

**TRANSACTIONS OF SOCIETY OF ACTUARIES
1961 REPORTS**

REPORT OF THE COMMITTEE ON AVIATION

AVIATION STATISTICS

THIS report has been confined primarily to the presentation of new data. The data of prior years have been included only as needed for comparison or to indicate trends. Reference should be made to the index in the 1960 Reports, pages 68-70, for the most recent information concerning categories not included 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. In domestic flying, these rates showed no marked improvement during the period under review. They reached their lowest levels during 1954-1957 and increased each year from 1957 to 1960. The rates for the 1957-1960 period were slightly higher than those for 1953-1956. In 1960, the passenger aviation death rate in domestic flying rose to nearly double that for 1957-1960, while the pilot and other crew death rate was approximately 50 percent higher than in 1957-1960. Preliminary estimates indicate that the 1961 aviation fatality rates for both passengers and pilots were not only substantially lower than in 1960, but also somewhat below the rates recorded during 1957-1960. For the two-year period 1960-1961, the passenger aviation death rates in domestic flying (based on a total of 9 fatal accidents) were somewhat higher than for 1957-1960, but the pilot aviation fatality rates were not significantly different.

In international flying, there have been only 10 accidents fatal to passengers, and only 6 fatal to pilots during the nine-year period 1953-1961 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 accumulated experience also does not provide an adequate basis for differentiating 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 Employed in Scheduled Flying" both include those 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 in nonscheduled flights operated by scheduled airlines, such as test or charter flights.

Pilots engaged in scheduled flying may not, under government regula-

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

	1953-1956	1957-1960	1960	1961 (Est.)
Passenger Death Rate per 1,000 Passenger Hours*				
Domestic.....	.0012 (19)	.0013 (21)	.0024 (6)	.0009 (3)
International...	.0001 (2)	.0011 (6)	.0004 (2)	.0000 (0)
Total.....	.0010 (21)	.0013 (27)	.0021 (8)	.0008 (3)
First Pilot Death Rate per 1,000 Airplane Hours*				
Domestic.....	.0013 (14)	.0014 (19)	.0023 (7)	.0006 (2)
International...	.0000 (0)	.0016 (4)	.0019 (1)	.0000 (0)
Total.....	.0011 (14)	.0014 (23)	.0023 (8)	.0005 (2)
Death Rate of All Pilots Employed in Scheduled Flying per Life Year of Exposure†				
Domestic.....	.0010 (17)	.0011 (26)	.0016 (9)	.0003 (2)
International...	.0001 (1)	.0011 (4)	.0012 (1)	.0000 (0)
Total.....	.0009 (18)	.0011 (30)	.0016 (10)	.0003 (2)
Death Rate of Other Crew Members Employed in Scheduled Flying per Life Year of Exposure†				
Domestic.....	.0011 (17)	.0011 (21)	.0018 (7)	.0005 (2)
International...	.0001 (1)	.0019 (4)	.0014 (1)	.0000 (0)
Total.....	.0008 (18)	.0012 (25)	.0017 (8)	.0005 (2)

* Helicopter experience excluded beginning in 1957.

† Includes deaths in nonrevenue flights.

tions, fly more than 85 hours per month in domestic operations, or more than 255 hours per quarter in international flying. In actual practice, they average between 72 and 82 hours flying time per month, with 15-35 hours per month spent in ground duties before and after their flights.

During the five years 1956-1960, helicopters flew approximately 27,941,000 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 five-year period a passenger death rate of .028 per 1,000 passenger hours. There were no fatal accidents in scheduled helicopter passenger flights in 1961. One fatal accident in scheduled helicopter cargo service involved the death of a crew member.

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

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	
1953-1956.....	.0043	.0012	.0010
1957-1960.....	.0028	.0011	.0013
1960.....	.0033	.0022	.0021

assumptions as to average speed, the passenger fatality rates per 1,000 passenger hours were derived both for the United States airlines reporting to the I.A.T.A. and for the member airlines of all other countries combined. About four fifths 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.

For the four years 1957-1960, the experience of United States scheduled

airlines is much better than that of airlines of other countries. Only in 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 percent 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 five years 1956-1960, 2 pilots lost their lives in scheduled all-cargo service; both fatalities occurred in 1959. During this five-year period, the first pilot fatality rate for scheduled all-cargo services was .005 per 1,000 airplane hours.

SUPPLEMENTAL AIRLINES

This category consists of those airlines, formerly called "irregular carriers," which have been awarded certificates of public convenience and

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

PERIOD	PASSENGER		FIRST PILOT*	
	Aviation Deaths	Rate per 1,000 Passenger Hours	Aviation Deaths	Rate per 1,000 Airplane Hours
1953-1956	177	.007	8	.010
1957-1960	94	.003	5	.006
1960	93	.008	3	.012

* Nonpassenger operations included in 1958 and subsequent years.

necessity allowing limited scheduled service, as well as nonscheduled cargo and passenger service. Also included are those irregular carriers operating on a temporary authorization pending final decision on their application for certificate as supplemental air carrier.

The figures shown in Table 3 for this category include military contract operations. They are based on mileage reports to the Civil Aeronautics Board and on the assumption of an average speed of 200 miles per hour from take-off to landing. This assumption has been tested recently and found still to be valid. There was only one passenger fatality in the years 1956-1959, but in 1960 there were 93 passenger fatalities, 73 of them in a single accident. Nevertheless, the passenger and the first pilot aviation

death rates were both lower during the four-year period 1957-1960 than during the preceding four-year period.

GENERAL AVIATION FLYING

All civil flying except that performed by the public air carriers (scheduled and supplemental) is considered as general aviation activity. Flight time accumulated annually in general aviation is at least three times that of the domestic flying of public carriers.¹ 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

¹ FAA *Statistical Handbook of Aviation*, 1961 Edition, page 50.

TABLE 4
GENERAL AVIATION FLYING BY KIND
PILOT AVIATION DEATH RATES PER 1,000 AIRPLANE HOURS

Period	Hours (000)	Aviation Deaths	Rate	Hours (000)	Aviation Deaths	Rate
	Pleasure			Instruction		
1956.....	2,100*	175	.08	1,500*	35	.023
1957.....	2,109	202	.10	1,864	49	.026
1958.....	2,200*	181	.08	2,000*	40	.020
1959.....	2,600	161	.06	1,900*	48	.025
1956-1959.....	9,000*	719	.08	7,300*	172	.024
	Business			Commercial (excluding Aerial Application) and Miscellaneous		
1956.....	4,600*	46	.010	1,200*	21	.018
1957.....	4,864	54	.011	1,147	31	.027
1958.....	5,300*	49	.009	1,330*	42	.032
1959.....	5,300*	74	.014	1,320*	56	.042
1956-1959.....	20,100*	223	.011	4,990*	150	.030
	Aerial Application					
1956.....	803	44	.05			
1957.....	866	41	.05			
1958.....	872*	50	.06			
1959.....	880	54	.06			
1956-1959.....	3,421*	189	.06			

* Estimated on the basis of trends, since no formal survey was conducted. Totals correspondingly rounded.

pilot under consideration, as well as on the kind of flying in which he engages.

Table 4 in this year's report differs in several major respects from Table 4 in last year's report. The experience in Aerial Application (crop control) has been added, while the category of Other Noncommercial Flying has been replaced by Business Flying. These last two categories are virtually identical and differ primarily in that the deaths in certain noncommercial activities other than business, corporate, and public flying are not included in the Business Flying category. The differences in the hours and aviation death figures from those shown in the Commercial and Miscellaneous categories in last year's report arise from the fact that certain noncommercial test, ferry, and demonstration activities, included in that category last year, have been removed this year. Because the exposures for these noncommercial activities are not available, the corresponding deaths have been omitted entirely from Table 4. Also omitted are 3 deaths which could not be classified on the basis of the preliminary information available concerning the flying activities involved.

Pleasure flying accounts for about one fifth of the total general aviation flying time but for more than double that proportion of the pilot fatalities. During 1956-1959, the fatality rate of pilots in pleasure flying was the highest among the several categories in general aviation. There is reason to believe that these high fatality rates for pleasure flying are substantially accurate. The great excess of these rates over those experienced among insured lives may reflect the much lesser hazards of pleasure flying in the most responsible segment of this category, presumably represented by the class of insured lives.

Somewhat less than half of the total general aviation flying is in the Business category, which accounts for 15 percent of the pilot fatalities and has the lowest of all the pilot death rates. All flying in connection with business or government activities, whether by professional or non-professional pilots, is included in this category.

Because of growing interest in "corporate flying" (business flying in planes operated by hired professional pilots), an attempt was made to estimate fatality rates for fixed-wing aircraft weighing over 12,500 pounds used in such operations. Using statistics from Civil Aeronautics Board publications, it appears that during the years 1956-1959 the aviation death rate was about .009 per 1,000 pilot hours for pilots and about .010 per 1,000 passenger hours for passengers. Twenty-three pilot deaths (including co-pilots) and 31 passenger deaths were involved. In calculating these rates, it was assumed (based on some statistical evidence) that one plane hour was equivalent to 2 pilot hours and 2.5 passenger hours.

Estimates for 1960 and 1961 indicate materially lower aviation death rates based, however, on only 3 fatal accidents.

Next to business flying, flight training of civilians presents the most favorable record. The pilot death rate for the years 1956-1959 was .024. Included are the deaths of the instructor or the student, whoever was acting as pilot when the accident occurred. The hours of instructional flying have been increasing since 1953 and now represent about one sixth of the total in general aviation. Single-engine planes are used almost exclusively for this purpose.

Commercial flying includes the transportation of passengers and cargo for hire, survey, and patrol activities, aerial application, and such miscellaneous flying as search and rescue work, Civil Air Patrol, etc. This category accounts for less than a fifth of the total hours in general aviation. The experience in aerial application, the largest subdivision of commercial flying, is shown separately in the table. The pilot fatality rates in aerial application have been higher than in other commercial activities, being about .06 per 1,000 airplane hours.

The use of helicopters in general aviation continues to rise. At the end of 1960, there were nearly twice the number of helicopters registered in active use as at the end of 1957. In the four-year period 1957-1960, there were 287 accidents involving helicopters in general aviation in the continental United States, excluding Alaska, resulting in 62 fatalities, 27 of them pilots. The corresponding fatality rate for pilots has been estimated at .04 per 1,000 hours flown, and for all persons at .10 per 1,000 hours flown in helicopters.

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 5. The number of fatal accidents is shown in parentheses.

TABLE 5
CANADIAN SCHEDULED AIRLINES
AVIATION DEATH RATES

	Passenger Death Rate per 1,000 Passenger Hours	First Pilot Death Rate per 1,000 Airplane Hours
1953-1956 . . . . .	.0043 (5)	.0033 (3)
1957-1960 . . . . .	.0003 (1)	.0008 (1)

There have been no fatal accidents on Canadian scheduled airlines since 1957.

The fatality rates of Canadian civil pilots during 1955-1960, as furnished by the Canadian Department of Transport, are shown in Table 6. The fatality rates for the period 1955 to 1960 are very close to the corresponding rates for the period 1954-1959 shown in the 1960 Reports. It should be noted that holders of airline transport licenses may engage in all types of flying, and are not necessarily engaged in scheduled airline flying. Excluded from the experience shown in the table were persons holding glider licenses only, of whom there were 406 in 1960 with no fatalities.

TABLE 6
CANADIAN CIVIL PILOTS BY CLASS OF LICENSE
1955-1960

Class of License	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Airline Transport	5,764	25	4.3
Senior Commercial	2,347	13*	5.5
Commercial	13,475	74*	5.5
Private (excluding students)	48,932	84†	1.7

* Includes one missing, presumed dead.

† Includes one death as glider pilot in each year 1958 and 1959. Also includes 2 missing, presumed dead, in the year 1960.

UNITED STATES MILITARY

Age and Rank

Table 7 shows the 1960 and 1957-1960 aviation death rates by age group for Air Force pilots and nonpilot rated officers, and for Navy and Marine aviators on active duty.

The favorable trend in aviation death rates of Air Force pilots noted in last year's Report continued during 1960 in all age groups. The rates for 1959 and 1960 show little variation by age at ages under 35, in contrast to the situation observed in earlier years. Nevertheless, the death rate at ages 35 and over is significantly lower than at younger ages.

While most of the Air Force nonpilot rated officer death rates for 1960 are based on fewer than 5 deaths, all of them are lower than the corresponding rates for 1959. The aviation death rates for 1957-1960 are with few exceptions lower than the rates for the previous four-year period. The distinctly lower level of aviation death rates among Air Force nonpilot rated officers at ages under 35, as compared with Air Force rated

pilots, reflects the markedly different character of the flying done by nonpilot officers; thus officers who perform nonpilot duties in high performance aircraft are frequently required to qualify as pilots, with the result that those with nonpilot ratings are less likely to fly in such planes.

The flying operations in the Navy and Marine Corps differ in many important respects from those in the Air Force. In recent years, an increased proportion of Navy flying operations has been reported to be from carriers. The 1960 aviation death rate among Navy and Marine aviators at ages under 25 was slightly higher than a year ago, but remains at a much lower level than during the years prior to 1959. Naval aviators

TABLE 7
 UNITED STATES MILITARY AVIATION
 AVIATION DEATH RATES PER 1,000 LIFE YEARS, BY AGE

AGE GROUP	AIR FORCE RATED PILOTS		AIR FORCE NONPILOT RATED OFFICERS		NAVY AND MARINE CORPS AVIATORS	
	1957-1960	1960	1957-1960	1960	1957-1960	1960
Under 25.....	6.3	3.8	3.0	0.3*	13.6	9.0
25-29.....	6.4	3.7	4.1	2.5	11.3	11.4
30-34.....	4.3	3.9	3.0	1.2*	5.9	6.5
35 and over.....	2.5	1.3	2.8	0.7*	3.0	2.8
All.....	4.1	2.4	3.3	1.3	7.4	6.5

* Based on less than 5 deaths.

show much greater variation in the death rates by age than Air Force pilots. In 1960, Naval aviators at ages 25 and over were subject to aviation death rates close to the average for 1957-1960.

The 1960 aviation fatality rates by rank (not shown in this Report) continue to show a high correlation with the experience by age for Air Force pilots and nonpilot rated officers as well as for Navy pilots.

Duty Assignment

The 1960 and 1957-1960 death rates among Air Force pilots according to duty assignment are given in Table 8. Fatality rates for pilots of helicopters, fighters, and bombers have continued downward since 1958, based on a small number of deaths in the case of helicopters. The fatality rate for pilots of reconnaissance planes was higher in 1960 than in 1959 but was not nearly as high as in 1958; no subdivisions of this type of flying are available. There have been no fatalities among pilots of amphibian planes since 1956.

The category "All Other" includes pilots whose primary duty is in some other assignment, e.g., administration.

Officers on Flying Status by Age Group and Duty Assignment

The distribution of Air Force officers on flying status by duty assignment and age, which was shown in the 1960 Report for the first time, is shown in Table 9. A comparison with last year's table shows a significant

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

Duty Assignment	1957-1960	1960
Pilot, Helicopter	3.9	1.5*
Pilot, Amphibian	0.0*	0.0*
Pilot, Transport	2.2	0.9*
Pilot, Troop Carrier	1.4	1.4*
Pilot, Fighter	11.1	6.6
Pilot, Bomber	5.0	2.3
Pilot, Reconnaissance	10.4	12.5
Pilot, Tanker†	2.2§	1.7
Operations Officer	2.9	2.1
All Other	2.1	1.3

* Based on less than 5 deaths.

† Includes pilot also qualified as bombardier and radar observer 1958-1960.

‡ Included in "All Other" in 1957.

§ 1958-1960.

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

DUTY ASSIGNMENT	AGE				
	Under 25	25-29	30-34	35-39	40 and over
Pilot, Helicopter	16.5%	58.2%	12.3%	9.8%	3.2%
Pilot, Amphibian	2.6	32.5	26.3	23.2	15.4
Pilot, Transport	5.4	34.9	16.1	25.8	17.8
Pilot, Troop Carrier	8.8	39.4	18.6	19.4	13.8
Pilot, Fighter	12.8	51.5	22.6	9.7	3.4
Pilot, Bomber	8.5	37.2	17.0	27.3	10.0
Pilot, Reconnaissance	2.6	37.3	24.8	24.1	11.2
Pilot, Tanker	9.9	40.1	17.1	20.0	12.9
Operations Officer	0.1	6.4	10.7	43.0	39.8
All Other	0.2	10.6	12.3	32.5	44.4
All	4.5%	24.7%	15.1%	28.0%	27.7%

increase in the proportion of pilots at ages 40 and over, particularly for pilots of transports, troop carriers, and bombers, as well as operations officers and officers in the category "All Other." This change in age distribution reflects in large part the calling up of reserve units to active duty.

Proficiency Flying

A limitation on flying by rated officers in senior management positions to maintain proficiency is imposed by legislation which will expire June 30, 1962. It is expected that this legislation will be re-enacted and the limitation will continue. As pointed out in last year's report, a pilot in a category so restricted may nevertheless pilot a plane under some circumstances.

Hours of Flying

The number of aircraft hours per pilot in the Air Force has dropped from about 140 per year to about 125 per year. It should be noted that this figure is not the same as the average number of flight hours per pilot, which is believed to be about double this figure.

The average number of flight hours per pilot in the Navy and Marine Corps during 1960 was 259, the same as during 1959, while inactive Naval Reservists flew an average of 70 hours per year.

The number of aircraft hours for Army pilots in fixed-wing and rotary-wing craft combined averaged 220 hours during 1960.

Military Air Transport Service

While there were no passenger fatalities in MATS during 1959 or 1960, 25 passengers lost their lives in 2 accidents during 1961.

The MATS passenger fatality rate for the period 1957-1960 was 1.2 per 100,000,000 passenger miles. This compares with a rate of 0.6 for all United States scheduled airlines during the same period, and with a rate of 1.7 for the combined civil and military passenger transportation operation of supplemental airlines.

Aviation death rates of flying personnel of the MATS are shown in Table 10. Such rates by age are not available.

United States Army

Table 11 shows the recent aviation death rates among Army pilots and crew members.

Fatality rates per 1,000 aircraft hours among Army pilots in rotary- and fixed-wing aircraft are compared in Table 12. During 1960, the death rates for pilots of rotary-wing craft were slightly lower than the rates for pilots of fixed-wing craft.

As previously emphasized, the data in Table 12 provide a better indica-

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

	7/1/57- 6/30/61	7/1/60- 6/30/61
Pilots		
Transport Units.....	2.5	2.7
Other Units.....	1.6	0.8*
All.....	2.0	1.8
Other Crew		
Transport Units.....	2.9	3.2
Other Units.....	4.8	7.2
All.....	3.5	4.0

* Based on less than 5 deaths.

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

	1957-1960	1960
Pilots.....	4.8	3.8
Crew Members.....	6.5	7.4

TABLE 12
UNITED STATES ARMY—ROTARY VERSUS FIXED-
WING AIRCRAFT PILOT DEATHS PER 1,000
AIRCRAFT HOURS OF EXPOSURE

	1957-1960	1960
Fixed-Wing Aircraft.....	.0180	.0168
Rotary-Wing Aircraft.....	.0250	.0162
All.....	.0207	.0166

tion of the relative hazard of helicopter flying than the data in Table 8 for the Air Force, since helicopters have been used much more extensively in the Army than in the Air Force.

Student Pilots

During 1960 the aviation fatality rate among Air Force student pilots in the primary course rose to 7.3 per 1,000 life years, compared with 4.9 per 1,000 in 1959 and with an average rate of 3.7 per 1,000 for the period 1957-1960. For those in the basic course, however, the 1960 rate was 2.9 per 1,000 life years, compared with 5.7 per 1,000 for the period 1957-1960.

The fatality rates among U.S. Navy student pilots reflect a relatively small number of deaths. For those in the basic course, the rate has held quite steady over the past four years, being 3.1 per 1,000 in 1960 and 3.2 per 1,000 during the period 1957-1960. For student pilots in the advanced course, however, the 1960 rate rose to 19.5 per 1,000 life years compared with an average rate of 9.7 per 1,000 during 1957-1960.

United States Coast Guard

During 1960, 1,320 life years of exposure were reported for Coast Guard pilots, student pilots, observers, and crew members. For the second successive year there were no fatalities.

Inactive Reservists

The fatality rates for Navy and Marine Corps inactive reservists on drill pay status have varied very little in recent years. During 1957-1960, they were 2.5 per 1,000 life years at ages under 30, 1.7 at ages 30 and over, and 1.9 for all ages combined.

Air National Guard

The Air National Guard has been converting additional squadrons from interceptor duty to troop carrier duty. The most recent figures available indicate that about one out of five Air National Guard squadrons is assigned to air carrier duty in support of the Air Lift Command of the MATS.

The fatality rate among Air National Guard pilots not federally activated was 3.9 per 1,000 life years of exposure during 1960 and 5.3 during the period 1957-1960.

Air Force Flight Surgeons and Nurses

During 1957-1960, the fatality rate among flight surgeons was 2.4 per 1,000 life years, and 6.0 per 1,000 among flight nurses based on fewer than five deaths.

Graduates of Academies—Assignment to Aviation

In 1960, 3 percent of the Military Academy graduates and 4 percent of the Naval Academy graduates were accepted for flying training by the Air Force.

Of the Air Force Academy graduates, 98 percent were commissioned in the Air Force, with the remainder split evenly between the Marine Corps and the Army.

ROYAL CANADIAN AIR FORCE

Table 13 shows the 1956-1960 fatality rates for pilots of the RCAF and of the RCAF Auxiliary (Reserve personnel who undergo weekly training in organized squadrons). The over-all death rate for pilots on active duty decreased to 7.2 per 1,000 life years during the period 1956-1960, compared with 8.7 per 1,000 for the years 1955-1959. The fatality rate

TABLE 13
ROYAL CANADIAN AIR FORCE PILOTS
AVIATION DEATH RATES
PER 1,000 LIFE YEARS OF EXPOSURE

	Regular 1956-1960	Auxiliary 1956-1960
<i>Age Group</i>		
24 Years of Age and Younger...	9.9	5.5*
25-29 Inclusive.....	11.3	7.8*
30-34 Inclusive.....	6.7	0.0*
35-39 Inclusive.....	2.9	3.3*
40 and Older.....	2.8	0.0*
All.....	7.2	4.5
<i>Rank</i>		
Flight Cadet and Pilot Officer...	4.5	10.0*
Flying Officer.....	11.2	2.8*
Flight Lieutenant.....	4.0	9.6*
Squadron Leader.....	2.2	0.0*
Wing Commander and Higher Ranks.....	5.5	0.0*
All.....	7.2	4.5
<i>Function</i>		
Fighter.....	13.4	.....
Training.....	5.5	.....
Transport.....	2.1	.....
Maritime.....	0.0	.....
Others.....	3.5	.....
All.....	7.2	.....

* Based on 5 deaths or less.

for the RCAF Auxiliary has been reduced from 6.3 per 1,000 life years during 1955-1959 to 4.5 for the period 1956-1960, reflecting reduced exposure to flying in jet aircraft.

A comparison of the 1956-1960 fatality rates by functional formation with those for 1955-1959 shows a substantial reduction for "Fighter" category, and a slight reduction for "Training." For the "Transport" and "Other" categories, the 1956-1960 fatality rates are higher than those for the period 1955-1959.

RCAF pilot air fatalities per 1,000 flying hours for the years 1957-1960 averaged .0404 for pilots flying jet aircraft and .0068 for pilots flying other aircraft. In 1960, the approximate number of flight hours per pilot was 298 for the RCAF and 100 for the RCAF Auxiliary.

TABLE 14
 ROYAL CANADIAN AIR FORCE PILOTS
 DISTRIBUTION BY FUNCTION AND BY AGE

FUNCTION	AGE				
	Under 25	25-29	30-34	35-39	40 and over
Fighter.....	31.7%	23.0%	9.3%	20.9%	15.1%
Training.....	37.6	24.4	11.8	14.4	11.8
Transport.....	4.9	19.5	14.6	39.8	21.2
Maritime.....	7.6	22.9	11.9	37.7	19.9
Other.....	1.7	8.4	15.6	29.9	44.4

A distribution of RCAF pilots by duty assignment and age is shown in Table 14. As might be expected, pilots of fighter planes and pilots in training show a higher proportion at the younger ages than do the pilots in other assignments.

Maritime operations of the Royal Canadian Air Force are primarily anti-submarine patrol.

INTERCOMPANY EXPERIENCE

Civilian Aviation

Table 15 shows the experience through December 31, 1960 among civilian pilots on policies issued since January 1, 1946 by the 32 contributing companies. 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 15 includes only a portion of such cases.

This year the fatality rates for civilian pilots have been shown for two experience periods: 1946-1954 and 1955-1960. The fatality rate among scheduled airline pilots insured with an aviation extra premium has been greater during the 1955-1960 period than previously, due in part to the practice of accepting the better risks at standard rates. However, even

TABLE 15
INTERCOMPANY EXPERIENCE ON PILOTS IN CIVILIAN AVIATION*
(1946 and Subsequent Issues—by Policies)

STATUS AT ISSUE	1946-1954 EXPERIENCE			1955-1960 EXPERIENCE		
	Years of Exposure	Aviation Deaths	Rate per 1,000	Years of Exposure	Aviation Deaths	Rate per 1,000
Employed as Scheduled Airline Pilot						
With Aviation Extra Premium...	23,181	45	1.9	13,241	36	2.7
Without Aviation Extra Premium†				13,245	23	1.7
Others Having Commercial or Transport Certificate and Flying for Hire						
With Aviation Extra Premium...	10,444	52	5.0	17,333	104	6.0
Without Aviation Extra Premium†				1,687	5	3.0
Flying Only for Pleasure or Personal Business‡						
With Aviation Extra Premium						
Less than 100 hours in 12 months preceding issue	30,090	44	1.5	50,328	53	1.1
100 or more hours in 12 months preceding issue						
100-199 hours	15,021	42	2.8	22,557	60	2.7
200-299 hours	4,614	21	4.6	8,009	39	4.9
300 or more hours	3,962	21	5.3	6,558	23	3.5
Total	23,597	84	3.6	37,124	122	3.3
Hours in 12 months preceding issue not stated	3,621	11	3.0	3,720	5	1.3
Without Aviation Extra Premium†				36,579	37	1.0

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

† Generally 1955 and subsequent issues.

‡ Includes pilots having commercial or transport certificates (not flying for hire) and pilots having private certificate and 100 or more solo hours (or solo hours not stated).

TABLE 16
 INTERCOMPANY EXPERIENCE ON PILOTS AND CREW MEMBERS
 IN MILITARY AVIATION
 (With Aviation Extra Premium†—by Policies)

STATUS AT ISSUE, YEARS OF ISSUE AND ATTAINED INSURANCE AGE	1953-1956 EXPERIENCE‡			1957-1960 EXPERIENCE		
	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 and subsequent . . .						
Under 25	821	3	*	2,493	10	4.0
25-29	7,351	43	5.8	15,672	57	3.6
30-34	34,818	123	3.5	24,768	76	3.1
35 and over	39,746	117	2.9	98,834	232	2.3
Issues of 1953 and subsequent						
40-150 hours in 12 months pre- ceding issue						
30-34	5,086	11	2.2	5,130	10	1.9
35 and over	5,241	13	2.5	22,369	49	2.2
Over 150 hours in 12 months pre- ceding issue						
30-34	7,305	29	4.0	14,219	52	3.7
35 and over	4,740	16	3.4	27,929	80	2.9
U.S. Navy or Marine rated pilots on full-time duty						
Issues of 1946 and subsequent						
Under 25	853	8	9.4	1,576	15	9.8
25-29	5,632	37	6.6	7,922	81	10.2
30-34	17,526	112	6.4	13,338	64	4.8
35 and over	16,404	74	4.5	40,155	107	2.7
Issues of 1953 and subsequent						
40-150 hours in 12 months pre- ceding issue						
30-34	1,701	15	8.8	2,914	12	4.1
35 and over	1,800	7	3.9	8,279	21	2.5
Over 150 hours in 12 months pre- ceding issue						
30-34	3,217	36	11.2	6,545	33	5.0
35 and over	1,720	16	9.3	10,154	29	2.9
U.S. Air Force or Army crew mem- bers						
Issues of 1946 and subsequent						
Under 25	1,274	1	*	6,819	17	2.5
25-29	2,500	16	6.4	13,995	34	2.4
30-34	6,749	18	2.7	8,243	23	2.8
35 and over	6,367	26	4.1	19,659	42	2.1

* Death rates not shown in classes with less than 5 deaths.
 † Exposure is terminated on discontinuance of extra premium.
 ‡ Deaths from enemy action are excluded. For classes covering issues of 1946 and subsequent, experience period begins July 1, 1953.

when these two groups are combined, the fatality rate for the 1955-1960 experience is somewhat higher than that for 1946-1954. Pilots flying for hire, other than scheduled airline pilots, also showed a somewhat higher fatality rate for 1955-1960 than for 1946-1954. Pilots flying for pleasure or personal business only (excluding student pilots) who were insured with an aviation extra premium showed some improvement in 1955-1960 over 1946-1954, even though a sizable proportion of such risks have been accepted at standard rates in recent years.

Military Aviation

Table 16 shows the experience through December 31, 1960 among military aviation personnel insured with an aviation extra premium. The experience covers issues since January 1, 1946. A further breakdown of the experience by number of annual flying hours reported at time of issue has been shown at attained ages 30 and over for issues of 1953 and subsequent. The experience is by number of policies and the classification of the insured is according to status at the time of application for insurance.

The fatality rates for military aviation are shown for two post-Korean War periods: 1953-1956 and 1957-1960. The fatality rates among U.S. Air Force and Army pilots in the 1957-1960 experience were lower than for the period 1953-1956. This was also true for U.S. Navy and Marine pilots at ages 30 and over. However, U.S. Navy and Marine pilots at ages under 30 showed a distinctly higher fatality rate during the years 1957-1960 than in the 1953-1956 experience. The rates at corresponding ages for U.S. Navy and Marine pilots are significantly higher than those for Air Force and Army pilots, probably reflecting differences in type of planes used, type of flying, and number of hours flown (see 1958 Reports, pages 86-90, and 1960 Reports, page 84). Among U.S. Air Force and Army crew members, the fatality rate was generally slightly lower for 1957-1960 experience than for 1953-1956.