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M.A.A. INC.

A PRELIMINARY ANALYSIS OF AIRCRAFT ACCIDENT DATA

U. S. CIVIL AVIATION

1968

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PRELIMINARY

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NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
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Highlights of the analysis are:

1. U. S. Certificated Route and Supplemental Air Carriers in All Operations showed in 1968 an increase over the base figure of 60.81 percent in aircraft miles flown. The total accident rate per million aircraft miles flown decreased 41.67 percent to .028. The fatal accident rate per million aircraft miles flown was .005 compared with .007 in the base period.
2. Comparing 1968 to the base period, U. S. Certificated Route Air Carriers in All Operations recorded a 60.23 percent increase in aircraft miles flown. The total accident rate per million aircraft miles flown decreased from .045 during the base period to .026 in 1968, while the fatal accident rate per million aircraft miles flown decreased from .006 to .005.
3. U. S. Certificated Route Air Carriers in All Scheduled Service recorded 58.21 percent more aircraft miles in 1968 than during the average base period year. Aircraft hours and aircraft departures increased 35.87 percent and 27.01 percent, respectively. The total accident rate per million aircraft miles flown decreased from .041 to .026 while the fatal accident rate per million aircraft miles flown was unchanged. The total accident rate per 100,000 aircraft departures decreased from 1.355 to 1.056, while the fatal accident rate per 100,000 departures increased to .204 from .179. The total accident rate per 100,000 aircraft hours flown declined from 1.398 to 1.018, while the fatal accident rate increased to .196 from .184.
4. U. S. Certificated Route Air Carriers in Scheduled Domestic and International Passenger Service carried 51.94 percent more passengers in 1968 than in the average base period year. The passenger fatality rate per 100 million passenger miles increased from .213 to .269 in 1968.
5. U. S. Certificated Route Air Carriers in Scheduled Domestic Passenger Service carried 51.80 percent more passengers in 1968 than in the average base period year. The number of fatal injuries increased 96.19 percent in 1968, and the passenger fatality rate per 100 million passenger miles flown increased from .213 during the base period to .297 in 1968.
6. U. S. Certificated Route Air Carriers engaged in Scheduled International Passenger Service experienced a 52.27 percent increase in passengers carried over the base period figure. The total number of accidents increased 35.13 percent, while 2 fatal accidents involving 57 fatalities were recorded in 1968. This record also helps to keep the fatality figures and rates low when the data is combined with that of Domestic Service, as in item #4 above.

7. An increase of 60.07 percent in aircraft miles flown was recorded by U. S. Supplemental Air Carriers in All Operations in 1968. The total number of accidents showed a 50.00 percent increase, and fatal accidents decreased 37.50 percent. One fatality was recorded in 1968, and the fatality rate per million aircraft miles flown decreased from .298 to .009.

8. In 1968, U. S. Supplemental Air Carriers engaged in Civil and Military Passenger Operations recorded a 103.20 percent increase in passengers carried over the base period. No fatal accidents were recorded in 1968 despite the very substantial increase in activity.

NATIONAL TRANSPORTATION SAFETY BOARD
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A PRELIMINARY ANALYSIS OF AIRCRAFT ACCIDENT DATA
U. S. CIVIL AVIATION
1968

This report provides a preliminary compilation and a statistical analysis of aircraft accidents in U. S. Civil Aviation that occurred during calendar year 1968. This compilation is in the form of several tables of statistical data which are attached as appendices. The analysis is contained in the following pages of narrative, with accompanying illustrative tables.

The report is labeled preliminary pending receipt, classification, and final analysis in each case. Nevertheless, it is believed that publication at this time of the information now available will be of benefit to the aviation community and of interest to the general public.

The analytical portion of this report presents data on accidents, fatalities, rates, and growth changes as percentage changes of the 1968 data compared with a base figure. The base figure was established by averaging the data for the five year period 1963 - 1967. Such a presentation helps to eliminate annual variations inherent in accident report data and allows more meaningful comparisons than would the customary year-by-year comparisons. This base figure can also be used as a standard and can be compared with other periods. For instance, the 1962 - 1966 base period can be compared with the 1963 - 1967 base period in measuring growth; fatalities; accident rates; aircraft miles, hours, and departures; passengers carried; passenger-miles; and other important annual variables. Furthermore, if this method of analysis is used for several consecutive years, the Board will have a sound basis for analyzing and projecting trends dealing with both growth and accident indices.

It is important to note, however, that this report, which is a comparison of one year's data with the base period data, does not provide the basis for trends and/or projections, anymore than would a comparison of data from two individual years. This report and similar reports for three or four consecutive years will provide such a basis, however.

SECTION I

ANALYSIS BY CLASS OF CARRIER

U. S. CERTIFICATED ROUTE AND SUPPLEMENTAL AIR CARRIERS
ALL OPERATIONS
1968

In 1968, U. S. Certificated Route and Supplemental Air Carriers in all operations flew 2,580,500,000 aircraft miles, an increase of 60.81 percent over the 1963-1967 base period average of 1,604,672,853 aircraft miles per year. The total number of accidents decreased 6.25 percent, but fatal accidents increased 45.45 percent. Fatal injuries increased 32.85 percent. Since the accident and injury percentages did not increase to the same degree as aircraft miles flown, it follows that the accident and fatality rates should decrease. The total accident rate per million aircraft miles flown decreased almost 42 percent, while the fatal accident rate decreased over 28 percent and the fatality rate decreased over 14 percent. In the 1967 Preliminary Analysis of Aircraft Accident Data, it was stated that this "decrease in total accidents coupled with an increase in fatal accidents is probably a reflection of the recent trend toward faster aircraft with increased passenger capacity". The data for 1968 tend to support this conclusion, for the ratio of fatal accidents to total accidents is the highest in the last twenty years.

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage</u> <u>Change</u>
Aircraft Miles Flown	1,604,672,853	2,580,500,000	+60.81%
<u>Accidents</u>			
Total Accidents	76.8	72	- 6.25%
Fatal Accidents	11.0	16 <u>a/</u>	+45.45%

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1962-1967) (CONT'D)

	<u>Base</u>	<u>1968</u>	<u>Percentage</u> <u>Change</u>
<u>Fatal Injuries</u>	264.2	351	+32.85%
<u>Accident Rate Per</u> <u>Million Aircraft</u> <u>Miles Flown</u>			
Total Accidents	0.048	.028	-41.67%
Fatal Accidents	0.007	.005	-28.57%
<u>Fatality Rate Per</u> <u>Million Aircraft</u> <u>Miles Flown</u>	0.159	0.136	-14.47%

a/ Includes 2 midair collisions nonfatal to Air Carrier occupants, excluded in fatal accident rate.

Note: Nonrevenue miles of the Supplemental Air Carriers were not reported in 1963, 1964, 1965, 1966, and 1967, and were not used in determining the base figure.

Note: Sabotage accident occurring 5/7/64 (44 fatalities) is included in all computations except rates.

U. S. CERTIFICATED ROUTE AIR CARRIERS
ALL OPERATIONS
1968

During the base period 1963-1967, U. S. Certificated Route Air Carriers in all operations flew an average of 1,541,520,654 aircraft miles per year. In 1968, the figure was 2,470,000,000 aircraft miles, representing an increase of 60.23 percent. The total number of accidents decreased 8.43 percent, while fatal accidents increased 59.57 percent. The number of fatal injuries increased 43.81 percent. This pattern of a decrease in total accidents and an increase in fatal accidents and fatal injuries is similar to data in these categories under U. S. Certificated Route and Supplemental Air Carriers, All Operations. As in 1967, accident rates per million aircraft miles flown showed decreases, as did the fatality rate.

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE(1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage</u> <u>Change</u>
<u>Aircraft Miles Flown</u>	1,541,520,654	2,470,000,000	+60.23%
<u>Accidents</u>			
Total Accidents	68.8	63 <u>a/</u>	- 8.43%
Fatal Accidents	9.4	15	+59.57%
<u>Fatal Injuries</u>	243.8	350	+43.81%
<u>Accident Rates Per</u> <u>Million Aircraft</u> <u>Miles Flown</u>			
Total Accidents	0.045	.026	-42.22%
Fatal Accidents	0.006	.005	-16.67%
<u>Fatality Rate Per</u> <u>Million Aircraft</u> <u>Miles Flown</u>	0.1524	.1417	- 7.02%

a/ Includes 2 midair collisions nonfatal to Air Carrier occupants, excluded in fatal accident rate.

Note: Sabotage accident occurring 5/7/64 (44 fatalities) is included in all computations except rates.

U. S. CERTIFICATED ROUTE AIR CARRIERS
ALL SCHEDULED SERVICE

1968

This segment of U. S. Air Carrier Operations showed a significant increase in aircraft activity. Aircraft miles flown increased over 58 percent, while aircraft hours and aircraft departures increased 35.87 percent and 27.01 percent, respectively. These percentage changes reflect the use of faster aircraft and the effects of changing route structures. The average aircraft in the base period flew a distance of 327 miles at 337 miles per hour, whereas in 1968, the average aircraft flew a distance of 407 miles at 393 miles per hour.

All rates reflecting total accidents showed marked decreases while the fatal accident rates either remained unchanged or showed moderate increases.

ACCIDENTS, ACCIDENT RATES, GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Aircraft Miles Flown</u>	1,390,599,161	2,200,000,000	+58.21%
<u>Aircraft Hours Flown</u>	4,121,610	5,600,000	+35.87%
<u>Aircraft Departures</u>	4,251,710	5,400,000	+27.01%
<u>Accidents</u>			
Total Accidents	57.6	57 ^{a/}	- 1.05%
Fatal Accidents	7.6	13	+71.05%
<u>Accident Rates Per Million Aircraft Miles Flown</u>			
Total Accidents	.041	.026	-36.59%
Fatal Accidents	.005	.005	Unchanged
<u>Accident Rates Per 100,000 Aircraft Hours Flown</u>			
Total Accidents	1.398	1.018	-27.18%
Fatal Accidents	.184	.196	+ 6.52%
<u>Accident Rates Per 100,000 Aircraft Departures</u>			
Total Accidents	1.355	1.056	-22.07%
Fatal Accidents	.179	.204	+13.41%

^{a/} Includes 2 midair collisions nonfatal to Air Carrier occupants excluded in fatal accident rates.

Note: Sabotage accident occurring 5/7/64 is included in all computations except rates.

U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED DOMESTIC AND INTERNATIONAL PASSENGER SERVICE

1968

Scheduled Domestic and International Passenger Service of the U. S. Certificated Route Air Carriers in 1968 showed a significant increase (51.94 percent) over the base period in the number of passengers carried. Passenger-miles flown also increased (52.26 percent) from the base period figure of 74.4 billion to 113.3 billion in 1968. The total number of accidents was up slightly (0.37 percent), but the number of fatal accidents almost doubled, showing an increase of about 97 percent. Passenger fatalities, up over 83 percent, nearly kept pace with the rise in fatal accidents, indicating that the concern for survivability in fatal crashes noted in the 1967 Preliminary Analysis of Aircraft Accident Data was well founded. Two of the 13 fatal accidents in 1968 were midair collisions which were nonfatal to Air Carrier occupants and which did not prevent the Air Carrier aircraft from making safe landings. Discarding these two accidents, the percentage change between the base period and 1968 is a 66.7 percent increase, which, when compared with the 83.29 percent increase in passenger fatalities, is further evidence of the continuing problem of crash survivability.

ACCIDENTS, ACCIDENT RATES, GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Passengers Carried</u>	97,868,202	148,700,000	+51.94%
<u>Passenger Miles Flown</u>	74,409,282,600	113,300,000,000	+52.26%
<u>Accidents</u>			
Total Accidents	53.8	54	+ 0.37%
Fatal Accidents	6.6	13 a/	+96.97%
<u>Fatal Injuries</u>			
Passengers	166.4	305	+83.29%
Crew	22.8	34	+49.12%
Others	1.2	6	+400.00%
Total	190.4	345	+81.20%
<u>Passenger Fatality Rate</u>			
<u>Per 100 Million Passenger</u>			
<u>Miles Flown</u>	0.213	0.269	+26.29%

a/ Includes 2 midair collisions nonfatal to Air Carrier occupants.

Note: Passenger deaths occurring in sabotage accident on 5/7/64
(41 fatalities) are included in all computations except rates.

U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED DOMESTIC PASSENGER SERVICE
1968

U. S. Certificated Route Air Carriers engaged in Scheduled Domestic Passenger Service during 1968 carried 133,000,000 passengers, representing a significant increase (51.80 percent) over the base period figure of 87,557,661. Passenger-miles flown, however, showed a larger rate of increase, indicating that, for the second consecutive year, the average passenger was carried further (653 miles) per departure in 1968 than in the average base period year (646 miles). The total number of accidents decreased slightly, while the number of fatal accidents showed a marked increase of 96.43 percent. Fatal injuries to passengers increased from an average of 128.8 for the average base period year to 258 in 1968, indicating a 100.78 percent increase. Crew fatalities climbed 41.18 percent, while injuries to others climbed 500 percent from the base period figure of one. The total number of fatalities in 1968 increased 96.19 percent over the base period figure. The passenger fatality rate per 100 million passenger-miles flown increased 30.26 percent.

ACCIDENTS, ACCIDENT RATES, GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Passengers Carried</u>	87,557,661	133,000,000	+51.80%
<u>Passenger-Miles Flown</u>	56,487,899,200	86,900,000,000	+53.84%
<u>Accidents</u>			
Total Accidents	46.4	44	- 5.17%
Fatal Accidents	5.6	11 ^{a/}	+96.43%
<u>Fatal Injuries</u>			
<u>Passengers</u>	128.8	258	+100.78%
<u>Crew</u>	17.0	24	+41.18%
<u>Others</u>	1.0	6	500.00%
<u>Total</u>	146.8	288	96.19%
<u>Passenger Fatality Rate</u>			
<u>Per 100 Million</u>			
<u>Passenger-Miles Flown</u>	0.213	0.297	+30.26%

^{a/} Includes 2 midair collisions nonfatal to Air Carrier occupants.

Note: Passenger deaths occurring in sabotage accidents are included in the Passenger Fatality row but excluded in the computation of Passenger Fatality Rates. (1964-41.).

U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED INTERNATIONAL PASSENGER SERVICE

1968

In 1968, U. S. Certificated Route Air Carriers engaged in Scheduled International Passenger Service showed large increases in activity indicators. The number of passengers carried increased 52.27 percent, while passenger-miles flown increased 47.30 percent. The total number of accidents increased 35.13 percent while the number of fatal accidents increased 100 percent from one in the base period year to two in 1968. Passenger fatalities increased 25 percent in 1968, while the total number of fatalities increased 30.73 percent. The passenger fatality rate per 100 million passenger-miles decreased over 15 percent.

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Passengers Carried</u>	10,310,540	15,700,000	+52.27%
<u>Passenger-Miles Flown</u>	17,922,869,600	26,400,000,000	+47.30%
<u>Accidents</u>			
Total Accidents	7.4	10	+35.13%
Fatal Accidents	1.0	2	+100.00%
<u>Fatal Injuries</u>			
Passengers	37.6	47	+25.00%
Crew	5.8	10	+72.41%
Others	0.2	0	-100.00%
Total	43.6	57	+30.73%
<u>Passenger Fatality Rate Per 100 Million Passenger- Miles Flown</u>	0.210	0.178	-15.24%

U. S. SUPPLEMENTAL AIR CARRIERS
ALL OPERATIONS
1968

The total number of accidents incurred by U. S. Supplemental Air Carriers in 1968 increased 50.00 percent, or about the increase in aircraft miles flown (60.07 percent). All of the other indicators showed decreases. The number of fatal injuries decreased 95.15 percent, while the fatality rate per 100 million passengers miles decreased almost 97 percent. The total accident rate and fatal accident rate showed decreases of 6.90 percent and 60.87 percent, respectively.

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Aircraft Miles Flown</u>	69,032,600 ^{a/}	110,500,000 ^{a/}	+60.07%
<u>Accidents</u>			
Total Accidents	6.0	9	+50.00%
Fatal Accidents	1.6	1	-37.50%
<u>Fatal Injuries</u>	20.6	1	-95.15%
<u>Accident Rates Per Million Aircraft Miles Flown</u>			
Total Accidents	.087	.081	- 6.90%
Fatal Accidents	.023	.009	-60.87%
<u>Fatality Rate Per Million Aircraft Miles Flown</u>	.298	.009	-96.98%

^{a/} Nonrevenue miles not reported.

U. S. SUPPLEMENTAL AIR CARRIERS
PASSENGER OPERATIONS-CIVIL AND MILITARY
1968

In 1968, U. S. Supplemental Air Carriers engaged in Civil and Military Passenger Operations flew over nine billion passenger-miles, representing a 189.20 percent increase over the 3,129,269,400 passenger-miles averaged during the base period of 1963-1967 and approximately a 50 percent increase over the six billion passenger-miles flown in 1967. An increase of 103.2 percent in passengers carried is further evidence of the large increase in activity for 1968. The three accidents in 1968 brought a 400 percent increase in the total number of accidents in 1968, but since there were no fatal accidents and no fatalities in 1968, all the indicators based on fatalities and fatal accidents decreased 100 percent. This is the second consecutive year that Passenger Operations of the Supplemental Air Carriers have incurred no fatal accidents or fatalities. The extremely safe year recorded by "Passenger Operations" helped to keep the fatal accident rate and fatality rate for "All Operations" down as well.

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1963-1967)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Passenger-Miles Flown</u>	3,129,269,400	9,050,000,000	+189.20%
<u>Passengers Carried</u>	1,279,518	2,600,000	+103.20%
<u>Accidents</u>			
Total Accidents	0.6	3	+400.00%
Fatal Accidents	0.2	0	-100.00%
<u>Fatal Injuries</u>			
Passengers	15.6	0	-100.00%
Crew	1.0	0	-100.00%
Others	0	0	Unchanged
Total	16.6	0	-100.00%
<u>Passenger Fatality Rate</u>			
<u>Per 100 Million</u>			
<u>Passenger-Miles Flown</u>	0.50	0	-100.00%

U. S. GENERAL AVIATION

1968

U. S. General Aviation continued to grow in calendar year 1968. The number of aircraft hours flown increased 32.07 percent over the 1963-1967 base period average, while aircraft miles flown increased 37.83 percent over the 1963-1967 figure. Again, the increase in aircraft hours flown and aircraft miles flown was greater than the increase in fatal accidents or fatalities. Because fatal accidents and fatal injuries did not increase to the same extent as aircraft hours flown and aircraft miles flown, the fatal accident rate per 100,000 aircraft hours flown decreased 3.67 percent when compared to the base period and the fatal accident rate per million aircraft miles flown decreased 7.96 percent from the base period average.

The total number of accidents in 1968 cannot be compared with the average base period year because of the effect of an amendment to Part 430; Subpart A, General; 430.2, Definitions; of the National Transportation Safety Board Investigation Regulations which became effective January 1, 1968. The amendment did not change the definition of an aircraft accident, which is: "an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which any person suffers death or serious injury as a result of being in or upon the aircraft or by direct contact with the aircraft or anything attached thereto, or the aircraft receives substantial damage".

The amendment, however, changed the definition of substantial damage. Effective January 1, 1968, the definition of substantial damage was changed to read:

(1) Except as provided in subparagraph (2) of this paragraph, substantial damage means damage or structural failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

(2) Engine failure, damage limited to an engine, bent fairings or cowlings, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for this part.

Prior to January 1, 1968, the definition of substantial damage was:

(1) Except as provided in subparagraph (2) of this paragraph:
(i) Substantial damage in aircraft of 12,500 pounds maximum certificated takeoff weight or less means damage or structural failure reasonably estimated to cost \$300 or more to repair.

(ii) Substantial damage in aircraft of more than 12,500 pounds maximum certificated takeoff weight means damage or structural failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repairs or replacement of the affected component.

(2) Engine failure, damage limited to an engine, bent fairings or cowlings, dented skin, small punctured holes in the skin or fabric, taxiing damage to propeller blades, damage to tires, engine accessories, brakes or wingtips are not considered "substantial damage" for the purpose of this part.

The decline in the total number of accidents in General Aviation is attributed to this change primarily because all activity indicators showed increases, and because fatal accidents and fatal injuries were greater for 1968 than for the base period or for 1967 alone.

U. S. GENERAL AVIATION

1968

ACCIDENTS, FATALITIES, RATES, AND GROWTH CHANGES FROM BASE (1963 - 67)

	<u>Base</u>	<u>1968</u>	<u>Percentage Change</u>
<u>Estimated Hours Flown</u>			
Total Flying	18,150,600	23,972,000 ^{a/}	+32.07%
<u>Miles Flown</u>			
Total Flying	2,713,574,800	3,740,000,000 ^{a/}	+37.83%
<u>Accidents</u>			
Total Accidents	5356.4	5069	- 5.37%
Fatal Accidents	544.4	692	+27.11%
Fatal Injuries	1097.8	1374	+25.16%
<u>Accident Rates</u>			
<u>Per 100,000 Aircraft</u>			
<u>Hours Flown</u>			
Total Accidents	29.51	21.14	-27.35%
Fatal Accidents	3.00	2.89	- 3.67%
<u>Per Million Aircraft</u>			
<u>Miles Flown</u>			
Total Accidents	1.974	1.355	-31.36%
Fatal Accidents	.201	.185	- 7.96%

^{a/} Estimated by FAA

SECTION II

A COMPARISON OF AIRCRAFT ACCIDENT DATA

SCHEDULED INTERNATIONAL PASSENGER SERVICE VS. SCHEDULED DOMESTIC PASSENGER SERVICE

Indices of growth (passengers carried and passenger-miles flown) were similar for Scheduled Domestic and Scheduled International Passenger service. Scheduled Domestic Passenger Service showed a slight decline in the total number of accidents (5.17 percent), while Scheduled International Passenger Service showed a slight increase (8.11 percent). Fatal accidents showed sharp increases in both cases, 100 percent in International Service and 96.43 percent in Domestic Service. Fatal injuries increased 96.19 percent in Scheduled Domestic Passenger Service, while in Scheduled International Passenger Service a 30.73 percent increase in total fatalities was posted.

The passenger fatality rate per 100 million passenger-miles flown was essentially the same for the two types of service during the base period, but for 1968 the rate for Scheduled Domestic Passenger Service was considerably higher than that for Scheduled International Passenger Service.

Scheduled Domestic Passenger Service carried 8.3 times more passengers than did Scheduled International Passenger Service, flying them 3.3 times as many passenger-miles. This indicates the difference in the average number of miles each passenger travels per departure, 653 miles in Scheduled Domestic Passenger Service and 1682 miles in Scheduled International Passenger Service.

The percentage of total accidents which were fatal is similar for both types of service during the five year base period, 13.5 percent for Scheduled International Passenger Service and 12.1 percent for Scheduled Domestic Passenger Service.

U. S. CERTIFICATED ROUTE AIR CARRIERS, ALL OPERATIONS, VS. U. S. SUPPLEMENTAL AIR CARRIERS, ALL OPERATIONS

U. S. Certificated Route Air Carriers accounted for 95.7 percent of the mileage flown by the Certificated Route and Supplemental Air Carriers in all operations in 1968, yet incurred only 7 times more total accidents than did the Supplemental Air Carriers. During the base period, however, the Certificated Route Air Carriers incurred over 11 times more total accidents than did the Supplemental Air Carriers. During the base period, slightly over one fourth of the accidents in Supplemental Operations were fatal, while about one seventh of the accidents in Certificated Route Operations were fatal.

The fatality rate per million aircraft miles flown was much higher in 1968 for U. S. Certificated Route Air Carriers, All Operations, than for U. S. Supplemental Air Carriers, All Operations. The figures for the base period, however, show that this relationship has been reversed in previous years. During the base period the fatality rate per million aircraft miles flown was almost two times higher for Supplemental Air Carriers than for Certificated Route Air Carriers.

SECTION III

TABLES

ACCIDENTS, ACCIDENT RATES AND FATALITIES
U. S. CERTIFICATED ROUTE AND SUPPLEMENTAL AIR CARRIERS

(ALL OPERATIONS)

1958 - 1968

1958 - 1968								Accident Rate Per Million Aircraft Miles Flown	
Year	Number of Accidents		Fatalities				Aircraft Miles Flown	Total	Fatal
	Total	Fatal	Passg.	Crew	Others	Total		Accidents	Accidents
1958.....	91	14	128	29	3	160	1,084,652,000	.083	.012
1959.....	101	18	271	61	8	340	1,155,520,000	.087	.015
1960.....	90	17 <u>a/</u>	429	57	13	499	1,130,069,000	.078	.011
1961.....	84	11	275	35	1	311	1,104,042,000	.076	.009
1962.....	70	10	279	48	3	330	1,170,374,000	.059	.008
1963.....	77	13	223	41	0	264	1,231,312,000 <u>b/</u>	.063	.011
1964.....	79	13	202	35	1	238	1,336,867,000 <u>b/</u>	.058	.009
1965.....	83	9	226	35	0	261	1,536,395,000 <u>b/</u>	.054	.006
1966.....	75	8	137	27	108	272	1,768,457,000 <u>b/</u>	.042	.005
1967.....	70	12	229	39	18	286	2,160,363,268 <u>b/</u>	.032	.006
1968 (Prelim).. <td>72</td> <td>16 <u>c/</u></td> <td>306</td> <td>39</td> <td>6</td> <td>351</td> <td>2,580,500,000 <u>b/</u></td> <td>.028</td> <td>.005</td>	72	16 <u>c/</u>	306	39	6	351	2,580,500,000 <u>b/</u>	.028	.005

a/ Includes 3 midair collisions nonfatal to Air Carrier occupants, excluded in fatal accident rates.

b/ Nonrevenue miles of the Supplemental Air Carriers are not reported.

NOTE: Sabotage accidents occurring 1/6/60, 5/22/62, and 5/7/64
are all included all computations except rates.

c/ Includes 2 midair collisions nonfatal to Air Carrier
occupants, excluded in fatal accident rates.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
December 31, 1968

ACCIDENTS, ACCIDENT RATES AND FATALITIES
U. S. CERTIFICATED ROUTE CARRIERS
 (ALL OPERATIONS)

1958 - 1968

<u>Year</u>	<u>Number of Accidents</u>		<u>Fatalities</u>				<u>Aircraft Miles Flown</u>	<u>Accident Rates Per Million Aircraft Miles Flown</u>	
	<u>Total</u>	<u>Fatal</u>	<u>Passg.</u>	<u>Crew</u>	<u>Others</u>	<u>Total</u>		<u>Total Accidents</u>	<u>Fatal Accidents</u>
1958.....	85	13	128	27	3	158	1,045,439,000	0.081	0.012
1959.....	93	17	270	59	8	337	1,112,703,000	0.083	0.015
1960.....	82	13	336	46	11	393	1,077,745,000	0.075	0.009
1961.....	78	8	124	24	1	149	1,056,059,000	0.073	0.007
1962.....	63	9	279	45	3	327	1,117,104,000	0.055	0.007
1963.....	66	10	222	37	0	259	1,180,620,000	0.056	0.008
1964.....	70	12	200	33	1	234	1,286,029,000	0.054	0.009
1965.....	73	8	226	30	0	256	1,473,744,000	0.050	0.005
1966.....	69	6	59	20	107	186	1,683,547,000	0.041	0.004
1967.....	66	11	229	36	18	283	2,083,667,757	0.032	0.005
1968. (PRELIM.).	63	15	a/ 305	39	6	350	2,470,000,000	0.026	0.005

a/ Includes 2 midair collisions nonfatal to Air Carrier occupants, excluded in fatal accident rates.

Note: Sabotage accidents occurring 1/6/60, 5/22/62, 5/7/64.
 are included in all computations except rates.

NATIONAL TRANSPORTATION SAFETY BOARD
 Department of Transportation
 Washington, D. C. 20591
 December 31, 1968

PRELIMINARY INFORMATIONFATAL ACCIDENTS - FATALITIESU. S. AIR CARRIERS(ALL OPERATIONS)

1968

<u>Date</u>	<u>Location</u>	<u>Operator</u>	<u>Type of Service</u>	<u>Aircraft</u>	<u>Damage</u>	<u>Fatalities</u>				<u>Aboard</u>	<u>Reported Type of Accident</u>
						<u>Passg.</u>	<u>Crew</u>	<u>Other</u>	<u>Total</u>		
<u>CERTIFICATED ROUTE AIR CARRIERS</u>											
3/27/68	St. Louis, Mo.	OZA	Passg. (S-D)	DC-9 Cessna 150	Subst. Dest.			2	None 2	44 2	Mid-air collision.
5/3/68	Dawson, Texas	BNF	Passg. (S-D)	L-188	Dest.	80	5		85	85	Crashed en route.
5/22/68	Los Angeles, California	LAA	Passg. (S-D)	S-61L	Dest.	20	3		23	23	Crashed en route.
6/13/68	Calcutta, India	PAWA	Passg. (S-I)	B-707	Dest.	5	1		6	63	Crashed during landing.
3/4/68	Nr. Milwaukee, Wisc.	NOR	Passg. (S-D)	CV-580 Cessna 150	Subst. Dest.			3	None 3	12 3	Mid-air collision.
8/10/68	Charleston, W. Va.	PAI	Passg. (S-D)	FH-227	Dest.	32	3		35	37	Crashed during approach.
8/14/68	Los Angeles, Calif.	LAA	Passg. (S-D)	S-61	Dest.	18	3		21	21	Crashed en route.
10/25/68	Hanover, N. H.	NEA	Passg. (S-D)	FH-227	Dest.	30	2		32	42	Crashed during descent for landing.

NATIONAL TRANSPORTATION SAFETY BOARD
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January 2, 1969

Date	Location	Operator	Type of Service	Aircraft	Damage	Fatalities			Aboard	Reported Type of Accident	
						Passg.	Crew	Other			
12/2/68	Pedro Bay, Alaska	WCA	Passg. (S-D)	F-27	Dest.	36	3		39	39	Crashed en route.
12/12/68	Nr. Caracas, Venezuela	PAWA	Passg. (S-I)	B-707	Dest.	42	9		51	51	Crashed en route.
12/24/68	Bradford, Pa.	AAA	Passg. (S-D)	CV-580	Dest.	18	2		20	47	Crashed during approach.
12/24/68	Put, Alaska	RDLX	Cargo (NS-D)	L-100	Subst.		2		2	4	Crashed during approach.
12/26/68	Anchorage, Alaska	PAWA	Cargo(I) Mil.-Ctr.	B-707	Dest.		3		3	3	Crashed during takeoff.
12/27/68	Chicago, Ill.	NOR	Passg. (S-D)	CV-580	Dest.	24	3		27	45	Crashed during approach.
					Subtotal	305	39	5	349	521	
<u>SUPPLEMENTAL AIR CARRIERS</u> 6/28/68	Nr. Vichy, Mo.	PURD	Passg. (D)	DC-3	Minor	1			1	27	Passenger fell out of door-opened in flight.
Total All Carriers						306	39	5	350	548	
<u>PROPELLER - TO - PERSON - ACCIDENT</u>											
11/19/68	Minneapolis, Minn.	NWA	Passg. (S-D)	L-188	None		1		1	62	Propeller-to-Person accident.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
January 2, 1968

ACCIDENTS, ACCIDENT RATES
CERTIFICATED ROUTE AIR CARRIERS
ALL SCHEDULED SERVICE
1958 - 1968

1958 - 1968						Accident Rates					
Year	Accidents		Aircraft Miles Flown	Aircraft Hours Flown	Number of Departures	Per 1 Million Aircraft Miles		Per 100,000 Aircraft Hours		Per 100,000 Departures	
	Total	Fatal				Total	Fatal	Total	Fatal	Total	Fatal
	Accidents	Accidents				Accidents	Accidents	Accidents	Accidents	Accidents	Accidents
1958.....	67	8	972,988,000	4,338,900	3,633,348	.068	.008	1.544	.184	1.844	.220
1959.....	78	14	1,030,252,000	4,503,000	3,912,178	.075	.013	1.732	.310	1.993	.357
1960.....	72	12 ^{a/}	997,923,699	4,088,650	3,856,477	.071	.009	1.736	.220	1.841	.233
1961.....	66	6	969,656,382	3,654,503	3,750,364	.068	.006	1.806	.164	1.760	.160
1962.....	47	6	1,009,683,730	3,491,174	3,660,245	.046	.005	1.318	.143	1.257	.137
1963.....	54	6	1,094,524,929	3,604,228	3,787,779	.049	.005	1.498	.166	1.426	.158
1964.....	59	11	1,169,135,330	3,774,771	3,954,083	.049	.008	1.537	.265	1.467	.253
1965.....	65	3	1,353,499,382	4,071,987	4,197,489	.048	.006	1.596	.196	1.549	.191
1966.....	56	5	1,482,273,113	4,232,932	4,373,229	.038	.003	1.323	.118	1.281	.114
1967.....	54	8	1,833,562,999	4,924,080	4,945,969	.029	.004	1.097	.162	1.092	.162
1968 (Prelim)	57	13 ^{a/}	2,200,000,000	5,600,000	5,400,000	.026	.005	1.018	.196	1.056	.204

^{a/} Includes 2 midair collisions, nonfatal to Air Carrier occupants, excluded in fatal accident rates.

Note: Sabotage accidents occurring 1/6/60, 3/22/62, and 5/7/64, are included in all computations except rates.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
January 17, 1969

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED DOMESTIC AND INTERNATIONAL PASSENGER SERVICE

1958 - 1968

<u>Year</u>	<u>Accidents</u>		<u>Fatalities</u>				<u>Passengers Carried</u>	<u>Passenger-Miles Flown</u>	<u>Passenger Fatality Rate Per 100 Million Passenger- Miles Flown</u>
	<u>Total</u>	<u>Fatal</u>	<u>Passg.</u>	<u>Crew</u>	<u>Other</u>	<u>Total</u>			
1958.....	54	6	124	15	5	144	48,853,324	32,497,133,000	0.382
1959.....	67	10	268	42	0	310	56,002,094	37,765,609,000	0.710
1960.....	67	12 <u>a/</u>	336	42	11	389	57,886,566	40,484,908,000	0.758
1961.....	58	5	124	11	1	136	58,411,977	41,701,560,000	0.298
1962.....	43	5	158	25	0	183	62,548,399	45,853,343,000	0.264
1963.....	49	5	121	24	0	145	71,437,828	52,703,333,000	0.230
1964.....	53	9	200	26	1	227	81,762,273	61,022,488,000	0.261
1965.....	63	7	226	27	0	253	94,662,314	71,796,399,000	0.315
1966.....	53	4	59	13	0	72	109,390,556	83,142,197,000	0.071
1967.....	51	8	226	24	5	255	132,088,038	103,381,996,000	0.219
1968 (Prelim.)	54	13 <u>a/</u>	305	34	6	345	148,700,000	113,300,000,000	0.269

a/ Includes 2 midair collisions, nonfatal to Air Carriers occupants.

Note: Passenger deaths occurring in sabotage accidents are included in the passenger fatality column, but excluded in the computation of Passenger Fatality Rates;
1960 - 29; 1962 - 37; 1964 - 41.

Note: Alaskan Air Carriers are not included prior to 1959.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
December 31, 1968

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED DOMESTIC PASSENGER SERVICE

1958 - 1968

<u>Year</u>	<u>Accidents</u>		<u>Fatalities</u>				<u>Passengers Carried</u>	<u>Passenger-Miles Flown</u>	<u>Passenger Fatality Rate Per 100 Million Passenger- Miles Flown</u>
	<u>Total</u>	<u>Fatal</u>	<u>Passg.</u>	<u>Crew</u>	<u>Other</u>	<u>Total</u>			
1958.....	42	4	114	15	5	134	44,580,984	26,266,401,000	0.434
1959.....	61	9	209	33	0	242	51,002,218	30,435,495,000	0.687
1960.....	62	10	326	37	11	374	52,391,708	31,851,753,000	0.932
1961.....	56	5	124	11	1	136	52,712,556	32,547,998,000	0.381
1962.....	35	5	158	25	0	183	55,949,948	35,287,129,000	0.343
1963.....	39	4	48	16	0	64	63,924,577	40,263,416,000	0.119
1964.....	45	6	106	14	0	120	72,987,736	46,044,743,000	0.141
1965.....	55	6	205	18	0	223	84,466,884	54,254,616,000	0.378
1966.....	50	4	59	13	0	72	97,745,566	62,964,948,000	0.094
1967.....	43	8	226	24	5	255	118,663,542	78,911,773,000	0.286
1968 (Prelim.)	44	11	258	24	6	288	133,000,000	86,900,000,000	0.297

Note: Alaskan Air Carriers are not included prior to 1959.

Note: Effective 1959, Alaskan Air Carrier operations between Alaska and the conterminous states are recorded under International Operations.

Note: Passenger deaths occurring in sabotage accidents are included in the passenger fatality column but excluded in the computation of passenger fatality rates. 1960-29; 1962-37; 1964-41.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
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December 31, 1968

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED INTERNATIONAL PASSENGER SERVICE

1958 - 1968

<u>Year</u>	<u>Accidents</u>		<u>Fatalities</u>				<u>Passengers Carried</u>	<u>Passenger-Miles Flown</u>	<u>Passenger Fatality Rate Per 100 Million Passenger Miles Flown</u>
	<u>Total</u>	<u>Fatal</u>	<u>Passg,</u>	<u>Crew</u>	<u>Other</u>	<u>Total</u>			
1958.....	12	2	10	0	0	10	4,272,340	6,230,732,000	0.160
1959.....	6	1	59	9	0	68	4,999,876	7,330,114,000	0.805
1960.....	5	2	10	5	0	15	5,494,858	8,633,155,000	0.116
1961.....	2	0	0	0	0	0	5,699,421	9,153,562,000	0
1962.....	8	0	0	0	0	0	6,598,451,	10,566,214,000	0
1963.....	10	1	73	8	0	81	7,513,251	12,439,917,000	0.587
1964.....	8	3	94	12	1	107	8,774,537	14,977,745,000	0.628
1965.....	8	1	21	9	0	30	10,195,430	17,541,783,000	0.120
1966.....	3	0	0	0	0	0	11,644,990	20,184,680,000	0
1967.....	8	0	0	0	0	0	13,424,496	24,470,223,000	0
1968(Prelim.)	10	2	47	10	0	57	15,700,000	26,400,000,000	0.178

Note: Effective 1959, Alaska Air Carrier operations between Alaska and the conterminous states are recorded under International Operations.

Note: Alaskan Air Carriers are not included prior to 1959.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
December 31, 1968

ACCIDENTS, ACCIDENT RATES AND FATALITIES
U. S. SUPPLEMENTAL AIR CARRIERS
(ALL OPERATIONS)

1958 - 1968

<u>Year</u>	<u>Number of Accidents</u>		<u>Fatalities</u>				<u>Aircraft Miles Flown</u>	<u>Accident Rate Per Million Aircraft Miles Flown</u>	
	<u>Total</u>	<u>Fatal</u>	<u>Passg.</u>	<u>Crew</u>	<u>Others</u>	<u>Total</u>		<u>Total Accidents</u>	<u>Fatal Accidents</u>
1958.....	6	1	0	2	0	2	39,213,000	0.153	0.025
1959.....	8	1	1	2	0	3	42,817,000	0.186	0.023
1960.....	8	4 <u>a/</u>	93	11	2	106	52,324,000	0.152	0.057
1961.....	6	3	151	11	0	162	47,983,000	0.125	0.062
1962.....	7	1	0	3	0	3	53,270,000	0.131	0.019
1963.....	11	3	1	4	0	5	50,692,000 <u>b/</u>	0.217	0.059
1964.....	9	1	2	2	0	4	50,838,000 <u>b/</u>	0.177	0.020
1965.....	10	1	0	5	0	5	62,651,000 <u>b/</u>	0.160	0.016
1966.....	6	2	78	7	1	86	84,911,000 <u>b/</u>	0.071	0.024
1967.....	4	1	0	3	0	3	96,071,000 <u>b/</u>	0.042	0.010
1968(Prelim.)	9	1	1	0	0	1	110,500,000 <u>b/</u>	0.081	0.009

a/ Includes 1 midair collision, nonfatal to Air Carrier occupants, excluded in fatal accident rates.

b/ Nonrevenue miles not reported.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
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December 31, 1968

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. SUPPLEMENTAL AIR CARRIERS
PASSENGER OPERATIONS (CIVIL AND MILITARY)

1958 - 1968

Year	Accidents		Fatalities				Passengers Carried	Passenger Miles Flown	Passenger Fatality Rate Per 100 Million Passenger Miles Flown
	Total	Fatal	Passg.	Crew	Other	Total			
1958.....	2	0	0	0	0	0	676,072	1,152,988,000	0
1959.....	5	1	1	2	0	3	895,518	1,629,556,000	0.061
1960.....	3	2	93	9	0	102	1,057,933	2,207,595,000	4.213
1961.....	2	2	151	9	0	160	978,171	1,543,027,000	9.786
1962.....	1	0	0	0	0	0	823,838	1,789,154,000	0
1963.....	2	0	0	0	0	0	749,164(est)	1,533,810,000	0
1964.....	0	0	0	0	0	0	674,489	1,502,018,000	0
1965.....	0	0	0	0	0	0	1,060,206	2,489,173,000	0
1966.....	1	1	78	5	0	83	1,597,911	4,125,445,000	1.891
1967.....	0	0	0	0	0	0	2,315,820	5,995,901,000	0
1968(Prelim.)	3	0	0	0	0	0	2,600,000	9,050,000,000	0

NATIONAL TRANSPORTATION SAFETY BOARD
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ACCIDENTS, FATALITIES, RATES
U. S. GENERAL AVIATION

1958 - 1968

Year	Accidents		Fatalities	Aircraft Hours Flown (000) ^{a/}	Aircraft Miles Flown (000) ^{a/}	ACCIDENT RATES			
	Total	Fatal				Per 100,000 Aircraft Hours Flown		Per Million Aircraft Miles Flown	
						Total	Fatal	Total	Fatal
1958.....	4,584	384	717	12,579	1,660,109	36.4	3.1	2.8	0.2
1959.....	4,576	450	823	12,903	1,716,019	35.3	3.5	2.7	0.3
1960.....	4,793	429	787	13,121	1,768,704	36.5	3.3	2.7	0.2
1961.....	4,625	426	761	13,602	1,857,946	34.0	3.1	2.5	0.2
1962.....	4,840	430	857	14,500	1,964,586	33.4	3.0	2.5	0.2
1963.....	4,690	482	893	15,106	2,048,574	31.0	3.2	2.3	0.2
1964.....	5,069	526	1,083	15,738	2,180,818	32.2	3.3	2.2	0.2
1965.....	5,196	538	1,029	16,733	2,562,380	31.1	3.2	2.0	0.2
1966.....	5,712	573	1,149	21,023	3,336,138	27.2	2.7	1.7	0.2
1967.....	6,115	603	1,228	22,153	3,439,964	27.6	2.7	1.8	0.2
1968 (Prelim)	5,069 ^{b/}	692	1,374	23,972	3,740,000	21.1	2.9	1.4	0.2

^{a/} Source: FAA

^{b/} Commencing January 1, 1968, the definition of "substantial damage", and therefore, of a reportable accident, was changed, therefore fewer accidents were reported. Care should be used in comparing with similar data for prior year.

NATIONAL TRANSPORTATION SAFETY BOARD
Department of Transportation
Washington, D. C. 20591
January 15, 1969