REPORT OF THE COMMITTEE ON AVIATION AND HAZARDOUS SPORTS

I. AVIATION STATISTICS

THIS section of the report covers statistics obtained from United States and Canadian governmental service, 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.

The reporting of pleasure flying for United States General Aviation once again has produced death rates per 1,000 flying hours that, when translated to life years of exposure, would appear to be considerably higher than the governmental figures for Canadian civil aviation and the intercompany figures. We can only assume that this represents an underreporting of exposure for pleasure flying.

The fatality rates for Canadian military pilots are considerably higher than for United States military pilots. This reflects the greater number of flying hours flown by Canadian military pilots.

Intercompany aviation data, which are now being compiled on a biennial basis, will be shown next year.

UNITED STATES CIVIL AIR CARRIER FLEET

United States civil aviation 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. Supplemental Carriers are discussed later in this section. Commercial Operators are not included in this report because the small number of aircraft involved makes the experience difficult to analyze. 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.

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., com-

muter 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 operate scheduled air transportation over specified routes as well as a limited amount of nonscheduled operations. They are divided into two groups—passenger/cargo and all-cargo. A 1976 issue of the monthly Civil Aeronautics Board publication *Air Carrier Traffic Statistics* listed 33 such passenger/cargo air carriers (including 5 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 Member" 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 that 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.

Another type of carrier, for which statistics are not available, is the Intrastate Air Carrier. Such carriers must obey the general safety rules and regulations for carrying passengers as set by the Civil Aeronautics Board. However, the responsibility for regulating, licensing, and collecting flight and fatality statistics for each Intrastate Air Carrier rests

solely with the respective state. Not all states have such carriers, and, of those that do, not all states collect statistics.

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 1964–76, there were 3 fatal accidents on helicopter airlines, resulting in a passenger death rate of 0.020 per 1,000 scheduled passenger hours.

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			
1964–67	.0008 (22)	.0013 (19)	.0007 (23)	.0005 (17)
1968–71	.0005 (14)	.0007 (13)	.0004 (18)	.0002 (14)
1972–75	.0004 (14)	.0006 (11)	.0002 (12)	.0001 (10)
1976§	.0000 (2)	.0002 (1)	.0001 (2)	.0000 (1)
1964–76§	.0005 (52)	.0008 (44)	.0004 (55)	.0002 (42)
	International Operations			
1964–67	.0007 (2)	.0013 (3)	.0008 (4)	.0011 (4)
1968–71	.0002 (3)	.0003 (1)	.0004 (2)	.0004 (3)
1972–75	.0011 (5)	.0014 (4)	.0008 (4)	.0012 (4)
1976§	.0005 (1)	.0000 (0)	.0000 (0)	.0003 (1)
1964–76§	.0007 (11)	.0009 (8)	.0006 (10)	.0008 (12)
	Domestic and International Operations			
1964–67	.0008 (24)	.0013 (22)	.0007 (27)	.0006 (21)
1968–71	.0004 (17)	.0006 (14)	.0004 (20)	.0002 (17)
1972–75	.0005 (19)	.0007 (15)	.0003 (16)	.0003 (14)
1976§	.0001 (3)	.0002 (1)	.0001 (2)	.0001 (2)
1964–76§	.0005 (63)	.0008 (52)	.0004 (65)	.0003 (54)

* 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.

§ 1976 figures are preliminary.

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 operation of scheduled air freight express and mail transportation over specified routes as well as nonscheduled flights, 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.

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)
1964–67	.0069 (5)	.0045 (5)
1968–71	.0051 (3)	.0018 (2)
1972–75	.0040 (2)	.0022 (2)
1976†	.0000 (0)	.0000 (0)
1964–76†	.0052 (10)	.0027 (9)

* Number of fatalities shown in parentheses.
† 1976 figures are preliminary.

Supplemental Carriers

These airlines form a class of carriers holding temporary certificates of public convenience and necessity (issued by the Civil Aeronautics Board) authorizing them to operate passenger and cargo charter services supplementing the scheduled service of the Certificated Route Air Carriers. In addition, they may operate on a limited or temporary basis, as authorized by the Civil Aeronautics Board, scheduled flights including the transportation of individually ticketed passengers and individually waybilled 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.

AIR CARRIERS OF COUNTRIES OTHER THAN THE UNITED STATES

The general conditions and aviation technology unique to any country influence the hazards of flying in that country. Each country has its own aviation regulations and methods of enforcement. These may differ for

domestic and international operations, the latter being affected by such compromises as the crossing of international boundaries.

World Air Transport Statistics, a publication of the International Air Transport Association (IATA), reports on the operations of the Association's members. In 1975, the IATA member airlines, which numbered 110 on December 31, 1975, carried 84 percent of the world's scheduled airline traffic (excluding the U.S.S.R. and the People's Republic of China). It should be noted in making comparisons between the current and prior years that Northwest Airlines, which accounts for about 5 per-

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	
1964–67	.0019	.0007	.0008
1968–71	.0014	.0001	.0004
1972–75†	.0011	.0006	.0005
1975†	.0005	.0003	.0003
1964–75†	.0014	.0004	.0006

* Experience of helicopter air carriers is excluded.
† IATA figures are preliminary.

cent of the world's scheduled airline traffic, has not been a member since 1973, and Continental Airlines, which accounts for about 3 percent, has not been a member since 1974. 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 9 members in the United States and 97 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.

For 1975, 44 percent of the scheduled passenger hours reported to IATA

were flown by the United States members, and these members accounted for 84 percent 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 six times that of the United States Civil Air Carrier Fleet's domestic flights. The FAA collects statistics on General Aviation by sending a registration form to all General Aviation aircraft owners each January, in which information such as the number of hours flown and the primary use of each aircraft is requested. The data are compiled and adjusted for "nonreporting" aircraft, which account for about 25 percent of the 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 estimated reliably 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 percent of the pilot flying time in General Aviation. Death rates in this category are probably overstated 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 an 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 15 percent of the total hours flown in General Aviation. The experience under flight training of civilians includes the death of either the instructor or the student, depending on who 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 account for approximately 28 percent of total General Aviation. Business flying is done by nonprofessional pilots flying for business reasons. Corporate flying is done by professional pilots receiving direct salary or compensation for piloting planes (not for public hire) operated by a corporation or business firm for the transportation of personnel or cargo in furtherance of the company's business.

Air Taxi flying accounts for approximately 10 percent 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 1974 there were 25 pilot deaths in small fixed-wing aircraft (12,500

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		
1972	9,988	357	.036	4,427	48	.011
1973	10,140	381	.038	5,052	44	.009
1974*	11,407	394	.035	4,969	49	.010
1972–74*	31,535	1,132	.036	14,448	141	.010
	Business			Corporate		
1972	4,549	86	.019	2,690	12	.004
1973	5,451	67	.012	3,106	23	.007
1974*	5,844	64	.011	3,296	14	.004
1972–74*	15,844	217	.014	9,092	49	.005
	Aerial Application			Air Taxi		
1972	1,616	29	.018	2,329	37	.016
1973	1,847	30	.016	2,802	38	.014
1974*	1,893	27	.014	3,303	28	.008
1972–74*	5,356	86	.016	8,434	103	.012

* 1974 figures are preliminary.

pounds or less), of which 15 deaths were in passenger flights and 10 were in cargo flights. There were no pilot deaths in large fixed-wing aircraft. In rotorcraft there were 2 pilot deaths in passenger flights and 1 in cargo flights. The type of aircraft of 1 pilot death was unknown.

Aerial Application, which accounts for approximately 6 percent of General Aviation flying, consists primarily of crop dusting. Other activities include spraying to control insects, reseeding forests, and fertilizing. Fire control is not included in this category. The pilot fatality rates have been higher than those in other commercial activities. The subdivision of experience by type of aircraft in 1969–74 showed pilot aviation fatality rates per 1,000 airplane hours of 0.018 for rotorcraft (12 deaths) and 0.021 for fixed-wing aircraft (186 deaths). For pilots involved in agriculture, the average annual flying time for pilots having a local business confined to a single growing season is believed to be considerably less than that of pilots who either work more than one season or move from area to area.

In addition to the 576 pilot deaths recorded in all the categories shown in Table 4, there were 102 other pilot deaths during 1974. Of this number, 24 deaths occurred in aircraft being used for commercial purposes other than those shown in Table 4, such as power and pipeline patrol, fire control, mapping, advertising, and photography; 21 deaths were classified as "noncommercial—other," a category that consists primarily of practice flying; and 57 deaths were classified as "miscellaneous." Miscellaneous accidents included 20 deaths in ferrying, 7 deaths in testing (including testing of homemade aircraft), 4 in police patrol, 3 in demonstration, with the remaining 23 deaths in activities such as experimentation, search and rescue, air-show racing, towing gliders, parachuting, nonpolice highway traffic advisory, and unknown uses.

Of the 678 pilot deaths during 1974 in General Aviation, 615 were in small fixed-wing aircraft (12,500 pounds or less), 16 in large fixed-wing aircraft (over 12,500 pounds), 37 in rotorcraft, 4 in gliders, and 6 in balloons or other aircraft. There were 751 pilots involved in these fatal accidents, of which 61 held student certificates, 340 held private certificates, 285 held commercial certificates, 10 held no certificates, and 4 were 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 Transport Canada and by 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.

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	
1964–67	.0014 (3)	.0020 (3)
1968–71	.0009 (4)	.0010 (2)
1972–75	.0000 (0)	.0000 (0)
1964–75	.0006 (7)	.0009 (5)
1973–76 (est.)	.0000 (0)	.0000 (0)
	Nonscheduled Airlines	
1968–71	.0175 (64)	.0153 (47)
1972–75	.0155 (82)	.0157 (61)
1968–75	.0165 (146)	.0155 (108)

* Number of fatal accidents shown in parentheses.

The fatality rates among Canadian civil pilots, by class of license, are shown in Table 6 separately, for the period 1968–71 and 1972–75, based on figures furnished by Transport Canada. It should be noted that many pilots holding licenses may be inactive and that pilots holding airline transport licenses are not necessarily flying for scheduled airlines, since they may engage in other types of flying.

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.

In aggregate, the 1975 experience is slightly less favorable than that reported for 1974 for the Air Force and moderately more favorable for the Navy and Marine Corps. The 1975 experience for the Army is less

TABLE 6

CANADIAN CIVIL PILOTS BY CLASS OF LICENSE
1968–75 AVIATION FATALITY RATES

Class of License	Period	Life Years of Exposure	Aviation Fatalities	Rate per 1,000 Life Years of Exposure
Airline transport	1968–71	10,123	19	1.9
	1972–75	13,740	25	1.8
Senior commercial	1968–71	2,605	14	5.4
	1972–75	3,384	9	2.7
Commercial	1968–71	18,877	82	4.3
	1972–75	23,668	72	3.0
Private (excluding students)	1968–71	94,388	108	1.1
	1972–75	116,316	128	1.1
Glider	1968–71	5,136	3	0.6
	1972–75	5,639	4	0.7

favorable than that reported for 1974 and is back to a level similar to the 1973 experience. The 1975 experience for the United States military represents a continuation of the drop in fatality rates since the height of the Vietnam conflict.

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. Nonpilot rated (in contrast to nonrated) officers in the Air Force are those who have flying duties other than as a pilot.

The overall fatality rates for Air Force pilots were slightly higher for 1975 than for 1974, while those for nonpilot rated officers were similar to the 1974 rates.

The 1975 fatality rates for Navy and Marine Corps pilots showed a decrease from the 1974 experience both in aggregate and for all but the two highest ranking groups. The decrease in fatality rates for the Navy

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	1968–71	1972–75	1975
	Air Force Pilots		
Under 25	5.1 [3.2]	2.5 [2.2]	2.8† [2.8]†
25–29	6.7 [4.3]	2.6 [1.8]	2.2 [2.0]
30–34	3.7 [2.5]	4.8 [2.3]	3.6 [1.4]
35–39	2.9 [1.9]	2.5 [1.0]	3.5 [0.0]†
40 and over	1.5 [1.1]	2.1 [0.9]	1.9 [0.3]†
All	3.7 [2.5]	2.8 [1.6]	2.7 [1.5]
	Air Force Nonpilot Rated Officers		
Under 25	0.5† [0.5]†	0.9† [0.9]†	0.0† [0.0]†
25–29	1.2 [0.9]	1.9 [1.4]	1.3 [1.1]†
30–34	1.1 [0.8]	2.2 [0.9]	1.7† [0.6]†
35–39	1.0 [0.7]	1.9 [1.2]	2.9† [0.6]†
40 and over	2.1 [1.6]	2.8 [1.0]†	3.1† [2.0]†
All	1.1 [0.8]	2.0 [1.1]	1.8 [0.9]
	Navy and Marine Corps Pilots		
Under 25	12.6 [8.4]	4.2 [4.2]	1.0† [1.0]†
25–29	10.9 [7.8]	4.3 [4.2]	4.0 [4.0]
30–34	7.9 [5.2]	2.3 [2.3]	0.5† [0.5]†
35–39	4.3 [3.2]	1.6 [1.5]	1.4† [1.4]†
40 and over	1.8 [1.4]	0.5 [0.5]	0.8† [0.8]†
All	7.8 [5.3]‡	2.8 [2.7]‡	2.0 [2.0]

* Rates in brackets exclude deaths due to hostile action.
† Based on 5 or fewer deaths.
‡ A small portion 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)†	1968–71	1972–75	1975
	Air Force Pilots		
2d Lieutenant (O-1)	5.3 [5.1]‡	3.2 [3.0]	5.6 [4.7]‡
1st Lieutenant (O-2)	6.4 [3.8]	2.4 [1.8]	1.4 [1.4]
Captain (O-3)	5.4 [3.5]	3.2 [2.0]	2.5 [1.8]
Major (O-4)	3.5 [2.3]	3.2 [1.4]	4.2 [0.3]
Lieutenant Colonel (O-5)	1.7 [1.2]	1.8 [0.9]	2.0‡ [0.5]‡
General and Colonel (O-6 and up)	0.8 [0.7]	2.4 [0.3]‡	5.7‡ [0.0]‡
All	3.7 [2.5]	2.8 [1.6]	2.7 [1.5]
	Air Force Nonpilot Rated Officers		
2d Lieutenant (O-1)	0.0‡ [0.0]‡	0.3‡ [0.3]‡	0.0‡ [0.0]‡
1st Lieutenant (O-2)	1.5 [1.3]	1.7 [1.5]	1.3‡ [1.3]‡
Captain (O-3)	1.1 [0.9]	2.2 [1.4]	1.5‡ [0.6]‡
Major (O-4)	1.1 [0.7]	2.2 [1.0]	2.0‡ [0.5]‡
Lieutenant Colonel (O-5)	1.2 [1.0]	1.4 [0.6]‡	8.3‡ [5.0]‡
General and Colonel (O-6 and up)	0.0‡ [0.0]‡	15.2‡ [0.0]‡	0.0‡ [0.0]‡
All	1.1 [0.8]	2.0 [1.1]	1.8 [0.9]
	Navy and Marine Corps Pilots		
Ensign (O-1)	9.7 [4.9]‡	1.7‡ [1.7]‡	0.0‡ [0.0]‡
Lieutenant Junior Grade (O-2)	15.9 [10.5]	4.5 [4.5]	4.1 [4.1]
Lieutenant (O-3)	7.8 [5.8]	4.2 [4.1]	2.5 [2.5]
Lieutenant Commander (O-4)	6.3 [4.5]	1.6 [1.6]	0.6‡ [0.6]‡
Commander (O-5)	3.0 [2.0]	0.9 [0.7]	1.1‡ [1.1]‡
Admiral and Captain (O-6 and up)	0.3‡ [0.3]‡	0.2‡ [0.2]‡	0.7‡ [0.7]‡
All	7.8 [5.3]§	2.8 [2.7]§	2.0 [2.0]

* Rates in brackets exclude deaths due to hostile action.

† Ranks shown under Navy and Marine Corps Pilots are for Navy; equivalent Marine Corps ranks are similar to Air Force Pilot ranks.

‡ Based on 5 or fewer deaths.

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

and Marine Corps pilots is a continuation of a decline which began in the mid- to late 1960s. In addition, hostile deaths have been at a very low level since 1971, and none occurred in 1974 and 1975.

Duty Assignment

Aviation fatality rates among Air Force pilots with full-time flying duties are shown in Table 9 according to duty assignment. In this table,

TABLE 9

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

Duty Assignment	1972–75	1975
	Air Force Pilots†	
Search rescue	1.9‡ [0.0]‡	0.0‡ [0.0]‡
Helicopter	4.8 [2.6]	9.3 [7.8]†
Tanker	0.3‡ [0.3]‡	0.7‡ [0.7]‡
Bomber	2.1 [1.7]	2.3 [2.3]
Reconnaissance	4.7 [1.6]	5.9 [0.0]‡
Trainer	1.4 [1.4]	1.2 [1.2]
Cargo	2.2 [1.5]	1.1‡ [0.9]‡
Observation	10.1 [2.6]	7.8‡ [1.9]‡
Fighter	10.8 [5.1]	6.9 [2.3]
Utility	3.1‡ [3.1]‡	0.0‡ [0.0]‡
Liaison	0.0‡ [0.0]‡	0.0‡ [0.0]‡
All	3.6 [2.0]	2.8 [1.5]
	Navy and Marine Corps Pilots§	
Navy carrier-based jet	4.5 [4.2]	2.0 [2.0]
Marine fighter/attack jet	5.0 [5.0]	4.5 [4.5]
Navy carrier-based prop	2.5 [2.5]	0.0‡ [0.0]‡
Marine fighter/attack/OBS prop.‖	3.4‡ [3.4]‡	0.0‡ [0.0]‡
Navy patrol/transport	0.8 [0.8]	0.0‡ [0.0]‡
Marine patrol/transport	2.0‡ [2.0]‡	8.8‡ [8.8]‡
Navy helicopter	1.9 [1.9]	0.9‡ [0.9]‡
Marine helicopter	2.7 [2.7]	4.5 [4.5]
All	2.8 [2.7]	2.0 [2.0]

* Rates in brackets exclude deaths due to hostile action.

† In this table Air Force pilots who were not assigned to a specific flying duty but flew chiefly to maintain proficiency are excluded from the exposure.

‡ Based on 5 or fewer deaths.

§ A small portion of total Navy and Marine Corps pilot deaths were not identified by duty assignment.

‖ OBS prop = observation/counter insurgency propeller.

pilots who were not assigned to a specific flying duty but flew chiefly to maintain proficiency are excluded from the experience. The aggregate fatality rates for 1975 were significantly lower than those for 1974, largely because of the reduction in the fatality rates among fighter pilots. The aggregate rate is at a level similar to that among all rated pilots primarily because fewer pilots flew chiefly to maintain proficiency. The fighter bomber category was deleted this year due to lack of exposure, but liaison pilot was added. This change had little impact on the aggregate fatality rate, however.

This year, for the first time, an analogous analysis was made for the Navy and Marine Corps. However, all pilots are included in this portion of Table 9, since no exclusion of pilots flying chiefly to maintain proficiency was possible. In almost all categories, the fatality rates for 1975 are lower than those for 1974.

Hours of Flying

Average hours of flying are based on the combined flying time of pilots who fly chiefly to maintain proficiency, as well as those with full-time flying duties.

In 1975 Navy pilots flew an average of 161 hours, and Active Naval Reserve pilots flew an average of 57 hours. The figure for Navy pilots represents a substantial increase (almost 100 percent) over the 82 hours recorded for 1974, while the figure for Reservists remained similar to that stated last year. For Marine Corps pilots and Active Marine Corps Reserve pilots, average flying hours in 1975 were 71 and 113 hours, respectively. Both figures are markedly lower than those recorded last year.

For the first time, the Army provided statistics on flying hours split between students and nonstudents. Prior to 1975, the hours for the two categories were combined. Since there have been no students flying fixed-wing aircraft since 1972, the split is applicable to only rotary-wing aircraft. However, the mean strengths which are used in calculating average flying hours include only nonstudents. During 1975, nonstudent Army pilots flew an average of 29 hours in fixed-wing aircraft and 51 hours in rotary-wing aircraft (64 hours in rotary-wing aircraft using combined student and nonstudent hours as has been done in previous years). Both averages are similar to those reported for 1974. These figures, however, are understated because a large percentage of Army pilots fly more than one type of aircraft. The extent of the understatement by type of aircraft cannot be measured. Taking all types of aircraft combined, nonstudent Army pilots flew an average of 60 hours during 1975 (72 hours using combined student and nonstudent hours).

The average number of aircraft hours for Air Force pilots is not available. In 1975, the average annual flying time for Air National Guard pilots on flying status was 111 hours, which was similar to that recorded for 1974.

Military Air Command (MAC)

Aviation fatality rates in 1975 among pilots and crew members of MAC, a branch of the Air Force, are shown in Table 10. A slight decrease from the 1974 rate was recorded for pilots in aggregate; however, the number of fatalities was small. For crew members on transport units, a

TABLE 10

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

	1968–71	1972–75	1975
Pilots:			
Transport units	0.8 [0.6]	0.9 [0.9]	1.1† [1.1]†
Other units	2.1 [1.0]	2.6 [1.5]	0.0† [0.0]†
All	1.3 [0.8]	1.5 [1.1]	0.8† [0.8]†
Crew members:			
Transport units	0.7 [0.7]	1.4 [1.4]	3.3 [3.3]
Other units	3.1 [1.9]	1.8 [0.9]	0.0† [0.0]†
All	1.5 [1.1]	1.6 [1.2]	2.3 [2.3]

* Rates in brackets exclude deaths due to hostile action.
† Based on 5 or fewer deaths.

sizable increase in the fatality rate was observed over that recorded in 1974, thus producing a higher aggregate figure for crew members. The experience of MAC pilots is also included in Tables 7–9. There were again no hostile deaths reported in 1975 among Military Air Command pilots or crew members.

United States Army

Table 11 includes data for nonstudent Army pilots and crew members for all flying operations. All 1975 rates have shown sizable increases over those of 1974, and accordingly they are back to a level similar to that reported for 1973. As was true in 1973–74, no hostile deaths were recorded in 1975. Both hostile and nonhostile fatality rates remain substantially below the rates recorded at the height of the Vietnam conflict.

As mentioned under the section "Hours of Flying," student and nonstudent flying hours in rotary-wing aircraft were split for the first time this year. However, the mean strengths and numbers of deaths that are used in calculating fatality rates include only nonstudents. The fatality rate shown in Table 11 for 1975 for rotary-wing and all types of aircraft would be 20 percent and 17 percent lower, respectively, using combined student and nonstudent flying hours, as has been done in previous years. The rates shown for 1972–75 were estimated using the same ratio of non-

TABLE 11

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

	1972–75	1975
	Aviation Fatality Rates per 1,000 Life Years of Exposure	
Pilots	1.8 [1.2]	1.4 [1.4]
Crew members	7.6 [3.8]	2.4 [2.4]
	Pilot Fatality Rates per 1,000 Aircraft Hours	
Fixed-wing aircraft	.0347 [.0335]	.0258† [.0258]†
Rotary-wing aircraft	.0227 [.0131]	.0238 [.0238]
All types of aircraft	.0247 [.0165]	.0242 [.0242]

* Rates in brackets exclude deaths due to hostile action.
† Based on 5 or fewer deaths.

student and student flying hours provided for 1975. Therefore, the fatality rates on the previous years' basis for rotary-wing and all types of aircraft would also be 20 percent and 17 percent lower than are shown in the table.

Student Pilots

Table 12 presents aviation fatality rates for student pilots in the military services. The 1975 rates for Air Force student pilots and Navy and Marine Corps student pilots have decreased from those of 1974. Since data were not available to compute fatality rates for Army student pilots

in 1974, no comparison can be made with 1975 rates. None of the rates was based upon more than 5 deaths.

Coast Guard

No fatalities among Coast Guard personnel on flight orders, either pilots or crew members, have occurred for the last four years. There have been no aviation fatalities among Coast Guard student pilots and observers for the last nineteen 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 for Air and Army National Guard

TABLE 12

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

	1968–71	1972–75	1975
Air Force*	2.1	1.6	0.0†
Navy and Marine Corps:*			
Basic course	2.6	1.7	1.3†
Advanced course	8.2	4.0	1.0†
Army	3.8	1.7‡	4.9†

* Commissioned officers only.
† Rates based on 5 or fewer deaths.
‡ Rate based on data excluding 1974, for which data was not available.

TABLE 13

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

	1968–71	1972–75	1975
Navy and Marine Corps Reserves:			
Ages under 30	2.1	0.0*	0.0*
Ages 30 and over	1.7	0.8	0.3*
All ages	1.8	0.6	0.3*
Army Reserves	N.A.†	1.3	0.9*
Air National Guard	2.1	1.9	1.9
Army National Guard	0.7	0.8	0.0*

* Based on 5 or fewer deaths.
† N.A. = Not available.

pilots. Such pilots are not on full-time active duty but generally fly on weekend and/or short-term (usually two weeks) training duty. Only the Air National Guard aviation fatality rate in 1975 was based on more than five deaths. All 1975 rates were at least as low as those recorded for 1974.

Air Force Flight Surgeons and Nurses

No fatalities among Air Force flight surgeons have occurred for the last four years. There have been no fatalities among Air Force flight nurses in the last fourteen years.

Graduates of Academies—Assignment to Aviation

Of those graduates of the military service academies in 1975 who were accepted for flight training by the Air Force, 98.2 percent were from the Air Force Academy, 0.9 percent were from the Military Academy, and 0.9 percent were from the Naval Academy.

Of the commissioned Air Force Academy graduates in 1975, 98.9 percent received their assignments in the Air Force, 0.5 percent in the Navy, 0.3 percent in the Army, and 0.3 percent in the Marine Corps.

CANADIAN MILITARY

Aviation fatality rates among Canadian regular military forces, excluding reserves, for the period 1970–75 are shown in Table 14 by age, rank, and functional classification. The average number of flying hours for all pilots combined has remained steady over the six-year period at approximately 300 hours per year and shows little variation by age group. Crew members average around 350 hours per year. There is some variation by functional classification, but this cannot be accurately determined because of duplicate counting in different functions. 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 average 350 hours per year, the latter approximately 130 hours per year.

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.

TABLE 14

CANADIAN REGULAR FORCES
1970–75 AVIATION FATALITY RATES
PER 1,000 LIFE YEARS OF EXPOSURE

	Pilots	Crew
Age group:		
Under 25	6.3	1.4*
25–29	3.8	1.2*
30–34	3.3	2.8
35–39	2.0*	1.5*
40 and over	0.4*	0.5*
All	2.9	1.5
Rank:		
Lieutenant and lower rank	4.3	2.1
Captain	3.5	0.8*
Major	0.9*	*
Lieutenant Colonel and higher rank	*	*
All	2.9	1.5
Functional classification:†		
Fighter	3.3	2.1*
Training	1.3	*
Transport	1.2*	1.1*
Maritime	2.9*	1.0*
Helicopter	3.0	2.9*
Others	1.0*	0.6*
All	1.9	1.2

* Based on 5 or fewer deaths.

† The fatality rates by functional classification are understated because some pilots and crew members fly more than one type of aircraft. The extent of understatement in total can be determined by comparing the fatality rates of the "All" categories.