BUREAU OF SAFETY REPORT

BOSR 5-4-4

U.S. AIR CARRIER ACCIDENTS

STATISTICAL REVIEW and RESUME OF ACCIDENTS

Calendar Year 1963

CIVIL AERONAUTICS BOARD
WASHINGTON, D.C. 20428

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FOREWORD

The purpose of this report is to present the record of aircraft accidents, incident to flight, which occurred in U. S. Air Carrier operations during the calendar year 1963. It includes a statistical recapitulation of all accidents, and a brief description of each accident along with the probable cause as determined by the Civil Aeronautics Board.

Certain revisions and corrections have been incorporated in data dealing with years prior to 1963 due to the receipt of additional information or changes in classification.

Public reports containing greater detail have been issued by the Board on a number of the major accidents included in this report and are available upon request. In all cases, factual data obtained in the investigation may be released to inquirers at their expense when the reproduction of records is involved.

Effective April 1, 1963 the Civil Aeronautics Board adopted a revised Part 320 of the Safety Investigation Regulations, pertaining to aircraft accidents, inflight hazards, overdue aircraft, and safety investigations. All accidents in this publication were classified under the provisions of the regulation in effect at the time of the accident.

December 22, 1964

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Explanatory Notes

Aircraft Accident: For the purpose of this report the accidents included in this report are those occurrences incident to flight in which "as a result of the operation" of an aircraft, any (occupant or non-occupant) receives fatal or serious injury, or any aircraft receives substantial damage. Whenever serious or fatal injury results from contact with a rotating propeller which is installed on an aircraft, it shall be considered an aircraft accident.

Aircraft Accident Incident to Flight: An aircraft accident incident to flight is an aircraft accident which occurs between the time an engine or engines are started for the purpose of commencing flight until the aircraft comes to rest with all engines stopped for complete or partial deplaning or unloading. It excludes death or injuries to persons on board which results from illness, altercations, and other incidents not directly attributable to flight operations.

Air Carrier: As used in this report, those operators who have been issued a Certificate of Public Convenience and Necessity by the Civil Aeronautics Board.

Aircraft Miles: The miles (computed in airport-to-airport distances) for each interairport flight actually completed, whether or not performed in accordance with the scheduled pattern. For this purpose, operation to a flag stop is a flight completed even though a landing is not actually made. In cases where interairport distances are inapplicable, aircraft miles flown are determined by multiplying the normal cruising speed of the aircraft by the airborne hours.

All-Cargo Carriers: Certificated Route Carriers primarily engaged in the transportation of freight and express. The nonscheduled passenger operations of these carriers are included in this category. Does not include the all cargo operations of the passenger/cargo carriers.

All-Cargo Service: Transport service established primarily for the transportation of freight, express, and/or mail.

Certificate of Public Convenience and Necessity: A certificate issued to an Air Carrier by the Civil Aeronautics Board, authorizing the carrier to engage in air transportation.

Explanatory Notes

Certificated Route Carriers: One of a class of air carriers holding certificates of Public Convenience and Necessity, issued by the Civil Aeronautics Board, authorizing the performance of scheduled air transportation over specified routes and a limited amount of nonscheduled operations. This general carrier grouping includes the all-purpose carriers (i.e., the so-called passenger/cargo carriers) and the all-cargo carriers, and comprises all of the airlines certificated by the Board, except supplemental air carriers. Certificated Route Air Carriers are often referred to as "Scheduled Airlines" although they also perform nonscheduled service.

Domestic Operations: In general, operation wholly within the territory of the United States. Includes domestic operations of the certificated trunk carriers and the local service, Helicopter, Intra-Alaska, Intra Hawaii and Domestic All-Cargo carriers.

Domestic Trunk Carriers: Those domestic "grandfather" carriers designated as "Trunk Carriers" in 1945-46, when "feeder" carriers (now called local service carriers) were granted certificates by the Civil Aeronautics Board to perform local feeder air service. International and Territorial operations of the Trunk Carriers are shown under "International and Territorial Operations" and are not included under "Domestic Operations."

Helicopter Carriers: Domestic Certificated Route Air Carriers employing helicopter aircraft for their primary operations.

International and Territorial Operations: In general, operations outside the territory of the United States, including operations between United States points separated by foreign territory or major expanses of international waters.

Intra-Alaska Operations: Statehood for Alaska since 1959 requires the inclusion of its Intra-State air carrier operations with the Domestic carriers. Operations between Alaska and other States of the United States are included under International and Territorial, since such operations are over foreign territory or International waters.

EXPLANATORY NOTES

Intra-Hawaii Operations: Intra-Hawaii air carrier operations, are included under Domestic operations. Operations between Hawaii and other States of the United States are carried under International and Territorial Operations.

Local Service Carriers: Certificated Domestic Route Air Carriers operating over routes of lesser density between the smaller traffic centers and between those centers and principal centers.

Nonscheduled Service: Revenue flights that are not operated in regular scheduled service such as charter flights and all nonrevenue flights incident to such flights.

Passenger Mile: One passenger transported one mile. Passenger miles are computed by the summation of the products of the aircraft miles flown on each interairport flight multiplied by the number of passengers carried on that flight

Revenue Passenger: A person receiving air transportation from an air carrier for which remuneration is received by the air carrier. Air carrier employees and others receiving air transportation against whom token service charges are levied are considered nonrevenue passengers.

Revenue Plane Miles: The total plane miles flown in revenue service.

Supplemental Air Carriers: One of a class of air carriers holding temporary Certificates of Public Convenience and Necessity, issued by the Civil Aeronautics Board, authorizing them to perform passenger and cargo charter services supplementing the scheduled service of the certificated route air carriers.

Causal Factors: In determining the cause of an accident all contributing factors are considered. The factors are classified according to appropriate categories. For statistical purposes, where two or more causal factors exist in an accident, each is recorded and no attempt is made to establish a primary cause. Therefore, the figure shown in the tables dealing with causal factors will exceed the total number of accidents.

Explanatory Notes

Accidents involving sabotage are included in the total number of accidents and the resulting fatalities are included in the total fatalities. However, these accidents and fatalities are excluded in the computation of accident rates and passenger fatality rates. Midair collisions nonfatal to air carrier occupants are excluded in computation of fatal accident rates.

Accidents Involving Sabotage

Date	Passenger Fatalities
11/1/55	39
7/25/57	1
1/6/60	29
5/22/62	37

The accident record of U. S. General Aviation, small fixed-wing aircraft, large fixed-wing aircraft, and rotorcraft, is contained in a separate publication entitled, General Aviation Accidents, A Statistical Review.

In 1963 there was one propeller accident to a person on the ground.

2/28/63 Boston, Mass. (Fatal)

This type of accident is excluded in all statistical tabulations except where noted.

Section I

STATISTICAL REVIEW

U. S. AIR CARRIER SAFETY RECORD - 1963

The 1963 safety record of the U. S. Air Carriers is presented in this report in relation to the various classifications and groupings of air carriers, and to the different types of operations in which they engage. There are two main categories of air carriers; the Certificated Route Carriers and the Supplemental Carriers. Data is furnished in relation to each category and to the different groupings of carriers within each category. Additional breakdowns are made in respect to the different types of service performed by these carriers.

HIGHLIGHTS - U. S. AIR CARRIER SAFETY RECORD - ALL OPERATIONS

In the overall operation of the U. S. Air Carriers during 1963 there were 77 aircraft accidents incident to flight, 13 of which were fatal accidents resulting in 264 fatalities. Following is a comparison of salient points with the previous three year's record.

	1960	1961	1962	1963
TOTAL ACCIDENTS.....	90	84	70	77
Fatal Accidents.....	17	11	10	13
Involving serious injury only.....	13	10	11	20
Involving minor or no injury	60	63	49	44
AIRCRAFT DAMAGE				
Destroyed.....	20	14	14	13
Substantial.....	56	63	46	48
FATALITIES - TOTAL.....	499	311	330	264
Passengers.....	429	275	279	223
Crew Members.....	57	35	48	41
Other Persons.....	13	1	3	0
MILES FLOWN - (Billions).....	1.13	1.10	1.17	1.23 1/
HOURS FLOWN - (Millions).....	4.66	4.19	4.11	4.13
ACCIDENT RATES				
Per 1 million aircraft miles.....	0.078	0.076	0.059	NA
Per 100 thousand aircraft hours.....	1.909	2.003	1.678	1.866

1/ Nonrevenue miles of the Supplemental Air Carriers not reported.

ALL OPERATIONS OF CERTIFICATED ROUTE CARRIERS

In 1963 the Certificated Route Carriers had 66 accidents in their total revenue and nonrevenue operations. Ten (10) of these were fatal accidents resulting in 259 fatalities. The distribution of accidents by type of operations was as follows:

Operation	Number Accidents Total	Number Accidents Fatal	Fatalities
Scheduled Passenger Service.....	49	5	145
Scheduled Cargo Service.....	5	1	4
Nonscheduled revenue operations.....	7	2	106
Nonrevenue Operations			
Training.....	3	1	3
Other.....	2	1	1
Total All Operations.....	66	10	259

Miles - Hours Flown	
Miles Flown.....	1,180,620,049
Hours Flown.....	3,901,423

	Total Accidents	Fatal Accidents
Accident Rates		
Per 1 million aircraft miles.....	0.056	0.008
Per 100 thousand aircraft hours....	1.692	0.256

SCHEDULED PASSENGER SERVICE

Revenue passengers carried.....	71.44 million
Passenger miles (revenue and nonrevenue)	52.70 billion
Aircraft miles flown.....	1.05 billion
Passenger Fatality Rate Per 100 Million Passenger-Miles Flown.....	0.23
Accident Rate Per 1 Million Aircraft Miles	
Total Accidents.....	0.047
Fatal Accidents.....	0.005
Miles Flown Per Accident.....	21.37 million
Miles Flown Per Fatal Accident.....	209.42 million

SUPPLEMENTAL AIR CARRIERS

ALL OPERATIONS OF SUPPLEMENTAL CARRIERS

In 1963, the Supplemental Air Carriers had 11 accidents three of which were fatal, resulting in 5 fatalities. These accidents occurred in the following types of operation.

Operation	Number Accidents Total	Number Accidents Fatal	Total Fatalities
Civil Operations:			
Passenger.....	1	0	0
Cargo.....	0	0	0
Military Operations:			
Passenger.....	1	0	0
Cargo.....	7	2	4
Training.....	0	0	0
Ferry.....	2	1	1
Total - All Operations.....	11	3	5

Miles - Hours Flown

Aircraft miles flown (Revenue)	50,692,208
Hours Flown (Revenue and Nonrevenue)	224,976

Accident Rates	Total Accidents	Fatal Accidents
Per 1 million aircraft miles	NA	NA
Per 100 thousand acft. hours	4.889	1.333

PASSENGER OPERATIONS

The Supplemental Carriers, in their Civil passenger operation had one nonfatal accident.

In their Military passenger operations, the Supplemental Carriers had one nonfatal accident.

Other pertinent statistics relating to passenger operations:

Type Operation	Passengers Carried	Passenger-Miles Flown	Passenger Fatality Rate Per 100 Million Passenger-Miles
Civil...	NA	398,010,000	0.00
Military	NA	1,135,800,000	0.00
Total...	NA	1,533,810,000	0.00

ACCIDENT RATES
U. S. CERTIFICATED ROUTE AND SUPPLEMENTAL AIR CARRIERS
ALL OPERATIONS
1963

CLASS OF CARRIER	Number of Accidents: Total	Injury Index: Fatal	Injury Index: Serious	Injury Index: Minor/None	Aircraft Damage: Destroyed	Aircraft Damage: Substantial	Aircraft Miles Flown	Aircraft Hours Flown	Accident Rates: Per 1 Million Miles: Total Accidents	Per 1 Million Miles: Fatal Accidents	Per 100,000 Hours: Total Accidents	Per 100,000 Hours: Fatal Accidents
CERTIFICATED ROUTE AIR CARRIERS												
1. Domestic Carriers												
Trunk	28	3	10	15	2	16	780,543,053	2,374,869	0.036	0.004	1.179	0.126
Local Service	9	2	1	6	3	6	125,462,191	735,793	0.072	0.016	1.223	0.272
Helicopter	3	1	0	2	1	2	1,634,765	17,230	1.835	0.612	17.411	5.804
All-Cargo	2	1	0	1	1	1	31,072,751	118,988	0.064	0.032	1.681	0.840
Other	0	0	0	0	0	0	173,065	1,274	0.000	0.000	0.000	0.000
Subtotal	42	7	11	24	7	25	938,885,825	3,248,154	0.045	0.007	1.293	0.216
Intra-Alaska	10	1	0	9	1	9	11,115,519	80,709	0.900	0.090	12.390	1.239
Intra-Hawaii	2	0	0	2	0	2	6,353,719	34,107	0.315	0.000	5.864	0.000
TOTAL DOMESTIC	54	8	11	35	8	36	956,355,063	3,362,970	0.056	0.008	1.606	0.238
2. International/Terr. Carriers												
Passenger/Cargo	12	2	7	3	2	4	213,033,867	502,788	0.056	0.009	2.387	0.398
All-Cargo	0	0	0	0	0	0	11,231,119	35,665	0.000	0.000	0.000	0.000
TOTAL INTERNATIONAL/TERRITORIAL	12	2	7	3	2	4	224,264,986	538,453	0.054	0.009	2.229	0.371
TOTAL CERTIFICATED ROUTE AIR CARRIERS.	66	10	18	38	10	40	1,180,620,049	3,901,423	0.056	0.008	1.692	0.256
SUPPLEMENTAL AIR CARRIERS												
1. Domestic Carriers												
Civil Operations	3	1	0	2	0	3	NA	NA	NA	NA	NA	NA
Military Contract	8	2	2	4	3	5	NA	NA	NA	NA	NA	NA
Subtotal	11	3	2	6	3	8	NA	NA	NA	NA	NA	NA
2. International												
Civil Operations	0	0	0	0	0	0	NA	NA	0.000	0.000	0.000	0.000
Military Contract	0	0	0	0	0	0	NA	NA	0.000	0.000	0.000	0.000
Subtotal	0	0	0	0	0	0	NA	NA	0.000	0.000	0.000	0.000
TOTAL SUPPLEMENTAL AIR CARRIERS	11	3	2	6	3	8	50,692,208 1/	224,976	NA	NA	4.889	1.333
TOTAL ALL OPERATIONS	77	13	20	44	13	48	1,231,312,257 2/	4,126,399	NA	NA	1.866	0.315

1/ Revenue miles only.

2/ Nonrevenue miles of the Supplemental Air Carriers not reported.

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ACCIDENT RATES
CERTIFICATED ROUTE AIR CARRIERS
ALL REVENUE OPERATIONS

1963

NOT REPRODUCIBLE

CLASS OF CARRIER	Number of Accidents: Total	Injury Index: Fatal	Injury Index: Serious	Injury Index: Minor/None	Aircraft Miles Flown	Aircraft Hours Flown	Number of Departures	Accident Rates: Total Accidents: 1 Million Miles	Total Accidents: 100,000 Hours	Total Accidents: 100,000 Departures	Fatal Accidents: 1 Million Miles	Fatal Accidents: 100,000 Hours	Fatal Accidents: 100,000 Departures
SCHEDULED SERVICE													
1. Domestic Carriers													
Trunk	27	2	10	15	752,715,970	2,288,839	2,075,499	0.036	1.180	1.301	0.003	0.087	0.096
Local Service	7	1	1	5	121,295,508	711,682	1,238,138	0.058	0.984	0.565	0.008	0.141	0.081
Helicopter	2	1	0	1	1,462,424	15,222	85,989	1.368	13.139	2.326	0.684	6.[illegible]	1.162
All-Cargo	2	1	0	1	7,928,814	29,894	11,743	0.252	6.690	17.031	0.126	3.345	8.516
Other	0	0	0	0	101,258	746	3,013	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal	38	5	11	22	883,503,974	3,046,383	3,414,382	0.043	1.247	1.113	0.006	0.164	0.146
Intra-Alaska	4	0	0	4	7,503,121	54,951	104,068	0.533	7.279	3.844	0.000	0.000	0.000
Intra-Hawaii	2	0	0	2	5,717,626	30,565	49,992	0.350	6.543	4.001	0.000	0.000	0.000
Total Domestic	44	5	11	28	896,724,721	3,131,899	3,568,442	0.049	1.405	1.233	0.006	0.160	0.140
2. International/Terr. Carriers													
Passenger/Cargo	10	1	6	3	192,140,447	454,244	213,506	0.052	2.201	4.684	0.005	0.220	0.468
All-Cargo	0	0	0	0	5,659,761	18,085	5,831	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL INTERNATIONAL/TERR.	10	1	6	3	197,800,208	472,329	219,337	0.051	2.117	4.559	0.005	0.212	0.456
TOTAL SCHEDULED SERVICE	54	6	17	31	1,094,524,929	3,604,228	3,787,779	0.049	1.498	1.426	0.005	0.166	0.158
NONSCHEDULED REVENUE SERVICE													
1. Domestic Carriers													
Trunk	0	0	0	0	4,248,310	15,293	6,254	0.000	0.000	0.000	0.000	0.000	0.000
Local Service	0	0	0	0	1,092,423	6,430	4,383	0.000	0.000	0.000	0.000	0.000	0.000
Helicopter	0	0	0	0	78,859	1,179	3,507	0.000	0.000	0.000	0.000	0.000	0.000
All-Cargo	0	0	0	0	20,898,408	82,006	42,011	0.000	0.000	0.000	0.000	0.000	0.000
Other	0	0	0	0	58,878	436	968	0.000	0.000	0.000	0.000	0.000	0.000
Subtotal	0	0	0	0	26,366,878	105,344	57,123	0.000	0.000	0.000	0.000	0.000	0.000
Intra-Alaska	5	1	0	4	2,988,865	21,063	27,266	1.673	23.738	18.338	0.335	4.748	3.668
Intra-Hawaii	0	0	0	0	134,586	955	960	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DOMESTIC	5	1	0	4	29,490,329	127,362	85,349	0.170	3.926	5.858	0.034	0.785	1.172
2. International/Terr. Carriers													
Passenger/Cargo	2	1	1	0	13,657,251	32,830	8,687	0.146	6.092	23.023	0.073	3.046	11.511
All-Cargo	0	0	0	0	5,182,426	16,247	2,668	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL INTERNATIONAL/TERR.	2	1	1	0	18,839,677	49,077	11,355	0.106	4.079	17.613	0.053	2.038	8.807
TOTAL NONSCHEDULED SERVICE	7	2	1	4	48,330,006	176,439	96,704	0.145	3.967	7.239	0.041	1.134	2.068
GRAND TOTAL	61	8	18	35	1,142,854,935	3,780,667	3,884,483	0.053	1.613	1.572	0.007	0.212	0.266

ACCIDENTS, INJURIES, AIRCRAFT DAMAGE
BY TYPE OF OPERATION
U. S. CERTIFICATED ROUTE AND SUPPLEMENTAL AIR CARRIERS

1963

ITEMS	CERTIFICATED ROUTE CARRIERS					SUPPLEMENTAL CARRIERS				GRAND TOTAL
	Scheduled Passenger Service	All Scheduled Service	Nonsched. Revenue Operations	Nonrevenue Operations	Total All Operations	Public Passenger/ Cargo Operations	Military Contract Operations	Nonrevenue Operations	Total All Operations	
Accidents - Injury Index										
Fatal	5	6	2	2	10	0	2	1	3	13
Serious	17	17	1	0	18	0	2	0	2	20
Minor/None	27	31	4	3	38	1	4	1	6	44
Total	49	54	7	5	66	1	8	2	11	77
Aircraft Damage										
Destroyed	6	7	2	1	10	0	3	0	3	13
Substantial	28	32	4	4	40	1	5	2	8	48
Minor/None	15	15	1	0	16	0	0	0	0	16
Total	49	54	7	5	66	1	8	2	11	77
Fatalities										
Captain	5	6	2	2	10	0	1	0	1	11
Copilot	5	6	1	0	7	0	2	0	2	9
Flight Engineer	2	2	1	0	3	0	0	0	0	3
Cabin Attendants	10	10	3	0	13	0	0	1	1	14
Other Crew	2	2	0	2	4	0	0	0	0	4
Passengers	121	123	99	0	222	0	1	0	1	223
Non-Occupants	0	0	0	0	0	0	0	0	0	0
Total	145	149	106	4	259	0	4	1	5	264
Serious Injuries										
Captain	0	0	0	0	0	0	2	1	3	3
Copilot	0	0	0	1	1	0	1	0	1	2
Flight Engineer	0	1	0	0	1	0	1	0	1	2
Cabin Attendants	8	8	1	1	10	0	0	0	0	10
Other Crew	0	0	0	0	0	0	0	0	0	0
Passengers	48	51	1	0	52	0	1	0	1	53
Non-Occupants	0	0	0	0	0	0	0	0	0	0
Total	56	60	2	2	64	0	5	1	6	70

RECORD OF INDIVIDUAL TRUNK CARRIERS
SCHEDULED PASSENGER SERVICE

1963

Operators	Accidents Total	Accidents Fatal	Fatalities Passg.	Fatalities Crew	Fatalities Others	Revenue Passengers Carried	Passenger-miles 1/ (000)	Revenue Plane-miles	Departures
Trunk									
American Airlines....	5	0	0	0	0	8,401,501	7,367,307	122,409,552	245,576
Braniff Airways.....	0	0	0	0	0	2,513,103	1,269,825	29,891,974	118,873
Continental Air Lines	1	1	5	3	0	1,686,067	1,270,390	26,993,055	81,533
Delta Air Lines.....	3	0	0	0	0	4,788,741	3,149,735	59,049,800	196,566
Eastern Air Lines....	7	0	0	0	0	9,677,643	4,986,130	106,774,060	409,322
National Airlines....	0	0	0	0	0	2,166,000	1,792,484	32,376,371	92,238
Northeast Airlines...	0	0	0	0	0	1,358,801	661,659	16,817,203	62,948
Northwest Airlines...	1	1	35	8	0	2,485,868	1,687,541	34,912,357	99,545
Trans World Airlines.	4	0	0	0	0	5,628,717	5,619,302	97,035,036	164,292
United Air Lines.....	3	0	0	0	0	11,965,322	8,803,611	177,741,061	480,624
Western Air Lines....	2	0	0	0	0	2,707,810	1,493,234	26,774,310	85,878
Total.....	26	2	40	11	0	53,379,573	38,101,218	730,774,779	2,037,395

1/ Both revenue and nonrevenue.

RECORD OF INDIVIDUAL LOCAL SERVICE AND HELICOPTER CARRIERS
SCHEDULED PASSENGER SERVICE

1963

Operators	Accidents Total	Accidents Fatal	Fatalities Passg.	Fatalities Crew	Fatalities Others	Revenue Passengers Carried	Passenger-Miles 1/ (000)	Revenue Plane-Miles	Departures
Local Service									
Allegheny Airlines.....	1	0	0	0	0	1,069,562	221,240	11,063,623	101,519
Bonanza Airlines.....	0	0	0	0	0	536,377	146,036	6,349,638	42,724
Central Airlines.....	0	0	0	0	0	382,501	82,761	7,170,696	82,488
Frontier Air Lines.....	0	0	0	0	0	539,001	164,459	12,247,598	105,229
Lake Central Airlines.....	0	0	0	0	0	471,647	76,107	6,626,500	84,541
Mohawk Airlines.....	1	1	5	2	0	1,193,411	256,475	11,691,558	99,959
North Central Airlines.....	0	0	0	0	0	1,115,618	210,721	14,507,296	170,990
Ozark Airlines.....	1	0	0	0	0	803,845	157,687	10,543,571	114,387
Pacific Air Lines.....	1	0	0	0	0	532,042	118,873	5,352,293	55,409
Piedmont Aviation.....	0	0	0	0	0	823,537	197,110	10,910,078	123,609
Southern Airways.....	1	0	0	0	0	578,789	112,381	9,378,218	103,944
Trans-Texas Airways.....	0	0	0	0	0	455,560	108,954	8,577,570	83,648
West Coast Airlines.....	2	0	0	0	0	362,723	95,872	6,706,096	68,376
Total.....	7	1	5	2	0	8,864,613	1,948,676	121,124,735	1,236,823
Helicopter Service									
Chicago Helicopter Airways.....	0	0	0	0	0	50,173	1,125	262,931	18,114
Los Angeles Airways.....	0	0	0	0	0	167,100	6,917	719,322	32,796
New York Airways.....	1	1	3	3	0	240,632	5,057	417,612	29,712
San Francisco & Oakland 2/ Helicopter Inc.....	1	0	0	0	0				
Total.....	2	1	3	3	0	457,905	13,099	1,399,865	80,622

1/ Both revenue and nonrevenue

2/ Certificated for operations 11/26/63, relieved of filing traffic reports for months of November and December 1963.

RECORD OF INDIVIDUAL INTRA-ALASKA AND INTRA-HAWAII CARRIERS
SCHEDULED PASSENGER SERVICE

1963

Operators	Accidents Total	Accidents Fatal	Fatalities Passg.	Fatalities Crew	Fatalities Others	Revenue Passengers Carried	Passenger-Miles 1/ (000)	Revenue Plane-Miles	Departures
Intra-Alaska									
Alaska Coastal-Ellis Airlines...	0	0	0	0	0	107,206	8,981	1,551,533	32,672
Cordova Airlines.....	1	0	0	0	0	22,708	2,579	587,976	10,639
Kodiak Airways.....	0	0	0	0	0	9,364	461	218,715	7,485
Northern Consolidated Airlines..	1	0	0	0	0	27,992	9,177	1,665,507	19,867
Reeve Aleutian Airways.....	0	0	0	0	0	13,489	13,847	865,119	4,004
Western Alaska Airlines.....	0	0	0	0	0	6,096	305	234,066	6,451
Wien Alaska Airlines.....	1	0	0	0	0	37,886	14,248	2,380,205	22,950
Total.....	3	0	0	0	0	224,741	49,598	7,503,121	104,068
Intra-Hawaii									
Aloha Airlines.....	1	0	0	0	0	423,758	64,922	2,304,524	20,053
Hawaiian Airlines.....	0	0	0	0	0	549,013	85,069	2,801,103	25,073
Total.....	1	0	0	0	0	972,771	149,991	5,105,627	45,126
Other									
Avalon.....	0	0	0	0	0	24,974	834	101,258	3,013

1/ Both revenue and nonrevenue

RECORD OF INDIVIDUAL U. S. INTERNATIONAL/TERRITORIAL CARRIERS
SCHEDULED PASSENGER SERVICE

1963

Operators	Accidents Total	Accidents Fatal	Fatalities Passg.	Fatalities Crew	Fatalities Others	Revenue Passengers Carried	Passenger-Miles 1/ (000)	Revenue Plane-Miles	Departures
Alaska Airlines.....	0	0	0	0	0	77,103	67,114	1,830,878	4,334
American Airlines.....	0	0	0	0	0	121,901	136,439	1,907,386	2,186
Braniff Airways.....	2	0	0	0	0	114,573	159,087	3,328,040	3,513
Caribbean Atlantic Airlines.....	0	0	0	0	0	671,401	53,833	1,891,013	25,881
Delta Air Lines..	0	0	0	0	0	32,522	59,745	1,302,835	881
Eastern Air Lines.....	3	0	0	0	0	594,002	916,643	12,261,696	8,588
Mackey Air Transport.....	0	0	0	0	0	123,096	22,555	1,048,711	11,150
National Air Lines.....	0	0	0	0	0				
Northwest Airlines.....	0	0	0	0	0	203,213	585,841	10,170,781	6,010
Pacific Northern Airlines.....	0	0	0	0	0	156,827	144,792	4,327,028	11,313
Pan American Grace Airways.....	0	0	0	0	0	144,616	247,710	3,725,466	4,597
Pan American World Airways.....	3	1	73	8	0	4,211,281	7,238,109	100,983,056	100,282
South Pacific Air Lines.....	0	0	0	0	0	3,775	11,603	224,024	82
Transportation Corp. of America.	0	0	0	0	0	182,028	296,231	3,183,179	2,319
Trans World Airlines.....	1	0	0	0	0	509,108	1,657,636	23,796,250	16,021
United Air Lines.....	0	0	0	0	0	267,779	685,740	8,874,675	3,558
Western Air Lines.....	1	0	0	0	0	100,026	156,839	2,223,442	1,457
Total.....	10	1	73	8	0	7,513,251	12,439,917	181,078,460	202,172

1/ Both revenue and nonrevenue

RECORD OF INDIVIDUAL SUPPLEMENTAL AIR CARRIERS
PASSENGER OPERATION (CIVIL AND MILITARY)

1963

Operators	CIVILIAN SERVICES					MILITARY-CONTRACT OPERATIONS					Aggregate 2/ Number of Passengers Carried	Total 3/ Hours Flown
	Accidents Total	Accidents Fatal	Revenue Passenger-miles (000)	Revenue 1/ Plane-Miles	Fatalities Passg. Crew	Accidents Total	Accidents Fatal	Revenue Passenger-miles (000)	Revenue 1/ Plane-miles	Fatalities Passg. Crew		
AXXICO Airlines, Inc.				9,677				9,816	7,451,194			30,630
American Flyers Airline Corporation	1		29,021					66,325	570,276			4,956
Capitol Airways, Inc.			76,419	1,281,439				135,644	8,280,036			43,314
Johnson Flying Service, Inc.			2,333	947,710								7,761
Modern Air Transport, Inc.			1,580	24,439				15,952	326,079			1,833
Overseas National Airways, Inc.			44,117	620,194				57,784	571,268			5,382
Purdue Aeronautics Corporation			4,707	311,554				2,022	34,100			2,788
Saturn Airways, Inc.			29,382	316,241				35,186	552,134			4,023
Southern Air Transport, Inc.			344	801,453				96,841	2,534,807			15,112
Standard Airways, Inc.			52,718	687,849		1		29,601	742,310			6,633
Trans International Airlines, Inc.			5,532	49,260				291,646	2,680,783			7,188
United States Overseas Airlines, Inc.			127,983	1,598,565				6,038	81,923			7,531
Roberts, Vance d/b/a Vance International Airways			88	31,620					4,120			286
World Airways, Inc.			23,487	806,837				387,394	7,873,807			30,055
Zantop Air Transport, Inc.			299	3,414,329				1,551	8,088,204			52,484
Total	1		398,010	10,901,167		1		1,135,800	39,791,041			224,976

1/ Includes miles flown in cargo operations.

2/ Not available.

3/ Total hours flown in all operations.

ACCIDENTS BY TYPE OF AIRCRAFT

CERTIFICATED ROUTE AIR CARRIERS

REVENUE OPERATIONS

1963

Following is a resume of the accident involvement of the different categories of aircraft. Accident rates per 100,000 hours of revenue flight operations are also presented.

Aircraft Category	Revenue Hours Flown	Accidents		Accident Rates Per 100,000 Hours	
		Total	Fatal	Total	Fatal
Helicopters.....	16,401	2	1	12.194	6.097
Single Engine Aircraft...	26,967	4	0	14.833	0.000
Piston Engine Aircraft 1/	1,877,523	24	4	1.278	0.213
Turboprop Aircraft 1/....	584,329	8	1	1.369	0.171
Turbojet Aircraft 1/.....	1,275,305	23	2	1.803	0.157
Total.....	3,780,525	61	8	1.614	0.212

1/ Two or more engines

ACCIDENT TYPE - PHASE OF OPERATION

Accidents are classified for statistical purposes according to certain established types. These accident types describe the general circumstances of the occurrence but they do not necessarily indicate the cause or the conditions that contributed to the cause. The phase of operation relates to the particular segment of the flight or operation during which the circumstances of the accident occur.

The table on page 14 shows the types of all the accidents during 1963 in relation to the operational phase in which they occurred.

Frequency - Accident Types - 1963

TYPE	NUMBER	PERCENT
Ground-waterloop-swerve	3	4
Wheels-up landing	4	5
Gear collapsed	6	8
Gear retracted	3	4
Hard landing	4	5
Overshoot	2	3
Undershoot	4	5
Collided with aircraft (Both on ground)	1	1
Collided with ground/water		
Controlled	3	4
Uncontrolled	2	3
Collided with objects	8	10
Fire or explosion in flight	3	4
Engine failure or malfunction	5	6
Propeller failure	3	4
Turbulence in flight	12	16
Evasive maneuver	3	4
Airframe failure in flight	2	3
Lightning strike	1	1
Other	7	9
Undetermined	1	1
Total	77	100

Frequency - Accidents/Phase of Operation 1963

Phase of Operation	NUMBER	PERCENT
Ground (Static)	2	2
Taxi	6	8
Takeoff	10	13
Enroute	29	38
Landing	29	38
Unknown	1	1
Total	77	100

TYPE OF ACCIDENT VS. PHASE OF OPERATION
TOTAL OPERATIONS
1963

OPERATIONAL PHASE	STATIC			TAXI		TAKEOFF			IN-FLIGHT						LANDING								UNK	
TYPE OF ACCIDENT	STARTING ENGINE (S)	IDLING ENGINE (S)	ENGINE RUNUP	TO TAKEOFF	FROM LANDING	GROUND ROLL-RUN	INITIAL CLIMB	ABORTED	CLIMB TO CRUISE	NORMAL CRUISE	DESCENDING	HOLDING (IFR)	IN TRAFFIC PATTERN -CIRCLING	FINAL APPROACH (VFR)	INITIAL APPROACH (IFR)	FINAL APPROACH (IFR)	LEVEL OFF / TOUCHDOWN	ROLL OUT	GO-AROUND (ABORTED) VFR	MISSED APPROACH (IFR)	OTHER	UNKNOWN		TOTAL
GROUND- WATERLOOP - SWERVE						2												1						3
DRAGGED WINGTIP, POD OR FLOAT																	4							4
WHEELS-UP LANDING																	1	5						6
GEAR COLLAPSED																		3						3
GEAR RETRACTED																	3				1			4
HARD LANDING																								
NOSE/OVER/DOWN														1				1						2
ROLL OVER														1	1	2								4
OVERSHOOT																								
UNDERSHOOT																								
COLLISION WITH AIRCRAFT																								
Both in flight																								1
One airborne					1																			3
Both on ground									3										1					2
COLLISION WITH GROUND/WATER																								
Controlled							1																	
Uncontrolled																1								1
COLLISION WITH OBJECTS																								
Wires / Poles																								
Trees																								
Residences																								
Other Buildings																								
Fence, fenceposts																								
Electronic towers																								
Runway or approach lights																								
Airport Hangar																								
Animals																								2
Ditches																								5
Snowbank				2																				
Parked Aircraft				2	1	1	1																	
Other																								
BIRD STRIKE																								
Collision with birds																								3
STALL, SPIN, SPIRAL							1		1			1												
FIRE OR EXPLOSION																								
In flight																								2
On ground										1	1													
AIRFRAME FAILURE																								
In flight														1										5
On ground							2		1	1				1										3
ENGINE TEARAWAY									1	1														
ENGINE FAILURE OR MALFUNCTION																								12
PROPELLER FAILURE																								
PROPELLER/ROTOR ACCIDENT TO PERSON										10	2													1
JET INTAKE/EXHAUST ACC TO PERSON																								3
TURBULENCE IN FLIGHT										1														
HAIL DAMAGE TO AIRCRAFT									1		2													7
LIGHTNING STRIKE																			1					1
EVASIVE MANEUVER									1		1											1		
MISSING AIRCRAFT	2					1	1																	
OTHER																								
UNDETERMINED																								77
TOTAL	2			4	2	4	6		5	17	6	1		4	1	3	6	10	2		1	1		

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CAUSAL FACTORS

There were 77 accidents in the overall operations of the air carriers in 1963. The figures shown below indicate the frequency of occurrence of each of the different causal categories in the 77 accidents.

Broad Categories of Causal Factors	Total Accidents	Accidents in Which No Other Causal Factor Was Involved
Pilot Personnel.....	38	12
Other Personnel.....	22	6
Weather.....	16	7
Powerplant.....	8	1
Landing Gear.....	7	1
Airframe.....	0	0
Rotor Installation.....	2	1
Airport Facilities/Terrain....	4	0
Systems.....	2	0
Instrument Equipment & Accessories	0	0
Miscellaneous.....	6	2
Undetermined.....	1	1

DETAILED LISTING OF INDIVIDUAL CAUSAL FACTORS

All of the separate, individual causal factors found to exist in Air Carrier accidents are listed as follows:

PILOT:

Continued VFR into adverse weather conditions.....	1
Continued flight into area of severe turbulence.....	1
Failed to extend landing gear.....	2
Inadvertent retraction of gear on ground.....	2
Failed to observe objects or obstructions.....	4
Failed to maintain adequate flying speed.....	2

PILOT: (Cont'd)

Misjudged distance, speed, altitude or clearance	6
Failed to follow approved procedures, directives, instructions, etc.	3
Improper operation powerplant and powerplant controls (Includes propeller controls)	1
Improper operation brakes and/or flight controls on ground	3
Improper level-off	2
Improper IFR operation	2
Improper In-flight decisions or planning	4
Inadequate or improper preflight preparation and or planning	5
Inadequate supervision of flight (Pilot)	4
Operated recklessly	1
Selected unsuitable terrain	1
Other	5

COPILOT:

Failed to extend landing gear	1
Improper level-off	1

PERSONNEL:

Improper maintenance - maintenance personnel	11
Improperly serviced aircraft - ground crew	1
Inadequate inspection of aircraft - maintenance personnel	7
Traffic control personnel	2
Pilot of other aircraft	2
Ground crewman	2
Passenger	1
Driver of vehicle	1
Flight engineer	3
Other	1

POWERPLANT:

Engine structure	2
Exhaust system	1
Propeller and accessories	3
Engine controls - cockpit	1
Compressor assembly	2

SYSTEMS:

Hydraulic	2

AIRFRAME: 0

LANDING GEAR:

Main gear	4
Nose gear	1
Wheels, tires, axles	2

ROTOR INSTALLATION:

Transmission rotor drive system	1

WEATHER:

Low ceiling	3
Fog	2
Icing conditions (airframe icing)	1
Turbulence in flight, clear air	4
Turbulence in flight, in clouds, including thunderstorms, etc	8
Lightning/static discharge	1

AIRPORTS/AIRWAYS FACILITIES:

Wet runway	1
Ice/slush on runway	2
Unmarked obstruction	1

MISCELLANEOUS:

Prop/jet blast (on ground)	1
Evasive maneuver to avoid collision	3
Other	2
Undetermined	1

ACCIDENTS, ACCIDENT RATES AND FATALITIES
U. S. CERTIFICATED ROUTE AND SUPPLEMENTAL CARRIERS
ALL OPERATIONS
1953 - 1963

Year	Number of Accidents		Fatalities				Aircraft Miles Flown	Accident Rate Per 1 Million Miles Flown	
	Total	Fatal	Passg.	Crew	Others	Total		Total Accidents	Fatal Accidents
1953.....	90	18	255	54	3	312	734,894,000	0.122	0.024
1954.....	93	8	25	13	2	40	758,654,000	.122	.010
1955.....	93	17	224	42	5	271	862,787,000	.106	.018
1956.....	103	9	156	18	0	174	993,055,000	.103	.009
1957.....	112	13	73	20	5	98	1,089,727,000	.101	.011
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	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 1/	NA	NA

1/ Nonrevenue miles of the Supplemental Carriers not reported.

ACCIDENTS, ACCIDENT RATES AND FATALITIES
CERTIFICATED ROUTE AIR CARRIERS
ALL OPERATIONS

1953 - 1963

Year	Number of Accidents		Fatalities				Aircraft Miles Flown	Accident Rate Per 1 Million Miles Flown	
	Total	Fatal	Passg.	Crew	Others	Total		Total Accidents	Fatal Accidents
1953.....	69	11	113	27	3	143	685,957,000	0.100	0.016
1954.....	80	7	16	12	2	30	719,550,000	.111	.009
1955.....	80	14	197	37	4	238	819,581,000	.096	.015
1956.....	94	9	156	18	0	174	948,183,000	.099	.009
1957.....	104	12	73	18	5	96	1,054,241,000	.097	.010
1958.....	85	13	128	27	3	158	1,045,439,000	.081	.012
1959.....	93	17	270	59	8	337	1,112,703,000	.083	.015
1960.....	82	13	336	46	11	393	1,077,745,000	.075	.009
1961.....	78	8	124	24	1	149	1,056,059,000	.073	.007
1962.....	63	9	279	45	3	327	1,117,104,000	.055	.007
1963.....	66	10	222	37	0	259	1,180,620,000	.056	.008

ACCIDENTS, ACCIDENT RATES
CERTIFICATED ROUTE AIR CARRIERS
ALL SCHEDULED SERVICE
1953 - 1963

Year	Number of Accidents		Miles Flown	Hours Flown	Number of Departures	Accident Rates					
						Per 1 Million Miles		Per 100,000 Hours		Per 100,000 Departures	
	Total	Fatal				Total Accidents	Fatal Accidents	Total Accidents	Fatal Accidents	Total Accidents	Fatal Accidents
1953.....	61	7	657,093,300	3,271,900	3,070,412	0.092	0.010	1.864	0.213	1.986	0.227
1954.....	67	6	689,782,700	3,294,100	3,093,672	.097	.008	2.033	.182	2.165	.193
1955.....	64	11	779,921,000	3,672,500	3,276,386	.080	.012	1.715	.272	1.922	.305
1956.....	70	7	869,315,000	4,031,000	3,502,790	.080	.008	1.736	.173	1.998	.199
1957.....	73	7	976,168,000	4,443,500	3,768,861	.073	.006	1.620	.135	1.910	.159
1958.....	67	8	972,988,000	4,338,900	3,633,348	.068	.008	1.544	.184	1.846	.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	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	1.805	.016	1.759	.159
1962.....	47	6	1,009,683,730	3,491,174	3,660,245	.045	.005	1.317	.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

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

1953 - 1963

Year	Accidents		Fatalities			Passengers Carried	Passenger-Miles Flown	Passenger Fatality Rate Per 100 Million Passenger Miles
	Total	Fatal	Passg.	Crew	Total			
1953	50	6	88	15	103	31,645,567	19,003,087,000	0.46
1954	58	5	17	7	24	35,447,523	21,388,518,000	0.07
1955	56	9	197	28	225	41,707,543	25,270,012,000	0.62
1956	61	6	152	15	167	46,004,528	28,608,285,000	0.53
1957	58	6	70	13	83	49,423,170	32,395,675,000	0.21
1958	62	8	125	16	141	49,165,720	32,671,848,000	0.38
1959	67	10	268	42	310	56,002,094	37,765,609,000	0.70
1960	67	12	336	42	378	57,886,566	40,484,908,000	0.75
1961	58	5	124	11	135	58,411,977	41,701,560,000	0.29
1962	43	5	158	25	183	62,548,399	45,853,343,000	0.26
1963	49	5	121	24	145	71,437,828	52,703,333,000	0.23

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED DOMESTIC PASSENGER SERVICE
1953 - 1963

Year	Accidents		Fatalities			Passengers Carried	Passenger - Miles Flown	Passenger Fatality Rate Per 100 Million Passenger-Miles Flown
	Total	Fatal	Passg.	Crew	Total			
1953.....	32	4	86	15	101	28,722,743	15,337,760,000	0.56
1954.....	44	4	16	7	23	32,343,867	17,389,817,000	0.09
1955.....	41	8	195	26	221	38,027,120	20,550,940,000	0.75
1956.....	47	4	143	13	156	41,738,569	23,155,153,000	0.61
1957.....	44	4	32	2	34	44,972,334	26,252,338,000	0.11
1958.....	42	4	114	15	129	44,580,984	26,266,401,000	0.43
1959.....	61	9	209	33	242	51,002,218	30,435,495,000	0.68
1960.....	62	10	326	37	363	52,391,708	31,851,753,000	0.93
1961.....	56	5	124	11	135	52,712,556	32,547,998,000	0.38
1962.....	35	5	158	25	183	55,949,948	35,287,129,000	0.34
1963.....	39	4	48	16	64	63,924,577	40,263,416,000	0.12

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. CERTIFICATED ROUTE AIR CARRIERS
SCHEDULED INTERNATIONAL/TERRITORIAL PASSENGER SERVICE
1953 - 1963

Year	Accidents		Fatalities			Passengers Carried	Passenger-Miles Flown	Passenger Fatality Rate Per 100 Million Passenger-Miles Flown
	Total	Fatal	Passg.	Crew	Total			
1953.....	5	2	2	0	2	2,702,678	3,565,420,000	0.05
1954.....	4	0	0	0	0	2,878,800	3,904,459,000	0.00
1955.....	5	1	2	2	4	3,416,652	4,601,273,000	0.04
1956.....	1	0	0	0	0	3,950,671	5,307,543,000	0.00
1957.....	7	1	36	8	44	4,147,937	5,981,841,000	0.60
1958.....	12	2	10	0	10	4,272,340	6,230,732,000	0.16
1959.....	6	1	59	9	68	4,999,876	7,330,114,000	0.80
1960.....	5	2	10	5	15	5,494,858	8,633,155,000	0.11
1961.....	2	0	0	0	0	5,699,421	9,153,562,000	0.00
1962.....	8	0	0	0	0	6,598,451	10,566,214,000	0.00
1963.....	10	1	73	8	81	7,513,251	12,439,917,000	0.59

ACCIDENTS, ACCIDENT RATES AND FATALITIES
SUPPLEMENTAL AIR CARRIERS
ALL OPERATIONS
1953 - 1963

Year	Number of Accidents		Fatalities				Aircraft Miles Flown	Accident Rate Per 1 Million Miles Flown	
	Total	Fatal	Passg.	Crew	Others	Total		Total Accidents	Fatal Accidents
1953.....	21	7	142	27	0	169	48,937,000	0.429	0.143
1954.....	13	1	9	1	0	10	39,104,000	.332	.025
1955.....	13	3	27	5	1	33	43,206,000	.301	.069
1956.....	9	0	0	0	0	0	44,822,000	.201	.000
1957.....	8	1	0	2	0	2	35,486,000	.225	.028
1958.....	6	1	0	2	0	2	39,213,000	.153	.025
1959.....	8	1	1	2	0	3	42,817,000	.186	.023
1960.....	8	4	93	11	2	106	52,324,000	.152	.057
1961.....	6	3	151	11	0	162	47,983,000	.125	.062
1962.....	7	1	0	3	0	3	53,270,000	.131	.019
1963.....	11	3	1	4	0	5	50,692,000 1/	NA	NA

1/ Revenue miles only

ACCIDENTS, FATALITIES, FATALITY RATES
U. S. SUPPLEMENTAL AIR CARRIERS
PASSENGER OPERATIONS (CIVIL AND MILITARY)
1953 - 1963

Year	Accidents		Fatalities			Revenue Passengers Carried	Revenue Passenger-Miles Flown	Passenger Fatality Ra Per 100 Million Passenger-Miles
	Total	Fatal	Passg.	Crew	Total			
1953.....	13	5	141	20	161	724,014	1,256,911,000	11.21
1954.....	4	1	9	1	10	695,152	1,243,030,000	0.72
1955.....	5	2	27	3	30	788,783	1,395,682,000	1.93
1956.....	0	0	0	0	0	663,603	1,003,261,000	0.00
1957.....	2	0	0	0	0	535,248	767,287,000	0.00
1958.....	2	0	0	0	0	676,072	1,152,988,000	0.00
1959.....	5	1	1	2	3	895,518	1,629,556,000	0.06
1960.....	3	2	93	9	102	1,057,933	2,207,595,000	4.21
1961.....	2	2	151	9	160	978,171	1,543,027,000	9.79
1962.....	1	0	0	0	0	823,383	1,789,154,000	0.00
1963.....	2	0	0	0	0	NA	1,533,810,000	0.00

Section II

RÉSUMÉ OF ACCIDENTS

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
1/1/63	2100 CST.	Nr. Chicago, Ill.	Trans World	CV-880	Substantial	None	64	0	0	56	0	0	8			

(SCHED. PASSG. SERV. DOM.) Over Lake Michigan, during a descent for landing at O'Hare Field, Chicago, a loud thump was heard and partial decompression occurred. This was accompanied by a minor left yaw of the plane and a fire warning, and a start valve "open" warning lights for the No. 2 engine. The engine was shut down, the partial decompression corrected, and the aircraft was landed safely. Investigation revealed that the No. 2 engine nose cowl and both right and left No. 2 cowl panels had separated in flight, causing subsequent damage to the left wing lower surface and fuselage. The latter included a penetration of the skin, causing the momentary loss of cabin pressurization. Examination revealed that the nose cowl had separated upward and aft. The inboard and outboard panels had separated from the attach and hinge points in an upward and aft direction. It was reported that all cowling fasteners were inspected and properly secured during the preflight inspection before takeoff.

PROBABLE CAUSE: In-flight failure of the nose cowl tension latch.

1/13/63	0233 CST.	Memphis, Tenn.	Delta	DC-7	Substantial	None	5				1	2	2			
			U. S. Air Force	C-123B	Substantial		0									

(FERRY) Delta Air Lines Flight 8715 a Douglas DC-7, N-4875C, collided with a U. S. Air Force C-123B, parked on a military ramp at the Memphis Municipal Airport on January 13, 1963. Delta 8715, a ferry flight planned from Memphis Tennessee, to Jackson, Mississippi, while taxing, failed to negotiate a turn and struck the parked, unoccupied C-123B. There was no fire.

PROBABLE CAUSE: The Board determines the probable cause of this accident was the crew's inattention to duty while taxiing on an unfamiliar taxiway at night and the captain's failure to stop the aircraft in sufficient time to avoid striking a parked aircraft.

Note: This accident is the subject of a long-form Board release. The report, dated October 29, 1964, is available upon request.

1/14/63	1534	EST.	Tampa, Fla.	Delta	DC-8-12	Substantial	None	53	0	0	46	0	0	7

(SCHED. PASSG. SERV. DOM.) During the landing roll, following a normal touchdown, the left landing gear shock strut failed and the oleo and wheel assembly separated from the aircraft. Thereafter, the aircraft slid to a stop off the left side of the runway substantially damaging the Nos. 1 and 2 engine pods. Investigation revealed that the left main landing gear shock strut cylinder had failed. The failure started at the lower gland nut area of the cylinder, and progressed upward approximately 40 inches. It then progressed traversely around the cylinder until complete failure occurred. Examination of the failure revealed that a crack in or close to the parting plane of the strut forging had existed prior to the final complete failure. Small surface flaws, some of mechanical origin, were present in the area of the initial fracture and had the potential of providing a possible nucleus for the fracture. A deficiency cadmium plating was noted at the fracture origin, as were indications of possible stress corrosion or hydrogen embrittlement. However, hardness and microstructure tests indicated that the cylinder had been properly heat treated. Review of the aircraft and company records disclosed that the failed cylinder had been in service approximately 11 service hours since overhaul.

PROBABLE CAUSE: Material failure of the left landing gear strut cylinder during landing.
Inadequate overhaul and overhaul inspection of the landing gear assembly.

1/14/63	2328	AST.	Barter Island, Alaska	Wien Alaska	Beech AT-11	Destroyed	None	6	4	1	0	1	0	0

(NON-SCHED. PASSG. SERV. DOM.) The flight was conducted under night visual flight, rules outside controlled airways. The aircraft departed Barter Island, Alaska at 1623 a.s.t.,on January 14, 1963, landed at Shingle Point, Canada, then proceeded to Cape Parry, Canada where cargo and passengers were loaded and the aircraft refueled. The aircraft departed Cape Parry at 2023 a.s.t., and the accident occurred on a snow and ice-covered sandspit on Barter Island about 1.4 miles from the airfield at approximately 2328 The wreckage was spotted from the air at 0545 a.s.t.,on January 15, 1963, and a ground party arrived at the site at 0630 a.s.t, Investigation disclosed that the aircraft had made ground contact in a slightly left-wing-low attitude with the landing gear retracted. After initial ground contact, it became airborne again for about 300 feet and then struck the ground inverted at a relatively steep angle. Impact at this point caused extensive damage to all components. There was no fire. All occupants except one received fatal injuries. No evidence of engine or aircraft failure or malfunction prior to ground contact was found. Propeller marks and r.p.m. reading on one tachometer indicated airspeed about 130 knots at the initial ground contact. The altimeters were found to be properly set but were extensively damaged. There was evidence of airframe icing but it was not considered sufficient to have caused the accident. The direction of the aircraft after ground contact was 263° magnetic, and the final location of the main wreckage was about 500 feet north of the extended centerline of the southwest runway, 1.4 miles from the approach end. Weather reports and personnel on the airfield at the time stated that low ceilings, fog, and icing conditions were present on the airfield for a period starting about 1½ hours before and for about one-half hour after the accident. The only reported weather information received by the pilot was the 2200 a.s.t., report from a Barter Island radar operator which was as follows: Indefinite 800 feet ceiling, sky obscured, visibility 1 mile in fog, temperature minus 9, dew point minus 21, surface wind west southwest 10 miles per hour, altimeter 30.27. There were several radar contacts and radio communications with N-65458 during the flight from Camp Parry to Barter Island, the last being at 2326 a.s.t., at which time the pilot requested and was given his position as being 6 nautical miles east of the station. The radar operator did not watch N-65458 after this communication. There was no reported indication of any difficulties being encountered by N-65458 in any of the communications. The sole survivor of the flight, who had occupied a seat on the left side in the rear of the cabin, stated

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Other F	Other S	Other M/N
1/14/63	Barter Island, Alaska (Cont'd.)															

that everyone in the aircraft was not as animated as usual and suspected that carbon monoxide may have caused everyone to be drowsy. However, a medical doctor who examined him, gave the opinion that he did not sustain any monoxide poisoning in flight. There was no autopsy performed on the pilot. However, the radar operator, who talked with N-65458 just prior to the crash, stated that the transmission was normal in every respect. It was also disclosed that the actual flying time for this flight was about 6 hours; however, the only appreciable time on the ground was 48 minutes at the blocks at Cape Parry where the pilot, who was the only crew member, was reported to have personally refueled the aircraft. On the flight from Cape Parry the copilot's seat was occupied by a U. S. Air Force pilot with over 14 years flying experience.

PROBABLE CAUSE: Pilot descended below obstructing terrain while attempting a visual landing approach in darkness and adverse weather.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Other F	Other S	Other M/N
1/17/63	1400 AST.	Bethel, Alaska	Northern Consolidated	Cessna T-50	Substantial	None	5	0	0	4	0	0	1			

(SCHED. PASSG. SERV. DOM.) When about 15 minutes after departure from Bethel, Alaska, the pilot experienced an unwanted feathering of the left propeller, he immediately reversed course and initiated landing at Bethel. The landing approach was high and fast in a nearly direct crosswind of between 13 and 15 knots, and touchdown occurred within the last third of the ice-covered runway. Thereafter, in the pilot's attempt to maintain directional control and stop the aircraft, the plane weathercocked and slid off the runway with side forces that failed the landing gear. Examination of the left engine propeller assembly revealed carbon particles in the propeller governor screen in sufficient quantity to create a loss of oil pressure and resultant unwanted feathering of the propeller.

PROBABLE CAUSE: Pilot misjudged distance and overshot during an emergency single-engine landing, under unfavorable wind and runway conditions.
Unwanted feathering of the left propeller caused by inadequate maintenance and inspection.

1/17/63	1553 MST.	Salt Lake City, Utah	West Coast	F-27	Destroyed	None	3			3	0	0

(TRAINING/CHECK) While conducting a simulated emergency descent during the flight requirements necessary for the trainee pilot to be approved for a type rating, the aircraft continued in the descent until it crashed into Great Salt Lake, Utah.

PROBABLE CAUSE: The Board determines that the probable cause of the accident was the crew's lack of vigilance, for undetermined reasons, in not checking the descent before striking the water.

Note: This accident is the subject of a long-form Board release. The report, dated September 10, 1963, is available upon request.

1/22/63	1551 PST.	Nr. Bakersfield, California	United	DC-8	Substantial	None	65	0	1	57	0	0	7

(SCHED. PASSG. SERV. DOM.) At 1551 p.s.t., over an area about 20 miles southwest of Bakersfield, the pilot of N-8029U took an evasive measure to avoid an apparent collision with an unidentified jet fighter. The occurrence took place on Jet Airway 5 at 32,000 feet while N-8029U was descending in clear weather conditions under Los Angeles radar control. The evasive maneuver resulted in one serious and three minor injuries to passengers. The pilots of N-8029U stated the jet fighter aircraft was sighted about one mile in their 10 to 1030 position on an apparent collision course. N-8029U was pulled up and the jet fighter passed under N-8029U with an estimated separation of about 100 feet. No evasive action was seen on the part of the fighter. The radar controller personnel stated that the jet fighter aircraft was not sighted on radar before or after the near-miss incident and investigation was unable to identify the aircraft.

PROBABLE CAUSE: Failure of the pilots to see the other's aircraft in time to avoid an evasive maneuver.

1/24/63	0130 HST.	Honolulu, Hawaii	Hawaiian	DC-3C	Substantial	None	2				0	0	2

(SCHED. CARGO SERV. DOM.) As N-62044 was being taxied at night on taxiway "X-ray" of the Honolulu International Airport, prior to takeoff, its right wingtip hit the van of a catering truck on the taxiway. The pilots of the aircraft stated they did not see the truck prior to impact. The truck driver reported that he had entered the taxiway and when he saw the aircraft, he stopped his truck to allow the plane to pass in front of him from left to right. He said the headlights, obstruction lights, and the blinker signal lights of the truck were on at all times. Investigation revealed at the time of impact, the truck was near the centerline of taxiway, and use of the taxiway is unauthorized for non-radio controlled vehicle such as the truck involved.

PROBABLE CAUSE: Failure of the pilots to see and avoid the truck during taxi.
Improper use of the taxiway by the truck driver.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Other F	Other S	Other M/N
1/29/63	2244 CST.	Kansas City, Mo.	Continental	Viscount 812	Destroyed	After Impact	8	5	0	0	3	0	0			

(SCHED. PASSG. SERV. DOM.) At 2244 C.S.T., N-242V, operating as a regularly scheduled passenger flight from Midland, Texas, crashed during a go-around attempt following a straight-in approach to land on runway 18, Municipal Airport, Kansas City, Missouri. The aircraft was destroyed by impact forces and subsequent fire. The eight occupants of the aircraft all received fatal injuries. Weather conditions at the airport were above VFR minima. Investigation determined that, after making the approach to land on runway 18, the aircraft continued in flight at a low altitude over the runway. Near the south end of the runway, at a height of about 90 feet above the terrain, the aircraft was observed to pitch down sharply in a wings-level attitude and strike the ground. Examination of the wreckage failed to disclose evidence of any pre-impact failures or malfunctions, mechanical in nature, that would have caused the accident. Further examination indicated that the aircraft wing and empennage deicer systems were not operating at impact. A review of the weather conditions at Kansas City revealed that, during the letdown from cruising altitude and during the landing approach, the flight encountered conditions which were conducive to the formation of rime ice deposits on the aircraft surface. Subsequent tests performed to investigate the probability of rime ice caused loss of control effectiveness were conducted. From the results of these tests it was concluded that the formation of horn-shaped or concave ice on the leading edge of the horizontal stabilizer can produce a strong nosedown pitching movement when flaps are lowered.

PROBABLE CAUSE: The Board determines that the probable cause of this accident was an undetected accretion of ice on the horizontal stabilizer which, in conjunction with a specific airspeed and aircraft configuration, caused a loss of pitch control.

NOTE: This accident is the subject of a long-form Board release. The report dated, June 17, 1964, is available upon request.

2/3/63	1207 PST.	San Francisco, California	Slick	L-1049H	Destroyed	None	8	2	3	0	2	1	0			

(SCHED. CARGO SERV. DOM.) A Slick Airways Lockheed 1049H, N-9740Z, operating as a military cargo flight struck the runway approach lights 1,170 feet short of the threshold while making an ILS approach to runway 28R, San Francisco International Airport, California. Thereafter, the aircraft climbed momentarily and then crashed on the left edge of runway 28 L at a point about 1,900 feet beyond the threshold. Investigation revealed that the weather conditions existing during the approach were variable above and below minima because of fog conditions. This information was passed to the pilot during the approach. It was also determined that no radar advisories were issued to the pilot by the PAR controller after the flight passed the ILS middle marker inbound.

PROBABLE CAUSE: The Board determines the probable cause of this accident was the continuation of an instrument approach after adequate visual reference was lost below authorized minimums. Inadequate monitoring of the instrument approach by the PAR controller was a contributing factor.

NOTE: This accident is the subject of a long-form Board release. The report, dated October 11, 1963 is available upon request.

2/7/63	1923 PST.	Nr. Mt. Hamilton, California	Western	DC-6B	None	None	38	0	0	33	0	1	4

(SCHED. PASSG. SERV. DOM.) About 1923 p.s.t., approximately 6,500 feet over an area about three miles northwest of Mt. Hamilton Intersection near Hamilton, California, the pilot of N-93123 and the pilots of a formation of A-1-H military aircraft took evasive maneuvers to avoid apparent collision courses. The occurrence took place in clear weather with a bright moon condition about three minutes after N-93123 left 5,500 feet to climb to a cruising altitude of 13,000 feet under an IFR clearance. The pullup type evasive maneuver by N-93123 resulted in injuries to four occupants of the aircraft. Investigation revealed that N-93123 was under radar contact and control of Oakland ARTCC; however, the military formation, being operated under VFR flight, were not visible to the radar controller by direct or transponder return until after the near miss. Tests showed that radar coverage would not permit detection of the aircraft below a minimum altitude of 7,000 feet over the area where the occurrence took place.

PROBABLE CAUSE: Failure of the flight leader of the military aircraft and the pilots of N-93123 to sight the other's aircraft in time to avoid an evasive maneuver.

2/12/63	1350 EST.	Nr. Miami, Fla.	Northwest	B-720B	Destroyed	After Impact	43	35	0	0	8	0	0

(SCHED. PASSG. SERV. DOM.) At 1335 EST, N-724US, took off from runway 27-L, Miami International Airport, Florida. The flight was on an IFR (instrument flight rules) clearance to Chicago, Illinois airport. At 1342 the flight was cleared to climb to and maintain flight level 250 (25,000 feet). At this time the pilot of N724US indicated that he was diverting from course to heading of 270° to avoid weather. At 1348 EST, the flight reported to Miami Center, "just out of 17,500 and standby on the DME one." No further transmissions were received from the flight. The wreckage of N-724US was subsequently located in an area of the Florida Everglades, about 37 miles west southwest of Miami International Airport. The wreckage disclosed a high degree of in-flight break-up and was widely distributed over the area.

PROBABLE CAUSE: Under investigation.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
2/16/63	1826 PST.	Puyallup, Wash.	Zantop	C-46F	Destroyed	After Impact	2				0	2	0			

(CARGO MIL. CTR.) About seven minutes after takeoff from McCord Air Force Base, Washington, the pilot experienced left engine malfunction which was followed by an unsuccessful attempt to feather the propeller. This was followed in due time by an intermittent overspeeding of the propeller during the subsequent approach to land at Thunfield near Puyallup, Washington. The first landing approach was considered to be high by the pilot and go-around was initiated. As the aircraft reached a height of about 200 feet above the ground, the propeller again oversped and the aircraft apparently stalled. It struck the ground left-wingtip-first and nose-low. The aircraft was destroyed by impact and fire after impact. Investigation revealed that the engine malfunction was caused by separation of the throttle control rod that connects the throttle arm to the jack shaft at the carburetor control arm. The throttle was in the full open position. The pressure contact switch in the propeller governor was adjusted to operate at 700 to 745 p.s.i. The normal operating pressure limits are 575 to 625 p.s.i. Investigation further revealed that airport information, as furnished to the pilot by the RAPCON Controller, did not reflect the true runway conditions.

PROBABLE CAUSE: The Board determines that the probable cause of this accident was the improper handling of an emergency situation, precipitated by a mechanical malfunction, which resulted in an unsuccessful single-engine go-around. A contributing factor was the failure of Radar Approach Control to provide complete and accurate airfield data to the pilot.

NOTE: This accident is the subject of a long-form Board Release. The report, dated November 8, 1963, is available upon request.

3/12/63	0854 EST.	Boston, Mass.	Eastern	DC-7B	Substantial	None	20	0	0	15	0	0	5			

(SCHED. PASSG. SERV. DOM.) At 0854 e.s.t., the right main landing gear of N-841D collapsed during the landing roll on runway 4R at Logan International Airport, Boston, Massachusetts. At the time of the accident, runway 4R was covered with approximately three-eighths of an inch of slush and wet snow when N-841D landed and braking action on the runway was poor. The wind at the time of the landing was from 120 degrees at 20 knots. Investigation disclosed that N-841D deviated slightly to the left after touchdown and continued to do so until the collapse of the right landing gear. Whether the deviation resulted from a swerve or a skid after landing, could not be positively ascertained. Examination of the failed gear assembly disclosed separation of the right main landing gear and oleo strut assembly from the aircraft. It was determined that the main landing gear shock strut cylinder had failed in fatigue in the area of a fatigue fracture which started in the fillet of the torque link lugs near the bottom end of the cylinder. Inspection revealed the existence of similar fatigue cracks in the corresponding fillet or the opposite side of the cylinder. Failure of the shock strut cylinder occurred after a total of 14,900 hours of service and 300 hours before the unit was due for inspection and rework in accordance with existing Airworthiness Directive 62-25-2, dated November 28, 1962.

PROBABLE CAUSE: Fatigue failure of the right main landing gear shock strut cylinder during the landing roll. Unfavorable runway condition for landing.

3/16/63	0729 PST.	Oakland, Calif.	American	DC-7B	Substantial	None	44	0	0	39	0	0	5

(SCHED. PASSG. SERV. DOM.) During taxi prior to takeoff for a flight segment from San Francisco to Oakland, California, the pilot noted a slight but insignificant resistance in nosewheel steering. Thereafter, during the landing roll at Oakland a severe nosewheel vibration occurred and the nose gear collapsed. Investigation revealed the nosewheel tire pressure was 42 p.s.i. relative to the normal inflation pressure of 85 p.s.i. It further revealed the nosewheel steering accumulator pressure was zero relative to the normal air preload of 50 p.s.i. There was no mechanical reason found to account for the loss of pressure. Examination of the aircraft records showed maintenance was performed on the aircraft 11 days preceding the accident which required discharge of the nosewheel steering accumulator air preload.

PROBABLE CAUSE: Collapse of the nose gear during the landing roll caused by inadequate maintenance and inspection. Inadequate preflight inspection.

3/18/63	2338 CST.	Peoria, Ill.	Ozark	DC-3	Substantial	None	15	0	0	12	0	0	3

(SCHED. PASSG. SERV. DOM.) About 2338 c.s.t., while the pilot was executing a back course ILS instrument approach to land on runway 12 at the Peoria, Illinois Airport, the aircraft struck a tree or trees. Impact caused substantial damage to the left wing and minor damage to the left engine. The pilot maintained control of the aircraft, executed a missed approach and continued to Chicago for a safe landing. Weather conditions reported at the time of the accident were: Indefinite ceiling 400 feet, sky obscured; visibility 1¼ miles, light drizzle and fog; wind east-southeast 14 knots, gust to 20. Thunderstorm activity had ended about 40 minutes before the accident. The pilot reported that he had experienced severe turbulence during the instrument approach and the aircraft descended. He said he applied full power to arrest the descent and about this time the impact was felt. As near as could be determined, impact with the tree or trees occurred about two miles from the end of the runway; however, the tree or trees hit could not be positively identified. Examination of the aircraft equipment and facilities necessary to the execution of the instrument approach involved revealed no evidence of malfunction or failure.

PROBABLE CAUSE: An improperly executed instrument approach in turbulent air, resulting in descent below obstructing terrain.

3/25/63	2234 Z	Nr. Panama City, Panama	Braniff	B-707-227	None	None	57	0	0	50	0	1	6

(SCHED. PASSG. SERV. INT.) The investigation of this accident is under the jurisdiction of the Panamanian Government. Their report of findings on this accident has not been received at this time by the Civil Aeronautics Board.

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Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
4/2/63	1730 BST.	Savoonga, Alaska	Wien Alaska	DeHavilland DHC-2	Substantial	None	2	0	0	1	0	0	1			

(SCHED. PASSG. SERV. DOM.) About 20 minutes after departure from Northeast Cape for a flight segment to Savoonga, Alaska, the pilot experienced improper engine performance. He attempted to reach the airport at Savoonga but total power failure occurred at a position on downwind leg of the traffic pattern from which he could not reach the runway. The forced landing was on an ice area, resulting in substantial structural damage to the aircraft. Investigation disclosed that the fuel of all three fuel tanks of the aircraft was contaminated with rust, sand, metal particles, and a fiber like material. By the absence of any other reason for the power failure, fuel contamination was clearly shown to have been the cause. Further investigation showed the aircraft had been refueled from 50-gallon drums which contained the same contamination. The fuel had been strained; however, the chamois skins used were found to be old with holes in them. The skins were obviously incapable of separating the contaminants.

PROBABLE CAUSE: Power failure resulting from fuel contamination caused by improper and inadequate fueling procedures.

4/10/63	1637 AST.	Nr. McIntire Pt., Alaska	Wien Alaska	Cessna 180A	Substantial	None	2	0	0	1	0	0	1			

(NON-SCHED. PASSG. SERV. DOM.) During landing at the camp site of a Geophysical Company near McIntire Point the ski equipped aircraft touched down in what the pilot described as a smooth landing with a slight skip. At second touchdown the left ski strut failed at the ski. The broken end of the ski leg dug into the surface and resultant force tore the leg from the aircraft at the gear box. The plane then groundlooped to an upright stop.

PROBABLE CAUSE: Under investigation.

4/18/63	1300 CST.	NE of Des Moines, Iowa	Trans World	B-707-131B	None	None	95	0	0	87	0	1	7

(SCHED. PASSG. SERV. DOM.) While cruising at 33,000 feet over an area about 80 miles northeast of Des Moines, Iowa during a flight from Los Angeles to Chicago, the crew sighted cumulus clouds ahead. Although no radar echoes were noted on the aircraft radarscope, power was reduced and the "fasten seat belt" sign was turned. Very shortly thereafter moderate turbulence lasting about two minutes was encountered. During this period a passenger came out of a lavatory and the door hit a stewardess Apparently the door impact in combination with the turbulence causedher to fall, resulting in a serious injury. Investigation disclosed that when the flight reached Chicago the radar receiver was replaced because of poor target retention. Also, as near as could be determined, it indicated there was insufficient time between illumination of the fasten-seat-belt sign and the turbulence encountered for the passenger and stewardess to reach their seat and fasten their seat belts.

PROBABLE CAUSE: The sudden encounter of momentary moderate in-flight turbulence before turbulence procedures could be completed.

5/8/63	1807 Z	Newark, N. J.	Allegheny	CV-340/440	Substantial	None	2			0	0	2	

(TRAINING) When the crew of N-3415 did not receive a green light, safe-for-landing gear indication, after the landing gear was extended for a practice landing, a go-around was initiated. On the next approach to land, the Captain/instructor extended the landing gear as the aircraft was turned on to base leg and normal light indications for a safe gear down and locked condition were received. This approach was then continued to touchdown and, during the landing roll, the landing gear warning horn began to sound. The aircraft then settled to the runway on the fuselage undersurface and slid to a stop. Investigation disclosed that the main landing gear was retracted into the nacelles but was not in the uplocks, and the nose gear was partially retracted. The cockpit landing gear handle was in the gear down position. Examination of the landing gear revealed that the normal and emergency extension systems were capable of normal operation. Tests further showed that the gear down locks could only be actuated by movement of the landing gear cockpit control handle from the down position. From this physical evidence it could only be concluded that the landing gear control handle had been moved out of the down position just before or after the landing touchdown. Examination of the landing gear warning light system revealed a malfunction in the cockpit pedestal landing gear control switch locking arm which actuates the microswitch to the gear down position green lights. A weak locking arm plunger return spring and a binding of the rod because of dirt would cause the green lights to remain off after the intransit light went out and with the gear down and locked. Snapping of the gear control switch locking arm would sometimes cause the rod to return to its normal position with resultant proper gear down and locked light indications.

PROBABLE CAUSE: Inadvertent movement of the cockpit landing gear control handle from the down position shortly before or after landing touchdown.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
5/15/63	0336 EST.	Miami, Fla.	National	L-188A	Substantial	None	3				0	0	3			

(SCHED. CARGO SERV. DOM.) Approaching Miami, Florida for landing at the conclusion of a night flight from New York, the crew cancelled its IFR clearance, completed the in-range checklist, and initiated descent. When the landing gear warning horn sounded with the reduction of power it was silenced. Thereafter, the crew members became engrossed in their respective duties and the landing gear was forgotten and the Captain, who was flying the aircraft, continued the approach and landing with the landing gear retracted. Investigation revealed no malfunction or failure of the landing gear actuating and gear position warning systems were involved in the accident. The crew could not recall whether or not the before landing checklist was used.

PROBABLE CAUSE: Failure of the pilots to extend the landing gear prior to landing.

5/17/63	1900 AST.	Baird Bay, Alaska	Wien Alaska	Beech. C-18S	Destroyed	None	7	0	0	6	0	0	1			

(NON-SCHED. PASSG. SERV. DOM.) The purpose of the flight was to deliver supplies and passengers to Alaskan construction sites and then return to Point Barrow. During the takeoff roll following an en route stop at Site Liz "C", the aircraft swerved left, struck a snowbank at the edge of the runway, and overturned. Investigation disclosed that the airstrip at Site Liz "C" is 1,781 feet long by 75 feet wide. The surface is earth and gravel; however, at the time of takeoff a thawing condition had reduced this to a 3-inch depth of soft mud. The takeoff weight of N-5080K was 8,227 pounds, the temperature was 40° to 44° F., and, at the time of the accident, there was a 90-degree crosswind of 15 to 20 m.p.h. The pilot stated he had noted the runway conditions and decided that a takeoff could be made. He further stated that the aircraft did not accelerate properly during the takeoff roll and he "lightened the load" by extending the flaps at 50 knots indicated speed. Thereafter, the aircraft swerved left and he was unable to control it directionally. There was no evidence of failure or malfunction of the aircraft prior to the accident.

PROBABLE CAUSE: A loss of directional control during the takeoff roll caused by unsuitable runway conditions. Inadequate flight preparation.

5/27/63	0945 CST.	Nr. Anniston, Alabama	United	Caravelle VIR	Minor	None	20	0	1	14	0	0	5

(SCHED. PASSG. SERV. DOM.) About 0945 c.s.t., over the vicinity of Anniston, Alabama at 14,000 feet, the aircraft encountered brief but severe turbulence. During the encounter one passenger received a broken leg when he was thrown to the cabin floor in the area between the lavatories. Another passenger received a possible injury. At the time of the accident the flight was en route to Birmingham from Newark, New Jersey after en route stops which included Washington, D. C. and Atlanta, Georgia. The Captain reported that a review of weather information at Washington led him to the opinion that severe weather would not affect the continued flight, although potentially severe weather was included in the current weather information. At Atlanta, while holding at 28,000 feet prior to landing, no echoes were noted between 50 and 150 miles west of Atlanta on the aircraft radar. Current weather at this time, however, called for thunderstorms with associated severe turbulence for the area west of Atlanta and thunderstorms were being reported at various stations, including Anniston. According to the crew, following takeoff from Atlanta and establishment of cruising altitude, 14,000 feet, an alto-cumulus cloud was sighted ahead. A turn to avoid it was begun; however, immediately thereafter the turbulence was encountered which injured the passenger. The fasten-seat-belt sign was turned on and turbulence penetration procedures were taken about the same time as the turbulence was encountered.

PROBABLE CAUSE: In-flight turbulence.

5/28/63	1746 CST.	Manhattan, Kansas	Standard	L-1049G	Destroyed	After Impact	70	0	1	63	0	0	6

(PASSG. MIL. CTR. DOM.) On May 28, 1963, at 1746 c.s.t., N-189S crashed and burned during the final stages of a VFR landing approach to runway 21 at Manhattan Municipal Airport, Manhattan, Kansas. The Captain stated that the approach was routine until the flaps were extended to 100 percent for landing and the airspeed was reduced to 120 knots. At this time, at a height of about 170 feet above the terrain, the right wing dropped and the aircraft yawed right as the rate of descent increased to higher than normal. When control forces were increased without correction of the attitude of the plane, the Captain added, "considerable" power to all four engines. Immediately thereafter, control pressures increased; however, the rate of descent also increased and caused the aircraft to strike the ground 546 feet short of the runway. A 3½ foot high ridge of earth was struck, causing the nose and right main landing gears to shear from the aircraft. The aircraft then slid to a stop and was evacuated in an orderly fashion. Investigation disclosed that the propeller of the No. 3 engine was in the reverse pitch range at impact. A teardown inspection of this propeller revealed that the threaded brake cage locking bolts were missing and the cage was backed off three full threads from the normal setting. This excessive brake clearance thus obtained rendered the brake propeller control function incapable of normal operations. Examination of the brake cage revealed that it had not been properly tightened and secured during installation.

PROBABLE CAUSE: The Board determines the probable cause of this accident was the in-flight reversal of the No. 3 propeller due to a propeller power unit malfunction, resulting from improper maintenance practices and inspection procedures.

NOTE: This accident is the subject of a long-form Board release. The report, dated April 28, 1964, is available upon request.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
5/28/63	1944 EDT.	Atlantic City, N. J.	Allegheny	CV-340	Substantial	None	41	0	0	37	0	0	4			

(SCHED. PASSG. SERV. DOM.) At the outer marker of the Philadelphia, Pennsylvania ILS, the crew of N-8427H extended the landing gear for landing and, as they did so, the left landing gear and wheel assembly separated from the aircraft. The Captain discontinued the approach and proceeded to Atlantic City, New Jersey, where a safe wheels-up landing was accomplished on a foamed runway. Inspection of the separated landing gear assembly disclosed that the piston and axle assembly had separated approximately two to four inches from the top. No fatigue was evidenced and it was determined the failure was due, primarily, to tensile overload accompanied by a slight bending in the horizontal plane. Examination of the left landing gear piston assembly gland nut revealed that all six screws were installed and safety wired. Further examination of the screws, however, revealed that none were of sufficient length to penetrate the 3/8-inch thick gland nut collar and engage one of the three collar retaining slots machined in the outer diameter of the upper strut assembly. Upon removal of the six screws from the gland nut collar, five were found to be only three-eighths inches long instead of one half inch. The sixth, which was of the proper length, contained two 1/16 inch washers which made its effective length also three-eighths of an inch. There was no evidence of stripped threads on the gland nut collar or on the thread portion of the upper strut assembly. Investigation revealed that recent aircraft modification had necessitated the removal and replacement of the gland nut collar and the piston by an aviation repair facility.

PROBABLE CAUSE: Material failure of the left landing gear caused by improper maintenance and inspection.

5/31/63	1410 EDT.	Wildwood, N. J.	United States Overseas	DC-6B	Substantial	None	5				0	0	5			

(FERRY) At the conclusion of an equipment ferry flight to Wildwood, N. J. from Philadelphia, the first officer, who was flying the aircraft from the left seat while the Captain occupied the right seat and performed the duties of copilot, initiated landing. The landing approach was high and fast, and near touchdown the Captain ordered a go-around and applied full power and maximum propeller r.p.m. Before a positive climb was established the flight engineer thought he heard the order to retract the landing gear and did so. The aircraft settled to an extent the No. 3 propeller struck the runway surface. The No. 3 propeller was feathered and its engine shut down. The Captain took the left seat and made a safe landing. Investigation revealed the Company Operations Manual contains the following instruction: "The pilot not making the takeoff will retract the gear upon command of the pilot making the takeoff." It was further stated by the crew members of the flight that retraction of the landing gear is not a flight engineer duty.

PROBABLE CAUSE: Premature and improper gear retraction action by the flight engineer during a go-around.
Inadequate crew coordination and supervision by the pilot in command.

6/3/63	1816 GMT.	Pacific Ocean WSW of Annette Island, Alaska	Northwest	DC-7C	Destroyed	None	101	95	0	0	6	0	0

(PASSG. MIL. CTR. INT.) About 0752 p.s.t., N-290, operated as a MATS charter flight, departed McChord AFB, Washington for Elmendorf AFB, Alaska. Thereafter, the flight reported in a normal manner that it was over Domestic Annette at 1006 at 14,000 feet requesting ATC clearance to fly at 18,000 feet. When efforts were made at 1009 to contact the flight, there was no response. At 1116 p.s.t., search for the aircraft was begun. About 1922 p.s.t., floating debries was located and it was determined N-290 had crashed about 1016 about 116 miles west-southwest of Annette Island, Alaska. The recovered portion of wreckage of the aircraft was small, and it failed to reveal any significant evidence relative to the cause of the accident.

PROBABLE CAUSE: Because of a lack of evidence, the Board is unable to determine the probable cause of the accident.

NOTE: This accident is the subject of a long-form Board release. The report, dated April 21, 1964 is available upon request.

6/8/63	2200 CDT.	Chicago, Ill.	American	L-188	None	None	56	0	0	51	0	1	4

(SCHED. PASSG. SERV. DOM.) During the approach descent for the landing at O'Hare Field, Chicago, Illinois, N-6134A encountered violent turbulence for a short period while in the vicinity of PAPI intersection about 23 miles northeast of O'Hare. One of the two stewardesses attending the passengers preparatory to landing was seriously injured by falling during the turbulence. Investigation disclosed that thunderstorms and other extremely adverse weather conditions were forecast for the area and that the pilot had been briefed regarding this condition. The pilot reported that the turbulence was unexpected, however, since the radarscope presentation showed the nearest precipitation area was about 10 miles abeam of the course of the aircraft.

PROBABLE CAUSE: In-flight turbulence.

6/9/63	2239 EST.	Fairfield, Ohio	Capitol	Argosy AW-650	Substantial	None	3				0	0	3

(CARGO MIL. CTR. DOM.) About 2239 e.s.t., the first officer, who was flying N-6506R from the right pilot's seat, made an ILS practice approach and landing on runway 23R at Patterson AFB, Fairfield, Ohio. After a ground roll of about 1,200 to 1,500 feet, the first officer called for flight fine pitch. The Captain, who was acting as copilot/instructor, in his intention to comply to the command, inadvertently actuated the gear-up lever instead of the fine pitch control and the main landing gear collapsed. Investigation disclosed no abnormalities in the landing gear extension/retraction system, the locking and safety mechanisms, or the warning indicators. The landing gear antiretract system does not function at speeds of 50 knots or greater.

PROBABLE CAUSE: Inadvertent gear retraction by the Captain during the landing roll.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/M
6/17/63	0654 CST.	Baton Rouge, La.	Southern	M-404	Substantial	None	19	0	0	16	0	0	3			

(SCHED PASSG. SERV. DOM) During the landing at Baton Rouge, Louisiana, the aircraft touched down hard nosewheel-first, and bounced twice before coming to a stop on the runway. Landing forces caused failure of the nosewheel tire, deformation of the nose gear fork assembly, damage to both propellers, and substantial wrinkling of the fuselage skin. The crew indicated a possible failure of the windshield wipers to properly clear the light rain from the windshield, but during testing in the stream from a fire hose, the wipers functioned adequately. The accident occurred in VFR weather conditions; however, a light rain was falling at the time. Witnesses, who observed the landing, stated that the approach was high and steep and that the touchdown was made on the nosewheel.

PROBABLE CAUSE: Pilot misjudged level off and made improper recovery from the resultant bounced landing.

6/23/63	1850 EDT.	In-flight, 68 mi. North of Norfolk, Virginia	Eastern	DC-8	Minor	None	69	0	3	59	0	0	7			

(SCHED. PASSG. SERV. INT.) At 1850 e.d.t., 28 minutes after takeoff from Idlewild Airport, New York, and at a position about 68 miles north of Norfolk, Virginia, N-8617 encountered severe clear-air turbulence while maintaining flight level 260 and a cruising speed of Mach .85. The encounter was abrupt and of short duration, approximately 15 seconds, and several of the cabin occupants were injured. Investigation revealed that the turbulence was associated with a jet stream which extended from Newfoundland, southwestward off the New England Coast and then inland between Washington, D. C. and Norfolk, continuing westward to Kentucky. The crew received weather briefings pertinent to this phenomena before the Idlewild departure, and they indicated that they had encountered it on two previous trips between New York to Bermuda earlier that day. The Captain stated that, because clouds which clearly defined limits of the jet stream were visible to him in flight, he thought that the shear line would be encountered 50 to 60 miles to the south of the position where the accident occurred.

PROBABLE CAUSE: Clear-air turbulence.
Failure of the pilots to initiate timely penetration procedures in an area of forecast clear-air turbulence.

6/28/63	1550 EST.	In-flight over Litchfield, Mich.	American	B-707B	None	None	139	0	1	131	0	0	7

(SCHED. PASSG. SERV. DOM.) Over Litchfield, Michigan, while cruising at 19,000 feet, m.s.l., en route from Chicago, Illinois to Detroit, Michigan, the crew of N-7509A observed a radar echo indicating a thunderstorm ahead and requested a ground station radar vector to a more suitable area before commencing a descent. As the aircraft was being turned to a vector heading toward the clearer area, it entered a cumulus-type cloud buildup and encountered a turbulence downdraft. One passenger received serious injuries as a result of the turbulence. Investigation revealed that the crew of N-7509A were briefed on the expected turbulence before departing Chicago, and had consequently taken normal precautions for operation in turbulenct air conditions. The seriously injured passenger reportedly had been instructed to return to her seat and fasten her seat belt just before the turbulence was encountered. The crew stated that the fasten-seat belt sign was intentionally left on throughout the flight and it was on at the time of the accident.

PROBABLE CAUSE: In-flight turbulence.
Failure of some passengers to comply with the crew's instructions.

7/2/63	1649 EDT.	Rochester, N. Y.	Mohawk	M-404	Destroyed	After Impact	43	5	29	6	2	1	0

(SCHED.PASSG. SERV. DOM.) N-449A crashed on the Rochester-Monroe County Airport, Rochester, New York at 1649 e.d.t. shortly after takeoff for a scheduled flight to Newark, New Jersey. Of the 43 persons on board, the two pilots and five passengers received fatal injuries. Investigation revealed that the crew began the takeoff from runway 28 as a thunderstorm moved over the runway from the west-northwest. After lift-off, the aircraft entered an area of heavy rain, shifting winds and hail that was associated with the thunderstorm. Immediately thereafter the left wing made contact with the ground. In the ensuing cartwheel to a stop, the aircraft was destroyed by impact and fire. Examination of the aircraft subsequent to the crash revealed no evidence of control system, powerplant, or structural failure. From an examination of the available evidence, it was found that Weather Bureau forecasts of weather conditions in the area were accurate and the distrubution was proper and timely.

PROBABLE CAUSE: The Board determines that the probable cause of this accident was a loss of control during an attempted takeoff into a severe thunderstorm.

NOTE: This accident is the subject of a long-form Board release. The report, dated May 20, 1964, is available upon request.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
7/2/63	1845 EDT.	In-flight near Bradford, Pa.	American	L-188	None	None	76	0	0	71	0	1	4			

(SCHED. PASSG. SERV. DOM.) Over the vicinity of Bradford, Pennsylvania, en route from Buffalo, New York to La Guardia Airport, New York City, the flight encountered a brief period of moderate turbulence while flying at an altitude of 15,000 feet, m.s.l. The encounter occurred as the stewardesses were serving dinner, and one stewardess who was thrown to the floor of the cabin sustained a broken ankle. Investigation disclosed that some turbulence had been anticipated by the crew, causing them to keep the fasten-seat-belt sign on through out the flight. The turbulence was adequately forecast and, at the time of the encounter, the crew was endeavoring to circumnavigate the thunderstorm areas by use of the aircraft weather radar. Obviously, the stewardess, in order to serve the meal duties, was unable to comply with the fasten-seat-belt sign.

PROBABLE CAUSE: In-flight turbulence associated with thunderstorm activity.

7/8/63	1640 EST.	Wilmington, N. C.	PAWA	B-707-121	None	None	117	0	1	107	0	0	9			

(SCHED. PASSG. SERV. INT.) En route from Kingston, Jamaica to Idlewild, New York, the flight was uneventful until approximately 1640 e.s.t. when it reached a position 6 to 8 miles north of Wilmington, N. C. At this time the aircraft was at its assigned altitude of 33,000 feet at a speed of approximately mach.79 in thin stratus clouds or haze when a sharp gust of a few seconds duration was encountered. During this period loose articles and persons who did not have their seat belts fastened or had nothing readily available to hold to, were thrown about in the passenger cabin. One passenger was seriously injured and three stewardesses received minor injuries. There was no reported damage to the aircraft. The seat belt sign was not on at the time. The Captain stated that Washington, D. C. ARTC Center had informed him of frontal activity north of Wilmington, N. C. with storm clouds reaching to 37,000 feet. Since the weight of the aircraft prevented going above the clouds, he had been advised to proceed due north from the Wilmington VOR. He then made an announcement to the passengers to the effect the turbulence would be encountered in a few minutes and to be seated with belts on as soon as the seat belt sign was on. He delayed turning the seat belt sign on, although radar indicated storm clouds 40 miles away. This was done because he wanted the flight service personnel to have a few minutes to put away equipment as he knew they were in the middle of meal service. The Captain added that the Weather Bureau advised the flight through the ARTC Center of a shear line ahead of the front, but not until after the incident. He further stated that the aircraft was on autopilot control throughout the period involved. Investigation disclosed that forecasts prepared by the West Indies Meteorological Service at Palisados, Jamaica were provided to the crew and included the upper winds and temperature, terminal forecasts, and an area forecast of significant weather and clouds. The portion of the area forecast pertinent to the incident site showed a cold front extending from northeast to southwest over eastern N. C., with an area of scattered towering cumulus, cumulos-nimbus clouds, and thunderstorms, cloud bases 1,500 feet, tops 30,000 feet, occasionally 45,000 feet with moderate to severe turbulence, and moderate icing.

PROBABLE CAUSE: Clear air turbulence.
Failure of the Captain to establish turbulence penetration procedures caused by his inaccurate evaluation of the reported and observed weather.

7/9/63	1930 HST.	Kailua, Kona, Hawaii	Aloha	F-27	Substantial	None	20	0	0	18	0	0	2

(SCHED. PASSG. SERV. DOM.) About 1930 h.s.t., as the right engine of N-5096A was being started in preparation for flight, the ground power unit being used rolled down a slight slope in the ramp surface into the rotating right propeller. The propeller and structure in the right nacelle area received substantial damage. After the accident the power unit rolled away from the plane and was stopped by a ground crewman. The ground crewman, who stopped it, felt the brake handle for the unit was in the on position. Examination of the brakes of the power unit revealed they were capable of normal function with ability, when fully on, to hold the power unit stationary. From this material evidence it was therefore evident the brake was not fully on at the time of the accident. Tests revealed that the position of the parking brake control handle, when the brakes were on, could easily be hit and released by the seat cushion of the unit if the cushion were tipped up. While the position of the seat cushion could not be determined, because it was mutilated by the propeller strikes; however, one reason to tip up the seat would be to keep it from getting wet and it had begun to rain shortly before the accident.

PROBABLE CAUSE: Failure of a ground crewman to assure adequate security of the ground power unit during aircraft starting.

7/15/63	0925 PDT.	Los Angeles, Calif.	Los Angeles Airways	S-61L	Substantial	None	3				0	0	3

(TRAINING) Following a normal touchdown during a demonstration of single-engine rejected takeoff procedures, the right main landing gear failed and separated from the helicopter. Investigation disclosed no significant factors of an operational nature in the causal area. Inspection of the failed landing gear revealed that both the fore and aft right main landing gear forged fittings, P/N S6125-50312-2 and P/N S6125-50313-1, respectively, had failed. Fatigue was evident in the fracture area of both fittings, with the fatigue crack originating in an area of stress concentration at a sharp corner on the inside surface of the closed end of the tubular section of the fitting. Metallurgical examination of the fitting revealed the material used in the fabrication of the fitting complied with the composition requirements of the specifications of the type forging involved.

PROBABLE CAUSE: Fatigue failure of the right landing gear forged attachment fittings.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
7/23/63	1035 AST.	Seldovia, Alaska	Cordova	Grumman G-44	Destroyed	None	4	0	0	2	0	0	2			

(SCHED. PASSG. SERV. DOM.) As the flight approached Seldovia, Alaska for landing, the pilot estimated that the surface wind was light and variable with landing toward the southeast being favored. The pilot reported that a straight-in approach to runway 16 was made and, following touchdown, he sensed the effects of a tailwind. He immediately applied maximum braking using the "pumping" or intermittent method in an effort to avoid glazing and fading of the brakes. The pilot stated that, when braking action did not seem to slow the aircraft sufficiently, the nose keel of the amphibian hull was lowered to the graveled runway surface. This action also failed to stop the landing roll and the aircraft overran the end of the runway. The company check-pilot, who occupied the right pilot seat through-out the flight, was aboard to route check the pilot. The Seldovia airstrip is gravel surfaced with an effective usable length of 1,960 feet with poor approaches. There are no weather reporting facilities at Seldovia. The landing was made during a condition of light rain.

PROBABLE CAUSE: Pilot misjudged speed and distance and overshot during landing.
Inadequate supervision by the check-pilot.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
7/28/63	0045 Z	In-flight, Nr. Des Moines, Iowa	United	DC-8	None	None	56	0	1	52	0	0	3			

(SCHED. PASSG. SERV. DOM.) En route from Philadelphia, Pennsylvania to San Francisco, California, at a flight altitude of 35,000 feet, m.s.l., moderate in-flight turbulence was encountered as the aircraft passed between the peaks of two cumulonimbus clouds with tops at approximately 37,000 feet. During the period of the turbulence, one passenger, who had left her seat before the fasten-seat-belt sign was turned on, had sustained a broken ankle when she was thrown to the aisle of the cabin. Investigation disclosed that the flight was conducted in accordance with standard procedures and that the fasten-seat-belt sign was turned on shortly after the first indications of more-than-light turbulence.

PROBABLE CAUSE: In-flight turbulence during passage between cloud buildups.

7/31/63	0028 CST.	Sheppard AFB, Wichita Falls, Tex.	AAXICO	C-46	Substantial	None	2			0	0	2

(CARGO MIL. CTR. DOM.) As the cargo was being unloaded from N-1824M at the Tinker AFB, Oklahoma City, Oklahoma, the cargo foreman noticed that the left elevator was bent upward approximately 45 degrees at the tip. When informed of the damage, the crew stated they were unaware of either the damage or its origin. The Captain did recall a slight tendency of the aircraft to porpoise during the previous takeoff from Sheppard AFB, Wichita Falls, Texas. Investigation conducted at Sheppard AFB revealed that N-1824M landed there about 0028 c.s.t. and had then been directed to an unloading area on a poorly lighted ramp that contained several darkened areas. Inspection of the ramp area at Sheppard disclosed that several unlighted "No Smoking" signs mounted on "A" frames were located at the refueling truck area and adjacent to the darkened ramp area where N-1824M had executed a right turn while parking. The sign nearest the turning area bore evidence of recent impact with some object. The impact marks were at a height of 4 feet 9 inches above the ground. This corresponds to the height of the scratch marks on the damaged section of N-1824M, which was about 4 feet 10 inches above the ground level.

PROBABLE CAUSE: Pilot failed to use adequate caution during night taxi on a poorly lighted ramp area. Unmarked obstruction.

8/7/63	1945 PDT.	San Francisco, Calif.	Pacific	F-27A	Substantial	None	18	0	1	14	0	0	3

(SCHED. PASSG. SERV. DOM.) As the crew of N-2771R were starting the engines preparatory to initiating a flight, the crew of a Lockheed Electra, which was parked ahead of N-2771R, were starting the Electra engines. As the engines of the Electra were turned up to an appreciable power level, the propeller wash caused three baggage carts to be blown rearward and strike N-2771R. One cart contacted the rotating left propeller of N-2771R, resulting in substantial damage to the aircraft and minor injury to one late-boarding passenger. Investigation disclosed that each baggage cart was equipped with a friction-type brake which was in proper working order and, when properly engaged, would prevent movement of the cart.

PROBABLE CAUSE: Failure of the ramp crew to assure the brakes were engaged on carts parked on a ramp area subjected to propeller wash.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
8/13/63	1812 EDT.	In-flight, McGuire AFB, Wrightstown, New Jsersy	PAWA	B-707-321	None	None	169	0	0	159	0	1	9			

(PASSG. MIL. CTR. INT.) As the flight, a military charter flight, was approaching McGuire AFB to land after a flight from England and an en route refueling stop at Boston, it was cleared to hold at 12,000 feet at Columbus intersection near McGuire. While holding the aircraft entered a cumulus buildup in which turbulence was encountered. During the encounter a stewardess was thrown to the cabin floor, receiving a broken leg. The Captain reported that, as he began the holding pattern, he saw the cumulus buildup ahead but felt he could tighten the initial holding turn and avoid the buildup. When he saw he could not, he turned on the fasten-seat-belt sign. The turbulence occurred shortly thereafter when the aircraft entered the buildup. The stewardess reported that, when the seat-belt sign came on, she was in Galley B and there were several of the 159 passengers out of their seats. She said, in taking seats, one of the passengers took hers and she had no place to go. Consequently, she had remained in the Galley and was holding on to the fixtures when the accident occurred.

PROBABLE CAUSE: Aircraft encountered turbulence with inadequate opportunity to complete the turbulence preparation procedures under the existing circumstances.

8/13/63	1012 EST.	Indianapolis, Indiana	Delta	DC-6	Substantial	None	24	0	0	19	0	0	5			

(SCHED. PASSG. SERV. DOM.) During a scheduled en route stop at Indianapolis, Indiana, N-1907M touched down approximately two feet short of the threshold of runway 31. The main landing gear struck an 18-inch high concrete face or dropoff at the end of the runway, which was part of a runway extension construction program currently in progress. Impact forces with the concrete lip of the runway damaged the main landing gear and, when the aircraft next touched down 1,800 feet farther down the runway, the main landing gears separated from their respective mountings. Thereafter, the aircraft slid on the fuselage an additional distance of about 600 feet before it came to rest on the runway. Investigation disclosed that the construction work, including the existence of the "18-inch dropoff on the end of runway 31" was the subject of valid NOTAM's. It was also determined that the crew of N-1907M were cautioned of the runway condition prior to the landing. The crew reported that, because of reported wind conditions for landing, wind west-northwest 12 knots, gusty to 18 knots, a 10-knot higher-than-normal approach speed was maintained. The crew further reported they were of the opinion that a downdraft was encountered near the end of runway 31.

PROBABLE CAUSE: Pilot misjudged distance and undershot during the landing approach.

8/14/63	1500 MST.	Nr. Great Falls, Montana	AAXICO	C-46-F	Substantial	None	2			1	1	0		

(CARGO MIL. CTR. DOM.) At approximately 1500 m.s.t., August 14, 1963, N-67941, operating as an air cargo flight from Malstrom AFB, Montana to Ellsworth AFB, South Dakota, crashed during an emergency landing on a plowed field, 35 miles east-northeast of Malstrom AFB. Investigation revealed that the right engine of N-67941 had overheated during the climb to altitude following the departure from Malstrom about 1414 m.s.t. Efforts to cool the engine resulted in a reduced rate of climb and, when failure of the engine main-master-rod bearing required that the right engine be shut down, the aircraft had not obtained sufficient altitude to pass safely over the mountainous terrain to the east. The crew, therefore, turned N-67941 westward to return to Malstrom. However, en route, N-67941 continued to lose altitude and airspeed and the crew altered course to fly along a canyon, the floor of which permitted a greater degree of terrain clearance. Once in the canyon, however, surrounding terrain soon surmounted the altitude of the aircraft, necessitating the landing on the plowed field. After touchdown on the field, N-67941 struck the earth dam of a small reservoir. Performance data pertinent to N-67941 indicate that the crew should have achieved a 50-foot-per-minute rate of climb in existing conditions.

PROBABLE CAUSE: The Board determines the probable cause of this accident was the failure of the Captain to effect a proper and timely assessment of a powerplant malfunction, followed by improper judgment and technique during a single-engine emergency operation.

NOTE: This accident is the subject of a long-form Board release. The report, dated May 1, 1964, is available upon request.

8/15/63	0130 CST.	Republic of Panama	Braniff	DC-7C	Substantial	None	52	0	0	45	0	0	7	

The investigation of this accident is under the jurisdiction of the Panamanian Government. Their report of findings on this accident has not been received at this time by the Civil Aeronautics Board.

8/21/63	0831 EDT.	Wilkes-Barre-Scranton Airport, Pennsylvania	Eastern	CV-440	Substantial	None	10	0	0	7	0	0	3	

(SCHED. PASSG. SERV. DOM.) En route from Syracuse, New York to Washington, D. C., the crew of N-9320 overflew Binghamton, New York, the first scheduled en route stop, because of adverse weather conditions for landing. They then proceeded to Wilkes-Barre-Scranton Airport, Pennsylvania, the next scheduled stop and, after holding about 12 minutes for a weather improvement, initiated an ILS approach to land on runway 04. The time was 0825 e.d.t. The crew stated that, during the ILS approach, flown by the Captain, descent was made to an altitude of 700 feet above the surface and maintained until the copilot called "runway in sight." The Captain stated that, at this time he saw both ends of runway 04 and, with N-9320 still west of the ILS middle marker, he continued the landing. He stated that the touchdown was hard and reverse thrust was immediately applied after touchdown. During the landing roll the nose gear collapsed and the propellers struck the runway. Witnesses, who observed the accident, reported N-9320 was first sighted when it broke out of the lower clouds near the approach end of runway 04. They described the landing touchdown as occurring from a steep high approach, with a

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
8/21/63		Wilkes-Barre-Scranton Airport, Pennsylvania														

(Cont'd)

hard contact on the nose and the right main landing gear. They stated that reverse thrust was applied immediately upon touchdown and during a subsequent bounce after touchdown. The witnesses stated that the nose gear failed during the initial runway contact. Examination of the nose gear assembly revealed that the nose gear oleo support trunnions were sheared from their attach points, resulting in an upward and rearward displacement of the oleo assembly and distortion and fracturing of the associated brackets. The nosewheel split rim attach bolts were also sheared. Inspection of the failed parts indicated that P/N 240-3110100-901 channel may have sustained a crack which preexisted the failure; however, it was concluded that failure of this channel could not, in itself, result in the collapse of the nose gear.

PROBABLE CAUSE: Pilot misjudged level off during landing at the conclusion of an instrument approach.

8/21/63	0855 EST.	Orlando, Fla.	Eastern	DC-8	Substantial	None	28	0	0	21	0	0	7			

(SCHED. PASSG. SERV. DOM.) Approaching McCoy AFB, Orlando, Florida a scheduled en route stop during the flight between Miami, Florida and New York, the crew completed the "descent-in-range" checklist and the "before landing" checklist to the the "gear extension and check" item. Thereafter, as final approach was established by the pilot in the right seat, who was flying the aircraft, the crew's attention was diverted to reported other traffic. During the period of diversion, the landing gear was forgotten until the gear unsafe-for-landing warning horn sounded with the reduction of power just before touchdown. An effort was made to extend the gear but it only began to extend before the aircraft touched down and slid to an upright stop on the bottom of the aircraft. Investigation showed there was no malfunction or failure of the landing gear actuating and gear position warning systems.

PROBABLE CAUSE: Pilots failed to assure the landing gear was extended prior to landing.
Inadequate supervision of flight by the Captain.

8/23/63	1136 AST.	Nr. Quinhagak, Alaska	Northern Consolidated	Pilatus-Porter PC6	Substantial	None	1		0	0	1		

(SCHED. CARGO SERV. DOM.) About 1136 a.s.t., N-4914 a scheduled cargo flight, sustained substantial damage when the pilot made a forced landing on a willow grove near Quinhagak, Alaska. The pilot stated that a loss of engine power after takeoff necessitated the forced landing. Subsequant to the forced landing, a complete check of the aircraft fuel system disclosed no irregularities and the aircraft engine started and ran normally. After temporary repairs of the structural damage incurred in the accident were completed, N-4914 was moved from the accident location and flown to the home base. During the fuel system inspection a mechanic noticed a small amount of fibrous material on the fuel injector unit fuel screen; however, a check of samples of fuel from sources where N-4914 was refueled failed to disclose any appreciable evidence of contamination. The fuel injection unit was removed for further examination and it was revealed that the fuel screen, which is constructed of a very fine mesh, was in fact, extremely dirty. According to overhaul activity personnel, this screen can be almost completely clogged and yet appear clean when viewed without optical aids. They further stated that the screen should be cleaned in lacquer or acetone. The operator of N-4914 used gasoline and cleaning solvent for this purpose. It was the opinion of personnel at the overhaul activity that during engine shutdown reverse fuel flow through the screen results in a "flushing action", which accounts for a period of normal operation until the material once again clogs the screen.

PROBABLE CAUSE: Fuel starvation resulting from foreign matter contamination of the fuel screen caused by inadequate maintenance and inspection.

8/24/63	2358 PDT.	Calgary, Canada	West Coast	F-27	Destroyed	None	16	0	2	11	0	1	2

The investigation of this accident is under the jurisdiction of the Canadian Government. Their report of findings on this accident has not been received at this time by the Civil Aeronautics Board.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
9/5/63	0630 AST.	Anchorage, Alaska	Cordova	C-46	Substantial	None	2				0	0	2			

(NON-SCHED. CARGO SERV. DOM.) Following the takeoff from International Airport, Anchorage, Alaska, the landing gear of N-7779B stopped during the retraction cycle. A hydraulic system pressure of 1,000 p.s.i. was indicated and the crew recycled the gear, at which time the system pressure dropped to zero and the hydraulic fluid quantity gauge showed empty. The landing gear handle was immediately returned to the down-and-locked position and emergency extension procedures were initiated. The first officer manually hand-crancked the gear toward the down-and-locked position until a green safe-to-land indication was reflected on the cockpit lights indicators. Despite this, during the landing roll the right landing gear collapsed. Investigation disclosed that the hydraulic system external ground service fitting, located in the pressure side of the system, had failed in fatigue causing the loss of hydraulic pressure and fluid. It was further disclosed that the right landing gear down-latch microswitch plungers, P/N 20,555,3379-1, and their associated key assemblies were stuck in the "gear locked" position. Since the aircraft landing gear lights are wire in series, with the right gear extended and locked, this malfunction resulted in a safe gear indication regardless of the position of the right landing gear. During testing, subsequent to the accident, it was found that during all extension tests the right landing gear was last to reach the down-and-locked position by an appreciable amount of time.

PROBABLE CAUSE: Hydraulic system failure caused by the fatigue failure of pressure line external ground service fitting.
Malfunction of the landing gear position warning system caused by inadequate maintenance and inspection.

9/10/63	1215 PDT.	Los Angeles, Calif.	PAWA	B-707-331	Minor	None	81	0	0	69	0	0	12			

(SCHED. PASSG. SERV. INT.) As N-705PA was being taxied east on south taxiway (F) for takeoff on runway 25L at Los Angeles International Airport, California, the right wingtip of N-705PA struck and substantially damaged the left horizontal stabilizer and elevator of a Boeing 377PG that was parked on the ramp adjacent to the taxiway. The pilot of N-705PA stated he saw that the empennage of the 377PG extended nearer to the taxiway than normal and had adjusted his taxi path to the left or north of the taxiway centerline. He further stated he assumed that this action would provide adequate clearance to pass the parked plane. He and the flight crew then directed their attention to the unusual design of 377PG. Investigation revealed that, at the time the right wingtip of N-705PA made contact with the empennage of the N-1024V, the nose gear centerline of N-705PA was 3.4 feet to the left or north of the centerline of the 50.8 foot wide taxiway. This would have put the centerline of the left main gear 10 feet inside the north edge of the taxiway. The area north of the taxiway was clear of obstructions. (Parked Aircraft: Boeing 377PG; N-1024V, (S).

PROBABLE CAUSE: Pilot of N-705PA misjudged clearance distance during taxi.

9/12/63	1010 AST.	Nr. Egegik, Alaska	Western Alaska	Cessna 180	Substantial	None	2	0	0	1	0	0	1

(NON-SCHED. PASSSG. SERV. DOM.) After spotting a moose, the pilot landed N-5398D on a small lake near the Egegik River, Alaska and the hunter, who had chartered the seaplane, then deplaned and subsequently shot the moose. The total weight of the hunter and the dressed moose meat was considered too great for takeoff from the confined area, so the pilot divided the meat and prepared to transport it to a larger lake nearby in two trips. He then planned to combine the load for takeoff from the larger lake. Prior to takeoff with the first load of meat, the pilot found it necessary to pump approximately 25 gallons of water from the forward compartment of the left float. Thereafter, the first round trip was uneventful. After loading the remainder of the meat, about 175 pounds, and the hunter, the pilot found the same compartment of the left float almost full of water and again he pumped it out before takeoff. During the subsequent takeoff run, the seaplane "stepped" normally and shortly thereafter the pilot extended the flaps to 30 degrees. As he did so, the right float lifted from the water but the left float remained in the water. With the seaplane in this attitude, the takeoff was continued until the edge of the lake was reached. At this point the left float struck a hummock causing the seaplane to become airborne in a stalled attitude. The pilot then aborted the takeoff and the seaplane was landed on swampy terrain. During the subsequent landing run the aircraft was extensively damaged. Examination of the left float revealed it contained about 10 gallons of water even after an unknown quantity had drained out of the unit. A hole was found in the left float located in the first compartment forward of the step. No other condition adversely affecting the takeoff performance was found.

PROBABLE CAUSE: Aircraft failed to become airborne in time to clear obstructions caused by drag and lack of buoyancy of the left float resulting from water in the float.
Judgment of the pilot in attempting takeoff with a known aircraft discrepancy.

9/21/63	0515 CST.	SE of Topeka, Kans.	Trans World	B-707-131	None	None	68	0	0	60	0	1	7

(SCHED. PASSG. SERV. DOM.) At 0230 c.s.t., 0130 p.d.t., the flight departed Los Angeles International Airport, California, en route nonstop to Kansas City, Missouri. At takeoff time, the Kansas City weather forecast for the arrival time was, "patchy alto-cumulus and alto-stratus clouds moving into northwestern Missouri in the early morning with ceiling 8,000 to 10,000 feet broken, variable to scattered." Shortly before 0500 the fasten-seat-belt sign was turned on and descent in preparation for landing was begun. Mild turbulence was encountered as the stewardesses completed their prelanding duties, and one went to the rear of the cabin for some personal items. About this time the aircraft entered stratified clouds about 10,500 feet over an area about 30 miles southeast of Topeka and a single sudden jolt of severe turbulence was encountered. The stewardess at the rear of the cabin was thrown to the floor and received a serious injury.

PROBABLE CAUSE: Unexpected in-flight turbulence.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
9/23/63	1828 MST.	NE. of Phoenix, Ariz.	American	B-707-123	None	None	95	0	1	86	0	0	8			

(SCHED. PASSG. SERV. DOM.) About 1828 m.s.t., the air carrier flight was descending between 11,500 and 10,000 feet over an area about 28 miles northeast of Phoenix, Arizona in preparation to land at Phoenix following a flight segment from Chicago. At this time the pilots sighted a light aircraft an estimated two miles ahead and made an abrupt evasive descent, during which one passenger received a serious injury although her seat belt was on. A stewardess sustainted minor injury. Investigation revealed that the occurrence took place in clear weather, while N-7523A was descending in accordance with an IFR clearance with radar surveillance. The light aircraft was not making a radar return. Collision was avoided by a narrow vertical separation but a substantial horizontal separation. The evasive maneuver involved one negative "g" force. Investigation further indicated that the light aircraft involved was a Cessna 210, which departed Phoenix at 1810 on a VFR no-flight plan to Show Low, Arizona. This was indicated by a report from the pilot who experienced severe turbulence at 10,500 feet over the area of the evasive maneuver. The pilot, however, did not see the large aircraft.

PROBABLE CAUSE: An abrupt evasive maneuver necessitated to avoid collision.

9/25/63	1325 EST.	Orlando, Fla.	Riddle	C-46	Substantial	None	2				0	0	2			

(SCHED. CARGO SERV. DOM.) At 1325 e.s.t., the Captain of N-1243N initiated takeoff from the Orlando, Florida Airport using runway 7 which is 6,000 feet in length. At the time the runway was wet and light rain was occurring. As full power was established, a pronounced thumping or vibration begun; however, the takeoff was continued until the aircraft had accelerated to between 60 and 65 knots, when a severe shaking of the right engine occurred. At this time the takeoff was aborted. Before the aircraft stopped it turned right, and the right main wheel went off the side of the runway. Rapid deceleration occurred and the plane nosed down, hit on the propeller and nose section, and rebounded to a normal 3-point position. Investigation revealed the right main wheel tire tube had failed. Examination of the tube revealed it had failed over a section where the tire fits to the wheel and where the thickness of the tube was .092 inches as compared to the manufacturer's standards of .110, minimum, and .180, maximum. The tire casing inside and out was in good condition. Examination of the runway disclosed marks from the right tire over a distance of 588 feet short of the final stopping point of the aircraft. Heavy braking marks from the left main tire were evidenced over a distance of 364 feet prior to the final resting place of the plane.

PROBABLE CAUSE: Failure of the defective right main tire tube during the takeoff roll, resulting in a loss of directional control.

9/25/63	2103 PDT.	Las Vegas, Nev.	AXXICO	C-46-F	Substantial	None	2				0	0	2	

(CARGO MIL. CTR. DOM.) At 2103 p.d.t., September 25, 1963, N-67935, a contract military cargo flight, crashed when the landing gear collapsed following touchdown for an emergency single-engine landing on runway 1, McCarran Field, Las Vegas, Nevada. It was disclosed that, during the climb after takeoff from Nellis AFB at 2049 p.s.t., the aircraft fire detection system indicated the presence of fire in the left engine. The pilot shut down the engine, feathered the propeller, and returned to McCarran Field for an emergency landing. Initial touchdown for landing on the 5,878-foot runway was approximately 4,775 feet beyond the approach threshold. After the landing gear collapsed, N-67935 slid to a stop on the fuselage 180 feet short of the upwind end of the runway. Investigation disclosed that failure in the No. 1 exhaust adapter of the left engine would have allowed sufficient escape heat to activate the fire warning light and bell. There was no evidence of preimpact failure or malfunction of the landing gear extension, retraction, or warning systems.

PROBABLE CAUSE: The Board has determined the probable cause of this accident was an improperly executed approach and landing during an emergency single-engine operation resulting in an overshoot.

NOTE: This accident is the subject of a long-form Board release. The report, dated May 19, 1964, is available upon request.

9/28/63	2030 EST.	Nashville, Tenn.	Eastern	DC-7	Substantial	None	45	0	0	40	0	0	5	

(SCHED. PASSG. SERV. DOM.) As the copilot flared the aircraft for landing on runway 2L at Barry Field, Nashville, Tennessee at the completion of an ILS approach, the Captain assumed command and took over the controls because the aircraft was slightly fast and right of the runway centerline. He made a correction back toward the centerline and touchdown sequence was left gear, right gear, and nose gear. According to the Captain's statement, he then placed the reverse thrust levers in the reversing regime and applied more power than intended. At this point the flight engineer advised that No. 4 propeller had not reversed. The Captain said that he then pushed all reverse levers forward and, "Before I could get some reverse back in," the aircraft deviated directionally toward the left of the runway. He applied forward thrust to Nos. 1 and 2 engines, causing the aircraft to swerve to the right and away from the runway boundary lights. As it did so, side loads failed the nose gear with violent vibrations preceding the failure. At this point, according to the pilot's statement, brakes were utilized for the first time. Examination of the aircraft, engines, and propellers subsequent to the accident disclosed no evidence of material or mechanical failure prior to impact. Inspection of the propellers revealed that the Nos. 1, 2, 3, and 4 propeller dome settings subsequent to the accident were 29.5°, 27.5°, - 14°, and -6°, respectively. Bench and operational checks of the propellers and their related components showed all operated within allowable tolerances. Propeller reverse thrust checks performed on the propeller assemblies disclosed no deviations of consequence and all test results were within allowable tolerances. The propeller low pitch limit is normally set at +29.5° with the reverse pitch limit -14.0°.

PROBABLE CAUSE: A loss of directional control during the landing roll caused by improper reversing technique.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
9/28/63	0913 PDT.	Los Angeles, Calif.	Trans World	B-707-131	Substantial	None	102	0	0	94	0	0	8			

(SCHED. PASSG. SERV. DOM.) The pilot received and returned the salute from the supervising ground crewman, indicating it was clear for him to taxi for takeoff. Power was applied and, as N-7741W moved forward, the left horizontal stabilizer struck the passenger jetway that was still in the process of being removed from the rear passenger loading door of the aircraft. Both the aircraft and the jetway were substantially damaged; however, there were no personnel injuries and there was no fire. Investigation disclosed that normally dispatching procedures require removal of the rear jetway five minutes before departure time. Thereafter, when the engines are started and all other ground facilities are secured, the supervising ground crewman releases the flight after making sure that the forward jetway is removed. It was further disclosed that when dispatching aircraft from this particular gate, only the rear jetway is used.

PROBABLE CAUSE: Failure of the ground crewman to assure that the ramp was clear before releasing the aircraft for taxi.

9/29/63	0105 CST.	Shreveport, La.	American Flyers	DC-3	Substantial	None	31	0	0	28	0	0	3			

(PASSG. CHARTER DOM.) As N-33656 accelerated through V_2 speed during a night takeoff at Monroe, Louisiana, the pilot who was flying the aircraft from the left seat discovered the elevator control was nearly immobile. With maximum force on the control by both pilots, takeoff was accomplished. Between the takeoff time, 0005 c.s.t., and 0020, two landing attempts were made at Monroe. In each, extremely hard touchdowns damaged the landing gear and blew out the right main tire. N-33656 was then flown to Barksdale AFB where, after determining the landing gear could not be extended and emergency cabin procedures were taken, the pilots made a wheels-up landing. Examination of the aircraft revealed that the external gust lock for the left elevator had not been removed. The reason and manner in which the lock had been missed during preflight which included removal of the aileron and right elevator gust locks could not be explained. It was further noted that a check for freedom of control movement is a 3-time check item before takeoff. The check is called for before engine start, before taxi, and before takeoff.

PROBABLE CAUSE: An emergency wheels-up landing cause by inadequate preflight inspection and pretakeoff checks.

10/14/63	1233 EDT.	Jamaica, N. Y.	New York Airways	Vertol 107-11	Destroyed	After Impact	6	3	0	0	3	0	0

(SCHED. PASSG. SERV. DOM.) Seconds after lift-off for a regularly scheduled flight from New York International Airport (Idlewild) to Newark International Airport, the helicopter crashed from a height of about 150 feet above the ground. Fire followed impact. Investigation, including teardown and detailed examination of the entire rotor drive system, disclosed that the drive quill shaft which transmits the drive force from the mix box to the aft transmission had failed in fatigue. In addition, it was discovered that the two jets designed to lubricate the quill shaft were plugged with metal shavings. It was determined that, when the quill shaft failed, the aft rotor blades became unsynchronized with the forward rotor blades. As a result, the forward green rotor blade hit the aft yellow and green rotor blades, failing the three involved blades in flight. The altitude at which this occurred was estimated to be approximately 150 feet.

PROBABLE CAUSE: The Board determines the probable cause of this accident was fatigue failure of the drive quill shaft due to contamination of the lubrication system in the aft transmission assembly.

NOTE: This accident is the subject of a long-form Board release. The report, dated June 24, 1964, is available upon request.

10/14/63	2145 GMT.	Paris, France	Trans World	B-707-331B	Substantial	None	14	0	0	7	0	0	7

The investigation of this accident is under the jurisdiction of the French Government. Their report of findings on this accident has not been received at this time by the Civil Aeronautics Board.

10/19/63	0235 PDT.	Los Mochis, Mex.	Western	L-188A	None	None	87	0	2	80	0	0	5

The investigation of this accident is under the jurisdiction of the Mexican Government. Their report of findings on this accident has not been received at this time by the Civil Aeronautics Board.

11/1/63	1140 EST.	Nr. Atlanta, Ga.	Eastern	DC-7B	Substantial	None	28	0	0	23	0	0	5

(SCHED PASSG. SERV. DOM.) At 1140 e.s.t., N-823D was struck by lightning while operating under IFR conditions at an en route cruise altitude of 13,000 feet, m.s.l., near Atlanta, Georgia. The flight crew reported that the aircraft speed was being reduced because of moderate turbulence when the strike occurred. They said that after the strike a banging noise was heard coming from the area aft of the cockpit section and some aircraft vibration was felt. Both the noise and vibration decreased as the airspeed was reduced and ceased at 150 knots. A precautionary landing was then made at Atlanta without further incident. Investigation disclosed the top 18 inches of the rudder was missing. The top rudder hinge bearing was arced and welded, with arcing and pitting of the lower hinge bearing. Arcing or burning and pitting were found on the rotating beacon and at numerous points on the fuselage, aft of the battery compartments, with small pinnacles of molten metal in the pitted areas. Both battery compartment doors were forced open by evenly distributed outward forces. A 1/8 inch hole was in the radome and burning or

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Other F	Other S	Other M/N
11/1/63	(Cont'd.)															

arching was found on the left ADF sense antenna. The flight crew reported when the lightning strike occurred the aircraft radar was in operation and showed steady rain but no cells or disturbances, although just prior to the lightning strike, turbulence and rain increased suddenly. No other lightning was observed.

PROBABLE CAUSE: In-flight lightning strike.

11/1/63	1114 EST.	Atlanta, Ga.	Delta	CV-440	Substantial	None	38	0	0	35	0	0	3			

(SCHED. PASSG. SERV. DOM.) N-4815C was being operated as regularly scheduled flight from Columbia, South Carolina to Atlanta, Georgia. During the landing roll, following a normal approach and touchdown at Atlanta, the crew of N-4815C overheard the pilot of a second aircraft notify the Atlanta tower that N-4815C had lost a wheel. After a visual inspection of the damage by the Captain, N-4815C was taxied to the parking ramp. Investigation disclosed that the left landing gear axle had failed at a point just outboard of the brake assembly attachment flange. Examination of the failure revealed it to be of a fatigue type, originating in the area of the fillet where the axle and flange join. Under microscopic examination of the failed parts the fatigue condition was shown by more than 14 small half-moon shaped areas which began at the surface of the axle and emanated along the plane of the failure. An area on the lower surface of the axle appeared to be the focal point. Aircraft records did not indicate the total time on the failed axle; however, they did show a total of 8,075 hours since aircraft overhaul.

PROBABLE CAUSE: Fatigue failure of the left main landing gear wheel axle.

11/6/63	0934 EST.	Boston, Mass.	Eastern	B-720	Substantial	None	38	0	0	31	0	0	7			

(SCHED. PASSG. SERV. DOM.) The flight crew reported that, as the aircraft was rotated for takeoff, they heard a loud noise followed by a vibration and a yaw of the aircraft to the right. When the Control Tower personnel advised there was a fire visible in the No. 4 engine, the flight crew actuated the firewall shutoff for that engine. Emergency procedures and immediate return to the airport were initiated. The engine fire went out and the aircraft was landed without further incident. Substantial Damage occurred to the engine pylon. Teardown inspection of the No. 4 engine revealed the No. 3 low pressure compressor spacer, P/N 359412, was missing. The tie rod bolts were all intact and secure, but bent in the direction of engine rotation in the area of the missing spacer. All of the No. 3 spacer internal bushings remained on the outer diameter of the tie rods; however, a 14-inch straightened section of the spacer, with the tie rod holes torn away outward, was recovered from the runway. Examination of the engine revealed no evidence of failure prior to or other than the separation and breakup of the No. 3 spacer. The crew stated that when each of the right side fire bottles were selected and the discharge switch pressed, the discharge light did not come on. The Nos. 3 and 4 engine fire bottles were found pressured to 670 and 525 p.s.i.g respectively, and both discharge

11/6/63 (Cont'd)

indicators were green. Each of the bottles discharged when the discharge switch was depressed. The pressure gauge for the forward bottle was found to be sticking and the discharge light did not come on until the gauge was tapped. No determination was made as to why the fire bottles did not discharge when actuated by the crew.

PROBABLE CAUSE: In-flight engine fire.
Material failure of the No. 3 low pressure compressor spacer of the No. 4 engine.

11/9/63	1500 CST.	Nr. Houston, Tex.	Eastern	DC-8	Substantial	None	128	0	1	120	0	1	6

(SCHED. PASSG. SERV. INT.) Prior to departure, because of forecast adverse winds and weather conditions, N-8603, normally operating as a non-stop New York City to Mexico City Flight, was scheduled for a refueling stop at Houston, Texas. About 18,000 feet during the climb to cruising altitude after takeoff from Houston, the crew experienced a temporary loss of control. The aircraft then entered a high speed dive from which recovery was effected at an altitude of about 5000 feet m.s.l. During the occurrence one cabin attendant and one passenger received injuries reported as serious, also, the number 3 engine separated from the aircraft.

PROBABLE CAUSE: Under investigation.

11/21/63	1958 EST.	Seymour Johnson AFB, North Carolina	Capitol	Armstrong-Whitworth Argosy AW-650	Substantial	None	3				0	0	3

(CARGO MIL. CTR. DOM.) Shortly after the flight departed Seymour Johnson AFB, North Carolina for VFR flight to Dover AFB, Delaware, the crew returned to Seymour Johnson AFB and landed to investigate a possible hydraulic system malfunction or failure being indicated by the hydraulic fail indicator. The Captain stated that before taxiing from the runway he checked all hydraulic system pressures and they were normal. He then returned the brake selector to the normal system from the emergency system positioned where it had been placed during landing. He further stated that, as the aircraft was being turned toward a parking space on the ramp, a loss of nosewheel steering and normal system braking were experienced. The brake selector was returned to emergency position and actuated; however, braking was insufficient and N-6507R struck the refueling boom assembly of a parked KC-97G. As directional control was completely lost, the Captain ordered the engines and electrical power shut down. N-6507R then struck a parked C-54 and a closed hangar door. Investigation revealed that the cap nut, P/N SP882-B, on the nose gear uplock assembly shuttle valve unit was loose and all of the hydraulic system fluid had leaked out around the gaskets on either side of the banjo fitting which is normally held in place by the cap nut. Examination of the cap nut revealed that it was improperly safetied and could beturned 1/4 turnwith finger pressure. When the nut was properly installed, the hydraulic system serviced, the system functioned normally. Aircraft records reveal that the uplock assembly had operated 14 hours since its removal, overhaul, reinstallation, and inspected during company maintenance. (Parked Aircraft: USANG-KC-97G; 52-902; (S); USAF C-54; 43-17215; (S).

PROBABLE CAUSE: A loss of directional control during parking, resulting from hydraulic system failure caused by inadequate maintenance and inspection.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
11/29/63	1110 EST.	Morgantown, W. Va.,	Purdue Aeronautics	DC-3	Destroyed	None	3				1	1	1			

(FERRY) The aircraft departed Lafayette, Indiana at 0836 EST. for an intended ferry flight to Morgantown, West Virginia. At 1110 EST. the aircraft struck trees and crashed on a wooded hillside, during a VOR instrument approach to land at the Morgantown Airport. The aircraft was damaged beyond economical repair. The crash site was 2½ miles from the Morgantown VOR on a 340° radial of the station and between the station and the Morgantown Airport. The 1118 EST. Morgantown Special Weather Observation was, Balloon ceiling 600-feet broken, 800-foot overcast, visibility 2 miles, light rain fog; wind north, 12 knots, gusts to 20 knots; altitude setting 29.42 inches; ceiling ragged.

PROBABLE CAUSE: Under investigation.

12/2/63	1700 PST.	Oakland, Calif.	San Francisco Oakland Airways	S-62A	Substantial	None	11	0	0	10	0	0	1			

(SCHED. PASSG. SERV. DOM.) Approximately two minutes after takeoff from Berkeley en route to Oakland, California, the pilot experienced a complete power failure. An autorotative landing was made in the Oakland Pacific Railroad Yards, during which the helicopter struck a parked automobile and received substantial damage. Investigation disclosed that the fuel control unit mechanism was contaminated with metal particles to the extent it was inoperative. The contamination was determined to have resulted from improperly securing the fuel pump centrifugal impeller with a castel nut and thick washer at overhaul. As a result the nut had backed off and was rotated against the impeller housing and impeller vanes. This caused considerable wear and abrasion of both housing and vanes producing the metal contamination. Proper installation of the component required a stop nut and thin washer.

PROBABLE CAUSE: Power failure resulting in metal contamination of the fuel control unit caused by inadequate maintenance and inspection.

12/4/63	1708 EST.	Lakeland, Fla.	Eastern	DC-8	None	None	70	0	1	62	0	0	7			

(SCHED. PASSG. SERV. INT.) About 1710, the flight was over the vicinity of Lakeland, Florida at 33,000 feet during a scheduled flight from Chicago, Illinois to San Juan, Puerto Rico, with an intermediate stop at Miami, Florida. At this time, because of high clouds about 100 miles ahead and forecast turbulence between 25,000 and 40,000, the Captain requested and received a cruising altitude of 25,000 feet. For the descent he turned on the "fasten seat belt" sign and advised passengers to take their seats and observe the sign. At this time one passenger was in the lavatory and saw the "return to your seat" sign come on. As she prepared to comply, the aircraft encountered one jolt of turbulence and a series of choppy jolts, and the passenger was thrown to the lavatory floor sustaining a broken ankle. Investigation indicated that the air carrier weather department had forecast a

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12/4/63 (Cont'd)

wind shear turbulence, light to moderate, between 25,000 and 40,000 feet 125 miles on either side of a line between Ft. Meyers and West Palm Beach. The Weather Bureau forecast was for moderate clear air turbulence between 30,000 and 40,000 over cental Florida. The flight involved, however, had not experienced prior turbulence to that encountered and none was reported by other flights in the area.

PROBABLE CAUSE: In-flight turbulence.
Failure of the Captain to use earlier turbulence precautions for cabin occupants over an area of forecast turbulence.

12/4/63	1520 AST.	Kodiak, Alaska	Kodiak Airways	PA-18-150	Substantial	None	1			0	0	1

(FERRY) Following replacement of the floats installed on the aircraft with wheels at the air carrier seaplane facility, the pilot attempted takeoff to ferry the plane to the Kodiak Airstrip. The takeoff was attempted from a praking lot which afforded only approximately 250 feet of takeoff area, and the surface wind was calm. The aircraft became airborne but not in time to climb over a log at the end of the area. The landing cross member hit the log, damaging the landing gear. The pilot was able to control the aircraft, make the takeoff, and thereafter land on a frozen lake. Additional damage, because of the damaged landing gear, was incurred in the landing. Investigation revealed that it was common practive to use the parking lot for takeoff of PA-18 type aircraft, but only when a favorable wind condition existed. It was stated by a company official that this was done to avoid dismantling the aircraft and trucking it to the airstrip; however, because of the accident, the practice of flying the aircraft from the area was to be discontinued.

PROBABLE CAUSE: Pilot attempted takeoff from terrain which was unsuitable under existing conditions.
Inadequate flight preparation for a company practice with insufficient safety consideration.

12/7/63	1930 MST.	Nederland, Colorado	Zantop	C-46	Destroyed	After Impact	3	1	0	0	2	0	0

(CARGO MIL. CTR. DOM.) At 1859 m.s.t., on December 7, 1963 N-609Z departed Lowry AFB, Colorado on a VFR flight plan en route to Hill AFB, Utah. The aircraft failed to arrive at Hill AFB, and was subsequently found on July 8, 1964. Investigation at the scene indicated that the aircraft impacted into a vertical rock face in a level or slightly nose up attitude at an approximate level of 12,500 feet. Fire followed impact destroying 90% of the fuselage and left wing.

PROBABLE CAUSE: Under investigation.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
12/8/63	2059 EST.	Elkton, Md.	PAWA	B-707	Destroyed	After Impact	81	73	0	0	8	0	0			

(SCHED. PASSG. SERV. INT.) At 2024 e.s.t., N-709PA took off from Baltimore Friendship Airport, Maryland to continue the flight from San Juan, Puerto Rico to Philadelphia, Pennsylvania. About 2042 e.s.t., the flight reported over the New Castle, Delaware VOR and received weather information and instructions to hold at 5000 feet. At approximately 2058 e.s.t., Philadelphia Approach Control received the following transmission, "Mayday, Mayday, Mayday, Clipper 214 out of control. Here we go." About 30 seconds later the words, "clipper 214 is going down in flames", were heard. The second transmission was later attributed to the co-pilot a second aircraft, who saw N-709PA on fire and descending. Shortly thereafter N-709PA crashed and burned near Elkton, Maryland. The accident occurred in an area of reported severe frontal weather with active lightning strikes visible in the crash area.

PROBABLE CAUSE: Under investigation.

12/11/63	1435 PST.	Kalispell, Mont.	West Coast	DC-3	Substantial	None	6	0	0	3	0	0	3			

(SCHED. PASSG. SERV. DOM.) About 1415 p.s.t., the first officer, who was flying the aircraft from the left pilot's seat, initiated landing at Kalispell, Montana, one of several scheduled stops for the flight between Seattle and Spokane. Apparently during the descent some windshield icing formed on the right side of the windshield which hampered the Captain's vision to some degree. The left side remained substantially clear. At initial touchdown on the snow-covered runway the aircraft bounced with the left wingtip striking the surface at the second runway contact. The plane then veered off the left side of the runway as the Captain took control and made a go-around. The Captain took the left seat for better vision and landed the aircraft safely. Investigation revealed the aircraft had settled to a very hard touchdown at a point 1,584 feet past the approach end of the 4,662-foot long runway. The second touchdown was 2,640 feet down the runway. After another 600 feet tire tracks appeared and showed the plane went off the left side of the runway. About 260 feet beyond the end of the runway and still off the side, the plane became airborne in the go-around. Examination of the windshield deicing system revealed no defective conditions, and during subsequent flights it functioned normally.

PROBABLE CAUSE: Pilot misjudged level off and made improper recovery from the resultant bounced landing.
Inadequate supervision by the Captain.

12/12/63	0033 CST.	New Orleans, La.	Eastern	B-720-025	Substantial	None	16	0	0	10	0	0	6

(SCHED. PASSG. SERV. DOM.) About 400 feet during the takeoff climb, the flight crew felt and heard a loud explosive noise in the No. 1 engine. The No. 1 engine was shut down and isolated and the climb continued. Between 500 and 600 feet the Nos. 2 and 3 engines low hydraulic pressure warning lights came on and the hydraulic fluid quantity level dropped to one gallon. A visual check revealed a large hole in the No. 1 engine nacelle above the engine compressor section. The climb was continued to 2,000 feet and preparation made for an emergency landing which included dumping approximately 15,000 pounds of fuel. The landing gear was lowered manually and the wing flaps extended electrically. The landing was normal; however, air brakes were used and two tires on the left main truck and one on the right were blown out during the rollout, a fourth tire on the right truck ruptured during an attempt to tow the aircraft off the runway. Investigation disclosed that two holes were blown through the No. 1 engine nacelle around the engine compressor area. Failed compressor blades had punctured the aircraft fuselage, wing leading edge and flaps, and the No. 2 engine pylon. Two hydraulic lines were severed, a fire extinguisher bottle damaged, and a large fuel line creased; however, there was no evidence of fire. Examination of the No. 1 engine revealed the third stage compressor rotor disk spacer assembly was missing and all the compressor and stator blades aft of the spacer had separated from the compressor or were severely damaged. It was further disclosed that engines Nos. 1, 3, and 4 were not modified with a later design of compressor rotor disk spacer assemblies. Also a borescope inspection of these engines recommended by a Pratt and Whitney Aircraft letter, dated November 27, 1963, and required by FAA Emergency Airworthiness Directive, dated November 29, 1963, had not been complied with on any of the engines.

PROBABLE CAUSE: Engine failure caused by material failure of the compressor rotor disk spacer assembly. Inadequate maintenance and inspection.

12/17/63	2341 PST.	Los Angeles, Calif.	Western	DC-6B	Substantial	None	46	0	0	40	0	0	6

(SCHED. PASSG. SERV. DOM.) About 2341 p.s.t., the number 1 and number 2 engine propellers of N-93131 struck the surface of runway 25L, at Los Angeles, International Airport, California. Reportedly the accident occurred during a go-around, that was initiated after the flight encountered zero runway visibility in fog, during the landing roll. Subsequently a safe landing was made at Lockheed Air Terminal, Burbank, California.

PROBABLE CAUSE: Under investigation.

Date	Time of Accident	Location	Airline	Aircraft	Aircraft Damage	Fire	Total Aboard	Division of Injury: Passengers F	Passengers S	Passengers M/N	Crew F	Crew S	Crew M/N	Others F	Others S	Others M/N
2/28/63	2129 EST.	Boston, Mass.	Eastern	DC-7	None	None	26	0	0	21	0	0	5	1	0	0

(SCHED. PASSG. SERV. DOM.) At the loading gate, the ramp agent who was attending the flight, saw and greeted a woman whom he recognized as an off duty stewardess for the company. He said that at this time she acted in a "bewildered manner." Thereafter, according to the ramp agent, when all four engines were started and the boarding stand had been pulled away, he saw the woman approaching the plane. He said he waved her back however, she began to run toward the No. 2 propeller. He tried to intercept her but was unsuccessful, and the off-duty stewardess was struck and fatally injured by the propeller.

PROBABLE CAUSE: Action of the off-duty stewardess in running into the rotating propeller.

Symbols

DOM..... Domestic
INT..... International
MIL. CTR..... Military Contract
NON-SCHED..... Non-Scheduled
PASSG..... Passenger
SCHED..... Scheduled
SERV..... Service