

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1955 REPORTS**

REPORT OF THE COMMITTEE ON AVIATION

AVIATION STATISTICS

THIS 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.

INDEX TO AVIATION REPORTS 1940-1955, INCLUSIVE*

CIVIL AVIATION—PASSENGERS

Coast Guard.....	†
Mechanics.....	XLI, 291
Nonscheduled Carriers.....	†
Scheduled Flying	
United States.....	†
Canada.....	†
Outside United States.....	†
Crew Members.....	†
Effect of Modifying Factors.....	XLI, 252
Intercompany Experience.....	XLI, 254
Voluntary Parachute Jumps.....	XLVIII, 371

CIVIL AVIATION—PILOTS

Airplane Owners.....	XLI, 286
Annual Flying Time.....	XLIX, 546
Autogiro.....	XLI, 288
By Age.....	XLI, 287
Intercompany Experience.....	1954 REPORTS, 72
By Amount of Annual Flying.....	XLI, 279
Intercompany Experience.....	†
By Amount of Total Flying Experience.....	XLI, 282
By Class of License, Canada.....	†
Coast Guard.....	†
Crop Control.....	†
Effect of Modifying Factors.....	XLI, 279-290
Nonairline Commercial Pilots—Intercompany Experience	†
Nonaviation Deaths.....	XLI, 291
Noncommercial Business or Company-Owned Aircraft.....	†
Nonscheduled by Type of Flying.....	†
Nonscheduled Carriers.....	1954 REPORTS, 66

* References are to *TASA* or *TSA*.

† In present Report.

Past and Possible Pilots—Intercompany ExperienceXLI, 290
 Pilots with Accident RecordXLI, 283
 Pilots with Physical DefectXLI, 287
 Pilots with Record of Violation of RegulationsXLI, 286
 Scheduled Flying
 United States†
 Canada†
 Intercompany Experience†
 Student Pilots1952 REPORTS, 68

MILITARY AND NAVAL AVIATION

Air National Guard†
 By Amount of Annual FlyingXLI, 281
 Flight Surgeons†
 Military Air Transport Service†
 ParatroopersI, 626
 Royal Canadian Air Force†
 Service Academy Graduates†
 United States Air Force
 By Attained Age†
 Intercompany Experience†
 By Duty Assignment†
 By Flying Hours—Intercompany Experience†
 By Rank†
 Flying HoursL, 101
 By Type of Aircraft†
 Nonpilot Personnel†
 Intercompany Experience†
 ReservesXLIX, 551
 Student Pilots1953 REPORTS, 44
 United States Army†
 United States Navy and Marine Corps
 Annual Flying Time1953 REPORTS, 47
 By Attained Age†
 Intercompany Experience†
 Nonpilot Personnel1953 REPORTS, 46
 Reserves†
 Student Pilots†

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

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 Em- ployed in Scheduled Flying, per Life Year of Exposure
Domestic				
1949 . . . . .	.0024	.0031	.0021	.0017
1950 . . . . .	.0021	.0019	.0018	.0015
1951 . . . . .	.0024	.0035	.0032	.0030
1952 . . . . .	.0007	.0012	.0009	.0004
1953 . . . . .	.0011	.0019	.0023	.0015
1954 . . . . .	.0002	.0008	.0006	.0001
1947-50 . . . . .	.0030	.0026	.0023	.0023
1948-51 . . . . .	.0023	.0027	.0022	.0021
1949-52 . . . . .	.0018	.0024	.0020	.0016
1950-53 . . . . .	.0015	.0021	.0020	.0015
1951-54 . . . . .	.0010	.0018	.0017	.0011
International				
1949 . . . . .	.0000	.0000	.0000	.0000
1950 . . . . .	.0045	.0023	.0013	.0031
1951 . . . . .	.0025	.0023	.0013	.0038
1952 . . . . .	.0067	.0021	.0025	.0042
1953 . . . . .	.0001	.0000	.0000	.0000
1954 . . . . .	.0000	.0000	.0000	.0000
1947-50 . . . . .	.0022	.0021	.0024	.0028
1948-51 . . . . .	.0023	.0016	.0019	.0028
1949-52 . . . . .	.0036	.0016	.0013	.0027
1950-53 . . . . .	.0033	.0016	.0013	.0027
1951-54 . . . . .	.0022	.0011	.0009	.0019
Total				
1949 . . . . .	.0019	.0024	.0016	.0010
1950 . . . . .	.0025	.0020	.0017	.0020
1951 . . . . .	.0024	.0033	.0028	.0032
1952 . . . . .	.0017	.0014	.0012	.0014
1953 . . . . .	.0009	.0016	.0019	.0011
1954 . . . . .	.0002	.0007	.0005	.0001
1947-50 . . . . .	.0028	.0025	.0023	.0025
1948-51 . . . . .	.0023	.0025	.0021	.0024
1949-52 . . . . .	.0021	.0023	.0018	.0019
1950-53 . . . . .	.0018	.0020	.0019	.0019
1951-54 . . . . .	.0012	.0017	.0015	.0013

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 test 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.

The fatality rates for 1954 on all of these bases were very low, and the improvement of the 4-year period 1951-1954 over 1950-1953 was greater than most previous changes in 4-year death rates between successive periods. The number of fatalities occurring so far in 1955, however, indicates that the very favorable experience of 1954 was something of a fluctuation. It is perhaps unnecessary to point out that the experience of a single year is not conclusive.

Outside of United States

On the basis described in *TSA 1954 REPORTS*, 65, the passenger aviation death rate per 1,000 hours for scheduled airlines of countries other than the United States for 1951-1954 was the same as in 1950-1953 and the comments in the passage cited continue to apply.

Canada

Passenger and pilot mortality rates per 1,000 hours derived from figures furnished by the Canadian Department of Transport and the Dominion Bureau of Statistics are shown in Table 2 together with the corresponding United States figures. The figures are shown only for domestic and international flying combined since there was only one fatal accident in Canadian international flying during the periods in question—in 1951. It will be seen from the table that the Canadian experience is somewhat less favorable than that for the United States, even after making allowance for the somewhat unusual accident in Canada in 1949.

NONSCHEDULED FLYING

Fatality rates of first pilots by kind of nonscheduled civil flying were shown in *TSA 1954 REPORTS*, 67, on the basis of 1,000 airplane hours for the years 1949 and 1951-1953. The usefulness of these figures, however, was limited by the lack of information about average annual hours per pilot, and by the fact that many pilots, especially professional pilots, engage in more than one kind of flying. However, a recent report of the

CAA based on 1953 flying classifies aircraft according to their principal use, and in some of these principal uses there is reason to believe that the number of pilots engaged mainly in the kind of flying in question does not differ materially from the number of aircraft engaged mainly in that kind of flying. This is particularly true of agricultural flying, where another CAA survey shows that the number of pilots taking part in each of several activities within that kind of flying closely approximated the number of aircraft taking part in those activities. It also seems reasonable to assume that the number of pilots whose principal flying is as pilot of aircraft used

TABLE 2
CANADIAN SCHEDULED AIRLINES
Compared with Those of the United States

PERIOD	PASSENGER AVIATION DEATH RATE PER 1,000 PASSENGER HOURS		AVIATION DEATH RATE OF FIRST PILOTS IN SCHEDULED FLIGHTS PER 1,000 AIRPLANE HOURS	
	Canada	United States	Canada†	United States
	Domestic and International			
1949-52 . . . . .	.0035(.0022)*	.0021	.0054(.0041)*	.0023
1950-53 . . . . .	.0019	.0018	.0038	.0020
1951-54 . . . . .	.0032	.0012	.0036	.0017

* Rates shown in parentheses are those excluding 19 passenger deaths and one first pilot death in an accident in 1949 in domestic flying (where the cause of death was adjudged murder).

† Based on less than 5 deaths in each period.

principally for business purposes will approximate the number of such aircraft. While undoubtedly there were some deaths in the course of other flying in aircraft whose major use was one of these kinds, nevertheless the percentages of flying which was in the major usage were respectively 95% and 92% in these two classes. For these classes of flying the Committee has computed two sets of fatality rates. As can be seen from Table 3, the two sets are in fairly close agreement. The first set of ratios are of the number of first pilot deaths in the given kind of flying to the number of aircraft engaged principally in that kind of flying. This assumes that the deaths, in the given kind of flying, of pilots engaged mainly in some other kind of flying are balanced by the deaths, in some other kind of flying, of pilots engaged mainly in the given kind. The second ratio uses as the life years of exposure the quotient of (*a*) the total hours flown by all aircraft

in the given kind of flying by (*b*) the average annual hours in all kinds of flying by the aircraft whose principal use is the given kind. This makes the same assumption about deaths as the first set of ratios, and also makes a similar assumption about the balancing of aircraft hours. Symbolically, the two sets of ratios may be represented by

$$\frac{d'}{H'/h} \quad \text{and} \quad \frac{d}{H/h}$$

while the ideal ratio would be

$$\frac{d}{H/h}$$

where *d* represents deaths, *H* total annual hours, and *h* average annual hours per aircraft, with the unprimed symbols referring to pilots and aircraft engaged mainly in the given kind of flying and the primed symbols referring to deaths of all pilots and hours of all aircraft in the given kind of flying.

TABLE 3
NONSCHEDULED FLYING BY KINDS

KINDS OF FLYING	FIRST PILOT AVIATION DEATH RATE PER 1,000 ESTIMATED LIFE YEARS OF EXPOSURE ACCORDING TO METHODS OF APPROXIMATION DESCRIBED ABOVE	
	First Method	Second Method
Crop control.....	11.2	11.7
Noncommercial business or personal transportation in company-owned aircraft.....	1.5	1.7

TABLE 4

Class of License	Life Years of Exposure	Aviation Fatalities	Fatality Rate per 1,000 Life Years
Airline Transport.....	4,367	22	5.0
Commercial and Senior Commercial.....	7,046	58	8.2
Private (excluding Students).....	22,663	57	2.5

CANADIAN CIVIL PILOTS

The fatality rates of Canadian civil pilots for 1949-1954, furnished by the Department of Transport and shown in Table 4, are slightly lower

than those shown in *TSA 1953 REPORTS*, 42, for the corresponding classes.

It is not unlikely that the class of private pilots includes a considerable number whose flying time is small or nonexistent, and that the rate shown is not applicable to pilots with substantial annual flying time. The Committee has no definite information on this point, however.

UNITED STATES AIR FORCE

Pilots and Other Rated Personnel—By Age

The fatality rates for 1953 and 1954, shown in Table 5, continue the downward trend observed in 1952 for all rated pilots and pilots of the

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 in 1952-1953 Only

Age Group	1952	1953	1954	1951-1954
ALL RATED PILOTS				
Under 25.....	27.5	26.7	20.8	25.1
25-29.....	13.0	13.1	12.9	12.8
30-34.....	6.8	5.1	5.3	5.9
35 and over.....	4.4	3.8	2.9	4.0
All.....	9.1	8.3	7.7	8.6
REGULAR AIR FORCE PILOTS (INCLUDED ABOVE)				
Under 25.....	41.9	35.2	26.2	36.6
25-29.....	13.1	12.9	10.4	12.8
30-34.....	5.5	4.5	6.8	5.0
35 and over.....	3.6	2.6	2.2	2.7
All.....	6.5	5.2	5.1	5.7
NONPILOT RATED OFFICERS				
Under 25.....	12.8	8.8	9.3	9.6
25-29.....	8.7	5.4	6.1	6.8
30-34.....	6.9	5.4	2.9	5.9
35 and over.....	5.1	4.5	2.1	4.4
All.....	7.5	5.8	4.9	6.3

regular service under age 25, all pilots at ages 35 and over, regular pilots at ages 25-29, and nonpilot rated officers at ages 30 and over.

Pilots—By Rank

Table 6 shows for 1953-1954 fatality rates for pilots and other rated officers by rank.

TABLE 6
 UNITED STATES AIR FORCE ON ACTIVE DUTY BY RANK
 AVIATION DEATH RATES PER 1,000
 LIFE YEARS OF EXPOSURE, 1953-1954
 Deaths Due to Enemy Action Excluded—Other Deaths
 in Combat Missions Included in 1953 Only

Rank	All Rated Pilots	Regular and Air Force Pilots (Included in Preceding Column)	Nonpilot Rated Officers
Lt. Col. and higher.	2.6	2.7	1.3*
Major.	3.6	4.6	3.6
Captain.	5.6	5.4	4.1
1st Lt.	11.8	16.6	5.3
2nd Lt.	21.2	17.5	8.3
All	8.0	5.1	5.3

* Based on less than 5 deaths.

Flight Surgeons

The fatality rate of flight surgeons in 1947-1953 was 7.2 per 1,000 life years of exposure as flight surgeon whether or not on flying status.

Graduates of Military Academy—Assignment to Aviation

24% of the 1953 graduating class of the United States Military Academy, and 28% of the 1954 class were accepted for flying training by the Air Force. Some graduates of the Naval Academy have also been accepted for Air Force training (see below under "United States Navy").

Duty Assignment

Table 7 gives aviation fatality rates of rated pilots according to duty assignment. These are for 1951-1953 except in classes otherwise indicated. The latter are mostly cases where the present classification became effective during 1952 and did not correspond closely to any previous classification. Deaths in combat missions are treated as in Table 4. Deaths are

classified by the duty assignment held at the time of death and include deaths as pilot, copilot, crew member, or passenger, in either military or civilian aircraft.

TABLE 7
AVIATION DEATH RATES BY DUTY ASSIGNMENT
UNITED STATES AIR FORCE ON
ACTIVE DUTY—1951-1953

Duty Assignment	Death Rate per 1,000 Life Years of Exposure
Pilot, Helicopter	17.1
Pilot, Amphibian	8.4
Pilot, Transport	3.9*
Pilot, Troop Carrier	10.5*
Pilot, Jet Fighter	32.3
Pilot, Nonjet Fighter	17.5*
Pilot, Jet Bomber	30.6
Pilot, Nonjet Bomber	7.1*
Pilot, Single-Engine Reconnaissance	8.4
Pilot, Multi-Engine Reconnaissance	6.8
Pilot, AOB†	17.4‡
Operations Officer	5.0
All Other	4.1

* July 1952—December 1953.

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

‡ 1952-1953.

Military Air Transport Service

For the period 1947-1953 the passenger fatality rate in the Military Air Transport Service was 2.0 per 100,000,000 passenger miles, with three fatal accidents. This compares with a rate of 1.1 for all United States scheduled commercial airlines for the same period.

Air National Guard

The fatality rate of pilots of the Air National Guard not federally activated was 4.4 per 1,000 life years of exposure in 1953 as against 9.8 per 1,000 for the period 1951-1953, in spite of the higher proportion of flying in jet aircraft during 1953.

UNITED STATES ARMY

The Department of the Army has furnished information (see Table 8) for the calendar years 1953-1954 for all its flying operations, with deaths from enemy action excluded.

TABLE 8
UNITED STATES ARMY—ALL FLYING OPERATIONS 1953-1954

	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Pilots.....	4,352	45	10.3
Other Personnel on Flying Status....	1,189	10	8.4

UNITED STATES NAVY

(Includes Marine Corps unless Otherwise Stated)

Pilots by Age

Because of the irregular trend in recent years, fatality rates are shown in Table 9 for 1952, 1953 and 1954 separately, as well as for the period

TABLE 9
UNITED STATES NAVY ON ACTIVE DUTY BY AGE
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	ALL NAVAL AVIATORS				REGULAR NAVAL AVIATORS (INCLUDED IN FOREGOING)			
	1952	1953	1954	1951- 1954	1952	1953	1954	1952- 1954
Under 25.....	25.6	41.7	27.9	30.8	20.2	58.1	19.0	25.9
25-29.....	13.4	9.0	13.0	11.8	13.3	9.6	10.6	11.2
30-34.....	9.1	8.1	9.1	8.7	8.3	6.0	8.7	7.6
35 and over.....	5.2	3.6	3.2	3.9	4.0	2.4	2.7	3.0
All.....	11.3	9.8	10.9	10.6	9.1	6.5	7.2	7.6

1951-1954 for all naval aviators (officers) on active duty and 1952-1954 for Regular naval aviators.

It may be interesting to note that the fatality rate for all naval aviators age 40 and over for the period 1947-1954 was 1.1 per 1,000.

In recent years the fatality rates in the age group 30-34 have been consistently higher than those for Air Force pilots of the same age group.

Student Pilots

Fatality rates of student naval aviators are shown in Table 10 for the year 1954 and the period 1951-1954. The continued increase of the rate in advanced training from the low point reached in 1952 may be associated

TABLE 10
UNITED STATES NAVY—
STUDENT NAVAL AVIATORS
AVIATION DEATH RATES PER 1,000
LIFE YEARS OF EXPOSURE

Stage of Training	1954	1951-1954
Basic	6.5	6.4
Advanced	18.4	13.6

with the increasing proportion of jet flying in that stage of training, and the fact that an accident in a jet aircraft is more likely to be fatal than one in propeller-driven aircraft.

Inactive Reservists

For inactive reserve pilots in drill pay status the fatality rates for the period 1952-1954 were 5.0 per 1,000 life years for ages under 30 and 1.9 for ages 30 and over.

For inactive reservists not receiving drill pay, the fatality rate in 1951-1954 for those who did some flying was 0.5 per 1,000 life years of exposure. These pilots are attached to volunteer aviation companies and do not receive pay for drills performed. As a general rule the only flying done by pilots in this group occurs during their 2-week periods of annual training duty.

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.

Graduates of Naval Academy—Assignment to Aviation

Of the 1955 graduating class of the United States Naval Academy, excluding those commissioned in the Marine Corps, who are not yet eligible to apply for flight training, 18% have been ordered to flight training or are on the waiting list for flight training in the Navy, and 12% in the Air Force. The latter percentage is not likely to be affected by the establish-

ment of the Air Force Academy before the graduation of the June 1959 class, since existing agreements requiring the Naval Academy to supply graduates to the Air Force do not terminate until that time.

ROYAL CANADIAN AIR FORCE

Table 11 gives fatality rates for the period 1950-1954 for pilots of the RCAF and of the RCAF Auxiliary (Reserve personnel who undergo week-

TABLE 11
ROYAL CANADIAN AIR FORCE PILOTS
AVIATION DEATH RATE PER 1,000 LIFE YEARS OF EXPOSURE

	Regular 1950-1954	Auxiliary 1950-1954
<i>Age Groups</i>		
Under 25.....	19.7	28.0
25-29.....	12.7	15.2
30-39.....	9.0	16.1
40 and over.....		
All.....	12.4	18.8
<i>Rank</i>		
Pilot Officer and Flight Cadet.....	10.4	36.3*
Flying Officer.....	17.4	18.9
Flight Lieutenant.....	8.8	11.3
Squadron Leader.....	3.8	14.8
Wing Commander and Higher Ranks....	3.6	20.0
All.....	12.4	18.8

* Based on small exposure.

ly training in organized squadrons). The rates are generally higher than those for 1949-1953, shown in *TSA 1954 REPORTS*, 71. There were no combat fatalities in the period covered.

INTERCOMPANY EXPERIENCE

Table 12 shows the experience of thirty-one companies on certain classes of pilots and military crew members for issues since January 1, 1946, observed in the case of some companies through December 31, 1954, in the case of others through June 30, 1955, and in one case through December 31, 1953. Fatality rates are omitted in classes having less than five deaths.

The experience is by policies. Classification is by status at time of application for insurance. Exposure is terminated upon discontinuance of extra premium, or upon discontinuance of aviation exclusion provision

TABLE 12
 INTERCOMPANY EXPERIENCE ON PILOTS AND CREW
 MEMBERS APPARENTLY ACTIVE AT TIME OF ISSUE
 Issues of 1946 and Later, Exposed to June 30, 1955
 (Dec. 31, 1953 or Dec. 31, 1954 in Some Companies)
 By Policies

STATUS AT ISSUE	ISSUED WITH AVIATION EXTRA PREMIUM			ISSUED WITH AVIATION EXCLUSION PROVISION		
	Years of Ex- posure	Avia- tion Deaths	Rate per 1,000	Years of Ex- posure	Avia- tion Deaths	Rate per 1,000
<i>Civilian Pilots</i>						
Employed as scheduled airline pilot	22,359	45	2.0	no study made		
Having commercial or transport cer- tificate, employed as nonairline pil- ot, with indication that at least half of flying time is as instructor	4,412	21	4.8	2,259	8	3.5
Others having commercial or trans- port certificate and employed as nonairline pilot	6,032	31	5.1	2,605	11	4.2
Having commercial or transport cer- tificate 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 months	18,324	22	1.2	38,855	26	.7
50-99 hrs. in preceding 12 months	11,766	22	1.9	14,854	12	.8
100-199 hrs. in preceding 12 months	15,017	42	2.8	12,364	17	1.4
200-299 hours in preceding 12 months	4,614	20	4.3	2,911	18	6.2
300 or more hours in preceding 12 months	3,962	21	5.3	2,231	6	2.7
Hours in preceding 12 months not stated	3,621	11	3.0	9,817	6	.6
100 or more hours in preceding 12 months	23,593	83	3.5	17,506	41	2.3

TABLE 12—Continued

EXPOSURE PERIOD, AND AT- TAINED INSURANCE AGE AT BEGINNING OF CALENDAR YEAR OF EXPOSURE	ISSUED WITH AVIATION EXTRA PREMIUM			ISSUED WITH AVIATION EXCLUSION PROVISION		
	Policy Years of Exposure	Avia- tion Deaths	Rate per 1,000	Policy Years of Exposure	Avia- tion Deaths	Rate per 1,000
<i>Military Personnel on Full-Time Duty</i>						
<i>Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action*</i>						
U. S. ARMY OR AIR FORCE						
Pilots, Including Stu- dent Pilots						
<i>Prior to July 1, 1950</i>						
Under 25						
800 or more solo hours.....	811	11	13.6	263	2	†
All other.....	1,207	21	17.4	1,136	17	15.0
25-29						
800 or more solo hours.....	8,800	52	5.9	1,668	8	4.8
All other.....	2,297	26	11.3	1,742	11	6.3
30-34.....	9,007	45	5.0	1,305	6	4.6
35 and over.....	2,353	1	†	158	0	†
<i>July 1, 1950 to June 30, 1953</i>						
Under 25						
800 or more solo hours.....	273	7(3)	25.6[†]	97	4(2)	† [†]
All other.....	914	31(12)	33.9[20.8]	631	24(14)	38.0[15.8]
25-29						
800 or more solo hours.....	9,063	124(54)	13.7[7.7]	1,620	11(6)	6.8[3.1]
All other.....	3,108	56(19)	18.0[11.9]	1,658	22(6)	13.3[9.7]
30-34.....	25,942	175(59)	6.7[4.5]	3,801	21(5)	5.5[4.2]
35 and over.....	10,332	46(10)	4.5[3.5]	971	2(0)	† [†]
<i>July 1, 1953 and Later</i>						
Under 25						
800 or more solo hours.....	83	0	†	42	0	†
All other.....	204	4	†	598	6	10.0
25-29						
800 or more solo hours.....	2,212	9	4.1	572	4(1)	† [†]
All other.....	1,438	11	7.6	906	5	5.5
30-34.....	16,091	55	3.4	2,785	6	2.2
35 and over.....	13,382	38(2)	2.8[2.7]	1,402	1	†
Crew Members.....	18,866	134(30)	7.1[5.6]	7,160	23(4)	3.2[2.7]

* Figures in parentheses indicate deaths from enemy action included. Figures in brackets indicate avia-
tion death rates with deaths from enemy action excluded.

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

TABLE 12—Continued

EXPOSURE PERIOD, AND AT- TAINED INSURANCE AGE AT BEGINNING OF CALENDAR YEAR OF EXPOSURE	ISSUED WITH AVIATION EXTRA PREMIUM			ISSUED WITH AVIATION EXCLUSION PROVISION		
	Policy Years of Exposure	Avia- tion Deaths	Rate per 1,000	Policy Years of Exposure	Avia- tion Deaths	Rate per 1,000
<i>Military Pilots on Full-Time Duty, Including Student Pilots Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action*</i>						
U.S. NAVY†						
<i>Prior to July 1, 1950</i>						
Under 25						
800 or more solo hours	686	5	7.3	202	1	†
All other	1,420	15	13.4	1,395	21	15.1
25-29						
800 or more solo hours	4,854	25	5.2	976	4	†
All other	2,082	25	12.0	1,226	6	4.9
30-34	4,111	20	4.9	777	3	†
35 and over	1,337	2	†	184	0	†
<i>July 1, 1950 to June 30, 1953</i>						
Under 25						
800 or more solo hours	287	5(1)	17.4[†]	73	1(0)	† [†]
All other	668	18(7)	26.9[16.5]	782	14(6)	17.9[10.2]
25-29						
800 or more solo hours	5,418	76(31)	14.0[8.3]	925	12(5)	13.0[7.6]
All other	2,068	23(5)	11.1[8.7]	1,303	10(4)	7.7[4.6]
30-34	11,480	161(55)	14.0[9.2]	1,966	24(10)	12.2[7.1]
35 and over	4,996	36(10)	7.2[5.2]	670	3(2)	† [†]
<i>July 1, 1953 and Later</i>						
Under 25						
800 or more solo hours	87	0	†	45	1	†
All other	158	0	†	287	2	†
25-29						
800 or more solo hours	1,542	7	4.5	339	6	17.7
All other	882	5	5.7	670	3	†
30-34	7,649	59	7.7	1,559	9	5.8
35 and over	5,603	12	2.1	743	2	†

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

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

‡ Includes Marine Corps but not Coast Guard.

unless it was replaced by an extra premium. The classification of deaths of military personnel as to combat was based on the remarks on the company death cards sent to the Committee. Cards which stated "killed (or missing) in action" or similar definite statements were counted as combat deaths. All others were assumed noncombat.

The new fatality rates in the three classes of professional civilian pilots studied show material relative improvement from those shown in *TSA 1954 REPORTS*, 72, for scheduled airline pilots and in *TSA 1952 REPORTS*, 68, for the other two classes. From the nature of the investigation the experience of recent years has more weight than that of earlier years.

For the scheduled airline pilot class tabular deaths were computed by using as the tabular death rate for each calendar year rates corresponding to those in Table 1 under the heading "Death Rates of All Pilots Employed in Scheduled Flying." The total tabular deaths were 39, giving a ratio of actual to tabular of 115%. This does not indicate any significant antiselection, or adverse effect from transfer to more hazardous kinds of flying by pilots who were employed by airlines at the time of application.

No significant difference was observed between pilots having a commercial or transport certificate but flying only for pleasure or personal business (not for hire) and 100 or more solo hours (or solo hours not stated), and pilots having a private certificate and 100 or more solo hours (or solo hours not stated). For the combination of these two classes the experience was subdivided further than heretofore as to the amount of annual flying in the twelve months preceding issue. As to policies issued with aviation extra premium, the results show a steady increase in fatality rate with increase in apparent annual flying time. While the flying time in a single 12-month period is not necessarily a guide to future average annual flying time, yet the relation of fatality rate to flying time in the twelve months preceding issue appears significant even though the experience includes policies with durations up to 10.

Within the subdivisions of apparent annual flying time there was no great change in fatality rates from those shown in *TSA 1954 REPORTS*, 72.

In the military classes, fatality rates are shown with and without deaths resulting from enemy action. In general the fatality rates for exposures of July 1, 1953 and later are lower than those for earlier periods, even when deaths from enemy action are excluded.

In recent exposure years the fatality rates of insured military pilots under age 25 have tended to be lower than those for all such pilots in the same age group.