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AN ANALYSIS OF AIRCRAFT ACCIDENT DATA

U. S. GENERAL AVIATION

1968

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NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
September 1, 1969

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TABLES

OVERVIEW

	1967	1968	Percentage Change
Estimated Hours Flown			
Total Flying	22,153,000	24,053,025	+8.6
Estimated Number of Aircraft			
Total Eligible Aircraft	114,186	124,237	+8.8
Accidents, Aircraft Damage, Injuries			
Total Accidents a/	6115	4968	-18.8 a/
Fatal Accidents	603	692	+14.8
Aircraft Involved	6163	5031	-18.4 a/
Aircraft Destroyed	1034	1137	+10.0
Fatal Injuries	1228	1399	+9.0
Serious Injuries	617	665	+7.8
Minor Injuries	1146	1146	0
Total Persons Aboard	12,193	10,260	-15.9 a/

a/ The definition of substantial damage contained in Section 430.2 of Part 430 of the National Transportation Safety Board Investigation Regulations, was amended on January 1, 1968. The result of the amendment was that fewer accidents were reported for 1968. Care should be used in comparing with similar data for prior years.

SECTION I

Growth of General Aviation, 1968

General Aviation flying continued to grow during calendar year 1968, but the rate of growth, as measured by several yardsticks, has declined from that of recent years. In order to determine the relative growth or decline of these indicators, an analysis was made of the 5-year period 1963-67. The growth rate during this 5-year period will be designated as the "trend."

Total flying in General Aviation increased from 22,153,000 aircraft-hours flown in 1967 to 24,053,000 in 1968. This is an 8.6-percent increase, and represents a slower rate of growth than the 10.0-percent increase shown by the 1963-67 trend. The trend in hours flown in instructional flying has been a 24.2-percent increase each year, but the increase in 1968 over 1967 was 13.8 percent, a substantial decrease in the growth rate. Similarly, the number of hours flown in pleasure flying, which has been increasing at an averate rate of 17.3 percent, dropped to an increase of 8.0 percent in 1968 over 1967. Aircraft-hours flown in business/corporate flying have been decreasing at an average rate of 2.5 percent per year, but registered a 1.8-percent increase in 1968. Aerial application aircraft-hours flown increased 13.7 percent in 1968 over the 1967 figure, a sharp increase from the average growth rate of 1.6 percent per year. Finally, the number of hours flown in air taxi operations showed stronger growth in 1968 than in the past, registering a 13.2-percent increase in 1968 as opposed to an average increase of 4.0 percent during the trend period.

The estimated number of active aircraft, which prior to 1968 had been increasing at an average rate of 7.6 percent per year, increased in 1968 8.8 percent over the 1967 figure. The average aircraft utilization, in terms of aircraft hours flown, decreased 0.2 percent in 1968 after increasing at an average rate of 2.2 percent from 1963-1967. Aircraft-miles flown increased 8.7 percent in 1968, down from the average increase of 13.8 percent during the trend period. These growth indices are presented in Table 1.

TABLE 1

GROWTH INDICES
U. S. GENERAL AVIATION
1968

Growth Index	1967	1968	Percentage Change	Trend a/
Aircraft-Hours Flown b/				
Total	22,153,000	24,053,000	+ 8.6	+10.0
Instructional	5,754,000	6,549,000	+13.8	+24.2
Pleasure	6,859,000	7,405,000	+ 8.0	+17.3
Business/Corporate	5,078,000	5,168,000	+ 1.8	- 2.5
Aerial Application	1,128,000	1,282,000	+13.7	+ 1.6
Air Taxi	1,766,000	1,999,000	+13.2	+ 4.0
Active Aircraft b/	114,186	124,237	+ 8.8	+ 7.6
Average Aircraft Utilization (Hours Flown per Aircraft)	194.0	193.6	- 0.2	+ 2.2
Aircraft-Miles Flown b/ (000)	3,439,964	3,740,000	+ 8.7	+13.8

Aircraft Utilization

The average number of aircraft-hours flown for rotorcraft in 1968 was 262.5. Multiengine fixed-wing aircraft were flown an average of 258.2 hours, while single-engine fixed-wing aircraft averaged 182.9. Gliders in 1968 registered an average 91.9 hours per aircraft, while the average number of hours flown for balloons or blimps was 88.2 hours. In 1968, 10.6 percent of the rotorcraft in the fleet were involved in accidents. By contrast, 3.0 percent of the multiengine fixed-wing and 4.1 percent of the single-engine fixed-wing aircraft in the fleet were involved in accidents. Further, 5.1 percent of the gliders and 2.1 percent of the balloons/blimps were involved in accidents.

a/ The trend is the average annual growth rate for the 5-year period 1963-67.

b/ Source: FAA Estimate

SECTION II

Accident Data, U. S. General Aviation

There were 4,968 accidents in U. S. General Aviation in 1968, down from the total of 6,115 in 1967, primarily because the definition of "substantial damage" contained in Section 430.2 of Part 430 of the National Transportation Safety Board Investigation Regulations, was amended effective January 1, 1968, to read as follows:

> (1) Except as provided in subparagraph (2) of this paragraph, substantial damage means damage or structure 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 cowlings, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for this part.

Prior to January 1, 1968, the definition of substantial damage was:

> (1) Except as provided in subparagraph (2) of this paragraph:
>
> (i) Substantial damage in aircraft of 12,500 pounds maximum certificated takeoff weight or less means damage or structural failure reasonably estimated to cost $300 or more to repair.
> (ii) Substantial damage in aircraft of more than 12,500 pounds maximum certificated takeoff weight 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 or fabric, taxiing damage to propeller blades, damage to tires, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this part.

The decline in the total number of accidents in General Aviation is attributed to this change primarily because all activity indicators showed increases, and because fatal accidents and fatalities were greater in 1968 than for 1967 or prior years. For this reason, this analysis will emphasize aspects of fatal accidents and fatalities, since figures for total accidents in 1967 and 1968 are not comparable.

In 1968, 5,031 aircraft were involved in 4,968 general aviation accidents. Almost 22.6 percent of these aircraft were destroyed, while 76.7 percent were substantially damaged. Of the 4,968 accidents, 692, or 13.9 percent, were fatal, while 367, or 7.4 percent, resulted in serious injury as the highest degree of injury suffered in the accident. Minor injuries represented the highest degree of injury in 665 accidents, or 13.4 percent of the total. There were no injuries in 3,244 accidents, or 65.3 percent of the total.

Of the 10,293 persons involved in 4,968 accidents, 1,399, or 13.6 percent, received fatal injuries, while 665, or 6.5 percent, received serious injury. In addition, 1,146 persons, or 11.1 percent of the total aboard, received minor injuries, and 7,083, or 68.8 percent, received no injuries. There were, on the average, 2.04 persons aboard each of the aircraft involved in an accident in 1968.

Fire after impact was involved in 208, or 30.1 percent of the fatal accidents, but in only 3.0 percent of the nonfatal accidents. Stated in another way, 208 or 61.5 percent of the accidents involving fire after impact were fatal, while 130 or 38.5 percent of the accidents involving fire after impact were nonfatal.

Of the 124,237 active general aviation aircraft in 1968, 5,023 or 4.0 percent of the active general aviation aircraft were involved in accidents. Furthermore, 1,137 or 0.92 percent of the aircraft which were active in 1968 were destroyed in accidents.

Injuries to Occupants: Within Type of Aircraft

The occupants of single-engine, small fixed-wing aircraft are less likely to be fatally injured than are those occupants of multiengine, small, fixed-wing aircraft. In accidents involving multiengine, small fixed-wing aircraft, 17.7 percent of the pilots aboard were fatally injured; 18.9 percent of the crew (other than the pilot) were fatally injured; while 17.4 percent of the passengers received fatal injuries. In accidents involving single-engine, small fixed-wing aircraft, the following percentages in each occupant category received fatal injuries: Pilot, 12.6 percent; crew (other than the pilot) 18.4 percent; and passengers, 13.7 percent.

The likelihood that a given occupant category will receive serious injuries does not differ greatly by aircraft type. The following table shows the percentage of each occupant category receiving fatal, serious, minor, and no injuries.

TABLE II

PERCENTAGE OF INJURIES TO OCCUPANTS
WITHIN TYPE OF AIRCRAFT
U.S. GENERAL AVIATION
1968

Aircraft Type and Occupant Category	Injuries			
	Fatal	Serious	Minor	None
Small Fixed-Wing, Single-Engine				
Pilot	12.6	6.8	12.7	67.9
Crew	18.4	4.9	12.8	63.9
Passengers	13.7	6.4	11.0	68.9
Small Fixed-Wing, Multiengine				
Pilot	17.7	4.2	6.1	72.0
Crew	18.9	5.3	5.3	70.5
Passengers	17.4	6.1	6.7	69.8

SECTION III

Accident Analysis by Kind of Flying

Instructional Flying

Aircraft-hours flown in instructional flying increased 13.8 percent from 1967 to 1968. Fatal accidents increased 27.5 percent, from 51 in 1967 to 65 in 1968. Accidents in which serious injuries constituted the highest degree of injury sustained increased 4.5 percent. The number of aircraft destroyed increased 30.1 percent. The fatal accident rate per 100,000 hours flown increased from .89 in 1967 to .99 in 1968. Instructional flying once again registered the lowest fatal accident rate of all categories of flying

Pleasure Flying

The increase in aircraft-hours flown in pleasure flying between 1967 and 1968 was 8.0 percent. During the same period, fatal accidents increased from 308 in 1967 to 384 in 1968, or 24.7 percent. Accidents in which the injury index was serious remained at about the same level, 178 in 1967 and 175 in 1968. The number of aircraft destroyed, 432 in 1967 and 560 in 1968, increased 16.2 percent. The fatal accident rate per 100,000 aircraft-hours flown increased from 4.49 in 1967 to 5.17 in 1968. This rate was the highest fatal accident rate of all categories of flying.

Business/Corporate Flying

Aircraft-hours flown in business/corporate flying increased 1.8 percent from 1967 to 1968, while 95 fatal accidents occurred each year. Accidents in which the injury index was serious decreased 6.8 percent, from 44 in 1967 to 41 in 1968. The number of aircraft destroyed decreased 8.1 percent, from 160 in 1967 to 147 in 1968. In 1967, the fatal accident rate for business/corporate flying was 2.07, while in 1968 it was 1.84.

Aerial Application Flying

Aircraft-hours flown in aerial application flying increased 13.7 percent from 1967 to 1968. The number of fatal accidents decreased 7.1

percent, from 42 in 1967 to 39 in 1968. Accidents in which serious injury was the highest degree of injury reported increased 17.1 percent, from 35 in 1967 to 41 in 1968. The number of aircraft destroyed, 115 in 1967 and 113 in 1968, decreased 1.7 percent. The fatal accident rate per 100,000 hours flown decreased substantially from 3.72 to 3.04.

Air Taxi Flying

Air taxi flying has been the subject of several NTSB studies, since these operations are concerned with carrying passengers and cargo for hire, and since their route systems often complement the Air Carrier routes. Air taxi flying, in terms of aircraft-hours flown, increased sharply in 1968, climbing 13.2 percent.

In 1967, air taxi operations registered 33 fatal accidents. The 1968 figure of 45 fatal accidents represents an increase of 36.4 percent. Five of the fatal accidents occurred during scheduled passenger service, four during scheduled cargo service, 32 during nonscheduled passenger service, and four during nonscheduled cargo service. Aircraft destroyed in 1967 numbered 45 while 62 aircraft were destroyed in 1968, an increase of 37.8 percent. The fatal accident rate per 100,000 hours flown increased from 2.07 in 1967 to 2.25 in 1968.

TABLE III

FATAL ACCIDENTS BY KIND OF FLYING
U. S. GENERAL AVIATION
1968

Kind of Flying	Fatal Accidents 1967	1968	Percentage Change	Trend
Total Flying	603	692	+14.8	+ 5.8
Instructional	51	65	+27.5	+17.2
Pleasure	308	384	+24.7	+ 6.8
Business/Corporate	95	95	No change	- 0.8
Aerial Application	42	39	- 7.1	+ 7.9
Air Taxi	33	45	+36.4	+16.3

SECTION IV

Analysis - First Type of Accident by First Phase of Operation

Small Fixed-Wing Aircraft

Accidents involving small fixed-wing aircraft accounted for 4,665 of the 4,968 general aviation accidents in 1968, representing 94.3 percent of the total number of accidents. The following analysis of these 4,665 accidents examines seven first types of accidents which, when combined, account for 2,826 of these accidents. Each accident type is examined to determine the frequency of that accident type by each phase of operation.

One out of every 5.6 accidents involving small fixed-wing aircraft was listed as an engine failure or malfunction. Of the 837 accidents involving engine failure or malfunction, 330 occurred during the in-flight, normal cruise phase of operation, 202 occurred during the takeoff, initial climb phase, 59 occurred during the landing, in-traffic-pattern phase, and 57 occurred during the landing, final approach (VFR) phase. The remaining 189 accidents were divided among the other phases of operation.

Small fixed-wing aircraft were involved in 663 accidents in which the first type of accident was a groundloop, waterloop, or a swerve. Of these 663 accidents, 419 occurred on the landing rollout, 140 occurred during the takeoff ground run, while 83 occurred during the level off, touchdown phase of operation. The remaining 21 occurred during other phases of operation.

During the level off, touchdown phase of operation, small fixed-wing aircraft had 381 hard landing accidents. Three accidents of the same type occurred during aborted takeoffs.

A total of 305 accidents involving small fixed-wing aircraft was of the overshoot type, 299 occurring during the level off, touchdown phase

of operation, five during the landing, final approach (VFR) phase, and one during the landing, rollout phase.

A wheels-up landing is cited as the first type of accident whenever the pilot fails to extend the landing gear for any reason, including intentional wheels-up landings. This type of accident occurred to small fixed-wing aircraft 223 times, and the largest proportion of these accidents, 220, occurred during the landing, level off, touchdown. Two occurred during aborted takeoffs, while one happened during the landing, rollout phase of operation.

Stalls, as the first type of accident, occurred a total of 224 times for small fixed-wing aircraft. Stalls as a first type of accident occurred 76 times during the in-flight, other, phase of operation, a/ 70 times during the takeoff, initial climb, phase of operation; 20 times during the landing, go-around (VFR), phase of operation; 19 times during the landing, final approach (VFR) phase; 13 times during the landing, in-traffic-pattern, phase; and 10 times during the in-flight, buzzing phase. The other 16 accidents in this category were divided among six categories of phase of operation.

All of the 194 undershoots occurred during the landing phase of operation, of course. Of these 194, 186 occurred during the landing, final approach (VFR); six occurred during the landing, level off, touchdown phase; one during the landing, rollout phase, and one during the landing, in-traffic-pattern, phase.

Rotorcraft

The most frequent type of accident in which rotorcraft were involved was engine failure or malfunction, One rotorcraft accident in four was an engine failure or malfunction accident. Of the 64 times rotorcraft experienced engine failure or malfunction as a first type of accident, 23 times were during the in-flight, normal cruise phase of operation; 15 were during the in-flight, other, phase; 12 were during the takeoff, initial climb phase; four were during the in-flight, power-on, descent phase; and three were during the in-flight, climb-to-cruise phase. The remaining seven instances of this type of accident were divided among several phases of operation.

Hard landing accidents involving rotorcraft occurred 28 times in 1968. Of these, 13 occurred during the landing, power-off, autorotative phase of operation; 10 during the landing, power-on, vertical phase of operation; three during the landing, touchdown phase; and one each during the landing, roll-on and takeoff, aborted, phases.

Collision with wires or poles as a first type of accident was cited 22 times for rotorcraft in 1968. Of these 22 accidents, 10 occurred during the in-flight, other phase of operation; five during the takeoff, initial climb phase; two during the in-flight, normal cruise phase, and one each during the takeoff, vertical phase, the in-flight, climb-to-cruise phase, the

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a/ This phase of operation includes special in-flight phases coded only in aerial application accidents, as well as emergency descent, low pass, search and rescue, etc.

in-flight, hovering phase, the landing, approach phase, and the landing, other, phase.

Uncontrolled collision with the ground or water occurred 20 times in rotorcraft operations in 1968. Of these 20 accidents, 17 occurred during the in-flight, other, phase of operation; two during the in-flight hovering phase; and one during the takeoff, other, phase of operation.

Tail rotor or main rotor failure occurred 26 times during 1968 in rotorcraft operations. The phase of operation most often cited in these types of accidents was the in-flight, normal cruise phase, which was cited in 13 of these accidents. Six such accidents occurred during the takeoff, initial climb phase of operation; two each happened during the aerial taxi phase and the vertical takeoff phase; while one each happened during the in-flight hovering phase, the in-flight, autorotative descent phase, and the in-flight, other, phase.

Large Fixed-Wing Aircraft

Almost half of the 42 accidents involving large fixed-wing aircraft are categorized into three accident types. The most frequent first type of accident in large fixed-wing operations was engine failure or malfunction, which occurred nine times. Five of these accidents occurred during the initial climb phase of operation, while two each occurred during the in-flight, normal cruise phase and the in-flight, other, phase.

Groundloop, waterloop, or swerve accidents involving this category of aircraft happened five times during the landing, rollout phase and one time during the takeoff, ground run phase. In addition, five overshoot accidents occurred, all during the landing, level off, touchdown phase of operation.

Glider Aircraft

Of the 65 accidents involving gliders, 12 were undershoot accidents. Of these 12, 10 happened during the landing, final approach phase, while one each occurred during the landing, level off, touchdown phase and the landing, other, phase. Nine glider accidents listed a stall as the first type of accident. Five of these happened during the landing, in-traffic-pattern phase of operation. Two occurred during the takeoff, initial climb, while one each occurred during the in-flight, climb-to-cruise phase and the landing, final approach phase. Groundloops, waterloops, or swerves were cited as the first type of accident in seven glider accidents. Three of these happened during the takeoff, ground run phase, while three happened during the landing, rollout phase and one occurred during the landing, level off, touchdown phase. Four hard landing accidents were reported for glider aircraft, and they all occurred during the level off, touchdown phase of operation. Of the four spin accidents which occurred, three happened during the in-flight, other, phase and one happened during the landing, in-traffic-pattern phase. There were four accidents in which gliders collided with trees, two during the landing, level off, touchdown phase of operation; one during the landing, final approach phase and one during the in-flight, descending, phase.

SECTION V

Analysis by Type of Accident

Collisions Between Aircraft

Collisions between aircraft occurred 48 times in 1967 and 63 times in 1968, a 31.3-percent increase. Midair collisions increased from 25 in 1967 to 37 in 1968, representing an increase of 48.0 percent. Collisions in which one aircraft was airborne increased from three in 1967 to 10 in 1968, an increase of 233.3 percent. Collisions between two aircraft both on the ground decreased 20.0 percent from 20 to 16.

The percentage of all collisions which caused fatal injuries was 38.1 percent in 1968, down from 41.7 percent in 1967. The percentage of midair collisions which were fatal was 62.2 percent in 1968 and 76.0 percent in 1967. Of a total of 126 aircraft involved in collisions, 46 were destroyed, 68 were substantially damaged, and 12 received minor damage. Of the 63 collision accidents, 44 involved the collision of two single-engine, small fixed-wing aircraft; seven involved collision between a single-engine, small fixed-wing and a multiengine, small fixed-wing aircraft. Three collisions were between military aircraft and single-engine, small fixed-wing aircraft. Air carrier aircraft collided with single-engine, small fixed-wing aircraft two times and once with a multi-engine, small fixed-wing aircraft. Glider aircraft collided with other gliders two times, while there was one collision between a rotorcraft and a single-engine, small fixed-wing aircraft. In addition, a large fixed-wing aircraft (not air carrier) collided with a single-engine, small fixed-wing aircraft; a single-engine, small fixed-wing aircraft collided with an aircraft of foreign registry, and a multiengine, small fixed-wing aircraft collided with an aircraft of foreign registry.

Half of the fatal collisions between aircraft, 12 of 24, occurred during the 4-hour time period from 2 p.m. to 5:59 p.m. During this same time period, 30 of 63 total collisions between aircraft occurred. No collisions between aircraft occurred between 11 p.m. and 5:59 a.m.

Of the 24 fatal collisions between aircraft, 23 happened while both aircraft were in flight; only one occurred while both aircraft were on the ground.

Two new charts dealing with midair collisions have been added to the 1968 Annual Review of U. S. General Aviation Accidents. One of these examines the phases of operation of the two aircraft involved in each collision. Not surprisingly, there appears to be a tendency for collisions to occur between two aircraft in the same phase of operation. Of the 37 collisions which occurred when both aircraft were airborne, 28 involved two aircraft in the same phase of operation. It is interesting to note that almost one-fourth of all midair collisions, nine, took place in VFR weather conditions while at least one aircraft was in the final approach, while seven occurred while at least one of the two aircraft involved was in the cruise phase of operation.

The other chart, entitled "Certificate of Pilot in Command - First Aircraft vs. Certificate of Pilot in Command - Second Aircraft," shows that 12 of the 74 pilots involved in midair collisions had student certificates, 25 had private certificates, 17 had commercial certificates, four had airline transport certificates, 14 had commercial - with flight instructor certificates, one had a foreign certificate, and the certificate of one pilot was unknown.

SECTION VI

Accident Analysis by Cause and Related Factor

The purpose of this section is the examination of the 4,874 accidents in which a causal determination was made in 1968.

The cause/factor category of Pilot was cited as a cause (not necessarily the cause) in 84.08 percent of all accidents in 1968 and as a related factor in 8.15 percent. The pilot was cited as a cause or as a related factor in 84.32 percent, or 4,110, of the 4,874 accidents. Powerplant was cited as a cause in 8.72 percent and as a factor in .55 percent, for a total involvement of 9.27 percent. The total number of accidents listed as weather involved was 1,034, or 21.21 percent of the total. Weather was cited as a cause and as a factor in 7.22 percent and 14.16 percent respectively, of all accidents. Personnel was cited as a cause of 6.77 percent of the accidents, and as a factor in 1.56 percent.

In fatal accidents, all operations, Pilot was cited as a cause 531 times, representing 82.58 percent of the fatal accidents. The category of Weather was cited as a cause in 9.33 percent of fatal accidents, while the categories of Personnel and Powerplant were cited in 7.62 percent and 4.82 percent of the fatal accidents. It is interesting to note that 25.19 percent of the fatal accidents in 1968 involved weather as a related factor, while over one accident in three cited some type of weather involvement.

Pilot involvement appears to occur more often in accidents involving small, fixed-wing aircraft than in accidents involving rotorcraft. A cause/factor tabulation by type of aircraft is presented in Table IV for those fatal accidents in 1968 for which a causal assignment has been made.

CAUSE/FACTOR TABLE

FATAL ACCIDENTS

U. S. GENERAL AVIATION

1968

	SMALL FIXED-WING a/			LARGE FIXED-WING b/			ROTORCRAFT c/			GLIDER d/			ALL OPERATIONS e/		
	Cause	Factor	Total	Cause	Factor	Total	Cause	Factor	Total	Cause	Factor	Total	Cause	Factor	Total
Pilot.....	503 83.55	49 8.14	504 83.72	4 100.00	1 25.00	4 100.00	19 59.38	4 12.50	21 65.63	5 100.00	3 60.00	5 100.00	531 82.58	57 8.86	634 83.05
Personnel.....	48 7.97	8 1.33	54 8.97	1 25.00	.00	1 25.00	1 3.13	.00	1 3.13	.00	.00	.00	49 7.62	8 1.24	55 8.55
Airframe.....	10 1.66	1 .17	11 1.83	.00	.00	.00	.00	.00	.00	1 20.00	.00	1 20.00	11 1.71	1 .16	12 1.87
Landing Gear.....	.00	1 .17	1 .17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1 .16	1 .16
Powerplant.....	30 4.98	1 .17	31 5.15	.00	.00	.00	1 3.13	.00	1 3.13	.00	.00	.00	31 4.82	1 .16	32 4.98
Systems.....	3 .50	.00	3 .50	.00	.00	.00	.00	.00	.00	.00	.00	.00	3 .47	.00	3 .47
Instruments/Equipment and Accessories	1 .17	4 .66	5 .83	.00	.00	.00	.00	.00	.00	.00	.00	.00	1 .16	4 .62	5 .78
Rotorcraft.....	.00	.00	.00	.00	.00	.00	6 18.75	.00	6 18.75	.00	.00	.00	6 .93	.00	6 .93
Airports/Airways/Facilities.....	.00	12 1.99	12 1.99	.00	1 25.00	1 25.00	.00	.00	.00	.00	.00	.00	.00	13 2.02	13 2.02
Weather.....	58 9.63	159 26.41	217 36.05	1 25.00	.00	1 25.00	1 3.13	1 3.13	2 6.25	.00	1 20.00	1 20.00	60 9.33	162 25.19	222 34.53
Terrain.....	5 .83	31 5.15	36 5.98	.00	1 25.00	1 25.00	3 9.38	2 6.25	5 15.63	.00	.00	.00	8 1.24	34 5.29	42 6.53
Miscellaneous.....	15 2.49	2 .33	17 2.82	.00	.00	.00	.00	.00	.00	.00	.00	.00	15 2.33	2 .31	17 2.64
Undetermined.....	68 11.30	.00	68 11.30	.00	.00	.00	9 28.13	.00	9 28.13	.00	.00	.00	77 11.98	.00	77 11.98

a/ Involves 602 fatal accidents in which cause/factor determinations have been made.

b/ Involves 4 fatal accidents in which cause/factor determinations have been made.

c/ Involves 32 fatal accidents in which cause/factor determinations have been made.

d/ Involves 5 fatal accidents in which cause/factor determinations have been made.

e/ Involves 643 fatal accidents in which cause/factor determinations have been made.

The figures opposite each causal category represent the number and percent of accidents in which that particular causal category was assigned.

If an accident includes both a cause and related factor in the same causal category, the accident is represented once under the total for that category.

APPENDIX

ACCIDENTS, FATALITIES, RATES
U. S. GENERAL AVIATION
1958 - 1968

Year	Accidents Total	Accidents Fatal	Fatalities	Aircraft-Hours Flown (000)	Aircraft-Miles Flown (000)	Accident Rates Per 100,000 Aircraft-Hours Flown Total	Accident Rates Per 100,000 Aircraft-Hours Flown Fatal	Accident Rates Per Million Aircraft-Miles Flown Total	Accident Rates Per Million Aircraft-Miles Flown Fatal
1958.....	4,584	384	717	12,579	1,660,109	36.4	3.05	2.76	0.231
1959.....	4,576	450	823	12,903	1,716,019	35.3	3.49	2.66	0.262
1960.....	4,793	429	787	13,121	1,768,704	36.5	3.27	2.71	0.243
1961.....	4,625	426	761	13,602	1,857,946	34.0	3.13	2.49	0.229
1962.....	4,840	430	857	14,500	1,964,586	33.4	2.97	2.46	0.219
1963.....	4,690	482	893	15,106	2,048,574	31.0	3.19	2.29	0.235
1964.....	5,069	526	1,083	15,738	2,180,818	32.2	3.34	2.32	0.241
1965.....	5,196	538	1,029	16,733	2,562,380	31.1	3.22	2.03	0.210
1966.....	5,712	573	1,149	21,023	3,336,138	27.2	2.73	1.71	0.172
1967.....	6,115	603	1,228	22,153	3,439,964	27.6	2.72	1.78	0.175
1968 c/.....	4,968 b/	692	1,399	24,053	3,740,000 (est.)	20.6	2.86	1.33	0.184

a/ Source: FAA

b/ Commencing January 1, 1968, the definition of "substantial damage" was changed; therefore, fewer accidents were reported. Care should be used in comparing with similar data for prior year.

c/ Three suicide/sabotage accidents are included in all computations except rates.

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September 19, 1969


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