

TRANSACTIONS OF SOCIETY OF ACTUARIES  
1974 REPORTS

REPORT OF THE COMMITTEE ON AVIATION  
AND HAZARDOUS SPORTS

AVIATION STATISTICS

THIS report covers statistics obtained from United States and Canadian governmental services, both civilian and military, supplemented by publications of the aviation industry. The emphasis in the report is primarily on new data which have become available during the past year. Data for earlier periods are included for comparison and to indicate trends.

There is no report this year of intercompany experience, inasmuch as this study is now being conducted biennially. The section on General Aviation, which was omitted last year because 1972 data were not available, is included this year with data for 1972 but not for 1973.

UNITED STATES CIVIL AIR CARRIER FLEET

United States civil aviation flying is divided into two categories: Civil Air Carrier Fleet and General Aviation. The United States Civil Air Carrier Fleet is made up largely of Certificated Route Air Carriers (passenger/cargo and all-cargo), which are the major airlines in the United States. The balance of the United States Civil Air Carrier Fleet, as defined in the *FAA Statistical Handbook of Aviation*, is comprised of Supplemental Carriers and Commercial Operators. Commercial Operators include all carriers operating at least one aircraft weighing over 12,500 pounds that are not classified as Certificated Route Air Carriers or Supplemental Carriers. The experience of Commercial Operators is very limited because of the small number of aircraft and is not included in this report.

Some companies not classified as part of the United States Civil Air Carrier Fleet because they operate only aircraft weighing 12,500 pounds or less may use such terms as "airlines," "airways," and "carrier" and may provide scheduled passenger service on a limited basis (e.g., commuter or feeder airlines). Such aircraft are included under General Aviation, and data regarding their activities are not included in this section of the report.

*Certificated Route Air Carriers (Passenger/Cargo)*

Certificated Route Air Carriers are air carriers holding certificates of public convenience and necessity (issued by the Civil Aeronautics Board) authorizing them to perform scheduled air transportation over specified

routes and a limited amount of nonscheduled operations. They are divided into two groups—passenger/cargo and all-cargo. A recent issue of the monthly Civil Aeronautics Board publication *Air Carrier Traffic Statistics* listed 31 such passenger/cargo air carriers (including 3 intra-Alaska, 2 intra-Hawaii, and 3 helicopter carriers) and 3 such all-cargo carriers.

“Domestic” operations are, in general, within and between the fifty states of the United States, including intra-Alaska and intra-Hawaii operations. “International” (technically, “international and territorial”) operations are, in general, outside the territory of the United States—including operations between the United States and foreign countries and the United States and its territories or possessions.

Table 1 shows the recent aviation fatality rates of United States Certificated Route Air Carriers (passenger/cargo) for passengers, first pilots, all pilots and copilots, and other crew members in domestic and international flying. The lives exposed as “all pilot and copilot” and “other crew members” include persons who may do less than the normal amount of flying because of supervisory duties or other reasons.

The small number of fatal accidents and the relatively large number of passenger fatalities in some accidents result in passenger fatality rates which are subject to marked fluctuations from year to year. However, such rates have shown a trend of improvement over the years.

Pilots engaged in air carrier 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 generally limited to either 100 hours per month or 300 hours every 90 days, depending on the size of the flight crew. In actual practice, pilots average 600–700 hours per year because they have ground duties before and after flights.

Helicopter airlines designated as “Certificated Route Air Carriers” are excluded from the experience for passengers and first pilots in Table 1. During the thirteen years 1961–73 there were 4 fatal accidents on helicopter airlines, resulting in a passenger death rate of 0.021 per 1,000 scheduled passenger hours.

#### *Certificated Route Air Carriers (All-Cargo)*

Carriers in this class hold temporary certificates of public convenience and necessity (issued by the Civil Aeronautics Board) authorizing the performance of scheduled air freight express and mail transportation over specified routes as well as nonscheduled operations which may include passengers.

The first-pilot fatality rates for all-cargo carriers, together with the rates for Supplemental Carriers, are shown in Table 2.

*Supplemental Carriers*

These airlines form a class of carriers holding temporary certificates of public convenience and necessity (issued by the Civil Aeronautics Board)

TABLE 1  
UNITED STATES CERTIFICATED ROUTE AIR CARRIER  
(PASSENGER/CARGO) AVIATION DEATH RATES\*

Years	Passenger Rate per 1,000 Scheduled Passenger Hours†	First-Pilot Rate per 1,000 Scheduled Airplane Hours†	All Pilot and Copilot Rate per Life Year‡	Other Crew Member Rate per Life Year‡
Domestic Operations				
1962-65.....	.0009 (19)	.0013 (16)	.0007 (22)	.0007 (16)
1966-69.....	.0007 (21)	.0012 (20)	.0007 (26)	.0004 (20)
1970-73.....	.0004 (12)	.0005 (9)	.0002 (10)	.0001 (10)
1974§.....	.0005 (3)	.0007 (3)	.0003 (4)	.0002 (3)
1962-74§.....	.0006 (55)	.0008 (48)	.0005 (62)	.0003 (49)
International Operations				
1962-65.....	.0015 (4)	.0016 (3)	.0013 (5)	.0023 (5)
1966-69.....	.0002 (2)	.0007 (2)	.0006 (3)	.0005 (4)
1970-73.....	.0003 (3)	.0003 (1)	.0002 (1)	.0003 (1)
1974§.....	.0038 (3)	.0045 (3)	.0025 (3)	.0036 (3)
1962-74§.....	.0008 (12)	.0011 (9)	.0008 (12)	.0010 (13)
Domestic and International Operations				
1962-65.....	.0010 (23)	.0013 (19)	.0008 (27)	.0010 (21)
1966-69.....	.0006 (23)	.0011 (22)	.0006 (29)	.0024 (24)
1970-73.....	.0004 (15)	.0004 (10)	.0002 (11)	.0002 (11)
1974§.....	.0011 (6)	.0011 (6)	.0005 (7)	.0007 (6)
1962-74§.....	.0006 (67)	.0009 (57)	.0005 (74)	.0004 (62)

\* Number of fatal accidents shown in parentheses.

† Based on scheduled operations only; experience of helicopter air carriers is excluded.

‡ Based on all operations, scheduled and nonscheduled, including helicopter operations.

§ 1974 figures are preliminary.

authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the Certificated Route Air Carriers. In addition, they may perform on a limited or temporary basis, as authorized by the Civil Aeronautics Board, scheduled operations including the transportation of individually ticketed passengers and individually way-billed cargo. There were 9 such air carriers listed in a recent edition of the *Air Carrier Traffic Statistics*.

The figures shown in Table 2 include experience in operations under contracts with military authorities. There has been a decline in first-pilot fatality rates over the years, on the basis of limited experience.

TABLE 2  
ALL-CARGO CARRIERS AND SUPPLEMENTAL CARRIERS  
FIRST-PILOT AVIATION DEATH RATES  
PER 1,000 AIRPLANE HOURS\*

Years	All-Cargo (All Operations)	Supplemental (All Operations)
1962-65	.0086 (6)	.0032 (3)
1966-69	.0041 (3)	.0024 (3)
1970-73	.0056 (3)	.0030 (3)
1974†	.0000 (0)	.0040 (1)
1962-74	.0057 (12)	.0029 (10)

\* Number of fatalities shown in parentheses.

† 1974 figures are preliminary.

#### AIR CARRIERS OF COUNTRIES OTHER THAN THE UNITED STATES

The general conditions and aviation technology peculiar to any country influence the hazards of flying in that country. Each country has its own aviation regulations and methods of enforcement. These may be different for domestic and international operations, the latter being affected by such compromises as the crossing of the international boundary lines may require.

*World Air Transport Statistics*, a publication of the International Air Transport Association (IATA), reports on the operations of the Association's members. In 1973 the 110 members carried 91 per cent of the world's scheduled airline traffic (excluding the U.S.S.R. and the People's Republic of China). Some companies operated only within the borders of a particular country and some only on an international basis, while others operated on both bases but in varying proportions.

Table 3 gives passenger fatality rates per 1,000 scheduled passenger hours based on the experience of 11 members in the United States and 95 members in other countries (four IATA members do not operate scheduled passenger flights in fixed-wing aircraft). The safety record of airlines in countries other than the United States has shown improvement but continues to be less favorable than that of the United States scheduled airlines.

TABLE 3  
SCHEDULED AIR CARRIERS OF  
UNITED STATES AND OTHER COUNTRIES  
(PASSENGER/CARGO) AVIATION DEATH RATES  
PER 1,000 SCHEDULED PASSENGER HOURS\*

YEARS	MEMBERS REPORTING TO IATA		ALL UNITED STATES AIR CARRIERS
	Countries Other than the United States	United States	
1962-65 . . . . .	.0028	.0011	.0010
1966-69 . . . . .	.0021	.0003	.0006
1970-73† . . . . .	.0011	.0002	.0004
1973† . . . . .	.0011	.0004	.0005
1962-73†	.0018	.0004	.0006

\* Experience of helicopter air carriers is excluded.

† IATA figures are preliminary.

For 1973, 50 per cent of the scheduled passenger hours reported to IATA were flown by the United States members, and these members accounted for 95 per cent of the scheduled passenger hours flown by all United States Certificated Route Air Carriers. The combined international and domestic scheduled experience of all United States Certificated Route Air Carriers (passenger/cargo) is included in Table 3 for comparison.

UNITED STATES GENERAL AVIATION

General Aviation includes all domestic civil flying except that performed by the United States Civil Air Carrier Fleet. The annual flying time in General Aviation is more than five times that of the United States Civil Air Carrier Fleet's domestic flights. In January of each year, General Aviation aircraft owners receive a registration form from the FAA. Certain statistical information is requested, including the number

of hours flown and the primary use of each aircraft. These statistics are then adjusted for "nonreporting" aircraft, which account for about 25 per cent of total estimated flying hours.

Death rates are expressed per 1,000 airplane hours. Although it might be useful to relate deaths to the average hours flown in a year by pilots in each category of General Aviation shown in Table 4, such data cannot be reliably estimated from the information supplied by the National Transportation Safety Board. Some distortion in death rates may occur because the methods used for assigning deaths are not totally consistent with those used for assigning airplane hours to a kind of flying.

Pleasure flying accounts for about 36 per cent of the time pilots spend in General Aviation. Death rates in this category are probably overstated

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

Years	Estimated Hours (000)	Aviation Deaths	Rate	Estimated Hours (000)	Aviation Deaths	Rate
	Pleasure			Instruction		
1970 .....	9,163	323	.035	4,524	52	.011
1971 .....	9,359	349	.037	4,309	55	.013
1972* .....	9,850	357	.036	4,608	48	.010
1970-72*	28,372	1,029	.036	13,441	155	.012
	Business			Corporate		
1970 .....	4,528	73	.016	2,676	8	.003
1971 .....	4,503	73	.016	2,638	7	.003
1972* .....	4,483	86	.019	2,709	12	.004
1970-72*	13,514	232	.017	8,023	27	.003
	Aerial Application			Air Taxi		
1970 .....	1,396	40	.029	2,311	32	.014
1971 .....	1,398	38	.027	2,042	27	.013
1972* .....	1,624	29	.018	2,348	37	.016
1970-72*	4,418	107	.024	6,701	96	.014

\* 1972 figures are preliminary.

because there is a tendency for pilots to understate the amount of time they spend in pleasure flying and overreport hours for other types of flying (causing a slight understatement of death rates in these other categories). In Table 4 "Rental" hours are included with "Pleasure" on the assumption that most pilots renting planes do so for pleasure purposes. In past Society reports (for flying done before 1970), most Rental hours were probably included under "Instruction." Caution should therefore be taken in analyzing long-term trends.

Instructional flying represents about 17 per cent of the total hours flown in General Aviation. The experience under flight training of civilians includes the death of the instructor or the student, whoever was acting as pilot when the accident occurred. Practice flying not under the supervision of an instructor, either in the air or from the ground, is not included in the Instruction category. The higher pilot aviation death rates after 1969 reflect the reduced number of airplane hours due to the change in reporting method mentioned above for Rental aircraft.

The "Business" and "Corporate" categories, which account for approximately 27 per cent of total General Aviation, are composed of nonprofessional pilots flying for business reasons (Business) and professional pilots receiving direct salary or compensation for piloting planes operated (not for public hire) by a corporation or business firm for the transportation of personnel or cargo in furtherance of the company's business (Corporate).

The pilot fatality rates in Aerial Application, which accounts for approximately 6 per cent of General Aviation flying, have been higher than those in other commercial activities. The subdivision of experience by type of aircraft in 1967-72 showed pilot aviation fatality rates per 1,000 airplane hours of 0.025 for rotorcraft (14 deaths) and 0.027 for fixed-wing aircraft (206 deaths). Aerial Application includes any form of flying in which chemicals are distributed from aircraft upon the land below, the usual form being crop dusting. Fire control is not included in this category. The average annual flying time 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.

Air Taxi flying accounts for approximately 9 per cent of the total General Aviation hours. This type of flying includes scheduled and nonscheduled passenger and cargo flying by professional pilots (other than Corporate) that is not done by the United States Civil Air Carrier Fleet. In 1972 there were 33 pilot deaths in small fixed-wing aircraft (12,500 pounds or less), of which 18 deaths were in passenger flights and 15 were in cargo flights. There were no pilot deaths in large fixed-wing

aircraft. In rotorcraft there were 4 pilot deaths in passenger flights and none in cargo flights.

In addition to the 569 deaths recorded in all the categories shown in Table 4, there were 70 other pilot deaths during 1972. Of this number, 17 deaths occurred in aircraft being used for commercial purposes other than those shown in Table 4, such as power and pipeline patrol, fire control, survey, advertising, and photography; 16 deaths were classified as "noncommercial--other," a category which consists primarily of practice flying; and 37 deaths were classified as "miscellaneous." Miscellaneous accidents included 6 accidents in testing (including testing of homemade aircraft), 10 in ferrying, 2 in hunting, and 3 in demonstration, with the remaining 16 accidents in activities such as air-show participation, towing gliders, search and rescue, and unauthorized or unknown uses.

Of the 639 pilot deaths during 1972 in General Aviation, 598 were in small fixed-wing aircraft (12,500 pounds or less), 6 in large fixed-wing aircraft (over 12,500 pounds), 29 in rotorcraft, and 6 in gliders or other aircraft. There were 706 pilots involved in these fatal accidents, of which 58 held student certificates, 323 held private certificates, 259 held commercial certificates, 57 held airline transport certificates, 8 held no certificates, and one was listed as unknown.

#### CANADIAN CIVIL FLYING

Passenger and first-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 Statistics Canada are shown in Table 5. Comparable passenger and first-pilot aviation fatality rates for Canadian nonscheduled airlines have been estimated from the same sources and are also shown in Table 5.

Canadian scheduled airlines comprise air carriers that serve designated points in accordance with a definite service schedule. Nonscheduled airlines are those that 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.

The fatality rates among Canadian civil pilots, by class of license, are shown in Table 6, separately, for the periods 1966-69 and 1970-73, 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.

TABLE 5  
CANADIAN AIRLINES  
AVIATION FATALITY RATES\*

Years	Passenger Rate per 1,000 Passenger Hours	First-Pilot Rate per 1,000 Airplane Hours
Scheduled Airlines		
1962-65 .....	.0031 (5)	.0030 (4)
1966-69 .....	.0006 (3)	.0011 (2)
1970-73 .....	.0008 (2)	.0005 (1)
1962-73 .....	.0012 (10)	.0014 (7)
1971-74 (est.) .....	.0000 (0)	.0000 (0)
Nonscheduled Airlines		
1966-69 .....	.0193 (75)	.0205 (57)
1970-73 .....	.0162 (76)	.0164 (55)
1966-73 .....	.0175 (151)	.0182 (112)

\* Number of fatal accidents shown in parentheses.

TABLE 6  
CANADIAN CIVIL PILOTS BY CLASS OF LICENSE  
1966-73 AVIATION FATALITY RATES

Class of License	Period	Life Years of Exposure	Aviation Fatalities	Rate per 1,000 Life Years of Exposure
Airline transport .....	{ 1966-69	8,228	14	1.7
	{ 1970-73	11,628	27	2.3
Senior commercial .....	{ 1966-69	1,992	9	4.5
	{ 1970-73	3,101	12	3.9
Commercial .....	{ 1966-69	16,469	103	6.3
	{ 1970-73	20,359	63	3.1
Private (excluding students) .....	{ 1966-69	81,687	123	1.5
	{ 1970-73	103,864	122	1.2
Glider .....	1970-73	5,006	2	0.4

## UNITED STATES MILITARY

*General*

Where the necessary information is available, aviation fatality rates are shown both including and excluding deaths due to hostile action. As in the previous report, fatality rates which include deaths due to hostile action are shown without brackets and fatality rates which exclude such deaths are shown within brackets.

All the United States military aviation statistics in this report are shown on a calendar-year basis.

The 1973 experience is a continuation of the downward trend in overall fatality rates in United States military aviation since the height of the Vietnam activity.

*Age and Rank*

Table 7 shows aviation fatality rates by age group, and Table 8 shows aviation fatality rates by rank for Air Force pilots and nonpilot rated officers and for Navy and Marine Corps pilots on active duty. This experience includes pilots who flew chiefly to maintain proficiency, as well as those with full-time flying duties. Rated (in contrast to nonrated) officers in the Air Force are those whose duties include flying other than as passengers.

The mortality experience for Air Force pilots showed decreases for each age group in 1973, and generally for each rank, from the corresponding experience in 1972. The fatality rates for Navy and Marine Corps pilots also generally decreased in 1973 from the rates in 1972. There were very few deaths due to hostile action in 1973 among Navy and Marine Corps pilots.

*Duty Assignment*

Aviation fatality rates among Air Force pilots according to duty assignment are shown in Table 9. In this table pilots who were not assigned to a specific flying duty but flew chiefly to maintain proficiency are excluded from the exposure. The original data received from the Air Force for 1972, which were reflected in last year's report, did not separate the two classes of pilots. Information more recently received from the Air Force permits the exclusion from the 1972 exposure of pilots who flew chiefly to maintain proficiency. Accordingly, the 1972 fatality rates were recomputed and printed in this report.

*Hours of Flying*

In 1973 Navy pilots flew an average of 193 hours, and Active Naval Reserve pilots also flew an average of 193 hours. In each case this represented an increase from the average hours flown in 1972. During 1973 Marine Corps pilots flew an average of 180 hours, while Active Marine

TABLE 7  
 UNITED STATES AIR FORCE, NAVY, AND  
 MARINE CORPS FLYERS, BY AGE  
 AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE  
 DEATHS DUE TO HOSTILE ACTION INCLUDED\*

Age Group	1966-69	1970-73	1973
Air Force Pilots			
Under 25 . . . . .	5.6 [3.9]	4.1 [2.6]	2.7 [1.9]†
25-29 . . . . .	6.9 [3.7]	4.3 [2.8]	2.3 [1.4]
30-34 . . . . .	5.8 [3.2]	4.3 [2.9]	4.6 [2.1]
35-39 . . . . .	4.1 [2.4]	2.3 [1.8]	1.5 [0.8]†
40 and over . . . . .	1.8 [1.2]	1.8 [1.2]	2.0 [0.5]†
All . . . . .	4.3 [2.5]	3.3 [2.2]	2.5 [1.2]
Air Force Nonpilot Rated Officers			
Under 25 . . . . .	1.3 [1.2]	0.7† [0.7]†	3.0† [3.0]†
25-29 . . . . .	2.2 [1.6]	1.8 [1.2]	2.1 [1.3]†
30-34 . . . . .	1.7 [1.1]	1.6 [0.9]	2.0† [0.4]†
35-39 . . . . .	1.3 [0.7]	1.2 [0.9]	1.0† [0.3]†
40 and over . . . . .	1.4 [1.1]	2.4 [1.5]	3.0† [1.5]†
All . . . . .	1.7 [1.2]	1.5 [1.0]	2.0 [1.0]
Navy and Marine Corps Pilots			
Under 25 . . . . .	11.9	6.8 [6.0]	5.8 [5.8]
25-39 . . . . .	11.9	6.3 [5.6]	3.5 [3.5]
30-34 . . . . .	9.7	4.1 [3.7]	4.6 [4.6]
35-39 . . . . .	5.7	2.2 [2.2]	1.8† [1.8]†
40 and over . . . . .	1.4	1.1 [1.0]	1.0† [1.0]†
All . . . . .	8.2‡	4.3 [3.8]‡	3.0 [2.9]‡

\* Rates in brackets exclude deaths due to hostile action.

† Based on 5 or fewer deaths.

‡ A small proportion of total Navy and Marine Corps pilot deaths were not identified by age.

TABLE 8

UNITED STATES AIR FORCE, NAVY, AND MARINE CORPS FLYERS, BY RANK  
 AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE  
 DEATHS DUE TO HOSTILE ACTION INCLUDED\*

Rank (Pay Grade)†	1966-69	1970-73	1973
<i>Air Force Pilots</i>			
2d Lieutenant (O-1).....	3.4 [2.9]	4.1 [4.1]	1.0‡ [1.0]‡
1st Lieutenant (O-2).....	8.0 [4.7]	4.5 [2.7]	2.5 [1.7]
Captain (O-3).....	6.9 [3.7]	4.3 [2.8]	3.4 [1.7]
Major (O-4).....	3.7 [2.3]	3.4 [2.4]	1.9 [1.1]
Lieutenant Colonel (O-5).....	1.8 [1.2]	1.7 [1.3]	1.7 [0.5]‡
General and Colonel (O-6 and up).....	0.8 [0.7]	1.2 [0.7]	2.5 [0.3]‡
All.....	4.3 [2.5]	3.3 [2.2]	2.5 [1.2]
<i>Air Force Nonpilot Rated Officers</i>			
2d Lieutenant (O-1).....	0.0‡ [0.0]‡	0.0‡ [0.0]‡	0.0‡ [0.0]‡
1st Lieutenant (O-2).....	2.9 [2.6]	2.2 [1.7]	2.2‡ [2.2]‡
Captain (O-3).....	2.1 [1.4]	1.7 [1.2]	2.8 [1.5]
Major (O-4).....	1.1 [0.6]	1.6 [1.1]	1.9 [0.6]‡
Lieutenant Colonel (O-5).....	0.8‡ [0.6]‡	0.8‡ [0.5]‡	0.9‡ [0.0]‡
General and Colonel (O-6 and up).....	0.0‡ [0.0]‡	0.0‡ [0.0]‡	0.0‡ [0.0]‡
All.....	1.7 [1.2]	1.5 [1.1]	2.0 [1.0]
<i>Navy and Marine Corps Pilots</i>			
2d Lieutenant (O-1).....	6.6	0.9‡ [0.9]‡	5.6‡ [5.6]‡
1st Lieutenant (O-2).....	16.1	8.0 [6.6]	3.1 [3.1]
Captain (O-3).....	9.9	5.2 [5.0]	4.6 [4.6]
Major (O-4).....	6.9	3.3 [2.8]	3.1 [3.1]
Lieutenant Colonel (O-5).....	2.8	1.8 [1.5]	0.9‡ [0.6]‡
General and Colonel (O-6 and up).....	0.3‡	0.0‡ [0.0]‡	0.0‡ [0.0]‡
All.....	8.2§	4.3 [3.8]§	3.0 [2.9]§

\* Rates in brackets exclude deaths due to hostile action.

† Ranks shown are for Army, Air Force, and Marine Corps; equivalent Navy ranks apply to Navy experience.

‡ Based on 5 or fewer deaths.

§ A small proportion of total Navy and Marine Corps pilot deaths were not identified by rank.

Reserve pilots flew an average of 123 hours. These also showed increases over the corresponding numbers of hours flown in 1972.

During 1973, Army pilots flew an average of 32 hours in fixed-wing aircraft, which was lower than the corresponding figure for 1972. The average number of hours flown by Army pilots in rotary-wing aircraft during 1972 was overstated in last year's report. During 1972, as well as

TABLE 9  
 UNITED STATES AIR FORCE PILOTS, BY DUTY ASSIGNMENT  
 AVIATION FATALITY RATES PER 1,000  
 LIFE YEARS OF EXPOSURE

Duty Assignment*	1970-73	1972†	1973
Including Deaths due to Hostile Action			
Pilot, search rescue.....	1.8‡	0.0‡	7.5‡
Pilot, helicopter.....	6.3	7.1	3.5‡
Pilot, tanker.....	0.2‡	0.0‡	0.3‡
Pilot, bomber.....	2.9	3.9	0.9‡
Pilot, reconnaissance.....	4.0	3.5‡	6.8
Pilot, trainer.....	1.8	1.8	1.1
Pilot, cargo.....	3.5	4.5	1.3
Pilot, observation.....	17.6	18.0	6.2‡
Pilot, fighter.....	11.0	11.0	12.5
Pilot, utility.....	11.5	12.7‡	0.0‡
All.....	4.4	4.6	3.5
Excluding Deaths due to Hostile Action			
Pilot, search rescue.....	0.0‡	0.0‡	0.0‡
Pilot, helicopter.....	2.2	2.4‡	1.2‡
Pilot, tanker.....	0.2‡	0.0‡	0.3‡
Pilot, bomber.....	2.4	3.1	0.4‡
Pilot, reconnaissance.....	2.4	3.5‡	1.5‡
Pilot, trainer.....	1.7	1.8	1.1
Pilot, cargo.....	2.9	3.2	1.0
Pilot, observation.....	5.9	3.9‡	3.1‡
Pilot, fighter.....	6.9	9.1	5.2
Pilot, utility.....	8.0	12.7‡	0.0‡
All.....	3.0	3.4	1.6

\* See text for comments relating to experience of pilots flying to maintain proficiency.

† 1972 data shown because of revisions to last year's report; see text.

‡ Based on 5 or fewer deaths.

during 1973, Army pilots flew an average of 93 hours in rotary-wing aircraft, which is lower than in 1971.

The average number of aircraft hours for Air Force pilots is not available. In 1973 the average annual flying time for Air National Guard pilots on flying status was 120 hours, which was more than in 1972.

#### *Military Air Command (MAC)*

Aviation fatality rates among pilots and crew members of MAC, a branch of the Air Force, are shown in Table 10. The rates for pilots and

TABLE 10  
MILITARY AIR COMMAND (MAC)  
AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE  
DEATHS DUE TO HOSTILE ACTION INCLUDED\*

	1966-69	1970-73	1973
Pilots:			
Transport units	0.8 [0.8]	1.0 [0.8]	1.3† [1.3]†
Other units	1.6 [1.0]	3.3 [1.4]	4.7† [2.8]†
All	1.1 [0.9]	1.8 [1.0]	2.4 [1.8]
Crew members:			
Transport units	1.1 [1.1]	0.7 [0.6]	1.3† [1.3]†
Other units	2.9 [2.0]	2.4 [0.6]†	2.1† [1.4]†
All	1.7 [1.4]	1.3 [0.6]	1.6 [1.3]

\* Rates in brackets exclude deaths due to hostile action.

† Based on 5 or fewer deaths.

crew members for 1973 showed increases in transport units and generally showed decreases in other units from the corresponding rates for 1972. The experience of MAC pilots is also included in Tables 7-9.

#### *United States Army*

Table 11 includes data for Army pilots and crew members for all flying operations. On the basis of additional information received from the Army, fatality rates for the four-year period 1969-72 shown in last year's report have been revised and are printed herein. With the exception of the pilot fatality rates per 1,000 aircraft hours in fixed-wing aircraft, all rates have shown a decrease in 1973 from the corresponding rates in 1972. There were no deaths due to hostile action in 1973.

*Student Pilots*

Table 12 presents aviation fatality rates for student pilots in the military services. Each rate in 1973 was based on 5 or fewer deaths.

*Coast Guard*

During the four-year period 1970-73, the aviation fatality rates per 1,000 life years of exposure for Coast Guard personnel on flight orders were 1.1 for pilots and 0.7 for crew members. There have been no aviation

TABLE 11  
UNITED STATES ARMY—ALL FLYING OPERATIONS  
DEATHS DUE TO HOSTILE ACTION INCLUDED\*

	1969-72†	1970-73	1973
Aviation Fatality Rates per 1,000 Life Years of Exposure			
Pilots.....	9.6 [4.7]	6.8 [3.6]	1.4 [1.4]
Crew members.....	32.8 [14.2]	25.9 [11.4]	2.8 [2.8]
Pilot Fatality Rates per 1,000 Aircraft Hours			
Fixed-wing aircraft.....	.0292 [.0234]	.0351 [.0313]	.0492 [.0492]
Rotary-wing aircraft.....	.0522 [.0238]	.0450 [.0213]	.0094 [.0094]
All types of aircraft..	.0485 [.0237]	.0435 [.0229]	.0143 [.0143]

\* Rates in brackets exclude deaths due to hostile action.

† 1969-72 data shown because of revisions to last year's report; see text.

TABLE 12  
UNITED STATES AIR FORCE, NAVY, AND MARINE CORPS,  
AND ARMY STUDENT PILOTS  
AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE

	1966-69	1970-73	1973
Air Force*.....	2.0	1.7	1.6†
Navy and Marine Corps:*			
Basic course.....	3.3	1.9	0.0†
Advanced course.....	12.0	4.9	4.3†
Army.....	4.1	2.4	0.0†

\* Commissioned officers only.

† Based on 5 or fewer deaths.

fatalities among Coast Guard student pilots and observers during the last seventeen years.

*Active Reserves and National Guard*

Table 13 shows the aviation fatality rates for Army, Navy, and Marine Corps pilots in the active reserves and Air and Army National Guard pilots. Such pilots are not on full-time active duty but generally fly on weekend and/or short-term (usually two weeks) training duty. Each rate in 1973 was based on 5 or fewer deaths.

TABLE 13  
PILOTS IN THE ACTIVE RESERVES AND NATIONAL GUARD  
AVIATION FATALITY RATES PER 1,000 LIFE YEARS OF EXPOSURE

	1966-69	1970-73	1973
Navy and Marine Corps Reserves:			
Ages under 30 .....	3.6	1.3*	0.0*
Ages 30 and over .....	2.7	1.0	0.9*
All ages .....	2.9	1.1	0.7*
Army Reserves .....	N.A.†	N.A.	1.7*
Air National Guard .....	2.1	2.0	0.8*
Army National Guard .....	0.7*	1.2	0.8*

\* Based on 5 or fewer deaths.

† N.A. = Not available.

*Air Force Flight Surgeons and Nurses*

During the four-year period 1970-73 the fatality rate for Air Force flight surgeons was 0.3 per 1,000 life years of exposure. There have been no fatalities among Air Force flight nurses in the last twelve years.

*Graduates of Academies—Assignment to Aviation*

In 1973 no Military Academy and no Naval Academy graduates were placed in the Air Force for flight training.

Of the commissioned Air Force Academy graduates in 1973, 99.6 per cent were placed in the Air Force, 0.4 per cent received assignment in the Marine Corps, and none were placed in the Army or the Navy.

CANADIAN MILITARY

Aviation fatality rates among Canadian regular military forces, excluding reserves, for the period 1969-73 are shown in Table 14 by age, rank,

and functional classification. Fatality rates are based upon flying hours rather than upon life years of exposure. The average number of flying hours for all pilots combined has remained steady over the four-year period at approximately 300 hours per year and shows little variation by age group. Crew members average around 350 hours per year. There

TABLE 14  
CANADIAN REGULAR FORCES  
1969 TO 1973 AVIATION FATALITY RATES  
PER 1,000 FLYING HOURS OF EXPOSURE

	Pilots	Crew Members
Age group:		
Under 25.....	.0371	.0034*
25-29.....	.0109	.0050*
30-34.....	.0116	.0070*
35-39.....	.0062*	.0060*
40 and over.....	.0017*	.0015*
All.....	.0115	.0048
Rank:		
Lieutenant and others of lower rank.....	.0242	.0050
Captain.....	.0104	.0048*
Major.....	.0051*	*
Lieutenant Colonel and others of higher rank.....	*	*
All.....	.0115	.0048
Functional classification:		
Fighter.....	.0373	.0368*
Training.....	.0164	*
Transport.....	.0042*	.0035*
Maritime.....	.0079*	.0030*
Helicopter.....	.0084*	.0152*
Others.....	.0059*	.0032*
All.....	.0115	.0048

\* Based on 5 or fewer deaths.

NOTE.—The functional classification "Others" is composed largely of pilots who ferry planes to air bases and test new planes, both accepted and experimental models. It also includes a small number of pilots whose primary assignment is on the ground but who occasionally fly to maintain proficiency.

appears to be some variation by functional classification, but this cannot be accurately determined because of duplicate counting in different functions. It would appear that the average annual flying time for transport and maritime pilots and crew is considerably higher than those in the categories of fighter, training, and helicopter. The former would appear to average in excess of 350 hours per year, the latter near 100 hours per year.

