing - flare/touchdown	94	5	1	56	5	6	167	10.8
Landing - roll	183	13	3	43	10	10	262	16.9
Maneuvering	25	5	0	11	3	19	63	4.1
Maneuvering - aerial application	0	1	0	0	51	1	53	3.4
Maneuvering - turn to reverse direction	2	0	0	1	7	0	10	0.6
Maneuvering - turn to landing area (emergency)	1	0	0	0	0	0	1	0.1
Hover	5	0	0	7	0	3	15	1.0
Unknown	2	0	0	0	0	1	3	0.2
Not reported	6	2	0	1	1	2	12	0.8
Other	38	4	0	10	0	3	55	3.6
Aircraft								
Number -	933	90	9	265	120	129	1546	
Percent -	60.3	5.8	0.6	17.1	7.8	8.3		

Table 59 - AIRCRAFT BY KIND OF FLYING AND TYPE OF AIRCRAFT
PROPERTY DAMAGE ACCIDENTS
1990

Kind of Flying	Type of Aircraft: All Fixed Wing	Fixed Wing Singl Recip Engin	Fixed Wing Multi Recip Engin	Fixed Wing Turbo prop	Fixed Wing Turbo Jet	All Rotor craft	Rotor craft Recip Engin	Rotor craft Turb Engin	Glid ers	Bal loons	Oth	Aircraft No.	Aircraft Pct
Personal	867	818	45	2	2	42	34	8	21	3	0	933	60.3
Business	74	49	16	8	1	14	8	6	0	1	1	90	5.8
Corporate/Executive	8	1	3	1	3	1	0	1	0	0	0	9	0.6
Instructional	226	214	11	1	0	34	30	4	5	0	0	265	17.1
Aerial Application	100	98	0	2	0	20	20	0	0	0	0	120	7.8
Other	92	65	19	7	1	35	12	23	1	1	0	129	8.3
Aircraft													
Number -	1367	1245	94	21	7	146	104	42	27	5	1	1546	
Percent -	88.4	80.5	6.1	1.4	0.5	9.4	6.7	2.7	1.7	0.3	0.1		

Table 60 - PILOTS BY TOTAL TIME AND TIME IN TYPE
PROPERTY DAMAGE ACCIDENTS
1990

Total time (hours)	Time in type (hours): 0-49	50-99	100-499	500-999	1000-4999	5000-9999	10000 or more	Not reptd	Pilots: No.	Pilots: Percent
0 - 49	105	0	0	0	0	0	0	6	111	7.2
50 - 99	56	48	0	0	0	0	0	4	108	7.0
100 - 499	145	73	141	0	0	0	0	30	389	25.2
500 - 999	40	32	103	35	0	0	0	12	222	14.3
1000 - 4999	79	33	123	56	88	0	0	22	401	25.9
5000 - 9999	19	9	35	15	46	13	0	7	144	9.3
1000 or more	9	6	28	13	35	26	3	2	122	7.9
Not reported	1	0	2	0	1	0	0	45	49	3.2
Pilots										
Number	454	201	432	119	170	39	3	128	1546	
Percent	29.4	13.0	27.9	7.7	11.0	2.5	0.2	8.3		

Table 61 - PILOTS BY AGE AND KIND OF FLYING
PROPERTY DAMAGE ACCIDENTS
1990

Pilot age	Kind of Flying						Pilots	
	Personal	Business	Corp/ Exec.	Instruct.	Aer. App.	Other	No.	Percent
15 - 19	5	0	0	12	1	0	18	1.2
20 - 24	40	1	0	44	5	6	96	6.2
25 - 29	69	2	1	49	11	15	147	9.5
30 - 34	103	11	0	36	13	17	180	11.6
35 - 39	126	16	0	31	25	20	218	14.1
40 - 44	133	12	4	31	18	25	223	14.4
45 - 49	125	21	0	19	13	10	188	12.2
50 - 54	85	7	2	15	11	9	129	8.3
55 - 59	83	9	1	10	13	7	123	8.0
60 - 64	66	3	0	3	9	6	87	5.6
65 - 69	49	1	1	5	0	5	61	3.9
70 or older	27	2	0	1	0	3	33	2.1
Not reported	22	5	0	9	1	6	43	2.8
Pilots								
Number -	933	90	9	265	120	129	1546	
Percent -	60.3	5.8	0.6	17.1	7.8	8.3		

Table 62 - SUMMARY OF LOSSES
MIDAIR COLLISION ACCIDENTS
(One or Both Aircraft General Aviation)
1986 - 1990

	1986	1987	1988	1989	1990
Accidents					
Fatal	17	13	9	12	12
Involved Serious Injury	4	1	2	1	0
Involved Minor Injury	3	1	2	2	1
Involved No Injury	5	10	6	3	8
Total	29	25	19	18	21
Fatalities					
Passenger	29	8	2	13	3
Crew	28	23	12	27	22
Other Persons	79	13	2	1	1
Total	136	44	16	41	26
Aircraft Damage*					
Destroyed	26	20	15	22	19
Substantial	24	16	15	9	16
Minor	5	6	5	3	4
None	1	1	1	1	0
Total	56	43	36	35	39

* Number of General Aviation Aircraft

Table 63 - ACCIDENTS BY TYPES OF OPERATIONS
MIDAIR COLLISION ACCIDENTS
1981 - 1990

Year	Accidents		Total	Number of Accidents Involving A General Aviation Aircraft AND						
	Total	Fatal	Fatalities	121	S135	N135	GA	US Mil	Forgn	NotReg
1981	29	12	45	0	1	2	25	1	0	0
1982	28	17	56	0	1	1	25	0	1	0
1983	12	7	22	0	0	1	10	0	1	0
1984	25	14	47	0	1	0	24	0	0	0
1985	23	13	35	0	0	0	19	2	1	1
1986	29	17	136	0	0	0	27	1	1	0
1987	25	13	44	0	3	2	18	2	0	0
1988	19	9	16	0	0	2	17	0	0	0
1989	18	12	41	0	0	1	17	0	0	0
1990	21	12	26	0	2	0	18	1	0	0
	229	126	468	0	8	9	200	7	4	1

NOTE: 121 = 14 CFR 121, 125 or 127 Operation
S135 = Scheduled 14 CFR 135 Operation
N135 = Nonscheduled 14 CFR 135 Operation
GA = General Aviation Operation
US Mil = United States Military Operation
Forgn = Foreign Registered Aircraft Operation
Not Reg = Operation by Unregistered Aircraft

Table 64 - ACCIDENTS BY WEATHER AND VISIBILITY
MIDAIR COLLISION ACCIDENTS
1990

Weather Conditions	Accidents	
	No.	Percent
Visual Meteorological Conditions (VMC)	21	100.0
Instrument Meteorological Conditions (IMC)	0	.0
Total	21	100.0
Visibility		
Greater than, Equal to 5 Miles, Less Than 10 Miles	4	19.0
Greater than, Equal to 10 Miles, Less than 20 Miles	7	33.3
Greater than, Equal to 20 Miles	10	47.6
Total	21	100.0

Table 65 - ACCIDENTS BY PHASES OF OPERATION
MIDAIR COLLISION ACCIDENTS
1990

Phases of Operation		Accidents*	
Aircraft	Aircraft 2	No.	Percent
Climb to Cruise	Cruise	1	4.8
Total (Either or Both Aircraft in Climb Phase)		1	4.8
Cruise	Cruise	2	9.5
Cruise	Landing	1	4.8
Cruise	Maneuvering	1	4.8
Cruise	Climb to Cruise	1	4.8
Cruise - Normal	Cruise - Normal	1	4.8
Cruise - Normal	Maneuvering	1	4.8
Cruise - Normal	Descent - Normal	1	4.8
Total (Either or Both Aircraft in Cruise Phase)		8	38.1
Descent - Normal	Approach - VFR Pattern - Downwind	1	4.8
Descent - Normal	Cruise - Normal	1	4.8
Total (Either or Both Aircraft in Descent Phase)		2	9.5
Approach - VFR Pattern Downwind	Approach - VFR Pattern Downwind	1	4.8
Approach - VFR Pattern - Downwind	Descent - Normal	1	4.8
Approach - VFR Pattern - Final Approach	Approach - VFR Pattern - Final Approach	4	19.0
Total (Either or Both Aircraft in Approach Phase)		6	28.6
Landing	Cruise	1	4.8
Landing - Flare/Touchdown	Landing - Landing Roll	1	4.8
Landing - Landing Roll	Landing - Flare/Touchdown	1	4.8
Total (Either or Both Aircraft in Landing Phase)		3	14.3
Maneuvering	Maneuvering	4	19.0
Maneuvering	Cruise	1	4.8
Maneuvering	Cruise - Normal	1	4.8
Maneuvering - Aerial Application	Maneuvering - Aerial Application	1	4.8
Maneuvering - Turn to Reverse Direction	Maneuvring - Turn to Reverse Direction	1	4.8
Total (Either or Both Aircraft in Maneuvering Phase)		8	38.1
Total Number of Midair Accidents		21	

* Midair collision accidents in this table are grouped according to the Phase of Operation of ONE of the involved aircraft. Column totals do not equal the total number of accidents since collisions between aircraft with different phases of operation are listed in both groupings.*

Table 66 - ACCIDENTS BY TYPE OF FLIGHT PLANS FILED
MIDAIR COLLISION ACCIDENTS
1990

Types of Flight Plan Filed	Accidents*	
	No.	Percent
None and None	16	76.2
None and VFR	2	9.5
None and IFR	1	4.8
None and Company (VFR)	1	4.8
Total (Either or Both Aircraft with No Flight Plan Filed)	20	95.2
VFR and VFR	1	4.8
VFR and None	2	9.5
Total (Either or Both Aircraft with VFR Flight Plan Filed)	2	9.5
IFR and None	1	4.8
Total (Either or Both Aircraft with IFR Flight Plan Filed)	1	4.8
Company (VFR) and None	1	4.8
Total (Either or Both Aircraft with Company (VFR) Flight Plan Filed)	1	4.8
IFR and None	1	4.8
Total (Either or Both Aircraft with IFR Flight Plan Filed)	1	4.8
Total Number of Midair Accidents	21	

* Midair collision accidents in this table are grouped according to the Type of Flight Plan filed by ONE of the involved aircraft. Column totals do not equal the total number of accidents since collisions between aircraft with different types of flight plans are listed in both groups.

Table 67 - ACCIDENTS BY TYPE OF AIRCRAFT
MIDAIR COLLISION ACCIDENTS
1990

Type(s) of Aircraft	Accidents	
	No.	Percent
Fixed Wing Single Engine Recip. and Fixed Wing Single Engine Recip.	14	66.7
Fixed Wing Single Engine Recip. and Fixed Wing Multiple Engine Recip.	4	19.0
Fixed Wing Turboprop and Rotorcraft, Turbine Engine	1	4.8
Total Fixed Wing (Either or Both Aircraft)	19	90.5
Rotorcraft, Reciprocating Engine and Rotorcraft, Turbine Engine	1	4.8
Rotorcraft, Turbine Engine and Rotorcraft, Turbine Engine	1	4.8
Rotorcraft, Turbine Engine and Fixed Wing Turboprop	1	4.8
Total Rotorcraft (Either or Both Aircraft)	3	14.3
Total Number of Midair Accidents	21	

* Midair collision accidents in this table are grouped according to the type of Aircraft of ONE of the involved aircraft. Column totals do not equal the total number of accidents since collisions between different types of aircraft are listed in both groupings.

Table 68 - ACCIDENTS BY KINDS OF FLYING
MIDAIR COLLISION ACCIDENTS
1990

Kind(s) of Flying	Accidents* No.	Percent
Personal and Personal	4	19.0
Personal and Instruction	4	19.0
Total (Personal Flying by Either or Both Aircraft)	8	38.1
Business and Instruction	1	4.8
Business and Other	1	4.8
Total (Business Flying By Either or Both Aircraft)	2	9.5
Aerial Application and Aerial Application	2	9.5
Total (Aerial Application by Either or Both Aircraft)	2	9.5
Instruction and Instruction	3	14.3
Instruction and Business	1	4.8
Instruction and Personal	4	19.0
Instruction and Other	2	9.5
Total (Instructional Flying by Either or Both Aircraft)	10	47.6
Other and Other	4	19.0
Other and Business	1	4.8
Other and Instruction	2	9.5
Total (Other Kind of Flying by Either or Both Aircraft)	7	33.3
Total Number of Midair Accidents	21	

* Midair collision accidents in this table are grouped according to the Kind of Flying of ONE of the involved aircraft. Column totals do not equal the total number of accidents since collisions between aircraft with different Kinds of Flying are listed in both groupings.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ CARL W. VOGT
Chairman

/s/ SUSAN M. COUGHLIN
Vice Chairman

/s/ JOHN K. LAUBER
Member

/s/ JOHN HAMMERSCHMIDT
Member

/s/ JIM HALL
Member

AIRCRAFT ACCIDENT: The accidents included in this report 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 Board's definition of substantial damage as stated in 49 CFR 830.2 is:

(1) Except as provided in subparagraph (2) of this paragraph, substantial damage means damage or structural 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 of 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".

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 two or more causes exist in 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.

KIND OF FLYING: The purpose for which the aircraft was being operated at the time of the accident. In this report, accident statistics are presented for five kinds of flying which are defined as follows:

Personal - Flying by individuals in their own or rented aircraft for pleasure, or personal transportation not in furtherance of their occupation or company business. This category includes practice flying (for the purpose of increasing or maintaining proficiency) not performed under supervision of an accredited instructor, and not part of an approved flight training program.

Business - The use of aircraft by pilots (not receiving direct salary or compensation for piloting) in connection with their occupation or in the furtherance of a private business.

Corporate/Executive - The use of aircraft owned or leased, and operated by a corporate or business firm for the transportation of personnel or cargo in furtherance of the corporation's or firm's business, and which are flown by professional pilots receiving a direct salary or compensation for piloting.

Aerial Application - The operation of aircraft for the purpose of dispensing any substance for plant nourishment, soil treatment, propagation of plant life, pest control, or fire control, including flying to and from the application site.

Instructional - Flying accomplished in supervised training under the direction of an accredited instructor.

PHASE OF OPERATION: The phase of the flight or operation is the particular phase of

flight in which the first occurrence or circumstance occurred. In the event that there was more than one occurrence in one operational phase, the same phase is recorded for each of those occurrences.

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. (49 CFR 830.2)

TYPE OF OCCURRENCE: "Occurrences" is the highest level of an accident classification mechanism known as the Sequence of Events. This concept was introduced in 1982 accident investigations to describe the circumstances in an accident. To describe an accident, up to five occurrences may be used. Typically each occurrence is further defined by one or more "findings" which, when presented chronologically depict the accident scenario from beginning to end in considerable detail. The findings are developed by NTSB analysts from a menu of words and phrases, and are the most detailed means of classifying an accident. The findings are also the vehicle used to describe the probable cause of, and related factors in an accident. The example below illustrates the relationship between occurrences and findings.

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

Finding(s)

1. WHEELS UP LANDING - INADVERTENT - PILOT IN COMMAND
2. IMPROPER USE OF PROCEDURE, DIVERTED ATTENTION - PILOT IN COMMAND

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 Aviation Regulations. These minima pertain to the ceiling and visibility, in conjunction with the type of airspace, at the accident site. Type of weather conditions is based on surface weather as detemined from officially recognized sources. Weather conditions encountered in flight are not necessarily representative of the classifications VMC/IMC as carried under Type of Weather Conditions.

APPENDIX B

CAUSE/FACTOR ASSIGNMENTS

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
AIRCRAFT		
1 engine	2	1
Aerial application equipment	1	0
Aircraft performance	1	1
Aircraft performance,climb capability	18	13
Aircraft performance,helicopter hover performance	1	1
Aircraft performance,hydroplaning condition	1	1
Aircraft performance,landing capability	2	1
Aircraft performance,takeoff capability	2	2
Autopilot/flight director	2	2
Balloon equipment	1	0
Balloon equipment,basket	1	1
Balloon equipment,heater system	3	1
Balloon equipment,suspension system	2	1
Bleed air system,governor	1	1
Bleed air system,valve	1	1
Carburetor heat control	2	1
Carburetor heat control,linkage	1	0
Comm/nav equipment	2	0
Comm/nav equipment,glide slope receiver	1	0
Comm/nav equipment,transceiver	1	0
Comm/nav equipment,transmitter	1	0
Compressor assembly	2	1
Compressor assembly,blade	2	2
Compressor assembly,rotor disc	1	1
Compressor assembly,stator vane	1	0
Cooling system,lines	1	1
Door	4	1
Door,cargo	1	0
Door,inspection	1	0
Door,passenger	3	1
Electrical system	4	2
Electrical system,alternator	2	0
Electrical system,battery	2	0
Electrical system,electric wiring	2	1
Electrical system,generator	1	1
Engine accessories,engine starter	2	2
Engine assembly	6	3
Engine assembly,bearing	3	2
Engine assembly,blower/impeller	3	3
Engine assembly,camshaft	3	1
Engine assembly,connecting rod	8	8
Engine assembly,connecting rod bolt	6	6
Engine assembly,connecting rod cap	4	4
Engine assembly,crankcase	2	1
Engine assembly,crankshaft	2	2
Engine assembly,cylinder	15	13
Engine assembly,master rod	1	0
Engine assembly,mount	1	0
Engine assembly,other	2	2
Engine assembly,piston	9	7
Engine assembly,ring	1	1
Engine assembly,rocker arm/tappet	7	5
Engine assembly,timing gear	2	2
Engine assembly,valve,exhaust	17	15
Engine assembly,valve,intake	5	5
Engine compartment	6	6
Engine instruments,fuel flow gage	1	0
Engine instruments,fuel quantity gage	8	0
Engine instruments,tachometer	1	0
Exhaust system	5	4
Exhaust system,baffle	2	2
Exhaust system,clamp	2	2
Exhaust system,exhaust cone	1	1
Exhaust system,manifold	4	4
Exhaust system,muffler	2	2
Exhaust system,stack	2	2
Exhaust system,turbocharger	1	0
Fire warning system,powerplant	1	1
Flashlight	1	0

	Cause or Factor	Cause
AIRCRAFT (continued)		
Flight control surfaces/attachments	1	1
Flight control,aileron	4	4
Flight control,aileron attachment	1	1
Flight control,elevator	1	1
Flight control,elevator attachment	1	1
Flight control,elevator surface	1	1
Flight control,rudder	2	2
Flight control,ruddervator	1	1
Flight/nav instruments	1	0
Flight/nav instruments,airspeed indicator	3	3
Flight/nav instruments,attitude indicator	1	0
Flight/nav instruments,heading indicator	1	0
Flt control syst, aileron control cable/rod	2	2
Flt control syst, elevator control cable/rod	2	1
Flt control syst, rudder	1	1
Flt control syst, rudder control attach points	1	1
Flt control syst, rudder control cable/rod	2	2
Flt control syst, stabilator contl attach points	1	0
Flt control syst, wing flap control attach points	1	0
Flt control syst, wing flap control bearing	1	0
Flt control syst, wing flap control cable/rod	1	0
Flt control syst, yoke/control stick	1	1
Flt control syst,aileron control	3	3
Flt control syst,elevator control	2	1
Flt control syst,rudder control	1	0
Flt control syst,rudder tab control(trim)	1	0
Flt control syst,wing spoiler system	1	1
Fluid,fuel	215	191
Fluid,fuel grade	3	1
Fluid,oil	15	13
Fluid,water	2	1
Fuel system	15	13
Fuel system,PC line	1	1
Fuel system,cap	9	6
Fuel system,carburetor	32	31
Fuel system,carburetor float	6	3
Fuel system,drain	2	0
Fuel system,electric boost pump	1	1
Fuel system,electric fuel trimming	1	0
Fuel system,filter	2	2
Fuel system,fuel control	6	4
Fuel system,fuel flow divider/distributor	1	1
Fuel system,fuel quantity float/sensor	4	0
Fuel system,line	11	10
Fuel system,line fitting	5	4
Fuel system,pump	5	5
Fuel system,ram air/induction air	1	1
Fuel system,screen	4	3
Fuel system,selector valve	4	2
Fuel system,strainer	2	1
Fuel system,tank	10	7
Fuel system,transfer pump	1	1
Fuel system,vapor return system	1	1
Fuel system,vent	7	7
Fuselage	3	2
Fuselage,cargo compartment	1	0
Fuselage,crew compartment	2	2
Fuselage,seat	2	2
Glider launch/tow equipment	2	2
Horizontal stabilizer surface	1	0
Hydraulic system,line	1	1
Hydraulic system,pump	1	0
Ignition system	5	2
Ignition system,distributor	1	1
Ignition system,ignition coil	1	1
Ignition system,ignition lead	3	2
Ignition system,ignition switch	1	0
Ignition system,magneto	13	11
Ignition system,magneto grounding lead (p-lead)	3	3

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
AIRCRAFT (continued)		
Ignition system,spark plug	8	5
Induction air control,air filter/screen	2	0
Induction air control,intake manifold	5	4
Induction air control,ram/induction air ducting	2	2
Induction air control/system	2	2
Instrument lights	1	0
Landing gear	3	0
Landing gear,axle	4	4
Landing gear,gear locking mechanism	4	4
Landing gear,gear warning system	3	0
Landing gear,main gear	4	4
Landing gear,main gear attachment	4	4
Landing gear,main gear shock absorbing strut	2	1
Landing gear,main gear spring	1	1
Landing gear,main gear strut	1	1
Landing gear,main gear strut scissors	1	1
Landing gear,normal brake system	8	8
Landing gear,normal retraction/extension assembly	7	6
Landing gear,nose gear	8	4
Landing gear,nose gear strut	2	2
Landing gear,parking brake	1	0
Landing gear,ski assembly	1	1
Landing gear,skid assembly	2	2
Landing gear,steering system	1	0
Landing gear,tailwheel assembly	1	1
Landing gear,tailwheel lock	2	1
Landing gear,tire	6	4
Landing gear,wheel	5	4
Lights	1	1
Lubricating system	4	1
Lubricating system,oil filler cap	2	2
Lubricating system,oil gasket	1	1
Lubricating system,oil hose	2	2
Lubricating system,oil line	3	3
Lubricating system,oil port/passage, internal	1	1
Lubricating system,oil pressure pump	2	2
Misc eqpt/furnishings,parachute/drag chute	2	2
Misc eqpt/furnishings,shoulder harness	1	0
Misc rotorcraft	1	1
Misc rotorcraft,tail boom	1	1
Misc rotorcraft,tail cone	1	0
Nacelle/pylon	1	0
Nacelle/pylon,fairing	1	1
Oxygen system,portable	1	1
Pitot/static system	4	3
Powerplant	18	12
Propeller control,linkage	1	0
Propeller governor control	1	1
Propeller governor control,cable	1	1
Propeller system/accessories	1	1
Propeller system/accessories,blade	8	7
Propeller system/accessories,counterweight	1	0
Propeller system/accessories,feathering system	2	2
Propeller system/accessories,governor	1	0
Propeller system/accessories,pitch change mech	1	1
Propeller system/accessories,prop blade retention	2	2
Ram/induction air	2	2
Rotor drive system	2	2
Rotor drive system,clutch assembly	1	1
Rotor drive system,engine to transmission drive	1	0
Rotor drive system,freewheeling sprag unit	1	1
Rotor drive system,tail rotor drive shaft	4	3
Rotor drive system,tail rotor drive shaft bearing	1	1
Rotor drive system,tail rotor drive shaft coupling	2	2
Rotor system,main rotor blade	3	1
Rotor system,main rotor hub pillow block	1	1
Rotorcraft flight control,collective control rod	1	1
Rotorcraft flight control,cyclic bellcrank	1	1
Rotorcraft flight control,cyclic control rod	2	2

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
AIRCRAFT (continued)		
Rotorcraft flight control,tail rotor cable	3	3
Rotorcraft flight control,tail rotor control	2	2
Rotorcraft flight control,tail rotor pedal	1	0
Sign towing equipment	1	1
Single engine aircraft	1	0
Stabilizer	4	3
Stall warning system	1	0
Throttle/power lever,bellcrank	2	2
Throttle/power lever,cable	3	3
Throttle/power lever,linkage	1	1
Turbine assembly,shaft bearing	1	1
Turboshaft engine	1	1
Turboshaft engine,free turbine governor	1	1
Vacuum system	2	0
Window,canopy	2	1
Window,flight compartment window/windshield	3	0
Wing	13	7
Wing,spar	1	1
Wing,wing attachment bolt	1	1
Wing,wing attachment fitting	1	1
FACILITY		
Airport facilities,ramp facilities	1	0
Airport facilities,rotating beacon	1	0
Airport facilities,runway edge lights	6	0
Airport facilities,runway marking	2	0
Airport facilities,runway/landing area condition	27	1
Airport facilities,taxiway marking	1	0
Airport facilities,wind direction indicator	2	0
Dirt bank	1	0
Missed approach procedure	1	1
Runway/landing area condition	1	0
ENVIRONMENT		
Aircraft parked	4	1
Airport facility	2	0
Animal(s)	6	6
Approach light/navaid	2	1
Below approach minimums	8	0
Bird(s)	2	2
Bright night	6	0
Building(nonresidential)	3	0
Carburetor icing conditions	42	10
Clouds	11	0
Crosswind	115	1
Dark night	81	0
Dawn	1	0
Downdraft	28	7
Drizzle	5	0
Dusk	8	0
Electrical tower	1	0
Fence	29	1
Fence post	3	1
Fog	52	0
Gusts	90	5
Guy wire	2	0
Haze/smoke	3	0
High density altitude	44	0
High wind	31	3
Ice fog	1	0
Icing conditions	18	1
Lightning	2	0
Low ceiling	54	1
Microburst/dry	4	4
Microburst/wet	1	1
Night	18	0
No thermal lift	3	1
None suitable	1	0
Obscuration	17	0

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
ENVIRONMENT (continued)		
Other	4	0
Other person	1	0
Pole	6	0
Rain	23	0
Residence	4	1
Runway light	1	0
Sign	3	0
Snow	9	0
Static discharge	1	1
Submerged object	1	1
Sunglare	13	0
Tailwind	65	1
Temperature extremes	3	0
Terrain condition	432	31
Thunderstorm	7	0
Tower, unmarked	1	0
Tree(s)	80	4
Turbulence	27	4
Turbulence in clouds	1	1
Turbulence(thunderstorms)	2	0
Turbulence, clear air	1	1
Unfavorable wind	31	5
Updraft	2	0
Utility pole	6	0
Vehicle	5	0
Wall/barricade	1	0
Water, rough	1	1
Weather condition	1	1
Whiteout	2	0
Windshear	8	3
Wire, static	13	0
Wire, transmission	27	0
FLIGHT CREW		
ATC clearance	1	1
Abort	9	8
Abort above V1	1	1
Aborted landing	5	4
Aborted takeoff	21	18
Acft/equip, inadequate control shape/size	1	0
Adequate rotor rpm	3	2
Aerobatics	17	9
Aileron	1	1
Air/ground communications	2	0
Aircraft control	127	123
Aircraft performance, climb capability	1	1
Aircraft preflight	84	76
Aircraft service	2	2
Aircraft unattended/engine(s) running	3	2
Aircraft weight and balance	23	7
Airplane handling	20	15
Airspeed	167	145
Airspeed(Vlof)	1	1
Airspeed(Vmc)	5	5
Airspeed(Vne)	1	1
Airspeed(Vref)	6	6
Airspeed(Vs)	37	35
Airspeed(Vso)	13	13
All available runway	7	3
Altimeter setting	1	0
Altitude	97	77
Anti-ice/de-ice system	4	4
Anxiety/apprenhension	3	0
Autopilot	1	0
Autorotation	10	5
Became lost/disoriented	11	4
Brakes(emergency)	1	0
Brakes(normal)	18	11
Buzzing	12	8

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
FLIGHT CREW(continued)		
Carburetor heat	48	45
Checklist	10	7
Clearance	94	91
Climb	12	10
Collective	2	1
Compensation for wind conditions	112	88
Complacency	6	1
Control interference	3	2
Crew/group briefing	1	1
Crew/group coordination	3	1
Cyclic	2	2
Decision height	4	4
Descent	16	14
Design stress limits of aircraft	16	15
Directional control	250	236
Distance	28	24
Diverted attention	25	9
Elevator	4	4
Elevator trim	1	0
Emergency procedure	26	18
Equipment, other	1	0
Excessive workload (task overload)	2	1
Fatigue	5	0
Fatigue(circadian rhythm)	1	0
Fatigue(lack of sleep)	6	0
Flare	69	62
Flight controls	27	20
Flight into known adverse weather	32	23
Flight manuals	2	1
Flight to alternate destination	1	1
Fluid,fuel	1	1
Fuel boost pump selector position	3	3
Fuel consumption calculations	35	26
Fuel supply	47	44
Fuel system	4	3
Fuel tank selector position	35	29
Gear down and locked	4	3
Gear extension	7	6
Gear retraction	4	4
Glider tow release	1	0
Go-around	47	40
Ground loop/swerve	41	29
Habit interference	3	0
Hydraulic system	1	1
IFR procedure	15	14
Ice/frost removal from aircraft	3	3
In flight briefing service	1	0
In flight weather advisories	1	0
In flight weather avoidance assistance	1	0
In-flight planning/decision	90	71
Inadequate initial training	2	0
Inadequate training	4	2
Inattentive	6	2
Incapacitation	3	3
Incapacitation(heart attack)	2	2
Incapacitation(loss of consciousness)	1	1
Incapacitation(organic problem)	1	1
Information insufficient	1	0
Information unclear(language)	1	0
Installation	1	1
Interpretation of instructions	1	0
Judgement	30	24
Lack of familiarity with aircraft	23	3
Lack of familiarity with geographic area	15	0
Lack of recent experience	7	2
Lack of recent experience in type of aircraft	2	0
Lack of recent experience in type operation	6	0
Lack of recent instrument time	3	0
Lack of recent total experience	3	0

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
FLIGHT CREW (continued)		
Lack of total experience	91	5
Lack of total experience in type of aircraft	54	4
Lack of total experience in type operation	27	1
Lack of total instrument time	15	1
Landed at wrong airport	2	1
Landing gear	1	1
Level off	11	9
Lift-off	27	18
Load jettison	3	1
Low pass	6	3
Lowering of flaps	14	6
Maintenance	7	6
Maintenance, adjustment	2	1
Maintenance, annual inspection	5	5
Maintenance, balancing	2	2
Maintenance, compliance with AD	1	0
Maintenance, inspection of aircraft	5	4
Maintenance, installation	9	7
Maintenance, pressurizing	1	1
Maintenance, replacement	2	2
Maintenance, service bulletins	1	0
Maintenance, service of aircraft	5	1
Maneuver	5	2
Minimum descent altitude	5	5
Missed approach	3	2
Mixture	11	7
Monitoring	1	1
Navigation receiver	1	1
Operation with known deficiencies in equipment	27	15
Ostentatious display	9	1
Other airport/runway maintenance	1	0
Other psychological condition	1	0
Over confidence in aircraft's ability	7	1
Over confidence in personal ability	26	7
Oxygen system	1	0
Passenger briefing	1	1
Performance data	5	3
Physical impairment	1	1
Physical impairment (alcohol)	19	14
Physical impairment (anoxia/hypoxia)	1	0
Physical impairment (carbon monoxide)	2	0
Physical impairment (drugs)	10	5
Physical impairment (motion sickness)	1	0
Physical impairment (organic problem)	1	0
Physical impairment (other toxic)	1	1
Physical impairment (visual deficiency)	2	0
Planned approach	19	9
Planning-decision	64	60
Powerplant controls	12	11
Precautionary landing	9	3
Preflight briefing service	11	4
Preflight planning/preparation	62	45
Pressure induced by others	1	0
Procedure inadequate	1	1
Procedures/directives	40	21
Propeller feathering	4	3
Proper alignment	25	18
Proper altitude	42	35
Proper assistance	5	4
Proper climb rate	7	6
Proper descent rate	8	5
Proper glidepath	14	13
Proper touchdown point	60	48
Pull-up	9	6
Qualification	5	2
Radar assistance to VFR aircraft	1	0
Radio communications	1	0
Raising of flaps	21	16
Reason for occurrence undetermined	3	3

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
FLIGHT CREW (continued)		
Recovery from bounced landing	37	33
Refueling	38	34
Relinquishing of control	2	1
Remedial action	76	48
Rotation	8	5
Rotor rpm	18	15
Rotorcraft flight controls	4	4
Rudder	8	8
Self-induced pressure	15	1
Slope capability	1	1
Spatial disorientation	32	23
Speed brakes	1	1
Spiral	2	1
Stabilator trim	3	1
Stall	105	93
Stall/mush	54	48
Stall/spin	45	44
Starting procedure	6	6
Supervision	42	33
Tail rotor	2	2
Taxispeed	7	5
Throttle/power control	8	5
Throttle/power control friction lock	2	1
Tie down	2	1
Total	3	0
Touchdown	4	4
Traffic advisory	1	0
Unsafe/hazardous condition warning	1	1
Unsuitable terrain	36	26
VFR flight into IMC	60	53
VFR procedures	2	1
Vertical takeoff	1	1
Visual lookout	105	87
Visual separation	2	2
Visual/aural detection	1	1
Visual/aural perception	13	2
Wake turbulence	3	2
Weather evaluation	33	13
Weather forecast	4	1
Wheels down landing in water	2	2
Wheels up landing	4	4
Wind information	8	3
Wrong propeller feathered	1	1
Wrong runway	31	23
OTHER PERSON		
ATC clearance	4	4
Aborted takeoff	1	1
Acft/equip, inadequate aircraft component	1	1
Acft/equip, inadequate aircraft manuals	1	1
Acft/equip, inadequate control location	1	0
Acft/equip, inadequate control shape/size	1	0
Acft/equip, inadequate standard/requirement	1	1
Aircraft control	1	1
Aircraft/equipment, inadequate design	5	3
Aircraft/equipment,inadqt compliance determination	2	0
Airport operations	1	0
Airspeed	1	1
Anxiety/apprenhension	1	0
Clearance	5	5
Communications	1	0
Communications/information/ATC	1	0
Company-induced pressure	1	0
Complacency	1	1
Control interference	4	2
Control tower service	1	0
Crew/group briefing	1	1
Crew/group coordination	2	1
Directional control	1	1

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
OTHER PERSON (continued)		
Disturbance	1	1
Diverted attention	2	0
Emergency procedure	1	0
Equipment, other	2	2
Excessive workload (task overload)	2	0
Facility inadequate, equipment interference	2	0
Facility, inadequate manuals/directives	1	0
Flight into known adverse weather	1	0
Flight manuals	1	1
Fuel system	3	2
Fuel tank selector position	2	2
IFR separation standards	1	1
Improper initial training	1	0
In-flight planning/decision	2	0
Inadequate certification/approval	1	0
Inadequate certification/approval - Aircraft	1	0
Inadequate initial training	2	2
Inadequate surveillance of operation	2	1
Inadequate training	2	0
Inattentive	2	0
Information insufficient	1	0
Instructions, written/verbal	1	1
Insufficient standards/requirements	2	0
Insufficient stds/rqmts - Aircraft	3	0
Judgement	3	3
Lack of familiarity with aircraft	1	0
Lack of total experience	2	0
Lack of total experience in type of aircraft	1	1
Lack of total experience in type operation	2	0
Lowering of flaps	1	1
Maintenance	20	16
Maintenance, 100 hour inspection	1	1
Maintenance, adjustment	4	3
Maintenance, annual inspection	10	7
Maintenance, compliance with AD	5	4
Maintenance, design change	1	0
Maintenance, inspection of aircraft	21	16
Maintenance, installation	21	18
Maintenance, lubrication	2	2
Maintenance, major alteration	2	1
Maintenance, major repair	1	0
Maintenance, modification	6	6
Maintenance, overhaul	5	5
Maintenance, overhaul, major	6	4
Maintenance, pressurizing	1	1
Maintenance, rebuild/remanufacture	2	2
Maintenance, replacement	3	3
Maintenance, service bulletins	2	1
Maintenance, service of aircraft	3	3
Material defect (inadequate quality control)	2	2
Material inadequate, improper	1	0
Monitoring	1	1
NOTAMs	1	0
Operation with known deficiencies in equipment	4	2
Other psychological condition	1	1
Over confidence in personal ability	2	0
Panic	1	1
Physical impairment (alcohol)	1	0
Physical impairment (drugs)	2	0
Planning-decision	1	1
Procedure inadequate	1	1
Procedures/directives	11	5
Proper assistance	2	1
Radar assistance to VFR aircraft	1	0
Radio communications	1	0
Remedial action	4	2
Runway maintenance	2	1
Sabotage	1	1
Safety advisory	2	0

CAUSE / FACTOR TABLE
ALL ACCIDENTS - 1990

	Cause or Factor	Cause
OTHER PERSON (continued)		
Self-induced pressure	2	0
Stall/spin	1	1
Starting procedure	1	0
Supervision	4	3
Throttle/power control	1	1
Traffic advisory	3	2
Unsafe/hazardous condition	2	1
Unsafe/hazardous condition warning	1	1
VFR procedures	1	1
Visual lookout	39	35
Visual separation	4	2
Visual/aural perception	1	0
Weather forecast	1	0
Weather observation	1	0

APPENDIX C

N.T.S.B. FORM 6120.4

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

2
1 ☐ Accident
2 ☐ Incident

3 Investigation
1 ☐ NTSB
2 ☐ FAA Delegated

4 Aircraft Registration Number	5 Nearest City/Place	6 State	7 Zip Code *(First 5 numbers only)*

8 Date of Accident *(Nos. for M,D,Y)*	9 Day of Week *(First 2 letters)*	10 Local Time *(24 hour clock)*	11 Time Zone

12 Narrative Statement of Facts, Conditions and Circumstances Pertinent to the Accident/Incident

Additional Persons Participating in this Accident/Incident Investigation *(Name, address, affiliation. Continue on page 2 if necessary)*

Investigated By:

13 Date *(Nos. for M,D,Y)*	14 Agency	15 Name/Signature

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

12 Narrative Statement of Facts, Conditions and Circumstances Pertinent to the Accident/Incident *(continued)*

Attach additional pages as necessary (Page 2b 2c 2d etc)

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

Airport/Approach/Landing Information

16 Accident Location
1 ☐ Off airport/airstrip
2 ☐ On airport
3 ☐ On airstrip
4 ☐ UNK/NA

17 Airport Information
☐ Not Applicable
(go to Block 28)

18 Airport Name

19 Airport Identifier

20 Distance From Airport Center *(Nearest SM)*
_____ SM
1 ☐ UNK/NA

21 Direction from Airport
_____ ° mag
1 ☐ UNK/NA

22 Runway Used Identifier
_____
1 ☐ UNK/NA

23 Runway Length
_____ Feet
1 ☐ UNK/NA

24 Runway Width
_____ Feet
1 ☐ UNK/NA

25 Airport Elevation
_____ Ft. MSL
1 ☐ UNK/NA

26 Runway/Landing Surface
1 ☐ Macadam
2 ☐ Asphalt
3 ☐ Concrete
4 ☐ Gravel
5 ☐ Dirt
6 ☐ Grass/turf
7 ☐ Snow
8 ☐ Ice
9 ☐ Water
10 ☐ Metal/Wood
11 ☐ UNK/NA

27 Runway/Landing Surface Condition *(Multiple entry)*
1 ☐ Dry
2 ☐ Wet
3 ☐ Ice covered
4 ☐ Snow--dry
5 ☐ Snow--wet
6 ☐ Snow--crusted
7 ☐ Snow--compacted
8 ☐ Vegetation
9 ☐ Water--calm
10 ☐ Water--choppy
11 ☐ Water--glassy
12 ☐ Rubber deposits
13 ☐ Soft
14 ☐ Rough
15 ☐ Slush covered
16 ☐ Holes
17 ☐ UNK/NA

28 Type Instrument Approach Flown *(Multiple entry)*
1 ☐ None
2 ☐ ADF/NDB
3 ☐ SDF
4 ☐ VOR/TVOR
5 ☐ VOR/DME
6 ☐ TACAN
7 ☐ ILS-complete
8 ☐ ILS-localizer
9 ☐ ILS-backcourse
10 ☐ RNAV
11 ☐ MLS
12 ☐ LDA
13 ☐ ASR
14 ☐ PAR
15 ☐ Sidestep
16 ☐ Visual
17 ☐ Contact
18 ☐ Circling
19 ☐ Practice
20 ☐ UNK/NA

29 VFR Approach/Landing *(Multiple entry)*
1 ☐ None
2 ☐ Traffic pattern
3 ☐ Straight-in
4 ☐ Valley/terrain following
5 ☐ Go around
6 ☐ Touch and go
7 ☐ Full stop
8 ☐ Stop and go
9 ☐ Simulated forced landing
10 ☐ Forced landing
11 ☐ Precautionary landing
12 ☐ UNK/NA

Aircraft Information

30 Aircraft Manufacturer

31 Aircraft Model/Series

32 Serial No.
_____
1 ☐ UNK/NA

33 Certificated Maximum Gross Weight
_____
1 ☐ UNK/NA

34 Type of Aircraft
1 ☐ Airplane
2 ☐ Helicopter
3 ☐ Glider
4 ☐ Balloon
5 ☐ Blimp/dirigible
6 ☐ Ultralight
7 ☐ Gyroplane
A Specify
_____

35 Type Airworthiness Certificate *(Multiple entry)*
Standard
1 ☐ Normal
2 ☐ Utility
3 ☐ Acrobatic
4 ☐ Transport
Special
5 ☐ Restricted
6 ☐ Limited
7 ☐ Provisional
8 ☐ Special flight
9 ☐ Experimental
10 ☐ UNK/NA

36 Home Built
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB Accident/Incident Number

Aircraft Information *(continued)*

37 Landing Gear

1 ☐ Tricycle--fixed
2 ☐ Tricycle--retractable
3 ☐ Tailwheel--all fixed
4 ☐ Tailwheel--all retractable
5 ☐ Tailwheel--retractable mains
6 ☐ Amphibian
7 ☐ Hull
8 ☐ Float
9 ☐ Emerg float
10 ☐ Ski
11 ☐ Ski/wheel
12 ☐ Skid
13 ☐ High Skid
14 ☐ UNK/NA

38 N0. of Seats

_____
1 ☐ UNK/NA

39 Stall Warning System Installed

1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

40 Aircraft Not Engine Powered

☐ Go to block 46

41 Engine Type

1 ☐ Reciprocating--carburetor
2 ☐ Reciprocating--fuel injected
3 ☐ Turbo prop
4 ☐ Turbo jet
5 ☐ Turbo fan
6 ☐ Turbo shaft
7 ☐ UNK/NA

42 Engine Manufacturer

43 Engine Model and Series

44 Engine Rated Power

A _____ Horsepower
B _____ Lbs. Thrust
C _____ UNK/NA

45 Number of Engines

_____
1 ☐ UNK/NA

46 Type of Last Inspection

1 ☐ Annual
2 ☐ 100 hour
3 ☐ AAIP
4 ☐ Continuous airworthiness
5 ☐ UNK/NA

47 Date Last Inspection Performed

(Nos. for M. D. Y)

_____
1 ☐ UNK/NA

48 Time Since Inspection

_____ Hours
1 ☐ UNK/NA

49 Airframe Total Time

_____ Hours
1 ☐ UNK/NA

Emergency Locator Transmitter (ELT)	1 Yes	2 No	3 UNK/NA
50 Installed			
51 Operated			
52 Aided in location of accident site			

Owner/Operator Information

53 Registered Aircraft Owner

Name :

54 Address

55 Operator of Aircraft 1 ☐ Same as registered owner

A Name :
B dba
2 ☐ UNK/NA

56 Address 1 ☐ Same as registered owner

A _____
_____
2 ☐ UNK/NA

57 Operator Designator Code

_____

Type of Certificate(s) Held

58 None ☐ *(Go to block 62)*

59 Air Carrier Operationg Certificate *(Check all applicable)*

1 ☐ Flag carrier/domestic (121)
2 ☐ Supplemental
3 ☐ All cargo (418)
4 ☐ Large helicopter (127)
5 ☐ Commuter air carrier
6 ☐ On-demand air taxi

60 Operating Certificate

☐ Other operator of large aircraft

61 Operator Certificate

1 ☐ Rotorcraft--external load operator (133
2 ☐ Agricultural aircraft (137)

Regulation Flight Conducted Under

62 Regulation Flight Conducted Under

1 ☐ 14 CFR 91 *(only)*
2 ☐ 14 CFR 91D
3 ☐ 14 CFR 103
4 ☐ 14 CFR 105
5 ☐ 14 CFR 121
6 ☐ 14 CFR 125
7 ☐ 14 CFR 127
8 ☐ 14 CFR 133
9 ☐ 14 CFR 135
10 ☐ 14 CFR 137
11 ☐ 14 CFR 129 *(Foreign flag)*
A Specify

Type of Flight Operation Conducted

(Complete 63 a, b, c ONLY if flight was a revenue operation conducted under 121, 125, 127, 129, 135)

63a

1 ☐ Scheduled
2 ☐ Non-scheduled

63b

1 ☐ Domestic
2 ☐ International

63c

1 ☐ Passenger
2 ☐ Cargo
3 ☐ Passenger/cargo
4 ☐ Mail contract ONLY

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

Owner/Operator Information *(continued)*

*(Complete 64 **ONLY** if 63 a, b, c are not applicable)*

64

1 ☐ Personal
2 ☐ Business
3 ☐ Instructional *(including air carrier training)*
4 ☐ Executive/corporate
5 ☐ Aerial application
6 ☐ Aerial observation
7 ☐ Other work use
8 ☐ Public use
9 ☐ Ferry
10 ☐ Positioning
A Specify _____

First Pilot Information

65 Name *(Last, First, Initial)*
1 ☐ UNK/NA

66 Pilot Certificate No.
1 ☐ UNK/NA

67 City
1 ☐ UNK/NA

68 State
1 ☐ UNK/NA

69 Date of Birth *(Nos. for M, D, Y)*
1 ☐ UNK/NA

70 Age
_____ Yrs.
1 ☐ UNK/NA

71 Sex
1 ☐ Male
2 ☐ Female

72 Seat Occupied
1 ☐ Left
2 ☐ Right
3 ☐ Center
4 ☐ Front
5 ☐ Rear
6 ☐ UNK/NA

73 Principal Profession
1 ☐ Pilot--civilian
2 ☐ Pilot--military
3 ☐ Other--military
4 ☐ Aircraft mechanic
5 ☐ Business
6 ☐ Lawyer
7 ☐ Doctor/dentist
8 ☐ Police
9 ☐ Student
10 ☐ Clergy
11 ☐ Teacher
12 ☐ Engineer
13 ☐ Farmer/rancher
14 ☐ Retired
15 ☐ UNK/NA

74 Certificate(s) *(Multiple entry)*
1 ☐ Student
2 ☐ Private
3 ☐ Commercial
4 ☐ Airline Transport
5 ☐ Flight Instructor
6 ☐ Flight Engineer
7 ☐ Military
8 ☐ None
9 ☐ Foreign
10 ☐ UNK/NA

75 Ratings--Airplane *(multiple entry)*
1 ☐ None
2 ☐ Single engine land
3 ☐ Multiengine land
4 ☐ Single engine sea
5 ☐ Multiengine sea

76 Rotorcraft/Glider/LTA *(multiple entry)*
1 ☐ None
2 ☐ Helicopter
3 ☐ Gyroplane
4 ☐ Airship
5 ☐ Free balloon
6 ☐ Glider

77 Instrument Rating *(multiple entry)*
1 ☐ None
2 ☐ Airplane
3 ☐ Helicopter

78 Instructor Rating(s) *(multiple entry)*
1 ☐ None
2 ☐ Airplane SE
3 ☐ Airplane ME
4 ☐ Helicopter
5 ☐ Gyroplane
6 ☐ Glider
7 ☐ Instrument airplane
8 ☐ Instrument helicopter

79 Type-Rating Endorsement This Aircraft
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

80 Biennial Flight Review *(Or equivalent)*
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

81 Months since Last BFR
_____ Months
1 ☐ UNK/NA

82 BFR *(or equivalent)*
Aircraft Make/Model
A Make _____
B Model _____
C ☐ UNK/NA

83 Medical Certificate
1 ☐ None
2 ☐ Class 1
3 ☐ Class 2
4 ☐ Class 3
5 ☐ UNK/NA

84 Medical Certificate Validity
1 ☐ Valid medical--no waivers/limitations
2 ☐ Valid medical--with waivers/limitations
3 ☐ Non valid medical for this flight
4 ☐ Expired
5 ☐ No medical certicate
6 ☐ UNK/NA

85 Date of Last Medical
(Nos. for M, D, Y)
1 ☐ UNK/NA

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

First Pilot Information *(continued)*

86 Source of Pilot Flight Time *(Multiple entry)*

1 ☐ Pilot log
2 ☐ Company
3 ☐ FAA
4 ☐ Pilot/Operator Report
5 ☐ Investigators Estimate
6 ☐ Relative
7 ☐ Other Person
8 ☐ UNK/NA

Flight Time	A All A/C	B This Make & Model	C Airplane Single Engine	D Airplane Multiengine	E Night	F Instrument Actual	G Instrument Simulated	H Rotorcraft	I Glider	J Lighter Than Air
87 Total Time										
88 Pilot in Command (PIC)										
89 Instructor										
90 Last 90 Days										
91 Last 30 Days										
92 Last 24 Hours										

93 Seatbelt Used
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

94 Shoulder Harness Used
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

95 Autopsy Performed *(This pilot)*
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

96 Toxicology Performed *(This pilot)*
1 ☐ Yes
2 ☐ No
3 ☐ UNK/NA

97 Person at Controls
1 ☐ Pilot in command
2 ☐ Second pilot
3 ☐ Both pilots
4 ☐ Non-pilot
5 ☐ No one
6 ☐ UNK/NA

98 Second Pilot
1 ☐ Yes *(Complete second pilot supplement)*
2 ☐ No

Flight Itinerary Information

99 Last Departure Point
1 ☐ Same as accident/incident location or
A Airport identifier _____
B City/Place _____
C State _____
2 ☐ UNK/NA

100 Destination
1 ☐ Same as accident/incident location or
2 ☐ Local flight
A Airport Identifier _____
B City/Place _____
C State _____
3 ☐ UNK/NA

101 Flight Plan Filed
1 ☐ None
2 ☐ Visual Flight Rules (VFR)
3 ☐ Instrument Flight Rules (IFR)
4 ☐ VFR/IFR
5 ☐ Company (VFR)
6 ☐ Military (VFR)
7 ☐ UNK/NA

102 Time of Departure
1 ☐ UNK/NA
A Time _____
B Time Zone _____

103 Type of Clearance *(Multiple entry)*
1 ☐ None
2 ☐ VFR
3 ☐ Special VFR
4 ☐ IFR
5 ☐ Special IFR
6 ☐ VFR on top
7 ☐ Cruise
8 ☐ Traffic Advisory
9 ☐ VFR Flight Following
10 ☐ UNK/NA

104 Airspace *(Multiple entry)*
1 ☐ Uncontrolled
2 ☐ Controlled
3 ☐ Airport traffic area
4 ☐ Control zone
5 ☐ Airport advisory area
6 ☐ Positive control area
7 ☐ Terminal control area
8 ☐ Stage II TRSA
9 ☐ Stage III TRSA
10 ☐ Prohibited area
11 ☐ Restricted area
12 ☐ Military Operation Area (MOA)
13 ☐ Student Jet Training Area
14 ☐ Demo Area
15 ☐ Warning area
16 ☐ FAR 93
17 ☐ (Special air traffic areas)
18 ☐ UNK/NA

Aircraft Loading Information

105 Load Description
1 ☐ None
2 ☐ Passengers
3 ☐ Cargo
4 ☐ Towing glider
5 ☐ Towing banner
6 ☐ Other external
7 ☐ Parachutists
8 ☐ Water
9 ☐ Chemical
10 ☐ Livestock
11 ☐ Illegal cargo
12 ☐ UNK/NA

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB Accident/Incident Number

Weather Information

106 Source of Weather Briefing *(Multiple entry)*

1 ☐ No record of briefing *(Go to block 109)*
2 ☐ National Weather Service (NWS)
3 ☐ Flight Service Station
4 ☐ PATWAS (Pilot Automated Tel. WX Answering Svc)
5 ☐ VRS (Voice Response System)
6 ☐ Company
7 ☐ Commercial weather service
8 ☐ TV/radio weather
9 ☐ Military
10 ☐ UNK/NA

107 Method of Briefing *(Multiple entry)*

1 ☐ In person
2 ☐ Teletype
3 ☐ Telephone
4 ☐ Aircraft radio
5 ☐ TV/radio
6 ☐ UNK/NA

108 Completeness of Weather Briefing

1 ☐ Weather not pertinent
2 ☐ Full
3 ☐ Partial--limited by pilot
4 ☐ Partial--limited by briefer/forecaster
5 ☐ UNK/NA

109 Investigator's Source of Weather Information

1 ☐ Pilot *(Go to block 111)*
2 ☐ Witness *(Go to block 111)*
3 ☐ Weather obervation facility

110 Weather Observation Facility

A Identifier _____
B Time of observation _____ zone _____
C Elevation _____ feet MSL
D Distance from accident site _____ NM
E Direction from accident site _____ °magnetic

111 Basic Weather Conditions at Accident Site

1 ☐ Visual Meteorological Conditions (VMC)
2 ☐ Instrument Meteorological Conditions (IMC)
3 ☐ UNK/NA

112 Conditions of Light

1 ☐ Dawn
2 ☐ Daylight
3 ☐ Night (Dark)
4 ☐ Night (Bright)
5 ☐ Dusk
6 ☐ UNK/NA

113 Sky/Lowest/Cloud Conditions

1 ☐ Clear
2 ☐ Scattered
3 ☐ Thin broken
4 ☐ Thin overcast
5 ☐ Partial obscuration
6 ☐ UNK/NA

A _____ Feet AGL

114 Lowest Ceiling

1 ☐ None
2 ☐ Broken
3 ☐ Overcast
4 ☐ Obscured
5 ☐ UNK/NA

A _____ Feet AGL

115 Visibility *(Decimals)*

A _____ SM
B RVR _____ Feet
C RVV _____ SM
1 ☐ UNK/NA

116 Temperature

_____ F
1 ☐ UNK/NA

117 Dew Point

_____ F
1 ☐ UNK/NA

118 Wind (From)

1 ☐ Variable
2 ☐ UNK/NA

A _____ Magnetic

119 Wind Speed

1 ☐ Calm
2 ☐ Light and Variable
3 ☐ UNK/NA

A _____ Kts.

120 Gusts

1 ☐ None
2 ☐ UNK/NA

A _____ Kts

121 Altimeter Setting

_____ " Hg
1 ☐ UNK/NA

122 Density Altitude

_____ feet
1 ☐ UNK/NA

123 Restrictions to Visibility

1 ☐ None
2 ☐ Haze (H)
3 ☐ Dust (D)
4 ☐ Smoke (K)
5 ☐ Fog (F)
6 ☐ Ice fog (IF)
7 ☐ Ground fog (GF)
8 ☐ Blowing spray (BY)
9 ☐ Blowing dust (BD)
10 ☐ Blowing snow (BS)
11 ☐ Blowing sand (BN)
12 ☐ UNK/NA

124 Type of Precipitation

1 ☐ None *(Go to block 126)*
2 ☐ Rain (R)
3 ☐ Snow (S)
4 ☐ Hail (A)
5 ☐ Rain showers (RW)
6 ☐ Freezing rain (ZR)
7 ☐ Snow shower (SW)
8 ☐ Drizzle (L)
9 ☐ Ice pellets (IP)
10 ☐ Snow pellets (SP)
11 ☐ Snow Grains (SG)
12 ☐ Freezing drizzle (ZL)
13 ☐ Ice crystals (IC)
14 ☐ Ice pellet shower (IPW)
15 ☐ UNK/NA

125 Intensity of Precipitation

1 ☐ Light
2 ☐ Moderate
3 ☐ Heavy
4 ☐ UNK/NA

126 Aircraft Damage

1 ☐ None
2 ☐ Minor
3 ☐ Substantial
4 ☐ Destroyed
5 ☐ UNK/NA

127 Aircraft Fire

1 ☐ None
2 ☐ In-flight
3 ☐ On ground
4 ☐ UNK/NA

128 Explosion

1 ☐ None
2 ☐ In-flight
3 ☐ On ground
4 ☐ UNK/NA

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AVIATION

NTSB Accident/Incident Number

Accident Information

129 Injury Index *(Most critical injury)*

1 ☐ None 2 ☐ Minor 3 ☐ Serious 4 ☐ Fatal

Injury Summary	A Fatal	B Serious	C Minor	D None	E Total
130 First Pilot					
131 Co-pilot					
132 Dual Student					
133 Check Pilot					
134 Flight Engineer					
135 Cabin Attendants					
136 Other Crew					
137 Passengers					
138 TOTAL ABOARD					
139 Other Aircraft					
140 Other Ground					
141 GRAND TOTAL					

142 Classification

1 ☐ U.S. Registered Aircraft on U.S. Soil, Territories and Possessions, or International Waters
2 ☐ U.S. Registered Aircraft on foreign Soil
3 ☐ U.S. Registered Aircraft operated by a Foreign Operator
4 ☐ Foreign Registered Aircraft on U.S. Soil, Territories or Possessions
5 ☐ Military Aircraft
6 ☐ Aircraft not Registered

Part Failure/Incorrect Part

143 Part Failure/Malfunction *(Multiple entry)*

1 ☐ None
2 ☐ Part/component #1
3 ☐ Part/component #2
4 ☐ Part/component #3
5 ☐ UNK/NA

144 Incorrect Part *(Multiple entry)*

1 ☐ None
2 ☐ Part/component #1
3 ☐ Part/component #2
4 ☐ Part/component #3
5 ☐ UNK/NA

	A Part/Component #1	B Part/Component #2	C Part/Component #3
145 Part Name			
146 Bogus Part	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No	1 ☐ Yes 2 ☐ No

*U.S. G.P.O.:1994-300-644:80015