

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1958 REPORTS**

REPORT OF THE COMMITTEE ON AVIATION

AVIATION STATISTICS

THIS report is confined to a 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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SCHEDULED FLYING

United States

Table 1 shows the recent trend of fatality rates on United States scheduled airlines. Since pilots engaged in scheduled flying are limited by government regulations to a maximum of 1,000 hours a year, the death rates per 1,000 hours form an upper limit to the annual death rate of pilots engaged full time in such flying. 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 some other reasons, and include, on the other hand, the deaths in nonscheduled flights operated by scheduled airlines, such as tests or charter flights. The hazard of the normal airline pilot probably lies between the figures in the second and third columns of rates. The difference in recent years is not great.

Fatality rates in domestic flying were unusually low in 1957. At the time this report was written (November 1958), there had been approximately 120 passenger and 8 pilot fatalities in 1958; these figures were already four times as high as the corresponding ones for the whole year 1957.

With respect to the death rates in international flying, it must be remembered that the exposure comprises less than one-sixth of the total and that a single fatal accident as in 1957 can result in violent fluctuations in the observed fatality rates. Also, starting with the year 1957 the Civil Aeronautics Board changed the basis for classifying flight personnel be-

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 Airplane Hours	Death Rate of All Pilots Employed in Scheduled Flying, per Life Year of Exposure	Death Rate of Other Crew Members Employed in Scheduled Flying, per Life Year of Exposure
Domestic				
1957 .....	.0003	.0003*	.0004*	.0001*
1950-1953 .....	.0015	.0022	.0020	.0015
1951-1954 .....	.0010	.0018	.0017	.0011
1952-1955 .....	.0010†	.0016†	.0015†	.0010†
1953-1956 .....	.0012†	.0014†	.0014†	.0011†
1954-1957 .....	.0009†	.0010†	.0009†	.0008†
International				
1957 .....	.0015	.0016*	.0010*	.0024
1950-1953 .....	.0033	.0017*	.0013	.0027
1951-1954 .....	.0022	.0011*	.0009	.0019
1952-1955 .....	.0015	.0005*	.0007	.0015
1953-1956 .....	.0001*	.0000*	.0001*	.0004*
1954-1957 .....	.0005	.0004*	.0004*	.0011
Total				
1957 .....	.0005	.0005*	.0005	.0006
1950-1953 .....	.0018	.0021	.0019	.0019
1951-1954 .....	.0012	.0017	.0015	.0013
1952-1955 .....	.0011†	.0014†	.0014†	.0011†
1953-1956 .....	.0010†	.0012†	.0011†	.0010†
1954-1957 .....	.0009†	.0009†	.0008†	.0008†

* Based on less than 5 deaths.

† Includes deaths caused by a bomb placed in an airplane.

tween international and domestic operations, with the result that there was a significant decrease in international flight personnel. The effect of this change was to increase somewhat the death rates per life year of exposure for flight personnel involved in international flying from what they would have been had the previous basis of classification been retained.

Outside of United States

The International Air Transport Association has furnished to the Committee the experience of most of its member companies. By deducting the included experience of United States scheduled airlines and making reasonable assumptions as to average speed in the years for which it was not specifically given, the passenger fatality rates per 1,000 hours shown in Table 2 were derived and compared with the rates from Table

TABLE 2
SCHEDULED AIRLINES OF UNITED STATES
AND OTHER COUNTRIES
PASSENGER AVIATION DEATH RATE
PER 1,000 PASSENGER HOURS

Period	Airlines of Countries Other than U.S. Reporting to I.A.T.A.	All U.S. Airlines
1957 . . . . .	.0028	.0005
1950-1953 . . . . .	.0046	.0018
1951-1954 . . . . .	.0046	.0012
1952-1955 . . . . .	.0040*	.0011*
1953-1956 . . . . .	.0043*	.0010*
1954-1957 . . . . .	.0039*	.0009*

* Includes deaths caused by sabotage or attack.

1 for all flying of United States scheduled airlines (whether or not they are members of the International Air Transport Association).

NONSCHEDULED (“IRREGULAR” AND “SUPPLEMENTAL”¹) CARRIER FLYING

The figures in Table 3 for “large” irregular and supplemental¹ 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 from take-off to landing. There were no fatal accidents during either 1956 or 1957, so that the death rates for the years 1954 through 1957 were well below those for any other recent four-year period.

CIVILIAN HELICOPTER FLYING

In 1957, helicopter crashes resulted in 7 pilot deaths. They occurred in the following types of flying: 2 exhibition-demonstration, 1 ferry, 4 con-

¹ These two classes differ in the services they are allowed to render (TSA 1956 Reports, 122), not in their safety regulation.

tract-charter. In an attempt to determine the exposure, the Committee wrote to the Civil Aeronautics Board and obtained the following data on the number of pilots holding a helicopter rating:

	January 1, 1957	January 1, 1958
Number holding helicopter rating only	251	473
Number holding helicopter rating in addition to other ratings	3,898	5,092
Total	4,149	5,565

If the mean of the total number of pilots with helicopter rating were used as the exposure, the aviation death rate for 1957 would be 1.4 per 1,000 life years. This would probably be a considerable understatement of the true rate, since not all pilots with a helicopter rating are active as helicopter pilots.

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

PERIOD	PASSENGER		FIRST PILOT*	
	Deaths	Rate per 1,000 Passenger Hours	Deaths	Rate per 1,000 Airplane Hours
1950-1953	274	.013	11	.012
1951-1954	254	.011	11	.012
1952-1955	203	.008	10	.012
1953-1956	177	.007	8	.010
1954-1957	36	.002	3	.004

* Nonpassenger operations excluded in 1953.

CANADIAN CIVIL PILOTS

The fatality rates of Canadian civil pilots for 1952-1957, furnished by the Department of Transport, are shown in Table 4. Except for a slight decrease in the rate of pilots holding an airline transport license, the rates are substantially the same as those for the period 1951-1956 reported last year. It should be noted that holders of an airline transport license engage in all types of flying and are not necessarily engaged in scheduled airline flying. The class of pilots with a private license may include a considerable number doing little or no flying.

UNITED STATES AIR FORCE

Pilots and Other Rated Officers—By Age

Table 5 shows aviation death rates by age group for the years 1954–1957 for all rated pilots of the Air Force and for other rated officers. The experience for pilots has continued to improve, especially at ages under 30. The rates for these ages, however, are still more than twice as high as

TABLE 4
CANADIAN CIVIL PILOTS BY CLASS OF LICENSE
1952–1957

Class of License	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Airline Transport	4,423	20	4.5
Senior Commercial	1,882	14	7.4
Commercial	10,062	69	6.9
Private (excluding Students)	31,561	63	2.0

TABLE 5
UNITED STATES AIR FORCE ON ACTIVE DUTY, BY AGE
AVIATION DEATH RATES PER 1,000
LIFE YEARS OF EXPOSURE
Deaths Due to Enemy Action Excluded—Other Deaths
in Combat Missions Included

Age Group	1954	1955	1956	1957	1954–1957
All Rated Pilots					
Under 25	20.8	12.1	8.3	7.1	11.3
25–29	12.9	12.5	11.9	9.3	11.5
30–34	5.3	5.0	4.4	3.9	4.8
35 and over	2.9	3.8	3.5	3.2	3.4
All	7.7	7.0	6.1	5.3	6.5
Nonpilot Rated Officers					
Under 25	9.3	4.3*	5.3	4.0	5.4
25–29	6.1	5.5	5.3	6.3	5.8
30–34	2.9	4.4	3.1	4.8	3.7
35 and over	2.1	3.3	3.4	5.3	3.7
All	4.9	4.3	4.3	5.1	4.7

* Based on less than 5 deaths.

those for ages 30 and over. On the other hand, in recent years pilots under age 25 have enjoyed slightly more favorable experience than those at ages 25-29. The rates are undoubtedly affected by factors other than age, of which duty assignment is probably the most important.

The average number of aircraft hours per pilot decreased from 169 in 1955 to 163 in 1956 to 148 in 1957. Note that this is not the same as the average number of flying hours per pilot, which is thought to be close to 300. The difference arises because, in the computation of the average number of aircraft hours, hours flown by more than one pilot in the same aircraft are counted only once. However, it may be assumed that there was a corresponding decrease in average flying hours. This decrease is probably one of the factors accounting for the recent improvement in fatality rates.

Pilots and Other Rated Officers—By Rank

Table 6 shows death rates by rank for pilots and other rated officers. As would be expected from the analysis by age, the decrease in death rates for pilots is most evident for the lower ranks.

Student Pilots

Table 7 shows aviation death rates of undergraduate pilot students for the period 1954-1957. Students in the advanced course are rated pilots and are included in Tables 5 and 6.

Duty Assignment

Table 8 gives fatality rates of rated pilots according to duty assignment.

The classification "All Other" includes the so-called proficiency pilots, whose primary duty is in some capacity other than as pilot—*e.g.*, administration—but who do a minimum amount of flying to maintain proficiency and qualify for flight pay.

There has been a notable improvement in the experience of fighter pilots, the rate in 1957 being only half of that in 1954. Fighter pilots, however, are still subject to much higher aviation death rates than any other group. The shift to jet bombers in recent years seems to have had no unfavorable effect on the experience of bomber pilots. The rates for helicopter pilots have been much lower in 1956-1957 than before, but the more recent experience is based on very few deaths.

Military Air Transport Service

For the period 1954-1957 the passenger fatality rate in the Military Air Transport Service was 2.4 per 100,000,000 passenger miles. This

compares with a rate of 0.4 for all United States scheduled commercial airlines for the same period.

Aviation death rates of flying personnel of the MATS have been obtained as shown in Table 9.

TABLE 6
 UNITED STATES AIR FORCE ON ACTIVE DUTY, BY RANK
 AVIATION DEATH RATES PER 1,000
 LIFE YEARS OF EXPOSURE
 Deaths Due to Enemy Action Excluded—Other Deaths
 in Combat Missions Included

Rank	1954	1955	1956	1957	1954-1957
All Rated Pilots					
2nd Lieutenant	19.5	13.5	9.1	7.4	13.2
1st Lieutenant	11.7	10.6	10.8	8.2	10.1
Captain	5.2	6.4	4.8	4.2	5.1
Major	3.1	2.7	3.4	3.1	3.1
Lt. Col. and higher	2.5	2.6	2.0	3.3	2.6
All	7.7	7.0	6.1	5.3	6.5
Nonpilot Rated Officers					
2nd Lieutenant	8.6	10.7	5.3	2.7	7.5
1st Lieutenant	4.9	2.8	4.6	5.4	4.5
Captain	3.2	2.9	5.1	5.9	4.3
Major	2.3*	0.0*	0.9*	4.4	1.9
Lt. Col. and higher	0.0*	0.0*	1.8*	4.9*	2.0*
All	4.9	4.3	4.3	5.1	4.7

* Based on less than 5 deaths.

TABLE 7
 UNITED STATES AIR FORCE STUDENT PILOTS
 AVIATION DEATH RATES PER 1,000 LIFE YEARS
 OF EXPOSURE

Course	1955	1956	1957	1954-1957
Primary	2.2	2.5	2.8	2.2
Basic	4.4	6.4	5.0	8.7

Air National Guard

The fatality rate among Air National Guard pilots not federally activated was 7.1 per 1,000 life years of exposure in 1957 and 9.3 in the period 1954-1957. These rates count only the deaths of Air National Guard pilots while flying on military orders and in uniform on temporary active duty. The Committee is informed that there have been instances where Air National Guard pilots, in addition to their duties as such, are employed by the Guard as civilians and have been killed in aircraft accidents in ANG aircraft while technically in a civilian status.

TABLE 8
UNITED STATES AIR FORCE ON ACTIVE DUTY
BY DUTY ASSIGNMENT
AVIATION DEATH RATES PER 1,000
LIFE YEARS OF EXPOSURE

Duty Assignment	1954	1955	1956	1957	1954-1957
Pilot, Helicopter	19.0	13.2	0.0*	5.2*	8.4
Pilot, Amphibian	3.1*	10.5	3.8	0.0*	4.6
Pilot, Transport	1.7	7.9	4.2	1.8	3.9
Pilot, Troop Carrier	12.0	8.1	4.1	0.0*	5.9
Pilot, Fighter	26.0	23.7	18.7	13.0	20.0
Pilot, Bomber	6.3	10.1	6.2	5.4	6.8
Pilot, Reconnaissance	7.2	3.6	8.9	6.8	6.7
Pilot, AOB†	4.3	4.8	7.4	4.6	5.4
Operations Officer	1.8	2.1	2.6	3.7	2.7
All Other	3.4	1.8	3.0	3.3	2.9

* Based on less than 5 deaths.

† Pilot qualified also as a bombardier and a radar observer.

TABLE 9
MILITARY AIR TRANSPORT SERVICE
AVIATION DEATH RATES PER 1,000 LIFE YEARS
OF EXPOSURE

	7/1/54- 6/30/55	7/1/55- 6/30/56	7/1/56- 6/30/57	7/1/57- 6/30/58	7/1/54- 6/30/58
Pilots					
Transport units	3.9	3.5	7.8	2.4*	4.4
Other units	0.9*	3.9	3.2	2.6	2.7
Total	1.5	3.9	4.4	2.6	3.1
Other Crew					
Transport units	5.3	5.2	10.9	2.2	5.5
Other units	0.7*	3.4	6.8	5.2	4.1
Total	2.3	4.0	8.2	3.9	4.6

* Based on less than 5 deaths.

It is believed that the Air National Guard's combat squadrons will be entirely jet-equipped by the end of 1958.

Flight Surgeons and Nurses

The fatality rate per 1,000 life years of exposure in the period 1954-1957 was 3.7 for flight surgeons and 2.9 for flight nurses.

Graduates of Military Academy—Assignment to Aviation

Of the 1957 graduating class of the United States Military Academy, 24% were accepted for flying training by the Air Force. (See also below under "United States Navy.") This percentage may decrease in 1959, when the Air Force Academy will graduate its first class.

UNITED STATES ARMY

The Department of the Army has furnished information (see Table 10) for the calendar years 1954-1957 for all its flying operations.

TABLE 10
UNITED STATES ARMY—ALL FLYING OPERATIONS 1954-1957
AVIATION DEATH RATES PER 1,000
LIFE YEARS OF EXPOSURE

	1954	1955	1956	1957	1954-1957
Aviators	5.2	9.2	3.1	6.6	6.0
Crew Members	16.4	9.8	1.9*	7.1*	8.4

* Based on less than 5 deaths.

For the period January 1 to September 30, 1958, separate fatality rates were furnished for pilots of fixed wing and rotary wing aircraft. The former rate was 2.5 and the latter 5.6 per 1,000 life years of exposure. These rates were computed by dividing the pilot fatalities in each type of aircraft by the number of pilots qualified for that type. Many pilots are qualified for both types, and the rates are understated to the extent that pilots qualified for a type do little or no flying in it. The fatality rate for all Army pilots for the same period was 5.8 per 1,000 life years of exposure.

Paratroops

The fatality rate of paratroops from jumps was 1.5 per 100,000 jumps in the years 1954-1957; the number of deaths was small. Using approximate mean strength figures, the Committee estimates that the fatality rate from jumps in the years 1954-1957 was 0.13 per 1,000 life years of

exposure. No information is available on the death rate of paratroops due to other aviation accidents.

The Department of the Army also informed the Committee that, as a result of an intensive training and accident prevention program, the disabling injury rate has been reduced from 7.8 injuries per 1,000 jumps in the period 1946-1948 to 1.8 in 1957. Further improvement is anticipated as research to overcome the problem of ground wind drag continues.

UNITED STATES NAVY

Pilots by Age

Table 11 shows aviation death rates by age group for the years 1954-1957 for all Navy and Marine aviators (officers) on active duty. At ages under 35 the rates in 1957 showed improvement over the preceding years,

TABLE 11
UNITED STATES NAVY ON ACTIVE DUTY BY AGE
ALL NAVAL AVIATORS (OFFICERS)
AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE
Deaths Due to Enemy Action Excluded—Other Deaths
in Combat Missions Included

Age Group	1954	1955	1956	1957	1954-1957
Under 25.....	27.9	26.8	25.2	17.6	23.5
25-29.....	13.0	13.5	15.0	11.2	13.2
30-34.....	9.1	6.3	8.2	4.8	7.4
35 and over.....	3.2	3.0	2.6	3.1	2.9
All.....	10.9	10.4	10.1	8.5	9.9

which was most marked at ages under 25. The figures indicate that improved safety measures are producing results. The average number of flight hours per pilot was as follows:

1954.....	292
1955.....	289
1956.....	283
1957.....	277

The decrease may have contributed slightly to the improvement in fatality rates.

Pilots by Rank

Table 12 shows fatality rates of Navy and Marine aviators by rank for the years 1955-1957. A downward trend is noticeable for the lowest group of ranks (Ensigns, etc.).

Student Pilots

Fatality rates of Navy and Marine student pilots are shown in Table 13. The rate for students in the advanced course dropped markedly in 1957.

Inactive Reservists

For inactive reserve pilots in drill pay status, the fatality rate for the period 1954-1957 was 4.5 per 1,000 life years of exposure for ages under 30 and 1.6 for ages 30 and over.

The average number of flight hours per inactive reservist doing some flying in 1957 was 80, the same as in 1956.

TABLE 12
 UNITED STATES NAVY ON ACTIVE DUTY BY RANK
 ALL NAVAL AVIATORS (OFFICERS)
 AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE

Rank	1955	1956	1957	1955-1957
Ensign, 2nd Lt., Chief Warrant Officer and Warrant Officer.....	27.2	15.7	12.8	18.0
Lt. (j.g.) and 1st Lt.....	16.7	19.3	15.9	17.3
Lt. (Navy) and Captain (M.C.).....	7.3	7.3	6.7	7.1
Lt. Commander and Major.....	3.8	4.8	2.9	3.8
Commander, Lt. Colonel, and higher..	3.0	3.0	3.5	3.2

TABLE 13
 UNITED STATES NAVY STUDENT PILOTS
 AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE

Course	1954	1955	1956	1957	1954-1957
Basic.....	6.5	3.0	6.3	3.4	4.9
Advanced..	18.4	17.3	20.0	7.8	15.5

Graduates of Naval Academy—Assignment to Aviation

Of the 1958 graduating class of the United States Naval Academy who were commissioned in the Navy or Air Force, 26% have been ordered to flight training in the Navy, and 7% in the Air Force. The latter percentage may decrease in 1958, when the Air Force Academy will graduate its first class. Those commissioned in the Marine Corps are not yet eligible to apply for flight training.

UNITED STATES COAST GUARD

The figures in Table 14 have been derived from information supplied by United States Coast Guard headquarters.

ROYAL CANADIAN AIR FORCE

Table 15 gives fatality rates for the period 1953-1957 for pilots of the RCAF and of the RCAF Auxiliary (Reserve personnel who undergo weekly training in organized squadrons). The over-all rate is somewhat lower than that for 1952-1956 shown in *TSA 1957 Reports*, 57. In recent years the use of jet aircraft by the RCAF Auxiliary has been decreasing and it is anticipated that by the end of 1958 no Auxiliary Units will be equipped with jets.

In *TSA 1957 Reports*, 57, pilot air fatalities per 1,000 flying hours were given for the years 1954-1956. It has now been ascertained that these rates were based on aircraft flying hours rather than on exposure hours.

TABLE 14
UNITED STATES COAST GUARD PERSONNEL
ON FLIGHT ORDERS
1953-1957

Class	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Pilots.....	1,644	8	4.9
Student Pilots....	163	1	*
Observers.....	77	1	*
Crew Members...	4,778	17	3.6

* Rate not shown because of small number of deaths.

Pilot air fatalities per 1,000 pilot flying hours for the years 1955-1957 averaged .0764 for pilots flying jet aircraft and .0124 for pilots flying other aircraft. The approximate average number of flight hours in 1957 per pilot on active duty was 280 hours for the RCAF Regular and 120 hours for the RCAF Auxiliary. The decrease since 1956 in flight hours per pilot in the RCAF Regular was due largely to the larger proportion of jet aircraft in use in 1957.

RCAF pilots may be transferred from one functional formation to another, depending upon the requirements of the Service at the time. Tours of full flying duty with a functional formation having an above average fatality expectancy rate are normally separated by a tour of duty with a functional formation having a lower fatality expectancy or by a tour of ground duty during which proficiency flying only is carried out.

INTERCOMPANY EXPERIENCE

Table 16 shows the experience of 32 companies on certain classes of pilots and military crew members for issues with aviation extra premium

since January 1, 1946, observed through December 31, 1957. The experience is by policies. Classification is by status at time of application for insurance. Exposure in the "Issued with Aviation Extra Premium" category is terminated on discontinuance of the extra premium.

The rates for professional civilian pilots were slightly higher for the period 1955-1957 than for the period 1952-1957. This may be partly due

TABLE 15
ROYAL CANADIAN AIR FORCE PILOTS
AVIATION DEATH RATES
PER 1,000 LIFE YEARS OF EXPOSURE

	Regular 1953-1957	Auxiliary 1953-1957
<i>Age Group</i>		
Under 25.....	18.0	21.6
25-29.....	16.4	18.0
30-34.....	10.7	8.5*
35-39.....	5.3	13.9*
40 and over.....	2.3	0
All.....	12.2	15.8
<i>Rank</i>		
Flight Cadet and Pilot Officer.....	8.3	21.2
Flying Officer.....	19.0	16.9
Flight Lieutenant.....	7.0	13.3*
Squadron Leader.....	2.4	6.6*
Wing Commander and Higher Ranks....	5.8	9.5*
All.....	12.2	15.8
<i>Function</i>		
Fighter.....	27.1	.....
Training.....	8.8	.....
Transport.....	.8	.....
Tactical.....	2.4	.....
Maritime.....	6.6	.....
Other.....	4.5	.....
All.....	12.2	.....

* Based on 5 deaths or less.

to the fact that those engaged in the least hazardous types of flying are now eligible for standard insurance in some companies and are thus no longer included in the "Issued with Aviation Extra Premium" category.

Commercial pilots other than scheduled airline pilots were subdivided into those who indicated that at least half their flying time was devoted to instructing, and all others. Since the experience of these two groups was very similar, only the combined results are shown. It should be recognized, however, that this class of commercial pilots is not homogeneous;

TABLE 16
 INTERCOMPANY EXPERIENCE ON PILOTS AND CREW MEMBERS
 ISSUED WITH AVIATION EXTRA PREMIUM
 Issued since January 1, 1946 unless Otherwise Stated—By Policies

CIVILIAN PILOTS			
Status at Issue and Exposure Period	Years of Exposure	Aviation Deaths	Rate per 1,000
Employed as scheduled airline pilot			
1946-1957	32,297	64	2.0
1949-1957	29,367	51	1.7
1952-1957	21,213	31	1.5
1955-1957	9,116	20	2.2
Others having commercial or transport certificate and flying for hire			
1946-1957	18,283	93	5.1
1949-1957	16,483	80	4.9
1952-1957	12,627	56	4.4
1955-1957	7,839	41	5.2
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 hours in preceding 12 months†			
1946-1957	30,738	29	.9
1949-1957	28,700	24	.8
1952-1957	22,210	20	.9
1955-1957	12,414	7	.6
50-99 hours in preceding 12 months†			
1946-1957	18,799	26	1.4
1949-1957	17,389	21	1.2
1952-1957	12,933	13	1.0
1955-1957	7,033	4	*
Less than 100 hours in preceding 12 months‡			
1946-1957	52,480	59	1.1
1949-1957	49,032	49	1.0
1952-1957	38,086	37	1.0
1955-1957	22,390	15	.7
100-199 hours in preceding 12 months			
1946-1957	25,630	62	2.4
1955-1957	10,613	20	1.9
200-299 hours in preceding 12 months			
1946-1957	8,399	42	5.0
1955-1957	3,785	22	5.8
300 or more hours in preceding 12 months			
1946-1957	6,801	31	4.6
1955-1957	2,839	10	3.5
100 or more hours in preceding 12 months			
1946-1957	40,830	135	3.3
1949-1957	38,200	124	3.2
1952-1957	29,140	89	3.1
1955-1957	17,237	52	3.0
Hours in preceding 12 months not stated			
1946-1957	5,514	13	2.4
1949-1957	3,891	5	1.3
1952-1957	3,355	8	2.4
1955-1957	1,893	2	*

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

† Excludes experience from one company which was unable to subdivide less than 100 flying hours.

‡ Includes all companies.

TABLE 16—Continued

MILITARY PERSONNEL				
Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action [§]				
Status at Issue and Exposure Period	Attained Insurance Age at Beginning of Calendar Year of Exposure, and Solo Hours at Issue	Years of Exposure	Aviation Deaths	Rate per 1,000
U.S. Army or Air Force rated pilots on full-time duty July 1, 1953—Dec. 31, 1957....	Under 25			
	800+ hours	625	3	*
	Others	1,041	4(1)	*
	25-29			
	800+ hours	6,745	35	5.2
	Others	3,027	15	5.0
	30-34	42,201	143(1)	3.4[3.4]
	35 and over	60,061	197(4)	3.3[3.2]
Issues and exposures, 1953-1957 40-150 hours in 12 months preceding issue.....	30-34	6,686	13	1.9
	35 and over	9,073	29	3.2
Over 150 hours in 12 months preceding issue.....	30-34	10,653	39	3.7
	35 and over	9,108	40	4.4
U.S. Navy [#] rated pilots on full-time duty July 1, 1953—Dec. 31, 1957....	Under 25			
	800+ hours	504	6	11.9
	Others	753	6	8.0
	25-29			
	800+ hours	5,038	26	5.2
	Others	2,325	23	9.9
	30-34	21,666	121	5.6
	35 and over	24,658	104	4.2
Issues and exposures, 1953-1957 40-150 hours in 12 months preceding issue.....	30-34	2,481	16	6.4
	35 and over	3,151	16	5.1
Over 150 hours in 12 months preceding issue.....	30-34	4,849	38	7.8
	35 and over	3,317	20	6.0
U.S. Army or Air Force crew members July 1, 1953—Dec. 31, 1957....	Under 25	3,100	5	1.6
	25-29	4,171	24(1)	5.8[5.5]
	30-34	8,664	26	3.0
	35 and over	9,990	38	3.8
	All Ages	25,925	93(1)	3.6[3.5]

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

[§] Figures in parentheses indicate included deaths from enemy action. Figures in brackets indicate aviation death rates with deaths from enemy action excluded.

[#] Includes Marine Corps but not Coast Guard.

it includes pilots engaged in such different activities as charter flying, crop control, business transportation, etc.

As in prior studies, there appeared to be no significant difference between the experience of pilots having a private certificate and 100 or more solo hours and that of pilots having a commercial or transport certificate but flying only for pleasure or personal business; therefore, Table 16 again presents the experience for the total of the two classes. The aviation death rates steadily increased with annual flying time, except that pilots who flew 200-299 hours in the 12 months preceding issue experienced higher rates than those who flew 300 or more hours. This was due to poor experience of pilots with a private certificate in the period 1956-1957.

TABLE 17
INTERCOMPANY EXPOSURES ON PILOTS APPARENTLY
ACTIVE AT TIME OF ISSUE—ISSUED STANDARD
Issues since 1955* Exposed to December 31, 1957

	Years of Exposure	Aviation Deaths
Employed as scheduled airline pilot.	2,223	2
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)	7,814	1

* Some earlier issues may be included.

The addition of one year's experience had little effect on the aviation death rates of military personnel. The rates in the intercompany experience continued to be lower than those for the Air Force and Navy as a whole, especially at ages under 30; the only exception was for Navy pilots aged 35 and over.

This year's investigation continued the subdivision, started last year, of military pilots aged 30 and over according to the amount of flying in the 12 months preceding issue. Results again show higher rates for pilots who flew more than 150 hours than for those who flew 40-150 hours, but the difference was smaller than last year, and the relationship was actually reversed for Navy pilots in the experience of 1957 alone.

As in the over-all experience shown in Tables 5 and 11, aviation death rates in the intercompany experience for Navy pilots were generally higher than for Air Force pilots.

Table 17 presents the experience on policies issued standard. Since there were only 3 deaths, no death rates are shown.