

# TRANSACTIONS OF SOCIETY OF ACTUARIES 1962 REPORTS

## REPORT OF THE COMMITTEE ON AVIATION AVIATION STATISTICS

**T**HIS report presents primarily new data which have become available during the past twelve months. The index in the 1960 Reports, pages 68-70, should be consulted for the most recent information on flying hazards not covered in this report.

### SCHEDULED AIRLINES

#### *United States Airlines*

This category includes all flying by airlines holding certificates of public convenience and necessity issued by the Civil Aeronautics Board to conduct services over specified routes. It includes certain nonscheduled or charter operations by these carriers. In addition to passenger operations, the statistics in this section cover cargo operations of passenger-cargo scheduled airlines, but do not include the operations of all-cargo airlines which are discussed in a later section. Intra-Alaska carriers have also been excluded from this report.

Table 1 shows the recent trend of aviation fatality rates on United States scheduled airlines for passengers, pilots, and other crew members. Because the official 1961 statistics, usually presented in this report, are not yet available, the figures shown for that year should be considered preliminary. In domestic scheduled flying, there does not appear to have been any significant improvement since 1950. The preliminary rates for 1961 do, however, show a marked decrease from the relatively high rates for 1959 and 1960. Although the fatality rates estimated for 1962 are somewhat higher than those for 1961, they are not substantially different from the average for the period 1958-1961.

In international flying, there have been only 13 accidents fatal to passengers, and only 9 fatal to pilots during the twelve-year period 1950-1961 under consideration. From these figures, it is not possible to draw any significant conclusions as to the trend of aviation fatality rates in international flying.

The experience to date still does not provide an adequate basis for distinguishing between the hazards of jet and propeller driven aircraft in scheduled flying.

The sections of Table 1 headed "Death Rate of All Pilots Employed in Scheduled Flying" and "Death Rate of Other Crew Members Em-

ployed in Scheduled Flying" both include the experience on pilots who do less than the normal amount of flying on account of having some supervisory duties or for some other reasons, as well as the deaths among those pilots which occurred on nonscheduled flights operated by scheduled airlines, such as test or charter flights.

Pilots engaged in scheduled flying may not, under government regulations, fly more than 100 hours per month or 1,000 hours per year in domestic operations. Pilots in international operations are limited either to 100 hours per month or 300 hours every 90 days. In actual practice, they

TABLE 1  
UNITED STATES SCHEDULED AIRLINES AVIATION DEATH RATES  
(Number of Fatal Accidents in Parentheses)

	1950-1953	1954-1957	1958-1961	1961*	1962 (Est.)
Passenger Death Rate per 1,000 Passenger Hours†					
Domestic.....	.0015 (17)	.0009 (19)	.0015 (20)	.0010 (3)	.0014 (4)
International....	.0033 (6)	.0005 (2)	.0008 (5)	.0000 (0)	.0000 (0)
Total.....	.0018 (23)	.0009 (21)	.0014 (25)	.0008 (3)	.0012 (4)
First Pilot Death Rate per 1,000 Airplane Hours†					
Domestic.....	.0019 (18)	.0010 (11)	.0015 (20)	.0007 (2)	.0015 (4)
International....	.0017 (3)	.0004 (1)	.0013 (3)	.0000 (0)	.0000 (0)
Total.....	.0019 (21)	.0009 (12)	.0015 (23)	.0006 (2)	.0013 (4)
Death Rate of All Pilots Employed in Scheduled Flying per Life Year of Exposure‡					
Domestic.....	.0016 (22)	.0008 (15)	.0011 (26)	.0004 (2)	.0007 (4)
International....	.0013 (4)	.0004 (2)	.0009 (3)	.0000 (0)	.0000 (0)
Total.....	.0015 (26)	.0007 (17)	.0010 (29)	.0003 (2)	.0007 (4)
Death Rate of Other Crew Members Employed in Scheduled Flying per Life Year of Exposure‡					
Domestic.....	.0014 (19)	.0008 (14)	.0012 (22)	.0005 (2)	.0014 (5)
International....	.0027 (5)	.0007 (2)	.0013 (3)	.0000 (0)	.0000 (0)
Total.....	.0018 (24)	.0007 (16)	.0012 (25)	.0004 (2)	.0012 (5)

\* Preliminary.

† Helicopter experience excluded beginning in 1957.

‡ Includes deaths in nonrevenue flights.

average between 72 and 82 hours flying time a month, with 15-35 hours per month spent in ground duties before and after their flights.

During the six years 1956-1961, helicopters flew approximately 36,700,000 passenger miles in scheduled passenger service. Although 5 accidents occurred on such scheduled helicopter flights, only 1, in 1960, involved any fatalities. This accident, however, took the lives of 11 passengers and 2 crew members and produced for the six-year period a passenger death rate of .021 per 1,000 passenger hours. There were no fatal accidents (accidents in which there was at least one fatality) in scheduled helicopter passenger flights in 1961 or 1962. One fatal accident in scheduled helicopter cargo service which occurred in 1961 involved the death of a crew member.

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

PERIOD	MEMBERS REPORTING TO I.A.T.A.		ALL U.S. AIRLINES
	Countries Other than U.S.	United States	
1950-1953.....	.0046	.0021	.0018
1954-1957.....	.0039	.0010	.0009
1958-1961.....	.0035	.0013	.0014
1961.....	.0054	.0011	.0008*

\* Preliminary.

*Airlines of Countries Other than United States*

The International Air Transport Association has furnished the Committee with the experience of most of its members. By making reasonable assumptions as to average speed, the passenger fatality rates per 1,000 passenger hours were derived for both the United States airlines reporting to the I.A.T.A. and for the member airlines of all other countries combined. Over 85 per cent of the passenger miles flown by United States scheduled airlines were accumulated by airlines which report to the I.A.T.A.

For comparative purposes, the experience of all United States airlines is also included in Table 2. The passenger fatality rates presented in the table relate to scheduled services only and exclude helicopter service.

At least since 1950, the experience of United States scheduled airlines has been much better than that of airlines of other countries. Only in a single year—1959—was the safety record of other countries' scheduled airlines comparable to that of United States airlines.

### *All-Cargo Carriers*

These carriers are primarily engaged in the transportation of freight and express. In recent years, approximately 40 per cent of their services have been on a scheduled basis. Their nonscheduled services include military contract operations which often involve the carrying of troops as well as cargo.

In the six years 1956–1961, 2 pilots lost their lives in scheduled all-cargo service; both fatalities occurred in 1959. During this six-year period, the first pilot fatality rate for scheduled all-cargo services was 0.004 per 1,000 airplane hours.

TABLE 3  
GENERAL AVIATION FATALITIES

Year	Number of Fatal Accidents	Number of Fatalities
1959.....	450	823
1960.....	429	787
1961.....	426	760
1962*.....	425	864

\* Preliminary.

### GENERAL AVIATION FLYING

It has not been possible thus far to obtain more recent figures on general aviation flying than those published in last year's report. According to the Civil Aeronautics Board, the numbers of fatal aviation accidents and aviation fatalities have recently been as shown in Table 3.

### CANADIAN CIVIL FLYING

Passenger and pilot aviation fatality rates per 1,000 hours in domestic and international operations of Canadian scheduled airlines, derived from figures furnished by the Canadian Department of Transport and the Dominion Bureau of Statistics, are shown in Table 4. The number of fatal accidents is shown in parentheses.

The fatality rates among Canadian civil pilots by class of license are shown in Table 5, separately for the periods 1954–1957 and 1958–1961, based on figures furnished by the Canadian Department of Transport.

The fatality rate among airline transport pilots has declined sharply from 6.0 to 2.1 per 1,000, while the fatality rates among senior commercial and commercial pilots which were about as high as those of airline transport pilots during 1954-1957 have decreased to about 4.5 per 1,000. It should be noted that holders of airline transport licenses are not necessarily flying for scheduled airlines, since they may engage in all types of flying. Excluded from the experience in Table 5 were persons holding glider licenses only, of whom there were 470 in 1961, with no fatalities that year.

TABLE 4  
CANADIAN SCHEDULED AIRLINES  
AVIATION FATALITY RATES

	Passenger Fatality Rate per 1,000 Passenger Hours	First Pilot Fatality Rate per 1,000 Airplane Hours
1950-1953 . . . . .	.0019 (2)	.0038 (3)
1954-1957 . . . . .	.0043 (5)	.0041 (4)
1958-1961 . . . . .	. . . . . (0)	. . . . . (0)
1950-1961 . . . . .	.0017 (7)	.0023 (7)

TABLE 5  
CANADIAN CIVIL PILOTS BY CLASS OF LICENSE  
1954-1961 AVIATION FATALITY RATES

Class of License	Period	Life Years of Exposure	Aviation Fatalities	Rate per 1,000 Life Years of Exposure
Airline Transport . . . . .	1954-1957	2,989	18	6.0
	1958-1961	4,661	10	2.1
Senior Commercial . . . . .	1954-1957	1,452	9	6.2
	1958-1961	1,674	7*	4.2
Commercial . . . . .	1954-1957	7,785	45	5.8
	1958-1961	9,594	45*	4.7
Private (excluding students).	1954-1957	22,795	42	1.8
	1958-1961	45,604	71†	1.6

\* Includes one missing, presumed dead.  
† Includes one fatality as glider pilot in each year 1958 and 1959. Also includes two missing and presumed dead in each year 1960 and 1961.

UNITED STATES MILITARY

*Age and Rank*

Table 6 shows the 1961 and 1958-1961 aviation fatality rates by age group for Air Force pilots and non-pilot rated officers, and for Navy and Marine Corps aviators on active duty.

The 1961 aviation fatality rates of Air Force pilots were below those for the four-year period 1958-1961 in every age group; similarly, as shown in the report for last year, the 1960 aviation fatality rates were below those for the four-year period 1957-1960. However, only at ages under 25 and at ages 30-34 were the 1961 aviation fatality rates lower than those for 1960. Aviation fatality rates at ages 35 and over continue to be significantly lower than at the younger ages.

The Air Force non-pilot rated officer aviation fatality rates were higher in 1961 than in 1960 in every age group except at ages 25-29; the 1961 aviation fatality rates were nevertheless lower than those for 1958-1961 in all age groups other than 30-34. As pointed out in last year's report,

TABLE 6  
UNITED STATES AIR FORCE, NAVY, AND MARINE CORPS FLYERS  
AVIATION FATALITY RATES PER 1,000 LIFE YEARS, BY AGE

AGE GROUP	AIR FORCE RATED PILOTS		AIR FORCE NON-PILOT RATED OFFICERS		NAVY AND MARINE CORPS PILOTS	
	1958-1961	1961	1958-1961	1961	1958-1961	1961
Under 25.....	5.3	3.6	2.2	1.7	11.8	11.8
25-29.....	5.3	4.8	3.2	2.1	10.9	9.5
30-34.....	4.3	3.6	2.5	2.8	6.4	6.3
35 and over..	2.1	1.4	2.0	1.8	3.0	3.3
All.....	3.4	2.7	2.5	2.0	7.0	6.7

the distinctly lower level of aviation fatality rates at ages under 35 among Air Force non-pilot rated officers as compared with Air Force rated pilots reflects the different character of the flying done by the non-pilot officers.

Naval and Marine aviators show a much wider range of variation in aviation fatality rates by age than do Air Force pilots. The 1958-1961 aviation fatality rates among Naval and Marine aviators at ages under 30 continued higher than 10 per 1,000, with the 1961 fatality rates showing little change from those for the period 1958-1961.

#### *Pilots and Other Rated Officers—by Rank*

Aviation fatality rates for Air Force pilots and other rated officers according to rank are shown in Table 7. The rates for both classes of officers were generally lower in 1961 than during the period 1958-1961. Since rank increases with advance in age, there is a high correlation between the aviation fatality experience by rank and that by age.

*Duty Assignment*

The 1961 and 1958-1961 aviation fatality rates among Air Force pilots according to duty assignment are given in Table 8. Fatality rates for pilots of reconnaissance planes were very much lower in 1961 than in prior years, but the 1961 rate was based on 5 or fewer deaths. There have been no fatalities among pilots of amphibian planes since 1956. The 1961 fatality rate for helicopter pilots, based on 5 or fewer deaths,

TABLE 7  
UNITED STATES AIR FORCE ON ACTIVE DUTY, BY RANK  
AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE

RANK	RATED PILOTS		NON-PILOT RATED OFFICERS	
	1958-1961	1961	1958-1961	1961
2nd Lieutenant.....	5.8	4.8*	1.7	1.5*
1st Lieutenant.....	6.2	6.2	3.4	2.6
Captain.....	3.4	2.8	2.1	2.0
Major.....	1.7	1.5	2.2	1.8
Lieutenant Colonel.....	1.9	1.1	1.4*	2.2*
Colonel.....	0.7	.....	3.4*	.....
General.....	1.5*	.....	.....	.....
All.....	3.4	2.7	2.5	2.0

\* Based on 5 or fewer deaths.

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

Duty Assignment	1958-1961	1961
Pilot, Helicopter.....	3.0	1.5*
Pilot, Amphibian.....	.....	.....
Pilot, Transport.....	2.2	1.7
Pilot, Troop Carrier.....	2.0	2.1*
Pilot, Fighter.....	10.2	10.0
Pilot, Bomber.....	4.8	4.6
Pilot, Reconnaissance.....	9.0	3.1*
Pilot, Tanker.....	2.1	1.7
Operations Officer.....	2.2	1.6
All Other Pilots.....	1.6	1.1
All.....	3.4	2.7

\* Based on 5 or fewer deaths.

was the same as in 1960; the 1960 and 1961 fatality rates among these pilots were distinctly lower than in earlier years.

The category of "All Other Pilots" includes pilots whose duties are primarily administrative.

*Officers on Flying Status by Age Group and Duty Assignment*

The 1961 distribution of Air Force officers on flying status by duty assignment and age is shown in Table 9. A comparison with the corre-

TABLE 9  
UNITED STATES AIR FORCE  
1961 DISTRIBUTION OF OFFICERS BY DUTY ASSIGNMENT AND AGE

DUTY ASSIGNMENT	AGE				
	Under 25	25-29	30-34	35-39	40 and Over
Pilot, Helicopter . . . . .	14.5%	54.6%	17.5%	9.8%	3.6%
Pilot, Search, Rescue . . . . .	6.6	32.0	23.4	22.3	15.7
Pilot, Transport . . . . .	9.4	32.9	19.3	18.8	19.6
Pilot, Troop Carrier . . . . .	11.2	37.7	21.4	13.3	16.4
Pilot, Fighter . . . . .	10.1	46.6	28.7	10.8	3.8
Pilot, Bomber . . . . .	6.9	37.2	20.5	21.1	14.3
Pilot, Reconnaissance . . . . .	2.3	28.1	30.1	25.0	16.5
Pilot, Tanker . . . . .	9.5	38.8	20.9	15.1	15.7
Operations Officer . . . . .	0.2	6.4	13.8	34.2	45.4
All Other . . . . .	0.9	11.7	14.8	23.9	48.7
All . . . . .	4.2%	23.2%	18.3%	21.9%	32.4%

sponding distribution for earlier years shows, at ages under 35, a generally higher proportion in age group 30 to 34 and a lower proportion at ages under 30. At ages 35 and over, the distribution shows a higher proportion at ages 40 and over and a lower proportion at ages 35 to 39. The proportion of pilots of fighter planes is lower at ages under 30 and higher in all groups at ages 30 and over.

*Hours of Flying*

The number of aircraft hours per pilot on flying status in the Air Force has dropped from about 140 per year in 1959 to 125 in 1960 and about 120 in 1961. It should be noted that the average number of flight hours per pilot has been estimated at about double the figures for the average number of aircraft hours per pilot.

The average number of flight hours per pilot in the Navy and Marine Corps, which was 259 in 1959 and 1960, dropped to 235 in 1961. Inactive



Naval Reservists flew an average of 70 hours per year in 1961 or the same as in 1960.

The average number of aircraft hours for Army pilots—in fixed-wing and rotary-wing craft combined—dropped from 220 in 1960 to 207 in 1961.

*Military Air Transport Service*

During 1961, there were 25 passenger fatalities in MATS, as compared with none during 1960 and 1959. The passenger fatality rate during 1958-1961 was 0.72 per 100,000,000 passenger miles.

Aviation fatality rates among pilots and crew members of MATS are shown in Table 10.

*United States Army*

Table 11 shows aviation fatality rates among Army rated pilots and crew members.

TABLE 10  
MILITARY AIR TRANSPORT SERVICE  
AVIATION FATALITY RATES PER 1,000 LIFE  
YEARS OF EXPOSURE

	7/1/56— 6/30/59	7/1/59— 6/30/62
Pilots		
Transport Units.....	4.5	1.6
Other Units.....	2.4	0.8
All.....	3.1	1.2
Crew Members		
Transport Units.....	5.0	2.2
Other Units.....	5.9	2.6
All.....	5.4	2.3

TABLE 11  
UNITED STATES ARMY—ALL FLYING OPERATIONS  
AVIATION FATALITY RATES PER 1,000 LIFE  
YEARS OF EXPOSURE

	1956-1958	1959-1961	1961
Rated Pilots.....	5.0	4.0	4.1
Crew Members.....	5.8	6.1	6.6

Fatality rates among Army rated pilots per 1,000 aircraft hours in rotary- and fixed-wing aircraft are compared in Table 12.

The data in Table 12 are believed to provide a better indication of the relative hazards of helicopter and fixed-wing aircraft flying than those given in Table 8 for Air Force pilots, inasmuch as helicopters are used more extensively in the Army than in the Air Force.

### *Student Pilots*

Table 13 shows aviation fatality rates among student pilots in the military services. During 1961, the aviation fatality rate among Air Force student pilots in the primary course dropped to 1.3 per 1,000 life years (based on 5 or fewer deaths), compared with 4.9 per 1,000 in 1959 and 7.3 per 1,000 in 1960. The average aviation fatality rate of 3.7 per 1,000 for the period 1958-1961 was the same as the average rate for the years 1957-1960. Among Air Force student pilots in the basic course, the 1961 aviation fatality rate was 4.1 per 1,000 life years (based on 5

TABLE 12  
UNITED STATES ARMY—ROTARY- VERSUS  
FIXED-WING AIRCRAFT  
PILOT FATALITY RATES PER 1,000  
AIRCRAFT HOURS

	1958-1961	1961
Fixed-Wing Aircraft.....	.0164	.0148
Rotary-Wing Aircraft.....	.0253	.0270
All Types of Aircraft.....	.0199	.0198

TABLE 13  
UNITED STATES AIR FORCE, NAVY AND MARINE CORPS,  
AND ARMY STUDENT PILOTS  
AVIATION FATALITY RATES PER 1,000 LIFE  
YEARS OF EXPOSURE

	1958-1961	1961
Air Force:		
Primary Course.....	3.7	1.3*
Basic Course.....	5.9	4.1*
Navy and Marine Corps:		
Basic Course.....	3.0	2.9
Advanced Course.....	11.2	11.9
Army.....	1.6	0.8*

\* Based on 5 or fewer deaths.

or fewer deaths), compared with 5.9 per 1,000 for the period 1958-1961.

Aviation fatality rates among Navy student pilots in the basic course have been substantially unchanged throughout the period 1959-1961 but are somewhat lower than the rates during years prior to 1959. For student pilots in the advanced course the aviation fatality rate of 11.9 per 1,000 during 1961 is distinctly lower than the rate of 19.5 per 1,000 during 1960.

The U.S. Army reported only one student fatality during 1961 in fixed-wing aircraft, and none in rotary-wing craft.

*United States Coast Guard*

Table 14 shows Coast Guard aviation fatalities for 1957-1961. There were no aviation fatalities during 1959 and 1960.

*Inactive Reservists*

The fatality rates for Navy and Marine Corps inactive reservists on drill pay status for 1956-1958, 1959-1961, and 1961 are given in Table 15.

TABLE 14  
UNITED STATES COAST GUARD PERSONNEL  
ON FLIGHT ORDERS  
1957-1961 AVIATION FATALITY RATES PER 1,000 LIFE  
YEARS OF EXPOSURE

Class	Life Years of Exposure	Aviation Fatalities	Rate per 1,000 Life Years of Exposure
Pilot.....	1,848	8	4.3
Student Pilot.....	240	0	.....
Observer.....	77	0	.....
Crew Man.....	5,687	4	0.7

TABLE 15  
UNITED STATES NAVY AND MARINE CORPS INACTIVE  
RESERVISTS ON DRILL PAY STATUS  
AVIATION FATALITY RATES BY AGE PER 1,000 LIFE  
YEARS OF EXPOSURE

	1956-1958	1959-1961	1961
Ages under 30.....	4.0	1.7	1.9*
Ages 30 and over.....	1.7	1.9	2.8
All ages.....	2.1	1.9	2.5

\* Based on fewer than 5 deaths.

*Air National Guard*

The aviation fatality rate among Air National Guard pilots not federally activated was 2.4 per 1,000 life years of exposure during 1961 and 4.4 for the period 1958-1961. These rates are slightly lower than those reported last year.

*Air Force Flight Surgeons and Nurses*

During 1958-1961, the aviation fatality rate among flight surgeons was 2.0 per 1,000 life years and 2.8 among flight nurses, both based on 5 or fewer deaths. These rates are lower than those reported last year for the 1957-1960 period.

*Graduates of Academies—Assignment to Aviation*

In 1961, 3 per cent of the Military Academy graduates and 2.5 per cent of the Naval Academy graduates were accepted for flying training by the Air Force.

Of the Air Force Academy graduates, 97.7 per cent were commissioned in the Air Force, 2 per cent in the Navy and Marine Corps, and 0.3 per cent in the Army.

## ROYAL CANADIAN AIR FORCE

Table 16 shows the 1956-1961 aviation fatality rates for pilots and crew members of the RCAF and for pilots of the RCAF Auxiliary (Reserve personnel who undergo weekly training in organized squadrons). The 1956-1961 aviation fatality rate for pilots on active duty decreased to 6.6 per 1,000 life years from 7.2 per 1,000 life years during 1956-1960 and 8.7 per 1,000 life years during 1955-1959. The aviation fatality rate for the RCAF Auxiliary has been reduced from 4.5 per 1,000 life years during 1956-1960 to 3.8 for the period 1956-1961. Fatality rates for other crew members are given for the first time.

The fatality rates by rank exhibit the same pattern as in earlier years both for pilots in the RCAF and those in the RCAF Auxiliary. It is noteworthy that crew members show the same pattern of fatality rates by rank as pilots in the RCAF.

A comparison of the 1956-1961 aviation fatality rates by function with those for the period 1956-1960 shows a continued improvement for the "Fighter" category, a slight improvement for both "Training" and "Transport" categories, and a slight increase for the "Other" category. It should also be noted that the fatality rates among radio navigators in the Fighter Command were slightly higher than those for pilots in the same category.

In considering the aviation fatality rates in Table 16, it should be kept in mind that the bulk of the RCAF flying experience was concentrated in the "Fighter" and "Training" categories and that the aviation fatality rates for the "Transport" and "Maritime" categories were based on relatively small exposures.

During the period 1956-1961, the aviation fatality rates were .0453 per 1,000 flying hours for RCAF pilots flying jet aircraft and .0069 for RCAF pilots flying other aircraft. For crew members, the corresponding rates were .0495 and .0015, respectively.

In 1961, the approximate number of flight hours per pilot was 303 for the RCAF and 149 for the RCAF Auxiliary.

The 1961 distribution of RCAF pilots and crew members by duty assignment and age is given in Table 17.

TABLE 16  
 ROYAL CANADIAN AIR FORCE  
 1956-1961 AVIATION FATALITY RATES  
 PER 1,000 LIFE YEARS OF EXPOSURE

	REGULAR		AUXILIARY PILOT
	Pilot	Other Crew	
Age Group:			
Under 25.....	9.5	3.6	5.1*
25-29.....	10.4	3.9	6.5*
30-34.....	6.3	0.0*	0.0*
35-39.....	2.8	0.0*	2.8*
40 and over.....	2.1	0.0*	0.0*
All.....	6.6	2.7	3.8
Rank:			
Flight Cadet and Pilot Officer.....	4.1	0.7*	9.4*
Flying Officer.....	10.9	4.6	2.5*
Flight Lieutenant.....	3.5	0.4*	8.2*
Squadron Leader.....	1.9*	0.0*	0.0*
Wing Commander and Higher Ranks.....	5.1	3.7*	0.0*
All.....	6.6	2.7	3.8
Function:			
Fighter.....	8.3	9.0	.....
Training.....	5.1	0.6*	.....
Transport.....	1.6*	0.0*	.....
Maritime.....	0.0*	0.0*	.....
Others.....	3.9	0.0*	.....
All.....	6.6	2.7	.....

\* Based on 5 or fewer deaths.

It has again been confirmed that the statement respecting transfers from one type of flying to another, given on page 92 of the 1958 Reports, continues to apply. However, because most pilots are employed first on fighter duties, there is a continual net movement of fighter aircrew personnel to other duties; but transfers from air transport duties to fighter duties do occur.

TABLE 17  
ROYAL CANADIAN AIR FORCE  
1961 DISTRIBUTION BY AGE AND DUTY ASSIGNMENT

FUNCTION	PILOTS AGE					OTHER AIR CREW AGE				
	Under 25	25-29	30-34	35-39	40 and Over	Under 25	25-29	30-34	35-39	40 and Over
By Age Group for Each Duty Assignment										
Fighter.....	25%	26%	14%	17%	18%	34%	38%	12%	5%	11%
Training.....	36	24	13	11	16	53	16	15	7	9
Transport.....	4	16	18	30	32	15	37	28	12	8
Maritime.....	5	16	19	33	27	41	32	15	7	5
Other.....	1	11	16	23	49	5	16	27	19	33
By Duty Assignment for Each Age Group										
Fighter.....	45%	44%	32%	31%	25%	24%	32%	17%	15%	25%
Training.....	49	30	22	14	16	33	12	18	17	18
Transport.....	3	11	17	21	18	6	18	23	19	10
Maritime.....	2	7	11	15	9	35	32	25	24	13
Other.....	1	8	18	19	32	2	6	17	25	34
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

#### INTERCOMPANY EXPERIENCE

##### *Civilian Aviation*

Tables 18 and 19 show the aviation fatality rates experienced in recent years among civilian pilots on policies issued since January 1, 1946 by the 29 companies contributing their data on civilian aviation risks. The experience is by number of policies and the classification of the insured is according to status at the time of application for insurance. Exposure in the "With Aviation Extra Premium" category is terminated when the extra premium is discontinued. If discontinuance is due to a liberalization of underwriting practices, companies are encouraged to

transfer the exposure to the "Without Aviation Extra Premium" classification. Not all companies have been able to do so and consequently the experience among such policies shown in Table 18 includes only a portion of such cases.

The experience in Table 18 covers the years 1957-1961 inclusive and

TABLE 18  
INTERCOMPANY EXPERIENCE ON PILOTS IN CIVILIAN AVIATION\*  
(1957-1961 EXPERIENCE—BY POLICIES)

STATUS AT ISSUE AND HOURS FLOWN IN 12 MONTHS PRECEDING ISSUE	WITH AVIATION EXTRA PREMIUM (1946 and Subsequent Issues)			WITHOUT AVIATION EXTRA PREMIUM (1955 and Subsequent Issues)		
	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000
Scheduled Airline Pilots . . .	7,105	23	3.2	16,948	28	1.7
Other Commercial Pilots Flying for Hire:						
Instructing (at least half- time) . . . . .	4,327	18	4.2	.....	.....	.....
Others . . . . .	11,231	70	6.2	2,307	7	3.0
Total . . . . .	15,558	88	5.7	2,307	7	3.0
Private Pilots:†						
Less than 100 hours . . . . .	45,647	43	0.9	35,497	41	1.2
100-199 hours . . . . .	19,590	53	2.7	4,348	5	1.1
200-299 hours . . . . .	6,875	30	4.4	597	1	.....
300 or more hours . . . . .	6,091	19	3.1	622	1	.....
Hours not stated . . . . .	2,908	3	.....	975	1	.....
Total . . . . .	81,111	148	1.8	42,039	49	1.2

\* Exposure in With Aviation Extra Premium category is terminated on discontinuance of extra premium. Exposure in Without Aviation Extra Premium category is for pilots apparently active at time of issue who were issued standard (without aviation rider) or reduced to standard because of a liberalization in companies' underwriting rules.

† Pilots flying only for pleasure or personal business (not flying for hire). Includes pilots having commercial or transport certificates and pilots having private certificate and 100 or more solo hours (or solo hours not stated).

is shown separately for cases "With Aviation Extra Premium" and "Without Aviation Extra Premium." The experience in the "Without Aviation Extra Premium" classifications has generally been more favorable than that in the "With Aviation Extra Premium" classifications. It should be noted, however, that even for scheduled airline pilots accepted "Without Aviation Extra Premium," the aviation fatality rate during the 1957-1961 period was 1.7 per 1,000 based on 28 deaths while among other commer-

cial pilots accepted "Without Aviation Extra Premium" it was 3.0 per 1,000 based on 7 deaths.

Table 19 shows the experience during the years 1954-1961 inclusive among commercial, transport and private pilots flying for pleasure or business, but not for hire, (a) by type of flying certificate and (b) by attained age, in each case according to the hours flown in the 12 months preceding issue. Among private pilots flying less than 100 hours per year, the experience has been distinctly more favorable for pilots with private certificates than for pilots with commercial or transport certificates, and more favorable at attained ages 35 and over than at attained ages under

TABLE 19  
INTERCOMPANY EXPERIENCE ON PILOTS FLYING FOR PLEASURE OR PERSONAL BUSINESS\* WITH AVIATION EXTRA PREMIUM†  
(1954-1961 Experience on 1946 and Subsequent Issues—by Policies)

HOURS FLOWN IN 12 MONTHS PRECEDING ISSUE	COMMERCIAL OR TRANSPORT CERTIFICATE			PRIVATE CERTIFICATE (WITH 100 OR MORE SOLO HOURS)		
	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000
Less than 100 hours.....	10,850	18	1.7	47,613	37	0.8
100-199 hours.....	4,931	12	2.4	20,354	50	2.5
200-299 hours.....	2,668	6	2.2	5,982	31	5.2
300 or more hours.....	3,211	8	2.5	4,206	18	4.3
Hours not stated.....	647	1	.....	2,915	5	1.7
Total.....	22,307	45	2.0	81,070	141	1.7
	ATTAINED AGES UNDER 35‡			ATTAINED AGES 35 AND OVER‡		
	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000	Years of Exposure	Avia- tion Fa- talities	Rate per 1,000
Less than 100 hours.....	21,646	28	1.3	35,551	26	0.7
100-199 hours.....	7,923	15	1.9	16,815	45	2.7
200-299 hours.....	1,955	6	3.1	6,511	29	4.5
300 or more hours.....	1,666	5	3.0	5,569	21	3.8
Hours not stated.....	1,037	1	.....	2,505	5	2.0
Total.....	34,227	55	1.6	66,951	126	1.9

\* Excludes pilots flying for hire. Includes pilots having commercial or transport certificates and pilots having private certificate and 100 or more solo hours or solo hours not stated, flying only for pleasure or personal business.

† Exposure is terminated on discontinuance of extra premium.

‡ Excludes experience of those companies which were unable to split experience by age.



TABLE 20

INTERCOMPANY EXPERIENCE ON PILOTS AND CREW MEMBERS  
IN MILITARY AVIATION—WITH AVIATION EXTRA PREMIUM\*  
(1957–1961 Experience on 1946 and Subsequent Issues—by Policies)

Status at Issue and Attained Insurance Age	Years of Exposure	Aviation Fatalities	Rate per 1,000
<b>U.S. Air Force Pilots†</b>			
Under 25.....	2,270	9	4.0
25–29.....	15,993	58	3.6
30–34.....	22,980	58	2.5
35 and over.....	81,684	177	2.2
Total.....	122,927	302	2.5
<b>U.S. Army Pilots†</b>			
Under 25.....	186	1	.....
25–29.....	1,702	2	.....
30–34.....	2,856	17	6.0
35 and over.....	14,715	19	1.3
Total.....	19,459	39	2.0
<b>U.S. Air Force and Army Pilots</b>			
Under 25.....	2,834	11	3.9
25–29.....	20,423	67	3.3
30–34.....	30,645	91	3.0
35 and over.....	125,732	259	2.1
Total.....	179,634	428	2.4
<b>U.S. Air Force and Army Crew Members</b>			
Under 25.....	7,873	17	2.2
25–29.....	18,477	39	2.1
30–34.....	10,689	28	2.6
35 and over.....	25,105	44	1.8
Total.....	62,144	128	2.1
<b>U.S. Navy and Marine Pilots</b>			
Under 25.....	1,708	23	13.5
25–29.....	9,965	103	10.3
30–34.....	16,065	82	5.1
35 and over.....	51,247	145	2.8
Total.....	78,985	353	4.5
<b>U.S. Air Force, Army and Navy Reserve Pilots.....</b>			
	8,471	12	1.4
<b>U.S. Air National Guard Pilots..</b>			
	2,783	9	3.2

\* Exposure is terminated on discontinuance of extra premium.

† Excludes experience of those companies which were unable to split experience between Air Force and Army.

35. On the other hand, among private pilots flying 100 or more hours per year, the experience has been more favorable for pilots with commercial or transport certificates and also at attained ages under 35 as compared with attained ages 35 and over.

### *Military Aviation*

Table 20 shows the aviation fatality rates during the years 1957-1961 inclusive among military aviation personnel on policies issued since January 1, 1946 with an aviation extra premium by the 26 companies which contributed their experience on military aviation. The experience

TABLE 21  
INTERCOMPANY EXPERIENCE ON PILOTS IN MILITARY AVIATION—  
WITH AVIATION EXTRA PREMIUM\*  
(1957-1961 Experience—by Policies)

HOURS FLOWN IN 12 MONTHS PRECEDING ISSUE (1953 AND SUBSEQUENT ISSUES)	U.S. AIR FORCE AND ARMY			U.S. NAVY AND MARINES		
	Years of Exposure	Aviation Fatalities	Rate per 1,000	Years of Exposure	Aviation Fatalities	Rate per 1,000
40-150 hours:						
Ages 30-34.....	6,089	16	2.6	3,531	17	4.8
Ages 35 and over...	28,941	56	1.9	10,932	24	2.2
Total.....	35,030	72	2.1	14,463	41	2.8
Over 150 hours:						
Ages 30-34.....	17,969	59	3.3	8,296	40	4.8
Ages 35 and over...	37,188	91	2.4	13,615	50	3.7
Total.....	55,157	150	2.7	21,911	90	4.1

\* Exposure is terminated on discontinuance of extra premium.

is by number of policies and the classification of the insured is according to status at the time of application for insurance. Exposure was terminated when the extra premium was discontinued.

Table 20 indicates a continued improvement in the aviation fatality rates of U.S. Air Force and Army pilots and crew members. The experience on U.S. Air Force pilots is shown separately from the experience on U.S. Army pilots for the first time. Since some of the contributing companies were not able to split their data according to the branch of service, the combined experience for U.S. Air Force and Army pilots includes not only the data contributed separately for each service but also data where the particular branch of service was not given. The experience among U.S. Air Force crew members has not been shown separately from

that among U.S. Army crew members because there was only one death among U.S. Army crew members.

The experience on U.S. Navy and Marine pilots indicates somewhat higher aviation fatality rates in each age group during the 1957-1961 period than during 1957-1960, the experience for which period was shown in last year's report. U.S. Navy and Marine pilots at ages under 30 have in recent years experienced significantly higher aviation fatality rates than U.S. Air Force and Army pilots at these ages.

Table 21 shows a further subdivision of the experience on pilots in military aviation at attained ages 30 and over according to the number of annual flying hours reported at time of issue—for issues of 1953 and later years only. The table shows that aviation fatality rates have continued to be generally higher for pilots who flew over 150 hours during the year preceding issue than for pilots who flew not more than 150 hours; fatality rates have continued to be lower for those at attained ages 35 and over than for those at ages 30-34.