

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1959 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.

INDEX TO AVIATION REPORTS 1940-1959, INCLUSIVE*
CIVIL AVIATION—PASSENGERS

Coast Guard.....	1952 Reports, 65; †
Mechanics.....	XLI, 291
Nonscheduled Carriers.....	†
Scheduled Flying	
United States.....	†
Canada.....	1955 Reports, 25; †
Outside United States.....	1956 Reports, 121; 1957 Reports, 45; †
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.....	1952 Reports, 65; †
Crop Control.....	†
Effect of Modifying Factors.....	XLI, 279-290
Helicopter.....	1958 Reports, 83; †

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

† In present Report.

Nonairline Commercial Pilots—Intercompany Experience.	†
Nonaviation Deaths.	XLI, 291
Noncommercial Business or Company-Owned Aircraft.	1956 Reports, 123; †
Nonscheduled by Type of Flying.	XLIX, 544; 1956 Reports, 123; †
Nonscheduled Carriers.	†
Past and Possible Pilots—Intercompany Experience.	XLI, 290
Pilots with Accident Record.	XLI, 283
Pilots with Physical Defect.	XLI, 287
Pilots with Record of Violation of Regulations.	XLI, 286
Private Pilots—Intercompany Experience.	†
Scheduled Flying	
United States.	†
Canada.	1955 Reports, 25; †
Intercompany Experience.	†
Student Pilots—Intercompany Experience.	1957 Reports, 58

MILITARY AND NAVAL AVIATION

Air National Guard.	†
Intercompany Experience.	1957 Reports, 58
By Amount of Annual Flying.	XLI, 281
Military Air Transport Service.	†
Paratroops.	1958 Reports, 89
Intercompany Experience.	1957 Reports, 58
Royal Canadian Air Force.	†
Service Academy Graduates.	†
United States Air Force	
Annual Flying Time.	1958 Reports, 86
By Amount of Annual Flying—Intercompany Experience.	†
By Attained Age.	†
Intercompany Experience.	1956 Reports, 135; †
By Duty Assignment.	†
By Duty Assignment and Specialty.	1956 Reports, 126
By Flying Hours—Intercompany Experience.	1956 Reports, 135; †
By Rank.	†
Flying Hours.	L, 101
By Type of Aircraft.	1953 Reports, 42; 1956 Reports, 129
Circumstances of Military Aircraft Accidents.	1957 Reports, 53
Crew Members—Intercompany Experience.	1957 Reports, 58; †
Flight Surgeons.	†

† In present Report.

Noncombat Death Rates	
Personnel on Flying Status.....	1957 Reports, 53
Personnel not on Flying Status.....	1957 Reports, 53
Reserves.....	XLIX, 551
Intercompany Experience.....	1957 Reports, 58
Student Pilots.....	†
Intercompany Experience.....	1957 Reports, 58
United States Army.....	†
By Rotary and Fixed Wing Aircraft.....	†
United States Navy and Marine Corps	
Annual Flying Time.....	†
By Amount of Annual Flying—Intercompany Experience.....	†
By Attained Age.....	†
Intercompany Experience.....	1956 Reports, 135; †
By Flying Hours—Intercompany Experience.....	1956 Reports, 135; †
By Rank.....	†
Crew Members—Intercompany Experience.....	1954 Reports, 75
Flight Surgeons.....	1956 Reports, 133
Nonpilot Personnel on Flying Duty.....	1956 Reports, 133
Reserves.....	†
Student Pilots.....	†
Intercompany Experience.....	1957 Reports, 58

SCHEDULED FLYING

United States

Table 1 shows the recent trend of fatality rates on United States scheduled airlines. Fatality rates in domestic flying, which were unusually low in 1957, rose in 1958. Though complete figures are not yet available for 1959, it is known that the passenger fatality rate in that year was about 50% higher than in 1958. Since the number of fatal accidents in scheduled flying is small but the number of passengers per plane is often large, aviation deaths resulting from a single accident can have a drastic effect on the fatality rates. This is particularly true of international flying, where the exposure is relatively low.

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 non-scheduled flights operated by scheduled airlines, such as test or charter flights.

TABLE 1
UNITED STATES SCHEDULED AIRLINES AVIATION DEATH RATES

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 Fly- ing, per Life Year of Exposure	Death Rate of Other Crew Members Em- ployed in Scheduled Fly- ing, per Life Year of Exposure
Domestic				
1958 . . . . .	.0010	.0014	.0010	.0008
1951-1954 . . . . .	.0010	.0018	.0017	.0011
1952-1955 . . . . .	.0010†	.0016†	.0015†	.0010†
1953-1956 . . . . .	.0012†	.0014†	.0014†	.0011†
1954-1957 . . . . .	.0009†	.0016†	.0009†	.0008†
1955-1958 . . . . .	.0011†	.0011†	.0010†	.0008†
International				
1958 . . . . .	.0004	.0000*	.0000*	.0000*
1951-1954 . . . . .	.0022	.0011*	.0009	.0019
1952-1955 . . . . .	.0015	.0005*	.0007	.0015
1953-1956 . . . . .	.0001*	.0000*	.0001*	.0004*
1954-1957 . . . . .	.0005	.0004*	.0004*	.0011
1955-1958 . . . . .	.0005	.0004*	.0005*	.0007
Total				
1958 . . . . .	.0008	.0012	.0008	.0007
1951-1954 . . . . .	.0012	.0017	.0015	.0013
1952-1955 . . . . .	.0011†	.0014†	.0014†	.0011†
1953-1956 . . . . .	.0010†	.0012†	.0011†	.0010†
1954-1957 . . . . .	.0009†	.0009†	.0008†	.0008†
1955-1958 . . . . .	.0010†	.0010†	.0009†	.0008†

* Based on less than 5 deaths.

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

Outside of United States

The International Air Transport Association has furnished to the Committee the experience of its member airlines. 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 1 for all flying of United States scheduled airlines (whether or not they are members of the International Air Transport Association).

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
1958 . . . . .	.0029	.0008
1951-1954 . . . . .	.0046	.0012
1952-1955 . . . . .	.0040*	.0011*
1953-1956 . . . . .	.0043*	.0010*
1954-1957 . . . . .	.0039*	.0009*
1955-1958 . . . . .	.0033*	.0010*

* Includes deaths caused by sabotage or attack.

Separate figures available for Canada show that in domestic and international operations of Canadian scheduled airlines during the period 1950-1958, the aviation death rate was .0028 per 1,000 passenger hours for passengers and .0034 per 1,000 airplane hours for pilots. The former rate is based on 150 passenger deaths, the latter rate on only 7 first-pilot deaths. The corresponding passenger death rate for the period 1955-1958 was also .0028, based on 87 passenger deaths.

NONSCHEDULED ("IRREGULAR" AND "SUPPLEMENTAL")
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—

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

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 passenger fatalities during the period 1956 through 1958, so that death rates shown for the recent periods have fallen off very sharply.

GENERAL AVIATION FLYING

Table 4 supplements Table 5 of the 1956 Report to the extent that additional data have become available. The term "general aviation flying" includes business, commercial, instructional, and pleasure flying. The data shown are taken from statistics compiled by the Federal Aviation Agency, the Civil Aeronautics Board, and the Civil Aeronautics Administration.

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
1951-1954.....	254	.011	11	.012
1952-1955.....	203	.008	10	.012
1953-1956.....	177	.007	8	.010
1954-1957.....	36	.002	3	.004
1955-1958.....	27	.001	2	.003

* Nonpassenger operations excluded in 1953 and subsequent years.

TABLE 4
GENERAL AVIATION FLYING BY KINDS—PILOT AVIATION
DEATH RATES PER 1,000 HOURS

PERIOD	CROP CONTROL			PLEASURE			INSTRUCTION		
	Hours*	Avia- tion Deaths	Rate	Hours*	Avia- tion Deaths	Rate	Hours*	Avia- tion Deaths	Rate
1955.....	852	52	.06	1,975	173	.09	1,275	31	.024
1956.....	803	44	.05	2,100	175	.08	1,500	35	.023
1957.....	866	41	.05	2,109	202	.10	1,864	49	.026
1955-1957..	2,521	137	.05	6,184	550	.09	4,639	115	.025

* 000 omitted.

The number of hours flown is an estimate based on annual surveys of aircraft use. Application of the figures in Table 4 depends on the average annual hours of the individual pilot under consideration, as well as on the kind(s) of flying in which he engages.

The largest segment (about 40%) of commercial flying is done for the purpose of crop control. The fatality rate in this activity for the years 1955 through 1957 shows some improvement over that for the years just prior thereto.

Pleasure flying accounts for about one-fifth of the hours flown in general aviation. Included are local hops, flying for sport or proficiency, and cross-country flights for purposes of vacation, air tours, and outdoor recreation.² The fatality rate for the period 1955 through 1957 was slightly lower than that shown in the 1956 Report.

The instructional flying category covers flight training of civilians, both dual instruction and solo flying, under an instructor's supervision. The hours flown in this activity have increased substantially from the postwar low in 1953. Single engine planes are used almost exclusively for this purpose.² In this category, too, recent fatality rates show improvement over those for the period 1951 through 1954.

The Civil Aeronautics Board made a study of business flying safety in the period 1951-1956. The study distinguished between "executive flying" and "flying for personal and other business." Executive flying was defined as "flying done by corporations, companies and other organizations in aircraft owned or leased in connection with the requirements of their enterprises, including the transport of personnel and cargo, not for compensation, and employing professional pilots for this purpose." Personal and other business flying was defined as "flying done by individuals (mainly nonprofessional pilots), not for compensation, in their own, borrowed or rented aircraft in connection with their business activities, including farmers, ranchers, lawyers, engineers, etc." This breakdown of business flying is not the same as that shown in Table 5 of the 1956 Report. The CAB study produced first pilot aviation death rates per 1,000 hours of .0065 for executive flying, .0123 for personal and other business flying, and .0105 for the two categories combined. The last rate is about the same as that shown in Table 5 of the 1956 Report for all noncommercial business flying in the period 1951-1954.

A survey of helicopter operations in general aviation flying made by the Civil Aeronautics Administration for the calendar year 1957 disclosed the following information relating to operations within the continental United States:

² *FAA Statistical Handbook of Aviation*, 1959 Edition, pages 45-46.

Number of helicopters in active use.....	290
Estimated total hours flown.....	105,000
Estimated total miles flown.....	8,800,000
Estimated occupants per flight, including pilot.....	2.7

In general aviation, helicopter crashes resulted in seven pilot deaths in 1957. On the basis of 105,000 hours flown, the pilot death rate was .07 per 1,000 hours.

CANADIAN CIVIL PILOTS

The fatality rates of Canadian civil pilots for 1953-1958, furnished by the Department of Transport, are shown below. The rates for pilots holding senior commercial and commercial licenses are slightly lower than the corresponding rates for the period 1952-1957 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.

CANADIAN CIVIL PILOTS BY CLASS OF LICENSE
1953-1958

Class of License	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Airline Transport.....	4,703	22	4.7
Senior Commercial.....	2,113	14*	6.6
Commercial.....	11,572	57*	4.9
Private (excluding students)...	35,665	71†	2.0

* Includes 1 missing, presumed dead.

† Includes 1 death as glider pilot.

UNITED STATES AIR FORCE

Pilots and Other Rated Officers—By Age

Table 5 shows aviation death rates by age group for the years 1955-1958 for all rated pilots of the Air Force and for other rated officers. For rated pilots at ages under 30, the rates for the period 1955-1958 were about 2 per 1,000 less than the corresponding rates for the period 1954-1957, but there was no improvement at ages 30 and over. 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 in 1958 was slightly less than in 1957.

For nonpilot rated officers, the rates for the period 1955-1958 were slightly below those for the period 1954-1957 at ages under 30, and slightly above them at ages 30 and over. There is much less variation with age for these officers than for pilots.

Pilots and Other Rated Officers—By Rank

Table 6 shows aviation death rates by rank for pilots and other rated officers. There is a close correlation between the experience by rank and that by age.

Student Pilots

Table 7 shows aviation death rates of undergraduate pilot students for the period 1955–1958. Students in the advanced course are rated pilots and are included in Tables 5 and 6. Since most undergraduate pilot students are in their twenties, it appears that they experience much lower fatality rates while in training than after obtaining their wings.

Duty Assignment

Table 8 shows fatality rates of rated pilots according to duty assignment. As indicated by the footnotes, several changes in classifications were made by the Air Force this year. For the first time, pilots of tanker

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	1955	1956	1957	1958	1955–1958
All Rated Pilots					
Under 25.....	12.1	8.3	7.1	8.1	9.2
25–29.....	12.5	11.9	9.3	7.3	9.9
30–34.....	5.0	4.4	3.9	5.4	4.6
35 and over.....	3.8	3.5	3.2	3.8	3.6
All.....	7.0	6.1	5.3	5.3	5.9
Nonpilot Rated Officers					
Under 25.....	4.3*	5.3	4.0	4.5	4.6
25–29.....	5.5	5.3	6.3	4.5	5.2
30–34.....	4.4	3.1	4.8	4.2	4.0
35 and over.....	3.3	3.4	5.3	3.8	4.0
All.....	4.3	4.3	5.1	4.2	4.5

* Based on less than 5 deaths.

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	1955	1956	1957	1958	1955-1958
All Rated Pilots					
2nd Lieutenant.....	13.5	9.1	7.4	8.5	10.4
1st Lieutenant.....	10.6	10.8	8.2	7.7	9.1
Captain.....	6.4	4.8	4.2	5.4	5.2
Major.....	2.7	3.4	3.1	2.7	3.0
Lt. Col. and higher.....	2.6	2.0	3.3	2.9	2.7
All.....	7.0	6.1	5.3	5.3	5.9
Nonpilot Rated Officers					
2nd Lieutenant.....	10.7	5.3	2.7	4.2	7.0
1st Lieutenant.....	2.8	4.6	5.4	4.7	4.5
Captain.....	2.9	5.1	5.9	3.5	4.4
Major.....	0.0*	0.9*	4.4	4.8	2.6
Lt. Col. and higher.....	0.0*	1.8*	4.9*	1.6*	2.1
All.....	4.3	4.3	5.1	4.2	4.5

* 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	1958	1955-1958
Primary.....	2.2	2.5	2.8	1.9	2.3
Basic.....	4.4	6.4	5.0	9.3	5.8

planes appear as a separate group; their fatality rate compares favorably with that of other Air Force pilots. Reconnaissance pilots produced an unexpectedly high fatality rate in 1958. The Committee asked the Air Force whether it could suggest an explanation for this feature of the experience; the reply indicated that there was no apparent reason for it.

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

Duty Assignment	1955	1956	1957	1958	1955-1958
Pilot, Helicopter.....	13.2	0.0*	5.2*	6.6*	6.1
Pilot, Amphibian.....	10.5	3.8	0.0*	0.0*	3.7
Pilot, Transport.....	7.9	4.2	1.8	3.8	4.2
Pilot, Troop Carrier.....	8.1	4.1	0.0*	4.3	4.1
Pilot, Fighter.....	23.7	18.7	13.0	14.0	17.2
Pilot, Bomber.....	10.1	6.2	5.4	8.4	7.3
Pilot, Reconnaissance.....	3.6	8.9	6.8	15.8	8.1
Pilot, Tanker†.....	.....	.....	.....	3.2	3.2§
Pilot, AOB‡.....	4.8	7.4	4.6	.....	5.5#
Operations Officer.....	2.1	2.6	3.7	2.3	2.7
All Other.....	1.8	3.0	3.3	2.5	2.6

* Based on less than 5 deaths.

† Grouped in "All Other," 1955-1957.

‡ Pilot also qualified as bombardier and radar observer—included in "Pilot, Bomber," 1958.

§ 1958 only.

3 year period, 1955-1957.

Military Air Transport Service

For the period 1955-1958, the passenger fatality rate in the Military Air Transport Service was 2.6 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 are shown in Table 9. The rates for the latest four-year period are close to the corresponding rates shown in last year's report. These rates are not available by age.

Air National Guard

The fatality rate among Air National Guard pilots not federally activated was 6.2 per 1,000 life years of exposure in 1958 and 8.0 in the period 1955-1958. These rates are slightly lower than those reported last year.

Flight Surgeons and Nurses

The fatality rate in the period 1955-1958 was 2.9 per 1,000 life years of exposure for both flight surgeons and flight nurses.

UNITED STATES ARMY

Table 10 shows fatality rates for United States Army pilots and crew members in the period 1955-1958.

For the calendar year 1958, separate fatality rates were furnished for pilots of fixed wing and rotary wing aircraft. The former rate was 3.0 and the latter 4.6 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. Nearly half the pilots are qualified for both types, and the rates are understated to the extent that some pilots qualified for a type may do little or no flying in it. Only the rate for all pilots, shown in Table 10, can be regarded as reliable.

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

	7/1/55- 6/30/56	7/1/56- 6/30/57	7/1/57- 6/30/58	7/1/58- 6/30/59	7/1/55- 6/30/59
Pilots					
Transport units.....	3.5	7.8	2.4*	3.9	4.3
Other units.....	3.9	3.2	2.6	1.3	2.8
Total.....	3.9	4.4	2.6	2.4	3.3
Other Crew					
Transport units.....	5.2	10.9	2.2	4.1	5.0
Other units.....	3.4	6.8	5.2	5.2	5.1
Total.....	4.0	8.2	3.9	4.4	5.1

* Based on less than 5 deaths.

TABLE 10
UNITED STATES ARMY—ALL FLYING OPERATIONS 1955-1958
AVIATION DEATH RATES PER 1,000
LIFE YEARS OF EXPOSURE

	1955	1956	1957	1958	1955-1958
Pilots.....	9.2	3.1	6.6	5.3	5.8
Crew Members.....	9.8	1.9*	7.1*	7.8	6.7

* Based on less than 5 deaths.

Graduates of Military Academy—Assignment to Aviation

Of the 1958 graduating class of the United States Military Academy, 24% were accepted for flight training by the Air Force. Preliminary figures indicate that the corresponding percentage was in the neighborhood of 5% in 1959, when the Air Force Academy graduated its first class. In addition, about 25% of the graduates of the United States Military Academy were selected for aviation training in the Army.

UNITED STATES NAVY

Pilots by Age

Table 11 shows aviation death rates by age group for the years 1955-1958 for all Navy and Marine aviators (officers) on active duty. Though

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	1955	1956	1957	1958	1955-1958
Under 25.....	26.8	25.2	17.6	18.5	21.5
25-29.....	13.5	15.0	11.2	11.9	12.9
30-34.....	6.3	8.2	4.8	5.6	6.3
35 and over.....	3.0	2.6	3.1	3.4	3.0
All.....	10.4	10.1	8.5	8.4	9.3

the rates in 1958 were somewhat higher than in 1957 in all age groups, the rate for all ages combined did not go up, because of a decrease in the proportion of pilots under age 25. The rates for the latest four-year period showed some improvement at ages under 35 over the corresponding rates shown last year.

The average number of flight hours per pilot in the last four years decreased as follows:

1955.....	289
1956.....	283
1957.....	277
1958.....	266

Pilots by Rank

Table 12 shows fatality rates for Navy and Marine aviators by rank for the years 1955-1958. The lowest group of ranks (ensigns, etc.) continued

to show a downward trend in 1958, but this rate is based on a relatively small number of fatalities. The rates for the other ranks have remained at about the same level in recent years.

Student Pilots

Fatality rates of Navy and Marine student pilots are shown in Table 13. In 1958, the rate for students in the advanced course dropped to a level not much higher than for students in the basic course.

Inactive Reservists

For inactive reserve pilots in drill pay status, the fatality rate for the period 1955-1958 was 3.8 per 1,000 life years of exposure at ages under 30 and 1.5 at ages 30 and over.

Graduates of Naval Academy—Assignment to Aviation

Of the 1959 graduating class of the United States Naval Academy, 24% will undergo flight training in the Navy and 6% in the Air Force. Those graduates commissioned in the Marine Corps are not yet eligible to apply for flight training.

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	1958	1955-1958
Ensign, 2nd Lt., Chief Warrant Officer and Warrant Officer.....	27.2	15.7	12.8	9.7	16.6
Lt. (j.g.) and 1st Lt.....	16.7	19.3	15.9	17.2	17.3
Lt. (Navy) and Captain (M.C.).....	7.3	7.3	6.7	7.2	7.1
Lt. Commander and Major.....	3.8	4.8	2.9	3.5	3.7
Commander, Lt. Colonel, and higher.....	3.0	3.0	3.5	3.9	3.4
All.....	10.4	10.1	8.5	8.4	9.3

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

Course	1955	1956	1957	1958	1955-1958
Basic.....	3.0	6.3	3.4	3.5	4.2
Advanced..	17.3	20.0	7.8	4.8	12.8

UNITED STATES COAST GUARD

The figures in Table 14 have been derived from information supplied by United States Coast Guard headquarters. There was only one fatality among pilots in 1958, and none among student pilots, observers or crew members.

TABLE 14
UNITED STATES COAST GUARD PERSONNEL
ON FLIGHT ORDERS
1953-1958

Class	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Pilots.....	1,994	9	4.5
Student Pilots....	210	1	*
Observers.....	90	1	*
Crew Members....	5,729	17	3.0

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

ROYAL CANADIAN AIR FORCE

Table 15 gives fatality rates for the period 1954-1958 for pilots of the RCAF and of the RCAF Auxiliary (Reserve personnel who undergo weekly training in organized squadrons). The over-all rates and the rates for most age groups and ranks have continued the downward trend shown in reports for the past three years. The lower fatality rate in the RCAF Auxiliary reflects the reduced exposure to flying in jet aircraft in 1958; there were no pilot fatalities in 1958.

A comparison of the fatality rates by functional formation for the periods 1954 to 1958, 1953 to 1957 and 1952 to 1956 indicates a generally improving trend for all categories except "Other."

Pilot air fatalities per 1,000 pilot flying hours for the years 1955-1958 averaged .0651 for pilots flying jet aircraft and .0120 for pilots flying other aircraft. The approximate number of flight hours in 1958 per pilot on active duty was 315 hours for the RCAF Regular and 100 hours for the RCAF Auxiliary.

INTERCOMPANY EXPERIENCE

Table 16 shows the experience of 32 companies on certain classes of pilots and military crew members insured with aviation extra premium, observed through December 31, 1958. The experience is by policies. Clas-

sification 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. If discontinuance is due to a liberalization of underwriting practice, companies are encouraged to transfer the exposure to the "Insured at Standard Rates" classification, but not all companies have been able to do so. Table 17, therefore, includes the experience on only a portion of such cases.

The addition of another year's experience has had very little effect on the rates, and the comments made in last year's report are still applicable.

Scheduled airline pilots insured with an aviation extra premium produced a considerably higher fatality rate than those insured at standard rates. Since late 1955, when companies began to accept scheduled airline pilots at standard rates, many such pilots have been dropped from the extra premium group. This group presumably includes a large proportion

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

	Regular 1954-1958	Auxiliary 1954-1958
<i>Age Group</i>		
Under 25.....	15.8	16.3
25-29.....	15.1	14.3
30-34.....	10.8	10.2*
35-39.....	3.8	7.8*
40 and over.....	3.0	0.0
All.....	10.9	12.7
<i>Rank</i>		
Flight Cadet and Pilot Officer.....	7.9	18.2
Flying Officer.....	15.7	12.3
Flight Lieutenant.....	7.2	14.9*
Squadron Leader.....	2.9	7.1*
Wing Commander and Higher Ranks.....	5.0	0.0
All.....	10.9	12.7
<i>Function</i>		
Fighter.....	23.8	
Training.....	7.9	
Transport.....	0.8	
Tactical.....	2.5	
Maritime.....	0.0	
Other.....	4.3	
All.....	10.9	

* Based on 5 deaths or less.

TABLE 16
 INTERCOMPANY EXPERIENCE ON PILOTS AND CREW MEMBERS
 INSURED 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			
1946-1958.....	33,772	72	2.1
1949-1958.....	30,842	59	1.9
1952-1958.....	22,688	39	1.7
1955-1958.....	10,591	27	2.5
Others having commercial or transport certificate and flying for hire			
1946-1958.....	21,182	109	5.1
1949-1958.....	19,382	96	5.0
1952-1958.....	15,526	72	4.6
1955-1958.....	10,738	57	5.3
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 ‡			
1946-1958.....	35,134	34	1.0
1949-1958.....	33,096	29	.9
1952-1958.....	26,606	25	.9
1955-1958.....	16,810	12	.7
50-99 hours in preceding 12 months ‡			
1946-1958.....	21,469	32	1.5
1949-1958.....	20,059	27	1.3
1952-1958.....	15,603	19	1.2
1955-1958.....	9,703	10	1.0
Less than 100 hours in preceding 12 months §			
1946-1958.....	61,110	73	1.2
1949-1958.....	57,662	63	1.1
1952-1958.....	46,716	51	1.1
1955-1958.....	31,020	29	.9
100-199 hours in preceding 12 months			
1946-1958.....	29,362	75	2.6
1955-1958.....	14,345	33	2.3
200-299 hours in preceding 12 months			
1946-1958.....	9,694	43	4.4
1955-1958.....	5,080	22	4.3
300 or more hours in preceding 12 months			
1946-1958.....	7,932	32	4.0
1955-1958.....	3,970	11	2.8
100 or more hours in preceding 12 months			
1946-1958.....	46,988	150	3.2
1949-1958.....	44,358	139	3.1
1952-1958.....	35,298	103	2.9
1955-1958.....	23,395	66	2.8
Hours in preceding 12 months not stated			
1946-1958.....	6,217	13	2.1
1949-1958.....	4,594	9	2.0
1952-1958.....	4,058	8	2.0
1955-1958.....	2,596	2	*

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

† Exposure is terminated on discontinuance of extra premium.

‡ Excludes experience of 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 Years of Issue	Attained Insurance Age at Beginning of Calendar Year of Exposure, and Solo Hours at Issue	Exposure 1953-1958‡			Exposure 1956-1958		
		Years of Exposure	Aviation Deaths	Rate per 1,000	Years of Exposure	Aviation Deaths	Rate per 1,000
U.S. Air Force or Army rated pilots on full-time duty Issues of 1946-1958.....	Under 25						
	800+hours	926	3	*	758	2	*
	Others	1,497	6(1)	4.0[3.3]	1,173	4	*
	25-29						
	800+hours	9,138	52	5.7	5,457	30	5.5
	Others	4,264	19	4.5	2,479	10	4.0
Issues of 1953-1958	30-34	48,583	168(1)	3.5[3.4]	22,502	74	3.3
	35 and over	83,739	278(4)	3.3[3.3]	58,489	191	3.3
40-150 hours in 12 months preceding issue.....	30-34	8,106	15	1.9	Not Available		
	35 and over	14,291	43	3.0	Not Available		
Over 150 hours in 12 months preceding issue.....	30-34	14,135	58	4.1	Not Available		
	35 and over	15,241	66	4.3	Not Available		

* 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.

‡ For classes covering issues of 1946-1958 exposure period begins July 1, 1953.

TABLE 16—Continued

MILITARY PERSONNEL							
Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action†							
Status at Issue and Years of Issue	Attained Insurance Age at Beginning of Calendar Year of Exposure, and Solo Hours at Issue	Exposure 1953-1958‡			Exposure 1956-1958		
		Years of Exposure	Aviation Deaths	Rate per 1,000	Years of Exposure	Aviation Deaths	Rate per 1,000
121 U.S. Navy§ rated pilots on full-time duty Issues of 1946-1958.....	Under 25						
	800+hours	638	9	14.1	382	7	18.3
	Others	1,074	9	8.4	773	6	7.8
	25-29						
	800+hours	6,244	37	5.9	3,454	24	6.9
	Others	3,043	33	10.8	1,828	23	12.6
	30-34	25,109	140	5.6	12,380	61	4.9
	35 and over	34,458	135	3.9	24,042	94	3.9
	Issues of 1953-1958						
	40-150 hours in 12 months preceding issue.....	30-34	3,265	21	6.4	Not Available	
	35 and over	5,164	20	3.9	Not Available		
Over 150 hours in 12 months preceding issue.....	30-34	6,436	52	8.1	Not Available		
	35 and over	5,648	31	5.5	Not Available		
U.S. Air Force or Army crew members Issues of 1946-1958.....	Under 25	5,039	12	2.4	Not Available		
	25-29	7,192	35(1)	4.9(4.7)	Not Available		
	30-34	10,548	32	3.0	Not Available		
	35 and over	14,462	53	3.7	Not Available		
	All Ages	37,241	132(1)	3.5(3.5)	Not Available		

§ Includes Marine Corps but not Coast Guard.

of pilots who have either changed to other jobs involving more hazardous types of flying, or whose flying activities apart from their job make them ineligible for standard rates. It is not surprising, therefore, that it has less favorable experience than the standard group.

TABLE 17
INTERCOMPANY EXPERIENCE ON PILOTS APPARENTLY
ACTIVE AT TIME OF ISSUE—INSURED AT STANDARD RATES*
Issues since 1955† exposed to December 31, 1958

	Years of Exposure	Aviation Deaths	Rate per 1,000
Employed as scheduled airline pilot	5,251	5	1.0
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) . . .	14,788	8	5
Others having commercial or transport certificate and employed as nonairline pilot (exposed 1955-1958)	585	0	‡

* Issued standard or reduced to standard because of a liberalization in companies' underwriting rules.

† Some earlier issues may be included.

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

As an innovation, the experience on military personnel is shown separately for the latest three-year period in classes where this could conveniently be done. The rates for this period do not differ significantly from those for the period 1953-1958. Rates for Air Force or Army pilots vary little with age; this is different from the experience for all Air Force pilots, shown in Table 5.

Table 17 presents the experience on policies issued standard or reduced to standard. The aviation death rates are well within the range anticipated when companies began to accept these pilots at standard rates.