

**TRANSACTIONS OF SOCIETY OF ACTUARIES  
1952 REPORTS**

**REPORT OF THE COMMITTEE ON AVIATION**

**AVIATION STATISTICS**

**T**HIS report is confined to a brief summary of such new data as add to or materially change conclusions reached in previous reports. Since this procedure has now been used for several years, the following index is given of the most recent information on various classes.

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\* References are to *TASA* or *TSA*. † In present Report.

SCHEDULED FLYING

*United States*

Table 1 shows the recent trend of fatality rates on United States scheduled airlines. Since pilots engaged full time in scheduled flying approximate 1,000 hours a year, the death rates per 1,000 hours are indicative of the annual death rate of such pilots. The columns headed "Death Rate of All Pilots Employed in Scheduled Flying" and "Death Rate of Other Crew Members Employed in Scheduled Flying" include, on the one hand, those who do less than the normal amount of flying on account of having some supervisory duties or for other reasons and include, on the other hand, the deaths in nonscheduled flights operated by scheduled airlines, such as test or charter flights. The "Death Rate of First Pilots in Scheduled Flights," therefore, might be said to indicate the hazard of the normal airline pilot, while the "Death Rate of All Pilots Employed in Scheduled Flying" represents that of the average pilot. The difference in recent years is not great.

It will be seen that in three of the four sets of figures shown, the 1951 rate in domestic flying was substantially higher than in 1950. Analysis of the fatal accidents, however, reveals no inherent reason for an increased fatality rate. It seems likely that the 1951 fatality rates for pilots and crew are due to a statistical fluctuation. This conclusion is supported by

**TABLE 1**  
**UNITED STATES SCHEDULED AIRLINES**  
**AVIATION DEATHS**

Period	Passenger Death Rate per 1,000 Passenger Hours	Death Rate of First Pilots in Scheduled Flights per 1,000 Air- plane Hours	Death Rate of All Pilots Employed in Scheduled Flying, per Year of Exposure	Death Rate of Other Crew Members Em- ployed in Scheduled Flying, per Year of Exposure
Domestic				
1948	.0023	.0020	.0015	.0021
1949	.0024	.0031	.0021	.0017
1950	.0021	.0020	.0018	.0015
1951	.0024	.0036	.0032	.0030
1945-1948	.0032	.0033	.0031	.0033
1946-1949	.0030	.0032	.0030	.0029
1947-1950	.0030	.0027	.0023	.0023
1948-1951	.0023	.0027	.0022	.0021
International				
1948	.0020	.0020	.0050	.0045
1949				
1950	.0045	.0023	.0013	.0031
1951	.0025	.0023	.0013	.0038
1945-1948	.0033	.0026	.0031	.0050
1946-1949	.0022	.0022	.0025	.0032
1947-1950	.0022	.0021	.0024	.0028
1948-1951	.0023	.0016	.0019	.0028
Total				
1948	.0022	.0020	.0024	.0031
1949	.0019	.0024	.0016	.0010
1950	.0026	.0020	.0017	.0020
1951	.0024	.0034	.0028	.0032
1945-1948	.0032	.0032	.0031	.0040
1946-1949	.0028	.0030	.0029	.0030
1947-1950	.0028	.0026	.0023	.0025
1948-1951	.0023	.0025	.0021	.0024

the low domestic passenger fatality rate of .0011 per 1,000 hours for the first eight months of 1952, this being the only 1952 figure yet available.

The Committee has in recent years shown fatality rates for four-year periods, and this has the interesting result that the pilot and crew rates for 1948-1951 are slightly lower than for 1947-1950 in spite of the high rates in the single year 1951. Under the most favorable interpretation, however, the downward trend of scheduled flying fatality rates has nearly leveled off by the addition of the 1951 figures.

NONSCHEDULED FLYING

Table 2 shows the fatality rates in the years 1946-1949, and 1951, of first pilots per 1,000 airplane hours by kind of nonscheduled civil flying.

TABLE 2  
NONSCHEDULED FLYING BY KINDS  
FIRST PILOT AVIATION DEATH RATE PER 1,000 HOURS

PERIOD	COMMERCIAL AND MISCELLANEOUS†			NONCOMMERCIAL BUSINESS			PERSONAL			INSTRUCTION		
	Hours*	Deaths	Rate	Hours*	Deaths	Rate	Hours*	Deaths	Rate	Hours*	Deaths	Rate
1946 . . . . .	1,256	120	.10 Low	1,037	29	.028	1,602	308	.19	5,749	157	.027
	663	123	.19 High									
1947 . . . . .	1,166	82	.07	1,966	68	.035	2,616	412	.16	10,353	244	.024
1948 . . . . .	1,117	100	.09	2,576	85	.033	2,606	403	.15	8,701	182	.021
1949 . . . . .	1,380	88	.06	2,615	55	.021	2,732	286	.10	4,187	86	.021
1951 . . . . .	1,659	117	.07	2,950	29	.010	1,880	207	.11	1,902	56	.029
1946-49 . . . . .	4,919	390	.08 Low	8,194	237	.029	9,556	1,409	.15	28,990	669	.023
	4,326	393	.09 High									
1947-49, 1951 . . . . .	5,322	387	.07	10,107	237	.023	9,834	1,308	.13	25,143	568	.023

\* 000 omitted.

† Excluding all "irregular" carriers in 1946-47, and "large irregular" carriers—those operating aircraft of more than 12,500 pounds gross weight—in other years.

The exposure is an estimate of airplane hours by the Civil Aeronautics Administration, based on a sampling survey of aircraft owners. No estimate was prepared for 1950. If there is any existing error in the underlying data it probably is in the direction of understatement of the use of individual aircraft, with consequent overstatement of the death rates. In 1946 several widely different estimates of the exposure of commercial and miscellaneous flying were made. The range of the resulting death rates is shown in the table.

The flying of those nonscheduled or irregular carriers which operate transport-type aircraft is of a different nature from the charter flights of local flying services and is discussed in a separate section below.

The table indicates a general, although irregular, improvement in

death rates over the period covered, which continued for most classes in 1951.

The class of noncommercial business flying is not homogeneous and covers all flying in connection with the business of the owner of the aircraft except where the purpose of the flight is to render transportation or some other service to others than the owner or his employees. Nonrevenue flights of scheduled air carriers are not included. The subdivision of this class which is probably of greatest interest to life insurance companies is flying in large aircraft maintained by corporations for the transportation of officers and employees on company business. The hazard of this type of flying is probably approximated by the statistics on business flying in multi-engine planes. Figures for this subdivision are available for 1948 and 1949. In those years there were approximately 800,000 hours of such flying, with 11 deaths of first pilots, producing a rate of .014 per 1,000 hours.

In the intercompany experience (Table 11 below) on persons employed as civilian nonairline pilots at time of application there was little difference between those who appeared to be giving flying instruction for at least half of their flying time and the others. Such a difference was noted in TSA I, 624, but seems to have disappeared with added exposure.

In the intercompany experience on pilots flying only for pleasure or personal business (not for hire) the differences according to amount of flying time in the twelve months preceding application were greater than those noted in TSA I, 625, and were proportionately about as great as those observed in the intercompany experience for 1929-1938 (TASA XLI, 270), although the absolute rates in the recent period were much smaller than the earlier rates.

#### NONSCHEDULED ("IRREGULAR") CARRIER FLYING

The figures in Table 3 for "large" irregular air carriers—those operating aircraft of more than 12,500 pounds gross weight—are based on reports of their mileage to the Civil Aeronautics Board, and the assumption of an average speed of 200 miles per hour.

The improvement in death rates in 1950 and 1951 is probably due to closer federal regulation, and to self-regulation by associations of non-scheduled airlines.

#### UNITED STATES AIR FORCE

##### *Pilots and Other Rated Personnel—by Age*

The fatality rates of rated pilots on active duty in 1951 were higher in all age groups than those for 1950 and for the period 1946-1950 given in

TSA 1951 Reports, 119, with the exception of Regular Air Force pilots at the higher ages.

In the figures previously published (*loc. cit.*) the fatality rate for Regular Air Force pilots under age 25 was substantially higher than that for all pilots. This, however, appears to have been due to some unexplained characteristic of the 1946 experience. In the experience for 1947-1951 the fatality rates for Regular pilots are similar to those for all pilots at the younger ages and lower at the older ages. The very high rate for Regular pilots under 25 in 1951 is probably not statistically significant.

TABLE 3  
 NONSCHEDULED CARRIERS OPERATING AIRCRAFT  
 OF MORE THAN 12,500 POUNDS GROSS WEIGHT

Year	Passenger Deaths	Rate per 1,000 Passenger Hours	First Pilot Deaths	Rate per 1,000 Airplane Hours
1948.....	90	.039	6	.046
1949.....	104	.036	5	.043
1950.....	29	.008	1	.006
1951.....	78	.014	3	.013
1948-51.....	301	.021	15	.023

The figures for 1951 and for the period 1947-1951 are given in Table 4. These exclude deaths on combat missions.

It was incorrectly stated in TSA 1951 Reports, 118, that the class of nonpilot rated personnel includes flight surgeons. The class includes those personnel who are rated as observers, such as navigators, bombardiers, and gunners, but does not include flight surgeons, aviation medical examiners, flight nurses, weather observers, and some other personnel who are described as having aeronautical designations rather than aeronautical ratings.

The fatality rates in the intercompany experience on policies issued with extra premium in 1946 and later, observed through June 30, 1952, (as reported in Table 11) were generally similar to those of all Air Force pilots for 1947-1951 except that the intercompany rate was lower in the age group 35 and over, being 2.9 per 1,000 with 19 deaths. The intercompany experience includes all deaths in flight, while that for all pilots excludes deaths in the course of combat missions. The effect of including the latter in the intercompany experience is shown in TSA 1951 Reports, 120. At the younger attained ages the fatality rates of pilots who had had 800

or more solo hours at time of application were lower than for pilots of less experience, but still were greater than for higher attained ages.

*Type of Flying*

The following noncombat aircraft fatality rates of rated pilots per 100,000 flying hours for 1951 correspond to those for the period January 1947—June 1949 in *TSA I, 626*, except that the 1951 figures are not limited to the continental United States. Deaths and exposure of rated

TABLE 4  
UNITED STATES AIR FORCE ON ACTIVE  
DUTY: AVIATION DEATH RATES PER  
1,000 YEARS OF EXPOSURE, DEATHS IN  
COMBAT MISSIONS EXCLUDED

ALL RATED PILOTS		
AGE GROUP	1951	1947-1951
Under 25.....	30.2	19.0
25-29.....	12.4	10.7
30-34.....	6.3	6.1
35 and over.....	6.2	5.4
All.....	9.5	9.2
REGULAR AIR FORCE PILOTS (INCLUDED ABOVE)		
	1951	1947-1951
Under 25.....	44.6	19.1
25-29.....	14.2	11.2
30-34.....	3.7	4.9
35 and over.....	2.9	3.6
All.....	5.9	7.2
NONPILOT RATED PERSONNEL		
	1951	1947-1951
Under 25.....	8.8	12.4
25-29.....	6.3	8.3
30-34.....	7.7	7.3
35 and over.....	9.2	7.8
All.....	7.4	8.2

pilots while flying in a nonpilot capacity are excluded. The fatality rates are in most instances either similar to or lower than those for the earlier period.

*Duty Assignment*

Noncombat aviation fatality rates of rated pilots have been obtained for 1951 according to duty assignment. A pilot may have more than one duty assignment in the course of a year and, if so, part of the year's ex-

TABLE 5  
DEATHS OF RATED USAF PILOTS IN NONCOMBAT  
AIRCRAFT ACCIDENTS, 1951

Aircraft Type Group	Death Rate per 100,000 Pilot Hours (including Copilots, etc.)
Bombers . . . . .	2.6
Jet fighters . . . . .	14.5
Conventional fighters . . . . .	9.8
Trainers . . . . .	2.0
Transports . . . . .	1.3
All Other . . . . .	1.9
All . . . . .	3.1

posure is allocated to each assignment. Deaths are classified according to the duty assignment held at time of death; 86% of the deaths occurred in a type of aircraft appropriate to the duty assignment. Deaths of rated pilots while flying in a nonpilot capacity are included. The rates for duty assignments other than those in which the exposure was very small are as follows:

TABLE 6  
DEATHS IN NONCOMBAT AIRCRAFT ACCIDENTS OF  
RATED USAF PILOTS CLASSIFIED BY  
DUTY ASSIGNMENT, 1951

Duty Assignment	Death Rate per 1,000 Years of Exposure
Pilot, jet fighter . . . . .	39.8
Pilot, single engine not otherwise classified . . . . .	25.1
Pilot, two-engine not otherwise classified . . . . .	9.3
Pilot, four-engine not otherwise classified . . . . .	10.4
Pilot, six-engine not otherwise classified . . . . .	25.9
Pilot, all weather . . . . .	28.5
Pilot, tactical reconnaissance . . . . .	13.0
Operations officer . . . . .	8.6
Pilot not assigned primarily to flying duty . . . . .	4.5



It is obvious, from comparison of these rates with the rate of 9.5 for all pilots given in Table 4, that a considerable proportion of pilots are not assigned primarily to flying duty at any one time.

#### *Student Pilots*

For the period 1949-1951 the fatality rate in basic pilot training was 5.1 per 1,000 years of exposure and in advanced training was 14.3.

#### *Military Air Transport Service*

For the period 1947-1951 the passenger fatality rate in the Military Air Transport Service was 0.9 per 100,000,000 passenger miles, all the deaths having occurred in a single crash. This compares with a rate of 1.5 for all U.S. scheduled commercial airlines for the same period. The additional fatalities in 1951 referred to in *TSA* 1951 Reports, 120, occurred in commercial operations under contract with the Air Force, and are not included in the foregoing figure.

#### *Air National Guard*

The fatality rate in 1951 of pilots of the Air National Guard not federally activated was 15.9 per 1,000.

#### *Flight Surgeons*

The fatality rate of flight surgeons in 1947-1951 was 7.3 per 1,000 per annum. The number of deaths was small, but the rate happens to be close to the average rate of 8.7 for the period 1925-1944, as shown in *TASA* XLVII, 191.

### UNITED STATES NAVY

#### *Pilots by Age*

The fatality rates of naval aviators on active duty in 1951 were higher in all age groups than those for 1950, as well as for the period 1947-1950, given in *TSA* 1951 Reports, 121. Since the rates at the younger ages were higher in the first half of 1950 than in the second half, the increase over earlier years appears not to be wholly attributable to the Korean action.

The figures for 1951 and for the period 1947-1951 are given in Table 7. These figures include reserve officers on active duty, and exclude deaths resulting from enemy action.

The rates are for officers only, but the Committee is informed by the Department of the Navy that there is no reason why the fatality rates of enlisted pilots on active duty should differ materially from those of officers.

As in the case of the Army and Air Force, the intercompany experience by attained ages gave results generally similar to those for all Navy

and Marine Corps pilots for a comparable period except that the intercompany rate was materially higher in the age group 30-34, being 9.8 per 1,000 with 91 deaths on policies issued with extra premium and 13.1 per 1,000 with 20 deaths on policies issued with exclusion rider. The intercompany experience includes deaths in flight whether or not resulting from enemy action. As in the case of the Army and Air Force, the fatality rates at the younger ages for pilots with at least 800 solo hours at time of application were lower than for less experienced pilots in the same respective age groups. In the Navy, however, (assuming all pilots over 30 to have had 800 hours) the fatality rate for pilots with that amount of ex-

TABLE 7  
 NAVAL AVIATORS—UNITED STATES NAVY  
 Excluding Students  
 (Includes Marine Corps 1948-1951)  
 AVIATION DEATH RATES PER  
 1,000 YEARS OF EXPOSURE  
*Deaths from Enemy Action Excluded*

Age Group	1951	1947-1951
Under 25 . . . . .	25.1	18.1
25-29 . . . . .	12.7	8.8
30-34 . . . . .	8.0	5.5
35 and over . . . . .	3.1	2.6
All . . . . .	10.9	8.2

perience varied little by age in the intercompany study up to age 35, the rates in the attained age groups under 25, 25-29, and 30-34 under policies issued with extra premium being 11.9, 8.5 and 9.8, respectively.

*Student Pilots*

As in 1950, the fatality rates of student naval aviators were higher than in the years 1946-1949. The figures for 1951 and for 1946-1951 are shown in Table 8.

*Flight Surgeons*

The fatality rate of flight surgeons in 1951, 7.7 per 1,000, was similar to that given above for the Air Force for the period 1947-1951.

*Inactive Reservists*

For inactive reserve aviators who did some flying during the year, the 1951 aviation fatality rate for organized reserve aviators and those associate volunteers who are in a drill pay status was 1.9 per 1,000. For asso-

ciate volunteers not receiving drill pay the corresponding rate was 0.9. Some of these reservists may do other flying as civilians, and it is possible that the hazard of those reservists who do no other flying than their reserve flying may be greater than the average figures given above, in which those pilots are also included whose experience is supplemented by civilian flying.

In addition to these classes for which fatality rates have been obtained, there are inactive reserve aviators classed as "Volunteers, Other" who do not participate on a regular basis, although the majority take two weeks' annual training. No statistics are available on the average amount of flying, although it is normally confined to the annual two-week training period.

TABLE 8  
STUDENT NAVAL AVIATORS  
UNITED STATES NAVY  
(Includes Marine Corps)  
AVIATION DEATH RATES PER  
1,000 YEARS OF EXPOSURE

Stage of Training	1951	1946-1951
Basic . . . . .	7.8	5.4
Advanced . . . . .	33.1	28.7

All of these classes of inactive reserve aviators are commissioned in the U.S. Naval Reserve and may be recalled to active duty as the needs of the service require, with the exception of those who have already served a tour of duty since the beginning of the Korean action. Aviators in the latter group can be recalled involuntarily only in case of war or of a national emergency declared by Congress.

#### *Annual Flying Time*

The average number of *aircraft* hours per pilot on active duty in 1951, including students, was 163, and that for active reservists who did some flying was 56. The average *flying* hours per pilot would be somewhat greater on account of flights by rated pilots as copilots or in some other capacity.

#### *Graduates of Naval Academy—Assignment to Aviation*

As in 1950, one-fourth of the 1951 graduating class of the U.S. Naval Academy were commissioned in the U.S. Air Force upon graduation; of these, about 80% were ordered to flight training. In addition, 20% of the

graduates were assigned to flight training after being commissioned in the Navy and 7% were put on a waiting list for assignment to Navy flight training. The graduates commissioned in the U.S. Marine Corps, 7% of the class, may not apply for flight training until 18 months after graduation.

UNITED STATES COAST GUARD

The figures given in *TASA L*, 101, have been extended through 1951. As there have been no fatalities in the added period the death rates have been materially reduced. It appears that one death counted as a pilot in the earlier figures should have been counted as a crew member.

TABLE 9  
UNITED STATES COAST GUARD  
PERSONNEL ON FLIGHT ORDERS  
FEBRUARY 1947—DECEMBER 1951

Class	Years of Exposure	Aviation Deaths	Rate per 1,000
Pilots.....	1,248	7	5.6
Student Pilots.....	73	0	0
Observers.....	97	0	0
Crew Members.....	3,465	12	3.5

The following descriptive information has been furnished by United States Coast Guard headquarters.

Pilots in the Coast Guard are divided into two categories: aviators and aviation pilots. The aviators are commissioned officers and the aviation pilots are chief petty officers. Every pilot is a graduate of the flight training course conducted by the Naval Air Training Command, Pensacola, Florida. All Coast Guard Officers are eligible for assignment to flight training if they meet the same age and physical requirements as Student Navy and Marine Corps Aviators. As a general rule, officers complete two or three years of sea duty prior to assignment to such training. Approximately twelve percent of the pilots are enlisted personnel holding the rating of chief aviation pilot. These men were selected for duty in the aviation branch on the basis of their having an excellent service record and an aptitude for flying. No enlisted men have been assigned to flight training since 1945, and it is expected that the rating of aviation pilot will be discarded eventually. The average age of Coast Guard aviators and aviation pilots is thirty-four.

Crew members consist of mechanics, radiomen, electronic technicians, metalsmiths, ordnancemen, and parachute riggers. These enlisted men

are trained at Coast Guard and Navy schools, and are qualified for both ground maintenance and flight crew duty.

At the present time, aviation personnel are serving at nine air stations and three air detachments within the United States, and at seven air detachments outside the continental limits. In these assignments, pilots average three hundred hours' flying time per year, a considerable portion of which is conducted under instrument weather conditions and at night. Nearly forty percent of the pilots are qualified in both fixed wing aircraft and helicopters.

Search and rescue missions flown include the evacuation of medical cases from vessels, searches for missing and overdue vessels and aircraft,

TABLE 10  
ROYAL CANADIAN AIR FORCE PILOTS  
AVIATION DEATH RATE PER 1,000 YEARS OF EXPOSURE

	Regular 1947-1951	Auxiliary 1948-1951
<i>Age Group</i>		
Under 25 .....	8.5	7.6
25-29 .....	9.2	8.9
30-39 .....	6.5	10.7
40 and over .....		
All .....	7.5	9.5
<i>Rank</i>		
Pilot Officer and Flight Cadet .....	7.1	(1 death)
Flying Officer .....	10.0	8.2
Flight Lieutenant .....	5.8	12.5
Squadron Leader .....	8.4	13.8
Wing Commander and Higher Ranks .....	1.3	
All .....	7.5	9.5

escort of disabled aircraft, evacuation of flood victims, delivery of vitally needed drugs to ships at sea, etc. Law enforcement flights are made principally for the purpose of enforcing the Halibut Fishing Act, sealing and whaling regulations, and customs laws, and to detect oil pollution and illegal distilleries. A considerable number of flights are made in cooperation with the Department of the Interior during the annual migratory waterfowl count.

#### ROYAL CANADIAN AIR FORCE

The fatality rates shown in Table 10, furnished by the Canadian Department of National Defence, add a year's experience to those shown

in *TSA* 1951 Reports, 123, for regular RCAF pilots, and incorporate rates for the period 1948-1951 for pilots of the RCAF Auxiliary (reserve personnel who undergo weekly training in organized reserve squadrons).

A possible explanation of the absence of the very high fatality rates seen at the youngest ages in the United States services is given in *TSA* 1951 Reports, 124.

That the differences by rank may not be too significant is indicated by the fact that the rate for squadron leaders was distinctly high in the 1947-1950 figures but is nearly normal when the 1951 experience is added, while at the same time the rate for flying officers has changed in the opposite direction.

It will be seen that the fatality rates of auxiliary pilots are slightly higher on the whole than those of regular pilots, per 1,000 years of exposure, although presumably their annual flying time is much smaller.

#### INTERCOMPANY EXPERIENCE—PILOTS

Twenty-nine companies contributed their experience this year on certain classes of pilots for issues since January 1, 1946, observed in the case of some companies through December 31, 1951 and in the case of others through June 30, 1952. The principal results are shown below, with fatality rates omitted in classes having less than 5 deaths.

The experience is by policies. The classification is by status at time of application for insurance. Exposure was terminated upon discontinuance of extra premium, or upon discontinuance of aviation exclusion provision unless it was replaced by an extra premium.

Some of the results have already been discussed under the headings "Nonscheduled Flying," "United States Air Force," and "United States Navy," for comparison with the experience on all similar pilots from Government sources. As stated there, the Air Force and Navy figures comprise all deaths in flight, including combat missions, whether or not resulting from enemy action.

Although the experience on policies issued with aviation exclusion was confined to applicants who appeared to be active as pilots or student pilots at time of issue, the fatality rates on such policies were generally lower than on those issued with extra premium. It may be that pilots who were about to discontinue flying, or military pilots expecting to be assigned to duty which involves less than the average amount of flying, tended to take restricted policies.

TABLE 11  
INTERCOMPANY EXPERIENCE ON PILOTS APPARENTLY  
ACTIVE AT TIME OF ISSUE

Issues of 1946 and Later, Exposed to June 30, 1952 (Dec. 31, 1951 in Some Companies)  
By Policies

<i>Civilian Pilots</i>						
STATUS AT ISSUE	ISSUED WITH AVIATION EXTRA PREMIUM			ISSUED WITH AVIATION EXCLUSION PROVISION		
	Years of Exposure	Avia- tion Deaths	Rate per 1,000	Years of Exposure	Avia- tion Deaths	Rate per 1,000
Employed as scheduled airline pilot . . .	11,010	30	2.7	1,090	2	*
Having commercial or transport certificate, employed as nonairline pilot, with indication that at least half of flying time is as instructor . . .	2,614	18	6.9	1,256	6	4.8
Others having commercial or transport certificate and employed as nonairline pilot . . . . .	3,042	19	6.2	1,206	9	7.5
Having commercial or transport certificate but flying only for pleasure or personal business (not for hire), or having private certificate and 100 or more solo hours (or solo hours not stated)						
Less than 50 hrs. in preceding 12 mos. . . . .	8,528	9	1.1	16,638	11	.7
50-99 hrs. in preceding 12 mos. . . . .	5,866	13	2.2	7,045	7	1.0
100 or more hrs. in preceding 12 mos. . . . .	11,690	46	3.9	9,252	25	2.7
Hours in preceding 12 mos. not stated . . . . .	2,159	5	2.3	4,691	3	*
Having private certificate and less than 100 solo hours						
Less than 50 hrs. in preceding 12 mos. . . . .	2,170	2	*	8,535	8	.9
50-99 hrs. in preceding 12 mos. . . . .	1,305	1	*	3,255	1	*
Having student certificate . . . . .	7,148	9	1.3	26,387	22	.8

\* Fatality rates not shown in classes with less than 5 deaths.

TABLE 11—Continued

*Military Pilots on Full Time Duty, Including Student Pilots  
Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action*

ATTAINED INSURANCE AGE AT BE- GINNING OF CALENDAR YEAR OF EXPOSURE	ISSUED WITH AVIATION EXTRA PREMIUM			ISSUED WITH AVIATION EXCLUSION PROVISION		
	Years of Exposure	Avia- tion Deaths	Rate per 1,000	Years of Exposure	Avia- tion Deaths	Rate per 1,000
<i>U.S. Army or Air Force</i>						
Under 25						
800 or more solo hours. . . . .	992	18	18.1	315	2	*
All other. . . . .	1,796	43	23.9	1,429	25	17.5
25-29						
800 or more solo hours. . . . .	13,903	119	8.6	2,502	13	5.2
All other. . . . .	4,045	58	14.3	2,712	20	7.4
30-34. . . . .	21,637	123	5.7	2,939	13	4.4
35 and over. . . . .	6,575	19	2.9	461	1	*
<i>U.S. Navy†</i>						
Under 25						
800 or more solo hours. . . . .	843	10	11.9	860	2	*
All other. . . . .	1,576	26	16.5	1,230	28	22.8
25-29						
800 or more solo hours. . . . .	8,114	69	8.5	1,811	10	5.5
All other. . . . .	3,213	37	11.5	1,542	10	6.5
30-34. . . . .	9,319	91	9.8	1,531	20	13.1
35 and over. . . . .	3,476	17	4.9	455	3	*
<i>Royal Canadian Air Force, including the Naval Air Division. . . . .</i>						
	263	2	*	816	3	*

\* Fatality rates not shown in classes with less than 5 deaths.

† Includes Marine Corps but not Coast Guard.