REPORT OF THE COMMITTEE ON AVIATION

AVIATION STATISTICS

THIS report is confined to a brief summary of such new data as add to or materially change conclusions reached in previous reports. Since this procedure has now been used for several years, the following index is given of the most recent information on various classes.

INDEX TO AVIATION REPORTS 1940–1953, INCLUSIVE*

CIVIL AVIATION—PASSENGERS

CIVIL AVIATION—PILOTS

* References are to *TASA* or *TSA*. † In present Report.

MILITARY AND NAVAL AVIATION

SCHEDULED FLYING

United States

Table 1 shows the recent trend of fatality rates on United States scheduled airlines. Since pilots engaged full time in scheduled flying approximate 1,000 hours a year, the death rates per 1,000 hours are indicative of the annual death rate of such pilots. The columns headed "Death Rate of All Pilots Employed in Scheduled Flying" and "Death Rate of Other Crew Members Employed in Scheduled Flying" include, on the one hand, those who do less than the normal amount of flying on account of having some supervisory duties or for other reasons, and include, on the other hand, the deaths in nonscheduled flights operated by scheduled airlines, such as test or charter flights. The "Death Rate of First Pilots in Scheduled Flights," therefore, might be said to indicate the hazard of the normal airline pilot, while the "Death Rate of All Pilots Employed in Scheduled Flying" represents that of the average pilot. The difference in recent years is not great.

Last year's report commented that the increased fatality rates for pilots and crew in domestic flying in 1951 were probably a statistical fluctuation.

TABLE 1

UNITED STATES SCHEDULED AIRLINES AVIATION DEATHS

Period	Passenger Death Rate per 1,000 Passenger Hours	Death Rate of First Pilots in Scheduled Flights per 1,000 Airplane Hours	Death Rate of All Pilots Employed in Scheduled Flying, per Life Year of Exposure	Death Rate of Other Crew Members Employed in Scheduled Flying, per Year of Exposure
	Domestic			
1948	.0023	.0020	.0015	.0021
1949	.0024	.0025	.0021	.0017
1950	.0021	.0019	.0018	.0015
1951	.0024	.0035	.0032	.0030
1952	.0007	.0012	.0009	.0004
1945–1948	.0032	.0033	.0031	.0033
1946–1949	.0030	.0031	.0030	.0029
1947–1950	.0030	.0025	.0023	.0023
1948–1951	.0023	.0025	.0022	.0021
1949–1952	.0018	.0023	.0020	.0016
	International			
1948	.0020	.0020	.0050	.0045
1949				
1950	.0045	.0023	.0013	.0038
1951	.0025	.0023	.0013	.0038
1952	.0067	.0021	.0025	.0042
1945–1948	.0033	.0026	.0031	.0050
1946–1949	.0022	.0022	.0025	.0032
1947–1950	.0022	.0021	.0024	.0028
1948–1951	.0023	.0016	.0019	.0028
1949–1952	.0036	.0016	.0013	.0027
	Total			
1948	.0022	.0020	.0024	.0031
1949	.0019	.0020	.0016	.0010
1950	.0025	.0020	.0017	.0020
1951	.0024	.0033	.0028	.0032
1952	.0017	.0014	.0012	.0019
1945–1948	.0032	.0032	.0031	.0040
1946–1949	.0028	.0029	.0029	.0030
1947–1950	.0028	.0024	.0023	.0025
1948–1951	.0023	.0024	.0021	.0024
1949–1952	.0021	.0022	.0018	.0019

This conclusion is supported by the low rates in 1952. When the fatality rates are grouped into four-year periods a continued gradual improvement is seen.

Canada

Passenger and pilot fatality rates per 1,000 hours, derived from figures furnished by the Canadian Department of Transport, are shown in Table 2

TABLE 2

CANADIAN SCHEDULED AIRLINES

Compared with Those of the United States

Period	Passenger Aviation Death Rate per 1,000 Passenger Hours		Aviation Death Rate of First Pilots in Scheduled Flights per 1,000 Airplane Hours	
	Canada	United States	Canada	United States
	Domestic			
1947–1950	.0039(.0016)*	.0030	.0053(.0035)*	.0025
1948–1951	.0020(.0002)*	.0023	.0033(.0016)*	.0025
1949–1952	.0017(.0002)*	.0018	.0044(.0030)*	.0023
	International			
1947–1950	.0000	.0022	.0000	.0021
1948–1951	.0139	.0023	.0096	.0016
1949–1952	.0129	.0036	.0097	.0016
	Domestic and International			
1947–1950	.0032(.0013)*	.0028	.0046(.0030)*	.0024
1948–1951	.0041(.0026)*	.0023	.0042(.0028)*	.0024
1949–1952	.0035(.0022)*	.0021	.0051(.0038)*	.0022

* Rates shown in parentheses are those excluding 19 passenger deaths and one first pilot death in an accident in 1949 in domestic flying (where the cause of death was adjudged murder).

together with the corresponding United States figures. It will be seen from the table that the Canadian figures are affected substantially by the inclusion or noninclusion of a single accident.

Outside of United States

The International Air Transport Association has furnished to the Committee the experience of most of its member companies for the period

1946–1952. By deducting the included experience of United States scheduled airlines and making reasonable assumption as to average speed in the years for which it was not specifically given, the passenger fatality rates per 1,000 hours shown in Table 3 were derived and compared with the rates from Table 1 for all flying of United States scheduled airlines (whether or not they are members of the International Air Transport Association). It appears that the Committee's derivation of the passenger fatality rate for airlines of countries other than the United States for 1946–1949, as given in *TSA* 1951 Reports, 114–15, was erroneous. The corrected figures show that a marked improvement has occurred in recent years but that the fatality rate still remains well above that of United States airlines.

TABLE 3

SCHEDULED AIRLINES OF COUNTRIES OTHER THAN UNITED STATES

PASSENGER AVIATION DEATH RATE PER 1,000 HOURS

Period	Airlines of Countries Other Than U.S. Reporting to I.A.T.A.	All U.S. Airlines
1946–1949	.0133	.0028
1947–1950	.0114	.0028
1948–1951	.0078	.0023
1949–1952	.0058	.0021

NONSCHEDULED ("IRREGULAR") CARRIER FLYING

The figures in Table 4 for "large" irregular air carriers—those operating aircraft of more than 12,500 pounds gross weight—are based on reports of their mileage to the Civil Aeronautics Board, and the assumption of an average speed of 200 miles per hour.

The recent improvement in death rates is probably due to closer federal regulation, and to self-regulation by associations of nonscheduled airlines.

CANADIAN CIVIL PILOTS

The data on Canadian civil pilots by class of license for 1947–1952, furnished by the Department of Transport, are shown in Table 5.

It is not unlikely that the class of private pilots includes a considerable number whose flying time is small or nonexistent, and that the rate shown

is not applicable to pilots with substantial annual flying time. The Committee has no definite information on this point, however.

UNITED STATES AIR FORCE

Pilots and Other Rated Personnel—by Age

The fatality rates for 1952, unlike those for 1950 and 1951, include death occurring in the course of combat missions but not resulting from

TABLE 4

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

Year	Passenger Deaths	Rate per 1,000 Passenger Hours	First Pilot Deaths	Rate per 1,000 Airplane Hours
1948	90	.039	6	.046
1949	104	.036	5	.043
1950	29	.008	1	.006
1951	78	.015	3	.013
1952	26	.004	2	.008
1948–1951	301	.021	15	.023
1949–1952	237	.013	11	.017

TABLE 5

CANADIAN CIVIL PILOTS—BY CLASS OF LICENSE

Class of License	Life Years of Exposure	Aviation Fatalities	Fatality Rate per 1,000 Life Years
Public Transport	4,738	30	6
Commercial	5,887	55	9
Private	17,300	49	3

enemy action. Nevertheless, as Table 6 shows, the resulting rates were not materially different from those for 1951 except for nonpilot rated officers under age 25, where the 1951 rate was apparently abnormally low. The very high rate observed for Regular Air Force pilots under age 25 in 1951 continued in 1952.

Type of Flying

Table 7 gives aircraft fatality rates of rated pilots per 100,000 flying hours for 1951 and 1952. As in Table 6, deaths due to enemy action are

excluded, while other deaths in the course of combat missions are included for 1952 only. Deaths and exposure of rated pilots while flying in a non-pilot capacity are excluded.

Duty Assignment

Table 8 gives aviation fatality rates of rated pilots according to duty assignment. These are for 1951–1952 except in classes otherwise indicated. These latter are mostly cases where the present classification became

TABLE 6

UNITED STATES AIR FORCE ON ACTIVE DUTY BY AGE

AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE

Deaths Due to Enemy Action Excluded—Other Deaths in Combat Missions Included in 1952 Only

Age Group	1952	1951	1947–1952
	ALL RATED PILOTS		
Under 25	27.5	30.2	20.4
25–29	13.0	12.4	11.1
30–34	6.8	6.3	6.3
35 and over	4.4	6.2	5.0
All	9.1	9.5	9.1
	REGULAR AIR FORCE PILOTS (Included Above)		
Under 25	41.9	44.6	21.1
25–29	13.1	14.2	11.3
30–34	5.5	3.7	5.0
35 and over	3.6	2.9	3.6
All	6.5	5.9	7.1
	NONPILOT RATED PERSONNEL		
Under 25	12.8	8.8	12.5
25–29	8.7	6.3	8.4
30–34	6.9	7.7	7.1
35 and over	5.1	9.2	6.5
All	7.5	7.4	8.0

effective during 1952 and did not correspond closely to any previous classification. Deaths in combat missions are treated as in Tables 6 and 7. Deaths are classified by the duty assignment held at the time of death, and include deaths as a pilot, nonpilot crew member or passenger in either military or civilian aircraft.

Student Pilots

The names of pilot training courses were changed during 1952. The change as it affects the first two courses is indicated in Table 9. The pres-

TABLE 7

TYPE OF AIRCRAFT
UNITED STATES AIR FORCE ON ACTIVE DUTY
AVIATION DEATH RATES PER 100,000 PILOT HOURS
(Including Copilots, etc.)

Aircraft Type Group	1951	1952
Bomber, Non-Jet	2.6	2.2
Transport	1.3	1.3
Fighter, Non-Jet	9.8	9.2
Fighter, Jet	14.5	12.2
Trainer	2.0	1.3
All, Including Types Not Listed	3.1	3.3

TABLE 8

AVIATION DEATH RATES BY DUTY ASSIGNMENT
UNITED STATES AIR FORCE ON ACTIVE DUTY

Duty Assignment	Death Rate per 1,000 Life Years of Exposure	
Pilot, Helicopter	14.6	
Pilot, Amphibian	2.6*	
Pilot, Transport	6.7	(last 6 mos. of 1952)
Pilot, Troop Carrier	19.7	(last 6 mos. of 1952)
Pilot, Jet Fighter	35.6	
Pilot, Non-Jet Fighter	22.5	(last 6 mos. of 1952)
Pilot, Non-Jet Bombardment	9.4	(last 6 mos. of 1952)
Pilot, Single Engine Reconnaissance	8.2	
Pilot, Multi-Engine Reconnaissance	4.8	
Pilot, Liaison	18.2	(last 6 mos. of 1952)
Pilot, AOB†	23.9	(year 1952)
Pilot, Not assigned primarily to flying duty	4.9	
Operations Officer	6.3	

* Less than 5 deaths.

† Pilot qualified also as a bombardier and a radar observer.

ent advanced course corresponds to the previous combat crew training. Formerly all students in this phase were rated pilots. Under the new system the pilot will receive a pilot rating only upon completion of the new advanced course, although he receives a commission upon completion of the new basic course. There was no exposure during 1952 in the new advanced course. The length of the new courses is: primary, 6 months; basic, 5 months; and advanced, 3 months.

Military Air Transport Service

For the period 1947–1952 the passenger fatality rate in the Military Air Transport Service was 2.5 per 100,000,000 passenger miles with 3 crashes. This compares with a rate of 1.3 for all United States scheduled commercial airlines for the same period.

TABLE 9

USAF STUDENT PILOTS

	OLD NAME	NEW NAME	AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE	
			1952	1949–1952
Officers	Basic	Primary	8.6	7.0
	Advanced	Basic	16.2	14.5
Cadets	Basic	Primary	3.3	4.1
	Advanced	Basic	16.5	15.4
Total	Basic	Primary	4.5	4.9
	Advanced	Basic	16.4	15.2

Air National Guard

The fatality rate in 1952 of pilots of the Air National Guard not federally activated was 14.4 per 1,000. The future rate may be affected by the fact that conversion of Air National Guard Units to jet aircraft is in progress and expected to be completed by the end of 1953.

Flight Surgeons

The fatality rate of flight surgeons in 1947–1952 was 6.3 per 1,000 years of exposure.

Graduates of Military Academy—Assignment to Aviation

Of the 1952 graduating class of the United States Military Academy, 23% were accepted for flying training by the Air Force.

UNITED STATES NAVY

(Includes Marine Corps unless otherwise stated)

Pilots by Age

The fatality rates of naval aviators (officers) on active duty in 1952, U.S. Navy and Marine Corps combined, were similar to but slightly higher than those for 1951. Fatality rates for officer pilots of the Regular Navy and Marine Corps were obtained for 1952. Unlike the Air Force figures given in Table 6, the fatality rate of Regular pilots under age 25 was not higher than that for all pilots under age 25.

TABLE 10

UNITED STATES NAVY ON ACTIVE DUTY BY AGE
NAVAL AVIATORS (OFFICERS)
(Includes Marine Corps 1948–1952)
AVIATION DEATH RATES PER 1,000 LIFE YEARS OF EXPOSURE
Deaths Due to Enemy Action Excluded—Other Deaths in Combat Missions Included

AGE GROUP	ALL NAVAL AVIATORS			REGULAR NAVAL AVIATORS (Included in Foregoing)
	1952	1951	1947–1952	1952
Under 25	25.6	25.1	19.3	20.2
25–29	13.4	12.7	9.6	13.3
30–34	9.1	8.0	6.6	8.3
35 and over	5.2	3.1	3.3	4.0
All	11.3	10.9	8.9	9.1

The figures for 1952 and for the period 1947–1952 are given in Table 10, with the 1951 figures shown for comparison. These figures include reserve officers on active duty. They exclude deaths resulting from enemy action but include other deaths in the course of combat missions.

The Committee is informed by the Department of the Navy that there is no reason why the fatality rates of enlisted pilots on active duty should differ materially from those of officers.

Nonpilot Personnel on Flying Duty

The fatality rate of nonpilot personnel ordered to duty involving flying in 1952 was 3.6 per 1,000 life years. Flight surgeons and flight nurses are not included.

Student Pilots

The fatality rates of student naval aviators in 1952 were much lower than in 1951, as is shown in Table 11. In 1952, carrier qualification training was made a part of basic training, whereas previously it had been included in advanced training.

Inactive Reservists

Fatality rates in 1952 were similar to those for 1951. For organized reserve aviators and others in a drill pay status the rate was 2.2 per 1,000 life years. The rate was 6.9 for ages under 30 and 0.9 for ages 30 and over. For those not receiving drill pay but who did some flying during the year the rate was 0.9. Some of these reservists may do other flying as civilians,

TABLE 11

UNITED STATES NAVY—STUDENT NAVAL AVIATORS
AVIATION DEATH RATES PER 1,000 LIFE
YEARS OF EXPOSURE

Stage of Training	1952	1951	1946-1952
Basic	5.9	7.8	5.5
Advanced	3.6	33.1	25.5

and it is possible that the hazard of those reservists who do no other flying than their reserve flying may be greater than the average figures given above, in which those pilots are also included whose experience is supplemented by civilian flying.

Annual Flying Time

The average number of flight hours per pilot on active duty in 1952, including students, was 254, and that for inactive reservists who did some flying was 80. The figures given in the 1952 Report, covering the year 1951, were the numbers of *aircraft* hours per pilot, which are necessarily lower on account of flights by rated pilots as copilots or in some other capacity.

Graduates of Naval Academy—Assignment to Aviation

Approximately 20% of the 1952 graduating class of the U.S. Naval Academy were accepted for flying training by the Navy or Marine Corps and 15% by the Air Force. The percentages for the 1953 Naval Academy Class were similar.

UNITED STATES COAST GUARD

The figures given in *TSA* 1952 Reports, 65, have been extended through 1952 in Table 12.

ROYAL CANADIAN AIR FORCE

Table 13 gives fatality rates for the period 1948–1952 for pilots of the RCAF and of the RCAF Auxiliary (Reserve personnel who undergo weekly training in organized squadrons). The figures for Regular pilots now begin to show the tendency to higher rates at the younger ages which

TABLE 12

UNITED STATES COAST GUARD PERSONNEL
ON FLIGHT ORDERS
FEBRUARY 1947—DECEMBER 1952

Class	Life Years of Exposure	Aviation Deaths	Rate per 1,000 Life Years of Exposure
Pilots	1,573	11	7.0
Student Pilots	85	0	0
Observers	120	0	0
Crew Members	4,355	15	3.4

TABLE 13

ROYAL CANADIAN AIR FORCE PILOTS
AVIATION DEATH RATE PER 1,000 LIFE YEARS OF EXPOSURE

	Regular 1948–1952	Auxiliary 1948–1952
Age Group		
Under 25	14.6	15.7
25–29	9.9	12.5
30–39	7.4	13.0
40 and over	.....	.....
All	9.5	13.2
Rank		
Pilot Officer and Flight Cadet	9.0	16.6*
Flying Officer	12.8	13.1
Flight Lieutenant	6.6	12.8
Squadron Leader	8.4	11.1
Wing Commander and Higher Ranks	1.1	15.4
All	9.5	13.2

* Based on an average annual strength of 12 for the period.

has been observed in the United States Services. There have been no combat fatalities, and the one pilot listed as missing in Korea is not included in the statistics. The addition of a year's experience on auxiliary pilots has considerably increased their average fatality rates, especially at the younger ages. The conversion of RCAF Auxiliary Squadrons to jet aircraft has not proceeded as rapidly as for the U.S. Air National Guard.

INTERCOMPANY EXPERIENCE—PILOTS

Thirty-one companies contributed their experience this year on certain classes of pilots for issues since January 1, 1946, observed in the case of some companies through December 31, 1952, and in the case of others through June 30, 1953. The results are shown in Table 14, with fatality rates omitted in classes having less than 5 deaths.

TABLE 14

INTERCOMPANY EXPERIENCE ON PILOTS APPARENTLY ACTIVE AT TIME OF ISSUE

Issues of 1946 and Later, Exposed to June 30, 1953
(Dec. 31, 1952 in Some Companies)
By Policies

Status at Issue	Issued with Aviation Extra Premium			Issued with Aviation Exclusion Provision		
	Policy Years of Exposure	Aviation Deaths	Rate per 1,000	Policy Years of Exposure	Aviation Deaths	Rate per 1,000
Civilian Pilots						
Employed as scheduled airline pilot	14,530	36	2.5	No study made		
Having commercial or transport certificate but flying only for pleasure or personal business (not for hire), or having private certificate and 100 or more solo hours (or solo hours not stated)						
Less than 50 hrs. in preceding 12 mos.	11,275	15	1.3	23,186	16	.7
50–99 hrs. in preceding 12 mos.	7,649	17	2.2	9,415	8	.8
100 or more hrs. in preceding 12 mos.	15,483	58	3.7	11,908	35	2.9
Hours in preceding 12 mos. not stated	2,558	6	2.3	6,305	5	.8

TABLE 14—*Continued*

Attained Insurance Age at Beginning of Calendar Year of Exposure	Issued with Aviation Extra Premium			Issued with Aviation Exclusion Provision		
	Policy Years of Exposure	Aviation Deaths	Rate per 1,000	Policy Years of Exposure	Aviation Deaths	Rate per 1,000
Military Pilots on Full-Time Duty, Including Student Pilots; Deaths in Combat Missions Included, Whether or Not Resulting from Enemy Action*						
	U.S. Army or Air Force					
Prior to July 1, 1950						
Under 25						
800 or more solo hours	794	8	10.1	262	3	†
All other	1,182	24	20.3	1,122	16	14.3
25–29						
800 or more solo hours	8,745	53	6.1	1,690	6	3.6
All other	2,261	23	10.2	1,729	13	7.5
30–34	9,147	47	5.1	1,364	6	4.4
35 and over	2,338	1	†	172	0	†
July 1, 1950 and Later						
Under 25						
800 or more solo hours	268	7 (3)	26.1	87	0	†
All other	843	28 (8)	33.2	493	14 (5)	28.4
25–29						
800 or more solo hours	8,568	92 (25)	10.7	1,391	11 (3)	7.9
All other	2,709	38 (10)	14.0	1,357	14 (3)	10.3
30–34	21,909	123 (30)	5.6	2,904	17 (3)	5.9
35 and over	7,908	31 (5)	3.9	625	4 (0)	†
	U.S. Navy‡					
Prior to July 1, 1950						
Under 25						
800 or more solo hours	683	4	†	221	1	†
All other	1,112	15	13.5	1,367	21	15.4
25–29						
800 or more solo hours	4,800	28	5.8	979	4	†
All other	2,067	27	13.1	1,204	6	5.0
30–34	4,108	17	4.1	784	3	†
35 and over	1,344	2	†	179	0	†
July 1, 1950 and Later						
Under 25						
800 or more solo hours	273	5 (1)	18.3	77	1 (0)	†
All other	610	15 (5)	24.6	694	11 (3)	15.9
25–29						
800 or more solo hours	4,968	65 (20)	13.1	818	10 (2)	12.2
All other	1,808	20 (4)	11.1	1,125	6 (1)	5.3
30–34	9,549	113 (32)	11.8	1,623	20 (7)	12.3
35 and over	3,993	27 (4)	6.8	531	3 (2)	†

* Figures in parentheses indicate deaths from enemy action.

† Fatality rates not shown in classes with less than 5 deaths.

‡ Includes Marine Corps but not Coast Guard.

In the civilian classes investigated, no important change in death rates resulted from the addition of a year's exposure, and the increase in number of deaths was not great enough to improve greatly the credibility of the fatality rates shown in *TSA* 1952 Reports, 68.

The figures for the United States Army or Air Force and the United States Navy were divided between exposures before and after July 1, 1950. As might be expected, the latter showed substantially higher rates, particularly at the younger ages. However, if the deaths in combat shown in parentheses are deducted from the experience after July 1, 1950, the rates are seen to be roughly similar. The classification of deaths as due to combat was based on the remarks on the company death cards sent to the committee. Cards which stated "killed (or missing) in action" or similar definite statements were counted as combat deaths. All others were assumed noncombat.

The experience is by policies. The classification is by status at time of application for insurance. Exposure was terminated upon discontinuance of extra premium, or upon discontinuance of aviation exclusion provision unless it was replaced by an extra premium.