REPORT OF THE COMMITTEE ON AVIATION

AVIATION STATISTICS

THIS report presents primarily new data which have become available during the past year. Data for earlier periods have been included for comparison or to indicate trends. Only aviation deaths are used in determining death rates. The 1960 report of the Committee includes an index, pages 68–70, covering the most recent information not shown in this report.

SCHEDULED AIRLINES

United States Airlines

This category includes all flying by airlines that hold Civil Aeronautics Board certificates of public convenience and necessity 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 been included under domestic operations beginning in 1959, in accordance with the current practice of the C.A.B.

Table 1 shows the recent trend of aviation fatality rates in United States scheduled airlines for passengers, pilots, and other crew members. The small number of fatal accidents and the relatively larger number of passenger fatalities in some accidents result in fatality rates which are subject to marked fluctuation from year to year. However, in domestic flying, it may be noted that rates, averaged over successive four-year periods beginning in 1952, are fairly constant. The passenger death rate for the entire period 1952–64 is 0.0011 per 1,000 passenger hours, and the rate for the period 1961–64 is estimated at 0.0008. For first pilots in scheduled domestic flying, the death rate for the period 1952–64 is 0.0013 and for the period 1961–64 is 0.0014 per 1,000 airplane hours.

In international flying of United States airlines there have been 17 fatal accidents—16 with passenger fatalities and 8 with pilot fatalities—during the period 1952–64. The two fatal accidents in 1963, in which a total of 168 passengers lost their lives, include one accident involving 95 passenger deaths which the 1963 report incorrectly classified in the Supplemental Airlines category. In 1964 there were two fatal accidents in which 94 passengers, one pilot, two copilots, and six other crew members

lost their lives. The death rates in international flying for the entire period 1952–64 are 0.0016 per 1,000 passenger hours for passengers and 0.0012 per 1,000 airplane hours for first pilots.

The accumulated experience does not provide an adequate basis for differentiating between the hazards of jet and of 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" include deaths of those who do less than the

TABLE 1

UNITED STATES SCHEDULED AIRLINES AVIATION DEATH RATES

(Number of Fatal Accidents in Parentheses)

	1952–55	1956–59	1960–63	1963*	1964 (Est.)
	Passenger Death Rate per 1,000 Passenger Hours†				
Domestic	0.0010 (17)	0.0010 (20)	0.0012 (19)	0.0003 (4)	0.0007 (6)
International	.0015 (6)	.0011 (4)	.0016 (4)	.0057 (2)	.0029 (2)
Total	0.0011 (23)	0.0010 (24)	0.0013 (23)	0.0013 (6)	0.0011 (8)
	First-Pilot Death Rate per 1,000 Airplane Hours†				
Domestic	0.0014 (15)	0.0011 (14)	0.0016 (19)	0.0016 (5)	0.0015 (5)
International	.0005 (1)	.0012 (3)	.0016 (3)	.0044 (2)	.0021 (1)
Total	0.0012 (16)	0.0011 (17)	0.0016 (22)	0.0020 (7)	0.0016 (6)
	Death Rate of All Pilots Employed in Scheduled Flying per Life Year of Exposure‡				
Domestic	0.0011 (18)	0.0009 (21)	0.0010 (25)	0.0010 (7)	0.0008 (5)
International	.0007 (3)	.0008 (3)	.0010 (3)	.0027 (2)	.0020 (2)
Total	0.0010 (21)	0.0009 (24)	0.0010 (28)	0.0012 (9)	0.0009 (7)
	Death Rate of Other Crew Members Employed in Scheduled Flying per Life Year of Exposure‡				
Domestic	0.0009 (16)	0.0010 (18)	0.0011 (19)	0.0007 (4)	0.0004 (4)
International	.0011 (3)	.0015 (3)	.0014 (3)	.0042 (2)	.0025 (2)
Total	0.0010 (19)	0.0011 (21)	0.0012 (22)	0.0012 (6)	0.0007 (6)

* Preliminary.

† Helicopter experience excluded beginning in 1957.

‡ Includes deaths in nonrevenue flights.

NOTE.—Beginning in 1959, intra-Alaska operations are included under domestic operations.

normal amount of flying on account of having some supervisory duties or for some other reasons, and deaths in nonrevenue flights, such as check flights of scheduled airlines.

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

During the eight years 1957–64, helicopters flew a total of approximately 68,000,000 passenger miles in scheduled passenger service. In 1960 a fatal accident took the lives of 11 passengers and 2 crew members. There was a fatal helicopter accident in 1963, in which 3 passengers and 3 crew members were killed. These two fatal accidents produced a passenger death rate of 0.016 per 1,000 passenger hours for the eight-year period 1957–64. A 1961 accident in scheduled helicopter cargo service caused the death of the pilot.

Airlines of Countries Other than the United States

The International Air Transport Association furnished the Committee with the experience of most of its members. By making reasonable assumptions regarding average speed, the passenger fatality rates per 1,000 passenger hours were derived for United States airlines reporting to I.A.T.A. and for the member airlines of all other countries combined. These fatality rates are compared in Table 2. Nearly 90 per cent of the passenger miles flown by United States scheduled airlines were accumulated by airlines which report to the I.A.T.A. The combined international and domestic experience of all United States scheduled airlines is also included in Table 2 for comparison. The passenger fatality rates presented in Table 2 relate to services of scheduled airlines only and exclude United States helicopter services.

At least since 1951, the experience of United States scheduled airlines has been 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, on the average, about 30 per cent of their services have been on a scheduled basis, although in 1962 only 19 per cent of their services were on a scheduled basis. Nonscheduled services include

military contract operations which often involve the carrying of troops as well as cargo.

In the eight years 1956–63 the first pilot fatality rate for scheduled all-cargo services was 0.007 per 1,000 airplane hours based on four deaths.

SUPPLEMENTAL AIRLINES

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

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 UNITED STATES AIRLINES
	Countries Other than the United States	United States	
1952–55.....	0.0040	0.0013	0.0011
1956–59.....	.0031	.0009	.0010
1960–63.....	.0038	.0015	.0013
1963.....	0.0027	0.0016	0.0013*

* Preliminary.

The figures shown in Table 3 include experience in operations under contracts with the military authorities. Fatality rates are derived from mileage reports supplied to the Civil Aeronautics Board, assuming an average speed of 200 miles per hour for years prior to 1960, increasing gradually to 225 miles per hour for the years 1963–64. As already stated in this report, the 1963 report incorrectly included a fatal accident involving 95 passenger deaths in the 1963 experience of Supplemental Airlines. There was, in fact, one fatal accident during 1963 involving a Supplemental Airlines plane in which the first pilot was killed but there were no passenger fatalities. The fatality rates for short periods of time are subject to wide fluctuations. During the eight-year period 1956–63 the passenger death rate was 0.004 per 1,000 passenger hours, and the death rate among first pilots was 0.005 per 1,000 airplane hours.

GENERAL AVIATION FLYING

General aviation flying includes all domestic civil flying except that performed by the public carriers (scheduled, supplemental, contract, and intrastate air carriers). The annual flying time of planes in general aviation totals almost four times the flying time of public carriers in their domestic flights. The number of hours flown in general aviation is estimated from annual surveys of aircraft use. The pilot death rates per 1,000 airplane hours are shown in Table 4 for five different classes of flying.

TABLE 3

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

(Number of Fatal Accidents in Parentheses)

PERIOD	PASSENGER		FIRST PILOT	
	Aviation Deaths	Rate per 1,000 Passenger Hours	Aviation Deaths	Rate per 1,000 Airplane Hours
1956–59	1 (1)	0.000	2	0.003
1960–63	244 (4)	.007	6	.007
1963	0 (0)	.000	1	.005
1964 (est.)	0 (0)	0.000	0	0.000

Pleasure flying accounts for slightly more than one-fourth of the total general aviation flying time but for more than two-fifths of the pilot fatalities. During 1959–62 the fatality rate of pilots in pleasure flying was the highest among the five categories in general aviation shown in Table 4. There is reason to believe that these high fatality rates for pleasure flying are substantially accurate.

The business category, which makes up more than two-fifths of total general aviation flying, accounts for one-fifth of the pilot fatalities and has the lowest pilot death rates. All flying in connection with business or government activities, whether by professional or nonprofessional pilots, is included in this category.

Fatality rates have been estimated for pilots and passengers flying in fixed-wing aircraft weighing over 12,500 pounds and engaged in "corporate flying" (business flying in planes operated by professional pilots). Using statistics from Civil Aeronautics Board publications, it appears that during the years 1956–62 the aviation death rate was about 0.007 per 1,000 pilot hours for pilots and about 0.008 per 1,000 passenger hours for passengers. Thirty-two pilot deaths (including copilots) and 46 passenger

deaths were involved. In calculating these rates, it was assumed (based on some statistical evidence) that 1 plane hour was equivalent to 2 pilot hours and 2.5 passenger hours.

Next to business flying, flight training of civilians presents the most favorable record. The pilot death rate for the years 1959–62 was 0.022 per 1,000 plane hours. Included are the deaths of the instructor or the student, whoever was acting as pilot when the accident occurred. The hours of instructional flying now represent about one-seventh of the total in general aviation. Single-engine planes are used almost exclusively for this purpose.

Commercial flying—which includes the transportation of passengers and cargo for hire, survey, and patrol activities, aerial application, mis-

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		
1959	2,600*	161	0.062	1,900*	48	0.025
1960	2,950	157	.053	1,700	48	.028
1961	3,160*	180	.057	1,670*	38	.023
1962†	4,020	173	.043	1,830	19	.010
1959–62	12,730*	671	0.053	7,100*	153	0.022
	Business			Commercial (Excluding Aerial Applications) and Miscellaneous		
1959	5,300*	74	0.014	1,320*	56	0.042
1960	5,300	83	.016	1,311	51	.039
1961	5,300*	78	.015	1,600*	43	.027
1962†	4,650	92	.020	1,710	31	.018
1959–62	20,550*	327	0.016	5,941*	181	0.030
	Aerial Application					
1959	880	54	0.061			
1960	889	32	.036			
1961	855*	38	.044			
1962†	950	39	.041			
1959–62	3,574*	163	0.046			

* Estimated on basis of trends.
† Preliminary.

cellaneous flying, such as search and rescue work, and Civil Air Patrol—accounts for less than one-fifth of the total hours in general aviation. The experience in aerial application—the largest subdivision of commercial flying—and that of other forms of commercial flying are shown separately in the table.

The pilot fatality rates in aerial application have been higher than in other commercial activities, being estimated at 0.046 per 1,000 airplane hours for the years 1959–62. Aerial application includes any form of flying in which chemicals are distributed from aircraft upon the land below, the usual form being crop-dusting. During 1962 the average annual flying time was about 220 hours per year, but it is believed to vary considerably among pilots who have a local business confined to a single growing season and those who move from area to area with the season. The 950,000 hours flown in 1962 include 23,000 hours in helicopters, with one death resulting.

In 1962 helicopters accounted for 256,000 flight hours among all the categories presented in Table 4, with 11 deaths, a fatality rate of 0.043 per 1,000 aircraft hours. During 1963 there were 12 helicopter pilot deaths in general aviation.

In addition to the categories presented in Table 4, there were 243,000 hours flown during 1962 in other flying, such as testing, demonstrating, and ferrying, resulting in 38 deaths, a rate of 0.156 per 1,000 aircraft hours. Gliders and lighter-than-air craft flew 39,000 hours during 1962 with one glider death. Preliminary information shows four glider deaths in 1963 and one glider death in 1964.

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.

Pilot aviation fatality rates per 1,000 hours in domestic and international operations of Canadian nonscheduled airlines have been estimated from figures furnished by the Canadian Department of Transport and the Dominion Bureau of Statistics and are shown in Table 6, compared with corresponding fatality rates in scheduled flying (domestic and international).

Canadian scheduled airlines comprise air carriers which serve designated points in accordance with a definite service schedule. Nonscheduled airlines are those which follow a route pattern with some degree of regularity or operate from a designated base to serve a defined area or on charter of an entire aircraft.

TABLE 5

CANADIAN SCHEDULED AIRLINES
AVIATION FATALITY RATES
(Number of Fatal Accidents in Parentheses)

Years	Passenger Fatality Rate per 1,000 Passenger Hours	First-Pilot Fatality Rate per 1,000 Airplane Hours
1952–55	0.0015 (2)	0.0023 (2)
1956–59	.0025 (4)	.0027 (3)
1960–63	.0025 (3)	.0015 (2)
1952–63	.0023 (9)	.0021 (7)
1961–64 (est.)	0.0023 (3)	0.0015 (2)

TABLE 6

NONSCHEDULED VERSUS SCHEDULED FIRST-PILOT
FATALITY RATES PER 1,000 AIRPLANE HOURS
(Number of Fatal Accidents in Parentheses)

Years	Nonscheduled	Scheduled
1956–59	0.0184 (28)	0.0027 (3)
1960–63	.0159 (21)	.0015 (2)
1956–63	0.0173 (49)	0.0020 (5)

TABLE 7

CANADIAN CIVIL PILOTS BY CLASS OF LICENSE
1956–63 AVIATION FATALITY RATES

Class of License	Period	Life Years of Exposure	Aviation Fatalities	Rate per 1,000 Life Years of Exposure
Airline transport	1956–59	3,868	16	4.1
	1960–63	5,164	9	1.7
Senior commercial	1956–59	1,567	9*	5.7
	1960–63	1,604	8	5.0
Commercial	1956–59	9,279	52*	5.6
	1960–63	9,114	34	3.7
Private (excluding students)	1956–59	31,107	50†	1.6
	1960–63	58,432	90‡	1.5

* Includes one missing and presumed dead.
† Includes one death as glider pilot in each of the years 1958 and 1959.
‡ Includes five missing and presumed dead.

The fatality rates among Canadian civil pilots, by class of license, are shown in Table 7, separately, for the periods 1956–59 and 1960–63, based on figures furnished by the Canadian Department of Transport. It should be noted that pilots holding airline transport licenses are not necessarily flying for scheduled airlines, since they may engage in other types of flying. The trend in recent years, indicated in previous reports, toward more favorable mortality for pilots holding airline transport licenses has continued, although there were four deaths in this category in 1963, including one death while flying a helicopter. Excluded from the experience in Table 7 were persons holding glider licenses only, of whom there were 616 in 1963 with 1 fatality reported in 1963.

TABLE 8

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 NONPILOT RATED OFFICERS		NAVY AND MARINE CORPS PILOTS	
	1960–63	1963	1960–63	1963	1960–63	1963
Under 25	2.3	0.2	1.0	0.4	9.2	8.5
25–29	4.3	3.9	2.8	1.7	10.1	12.9
30–34	4.3	4.6	2.5	2.7	4.9	4.2
35 and over	1.6	2.0	1.2	0.7	2.4	1.9
All	2.8	3.0	2.0	1.5	5.7	5.1

UNITED STATES MILITARY

Age and Rank

Table 8 shows the 1963 and 1960–63 aviation fatality rates by age group for Air Force pilots and nonpilot rated officers and for Navy and Marine Corps aviators on active duty.

Aviation fatality rates of Air Force rated pilots at ages under 25 continued their downward trend which started in 1959. Fatality rates at ages 25–34 continued to be somewhat higher than at the younger and older ages. At ages 35 and over, each of the past three years has shown a slightly higher rate than the year before.

Aviation fatality rates for Air Force nonpilot rated officers were generally lower in 1963 than during 1962 and 1961 in each issue age group. The average rates for the four most recent years continued to be less than comparable rates for rated pilots for each age group shown.

The aviation fatality rates of Navy and Marine pilots increased somewhat at each age group in 1963 as compared with rates for 1962 which,

as was mentioned in last year's report, were lower than in any preceding year for which information is available. At ages 30 and over Navy and Marine Corps pilot fatality rates were at about the same level as those of the Air Force rated pilots.

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 9. The fatality rate of first lieutenants shows a marked reduction from that of prior years.

TABLE 9

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

RANK	RATED PILOTS		NONPILOT RATED OFFICERS	
	1960–63	1963	1960–63	1963
2nd Lieutenant	3.8	5.0	0.8	0.0*
1st Lieutenant	5.7	3.9	2.7	1.8
Captain	3.3	4.9	2.0	2.9
Major	1.4	1.2	1.4	1.4
Lieutenant Colonel	1.3	1.6	0.7	0.8
General and Colonel	0.5	0.3	0.0*	0.0*
All	2.8	3.0	2.0	1.5

* Based on five or fewer deaths.

Duty Assignment

The 1963 and 1959–62 aviation fatality rates among Air Force pilots, according to duty assignment, are given in Table 10. For the first time fatality rates for pilots of fighter-interceptors and fighter-bombers are separated from rates for pilots of other fighters and bombers. However, these separate rates are available for the year 1963 only.

Officers on Flying Status—by Age Group and Duty Assignment

The 1963 distribution of Air Force officers on flying status, by duty assignment and age, is shown in Table 11. As in Table 10, the fighter and bomber categories have each been subdivided. A comparison with the corresponding distribution for 1962 indicates increased proportions under age 35 and lower proportions at ages 35 and over.

Hours of Flying

The number of aircraft hours per pilot on flying status in the Air Force was about 120 hours per year in 1963 and has remained fairly constant

TABLE 10

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

Duty Assignment	1959-62	1963
Pilot, helicopter	1.5*	2.8
Pilot, search-rescue	0.0*	4.5
Pilot, transport	2.5	2.6
Pilot, troop carrier	3.0	1.6
Pilot, fighter	8.7	13.9
Pilot, fighter-interceptor		10.1
Pilot, fighter-bomber	3.9	18.6
Pilot, bomber		3.5
Pilot, reconnaissance	6.8	8.9
Pilot, tanker	2.1	2.6
Operations officer	2.0	2.3
All other pilots	1.4	1.5
All	2.9	3.0

* Based on five or fewer deaths.

TABLE 11

UNITED STATES AIR FORCE
1963 DISTRIBUTION OF OFFICERS BY DUTY ASSIGNMENT AND AGE

DUTY ASSIGNMENT	AGE				
	Under 25	25-29	30-34	35-39	40 and Over
Pilot, helicopter	6.4%	46.9%	35.1%	6.6%	5.0%
Pilot, search-rescue	3.2	31.2	33.5	10.4	21.7
Pilot, transport	7.8	32.8	29.1	10.6	19.7
Pilot, troop carrier	9.2	37.9	28.6	9.3	15.0
Pilot, fighter	6.3	36.5	39.7	11.2	6.3
Pilot, fighter-interceptor	4.7	36.1	40.1	12.0	7.1
Pilot, fighter-bomber	0.4	21.9	49.8	13.8	14.1
Pilot, bomber	3.3	30.2	30.6	15.0	20.9
Pilot, reconnaissance	2.0	23.1	41.4	18.2	15.3
Pilot, tanker	5.9	30.3	35.0	10.5	18.3
Experimental flight testing	0.0	2.3	52.7	42.0	3.0
Flight training	9.0	42.4	35.0	8.6	5.0
Operations staff officer	0.1	0.1	3.7	20.7	75.4
Air operations officer	0.2	8.1	38.8	25.3	27.6
All other	7.2	33.6	28.2	10.9	20.1
All	4.7%	27.1%	30.7%	14.1%	23.4%

since 1960. The average number of flight hours per pilot has been estimated at about double the number of aircraft hours per pilot.

The average number of flight hours per pilot in the Navy and Marine Corps decreased to 234 in 1963 from 279 in 1962. The corresponding average flight hours were 235 in 1961 and 259 in 1960. Inactive Naval Reservists flew an average of 88 hours per year in 1963, as compared with 85 hours in 1962 and 70 hours in both 1961 and 1960.

The average number of aircraft hours for Army pilots—in fixed-wing and rotary-wing craft combined—was 199 in 1963. The average for the years 1960–63 combined was 210 hours.

TABLE 12

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

	7/1/56–6/30/60	7/1/60–6/30/64	7/1//63–6/30/64
Pilots:			
Transport units	3.3	2.1	2.0
Other units	2.2	1.6	4.5
All	2.6	1.9	2.7
Crew members:			
Transport units	3.9	2.6	3.9
Other units	5.3	3.1	10.4
All	4.5	2.8	5.3

Military Air Transport Service

There were no passenger fatalities on military carriers in MATS in 1963 or 1962. The passenger fatality rate for the four-year period 1960–63 was 0.35 per 100,000,000 passenger miles.

Aviation fatality rates among pilots and crew members of MATS are shown in Table 12.

United States Army

Table 13 shows aviation fatality rates among Army rated pilots and crew members. Fatality rates among Army rated pilots per 1,000 aircraft hours in rotary- and fixed-wing aircraft are compared in Table 14.

The data in Table 14 are believed to provide a better indication of the relative hazards of helicopter and fixed-wing aircraft flying than those given in Table 10 for Air Force pilots inasmuch as helicopters are used more extensively in the Army than in the Air Force. In 1963, as in 1962,

the fatality rate per 1,000 aircraft hours for pilots of fixed-wing aircraft was higher than that for pilots of rotary-wing aircraft.

Student Pilots

Table 15 shows aviation fatality rates among student pilots in the military services. The Navy and Marine Corps rates are based on both officers and cadets, whereas the Air Force rates are based on officers only. The Air Force cadet program was phased out in 1962.

TABLE 13

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

	1956–59	1960–63	1963
Rated pilots	4.9	3.7	3.2
Crew members	5.3	5.5	4.9†

* Excludes fatalities in Viet Nam.
† Based on five or fewer deaths.

TABLE 14

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

	1960–63	1963
Fixed-wing aircraft	0.0178	0.0190
Rotary-wing aircraft	0.0173	0.0120
All types of aircraft	0.0176	0.0158

* Excludes fatalities in Viet Nam.

The 1963 fatality rates were lower than the corresponding 1962 rates except for Navy and Marine Corps Basic Course pilots, who experienced slightly higher rates. The fatality rates averaged over four-year periods also exhibited a trend which was generally downward.

Coast Guard

Aviation fatality rates among Coast Guard personnel on flight orders for the period 1961–63 were substantially the same as reported for 1960–62 in last year's report. There were no pilot fatalities reported in 1963 or 1962, and there have been no fatalities among Coast Guard student pilots or observers during the past seven years.

Inactive Reservists

The fatality rates for Navy and Marine Corps inactive reservists on drill-pay status are shown in Table 16.

Air National Guard

The aviation fatality rate among Air National Guard pilots not federally activated was 4.3 per 1,000 life years of exposure during 1963 and 3.6 for the period 1960–63. The rates for 1962 and 1959–62 were 5.0 and 4.3, respectively.

Army National Guard

For Army National Guard flyers, there was one aviation fatality reported during 1963 among rated pilots and none among student pilots or

TABLE 15

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

	1956–59	1960–63	1963
Air Force:*			
Primary course	2.5	3.7	2.3
Basic course	6.7	4.2	3.3
Navy and Marine Corps:			
Basic course	4.1	3.2	3.7
Advanced course	11.2	10.8	5.8†
	1958–60	1961–63	1963
Army	2.0†	1.2†	1.0†

* Officers only (cadet program phased out in 1962).
† Based on five or fewer deaths.

TABLE 16

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

	1956–59	1960–63	1963
Ages under 30	3.5	2.6	5.3*
Ages 30 and over	1.5	2.1	2.1
All ages	1.9	2.2	2.6

* Based on five or fewer deaths.

crew members. This is the first time that Army National Guard aviation experience has been included in this report.

Air Force Flight Surgeons and Nurses

During the period 1960–63 the aviation fatality rate among flight surgeons was 2.1 per 1,000 life years. The corresponding rate for 1959–62 was 2.4, and for 1958–61 it was 2.0. There have been no fatalities among flight nurses during the last five years.

Graduates of Academies—Assignment to Aviation

In 1963, 2.5 per cent of the military academy graduates and 1.2 per cent of the naval academy graduates were accepted for flight training by the Air Force.

Of the Air Force academy graduates, 98.2 per cent were commissioned in the Air Force, 1.0 per cent in the Navy, 0.2 per cent in the Marine Corps, and 0.6 per cent in the Army.

The superintendent of the naval academy has stated that graduates of the Class of 1964 and subsequent classes will be assigned only to the Navy or Marine Corps.

ROYAL CANADIAN AIR FORCE

Table 17 shows the 1958–63 aviation fatality rates for pilots and crew members of the R.C.A.F. The aviation fatality rate for pilots on active duty decreased to 4.2 per 1,000 life years from 5.1 in 1957–62 and 6.6 in 1956–61. The aviation fatality rates for other crew members decreased to 1.6 per 1,000 life years from 1.9 in 1957–62 and 2.7 in 1956–61.

The fatality rates by rank follow, in general, patterns similar to those shown in last year's report for both pilots and other crew members.

There were no pilot fatalities during the period 1958–63 for the R.C.A.F. Auxiliary (i.e., reserve personnel who undergo weekly training in organized squadrons).

A comparison by function of the 1958–63 aviation fatality rates for pilots with those for the period 1957–62 shows that the rates have decreased slightly in each category. The aviation fatality rate among radio navigators in the Fighter Command was 5.6 per 1,000 life years for 1958–63, as compared with 6.5 for the period 1957–62 and 9.0 for the period 1956–61.

In considering the results shown in Table 17, it should be kept in mind that the bulk of the R.C.A.F. 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. Likewise, the movements of pilots and crew from one

category to another, which has been commented on in earlier reports, continues.

During the period 1958–63 the aviation fatality rates were 0.0301 per 1,000 flying hours for R.C.A.F. pilots flying jet aircraft and 0.0057 for pilots flying other aircraft. For crew members, the corresponding rates were 0.0226 and 0.0020, respectively.

In 1963 the approximate number of flight hours per pilot was 300 for R.C.A.F. and 158 for the R.C.A.F. Auxiliary.

The 1963 distribution of R.C.A.F. pilots and crew members by duty assignment and age is given in Table 18. Compared with the distribution

TABLE 17

ROYAL CANADIAN AIR FORCE
1958–63 AVIATION FATALITY RATES
PER 1,000 LIFE YEARS OF EXPOSURE

	Regular	
	Pilot	Other Crew
Age group:		
Under 25	6.0	1.9
25–29	7.4	2.0
30–34	4.7	1.1*
35–39	1.9	0.9*
40 and over	0.9*	0.9*
All	4.2	1.6
Rank:		
Flight cadet and pilot officer	0.7*	0.0*
Flying officer	7.8	2.6
Flight lieutenant	2.8	0.8*
Squadron leader	1.4*	0.0*
Wing commander and higher ranks	2.2*	3.0*
All	4.2	1.6
Function:		
Fighter	7.2	5.6
Training	3.2	0.4*
Transport	0.9*	0.0*
Maritime	0.7*	0.0*
Others	3.3	0.0*
All	4.2	1.6

* Based on five or fewer deaths.

NOTE.—The function classified as "other" is composed largely of pilots whose primary assignment is on the ground but who occasionally fly to maintain proficiency. It also includes pilots of the Air Material Command who ferry planes to air bases and test new planes, both accepted and experimental models.

in the *1963 Reports*, there is a decreased percentage in the Fighter Command at ages below 30 and increased percentages at most other ages.

INTERCOMPANY EXPERIENCE

Contributions submitted for the 1963 experience were limited to issues of 1953 and later, and this is indicated in the footnotes to the tables.

Contributing companies were asked to show separately their military

TABLE 18

ROYAL CANADIAN AIR FORCE
1963 DISTRIBUTION BY AGE AND DUTY ASSIGNMENT

FUNCTION	PILOT AGE					OTHER AIR CREW AGE				
	Under 25	25–29	30–35	35–39	40 and Over	Under 25	25–29	30–34	35–39	40 and Over
	By Age Group for Each Duty Assignment									
Fighter	9%	22%	21%	15%	33%	12%	40%	24%	8%	16%
Training	49	23	10	5	13	43	16	20	10	11
Transport	5	14	20	17	44	26	23	24	14	13
Maritime	9	14	17	16	44	42	32	15	6	5
Others	1	9	15	13	62	1	12	25	19	43
	By Duty Assignment for Each Age Group									
Fighter	13%	33%	39%	36%	29%	10%	34%	27%	18%	28%
Training	80	43	21	16	13	31	12	20	22	16
Transport	3	11	18	20	19	12	11	16	19	12
Maritime	4	7	10	13	13	47	38	24	21	11
Others	.....	6	12	15	26	.....	5	13	20	33
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

experience for ages 35–39. The publication of this subdivision of the data has been deferred until more data have been accumulated.

Civilian Aviation

Tables 19 and 20 show the aviation fatality rates experienced in recent years among civilian pilots on policies issued since January 1, 1946, by the twenty-nine companies contributing part or all of their data on civilian aviation risks. The experience is by numbers 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 have been 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 for such policies shown in Table 19 includes only a portion of such cases.

The experience in Table 19 covers the years 1957–63 inclusive and 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 1957–63 period was

TABLE 19

INTERCOMPANY EXPERIENCE ON PILOTS IN CIVILIAN AVIATION*
(1957–63 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	Aviation Fatalities	Rate per 1,000	Years of Exposure	Aviation Fatalities	Rate per 1,000
Scheduled airline pilots	8,433	24	2.8	25,533	40	1.6
Other commercial pilots flying for hire:						
Instructing (at least half-time)	5,897	22	3.7	.....	.....	.....
Others	15,712	85	5.4	4,133	13	3.1
Total	21,609	107	5.0	4,133	13	3.1
Private pilots:‡						
Less than 100 hours	59,881	75	1.3	66,071	73	1.1
100–199 hours	25,571	67	2.6	10,081	18	1.8
200–299 hours	9,103	35	3.8	1,265	1	.....
300 or more hours	8,275	27	3.3	1,156	1	.....
Hours not stated	3,656	5	1.4	1,682	1	.....
Total	106,486	209	2.0	80,255	94	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.

† For exposure year 1963, issues of only 1953–63 are included.

‡ 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).

1.6 per 1,000, based on 40 deaths, while among other commercial pilots accepted without aviation extra premium it was 3.1 per 1,000, based on 13 deaths. Also, for private pilots flying 100–199 hours and accepted without aviation extra premium, the aviation fatality rate for the 1957–63 period was 1.8 per 1,000, based on 18 deaths.

Table 20 shows the experience during the period 1954–63 inclusive, among commercial, transport, and private pilots flying for pleasure or personal business, but not for hire, (*a*) by type of flying certificate and

TABLE 20

INTERCOMPANY EXPERIENCE ON PILOTS FLYING FOR PLEASURE OR PERSONAL BUSINESS* WITH AVIATION EXTRA PREMIUM†
(1954–63 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	Aviation Fatalities	Rate per 1,000	Years of Exposure	Aviation Fatalities	Rate per 1,000
Less than 100 hours	13,126	26	2.0	59,571	61	1.0
100–199 hours	6,110	14	2.3	25,156	62	2.5
200–299 hours	3,346	8	2.4	7,532	34	4.5
300 or more hours	4,130	11	2.7	5,471	23	4.2
Hours not stated	770	3	.....	3,540	5	1.4
Total	27,482	62	2.3	101,270	185	1.8
	Attained Ages under 35§			Attained Ages 35 and Over§		
	Years of Exposure	Aviation Fatalities	Rate per 1,000	Years of Exposure	Aviation Fatalities	Rate per 1,000
Less than 100 hours	26,398	42	1.6	45,033	44	1.0
100–199 hours	9,652	19	2.0	21,067	55	2.6
200–299 hours	2,346	7	3.0	8,348	33	4.0
300 or more hours	2,044	5	2.4	7,375	29	3.9
Hours not stated	1,232	1	.....	3,058	7	2.3
Total	41,672	74	1.8	84,881	168	2.0

* 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.

‡ For exposure year 1963, issues of only 1953–63 are included.

§ Excludes experience of those companies which were unable to subdivide experience by age.

TABLE 21

INTERCOMPANY EXPERIENCE ON PILOTS AND CREW MEMBERS IN MILITARY AVIATION—WITH AVIATION EXTRA PREMIUM* (1957–63 EXPERIENCE ON 1946 AND SUBSEQUENT ISSUES† —BY POLICIES)

Status at Issue and Attained Insurance Age	Years of Exposure	Aviation Fatalities	Rate per 1,000
U.S. Air Force pilots:‡			
Under 25	2,607	9	3.5
25–29	21,802	79	3.6
30–34	33,748	97	2.9
35 and over	118,708	228	1.9
Total	176,865	413	2.3
U.S. Army pilots:‡			
Under 25	256	3	.....
25–29	2,608	3	.....
30–34	4,526	19	4.2
35 and over	18,489	21	1.1
Total	25,879	46	1.8
U.S. Air Force and Army pilots:			
Under 25	3,245	13	4.0
25–29	27,247	87	3.2
30–34	43,517	132	3.0
35 and over	169,467	316	1.9
Total	243,476	548	2.3
U.S. Air Force and Army crew members:			
Under 25	10,113	22	2.2
25–29	26,631	60	2.3
30–34	18,472	40	2.2
35 and over	35,299	56	1.6
Total	90,515	178	2.0
U.S. Navy and Marine pilots:			
Under 25	1,975	24	12.2
25–29	13,228	119	9.0
30–34	21,407	101	4.7
35 and over	68,139	187	2.7
Total	104,749	431	4.1
U.S. Air Force, Army, and Navy Reserve pilots	11,819	19	1.6
U.S. Air National Guard pilots	4,224	12	2.8

* Exposure is terminated on discontinuance of extra premium.

† For exposure year 1963, issues of only 1953–63 are included.

‡ Excludes experience of those companies which were unable to subdivide experience between Air Force and Army.

(*b*) by attained age, in each case according to the hours flown in the twelve 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 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.

TABLE 22

INTERCOMPANY EXPERIENCE ON PILOTS IN MILITARY AVIATION—WITH AVIATION EXTRA PREMIUM*
(1957–63 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	8,656	30	3.5	4,787	22	4.6
Ages 35 and over	43,015	64	1.5	16,628	39	2.3
Total	51,671	94	1.8	21,415	61	2.8
Over 150 hours:						
Ages 30–34	27,296	83	3.0	11,954	57	4.8
Ages 35 and over	55,707	131	2.4	20,223	63	3.1
Total	83,003	214	2.6	32,177	120	3.7

* Exposure is terminated on discontinuance of extra premium.

Military Aviation

Table 21 shows, for the twenty-six companies which contributed their experience on military aviation, the aviation fatality rates during the years 1957–63 inclusive among military aviation personnel on policies issued since January 1, 1946, with an aviation premium. 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 was terminated when the extra premium was discontinued.

Table 21 indicates a continued general improvement in the aviation fatality rates of United States military pilots in all active branches of service as compared with the 1957–61 and 1957–62 experience reported in the past two years. Inasmuch as some of the contributing companies were

not able to subdivide their data according to branch of service, the combined experience for United States Air Force and Army pilots included not only the data contributed separately for each service but also data for which the particular branch of service was not given. Although the crew-member data report the combined experience of both Air Force and Army, the Army portion is very small, amounting in 1963 to less than 1 per cent of the exposure and one fatality.

United States Navy and Marine pilots at ages under 30 have experienced in recent years significantly higher aviation fatality rates than United States Air Force and Army pilots at these ages.

Table 22 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 for ages 35 and over aviation fatality rates are higher for pilots who flew more than 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.