NUREG-0533

AIRCRAFT IMPACT RISK ASSESSMENT DATA BASE FOR ASSESSMENT OF FIXED WING AIR CARRIER IMPACT IN THE VICINITY OF AIRPORTS

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission

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ABSTRACT

The FIXED WING AIRCRAFT accidents occurring to U.S. air carriers during the years 1956 through 1977 are listed, with those resulting in impact within five miles of airports in the contiguous U.S. being considered in detail as to location of impact relative to the airport runways.

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to describe the data base for the estimation of fixed wing aircraft impact probability at nuclear power plant sites in the vicinity of airports, and to provide a single, compact source of information to assist in reviews of fixed wing aircraft hazards. This data does not cover the hazards from all types of air carrier operations (i.e., helicopter, dirigible, etc.) It is to be expected that data contained in this report eventually will become outdated, and necessitate future recompilation.

1.2 Background

10 CFR Part 50 (Appendix A, General Design Criteria 3 and 4) and Part 100 (land use characteristics) set forth design and siting considerations for nuclear power plants. In interpreting these regulations in specific licensing cases, the NRC staff examines applications for licenses for compliance to criteria according to the established procedures contained in the Standard Review Plan (NUREG-75/087), and, where those procedures demonstrate compliance to the criteria, recommends that a license be issued.

In Section 3.5.1.6 of the Standard Review Plan, NUREG-75/087, the acceptance criteria are that either the facility is designed to safely survive aircraft impact and associated fire effects without initiating an accident having potential consequences in excess of 10 CFR Part 100 guidelines or that aircraft hazards not designed against have an expected frequency of occurrence less than the criteria of Standard Review Plan, Section 2.2.3. These latter criteria interpret the provisions of 10 CFR Parts 50 and 100 which require design against all hazards which are "credible" and which have potential consequences in excess of 10 CFR Part 100 guidelines. The criteria of Section 2.2.3 are that a "realistic" estimate of probability of occurrence not exceed approximately 10^{-7} in any year, or, if uncertainties of estimation are inherently large due to the unprecedented nature of the event, that a "conservative" estimate of the same quantity not exceed approximately 10^{-6} in any year.

In practice, the staff has generally interpreted "realistic" as the use of actual accident rates, and "conservative" as the use of derived or selected judgmental factors in a computation which is likely to significantly overestimate the likelihood of the event being considered.

In recent licensing hearings, the reliability of factors involved in estimating aircraft impact likelihoods, in particular, crash densities, have been matters of concern. The accumulation, display, and interpretation of large numbers of accident records is a difficult task in the context of an administrative adjudicatory proceeding. During the past decade, the staff has, on several occasions, examined the records of various aspects of U.S. aviation for use in specific reviews and presented the results as evidence. Excerpts of these other data and methods of interpretation will be forthcoming as a separate report.

1.3 Definitions of Terms

Since the 1950's, the responsibility for maintaining records of use in esti mating air crash impact probability has at various times rested with the Civil Aeronautics Administration, the Federal Aviation Agency, the Federal Aviation Administration (FAA), the Civil Aeronautics Board (CAB), and the National Transportation Safety Board (NTSB). At present, only the last three of these organizations exist.

Definitions and classifications of aviation uses have changed greatly over the past 25 years, particularly at the time of the adoption of the Federal Aviation Regulations (FAR) in 1958. For the most part aviation terms will be used as defined in the Glossary of the FAA Statistical Handbook of Aviation.

1.4 Categorization of U.S. Aviation Hazards

Aircraft have been broadly characterized as being air carrier, general aviation, or military; each of these three categories being further divided and discussed in greater detail in its appropriate section of this report. Hazards from each category to a specific site are characterized by that site's

proximity to an aerodrome or airport, or its location underneath airspace either used for a specific purpose or resulting from random overflight.

A phrase which appears in the Standard Review Plan and frequently occurs in licensing hearing testimonies refers to a specific site as being "in the vicinity" of airports, etc. As used by the staff, this phrase has generally been taken to mean within 5 miles (8 km) when applied to airports. This specific distance appears in both civilian and military aviation usages. At small airports possessing a control tower, that control tower is, in the FAR, given authority over traffic control up to a specified altitude and out to a lateral distance of 5 statute miles. The maximum width of military low level training routes is 4 nautical miles on each side of centerline, a distance very nearly equal to 5 statute miles. This is also the usual lateral separation distance applied to traffic within the Federal Airway system. Large airports, or hubs served by two or more airports, however, may have Terminal Control Areas (TCA) extending much farther, and in such cases holding patterns, approach, and departure flight paths should be considered as air corridors.

2.0 AIR CARRIER ACCIDENTS IN THE VICINITY OF AIRPORTS

2.1 Definition of Air Carriers

The term "air carrier" has been used to describe a variety of commercial aviation over the period from 1956 to date. Prior to 1958, for example, certification was not required for all types of commercial air transportation, and the definitions of various types of air transportation for compensation or hire have changed several times since then. For purposes of deriving accident rates, the staff has considered "air carrier" to be divided into "scheduled," meaning operations by Certified Route Air Carriers (CRAC) on scheduled routes, but excluding local commuter airline operations by small aircraft, and "non-scheduled," which is taken to include not only non-scheduled operations by CRAC, but all operations by Supplemental Airlines, Air Travel Clubs, Commercial Operators of Large Aircraft, and military transportation services either by charter to the Department of Defense or by passenger or cargo aircraft of the Military Airlift Command.

2.2 Accident Data, 1956 through 1977

An exhaustive stepwise process was used to compile data which the staff could use to evaluate the probability of a damaging fixed wing air carrier crash for plant sites located in the vicinity of airports. All the air carrier accident resumes prepared by the Civil Aeronautics Board (CAB) and the National Transportation Safety Board (NTSB) for the period 1956-1977 were collected and reviewed. These data include all accidents worldwide and totalled 1514 accidents.

In order to determine the potential hazard to a nuclear power plant, only those accidents that involved the destruction of the aircraft or a fatality of one or more of the aircraft occupants were chosen as being severe and applicable to the staff data set. This reduced the available accidents to the 268 accidents summarized in Table 2-1 of this report.

A further qualifier on the data was that the staff was only interested in the potential hazard of an aircraft crash at a location in the contiguous U.S. The staff concluded from examination of many accident reports that all accidents that occurred outside the contiguous United States were not applicable because of the variations in airport operations, flying conditions, and flight control assistance. Using this criterion the 268 accidents of Table 2-1 were reexamined and found to include 197 accidents that occurred in the contiguous U.S. The next division was to separate inflight accidents and those accidents in which the aircraft crashed within 5 miles of the airport from which they had departed or at which they were to have landed. These latter 97 accidents are summarized in Table 2-2 along with the range and bearing of the crash location relative to the end of the runway and the runway extended centerline. Table 2-2 has been broken down into Tables 2-3A, 2-3B, 2-3C and 2-3D which show, in tabular form, takeoff and landing accidents for scheduled and non-scheduled operations. This information has been plotted in figures 2-2, 2-3, 2-4, and 2-5 which graphically depict this breakdown. Table 2-3E which lists pertinent accident information about the accidents listed in Table 2-2 is also provided for future reference.

After establishing a preliminary data set of 97 accidents from the accident report resumes, the staff contacted the file personnel at the NTSB and requested all the available accident crash files from their archives concerning the off-runway accidents listed in Table 2-2. At that time the staff was informed that crash data are held in the archives for only 17 years.

Of the 33 files received, most provided specific location information on distance and bearing including an identification of whether such bearing was to the right or to the left of the runway extended centerline. Table 2-4 lists the "confirmed" accidents and provides additional information concerning the weight of the plane and air speed at the time of impact.

Further inspection of the data contained on Table 2-2 shows that a large number of the commercial aircraft crashes occurred on the runway. These accidents are listed as having a location of range (R) = 0. Since these accidents would not contribute to the calculation of crash likelihood at a location away from an airport, these accidents were not included in the relevant accident data set. This additional criterion further reduced the applicable data set to the final number of 55 accidents. These accident locations are plotted on Fig. 2-6 for takeoff accidents and Fig. 2-7 for landing accidents. Since some of the accident locations could not be determined as being left or right of the runway extended centerline (particularly those accidents for which we had resumes only), the range and bearing information of Table 2-2 has been plotted in Fig. 2-1 which displays all crashes in a single 90 degree quadrant (looking away from the end of the runway).

When the ability of a facility to withstand the impact of a plane crash is a consideration, the crash rate for different sizes of aircraft must be determined. Table 2-5 lists only those aircraft crashes from Table 2-2 in which the aircraft weighted more than 200,000 pounds and Table 2-6 lists typical U.S. manufactured passenger aircraft weighing over 200,000 pounds.

2.3 Accuracy of Crash Locations

The staff attempted to arrive at an estimate of the accuracy of the location information contained in the accident resumes so that a judgment could be reached about the overall accuracy of the data. To do this a comparison was made between the range and bearing information obtained from the detailed crash files and the range and bearing information obtained from the accident resumes for the same crashes. With only one or two exceptions the variations between the "confirmed" values and the accident resume values were relatively small. From this evaluation, the staff concludes that the range information of Table 2-2 is generally accurate to within a half-mile and that the bearing (angular information from end of runway) information is generally accurate to within 5°.

2.4 Definition of Operations

The FAR and FAA documents use the term "operations" in several contexts, and the FAA glossary defines "phase of operation" and "type of operation." The term "airport operation" is defined by the FAA glossary as any of several acts of traffic control by an airport control tower. For convenience, the term "aircraft operation," or simply "operation," will be used to mean any landings or takeoffs, whether full stop or touch-and-go, i.e., each individual movement by an aircraft that results in a single overflight of the airport vicinity.

Crash rates usually are expressed as crashes per exposure unit, i.e., per aircraft-mile, aircraft-hour, or per departure. For present purposes, the exposure unit will be taken as "per operation," this being further divided into per landing and per takeoff, since the hazard to be measured by the rate is that of impact at a particular site, rather than the hazard to the aircraft and its occupants.

2.5 Air Carrier Operations

The staff developed the association between the number of takeoffs and landings and the number of accidents listed in Table 2-2. This information is contained in Table 2-7 and is listed for scheduled, non-scheduled and total

air carrier traffic in the contiguous U.S. For each row in the table, five items of information are supplied, these are: the millions of takeoffs and landings associated with that traffic, the numbers of landing and takeoff accidents contained in Table 2-2 and ratios of the numbers of each type of accident to the numbers of times that particular operation was performed. Assumptions needed in preparing this table are explained in the footnotes, and at the end of this table are summary totals and subtotals for use in identifying trends in time.

2.6 Military Air Transport

Table 2-8 lists the recent accident experience and traffic by military aircraft similar to types flown by civilian air carriers. As can be seen by comparing Tables 2-8 and 2-7, the military, when operating as an air carrier, has accident rates approximately the same as those of civilian non-scheduled air carrier service.

Table 2-1

U.S. Air Carrier Accidents in Which Aircraft Was Destroyed
and/or an Occupant Fatality Occurred Worldwide

Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1956								
1/2		Alaska	T	Cessna-170B	D	0	SP	Skis caught in fresh snow
2/17	1458	Owensboro, KY	L	H-404	D	0	SP	Stalled
4/1	1920	Pittsburgh, PA	T	H-404	D	F	SP	Fire in engine
4/2	0810	Seattle, WA	T	B-377	D	F	SP	Ditched in Sound
4/9		Skelak, AK	I	Aero Commander	D	F	SP	Mountain
6/13	1807	Shelby, NC	I	DC-3	M	F	SP	Passenger fell out
6/30	1031	Grand Canyon, AZ	I	L-1049	D	F	SP	Midair
6/30	1031	Grand Canyon, AZ	I	DC-7	D	F	SP	Midair
7/2		Alaska	I	DH-2A	D	F	SP	Emergency Landing
10/2	1825	Nome, AK	I	Stinson AT-19	D	0	SP	Lost in snow under VFR
10/16	0615	Pacific Ocean	I	B-377	D	0	SP	Ditched in sea
11/1[illegible]	1504	Las Vegas, NV	L	M-404	D	0	SP	Wheels up
12/12		Panama	I	C-46F	D	0	NS	Ditched in Sea
12/6		California	I	C-46A	D	0	NS	Lost in fog under VFR
1957								
1/6	0001	Tulsa, OK	L	CV-240	S	F	SP	Approach 3 miles short
1/19	1910	Idlewild, NY	T	DC-3	D	F	Unauthorized	Mechanic took plane - runway stall
2/1	1802	Rikers Island, NY	T	DC-6	D	F	SP	Pilot disoriented in fog
3/2	1719	Blyn, WA	I	DC-4	D	F	SP	
3/10	1138	Louisville, KY	L	M-404	D		SP	Hard landing, full flap
5/13	2330	Narsassuak, Greenland	I	DC-4	D	F	Mil/C	White out, Mountain
6/22	0750	Clarksburg, MD	NA	DC-3	D	F	Training	Stall during fly-by
6/28	2330	Miami, FL	Taxiing	DC-7	D	F	Check-out	
7/25	0337	Daggett, CA	I	CV-240	S	F	SP	
9/15	2046	New Bedford, MA	L	DC-3	D	F	SP	Off ILS approach in fog
11/6	1135	Guatamala	L	C-46A	D	F	SC	Aborted emergency landing - children playing in field
11/9		Pacific Ocean	I	B-377	D	F	SP	

Table 2-1 (continued)

Date & Hour	Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1957							
3/2 1720	Alaska	I	DC-4	D	F	SP	
3/22 1115	Alaska	I	PA-22A	D	F	SP	
6/19 1500	Canada	I	Cessna-180	D	0	Search & Rescue	
6/22 1400	Alaska	I	Norseman	D	F	NS	
9/14 0930	Alaska	T	Cessna-180	D	0	NS	
1958							
1/15 1600	Tenakee, AK	I	Vega	D	F	SP	Ran out of fuel
2/13 1344	Palm Springs, CA	T	CV-240	D	0	SP	Forced landing in desert
3/25 0006	Miami, FL	T	DC-7	D	F	SP	Forced landing in swampy marsh
4/6 2319	Freeland, MI	L	V-700	D	F	SP	Approach
4/21 0830	Las Vegas, NV	I	DC-7	D	F	SP	Midair
5/20 1029	Brunswick, MD	I	Viscount	D	F	SP	Midair
5/31 1320	Alaska	I	C-46	D	F	NS	Cargo shift in flight
6/4 1358	Martinsburg, WV	L	DC-3	D	F	Training	Hit tree on long takeoff
8/15 2234	Nantucket, MA	T	CV-240	D	F	SP	1450 ft. about 600 ft. to left
8/20 1525	Eldred Rock, AK	I	G-21	D	F	SP	
8/28 0329	Minneapolis, MN	T	DC-6	D	0	SP	Hit fence at runway
9/9	Atsugi, Japan	I	L-1049	D	F	CTR/C	Mountain, 15 miles out
9/19 0950	Alaska	I	Cessna-180	D	F	NS	Cabin heaters - CO poisoning
11/10 1101	New York, NY	T	L-1049	D	0	Training	Taxi collision
11/16 0615	Colorado	I	C-46	D	F	Mil/CTR	Hit mountain
1959							
1/20 1054	Alaska	I	BE-18	D	F	NS	
2/1 2345	Kerrville, TX	L	DC-3	D	F	Mil/CTR/P	Ran out of fuel
2/3 2356	New York, NY	L	L-188	D	F	SP	Auto pilot error
2/20 0756	San Francisco, CA	L	DC-7	D	0	NS	Hard landing

Table 2-1 (continued)

Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1959								
3/15	0053	Chicago, IL	L	CV-240	D	0	SC	Hit tower
3/30	2346	Alma, GA	I	C-46	D	F	SC	Fire
4/10	1522	Juneau, AK	L	B-377	D	0	SP	
5/12	1529	Charleston, WV	L	L-1049	D	F	SP	On runway
5/12	1613	Chase, MD	I	V-745	D	F	SP	Thunderstorm
6/16	0027	Ireland	T	DC-6	D	0	SC	Takeoff abort
6/21	1330	Alaska	I	PA-14	D	0		
6/26	1632	Milan, Italy	I	L-1049	D	F	SP	Disintegration (storm)
7/3	1525	Alaska	I	Cessna-180	D	F		Cabin heaters, CO poisoning
8/15	1641	Calverton, NY	L	B-707	D	F	Training	2-engine simulated landing
9/2	1716	Abilene, TX	L	C-46	D	F	Mil/CTR/C	
9/12	2105	Honduras	I	DC-4	D	F	SC	
9/24	1615	Great Sitkin Is., AK	I	C-54	D	F	SP	
9/29	2309	Buffalo, TX	I	L-188	D	F	S.	Inflight disintegration
10/15	2105	Jacksonville, FL	I	C-54	D	F	Mil/CTR/C	Forced landing in lake
10/26	2018	Santa Maria, AC	T	DC-3	S	F	SP	Fire, emergency landing
10/30	2040	Charlottesville, VA	I	DC-3	D	F	SP	Mountain
11/16	0144	Louisiana	I	DC-7B	D	F	SP	
11/24	0535	Chicago, IL	L	L-1049	D	F	SC	lakeoff returned, hit house near tower
12/1	0047	Williamsport, PA	L	M-202	D	F	SP	Mountain
1960								
1/16		Bolivia, NC	I	DC 6	D	F		Bomb
1/19	2219	Charles City, VA	I	Viscount	D	F	SP	Icing
3/17	1525	Cannelton, IN	I	L-188	D	F	SP	Flutter
3/29	1333	Cape Pole, AK	L	G-21	D	0	SP	
5/23	1152	Atlanta, GA	T	CV-880	D	F	Training	Takeoff rotation
6/3		Alaska	I	G-44	D			
6/14	0447	Mt. Gilbert, AK	I	L-749	D	F	SP	Mountain
7/14	0430	Manila, PI	I	DC-7	D	F	SP	Ditched in ocean
7/22	1430	Houston, TX	Taxiing	DC-3	S	F	SP	

Table 2-1 (continued)

Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1960								
8/10	1410	Northeast Cape, AK	I	Beech C-18	D	0	SP	
9/14	0800	New York, NY	T	L-188	D	0	SP	T/D
9/15	2215	Nome, AK	L	L-10	D	F	SN/P	
9/19	0602	Guam	T	DC-6	D	F	Mil/CTR/P	
10/4	1740	Boston, MA	T	L-188	D	F	SP	Bird strike
10/15	1103	Plain City, UT	I	C-46	D	F	Mil/CTR/P	Landing approach, wing fell off
10/28	1139	Missoula, MT	I	DC-4	D	F	SP	
10/29	2202	Toledo, OH	T	C-46	D	F	CTR/P	Overweight takeoff
12/16	1033	Staten Island, NY	I	L-1049	D	F	SP	Midair
12/16	1033	Staten Island, NY	I	DC-8	D	F	SP	Midair
12/18	1454	Northeast Cape, AK	T	Beech C-18	D	0	Mil/CTR/P	Takeoff stall
1961								
1/22	1509	Katy, TX	I	C-46	D	F	Mil/CTR/C	Fire
1/28	1225	Montauk, Pt., NY	I	B-707	D	F	Training	-----
3/31	1430	Crown Mt., AK	I	G-44	D	0	NS/C	-----
7/11	1156	Denver, CO	L	DC-8	D	F	SP	-----
7/21	0211	Shemya, AK	L	DC-6	D	F	Mil/CFT/C	Lights on Runway Out 200 Feet short
8/3	2245	New York, NY	Taxiing	L-1049	D	0	SC	-----
9/1	0200	Chicago, IL	I	L-1049	D	F	SP	Takeoff Climb (5 miles)
9/10	0252	Shannon, Ireland	T	DC-6	D	F	NS/P	1.5 Minutes Out Into River
9/17	0857	Chicago, IL	T	L-188	D	F	SP	Takeoff to climb (2 miles)
10/8	1645	Avalon, CA	T	G-21	D	0	SF Amphibian	-----
11/8	2124	Richmond, VA	L	L-1049	D	F	Mil/CTR/P	-----
12/8	1058	Nome, AK	I	Cessna 180	D	F	SP	-----
12/24	1050	Old Harbor, AK	T	G-21	D	F	SP	-----
1962								
3/1	1009	Jamaica Bay, NY	T	B-707	D	F	SP	Climb Out - 3 mile SW
3/5	1731	Moses Pt., AK	L	Beech D-18	D	0	SP	Flew Into Terrain - Altimeter Off - "Private" Pilot

Table 2-1 (continued)

Date & Hour	Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1962							
3/15 0114	Adak, AK	L	L-1049	D	F	Mil/CTR/C	Landed on Rocks - Short of Runway
3/15 Unknown	Btwn Guam & Philippines	I	L-1049	D	F	Mil/CTR/P	Missing
4/18 1622	Dallas, TX	T	DC-3	D	F	Test	Takeoff stall
5/22 2120	Unionville, MO	I	B-707	D	F	SP	Bomb
7/8 0705	Amarillo, TX	T	Viscount 812	D	0	SP	Forced Landing 6930 Feet out 21°R
8/22 0740	Wilmington, NC	L	M-404	D	0	Training	-----
9/23 2200	N. Atlantic Ocean	I	L-1049	D	F	Mil/CTR/P	-----
10/19 2050	Windsor Locks, CT	I	CV-440	H	F	SP	Door Opened in Flight - Stewardess Fell Out
10/22 1052	Sitka Sound, AK	I	DC-7	D	0	Mil/CTR/P	Ditched in Sea
11/23 1224	Ellicott City, MD	I	Viscount	D	F	SP	Birds in Flight
11/30 2145	New York, NY	L	DC-7	D	F	SP	Crash on Runway
12/14 2212	Hollywood, CA	L	L-1049	D	F	SC	Pilot Heart Attack
12/21 2030	Grand Island, NEB	L	CV-340	D	0	SP	Fog - 4061 Feet Short
1963							
1/13 0233	Memphis, TN	Taxiing	DC-7	S	F	Ferry	
1/14 2328	Barter Island, AK	L	Beech AT-11	D	F	NS/P	
1/17 1553	Salt Lake City, UT	I	F-27	D	F	Training	Crashed in lake
1/29 2244	Kansas City, MO	L	Viscount 812	D	F	SP	Near runway
2/3 1207	San Francisco, CA	L	L-1049	D	F	SC	Struck lights
2/12 1350	Miami, FL	I	B-720	D	F	SP	Breakup in flight
2/16 1826	Puyallup, WA	L	C-46	D	0	Mil/CTR/C	
5/17 1900	Baird Bay, AK	T	Beech C-18	D	0	NS/P	
5/28 1746	Manhattan, KS	L	L-1049	D	0	Mil/CTR/P	
6/3 1816	Pacific Ocean, nr AK	I	DC-7	D	F	Mil/CTR/P	

Table 2-1 (continued)

Date & Hour	Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1963							
7/2 1649	Rochester, NY	T	M-404	D	F	SP	Takeoff in storm
7/23 1035	Seldovia, AK	L	G-44	D	0	SP	Overshot runway
8/14 1500	Great Falls, MT	I	C-46	S	E	Mil/CTR/C	
8/24 2358	Calgary, Canada	Unknown	F-27	D	F	Unknown	
11/29 1110	Morgantown, WV	L	DC-3	D	F	Ferry	
12/7 1930	Nederland, CO	I	C-46	D	F	Mil/CTR/C	
12/8 2059	Elkton, MD	I	B-707	D	F	SP	
1964							
2/25 0205	New Orleans, LA	I	DC-8	D	F	SP	Turbulence - Fell in Lake Ponchartrain
3/10 0822	Boston, MA	L	DC-4	D	F	SC	
3/12 2050	Miles City, MT	L	DC-3C	D	F	SP	1 1/2 miles inbound
4/17 1514	Elim, AK	I	Cessna 185	D	F	SP	
5/7 0649	San Ramon, CA	I	F-27	D	F	SP	Capt. & 1st Off. shot by passenger
7/8 1210	Knoxville, TN	I	Caravelle	N	F	SP	Turbulence
7/9 1015	Parrotsville, TN	I	Viscount-745	D	F	SP	Inflight fire
10/2 1630	Chichagof I., Alaska	L	CV-285	D	F	NS/CTR/C	
11/15 2025	Las Vegas, NV	I	F-27A	D	F	SP	9.7 miles out
11/20 0611	Detroit, MI	T	C-46	D	0	NS/CTR/C	2050 ft. past runway
11/23 1425	Rome, Italy	T	B-707	D	F	SP	
12/24 0031	San Francisco, CA	T	L-1049H	D	F	SC	Climb 4.3 miles S.W.
12/30 0214	Detroit, MI	L	C-46A	D	F	NS/CTR/C	2.2 miles short of runway
1965							
2/8 1826	Jones Beach, NY	I	DC-7B	D	F	SP	Climb to cruise
4/16 0445	Las Vegas, NV	T	F-27A	D	0	Training	

Table 2-1 (continued)

Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1965								
4/23	1423	Mt. Rainier, WA	I	DC-6A	D	F	Mil/CTR/C	
5/18	0601	Knob Noster, MO	L	DC-6A	D	0	Mil/CTR/C	
7/23	1406	Montopsville, PA	T	Convair 440	D	0	SP	
8/16	2021	Lake Michigan, IL	I	B-727	D	F	SP	
9/4	0940	Lake Tustumena, Alaska	I	Aero Comm. 680	D	F	SP	
9/13	1240	Kansas City, MI	T	Convair CV-880	D	0	Training	
9/17	0724	Montserrat, BWI	I	B-707	D	F	SP	
10/14	1743	Piqua, OH	L	Argosy AW650	D	0	Mil/CTR/C	Forced landing off runway
11/8	1902	Constance, KY	L	B-727	D	F	SP	
11/11	1750	Salt Lake City, UT	L	B-727	D	F	SP	
12/4	1618	Carmel, NY	I	L-1049C	D	F	SP	Collision with other aircraft forced landing
12/15	0130	Alamosa, CO	I	L-1049	D	F	SC	
1966								
3/21	1525	Norfolk, VA	L	Canadair CL-44D	D	0	SC	-----
4/22	2030	Ardmore, OK	L	L-188C	D	F	Mil/CTR/P	Landing Pattern
6/16	0848	Columbia City, IND	I	Curtis C-46	D	F	NS/C	Midair
7/28	0850	Newark, NJ	T	Curtis WRTC-46F	D	0	NS/C	Intentional Gear Up Landing in Marsh
8/6	2312	Falls City, NEB	I	BAC111	D	F	SP	Bomb
8/21	1035	Juneau, Alaska	I	Grumman G21A	D	F	SP	Struck Glacier
9/12	2203	Tokyo, Japan	T	DC 7C	D	0	Mil/CTR/C	-----
10/1	1104	Portland, OREG	I	DC9	D	F	SP	-----
11/14	0242	Berlin, Germany		B727	D	F	SC	-----
11/20	0606	New Bern, NC	L	Martin M-404	D	F	SP	Struck Tree - No Passengers
12/24	1915	Tourane, Vietnam	L	Canadair CL-44	D	F	Mil/CTR/C	-----
12/30	1719	Saigon, Vietnam	T	DC-7C	D	0	Mil/CTR/C	-----

Table 2-1 (continued)

1967 Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1/31	0320	San Antonio, TX	L	DC-6A	D	F	Mil/CTR/C	Diverted, low, hit cliff
3/5	2007	Marseilles, OH	I	Convair 340	D	F	SP	
3/9	1154	Urbana, OH	I	DC-9	D	F	SP	Midair
3/10	0503	Klamath Falls, OREG	I	F-27	D	F	SP	Iced
3/30	0050	Kenner, LA	L	DC-8	D	F	Training	2-engine out landing
6/22	2116	Saigon, Vietnam	L	L-1049H	D	F	Mil/CTR/C	
6/23	1347	Blossburg, PA	I	BAC-111	D	F	SP	Fire
7/19	1101	Hendersonville, NC	I	B727	D	F	SP	Midair
11/6	1841	Erlanger, KY	T	B707	D	F	SP	Gear collapsed on runway
11/20	2057	Constance, KY	L	Convair 880	D	F	SP	Undershot
12/21	1600	Denver, CO	T	DC-3C	D	F	NS/C	T/O stall
1968								
1/1	2300	Oxford, Miss.	L	Martin 404	D	O	Ferry	Undershot
3/21	0353	Chicago, IL	T	B727	D	O	SC	Takeoff roll
4/28	0523	Atlantic City, NJ	L	DC8	D	O	Training	
5/3	1548	Dawson, TX	I	L-188	D	F	SP	Wing overload
6/13	0058	Calcutta, India	L	B707	D	F	SP	Undershot
6/28	1246	Vichy, MO	I	DC3	H	F	NS/CTR/F	Passenger fell out door
8/10	0757	Charleston, WV	L	F227	D	F	SP	Undershot
9/27	0241	Cherry Point, NC	L	DC7C	D	O	Mil/CTR/C	Controlled landing. Missed runway in fog
10/25	1717	Hanover, NH	L	F227	D	F	SP	
12/2	0936	Pedro Bay, Alaska	I	F27B	D	F	SP	Airframe fail
12/12	2202	Caracas, Venzuela	L	B707	D	F	SP	Undershot
12/24	2012	Bradford, PA	L	Convair 580	D	F	SP	Hit trees on initial approach
12/26	0615	Anchorage, Alaska	T	B707	D	F	Mil/CTR/C	Ice
12/27	0711	Sioux City, IA	T	DC9	D	O	SP	Stall, ice
12/27	2022	Chicago, IL	L	Convair 580	D	F	SP	Stall

Table 2-1 (continued)

Date & Hour	Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1969							
1/6 2035	Bradford, PA	L	Convair 440	D	F	SP	
1/18 1821	Los Angeles, CA	I	B727	D	F	SP	
3/13 1552	Munchumina, Alaska	L	DHC-6	D	F	SP	
7/15 0657	Jamaica, NY	T	DHC-6	D	F	SP	
7/26 1133	Pomona, NJ	L	B707	D	F	Training	Control loss during fly-by
9/9 1429	Fairland, IN	I	DC9	D	F	SP	Midair
10/16 1445	Stockton, CA	T	DC8	D	0	Training	Takeoff aborted
11/19 2020	Glen Falls, NY	I	FH227B	D	F	SP	Below ceiling, into mountain
1970							
6/22 1520	False Pass, Alaska	L	Grumman G21	D	0	SP	Amphibian sank after landing
7/27 1136	Naha, Okinawa	L	DC8	D	F	SC	Undershot
8/8 0002	Acapulco, Mexico	L	Convair 990	D	0	Ferry	Runway lights collision
8/24 0708	Hill AFB, UT	T	LI88C	D	0	Mil/CTR/C	
9/8 1606	Jamaica, NY	T	DC-8F	D	F	Ferry	
10/2 1155	Sitkinak, Alaska	T	Cessna 207	D	0	SC	
10/10 2130	Wrightstown, NJ	L	L-GA382B	D	F	Mil/CTR/C	5470 feet short in fog
11/14 1936	Huntington, WV	L	DC9	D	F	NS/CTR/P	
11/27 1705	Anchorage, Alaska	T	DC8	D	F	Mil/CTR/P	
11/30 0255	Tel Aviv, Israel	T	B707	D	F	SC	Runway collision
12/28 1442	St. Thomas, V.I.	L	B727	D	F	SP	
1971							
3/31 0633	Ontario, CA	L	B-720	D	F	Training	Missed Approach
6/6 1711	Duarte, CA	I	DC-9	D	F	SP	Collision with Military A.C.
6/7 0849	New Haven, CT	L	Convair 580	D	F	SP	-----
7/25 1321	Manila, PI	L	B-707	D	F	SP	Initial Approach
9/4 1115	Juneau, Alaska	L	B-727	D	F	SP	Initial Approach

Table 2-1 (continued)

Date & Hour		Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1972								
3/3	2048	Albany, NY	L	FH227B	D	F	SP	-----
5/18	1421	Ft. Lauderdale, FLA	L	DC9-31	D	0	SP	-----
5/30	0624	Ft. Worth, TX	L	DC-9	D	F	Training	-----
6/29	0937	Appleton, WISC	I	Convair 580	D	F	SP	Midair
6/29	0937	Appleton, WISC	I	DHC-6	D	F	SP	Midair
12/8	1428	Chicago, ILL	L	B-737	D	F	SP	-----
12/20	1800	Chicago, ILL	T	DC-9	D	F	SP	-----
12/29	2342	Miami, FL	I	L-1011	D	F	SP	(Subject of Motion Picture)
1973								
7/22	2207	Papeete, Tahiti	T	B707	D	F	SP	
7/23	1643	St. Louis, MO	L	FH227B	D	F	SP	
7/31	1008	Boston, MA	L	DC9	D	F	SP	Hit seawall
8/28	2050	Los Angeles, CA	I	B707	N	F	SP	
9/8	0442	King Cove, Alaska	I	DC8	D	F	Mil/CTR/C	Hit mtn. 15 miles out
9/27	1952	Mena, ARK	I	Convair 600	D	F	SP	Hit mountain
11/3	0940	Boston, MA	L	B707	D	F	SC	
11/3	1640	Socorro, NM	I	DC10	S	F	SP	Inflight decompression
11/27	2127	Akron, OH	L	DC9	D	0	SP	
1974								
1/16	0035	Los Angeles, CA	L	B707	D	0	SP	
1/30	2341	Pago Pago, Samoa	L	B707	D	F	SP	
2/2	2130	Honolulu, Hawaii	I	B747	N	F	SP	
4/22	1526	Bali, Indonesia	I	B707	D	F	SP	
5/23	1553	Springfield, ILL	I	L382	D	F	Mil/CTR/C	Airframe failure in thunder-storm
9/8	0940	Cephalonia, Greece	I	B707	D	F	SP	Bomb
9/11	0734	Charlotte, NC	L	DC9	D	F	SP	

Table 2-1 (continued)

Date & Hour	Location	Phase	Aircraft	Damage	Injury	Scheduled/ Non-Scheduled	Comments
1974							
12/1 1110	Berryville, VA	I	B727	D	F	SP	
12/1 1926	Thiella, NY	I	B727	D	F	Ferry	
12/11	Missing in Alaska	I	G-21	Assumed D	Assumed F	SP	
1975							
2/16 1902	Fairbanks, Alaska	T	DC-6B	S	F	NS/CTR/C	
4/20 2015	Deadhorse, Alaska	L	L-188A	D	0	NS/CTR/C	Hard Landing
6/24 1605	Jamaica, NY	L	B727	D	F	SP	
8/8 1530	Aquadilla, P.R.	I	C46F	D	0	NS/CTR/C	Ditched at sea
8/30 1357	Gambell, Alaska	L	F-27B	D	F	SP	Hit Mountain
11/12 1310	Jamiaca, NY	T	DC-10	D	0	Company Flt.	Takeoff roll
12/22 1115	Milan, Italy	L	B707	D	0	SP	
1976							
2/8 1044	Van Nuys, CA	T	DC6	D	F	Ferry	Forced landing in field
3/7 1107	Igiugig, Alaska	I	Cessna 207	D	F	NS/CRT/P	
3/12 1040	Udrivik Lake, Alaska	L	L-188	D	0	NS/CTR/C	
4/5 0819	Ketchikan, Alaska	L	B727	D	F	SP	
4/27 1510	St. Thomas, V.I.	L	B727	D	F	SP	
6/23 1712	Philadelphia, PA	L	DC9	D	0	SP	Crash during attempted go-around
1977							
3/27 1704	Canary Islands	T	B747	D	F	NS/P	Taxi
4/4 1619	New Hope, GA	I	DC9	D	F	S[illegible]	Forced landing on highway
7/6 2327	St. Louis, MO	T	L-188	D	F	NS/C	Commercial Operator
12/18 0139	Kaysville, UT	I	DC8	D	F	SC	Hit mountain

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932 316

Phase:	T = Take-off
	L = Landing
	I = Inflight
Damage:	D = Destroyed
	M = Minor
	S = Substantial
Injury:	F = One or More Fatality
	0 = None
Schedule:	SP = Scheduled Passenger
	SC = Scheduled Cargo
	NS = Non-scheduled
	Mil = Military
	CTR = Charter

Where none apply, aircraft use is stated in prose

TABLE 2-2

Listing of U.S. Fixed Wing Air Carrier Landing and Takeoff Accidents in the Contiguous U.S. Involving Occupant Fatality and/or Destruction of the Aircraft

1956 - 1977

Ref. No.	Date	Location	Phase	Aircraft	Fatality	Type Oper.	Range & Bearing[1] r mi.	θ deg.
	1956							
1	2/17	Owensboro, Ky.	L	M-404	0	SP	0	0
2	4/1	Pittsburgh, Pa.	T	M-404	F	SP	0	0
3	4/2	Seattle, Wa.	T	B-377	F	SP(Controlled)	4.7	0
4	11/15	Las Vegas, Nev.	L	M-404	0	SP	0	0
1957								
5	1/6	Tulsa, Ok.	L	CV-240	F	SP	3.5	0
6	2/1	Rikers Island, NY	T	DC-6	F	SP	0.9	47
7	3/10	Louisville, Ky.	L	M-404	0	SP	0	0
8	9/15	New Bedford, Mass	L	DC-3	F	SP	0.8	6
1958								
9	2/13	Palm Springs, Ca.	T	CV-240	0	SP	4.0	0
10	3/25	Miami, Fl.	T	DC 7	F	SP (Emergency landing)	3.1	26
11	4/6	Freeland, Mi	L	Viscount	F	SP	0.4	0
12	6/4	Martinsburg, W.Va.	T	DC-3	F	Training	0.3	90
13	8/15	Nantucket, Ma.	L	CV-240	F	SP	0.3	22
14	8/28	Minneapolis, Mn.	T	DC-6	0	SP	0.6	0
15	11/10	New York, New York	T	L-1049	0	Training	0	0
1959								
16	2/3	New York, NY	L	L-188	F	SP	0.8	0
17	2/20	San Francisco, Ca.	L	DC-7	0	NS	0	0
18	3/15	Chicago, Ill.	L	CV-240	0	SC	1.2	28
19	5/12	Charleston, W. Va.	L	L-1049	F	SP	0	0
20	8/15	Calverton, NY	L	B-707	F	Training	3	13
21	9/2	Abilene, Tx.	L	C-46	F	NS/C	0	0
22	10/26	Santa Maria, Ca.	T	DC-3	F	SP (Emergency landing)	1.5	NA
23	11/24	Chicago, Ill.	L	L-1049	F	SC	0.2	0
24	12/1	Williamsport, Pa.	L	M-202	F	SP	1.4	90

TABLE 2-2 (continued)

Listing of U.S. Fixed Wing Air Carrier Landing and Takeoff Accidents in the Contiguous U.S. Involving Occupant Fatality and/or Destruction of the Aircraft

1956 - 1977

Ref. No.	Date	Location	Phase	Aircraft	Fatality	Type Oper.	Range & Bearing[1] r mi.	θ deg.
1960								
25	5/23	Atlanta, Ga	T	CV-880	F	Training	0	0
26	9/14	New York, NY	L	L-188	0	SP	0	0
27	10/4	Boston, Mass.	T	L-188	F	SP	1.0	20L
28	10/29	Toledo, Ohio	T	C-46	F	NS/P	1.1	4L
1961								
29	7/11	Denver, Colo.	L	DC-8	F	SP	0	0
30	9/17	Chicago, Ill.	T	L-188	F	SP	0.8	90R
31	11/8	Richmond, Va.	L	L-1049	F	NS/P (Controlled)	1.1	26R
1962								
32	3/1	Jamaica Bay, NY	T	B-707	F	SP	2.7	95L
33	7/8	Amarillo, Tx.	T	V-812	0	SP (Intentional)	1.2	21
34	8/22	Wilmington, NC	L	M-404	0	Training	0	0
35	11/30	New York, NY	L	DC-7B	F	SP	0.75	9R
36	12/14	Hollywood, Ca.	L	L-1049	F	SC (Pilot coronary)	1.25	0
37	12/21	Grand Island, Neb.	L	CV-340	0	SP	0.8	0
1963								
38	1/29	Kansas City, Mo.	L	V-812	F	SP	0	0
39	2/3	San Francisco, Ca.	L	L-1049	F	SC	0.2	0
40	2/16	Puyallup, Wa.	L	C-46	0	NS/C	0.5	0
41	5/28	Manhattan, Ks.	L	L-1049	0	NS/P	0.1	0
42	7/2	Rochester, NY	T	M-404	F	SP	0	0
43	11/29	Morgantown, W.Va.	L	DC-3	F	Ferry	2.5	18R
1964								
44	3/10	Boston, Mass.	L	DC-4	F	SC	1.3	0
45	3/12	Miles City, Mt.	L	DC-3	F	SP	1.9	0

TABLE 2-2 (continued)

Listing of U.S. Fixed Wing Air Carrier Landing
and Takeoff Accidents in the Contiguous U.S.
Involving Occupant Fatality and/or Destruction of the Aircraft

1956 - 1977

Ref. No.	Date	Location	Phase	Aircraft	Fatality	Type Oper.	Range & Bearing(1) r mi.	θ deg.
1964 contd.								
46	11/20	Detroit, Mi.	T	C-46	0	NS/C	0.4	0
47	12/24	San Francisco, Ca.	T	L-1049	F	SC	4.2	31L
48	12/30	Detroit, Mi.	L	C-46	F	NS/C	2.2	13
1965								
49	4/16	Las Vegas, Nev.	T	F-27	0	Training	0	0
50	5/18	Knob Noster, Mo.	L	DC-6	0	NS/C	0.8	15L
51	7/23	Montorsville, Pa.	T	CV-440	0	SP	2.8	45L
52	9/13	Kansas City, Mo.	T	CV-880	0	Training	0.2	27
53	11/8	Constance, Ky.	L	B-727	F	SP	2.0	0
54	11/11	Salt Lake City, Ut.	L	B-727	F	SP	0.1	0
1966								
55	3/21	Norfolk, Va.	L	CL-44	0	SC	0	0
56	4/22	Ardmore, Ok.	L	L-188	F	NS/P	2.3	100L
57	7/28	Newark, N.J.	L	C-46	0	NS/C (controlled)	1.75	90R 2/
58	11/20	New Bern, N.C.	L	M-404	F	SP	4.0	9
1967								
59	1/31	San Antonio, Tx.	L	DC-6	F	NS/C	4.5	0
60	3/30	Kenner, La.	L	DC-8	F	Training	0.4	27R
61	11/6	Erlanger, Ky.	T	R-707	F	SP	0	0
62	11/20	Constance, Ky.	L	CV-880	F	SP	NA	NA
63	12/21	Denver, Colo.	T	DC-3	F	NS/C	0	0
1968								
64	1/1	Oxford, Ms.	L	M-404	0	Ferry	0	0
65	3/21	Chicago, Ill.	T	B-727	0	SC	0	0
66	4/28	Atlantic City, N.J.	L	DC-8	0	Training	0	0
67	8/10	Charleston, W.Va.	L	F-227	F	SP	0	0

TABLE 2-2 (continued)

Listing of U.S. Fixed Wing Air Carrier Landing
and Takeoff Accidents in the Contiguous U.S.
Involving Occupant Fatality and/or Destruction of the Aircraft

1956 - 1977

Ref. No.	Date	Location	Phase	Aircraft	Fatality	Type Oper.	Range & Bearing(1) r mi.	θ deg.
1968 contd.								
68	9/27	Cherry Point, N.C.	L	DC-7	0	NS/C	0.4	17
69	10/25	Hanover, N.H.	L	F-227	F	SP	NA	NA
70	12/24	Bradford, Pa.	L	CV-580	F	SP	2.8	8R
71	12/27	Sioux City, Ia.	T	DC-9	0	SP	0	0
72	12/27	Chicago, Ill.	L	CV-580	F	SP	0.3	86R
1969								
73	7/15	Jamaica, N.Y.	T	DHC-6	F	SP	0	0
74	7/26	Pomona, N.J.	L	B-707	F	Training	0	0
75	10/11	Stockton, Ca.	T	DC-8	0	Training	0	0
1970								
76	8/24	Hill AFB, Ut.	T	L-188	0	NS/C	0	0
77	9/8	Jamaica, N.Y.	T	DC-8	F	Ferry	0	0
78	10/10	Wrightstown, N.J.	L	GA-382	F	NS/C	1.0	0
79	11/14	Huntington, W.Va.	L	DC-9	F	NS/P	1.1	1L
1971								
80	3/31	Ontario, Ca.	L	B-720	F	Training	0	0
81	6/7	New Haven, Conn.	L	CV-580	F	SP	0.9	6
1972								
82	3/3	Albany, N.Y.	L	F-227	F	SP (controlled)	3.8	0
83	5/18	Ft. Lauderdale, Fla.	L	DC-9	0	SP	0	0
84	5/30	Ft. Worth, Tx.	L	DC-9	F	Training	0	0
85	12/8	Chicago, Ill.	L	B-737	F	SP	2.0	7L
85	12/20	Chicago, Ill.	T	DC-9	F	SP	0	0
1973								
87	7/23	St. Louis, Mo.	L	F-227	F	SP	2.6	4R
88	7/31	Boston, Mass.	L	DC-9	F	SP	0.6	4
89	11/3	Boston, Mass.	L	B-707	F	SC (controlled)	0.05	0
90	11/27	Akron, Ohio	L	DC-9	0	SP	0	0

TABLE 2-2 (continued)

Listing of U.S. Fixed Wing Air Carrier Landing
and Takeoff Accidents in the Contiguous U.S.
Involving Occupant Fatality and/or Destruction of the Aircraft

1956 - 1977

Ref. Nr.	Date	Location	Phase	Aircraft	Fatality	Type Oper.	Range & Bearing[1] r mi.	θ deg.
1974								
91	1/16	Los Angeles, Ca.	L	B-707	0	SP	0	0
92	9/11	Charlotte, NC.	L	DC-9	F	SP	NA	NA
1975								
93	6/24	Jamaica, N.Y.	L	B-727	F	SP	0	0
94	11/12	Jamaica, N.Y.	T	DC-10	0	NS/P	0	0
1976								
95	2/8	Van Nuys, Ca.	L	DC-6	F	Ferry	1.5	0
96	6/23	Philadelphia, Pa.	L	DC-9	0	SP	0	0
1977								
97	7/6	St. Louis, Mo.	T	L-188	F	NS/C	0	0 3/

Abbreviations:

Phase: L - Landing, T = Takeoff
Injury: F - One or more occupant fatalities, 0 = None
Type Oper.: SC = Scheduled Cargo, SP = Scheduled passenger
NS/C = Non-scheduled cargo, NS/P - Non-scheduled passenger
(NS includes military charters)

Range and Bearing:

r is the radial distance, in miles, of the hit to the end of the runway in use. θ is the angle to the runway centerline, in degrees.

1/ L = Left of aircraft course, R = Right of aircraft course, NA = Not available in reports.

2/ Plane takeoff had engine problems - attempted to land on other runway. Force landing - short of runway. Distances are those to runway of attempted landing.

3/ Accident occurs above 3/4 of distance down runway off-runway to the left on airport property.

Table 2-3A

U.S. Air Carrier Takeoff Accidents of Scheduled Flights
In the Contiguous U.S.*

1956 - 1977

Reference No.	Type Operation	r Miles	θ Degrees	Actual Orientation**
3	SP	4.7	0	
6	SP	0.9	47	
9	SP	4.0	0	
10	SP	3.1	26	
14	SP	0.6	0	
27	SP	1.0	20	L
30	SP	0.8	90	R
32***	SP	2.7	95	L
33	SP	1.2	21	
47	SC	4.2	31	L
51	SP	2.8	45	L

* This table is derived from Table 2.3 by listing only those accidents from Table 2.3 involving takeoff of scheduled passenger or cargo flights.

** Orientation where known is left (L) or right (R) of the runway centerline looking toward the arriving or departing aircraft from the end of the runway.

*** Aircraft involved was heavier than 200,000 pounds.

Table 2-3B

U.S. Air Carrier Takeoff Accidents of Non-Scheduled Flights
In the Contiguous U.S.*

1956 - 1977

Reference No.	Type Operation	r Miles	θ Degrees	Actual Orientation**
12	Training	0.3	90	
28	NS/P	1.1	4	L
46	NS/C	0.4	0	
52	Trianing	0.2	27	

* This table is derived from Table 2-3 by listing only those accidents from Table 2-3 involving takeoff accidents of non-scheduled passenger or cargo, training, and ferry flights.

** Orientation where known is left (L) or right (R) of the runway centerline looking toward the arriving or departing aircraft from the end of the runway.

Table 2-3C

U.S. Air Carrier Landing Accidents of Scheduled Flights
In the Contiguous U.S.*

1956 - 1977

Reference No.	Type Operation	r Miles	θ Degrees	Actual Orientation**
5	SP	3.5	0	
8	SP	0.8	6	
11	SP	0.4	0	
13	SP	0.3	22	
16	SP	0.8	0	
18	SC	1.2	28	
23	SC	0.2	0	
24	SP	1.4	90	
35	SP	0.75	9	R
36	SC	1.25	0	
37	SP	0.8	0	
39	SC	0.2	0	
44	SC	1.3	0	
45	SP	1.5	0	
53	SP	2.0	0	
54	SP	0.1	0	
58	SP	4.0	0	
70	SP	2.8	8	R
72	SP	0.3	86	R
81	SP	0.9	6	
82	SP	3.8	0	
85	SP	2.0	7	L
87	SP	2.6	4	R
88	SP	0.6	4	
89***	SC	0.05	0	

*This table is derived from Table 2.3 listing only those accidents from Table 2.3 involving landing of scheduled passenger or cargo flights.

**Orientation where known is left (L) or right (R) of the runway centerline looking towards the arriving or departing aircraft from the end of the runway.

***Aircraft involved was heavier than 200,000 pounds.

Table 2-3D

U.S. Air Carrier Landing Accidents of Non-Scheduled Flights
In the Contiguous U.S.*

1956 - 1977

Reference No.	Type Operation	r Miles	θ Degrees	Actual Orientation**
20***	Training	3.0	13	
32	NS/P	1.1	26	R
40	NS/C	0.5	0	
41	NS/P	0.1	0	
43	Ferry	2.5	18	R
48	NS/C	2.2	13	
50	NS/C	0.8	15	L
56	NS/P	2.3	100	L
57	NS/C	1.75	90	R
59	NS/C	4.5	0	
60***	Training	0.4	27	R
68	NS/C	0.4	17	
78	NS/C	1.0	0	
79	NS/P	1.1	5	L
95	Ferry	1.5	0	

*This table is derived from Table 2.3 by listing only those accidents from Table 2.3 involving landing of non-scheduled passenger or cargo, training, and ferry flights.

**Orientation where known is left (L) or right (R) of the runway centerline looking towards the arriving or departing aircraft from the end of the runway.

***Aircraft involved was heavier than 200,000 pounds.

TABLE 2-3E

SUMMARY DATA TABLE OF PERTINENT ACCIDENT INFORMATION INCLUDING PROBABLE CAUSE OF THE ACCIDENT [1/]

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
1	1956 2/17	Owensboro, Ky.	M-404	Circling approach. Little or no portion of the approach was straight in. Stalled, struck ground.		
2	4/1	Pittsburgh, Pa.	M-404	First power reduction during takeoff. Fire indication in engine. Co-pilot retarded throttle to the point which deactivated auto-feathering. Pilot was unaware and attempted to feather. Drag of wind milling propeller caused sharp descending left turn.		
3	4/2	Seattle, Wash.	B-377	Improper setting of engine cowl flaps caused severe buffeting about 2 min. after takeoff. Aircraft ditched. 4 passengers, 1 crew drowned (38 aboard).		
4	11/15	Las Vegas, Nev.	M-404	Roughness developing in engine on takeoff. Return to airport. Approach was high and fast. Go-around attempted but could not gain altitude. Wheels-up landing within airport.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
5	1957 1/6	Tulsa, Ok.	CV-240	Weather conditions deteriorating rapidly. Instrument approach continued below company minimums.	IFR	
6	2/1	Rikers Island, N.Y.	DC-6	Instrument weather conditions. Pilot thought flight was normal until instant before impact.	IFR	Instrument weather conditions
7	3/10	Louisville, Ky.	M-404	Co-pilot made approach high. Pilot took over. Nosed aircraft sharply down continued steep power-off approach. Because power was not applied, flareout ineffective due to low air speed. Hard landing, wing torn off.		
8	9/15	New Bedford, Mass.	DC-3	Crew failed to adhere to prescribed ILS approach. Hit trees to right and below glide path.	IFR ILS	Fog, low ceiling
9	1958 2/13	Palm Springs, Ca.	CV-240	Shortly after takeoff, section of leading edge separated from plane. Severe control difficulty and buffeting. Made wheels-down landing on boulder strewn area. Broke up on boulders.		
10	3/25	Miami, Fla.	DC-7	No. 3 engine failed shortly after takeoff during turn. Loss of altitude rapidly. Crashed.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1958 (cont'd)					
11	4/6	Freeland, Mich.	Viscount	Restricted visibility. Steep turn made to align with runway. Stall. Insufficient altitude to permit recovery.		Restricted visibility
12	6/4	Martinsburg, W.Va.	DC-3	Training. Single engine climb-out. Under investigation.		
13	8/15	Nantucket, Mass.	CV-240	VOR instrument approach. With plane in low altitude, ran into heavy fog bank. Lost all visual reference. Although visibility below minimum, descent was continued. Struck ground at time pullup was started.	ILS	
14	8/28	Minneapolis, Minn.	DC-6	Under investigation.		
15	11/10	New York, N.Y.	L-1049	Unwanted propeller reversal during takeoff. Under investigation.		
	1959					
16	2/3	New York, N.Y.	L-188	ILS with auto-pilot. Crew not experienced with plane. Auto-pilot used throughout approach. Error in altimeter setting.	ILS	
17	2/20	San Francisco, Ca.	DC-7	Training. During flareout, high rate of descent continued and struck runway.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1959 (cont'd)					
18	3/15	Chicago, Ill.	CV-240	ILS instrument landing first approach discontinued since instruments tuned to wrong frequency. On second approach, hit a steel tower, came down in railroad yard.	ILS	
19	5/12	Charlestown, W.Va.	L-1049	Wet runway. Braking was ineffec-time. Pilot tried to ground loop rather than continue down sharp declinvity at end of runway. Plane turned off runway went over embank-ment, burned.		
20	8/15	Calverton, N.Y.	B-707	Training crew made no flap waveoff. Continued around with gear down. Second approach was simulated, one engine out. Went into a scooping barrel roll and crashed.		
21	9/2	Abilene, Tex.	C-46	Lost elevator control on auto-pilot. Assisted by CCA, tried to land with power and trim for pitch control. Landing on main wheels accomplished but during roll plane "porpoised." Power applied, plane rose 200 ft., stalled, pitched down, hit runway (angle more than 45°). Investigation showed improperly secured part in elevator assembly.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1959 (cont'd)					
22	10/26	Santa Maria, Ca.	DC-3	Shortly after the first power reduction after takeoff, explosion and fire in left engine. Fire appeared to be extinguished, but severe buffeting continued. Attempted forced landing. Just before land swerved to avoid an obstruction. Left wing struck ground.		
23	11/24	Chicago, Ill	L-1049	One min. after takeoff No. 2 engine indicated fire warning and shut down. Cleared to return during VFR below an overcast. Plane struck top of house.		Low ceiling
24	12/1	Williamsport, Pa.	M-202	Missed first approach. Circling for second approach. Plane rolled out of correct right turn into left turn into snow showers. Hit mountain.	IFR	Snow
	1960					
25	5/23	Atlanta, Ga.	CV-880	Training flight. Immediately after liftoff became extremely nose high and banked steeply. Aircraft stalled at an altitude too low to effect recovery.		
26	9/14	New York, N.Y.	L-188	In landing plane struck dike at start of runway. Runway had been shortened during construction. Dike was unmarked.		

TABLE 2-3E (Continued)

	1960 (cont'd)				
27	10/4	Boston, Mass.	L-188	A few sec. after being airborne, plane struck flock of starlings. Engines experienced momentary loss of power. Plane stalled, dropped into water.	
28	10/29	Toledo, Ohio	C-46	Fog. Overweight takeoff. Partial loss of power in one engine.	Fog
	1961				
29	7/11	Denver, Col.	DC-8	Asymmetric thrust which during a hydraulic emergency resulted from failure of the thrust reversers on Engine Nos. 1 and 2 when reverse thrust was selected.	
30	9/17	Chicago, Ill.	L-188	Takeoff normal but subsequent turn continued into increasing bank to 90°. Gradual descent began and plane struck ground (power lines). Probable cause, mechanical failure in aileron control due to improper replacement of a part.	
31	11/8	Richmond, Va.	L-1049	Military. Nos. 3 and 4 engines ran out of fuel. Co-pilot, without warning pilot, attempted landing on a runway different from pilot's intent. Co-pilot put down landing gear, gear did not extend. During attempted go-around overboost on Engine 1 caused failure. Crashed short of the other runway.	

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
32	1962 3/1	Jamaica Bay, N.Y.	B-707	Normal takeoff. While climbing and turning, banking continued. Plane rolled and became inverted nose down. Rudder system malfunction, recovery ineffective.		
33	7/8	Amarillo, Tex.	V-812	During takeoff, pilot distracted by rain leak on his arm as landing gear was being retracted. Props struck runway. Broken prop pieces from No. 3 engine damaged No. 4 engine. Severe vibrations developed. Emergency wheels-up landing off airport.		Rain
34	8/22	Wilmington, N.C.	M-404	Training. Simulated right engine out landing, uneventful until final power reduction. Left wing dropped sharply. Corrective controls applied with negligible effect. Probable cause, malfunction in servo valve controls for prop reversal.		
35	11/30	New York, N.Y.	DC-7B	Attempted go-around but plane continued to descend. Fog conditions not adequately reported. Poor technique by crew.	I	Fog
36	12/14	Hollywood, Ca.	L-1049	No evidence of aircraft failure. Pilot had heart disease. Probable cause, pilot incapacitation during critical phase of landing.	ILS	Fog

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1962 (cont'd)					
37	12/21	Grand Island, Neb.	CV-340	Failure of the crew to monitor altitude properly during landing approach.		
	1963					
38	1/29	Kansas City, Mo.	V-812	Plane continued in flight at low altitude above runway, suddenly pitched down. During let down from cruising, conditions were conducive to the formation of rime ice on aircraft surfaces. Deicer not in use. Subsequent tests showed ice on leading edge of horizontal stabilizer and caused strong nose down pitch when flaps were lowered.		Weather above IFR minimums. Icing.
39	2/3	San Francisco, Ca.	L-1049	Struck runway lights, short of runway making ILS approach. Probable cause, continuation of instrument approach after visual reference was lost. Inadequate monitoring approach by PAR controller was a contributing factor.	ILS	Fog, variable above and below minimum.
40	2/16	Puyallup, Wash.	C-46	Seven min. after takeoff from McCord AFB, engine malfunction. Unsuccessful attempt to feather. Engine intermittently oversped due to separation of throttle control rod with throttle in full open position. Attempted to land at Puyallup. First approach too high. An attempted go-around engine again oversped and aircraft apparently stalled. Controller did not provide pilot with true runway conditions.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1963 (cont'd)					
41	5/28	Manhattan, Kansas	L-1049	Landing normal until flap fully lowered and air speed reduced to 120 kn. Plane yawed, unable to correct easily. Applied "considerable power" to all 4 engines. Control increased but so did speed of descent. Investigation showed No. 3 propeller part improperly installed.		
42	7/2	Rochester, N.Y.	M-404	Plane took off into severe thunderstorm. Crashed. No evidence of systems or structure failure. Weather forecasts accurate.		Thunderstorm, hail, rain, winds
43	11/29	Morgantown, W.Va.	DC-3	Inaccurate instrumentation caused approach to be off target.	ILS IFR	Light rain, fog
	1964					
44	3/10	Boston, Mass.	DC-4	Apparently normal ILS approach. Plane suddenly pitched down and crashed. Weather conducive to icing. Heavy rime ice encountered at assigned 3,000 ft. IFR altitude. Damaged such that investigation could not determine whether there was a malfunction of the deicer. The probable cause is excessive ice formation.	ILS IFR	Icing

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1964 (cont'd)					
45	3/12	Miles City, Mt.	DC-3	Plane hit hill at an elevation a few feet below the elevation of the airport at some distance away during an instrument approach in adverse weather.	ILS	Icing. Near min. visibility
46	11/20	Detroit, Mich.	C-46	Plane was deiced. Plane was loaded to maximum weight. Takeoff used three-fourths of runway. Power reduced at around 110 kn. (200 ft.). Plane began to vibrate and pilot saw trees ahead. Applied full power but plane settled to ground with flaps and gear up. Cause: inadequate deicing and preflight inspection.		Ice
47	12/24	San Francisco, Ca.	L-1049	Pilot advised of need to correct instrument approach. Disappeared from radar and crashed. Reason for deviation from course unknown.	IFR	Fog, drizzle
48	12/30	Detroit, Mich.	C-46	Making apparently good ILS approach. Advised of need to make small correction. Followed by abrupt excessive steep turn. Cause: loss of control during approach in adverse weather.	IFR ILS	Fog, drizzle

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
49	1965 4/16	Las Vegas, Nev.	F-27	Improper function of assymetric flap indicator due to foreign material. Plane swerved on takeoff run.		
50	5/18	Knob Noster, Mo.	DC-6	Plane descended below ILS glide slope during approach in adverse weather and hit trees.	IFR ILS	Low ceiling
51	7/23	Montorsville, Pa.	CV-440	After initial climb during takeoff, connecting rod failure in engine. Improper emergency procedures.		
52	9/13	Kansas City, Mo.	CV-880	Training. Probable Cause: student improperly operated flight controls causing stall during takeoff. Inadequate supervision.		
53	11/8	Constance, Ky.	B-727	Co-pilot was a captain receiving route check. Probable cause: pilots did not monitor altimeter during the landing on the low-ceiling conditions.		Rain. Low ceiling
54	11/11	Salt Lake City, Utah	B-727	Pilot failed to take timely action to arrest excessive rate of descent during landing.		
55	1966 3/21	Norfolk, Va.	CL-444	Landing roll. Improper level-off. Inadequate supervision.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1966 (cont'd)					
56	4/22	Ardmore, Ok.	L-188	Struck hill on visual circling approach under instrument flight conditions. Pilot suffered heart attack.	IFR	Rain, fog, low ceiling
57	7/28	Newark, N.J.	C-46	Craft overloaded. Improper center of gravity. Material failure in power plant. Controlled forced landing at airport.		
58	11/20	New Bern, N.C.	M-404	Collided with trees. Pilot descended below obstructing terrain.		
	1967					
59	1/31	San Antonio, Tex.	DC-6	Undetermined. Instrument landing attempt in bad weather. Hit cliff 1000 ft. below glide path.		
60	3/30	Kenner, La.	DC-8	Simulated 2-engine outlanding. Improper operation of power plant and flight controls.		
61	11/6	Erlanger, Ky.	B-707	Co-pilot suspected collision. Aborted takeoff. Runway too short. Other plane not clear of runway as pilot had reported to tower.		
62	11/20	Constance, Ky.	CV-880	Under review.		
63	12/21	Denver, Col.	DC-3	Inadequate preflight preparation and/or planning - gust locks engaged - pitch control problem.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
64	1968 1/1	Oxford, Miss.	M-404	Landing undershoot. Gear collapsed. Pilot misjudged distance and altitude. No runway approach lights.		
65	3/21	Chicago, Ill.	B-727	Co-pilot did not properly set flaps. Takeoff warning on sounded. Pilot delayed action to abort takeoff.		
66	4/28	Atlantic City, N.J.	DC-8	Simulated 2-engine landing. Improper operation of power plant.		
67	8/10	Charleston, W.Va.	F-227	Unrecognized loss of altitude orientation. Pilot delayed in initiating go-around. Midjudged distance and altitude.	IFR	Fog
68	9/27	Cherry Point, N.C.	DC-7	Improper IFR operation.	IFR	Fog, low ceiling
69	10/25	Hanover, N.H.	F-227	Pilot delayed action in aborting takeoff.		
70	12/24	Bradford, Pa.	CV-580	Struck trees on instrument approach in a snow shower.		
71	12/27	Chicago, Ill.	CV-580	Missed approach to land while on instruments - inability to recover - struck aircraft hanger.		
72	12/27	Sioux City, Iowa	DC-9	Takeoff made with known airframe icing.	IFR	Icing, low ceiling freezing drizzle

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1969					
73	7/15	Jamaica, N.Y.	DC-6	Vortex turbulence. Pilot misjudged distance. Warned of wake turbulence from recently departed jet.		
74	7/26	Pomona, N.J.	B-707	Missed approach. Pilot failed to follow approved procedures, loss of directional control.		
75	10/11	Stockton, Ca.	DC-8	False ground spoiler position indication. Takeoff warning on malfunction.		
	1970					
76	8/24	Hill AFB, Utah	L-188	One hydraulic pump used. Company required use of all 3 hydraulic pumps for takeoff.		
77	9/8	Jamaica, N.Y.	DC-8	Loss of pitch control due to entrapment of foreign object (pointed asphalt cover) between R-elevator and R-horizontal stabilizer.		
78	10/10	Wrightstown, N.J.	GA-382	Crew disoriented by light glare during transition from instrument to visual flight. Improper IFR operation. Instruments misread or not read.	IFR	Fog, low ceiling
79	11/14	Huntington, W.Va.	DC-9	Descent below minimum altitude. Undetermined as to whether descent was due to improper instrument data use or altimeter systems error.		

TABLE 2-3E (Continued)

80	1971 3/31	Ontario, Ca.	B-720	Simulated 3-engine landing. Missed approach. Rudder and hydraulic actuator support fitting stressed corrosion cracks.	IFR	Fog
81	6/7	New Haven, Conn.	CV-580	Unwarranted low flying. Pilot continued descent below minimum altitude without forward vision despite advisories from First Officer.	IFR	Fog, low ceiling
82	1972 3/3	Albany, N.Y.	F-227	Cruise pitch lock malfunction. Feathered prop for undetermined reason. Descended below minimum altitude. Improper altitude awareness procedures.		
83	5/18	Ft. Lauderdale, Fla.	DC-9	Weather below minimum. Flight did not report the outer marker inbound as requested by tower controller and did not receive a landing clearance.	IFR	Rain, thunderstorm, low ceiling
84	5/30	Ft. Worth, Tex.	DC-9	Vortex turbulence from proceeding plane.		
85	12/8	Chicago, Ill.	B-737	About 700 ft. high at landing marker during landing approach. Spoilers displayed. Failure to obtain or maintain flying speed.		

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1972 (cont'd)					
86	12/20	Chicago, Ill.	DC-9	Collision during takeoff with taxiing planes. Air traffic control system did not provide separation. Controller instructions ambiguous.	IFR	Fog, low ceiling
	1973					
87	7/23	St. Louis, Mo.	F-227	Weather conditions considerably worse than forecast. Pilot continued instrument landing into thunderstorm. Lack of timely issuance of severe weather warning.	IFR	Thunderstorm, downdrafts and updrafts, lightning
88	7/31	Boston, Mass.	DC-9	Improper IFR operation - unstable ILS approach.	IFR	Fog, low ceiling
89	11/3	Boston, Mass.	B-707	Inflight fire.		
90	11/27	Akron, Ohio	DC-9	Ran off runway into ravine due to reduced ability to brake on wet runway.		Fog, light rain, showers, low ceiling
	1974					
91	1/16	Los Angeles, Ca.	B-707	Pilot continued visual approach after losing visual reference. Penetrated fog over runway. Co-pilot improper IFR operation. Hard landing gear collapse. Landing roll.	Weather VFR Flight plan IFR	Fog

TABLE 2-3E (Continued)

92	9/11	Charlotte, N.C.	DC-9	Lack of altitude awareness during approach. Altitude callouts not made. Co-pilot improper IFR operation.	IFR*	
93	1975 6/24	Jamaica, N.Y.	B-727	Undershoot landing. Collided with runway approach lights. Traffic control cleared aircraft for wrong runway under existing conditions. Continued use of runway should have become evident to air traffic control and crew. Severe weather hazard existed along approach path.	IFR	Thunderstorm, wind shear
94	11/12	Jamiaca, N.Y.	DC-10	Bird ingested. Takeoff aborted. Under investigation.		
95	1976 2/8	Van Nuys, Ca.	DC-6	Propeller failure. Fatigue. Propeller severed fuselage. Forced landing off airport. Inadequate maintenance inspection of aircraft.	VFR	Rain

FR* Report does not specifically state plane was on IFR but remarks indicate it was IFR.

TABLE 2-3E (Continued)

No.	Date	Location	Type of Plane	Probable Cause Remarks	IFR[2/]	Weather
	1976 (cont'd)					
96	6/23	Philadelphia, Pa.	DC-9	Under investigation.		
97	1977 7/6	St. Louis, Mo.	L-188	Propeller failure. On first takeoff No. 2 engine auto-feathered, oil exhaustion (leaks?). Improperly replaced. No. 2 propeller was reversed on second takeoff.		

1/ This table was generated by identifying accidents involving commercial carriers which resulted in fatalities to occupants of the aircraft or which resulted in the destruction of the aircraft.

2/ IFR - Instrument Flight Rules - define a set of weather minimum weather conditions. These are at least a 3 mile visibility and a 1000 ft. ceiling.

ILS - Instrument Landing System - is used to identify the physical hardware systems used to land a plane on instruments. Consists of the airport equipment on the ground as well as the equipment in the aircraft essential to land the aircraft.

VFR - Visual Flight Rules - is the opposite of IFR and reflects a set of weather conditions better than those defined as IFR.

TABLE 2-4

ACCIDENTS FOR WHICH DETAILS WERE CONFIRMED

Ref. No.	Date	Location	Flight Phase	Aircraft** TYPE/WT	Impact Speed knots	Type Operation	Comments	Range & Bearing r mi.	Range & Bearing θ deg.
	1960								
27	10/4	Boston, Mass	T	--	136-108	NS/P	Hit flock of birds on takeoff	1.0	20L
28	10/24	Toledo, Ohio	T	-/48,900	low speed engines stopped	NS/P	Overweight, left turn required on takeoff, fog	1.1	4L
	1961								
30	9/17	Chicago, Ill.	T	T/95,700	120-160	SP	Right turn required on takeoff for nose abatement - struck power lines	0.8	90R
31	11/8	Richmond, Va.	L	P/82,000	<95	NS/P	Controlled crash on approach for emergency landing	1.1	26R
	1962								
32	3/1	Jamaica Bay, N.Y.	T	J/246,000	200	SP	Left turn required on takeoff. Near vertical dive on crash	2.7	95L
35	11/30	New York, N.Y.	L	-/103,164	--	SP	Inst. approach, fog	0.75	9R
	1963								
39	2/3	San Francisco CA	L	P/83,400	120	SC	Hit appraoch lights, poor weather	0.2	0
40	2/16	Puyallup, Wa.	L	-/46,751	-	NS/C	Engine malfunction on takeoff. Attempted go around - struck tree	0.5	0
41	5/28	Manhattan, Ks.	L	P/102,000	120	NS/P	Hit just short of runway	0.1	0
43	11/29	Morgantown, W.Va.	L	---	-	Ferry	Inst. approach, struck tree, bad compass, fog	2.5	18R
	1964								
44	3/10	Boston, Mass.	L	P/56,300	fell 500' from approach speed	SC	Landed short - 30° angle of impact from horizontal, winds	1.3	0
45	3/12	Miles City, Mt.	L	-/23,300	135	SP	Approach too low	1.9	0

*Summary of all accidents in Table 2-2 for which detailed information is available.

**P = prop; T = turboprop; J = Jet, (-) not available.

TABLE 2-4 (Continued)

Ref. No.	Date	Location	Flight Phase	Aircraft** TYPE/WT	Impact Speed knots	Type Operation	Comments	Range & Bearing r mi.	Range & Bearing θ deg.
	1964 (cont.)								
46	11/20	Detroit, Mi.	T	P/47,900	<110	NS/C	Snow and ice	0.4	0
47	12/24	San Francisco, CA	T	P/142,100	140	SC	Poor weather, night - hit mountain	4.2	31L
	1965								
50	5/18	Knob Noster, Mo.	T	P/86,800	125-140	NS/C	Inst approach, missed, attempting to pull out, hit tree	0.8	15L
51	7/23	Montorsville, Pa.	T	P/45,155	100-115	SP	Glanced top of hill, slid down backside	2.0	45L
53	11/8	Constance, Ky.	L	J/121,000	140	SP	Visual - heavy rain	2.0	0
54	11/11	Salt Lake City, U.	L	J/136,300	132	SP	Visual Approach - hit just short of runway	0.1	0
	1966								
56	4/22	Ardmore, Ok.	L	T/92,600	150	NS/P	Visual approach - fog	2.3	100L
57	7/28	Newark, N.J.	L	P/47,000	<97	NS/C	Controlled - Engine failure on takeoff, circling back to land	1.75	90R
	1967								
59	1/31	San Antonio, Tx.	L	P/ -	-	NS/C	Fog - Instrument Approach	4.5	0
60	3/30	Kenner, La.	L	J/179,670	less than normal landing speed	Training	Simulated 2 engine failure on takeoff, circling back to land	0.4	27R
	1968								
70	12/24	Bradford, Pa.	L	T/51,000	130	SP	Struck tree on mountain - snow	2.8	8R
72	12/27	Chicago, Ill.	L	T/53,000	Stall	SP	Aborted landing, struck hanger	0.3	86R
	1970								
79	11/14	Huntington, W.Va.	L	J/85,300	122-139	NS/P	Horizontal impact into trees	1.1	5L
	1971								
81	6/7	New Haven, Conn.	L	T/ -	-	SP	Crash after 3 approaches	0.9	6

TABLE 2-4 (Continued)

Ref. No.	Date	Location	Flight Phase	Aircraft** TYPE/WT	Impact Speed Knots	Type Operation	Comments	Range & Bearing r mi.	Range & Bearing θ deg.
	1972								
82	3/3	Albany, N.Y.	L	T/45,000	130	SP	Low visibility - controlled crash	3.8	0
85	12/8	Chicago, Ill.	L	J/98,000	120	SP	Fog - Crashed short of runway	2.0	7L
	1973								
87	7/23	St. Louis, Mo.	L	T/43,000	?	SP	Possible struck by lightning	2.6	4R
89	11/3	Boston, Mass.	L	P/116,500	150	SC	Low altitudes - fall on tail, crashed	.05	0
	1976								
95	2/8	Van Nuys, Ca.	L	P/116,500	140	Ferry	Fog, hit tree	1.5	0
	1977								
97	7/6	St. Louis, Mo.	T	T/69,699	100-120	NS/C	Just off runway	0	0

TABLE 2-5

Listing of U.S. Heavy Air Carrier Landing and Takeoff Accidents in the contiguous U.S., Involving Occupant Fatality and/or Destruction of the Aircraft

Date	Location	Phase	Aircraft	Injury	Type Oper.	Hit Location[1] r mi.	Hit Location[1] θ deg.	Speed at Impact	Remarks
8/15/59	Calverton, N.Y.	L	B-707	F	Training	3	13	165 Knots	(T/) at 201,000 3 hours earlier (26° velocity rector, 12° aircraft)
7/11/61	Denver, Co.	L	DC-8	F	SP	0.0	0	~50 Knots	(thrust reversal failure during landing roll)
3/1/62	Jamaica Bay, N.Y.	T	B-707	F	SP	2.7	90	~200 Knots	(vertical descent) (246,000 lbs.)
3/30/67	Kenner, La.	L	DC-8	F	Training	0.4	27	132 Knots	(struck wires prior to impact)
11/6/67	Erlanger, Ky.	T	B-707	F	SP	0.0	0		(T/O abort following runway collision with other aircraft)
4/28/68	Atlantic City, N.J.	L	DC-8	0	Training	0.0	0	~150 Knots	(control failure while overflying runway)
10/16/69	Stockton, Ca.	T	DC-8	0	Training	0.0	0		(gear collapse on T/O abort)
9/8/70	Jamaica, N.Y.	T	DC-8	F	Ferry	0.0	0		

TABLE 2-5 (Continued)

Listing of U.S. Heavy Air Carrier Landing
and Takeoff Accidents in the Contiguous U.S., Involving
Occupant Fatality and/or Destruction of the Aircraft

Date	Location	Phase	Aircraft	Injury	Type Oper.	Hit Location[1] r mi.	Hit Location[1] θ deg.	Speed at Impact	Remarks
3/31/71	Ontario, Ca.	L	B-720	F	Training	0	0		
11/3/73	Boston, Mass.	L	B-707	F	SC	0.05	90	150 Knots	prior to rotation, struck vertical, tail down, T/O at 293,872 lbs. several hours earlier
1/16/74	Los Angles, Ca.	L	B-707	0	SP	0	0		
11/12/75	Jamaica, N.Y.	T	DC-10	0	NS/P	0	0		

Abbreviations:
Phase: L = Landing, T = Takeoff
Injury: F = One or more occupant fatalities, 0 = None
Type Oper.: SC = Scheduled cargo, SP = Scheduled passenger
NS/C = Non-scheduled cargo, NS/P = Non-scheduled passenger

Range and Bearing (T)
r is the radial distance, in miles, of the hit to the end of the runway in use. θ is the angle to the runway centerline, in degrees.

TABLE 2-6

TYPICAL U.S.-MANUFACTURED CIVILIAN PASSENGER AIRCRAFT OVER 200,000 LBS

MODEL	WT. EMPTY (1000 lbs)	TYPICAL MAXIMUM GROSS WT. (1000 lbs)	MAXIMUM LANDING WT. (1000 lbs)	LANDING SPEED (MPH)	FAA T/O FIELD LENGTH (FT)
B707-120	118	258	190	165	10,550
B707-120B	125	258	190	158	7,450
B707-320	135	316	207	161	10,650
B707-320B	141.8	336	247	158	10,020
B707-320C	145.7	336	247	158	10,020
B707-420	133	316	207	162	10,650
B720	110.8	230	175	148	9,400
B720B	112.9	235	175	152	6,450
B747-100	354	713	564	162	9,000
B747-200B	362.9	778	564	162	10,500
B747-200C	375	778	630	175	10,200
B747-SR	347.8	523	505	148	4,600
B747-SP	313	663	450	155	7,530
B767-200	158.7	280	255	134	7,600
DC-8-10	121	273	193	148	9,625
DC-8-20	123.8	276	199.5	151	7,680
DC-8-30	126.5	315	207	153	9,050
DC-8-40	124.4	315	207	153	9,650
DC-8-50	134.8	325	207	145	10,000
DC-8-61	148.9	325	240	163	10,000
DC-8-62	141.9	335	240	143	9,800
DC-8-63	153.7	350	245	157	10,180
DC-10-10	235.3	440	363.5	147	9,000
DC-10-30	261.5	565	403	158	11,100
DC-10-40	267.8	555	403	160	12,250
DCX-200	N/A	293	N/A	N/A	N/A
CNVR-990	114.8	255	202	125	5,400
L1011-I	241.4	430	359	161	7,600
L1011-100	243.2	466	368	164	10,700
L1011-200	244.2	466	368	164	8,060

Source: Aviation Week and Space Technology, various issues.
Note: The B757 is expected to have a gross weight of less than 219,000 pounds.

TABLE 2-7

U.S. AIR CARRIER OPERATIONS AND ACCIDENTS
IN CONTIGUOUS U.S.

Year	Type	Millions of Operations	Table 2-3 Accidents 3/ Landing	Table 2-3 Accidents 3/ Takeoff	Accidents Per Million Each Type of Operation Landing	Accidents Per Million Each Type of Operation Takeoff
1956	S 1/ 2/	6.36	2	2	.63	.63
1957	S	6.88	3	1	.87	.29
1958	S 1/	6.34	2	3	.63	.95
	N 2/	.18	0	0	0	0
	T	6.52	2	3	.61	.92
1959	S	6.84	5	1	1.46	.29
	N	.18	2	0	22.2	0
	T	7.02	7	1	1.99	.28
1960	S	6.68	1	1	.30	.30
	N	.25	0	1	0	8.0
	T	6.93	1	2	.29	.58
1961	S	6.50	1	1	.31	.31
	N	.28	1	0	7.1	0
	T	6.78	2	1	.59	.29
1962	S	6.40	3	2	.94	.63
	N	.35	0	0	0	0
	T	6.75	3	2	.89	.59
1963	S	6.66	2	1	.60	.30
	N	.31	3	0	19.4	0
	T	6.97	5	1	1.43	.29
1964	S	6.86	2	1	.58	.29
	N	.19	1	1	10.5	10.5
	T	7.05	3	2	.85	.57
1965	S	7.30	2	1	.55	.27
	N	.19	1	0	10.5	0
	T	7.49	3	1	.80	.27
1966	S	7.57	2	0	.52	0
	N	.17	2	0	23.5	0
	T	7.74	4	0	1.0	0

TABLE 2-7 (Continued)

Year	Type	Millions of Operations	Table 2-3 Accidents 3/ Landing	Table 2-3 Accidents 3/ Takeoff	Accidents Per Million Each Type of Operation Landing	Accidents Per Million Each Type of Operation Takeoff
1967	S	8.66	1	1	.23	.23
	N	.17	1	1	11.1	11.1
	T	8.84	2	2	.45	.45
1968	S	9.29	4	2	.86	.43
	N	.21	2	0	19.0	0
	T	9.50	6	2	1.26	.42
1969	S	9.48	0	1	0	.21
	N	.23	0	0	0	0
	T	9.71	0	1	0	.21
1970	S	9.12	0	0	0	0
	N	.25	2	2	16.0	16.0
	T	9.37	2	2	.43	.43
1971	S	9.09	1	0	.22	0
	N	.31	0	0	0	0
	T	9.40	1	0	.21	0
1972	S	8.88	3	1	.68	.22
	N	.27	0	0	0	0
	T	9.15	3	1	.66	.22
1973	S	9.27	4	0	.86	0
	N	.26	0	0	0	0
	T	9.53	4	0	.84	0
1974	S	8.39	2	0	.48	0
	N	.21	0	0	0	0
	T	8.60	2	0	.47	0
1975	S	8.40	1	0	.24	0
	N	.22	0	1	0	9.1
	T	8.62	1	0	.23	.23
1976	S	8.71	1	0	.23	0
	N	.23	1	0	8.70	0
	T	8.94	2	0	.45	0
1977	S	8.98	0	0	0	0
	N	.25	0	1	0	8.0
	T	9.23	0	1	0	.22

TABLE 2-7 (Continued)

Year	Type	Millions of Operations	Table 2-3 Accidents 3/ Landing	Takeoff	Accidents Per Million Each Type of Operation Landing	Takeoff
			5-Year Totals			
1958	S	32.8	12	8	.73	.49
thru	N	1.24	3	1	4.8	1.6
1962	T	34.0	15	9	.88	.53
1963	S	37.1	9	4	.49	.22
thru	N	1.04	8	2	15.4	3.8
1967	T	38.1	17	6	.92	.31
1968	S	45.9	8	4	.35	.17
thru	N	1.27	4	2	6.3	3.1
1972	T	47.1	12	6	.51	.25
1973	S	43.8	8	0	.37	0
thru	N	1.17	1	2	1.7	3.4
1977	T	44.9	9	2	.40	.09
			20-Year Totals			
1958	S	159.6	37	16	.46	.20
thru	N	4.72	16	7	6.8	3.0
1977	T	16.41	53	23	.65	.28
			22-Year Totals			
1956 thru 1977	S (only)	172.6	42	19	.49	.22

NOTES:

1/ S was derived from the Civil Aeronautics Board Annual (or NTSB) review of U.S. Air Carrier Accidents:

For 1958 through 1963 it was taken from CAB-BOSR 58/63 PB196674
For 1964 from BOSR 7-1 PB177424
For 1965 from BOSR 7-6 PB177423
For 1966 from NTSB Annual Review for 1966
For 1967 from NTSB Annual Review for 1967
For 1968 from NTSB Annual Review for 1968
For 1969 from NTSB-ARC 71-1 PB203183
For 1970 through 1972 from NTSB ARC 741 PB232634

TABLE 2-7 (Continued)

For 1973 from NTSB-ARC 74-2
For 1974 from NTSB-ARC 76-1
For 1975 from NTSB-ARC 77-1
For 1976 from NTSB-ARC 78-1
For 1977 from NTSB-ARC 78-2

It is twice the number of reported domestic departures for scheduled Certified Route Air Carriers (CRAC) for fixed wing, excluding intra-Alaska and intra-Hawaii.

For 1956 and 1957, the number is not reported in available reports for U.S. domestic departures. But Table 28 of BOSR-58/63 PB196674 (noted above for 1958-1963) provides number of total scheduled departures for U.S. carriers. To derive a number of departures for U.S. contiguous service, this number was multiplied by the ratio of passengers carried in scheduled domestic service by CRAC to total passengers carried in all scheduled CRAC flights.

2/ N, non-scheduled operations, is made up of two components. The first is the number of departures in non-scheduled service by CRAC for fixed wing, excluding intra-Alaska and intra-Hawaii taken from the same sources as S above. The second component is departures in non-scheduled service by supplemental carriers. This was derived by obtaining the average revenue plane miles per departure for CRAC non-scheduled service from sources identified above. For want of contrary information, it was assumed that this same average would be applicable to supplemental carriers. The number of supplemental carrier revenue plane miles was divided by this average to obtain number of supplemental carrier departures. The sum of the non-scheduled departures was doubled for "operations."

No similar data is available for 1956 and 1957, so only scheduled departures are used for these years. One non-scheduled serious accident within 5 miles is reported for these two years, and 3 are reported for scheduled service.

This method of estimating operations tends to underestimate the total number of operations for supplemental carriers. Supplemental carriers tend to run more non-revenue ferry operations in order to move aircraft from home location to point of charter. These non-revenue operations are not generally reported. CRAC, with a wider dispersed fleet, tends to have less ferry operations.

Another element tending to make these estimates of supplemental operations low is the exclusion of operations of "Commercial Operators of Large Aircraft" where this could be identified. In some years it is identified separately from supplemental carriers. For some years in which there is no separate identification, it may be included in data relating to supplemental carriers. We have not attempted to separately identify these operations. It should be noted that for the years 1965-1974 these carriers tended to have about as many planes as the supplemental carrier fleet. But they tended to be smaller planes. See FAA Annual Report for 1974.

Not considering ferry flights and operation of "Commercial Operators of Large Aircraft" tends to make the ratio of accidents to operations high since accidents in ferry flights and by "Commercial Operators of Large Aircraft" are

TABLE 2-7 (Continued)

included in the numerator but their operations are not included in the denominator.

3/ Despite inquiry to CAB, FAA and airlines, we could find no source of data concerning the number of landings and takeoffs associated with training flights, nor any reasonable basis for a reliable estimate. Since the number of these operations is not known, we have excluded training accidents from this table. We have attempted to bound the effect of this exclusion by estimates on a number of bases. This results in a range for the 22 year period of between 0.9 and 17 million operations.

For the 4 off-runway training accidents during this period, the rate for off-runway training accidents is between 10% and 130% of the off-runway rate for non-scheduled aircraft. Thus, it appears reasonable or conservative to use the non-scheduled off-runway rate for training.

TABLE 2-8

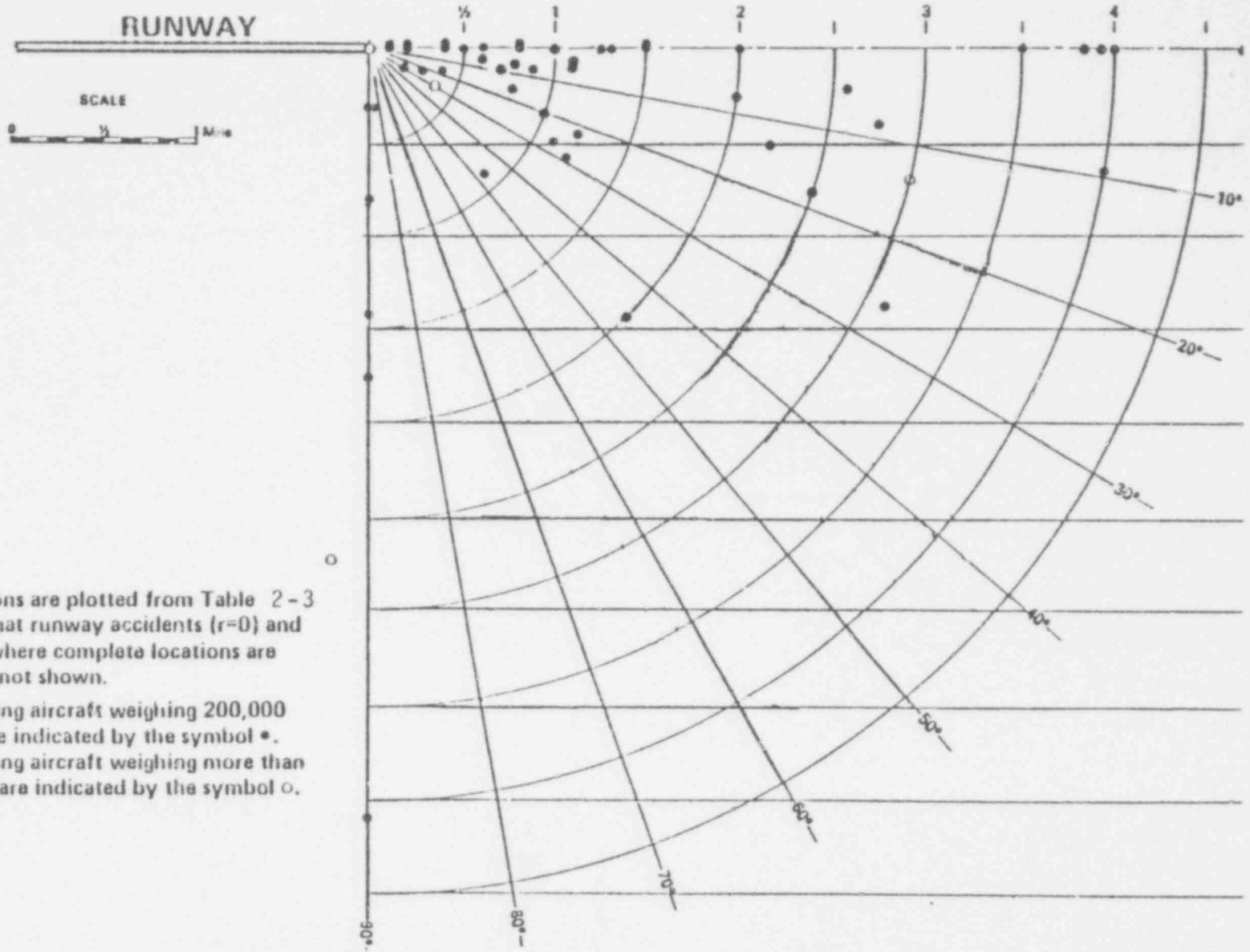
LARGE MILITARY AIRCRAFT LANDINGS & ACCIDENTS
C5A, C141, E4A

1968 - June 1978

Plane	Year	Landings	Accidents
C141	1973	182,000	1
	1974	177,000	1
	1975	169,000	1
	1976	153,000	2
	All Other Years - No Accidents		
	10 1/2 year total	2,152,000	5
C5A	1970	12,000	1
	1974	33,000	1
	1975	29,000	1
	All Other Years - No Accidents		
	10 1/2 year total	211,000	3
	1968 - June 1978		
E4A	No Accidents Since Start of Operations - 1974		
	4 1/2 year total	4,700	0
	1974 - June 1978		

FIGURE 2-1

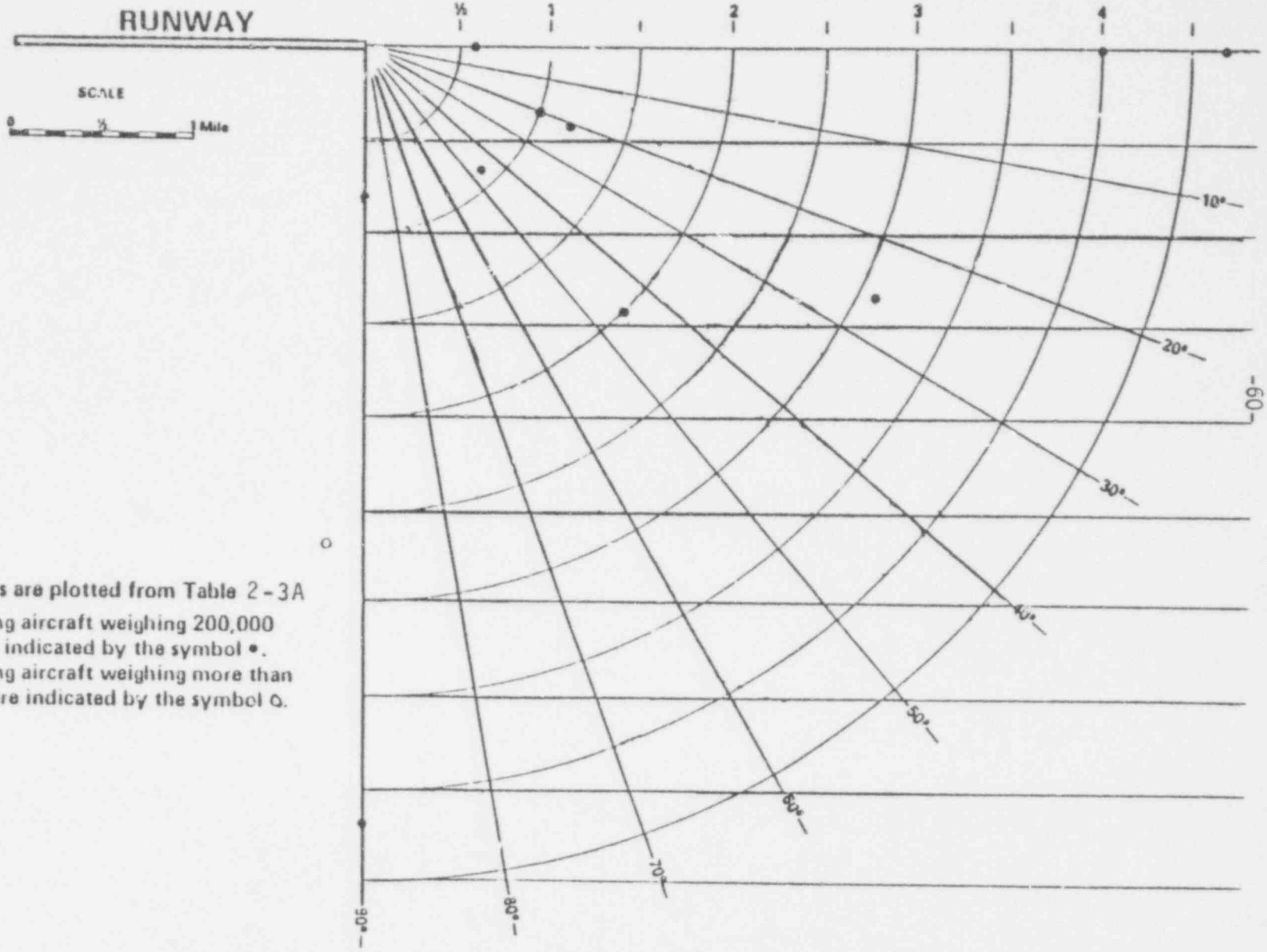
U.S. AIR CARRIER ACCIDENTS IN THE CONTIGUOUS UNITED STATES
1956 - 1977



NOTES

1. Accidents locations are plotted from Table 2-3 except that runway accidents (r=0) and those accidents where complete locations are not available are not shown.
2. Accidents involving aircraft weighing 200,000 pounds or less are indicated by the symbol •. Accidents involving aircraft weighing more than 200,000 pounds are indicated by the symbol o.

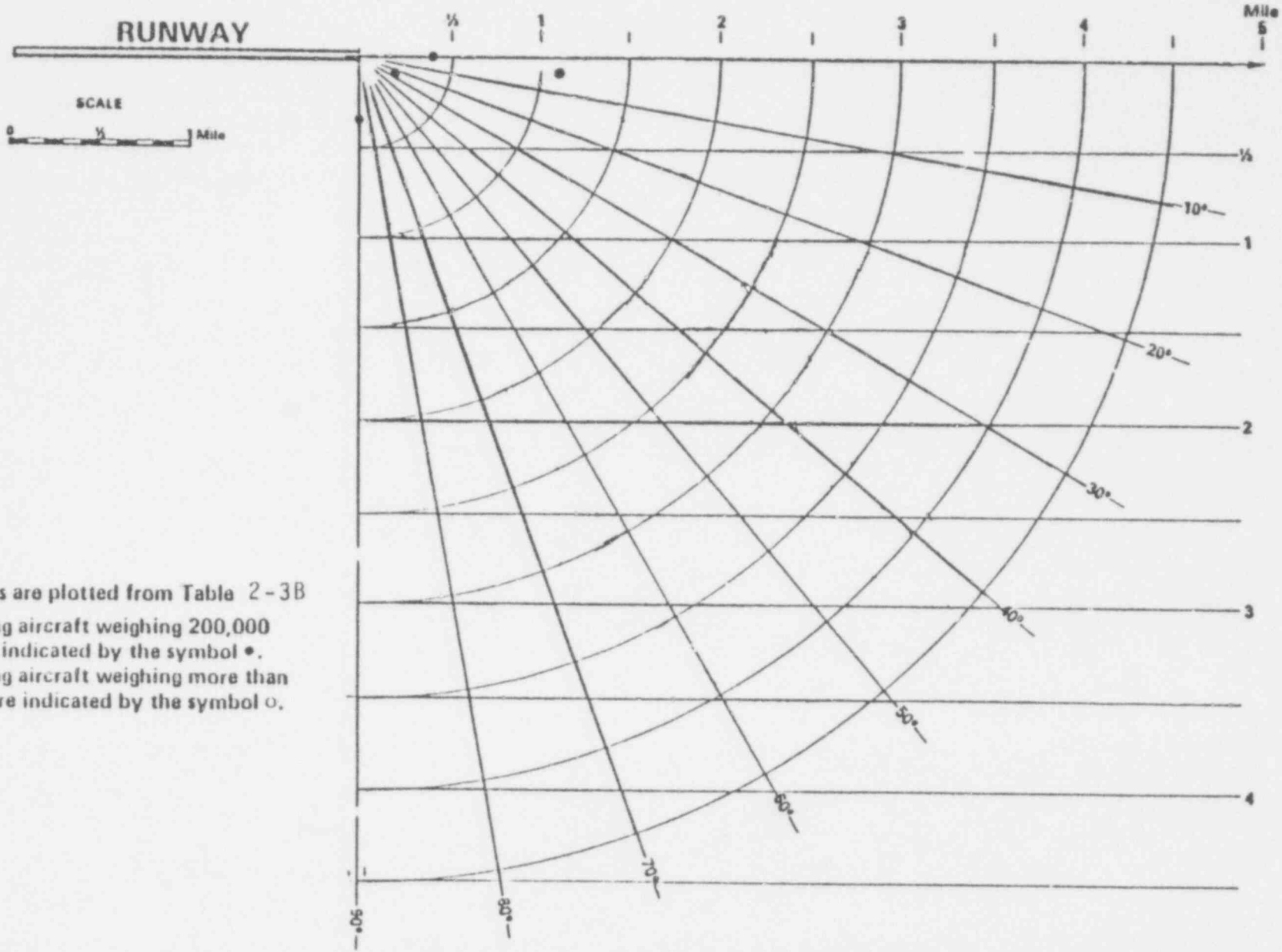
FIGURE 2-2
U.S. AIR CARRIER TAKEOFF ACCIDENTS OF SCHEDULED FLIGHTS
IN THE CONTIGUOUS UNITED STATES
1956 - 1977



NOTES

1. Accident locations are plotted from Table 2-3A
2. Accidents involving aircraft weighing 200,000 pounds or less are indicated by the symbol •. Accidents involving aircraft weighing more than 200,000 pounds are indicated by the symbol o.

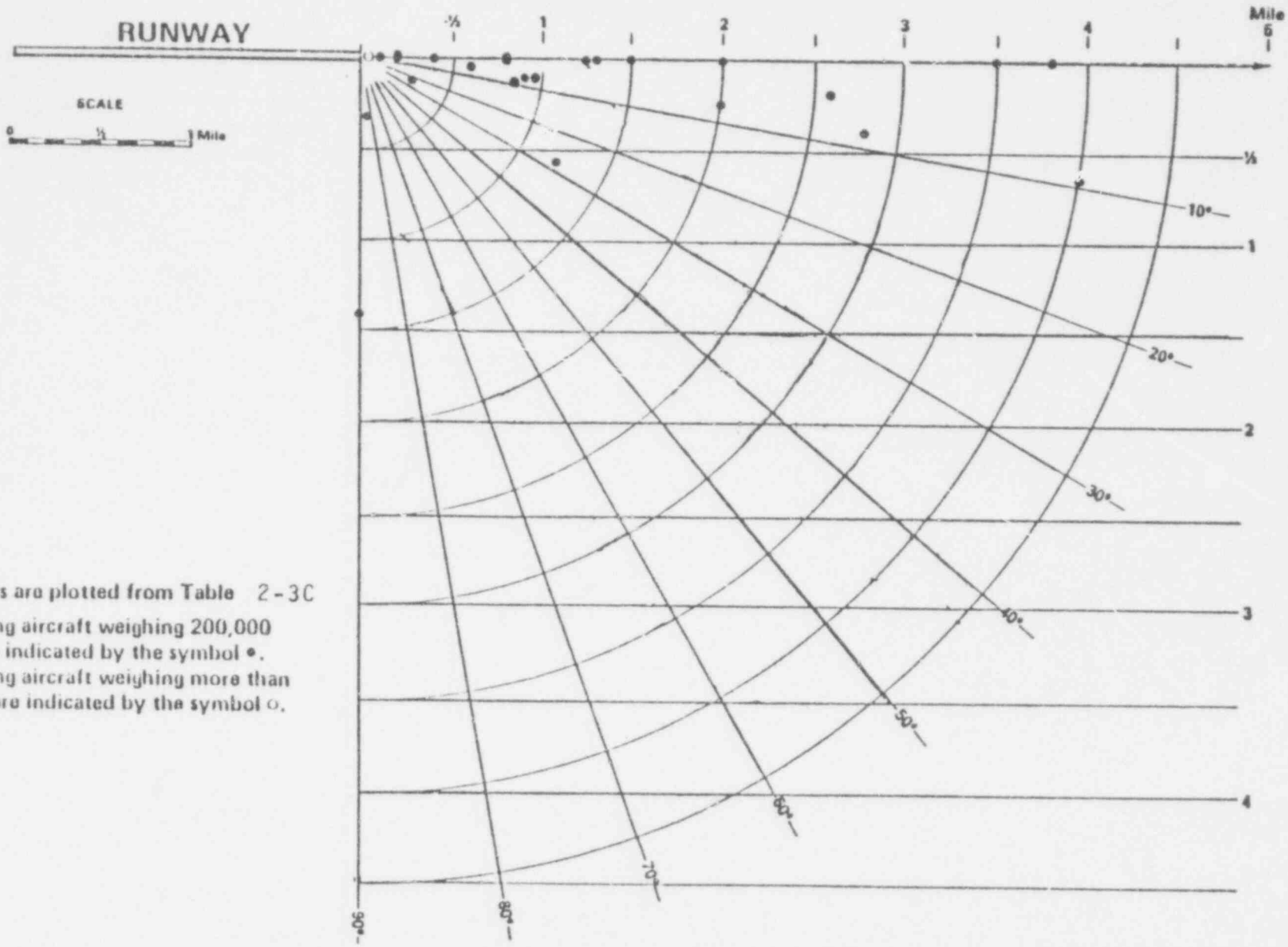
FIGURE 2-3
U.S. AIR CARRIER TAKEOFF ACCIDENTS OF NON-SCHEDULED FLIGHTS
IN THE CONTIGUOUS UNITED STATES
1956 - 1977



NOTES

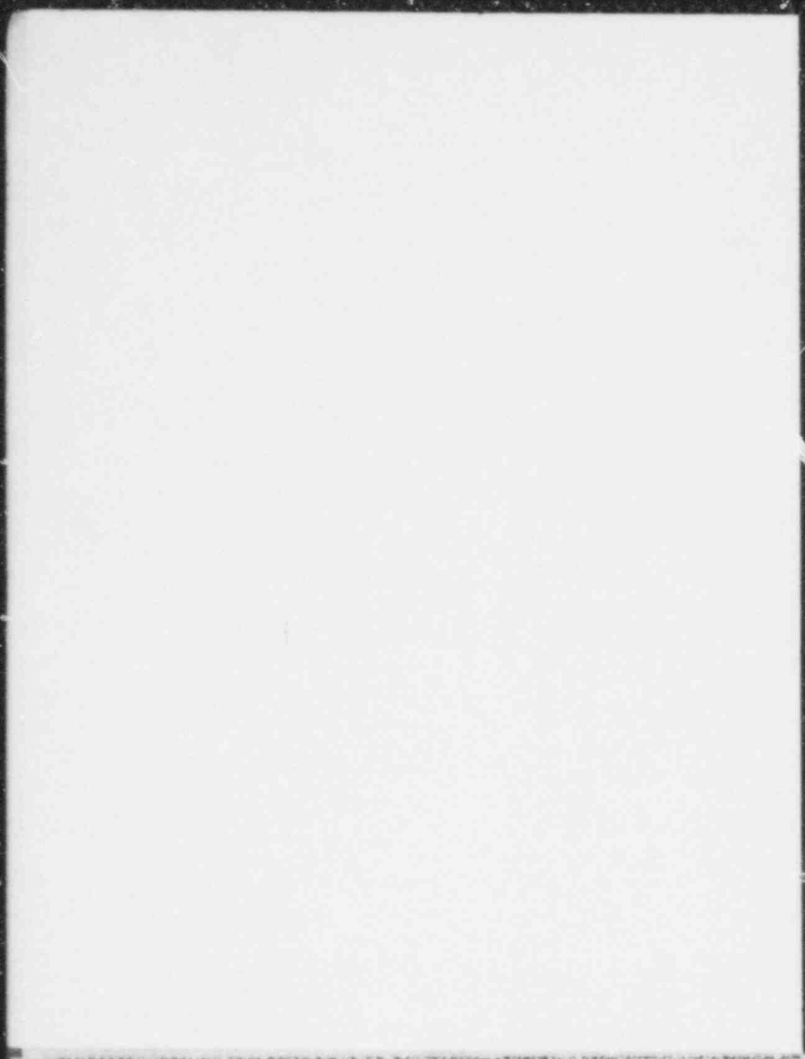
1. Accident locations are plotted from Table 2-3B
2. Accidents involving aircraft weighing 200,000 pounds or less are indicated by the symbol •. Accidents involving aircraft weighing more than 200,000 pounds are indicated by the symbol ○.

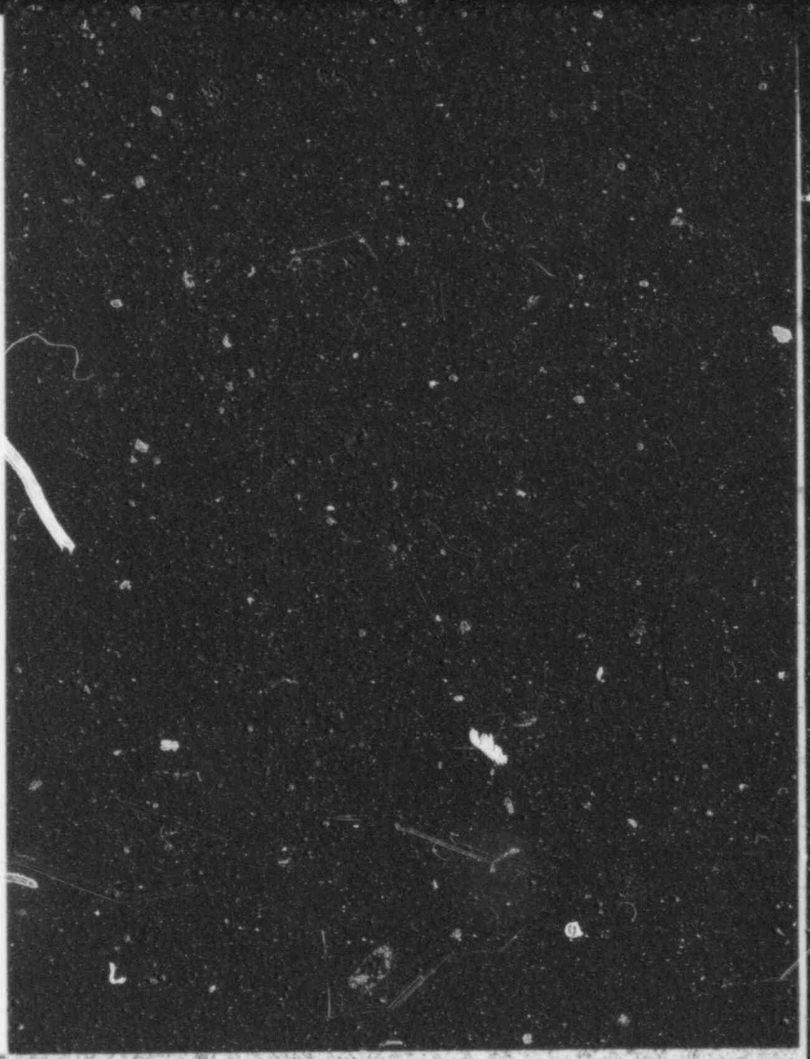
FIGURE 2-4
U.S. AIR CARRIER LANDING ACCIDENTS OF SCHEDULED FLIGHTS
IN THE CONTIGUOUS UNITED STATES
1956 - 1977

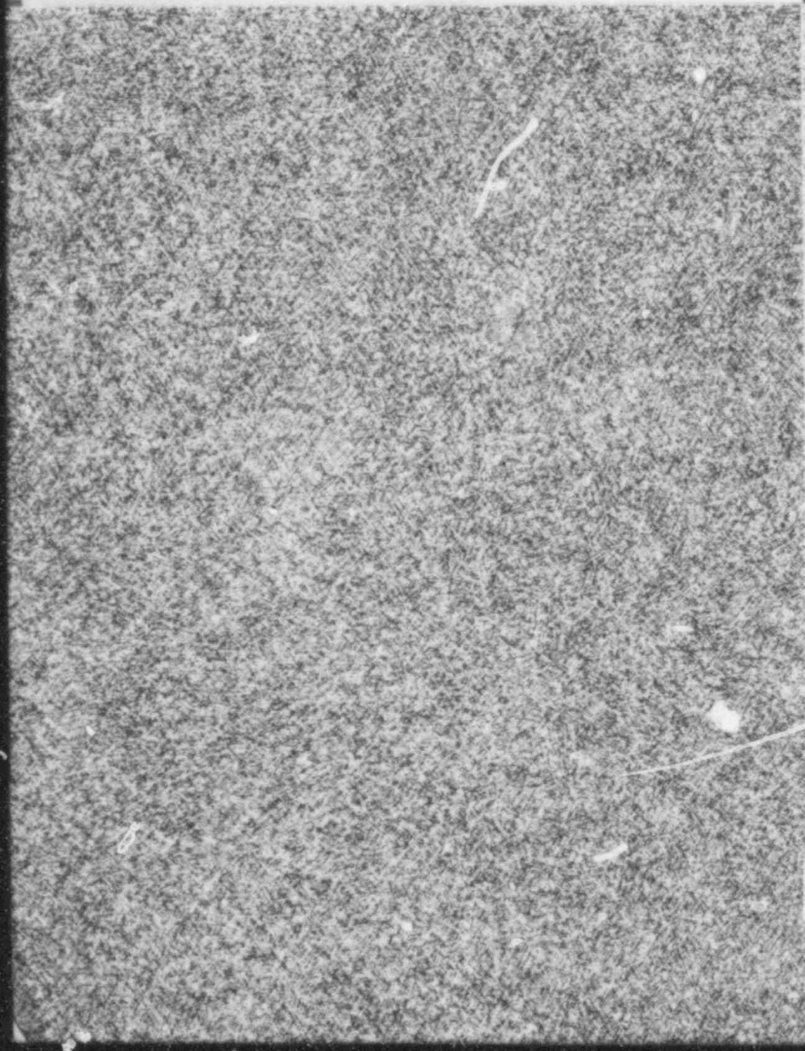


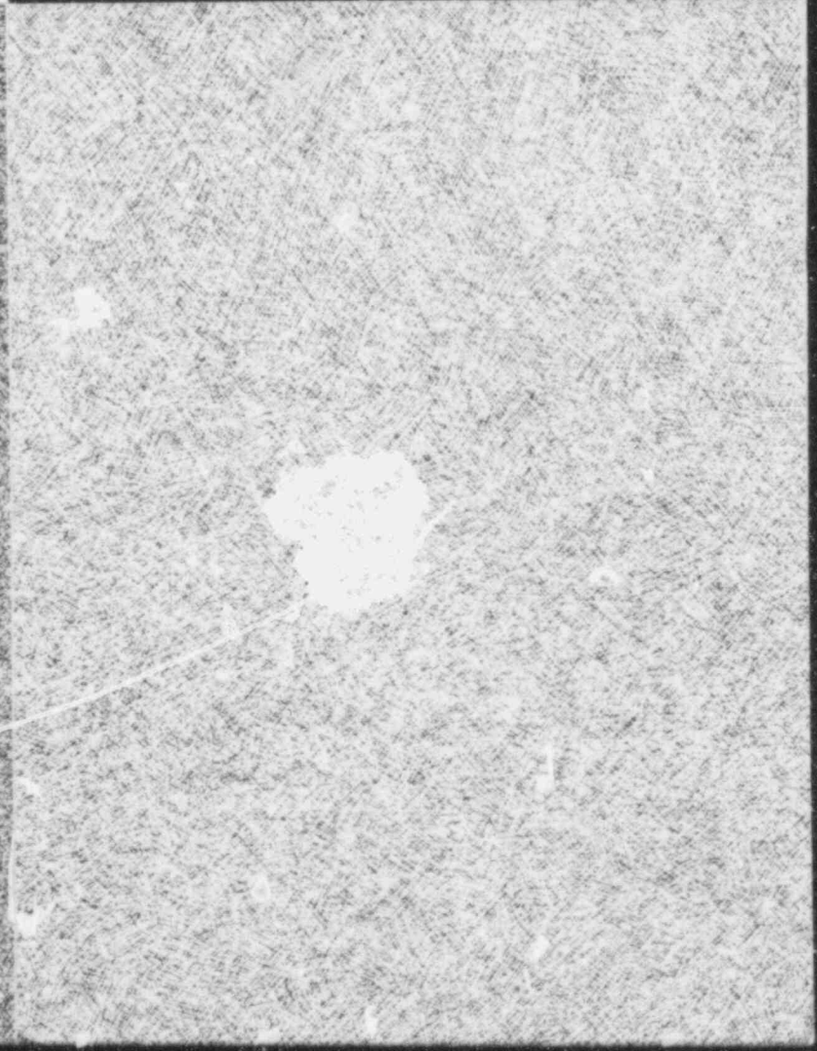
NOTES

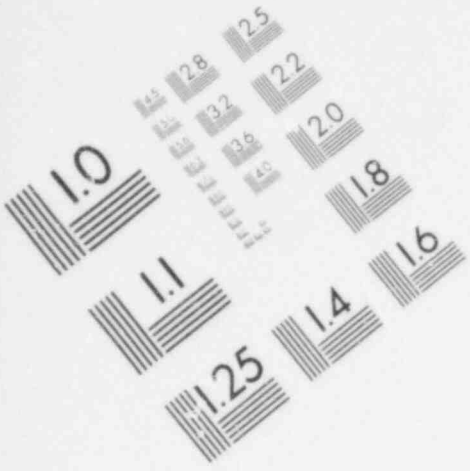
1. Accident locations are plotted from Table 2-3C
2. Accidents involving aircraft weighing 200,000 pounds or less are indicated by the symbol •. Accidents involving aircraft weighing more than 200,000 pounds are indicated by the symbol ○.











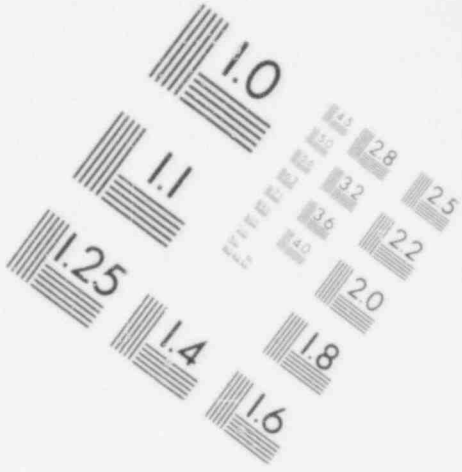
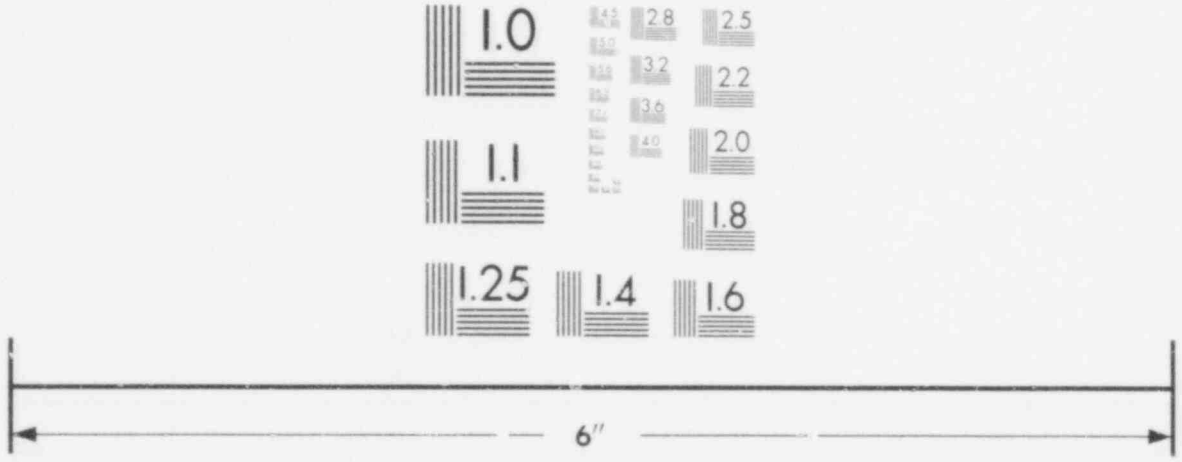
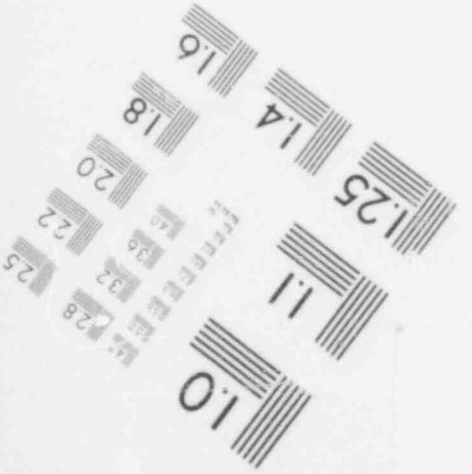
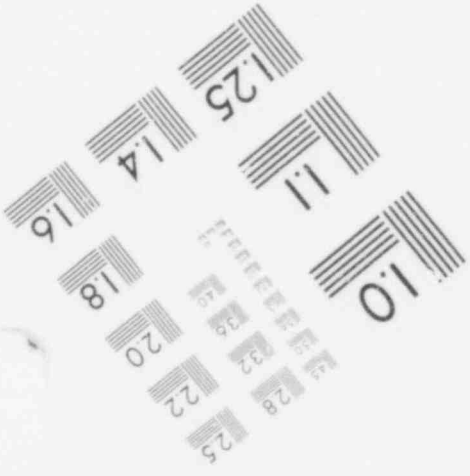
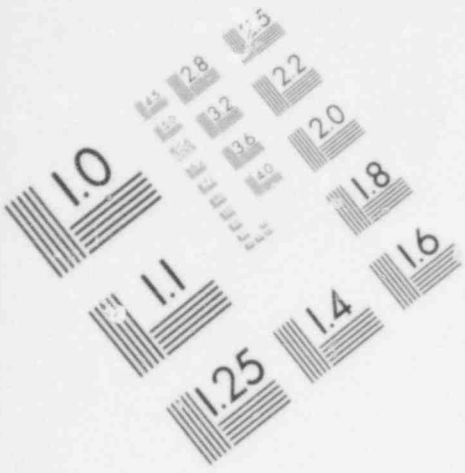


IMAGE EVALUATION
TEST TARGET (MT-3)









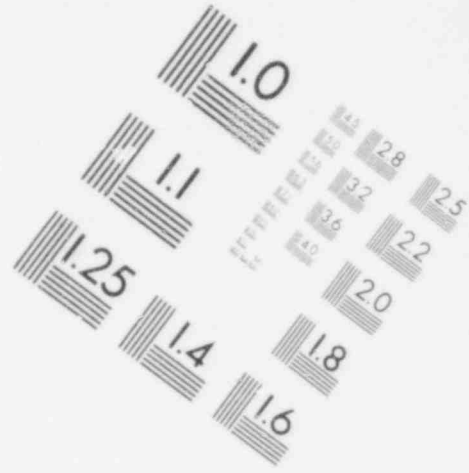
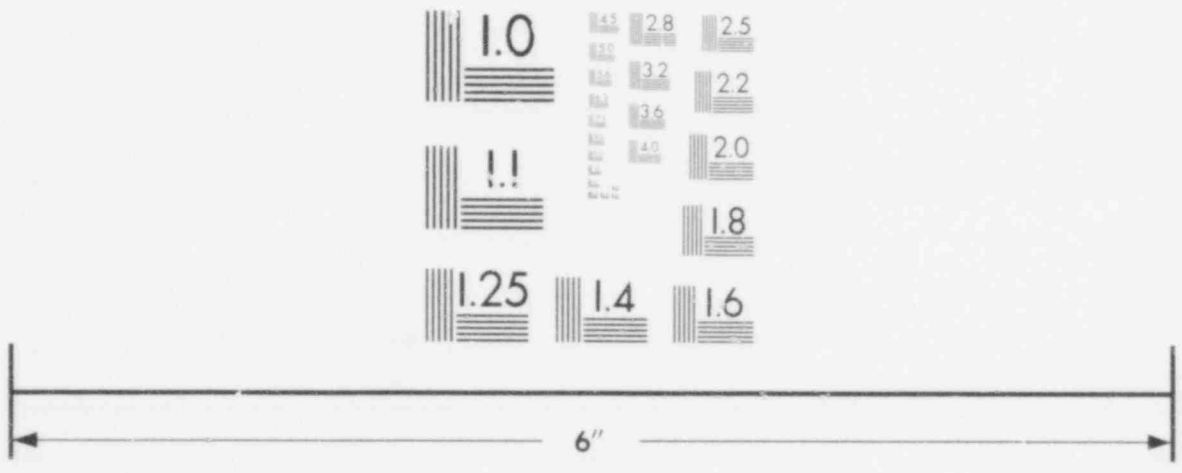
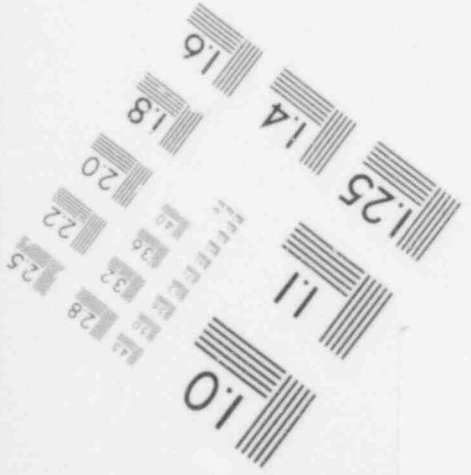
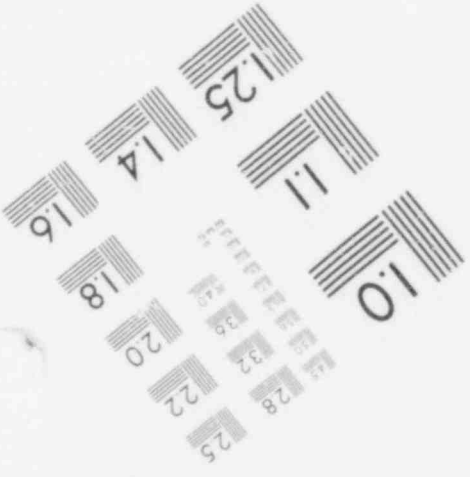
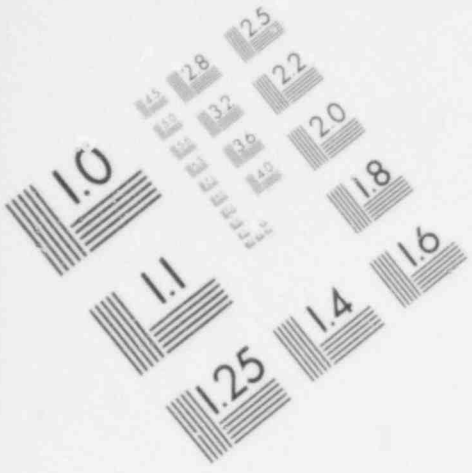


IMAGE EVALUATION
TEST TARGET (MT-3)









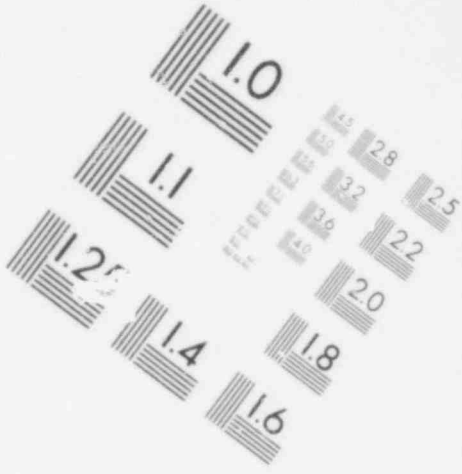
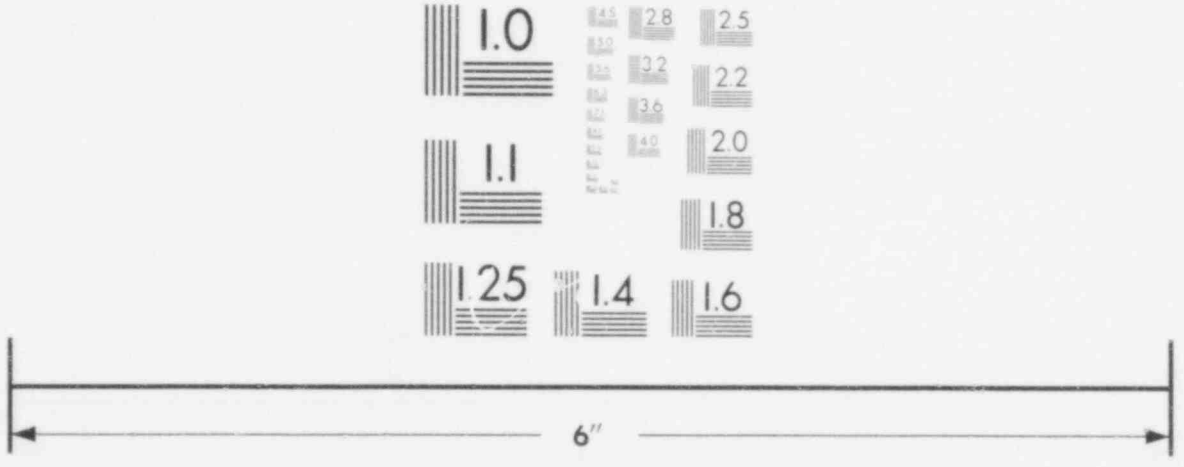
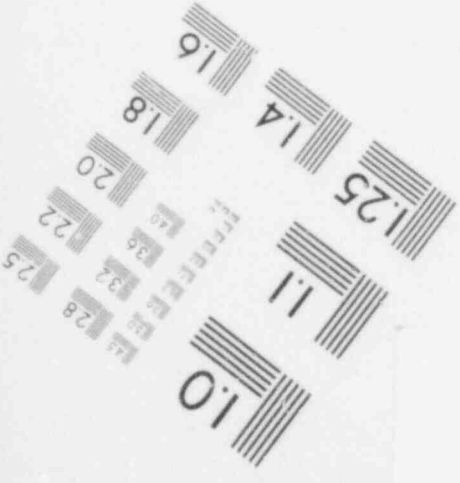


IMAGE EVALUATION
TEST TARGET (MT-3)





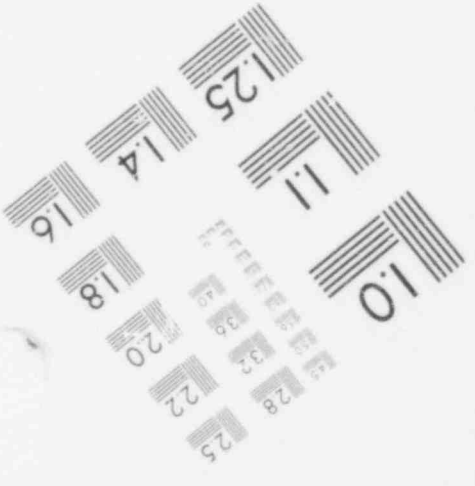
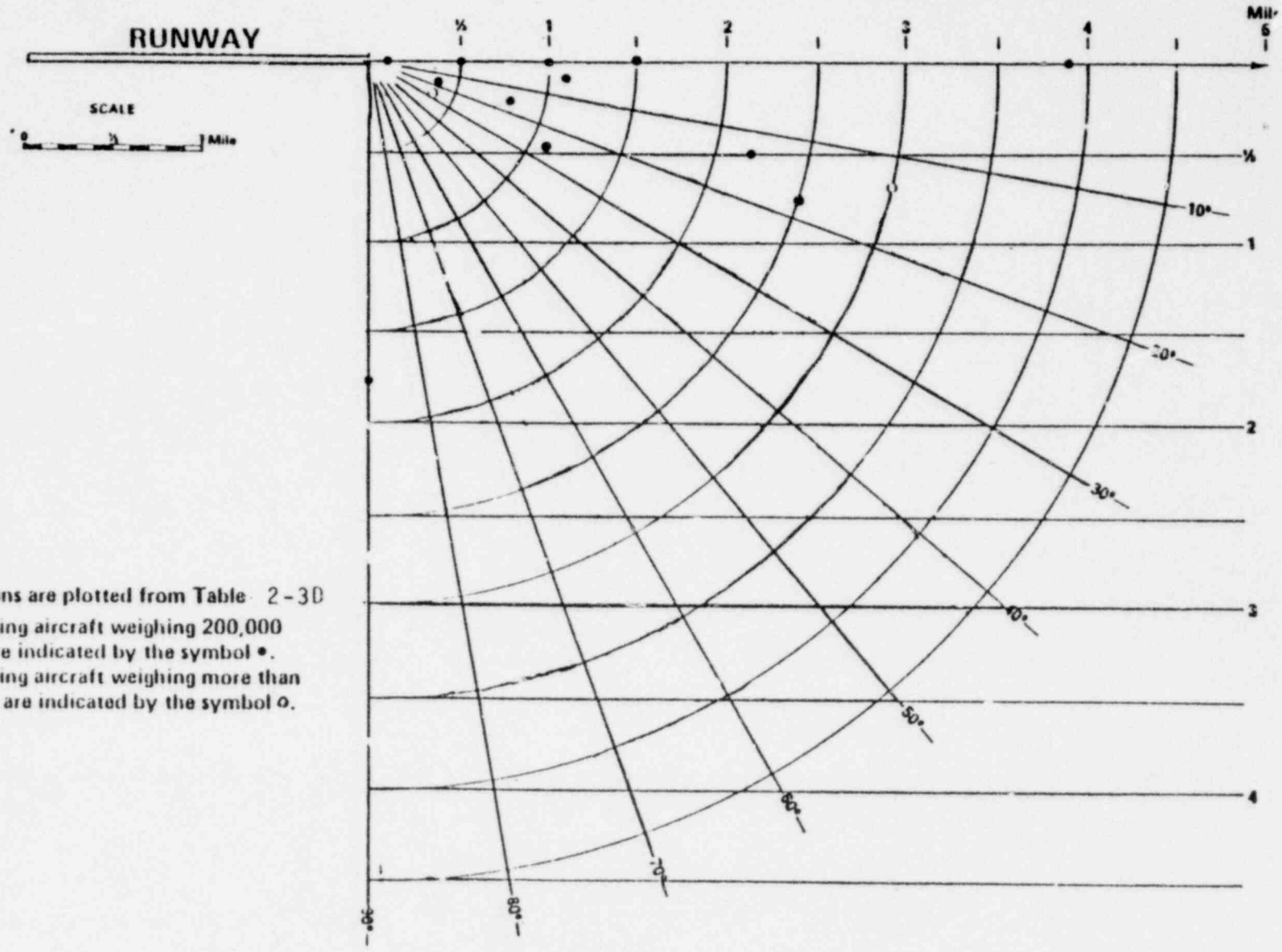


FIGURE 2-5
U.S. AIR CARRIER LANDING ACCIDENTS OF NON-SCHEDULED FLIGHTS
IN THE CONTIGUOUS UNITED STATES
1956 - 1977



NOTES

1. Accident locations are plotted from Table 2-3D
2. Accidents involving aircraft weighing 200,000 pounds or less are indicated by the symbol •. Accidents involving aircraft weighing more than 200,000 pounds are indicated by the symbol o.

Figure 2-6
TAKEOFF DATA FOR ALL ACCIDENTS*

Radial Distance Miles	Radial Distribution in Degrees																		
	0-<5	5-<10	10-<15	15-<20	20-<25	25-<30	30-<35	35-<40	40-<45	45-<50	50-<55	55-<60	60-<65	65-<70	70-<75	75-<80	80-<85	85-<90	90+
0 < 5	1					1T													1T
5 < 1	1									1									1
1 < 1.5	1				2														
1.5 < 2																			
2 < 2.5																			
2.5 < 3										1									1
3 < 3.5						1													
3.5 < 4																			
4 < 4.5	1						1												
4.5 < 5	1																		

T - Training flight.
* - All takeoff accidents off runway from Table 2-3.

Figure 2-7
LANDING DATA FOR ALL ACCIDENTS*

Radial Distance Miles	Radial Distribution in Degrees																		
	0- <5	5- <10	10- <15	15- <20	20- <25	25- <30	30- <35	35- <40	40- <45	45- <50	50- <55	55- <60	60- <65	65- <70	70- <75	75- <80	80- <85	85- <90	90+
0 < 5	6			1	1	1T												1	
5 < 1	5	2		1															
1 < 1.5	3	1				2													1
1.5 < 2	2																		1
2 < 2.5	1	1	1																1
2.5 < 3	1	1		1															
3 . .5		1T																	
3.5 < 4	3																		
4 < 4.5		1																	
4.5 < 5																			

T - Training flight.
*- All landing accidents off runway from Table 2-3.

APPENDIX A

Correspondence with U.S. Air Force concerning
large non-combat aircraft traffic and accidents

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE INSPECTION AND SAFETY CENTER
NORTON AIR FORCE BASE, CALIFORNIA 92409

REPLY TO ATTN OF: SERR

2 AUG 1978

SUBJECT: C-5A Aircraft

TO: United States Nuclear Regulatory Commission
Washington, DC 20555

1. In response to your request of 25 July 1978, attached chart contains information concerning C-5A aircraft destroyed in flight mishaps.

2. There have been over 220,000 takeoffs and approaches since 1968. Of the three destroyed aircraft, only one actually crashed outside the limits of the airfield.

3. Destroyed aircraft mishap rates are based on the number of mishaps per 100,000 flying hours.

4. If we can be of further service, please advise.

Ray C. Hellman

RAY C. HELLMAN
Chief, Reports Branch
Directorate of Aerospace Safety

1 Atch
C-5A Data

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE INSPECTION AND SAFETY CENTER
NORTON AIR FORCE BASE, CALIFORNIA 92409

REPLY TO ATTN OF: SERR

25 AUG 1978

SUBJECT: Request for C-5 Landing Information

RECEIVED
AUG 28 19..
PLG

TO: Pickard, Lowe and Garrick, Inc
ATTN: Mr. John M. Vallance
1200 18th Street, NW, Suite 612
Washington DC 20036

This is in response to your letter of 18 August 1978. Listed below is the number of C-5 landings for the period 1968-June 1978.

1968	12
1969	526
1970	12,153
1971	21,734
1972	19,314
1973	27,362
1974	33,111
1975	29,184
1976	21,913
1977	30,436
1978 (June)	15,575 ← ½ year
TOTAL	211,320

Roger G. Crewse
ROGER G. CREWSE
Chief, Reports & Analysis Division
Directorate of Aerospace Safety

C-5A FLIGHT EXPERIENCE

	Flying Hours		Sorties		Destroyed Acft			
	Year	Cumulative	Year	Cumulative	No.	Rate	Phase of Operation	Remarks
1968	24	24	11	11	0	0.0		
1969	472	496	110	121	0	0.0		
1970	9,680	10,176	2,176	2,297	1	10.3	Taxiing for takeoff.	Fuselage fire.
1971	24,699	34,875	5,331	7,628	0	0.0		
1972	46,735	81,610	10,025	17,653	0	0.0		
1973	49,656	131,266	11,030	28,683	0	0.0		
1974	50,263	181,529	10,565	39,248	1	2.0	Landing roll.	Short runway.
1975	45,601	227,130	9,759	49,007	1	2.2	Final approach.	Impact 2NM from runw
1976	40,946	268,076	8,501	57,508	0	0.0		
1977	49,289	317,365	9,602	67,110	0	0.0		
Jun 1978 (est.)	24,795	342,160	5,122	72,232	0	0.0		

E-4A AIRCRAFT
1974 - 31 July 1978

	FLYING HOURS		SORTIES		LANDINGS		DESTROYED AIRCRAFT	
	YEAR	CUMULATIVE	YEAR	CUMULATIVE	YEAR	CUMULATIVE	NUMBER	RATE*
1974	66	66	15	15	107	107	0	0
1975	1,274	1,340	311	326	1,856	1,963	0	0
1976	865	2,205	262	588	948	2,911	0	0
1977	1,276	3,481	313	901	1,021	3,932	0	0
1978	1,143	4,624	260	1,161	797	4,729	0	0

*Rates based on number of accidents per 100,000 flying hours.

C-141 AIRCRAFT
1968 - 31 July 1978

	FLYING HOURS		SORTIES		LANDINGS		DESTROYED AIRCRAFT		PHASE OF OPERATION	REMARKS
	YEAR	CUMULATIVE	YEAR	CUMULATIVE	YEAR	CUMULATIVE	NUMBER	RATE*		
68	672,627	672,627	163,439	163,439	244,166	244,166	0	0		
69	642,291	1,314,918	208,654	372,093	253,917	498,083	0	0		
70	612,518	1,927,436	147,265	519,358	251,790	749,873	0	0		
71	487,929	2,415,365	125,318	644,676	235,288	985,161	0	0		
72	471,440	2,886,805	121,151	765,827	213,995	1,199,156	0	0		
73	362,532	3,249,337	97,014	862,841	181,814	1,380,970	1	0.3	Descent; landing approach	Impact 22.5 NM northeast of arpt
74	286,377	3,535,714	78,500	941,341	177,351	1,558,321	1	0.3	Enroute descent	Struck high mountain
75	314,771	3,850,485	85,134	1,026,475	169,149	1,727,470	1	0.3	Enroute descent	Struck high mountain
76	281,622	4,132,107	77,981	1,104,456	153,365	1,880,835	2	0.7	Final approach Landing roll	Impact 22.5 NM east of airport Departed side of runway and burned
77	299,191	4,431,298	83,461	1,187,971	171,598	2,052,433	0	0		
78	169,579	4,600,877	47,515	1,235,432	99,226	2,151,659	0	0		

ates based on number of accidents per 100,000 flying hours.

APPENDIX B

Briefs of accidents and incidents involving foreign registered air carriers within the U.S.

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20594

BRIEFS OF ACCIDENTS/INCIDENTS INVOLVING

FOREIGN REGISTERED AIR CARRIERS WHERE

ACCIDENTS/INCIDENTS OCCURRED ON U. S. SOIL

1962 THRU 1977

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	8/13/64 TIME - 1952	NEW YORK NY	BOEING 707 328 FBHSQ DAMAGE-SUBSTANTIAL	CR- 0 0 10 PX- 0 0 151	SCHED DOM PASSG SRV	AIRLINE TRANSPORT, AGE 56, 19894 TOTAL HOURS, 2057 IN TYPE, INSTRUMENT RATED.
	NAME OF AIRPORT - JOHN F KENNEDY OPERATOR - AIR FRANCE TYPE OF ACCIDENT COLLIDED WITH DITCHES			PHASE OF OPERATION TAXI FROM LANDING		
C-0002	11/11/64 TIME - 1830	JAMAICA NY	BOEING 707 GAPFH DAMAGE-NONE	CR- 1 0 9 PX- 0 0 51	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE 50, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.
	OPERATOR - BRITISH AIRWAYS TYPE OF ACCIDENT MISCELLANEOUS			PHASE OF OPERATION TAXI FROM LANDING		

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	12/25/65 TIME - 1311	SAN FRANCISCO,CAL	DOUGLAS DC-8 JA-8006 DAMAGE-SUBSTANTIAL	CR- 0 0 10 PX- 0 0 31	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 40, 8031 TOTAL HOURS, 909 IN TYPE, INSTRUMENT RATED.

OPERATOR - JAPAN AIRLINES

TYPE OF ACCIDENT	PHASE OF OPERATION
ENGINE FAILURE OR MALFUNCTION	IN FLIGHT CLIMB TO CRUISE
FIRE OR EXPLOSION IN FLIGHT	IN FLIGHT CLIMB TO CRUISE

PROBABLE CAUSE(S)
POWERPLANT - COMPRESSOR ASSEMBLY OTHER
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY INSTALLED
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION IMPROPER MAINTENANCE (MAINTENANCE PERSONNEL)
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE INSPECTION OF AIRCRAFT (MAINTENANCE PERSONNEL)
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - FIRE IN ENGINE
PLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
GENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
ARKS- NO.1 ENG LOW PRESSURE COMPRESSOR SECTION TORQUE RING FAILED,IMPROPERLY SECURED DURING ENG OVERHAUL

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	2/13/65 TIME - 0420	MIAMI,FLA	CURTISS C-46A YS-012C DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 45, 14606 TOTAL HOURS, 2353 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER

TYPE OF ACCIDENT	PHASE OF OPERATION
ENGINE FAILURE OR MALFUNCTION	TAKEOFF INITIAL CLIMB
COLLISION WITH GROUND/WATER CONTROLLED	TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
POWERPLANT - ENGINE STRUCTURE CRANKSHAFT
MISCELLANEOUS ACTS,CONDITIONS - FATIGUE FRACTURE
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE MAINTENANCE AND INSPECTION
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
FIRE AFTER IMPACT
REMARKS- AEROLINAS EL SALVADORE S.A.CARGO FLT. FAILURE OFL.PROP.TO FEATHER,PROBABLY,DUE OIL CONTAMINATION

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	3/10/66 TIME - 1714	REEF ISLAND ALAS.	GRUMMAN G-21A CF-MSK DAMAGE-DESTROYED	CR- 0 0 1 PX- 6 0 0	SCHED DOM PASSG SRV	AIRLINE TRANSPORT, AGE 41, 12719 TOTAL HOURS, 246 IN TYPE, NOT INSTRUMENT RATED.

OPERATOR - OTHER-FOREIGN FLAG CARRIER

TYPE OF ACCIDENT
- UNDERSHOOT
- COLLIDED WITH WIRES/POLES

PHASE OF OPERATION
- LANDING FINAL APPROACH
- LANDING FINAL APPROACH

PROBABLE CAUSE(S)
- PILOT IN COMMAND - CONTINUED VFR FLIGHT INTO ADVERSE WEATHER CONDITIONS
- PILOT IN COMMAND - MISJUDGED ALTITUDE AND CLEARANCE

FACTOR(S)
- WEATHER - LOW CEILING
- WEATHER - SNOW
- WEATHER - UNFAVORABLE WIND CONDITIONS
- WEATHER - DOWNDRAFT,UPDRAFTS
- MISCELLANEOUS ACTS,CONDITIONS - FAILED TO EXTEND THE LANDING FLAPS

WEATHER BRIEFING - BRIEFING RECEIVED-METHOD UNKNOWN
WEATHER FORECAST - FORECAST SUBSTANTIALLY CORRECT
MISSING AIRCRAFT - LATER RECOVERED
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING OFF AIRPORT
ADVERSE/UNFAVORABLE WEATHER

SKY CONDITION
- OVERCAST

CEILING AT ACCIDENT SITE
- 200

VISIBILITY AT ACCIDENT SITE
- 1/2 MILE OR LESS

PRECIPITATION AT ACCIDENT SITE
- SNOW

OBSTRUCTIONS TO VISION AT ACCIDENT SITE
- BLOWING SNOW

TEMPERATURE-F
- 34

WIND DIRECTION-DEGREES
- 135

WIND VELOCITY-KNOTS
- 35

TYPE OF WEATHER CONDITIONS
- IFR

TYPE OF FLIGHT PLAN
- VFR

REMARKS- RECOVERY DATE-03/11/66.AIRCRAFT SANK IN PORTLAND CANAL. CANADIAN REGISTRY.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	11/21/67 TIME - 1315	HONOLULU,HAWAII	BOEING 707 G-ARWE DAMAGE-SUBSTANTIAL	CR- 0 0 11 PX- 0 0 41	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 2, 11728 TOTAL HOURS, 1107 IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - HONOLULU INTL.
OPERATOR - BRITISH AIRWAYS

TYPE OF ACCIDENT
- ENGINE FAILURE OR MALFUNCTION
- FIRE OR EXPLOSION ON GROUND

PHASE OF OPERATION
- TAKEOFF RUN
- TAKEOFF ABORTED

PROBABLE CAUSE(S)
- POWERPLANT - TURBINE ASSEMBLY BEARING,SHAFT
- POWERPLANT - TURBINE ASSEMBLY WHEEL TURBINE
- MISCELLANEOUS ACTS-CONDITIONS - MATERIAL FAILURE

COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
REMARKS- FAILURE OF MAIN THRUST BEARING CAUSED DISINTEGRATION OF NO.1 LOW PRESSURE TURBINE DISC ON NO.4 ENG

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	1/3/68 TIME - 2125	NR.NEW ORLEANS,LA	DOUGLAS DC-6B HR-SAO DAMAGE-SUBSTANTIAL	CR- 0 0 6 PX- 0 0 76	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 33, 9420 TOTAL HOURS, 560 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MOISANT INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
TYPE OF ACCIDENT
COLLIDED WITH TREES
PHASE OF OPERATION
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER IFR OPERATION
FACTOR(S)
WEATHER - LOW CEILING
WEATHER - FOG
MISCELLANEOUS ACTS,CONDITIONS - NOT ALIGNED WITH RUNWAY/INTENDED LANDING AREA
WEATHER BRIEFING - COMPANY DISPATCH
WEATHER FORECAST - FORECAST SUBSTANTIALLY CORRECT

SKY CONDITION
OBSCURATION
CEILING AT ACCIDENT SITE
200
VISIBILITY AT ACCIDENT SITE
1/4 MILE OR LESS
PRECIPITATION AT ACCIDENT SITE
NONE
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
FOG
TEMPERATURE-F
68
WIND DIRECTION-DEGREES
200
WIND VELOCITY-KNOTS
10
TYPE OF WEATHER CONDITIONS
IFR
TYPE OF FLIGHT PLAN
IFR
REMARKS- PLT DESCENDED BELOW GLIDE SLOPE TO RT OF CENTERLINE.SUCCESSFUL PULLUP AND LNDG.NO RECEIVER ILS TRNG.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	11/22/68 TIME - 0124	S.FRANCISCO,CALIF	DOUGLAS DC-8 JA8032 DAMAGE-SUBSTANTIAL	CR- 0 0 11 PX- 0 0 96	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 46, 9795 TOTAL HOURS, 1062 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - S.FRANCISCO INTL
OPERATOR - JAPAN AIRLINES
DEPARTURE POINT
TOKYO,JAPAN
INTENDED DESTINATION
S.FRANCISCO,CALIF
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
LANDING INITIAL APPROACH

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER IFR OPERATION
PILOT IN COMMAND - FAILED TO USE OR INCORRECTLY USED MISC.EQUIPMENT
REMARKS- IMPROP APPLICATION OF PRO TO EXECUTE AUTO-COUPLED ILS APCH.LACK FAMIL.INFROT OPNS FLT DIR-AUTO-PLT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	6/13/68 TIME - 0510	MIAMI,FLA	DOUGLAS C-54B HC-ANL DAMAGE-SUBSTANTIAL	CR- 0 0 3 PX- 0 0 0	SCHED INTERNATL CARGO SRV	CERTIFICATE OTHER, AGE 39, 9300 TOTAL HOURS, 2400 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI
OPERATOR - OTHER-FOREIGN FLAG CARRIER
TYPE OF ACCIDENT
GEAR COLLAPSED
PHASE OF OPERATION
LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
AIRFRAME - LANDING GEAR MAIN GEAR-SHOCK ABSORBING ASSY,STRUTS,ATTACHMENTS,ETC.
MISCELLANEOUS ACTS,CONDITIONS - PREVIOUS DAMAGE
FACTOR(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
SUSPECTED OR KNOWN AIRCRAFT DAMAGE
UNUSUAL NOISE
REMARKS- GR WOULD NOT RETRACT ON PREVIOUS T/O. RT GR RETRACT LATCH FAILED,ALLOWED ACTUATING ROD TO SEPARATE

A-0004	11/21/68 TIME - 1112	MIAMI,FLA	CURTIS C C-46 HP-344 DAMAGE-SUBSTANTIAL	CR- 0 0 2 PX- 0 0 0	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 46, 11298 TOTAL HOURS, 1510 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
MIAMI,FLA
INTENDED DESTINATION
SNTIAGO,DOM REPUBLIC
TYPE OF ACCIDENT
STALL MUSH
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
PILOT IN COMMAND - PREMATURE LIFT-OFF
REMARKS- HEAVILY LOADED. DOMINICAN REGISTRY.

C-0001	12/10/68 TIME - 1800	JFK INTL,NY	BOEING 707 EI-APG DAMAGE-MINOR	CR- 0 0 11 PX- 0 0 50	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE ?, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL.
OPERATOR - IRISH
TYPE OF ACCIDENT
COLLIDED WITH PARKED AIRCRAFT
PHASE OF OPERATION
TAXI FROM LANDING

REMARKS- HIT TWA BOEING 707 N760TW.MINOR L WING TIP DMGE.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES	FLIGHT PURPOSE	PILOT DATA
A-0002	6/23/69 TIME - 1442	MIAMI,FLA	DOUGLAS C-54D HI-168 DAMAGE-DESTROYED	CR- 3 0 0 PX- 1 0 0 OT- 6 1 11	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 42, 13736 TOTAL HOURS, 500 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
MIAMI,FLA
INTENDED DESTINATION
SANTA DOMINGO,DOMINI
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
COLLIDED WITH BUILDING(S)
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB
LANDING TRAFFIC PATTERN-CIRCLING

PROBABLE CAUSE(S)
MISC-CONFUSED ACTION BY CREW FOLLOWING ENG FAILURE
PILOT IN COMMAND - SPONTANEOUS-IMPROPER ACTION
MISCELLANEOUS ACTS,CONDITIONS - IMPROPER EMERGENCY PROCEDURES
MISCELLANEOUS ACTS,CONDITIONS - FEATHERED WRONG ENGINE
POWERPLANT - ENGINE STRUCTURE OTHER
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
MISCELLANEOUS ACTS,CONDITIONS - FAILURE OF TWO OR MORE ENGINES
FACTOR(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY LOADED AIRCRAFT-WEIGHT-AND/OR C.G.
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-2 ENGINES
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON LAND
FIRE AFTER IMPACT
REMARKS- NR 2 ENG FAILED,CREW FEATH NR 4,OVR MAX GROSS WT

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES	FLIGHT PURPOSE	PILOT DATA
A-0003	4/13/69 TIME - 1945	E BOSTON,MASS	DOUGLAS DC-8 I-DIWM DAMAGE-NONE	CR- 0 0 12 PX- 0 1 96	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 49, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LOGAN
OPERATOR - ALITALIA
TYPE OF ACCIDENT
MISCELLANEOUS
PHASE OF OPERATION
STATIC PARKED-ENGINES NOT OPERATING

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL PASSENGER
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
REMARKS- FLT DIVERTED TO BOSTON DUE TO REPORTED BOMB ON ACFT. PX FELL WHILE EVACUATING ACFT BY CHUTE.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0004	6/24/69 TIME - 1603	MOSES LAKE,WASH	CONVAIR 880 JA-8028 DAMAGE-DESTROYED	CR- 3 2 0 PX- 0 0 0	TRAINING	CERTIFICATE OTHER, AGE 37, 7639 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - GRANT COUNTY
OPERATOR - JAPAN AIRLINES
DEPARTURE POINT
MOSES LAKE,WASH
INTENDED DESTINATION
LOCAL
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
COLLISION WITH GROUND/WATER UNCONTROLLED
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB
TAKEOFF ABORTED

PROBABLE CAUSE(S)
MISCELLANEOUS ACTS,CONDITIONS - SIMULATED CONDITIONS
PILOT IN COMMAND - FAILED TO MAINTAIN DIRECTIONAL CONTROL
PILOT IN COMMAND - INADEQUATE SUPERVISION OF FLIGHT
FIRE AFTER IMPACT
REMARKS- DELAYED CORRECTIVE ACTION DURING SIMULATED NR 4 ENG OUT, CAUSED EXCESSIVE SIDESLIP.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	4/14/70 TIME - 0724	MIAMI,FLA	DOUGLAS C-54D HC-AON DAMAGE-DESTROYED	CR- 2 0 0 PX- 0 0 0	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 39, 3053 TOTAL HOURS, 318 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL.
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
MIAMI,FLA
INTENDED DESTINATION
QUITO,ECUADOR
LAST ENROUTE STOP
PANAMA CITY,PANAMA
TYPE OF ACCIDENT
COLLISION WITH GROUND/WATER CONTROLLED
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER IFR OPERATION
FACTOR(S)
WEATHER - LOW CEILING
WEATHER - FOG
WEATHER BRIEFING - UNKNOWN/NOT REPORTED
WEATHER FORECAST - FORECAST SUBSTANTIALLY CORRECT

SKY CONDITION
OBSCURATION
CEILING AT ACCIDENT SITE
100
VISIBILITY AT ACCIDENT SITE
1/4 MILE OR LESS
PRECIPITATION AT ACCIDENT SITE
FREEZING DRIZZLE
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
FOG
WIND DIRECTION-DEGREES
300
WIND VELOCITY-KNOTS
5
TYPE OF WEATHER CONDITIONS
IFR
TYPE OF FLIGHT PLAN
IFR
FIRE AFTER IMPACT
REMARKS- COMPANIA ECUATORIANA DE AVIACION. IMPROPER MONITORING OF FLT INSTRUMENTS DURING TKOF IN IMC.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	4/30/70 TIME - 0807	JAMAICA,NY	CANADAIR CL44J TF-LLI DAMAGE-SUBSTANTIAL	CR- 0 0 11 PX- 0 0190	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, 7015 TOTAL HOURS, 3165 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - J F KENNEDY
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: KEFLAVIK,ICELAND
INTENDED DESTINATION: JAMAICA,NY
TYPE OF ACCIDENT: GEAR COLLAPSED
PHASE OF OPERATION: LANDING ROLL

PROBABLE CAUSE(S)
AIRFRAME - LANDING GEAR MAIN GEAR-SHOCK ABSORBING ASSY,STRUTS,ATTACHMENTS,ETC.
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
REMARKS- L MAIN LDG GR ATTACH BRACKETS FAILED IN LUGS FOR UPPER AND LOWER MOUNT BOLTS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	9/15/70 TIME - 1221	JAMAICA,NY	DOUGLAS DC-8 I-DIWZ DAMAGE-DESTROYED	CR- 0 0 10 PX- 0 11135	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 42, 13310 TOTAL HOURS, 1362 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL
OPERATOR - ALITALIA
DEPARTURE POINT: ROME,ITALY
INTENDED DESTINATION: JAMAICA,NY
TYPE OF ACCIDENT: HARD LANDING; GEAR COLLAPSED
PHASE OF OPERATION: LANDING LEVEL OFF/TOUCHDOWN; LANDING ROLL

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
PILOT IN COMMAND - IMPROPER OPERATION OF POWERPLANT & POWERPLANT CONTROLS
FACTOR(S)
PERSONNEL - TRAFFIC CONTROL PERSONNEL OTHER
PILOT IN COMMAND - FAILED TO INITIATE GO-AROUND
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- USED REVERSE THRUST IN FLT.ATC POSITIONED ACFT TOO HI AND TOO CLOSE TO RWY,NO GLIDE SLOPE ILS APCH

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0004	7/19/70 TIME - 2235	SEATTLE,WASH	DOUGLAS DC-8 OYKTF DAMAGE-SUBSTANTIAL	CR- 0 0 9 PX- 0 0139	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, 12947 TOTAL HOURS, 1769 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - SEATTLE-TACOMA
OPERATOR - SAS
DEPARTURE POINT: LOS ANGELES,CALIF
INTENDED DESTINATION: OSLO,NORWAY
LAST ENROUTE STOP: SEATTLE,WASH
TYPE OF ACCIDENT: COLLIDED WITH PARKED AIRCRAFT
PHASE OF OPERATION: TAXI FROM LANDING

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL GROUND SIGNALMAN
MISCELLANEOUS ACTS,CONDITIONS - CONGESTED RAMP/TAXIWAY
REMARKS- L WING MAN GAVE SAS MARSHALLER WAVE-OFF ABT TIME L WING HIT R WING OF N8636. ACFT TAXI LTS ON.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	8/17/70 TIME - 2235	NR.ST.JEAN,PQ CANADA	BOEING 747 F-BPVD DAMAGE-MINOR	CR- 0 0 17 PX- 0 0176	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

OPERATOR - AIR FRANCE
DEPARTURE POINT
CHICAGO,ILL
INTENDED DESTINATION
PARIS,FRANCE
LAST ENROUTE STOP
MONTREAL P.Q.CANADA
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
PHASE OF OPERATION
IN FLIGHT CLIMB TO CRUISE

PROBABLE CAUSE(S)
POWERPLANT - TURBINE ASSEMBLY OTHER
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
PERSONNEL - PRODUCTION-DESIGN-PERSONNEL INCORRECT FACTORY INSTALLATION
PARTIAL POWER LOSS - PARTIAL LOSS OF POWER - 1 ENGINE
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
REMARKS- IN-FLT SEPN 2ND STAGE TURBINE DISK RIM NR 3 ENG AS RESULT OF INCOR ASSY OF HI-PRES TURBINE MODULE.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0002	8/26/70 TIME - 0852	BOSTON,MASS	BOEING 747 G-AWNA DAMAGE-MINOR	CR- 0 0 9 PX- 0 0 15	TRAINING	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - LOGAN INTL
OPERATOR - BRITISH AIRWAYS
DEPARTURE POINT
LONDON,ENGLAND
INTENDED DESTINATION
JFK INTL,NY
LAST ENROUTE STOP
BOSTON,MASS
TYPE OF ACCIDENT
MISCELLANEOUS
PHASE OF OPERATION
UNKNOWN/NOT REPORTED

REMARKS- BOTH INBD FLAP TRACK FAIRINGS DMGD AT UNDET TIME. AFT FLAP TRACK MECHANISM JUMPED TRACK.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0003	8/25/70 TIME - 2052	NR.JAMAICA,NY	BOEING 747 F-BPVC DAMAGE-NONE	CR- 0 0 17 PX- 0 0367	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL
OPERATOR - AIR FRANCE
DEPARTURE POINT
JAMAICA,NY
INTENDED DESTINATION
MONTREAL CAN
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
PHASE OF OPERATION
IN FLIGHT CLIMB TO CRUISE

EMERGENCY CIRCUMSTANCES - FORCED LANDING ON AIRPORT/SEAPLANE BASE/HELIPT.
REMARKS- FIRE WRNG NR 2 ENG.CREW ACCIDENTALLY CLOSED NR 1 ENG START LEVER,CAUSED COMPRESSOR STALL.LND OK.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0004	10/2/70 TIME - 1111	NR,VENTURA,CALIF	BOEING 747 JAB103 DAMAGE-NONE	CR- 0 0 21 PX- 0 0156	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE UNK/NR, 10754 TOTAL HOURS, 208 IN TYPE, UNK/NR INSTRUMENT RATED.
	OPERATOR - [illegible] AIRLINES DEPARTURE POINT LOS ANGELES,CALIF TYPE OF ACCIDENT FIRE OR EXPLOSION IN FLIGHT		INTENDED DESTINATION HONOLULU,HAWAII		PHASE OF OPERATION IN FLIGHT CLIMB TO CRUISE	
	PROBABLE CAUSE(S) PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE MAINTENANCE AND INSPECTION FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - FIRE IN ENGINE EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT REMARKS- BOEING SV BUL 71-201R NOT COMPLIED WITH,COMBUSTION CHAMBER DRAIN FITTING MISALIGNED WITH COWL PORT					
C-0005	6/9/70 TIME - 2121	NR,NANTUCKET,MASS	BOEING 707 F-BNSF DAMAGE-NONE	CR- 0 0 10 PX- 0 0146	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.
	OPERATOR - AIR FRANCE DEPARTURE POINT JAMAICA,NY TYPE OF ACCIDENT ENGINE FAILURE OR MALFUNCTION		INTENDED DESTINATION PARIS,FRANCE		PHASE OF OPERATION IN FLIGHT NORMAL CRUISE	
	COMPLETE POWER LOSS - UNKNOWN/NOT REPORTED REMARKS- NR 1 ENG FAILED,ENG RETURNED TO TWA,KANSAS CITY FOR TEARDOWN AND INSP.					
A-0001	8/30/71 TIME - 0746	FT.LAUDERDALE,FLA	CONVAIR 440 TI-1086C DAMAGE-SUBSTANTIAL	CR- 0 0 3 PX- 0 0 2	TRAINING	AIRLINE TRANSPORT, AGE 63, 14000 TOTAL HOURS, 645 IN TYPE, INSTRUMENT RATED.
	NAME OF AIRPORT - FT.LAUDERDALE OPERATOR - OTHER-FOREIGN FLAG CARRIER DEPARTURE POINT FT.LAUDERDALE,FLA TYPE OF ACCIDENT GROUND-WATER LOOP-SWERVE GEAR COLLAPSED		INTENDED DESTINATION LOCAL		PHASE OF OPERATION TAKEOFF RUN TAKEOFF ABORTED	
	PROBABLE CAUSE(S) DUAL STUDENT - IMPROPER OPERATION OF BRAKES AND/OR FLIGHT CONTROLS PILOT IN COMMAND - INADEQUATE SUPERVISION OF FLIGHT FACTOR(S) MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE AIRPORTS/AIRWAYS/FACILITIES - AIRPORT CONDITIONS SOFT SHOULDERS REMARKS- STUDENT PLTS FIRST T/O IN TYPE ACFT.					

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	4/13/71 TIME - 1615	BOSTON,MASS	DOUGLAS DC-8 XASIA DAMAGE-MINOR	CR- 0 0 8 PX- 0 0 0	FERRY	CERTIFICATE OTHER, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

OPERATOR - AERONAVES
DEPARTURE POINT — INTENDED DESTINATION
BOSTON,MASS — PHILADELPHIA,PA
TYPE OF ACCIDENT — PHASE OF OPERATION
ENGINE FAILURE OR MALFUNCTION — IN FLIGHT CLIMB TO CRUISE
FIRE OR EXPLOSION IN FLIGHT — IN FLIGHT CLIMB TO CRUISE

PROBABLE CAUSE(S)
POWERPLANT - MISCELLANEOUS POWERPLANT FAILURE FOR UNDETERMINED REASONS
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - DUMPED FUEL
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
SUSPECTED OR KNOWN AIRCRAFT DAMAGE
REMARKS- FIRE IN NR1 ENG SN 0A465625. NO ENG TEAR DOWN REPORT RECD. NO ENG MAKE/MODEL INFO.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0002	4/7/71 TIME - 2128	JAMAICA,NY	BOEING 707 VT-DPM DAMAGE-NONE	CR- 0 0 10 PX- 0 0 99	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

OPERATOR - AIR INDIA
DEPARTURE POINT — INTENDED DESTINATION
JAMAICA,NY — LONDON,ENGLAND
TYPE OF ACCIDENT — PHASE OF OPERATION
MISCELLANEOUS — TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
SYSTEMS - FLIGHT CONTROL SYSTEMS RUDDER AND RUDDER TAB CONTROL SYSTEM
MISCELLANEOUS ACTS,CONDITIONS - SHEARED
EMERGENCY CIRCUMSTANCES - PRECAUTIONARY LANDING ON AIRPORT
DIRECTIONAL CONTROL PROBLEM
REMARKS- SHAFT,PN69-50237-1,IN RUDDER POWER GEAR BOX SHEARED,AIR INDIA REPORTED LUBRICANT WAS DRY AND HARD.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0003	6/12/71 TIME - 0035	JAMAICA,NY	BOEING 707 4XATS DAMAGE-MINOR	CR- 0 0 10 PX- 0 0150	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, 9000 TOTAL HOURS, 5000 IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL
OPERATOR - EL AL
DEPARTURE POINT — INTENDED DESTINATION
JAMAICA,NY — LONDON,ENGLAND
TYPE OF ACCIDENT — PHASE OF OPERATION
COLLIDED WITH AUTOMOBILE — TAXI TO TAKEOFF

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL DRIVER OF VEHICLE
FACTOR(S)
PERSONNEL - AIRPORT SUPERVISORY PERSONNEL IMPROPER OPERATION OF FACILITIES
REMARKS- R WG TIP HIT IMPROPERLY PARKED TRUCK. SIGNS OR MARKINGS PROHIBITING VEHICLES IN AREA NON EXISTENT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	8/13/72 TIME - 0050	JAMAICA,NY	BOEING 707 YU-AGA DAMAGE-SUBSTANTIAL	CR- 0 0 11 PX- 0 0 175	NS/CTR REVENUE PASSG INTL	AIRLINE TRANSPORT, AGE 53, 14943 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: JAMAICA,NY
INTENDED DESTINATION: RIJEKA,YUGOSLAVIA
TYPE OF ACCIDENT: COLLIDED WITH FENCE,FENCEPOSTS
PHASE OF OPERATION: TAKEOFF ABORTED

PROBABLE CAUSE(S)
AIRFRAME - LANDING GEAR BRAKING SYSTEM (NORMAL SYSTEM)
FACTOR(S)
AIRFRAME - FUSELAGE WINDSHIELDS,WINDOWS,CANOPIES
FIRE AFTER IMPACT
REMARKS- C/P WNDW,OUT OF ADJUSTMNT,OPENED,SOUNDED LIKE EXPSN.2 BRAKES INEFF DUE MALF RELAY,HIT BLAST FENCE.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	10/5/72 TIME - 0814	MIAMI,FLA	CURTISS WRT C-46A HK-851 DAMAGE-SUBSTANTIAL	CR- 0 0 2 PX- 0 0 0	SCHED INTERNATL CARGO SRV	CERTIFICATE OTHER, AGE 42, 9000 TOTAL HOURS, 4500 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: MIAMI,FLA
INTENDED DESTINATION: BARRANQUILLA,COLUMB
TYPE OF ACCIDENT: ENGINE FAILURE OR MALFUNCTION; PROPELLER/ROTOR FAILURE PROPELLER
PHASE OF OPERATION: TAKEOFF INITIAL CLIMB; LANDING FINAL APPROACH

PROBABLE CAUSE(S)
POWERPLANT - ENGINE STRUCTURE OTHER
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
MISCELLANEOUS ACTS,CONDITIONS - IMPROPER EMERGENCY PROCEDURES
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - SEPARATION IN FLIGHT
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING ON AIRPORT/SEAPLANE BASE/HELIPT.
REMARKS- L ENG FAILED INTERNALLY-PLT DIDNT FEATH PROP,ENG SEIZED AND PROP SEPARATED,DMGD ACFT,LND OK.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	11/1/72 TIME - 1057	ANCHORAGE,ALAS	BOEING 747 JAB107 DAMAGE-SUBSTANTIAL	CR- 0 0 20 PX- 0 0261	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 36, 8139 TOTAL HOURS, 1312 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - ANCHORAGE INTL
OPERATOR - JAPAN AIRLINES
DEPARTURE POINT: TOKYO,JAPAN
INTENDED DESTINATION: HAMBURG,GERMANY
LAST ENROUTE STOP: ANCHORAGE,ALAS
TYPE OF ACCIDENT: WHEELS-UP
PHASE OF OPERATION: LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO ASSURE THE GEAR WAS DOWN AND LOCKED
FACTOR(S)
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
AIRFRAME - LANDING GEAR NORMAL RETRACTION/EXTENSION ASSEMBLY
REMARKS- NOSE GR DIDNT EXTEND FOR UNDET REASON,WRNG HORN SOUNDED,GR UNSAFE LTS ON,DIDNT USE EMERG GR SYS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	7/2/72 TIME - 2014	FA,BOSTON,MASS	DOUGLAS DC-8 HB-IDG DAMAGE-MINOR	CR- 0 0 12 PX- 0 0142	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - LOGAN INTL
OPERATOR - SWISS AIR
DEPARTURE POINT: FA,BOSTON,MASS
INTENDED DESTINATION: LUCERNE,SWITZERLAND
TYPE OF ACCIDENT: MISCELLANEOUS; FIRE OR EXPLOSION ON GROUND
PHASE OF OPERATION: TAKEOFF RUN; TAKEOFF ABORTED

PROBABLE CAUSE(S)
AIRFRAME - LANDING GEAR WHEELS,TIRES,AXLES
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
MISCELLANEOUS ACTS,CONDITIONS - FIRE IN BRAKES,WHEEL ASSEMBLY,WHEEL WELL
REMARKS- R MLG REAR TIRES FAILED. FRICTION CAUSED FIRE. DMGD R INBD FLAP AND BELLY.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0002	4/9/72 TIME - 0046	JAMAICA,NY	BOEING 707 AP-AVN DAMAGE-MINOR	CR- 0 0 12 PX- 0 0 24 OT- 0 0 2	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 41, 13000 TOTAL HOURS, 5500 IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: JAMAICA,NY
INTENDED DESTINATION: LONDON,ENGLAND
TYPE OF ACCIDENT: COLLIDED WITH AUTOMOBILE
PHASE OF OPERATION: TAXI TO TAKEOFF

PROBABLE CAUSE(S)
PILOT IN COMMAND - SELECTED UNSUITABLE TERRAIN
FACTOR(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL DRIVER OF VEHICLE
MISCELLANEOUS ACTS,CONDITIONS - INSTRUCTIONS-MISINTERPRETED
REMARKS- DEP GATE,TURNED L ONTO VEHICLE SERVICE ROAD AND HIT IMPROPERLY PRKD TRUCK,PLT UNFAMILIAR WITH JFK.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	5/1/73 TIME - 1207	ST.CROIX,VI	HAWKER-SDLY HS748 VP-LIK DAMAGE-SUBSTANTIAL	CR- 0 0 5 PX- 0 0 15	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 26, 3158 TOTAL HOURS, 2907 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - ALEXANDER HAMILTO
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
ANTIGUA,BWI
INTENDED DESTINATION
ST.CROIX,VI
LAST ENROUTE STOP
ST.THOMAS,VI
TYPE OF ACCIDENT
HARD LANDING
GEAR COLLAPSED
PHASE OF OPERATION
LANDING LEVEL OFF/TOUCHDOWN
LANDING ROLL

PROBABLE CAUSE(S)
COPILOT - IMPROPER LEVEL OFF
PILOT IN COMMAND - INADEQUATE SUPERVISION OF FLIGHT
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- HIT NOSE GR FIRST,LEEWARD ISLANDS AIR TRANSPORT SERVICES,LTD.

A-0002	6/15/73 TIME - 1955	BOSTON,MASS	DOUGLAS DC-8 HP-IDK DAMAGE-SUBSTANTIAL	CR- 0 0 11 PX- 0 0 3	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LOGAN INTL
OPERATOR - SWISS AIR
DEPARTURE POINT
BOSTON,MASS
INTENDED DESTINATION
UNKNOWN/NOT REPORTED
TYPE OF ACCIDENT
COLLIDED WITH PARKED AIRCRAFT
PHASE OF OPERATION
TAXI TO TAKEOFF

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED CLEARANCE
FACTOR(S)
AIRPORTS/AIRWAYS/FACILITIES - AIRPORT FACILITIES TAXIWAY LIGHTING AND MARKING
REMARKS- PLT MISTOOK NEW PAINTED TAXIWAY BOUNDARY LINE FOR CENTERLINE WHICH WAS WORN,HIT L-188 N5504,SUBSTL

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	6/23/73 TIME - 0258	JAMAICA,NY	DOUGLAS DC-8 N8968T DAMAGE-SUBSTANTIAL	CR- 0 2 7 PX- 0 6113	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 48, 18000 TOTAL HOURS, 1638 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTL ARPT
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
STOCKHOLM,SWEDEN
INTENDED DESTINATION
JAMAICA,NY
LAST ENROUTE STOP
REYKJAVIK,ICELAND
TYPE OF ACCIDENT
UNDERSHOOT
HARD LANDING
PHASE OF OPERATION
LANDING FINAL APPROACH
LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
COPILOT-INADVRTNLY DPLYD GND SPOILERS WHILE ARMING
FACTOR(S)
PILOT IN COMMAND - IMPROPER IN-FLIGHT DECISIONS OR PLANNING
FIRE AFTER IMPACT
REMARKS- ARMED JUST BFR TOUCHDOWN.LOFTLEIDER AIRLINES.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0004	12/17/73 TIME - 1543	BOSTON,MASS	DOUGLAS DC-10 EC-CBN DAMAGE-SUBSTANTIAL	CR- 0 1 13 PX- 0 2151	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 53, 21705 TOTAL HOURS, 426 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LOGAN INTL
OPERATOR - IBERIA
DEPARTURE POINT
MADRID,SPAIN
INTENDED DESTINATION
BOSTON,MASS
TYPE OF ACCIDENT
UNDERSHOOT
COLLIDED WITH OBJECT
PHASE OF OPERATION
LANDING FINAL APPROACH
LANDING FINAL APPROACH

PROBABLE CAUSE(S)
PLT-DIDNT RECOG INCR DSCNT RATE,MAY HV BEEN UN TO
FACTOR(S)
WEATHER - UNFAVORABLE WIND CONDITIONS
AIRPORTS/AIRWAYS/FACILITIES - AIRPORT FACILITIES INSTRUMENT LANDING SYSTEM
WEATHER BRIEFING - BRIEFING RECEIVED-METHOD UNKNOWN
WEATHER FORECAST - UNKNOWN/NOT REPORTED

SKY CONDITION
OBSCURATION
VISIBILITY AT ACCIDENT SITE
3/4 MILS OR LESS
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
FOG
TEMPERATURE-F
41
WIND VELOCITY-KNOTS
9
TYPE OF FLIGHT PLAN
IFR
CEILING AT ACCIDENT SITE
300
PRECIPITATION AT ACCIDENT SITE
RAIN
RELATIVE BEARING OF WIND
LEFT QUARTERING HEAD WIND 293-337 DEGREES
WIND DIRECTION-DEGREES
290
TYPE OF WEATHER CONDITIONS
IFR
FIRE AFTER IMPACT
REMARKS- LOW ALT WND SHEAR,MIN WHL CLNC,APCH LITE FIERS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0005	10/25/73 NR.MIAMI,FLA TIME - 0018		DOUGLAS DC-6B N414SF DAMAGE-DESTROYED	CR- 0 2 1 PX- 0 0 0	SCHED INTERNATL CARGO SRV	AIRLINE TRANSPORT, AGE 52, 22000 TOTAL HOURS, 6000 IN TYPE, INSTRUMENT RATED.

OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
GEORGETOWN,GUYANA
INTENDED DESTINATION
MIAMI,FLA
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
DITCHING
PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE
LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
POWERPLANT - FUEL SYSTEM OTHER
MISCELLANEOUS ACTS,CONDITIONS - LEAK/LEAKAGE
PILOT IN COMMAND - MISMANAGEMENT OF FUEL
MISCELLANEOUS ACTS,CONDITIONS - INATTENTIVE TO FUEL SUPPLY
PILOT IN COMMAND - IMPROPER IN-FLIGHT DECISIONS OR PLANNING
MISCELLANEOUS ACTS,CONDITIONS - FUEL EXHAUSTION
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - AIRCRAFT CAME TO REST IN WATER
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-4 ENGINES
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON WATER
REMARKS- GUYANA AIRWAYS,DITCHED IN BISCAYNE BAY,LK NO 3 MN FUEL SYS,OVERFLEW NASSAU & BIMINI WITH LOW FUEL.

A-0006	9/17/73 NR.MIAMI,FLA TIME - 0509		DOUGLAS DC-6A HH-220 DAMAGE-SUBSTANTIAL	CR- 0 0 3 PX- 0 0 0	SCHED INTERNATL CARGO SRV	AIRLINE TRANSPORT, 30, 5873 TOTAL HOURS, 441 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
MIAMI,FLA
INTENDED DESTINATION
PORT AU PRINCE,HAITI
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
FIRE OR EXPLOSION IN FLIGHT
PHASE OF OPERATION
IN FLIGHT CLIMB TO CRUISE
IN FLIGHT CLIMB TO CRUISE

PROBABLE CAUSE(S)
POWERPLANT - ENGINE STRUCTURE MASTER AND CONNECTING RODS
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
MISCELLANEOUS ACTS,CONDITIONS - LACK OF LUBRICATION-SPECIFIC PART,NOT SYSTEM
FACTOR(S)
MISCELLANEOUS ACTS,CONDITIONS - FIRE IN ENGINE
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING ON AIRPORT/SEAPLANE BASE/HELIPT.
REMARKS- MASTER ROD ASSEMBLY,P/N 1808041-3761,EVIDENCE OF HI FRICTIONAL FORCES CONSISTANT WITH LUBE BKDWN.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	9/17/73 TIME - 1940	JAMAICA,NY	BOEING 747 CS-TJR DAMAGE-MINOR	CR- 0 0 16 PX- 0 0164	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 57, 20000 TOTAL HOURS, 600 IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - JOHN F KENNEDY
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: JAMAICA,NY
INTENDED DESTINATION: LISBON,PORTUGAL
TYPE OF ACCIDENT: COLLIDED WITH WIRES/POLES
PHASE OF OPERATION: TAXI TO TAKEOFF

PROBABLE CAUSE(S)
PILOT IN COMMAND - FAILED TO SEE AND AVOID OBJECTS OR OBSTRUCTIONS
PERSONNEL - AIRPORT SUPERVISORY PERSONNEL. FAILURE TO NOTIFY OF UNSAFE COND/AND OR FAILURE TO MARK OBSTRUCTION
FACTOR(S)
POWERPLANT - MISCELLANEOUS FOREIGN OBJECT DAMAGE
MISCELLANEOUS ACTS,CONDITIONS - CONGESTED RAMP/TAXIWAY
REMARKS- JUMBO JET MADE WIDE TURN,TAXIED ACROSS UNLITED AREA,STRUCK WINDSOCK,PORTUGUESE AIRWAYS.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	1/19/74 TIME - 1908	MIAMI,FLA	BRITISH AC 1-11 TI-LRI DAMAGE-NONE	CR- 0 0 4 PX- 0 1 87	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: MIAMI,FLA
INTENDED DESTINATION: SAN JOSE,COSTA RICO
TYPE OF ACCIDENT: MISCELLANEOUS
PHASE OF OPERATION: STATIC PARKED-ENGINES NOT OPERATING

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL PASSENGER
REMARKS- APPARENTLY INTOXICATED PSGR FELL THRU CURTAIN & GALLEY DOOR,EXPIRED 1/28/74.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	2/7/74 TIME - 2307	LOS ANGELES,CALIF	DOUGLAS DC-8 F-ROLH DAMAGE-SUBSTANTIAL	CR- 0 0 9 PX- 0 1151	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 44, 11000 TOTAL HOURS, 7000 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - LOS ANGELES INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: LOS ANGELES,CALIF
INTENDED DESTINATION: PAPEETE,TAHITI
TYPE OF ACCIDENT: AIRFRAME FAILURE ON GROUND; FIRE OR EXPLOSION ON GROUND
PHASE OF OPERATION: TAKEOFF RUN; TAKEOFF RUN

PROBABLE CAUSE(S)
AIRFRAME - LANDING GEAR BRAKING SYSTE (NORMAL SYSTEM)
MISCELLANEOUS ACTS,CONDITIONS - OVERHEATED
FIRE AFTER IMPACT
REMARKS- NR 6 TIRE DEFLATED DRG TAXI,WORN BRAKE SYS,NR 5 TIRE BLEW DRG TKOF RUN,L WHEEL WELL FIRE,ABORT.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	5/13/74 TIME - 0136	NR.O'NEILL,NEBR	BOEING 707 FALCA DAMAGE-NONE	CR- 0 1 11 PX- 0 2 97	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 51, 22508 TOTAL HOURS, 4935 IN TYPE, INSTRUMENT RATED.

OPERATOR - AIR FRANCE
DEPARTURE POINT
LOS ANGELES,CALIF
INTENDED DESTINATION
PARIS,FRANCE
TYPE OF ACCIDENT
TURBULENCE
PHASE OF OPERATION
IN FLIGHT NORMAL CRUISE

PROBABLE CAUSE(S)
PILOT IN COMMAND - IMPROPER IN-FLIGHT DECISIONS OR PLANNING
WEATHER - TURBULENCE, ASSOCIATED W/CLOUDS AND/OR THUNDERSTORMS
WEATHER - THUNDERSTORM ACTIVITY
MISCELLANEOUS ACTS,CONDITIONS - SEAT BELT SIGN OFF
WEATHER BRIEFING - SELF-HELP,PILOT CHECKED WEATHER DATA
WEATHER FORECAST - WEATHER SLIGHTLY WORSE THAN FORECAST

SKY CONDITION
BROKEN
CEILING AT ACCIDENT SITE
3800
VISIBILITY AT ACCIDENT SITE
5 OR OVER(UNLIMITED)
PRECIPITATION AT ACCIDENT SITE
NONE
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
NONE
TYPE OF WEATHER CONDITIONS
IFR
TYPE OF FLIGHT PLAN
IFR
REMARKS- MDT-SVR TURBC,VERY STRONG TSTM ACTIVITY WHICH SHOULD HAVE BEEN EASILY DETECTABLE,FLT CONTD TO ORLY

A-0004	7/11/74 TIME - 2205	NEW YORK,NY	BOEING 747 OO-SGB DAMAGE-SUBSTANTIAL	CR- 0 0 17 PX- 0 0185	MIL CONTRACT PASSG INTL	AIRLINE TRANSPORT, AGE 56, 23739 TOTAL HOURS, 1794 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JOHN F KENNEDY
OPERATOR - SABENA
DEPARTURE POINT
NEW YORK,NY
INTENDED DESTINATION
BRUSSELS,BELGIUM
TYPE OF ACCIDENT
COLLIDED WITH BUILDING(S)
PHASE OF OPERATION
TAXI OTHER

REMARKS- NR 4 ENG FAILED TO START. RETURNED TO TERMINAL,ACFT,STRUCK EXTENDED JET-WAY.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0005	5/16/74 TIME - 2045	JAMAICA,NY	DOUGLAS DC-8 N8960 DAMAGE-NONE	CR- 0 0 8 PX- 0 0224 OT- 1 0 0	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 36, 7992 TOTAL HOURS, 1245 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JFK INTERNATIONAL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: JAMAICA,NY
INTENDED DESTINATION: KEFLAVIK,ICELAND
TYPE OF ACCIDENT: MISCELLANEOUS
PHASE OF OPERATION: TAXI OTHER

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL GROUND CREWMAN
MISCELLANEOUS ACTS,CONDITIONS - DISREGARD OF GOOD OPERATING PRACTICE
FACTOR(S)
PERSONNEL - OPERATIONAL SUPERVISORY PERSONNEL *ERROR-INVALID CODE*
REMARKS- GND CREWMAN ON TOW BAR FELL UNDER NOSEWHEEL DRG PUSHBACK. ICELANDIC AIRLINES,INC.

C-0001	10/21/74 NR,SEATTLE,WASH TIME - 0030		DOUGLAS DC-8 DYKTE DAMAGE-NONE	CR- 0 0 11 PX- 1 0 93	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

OPERATOR - SAS
DEPARTURE POINT: SEATTLE,WASH
INTENDED DESTINATION: COPENHAGEN,DENMARK
TYPE OF ACCIDENT: MISCELLANEOUS
PHASE OF OPERATION: IN FLIGHT NORMAL CRUISE

PROBABLE CAUSE(S)
MISC-PAX DIED OF NATURAL CAUSES.

A-0001	9/27/75 TIME - 0600	MIAMI,FL	CANADAIR CL-44 LV-JSY DAMAGE-DESTROYED	CR- 4 2 0 PX- 2 2 0 OT- 0 0 1	SCHED INTERNATL CARGO SRV	AIRLINE TRANSPORT, AGE 49, 11601 TOTAL HOURS, 2352 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: MIAMI,FL
INTENDED DESTINATION: BUEN[illegible], ARIES,ARGENT
LAST ENROUTE STOP: ASUNCION,PARAGUAY
TYPE OF ACCIDENT: COLLIDED WITH DITCHES
PHASE OF OPERATION: TAKEOFF ABORTED

PROBABLE CAUSE(S)
PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
COPILOT - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
PERSONNEL - FLIGHT ENGINEER INADEQUATE PREFLIGHT
MISCELLANEOUS ACTS,CONDITIONS - GUST LOCKS ENGAGED
FACTOR(S)
PERSONNEL - OPERATIONAL SUPERVISORY PERSONNEL FAILURE TO PROVIDE ADEQ,DIRECTIVES,MANUAL,EQUIPMENT
SYSTEMS - FLIGHT CONTROL SYSTEMS FLIGHT CONTROL GUST LOCK SYSTEM
MISCELLANEOUS ACTS,CONDITIONS - RAN OFF END OF RUNWAY
FIRE AFTER IMPACT
REMARKS- HYD ACTUATOR REMOVED,OPERATOR USED MANUAL EXTERNAL LOCK,NOT CERTIFICATED BY MFG,OPERATOR-AER.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0002	7/27/75	NR,NEW YORK,NY	BOEING 707	CR- 0 1 9	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 55, 15828 TOTAL HOURS, 3594 IN TYPE, INSTRUMENT RATED.
	TIME - 2245		BHSH	PX- 0 0 126		
			DAMAGE-NONE			

OPERATOR - AIR FRANCE
DEPARTURE POINT
  FRENCH ANTILLES
INTENDED DESTINATION
  NEW YORK,NY
LAST ENROUTE STOP
  NEW YORK,NY
TYPE OF ACCIDENT
  TURBULENCE
PHASE OF OPERATION
  IN FLIGHT NORMAL CRUISE

PROBABLE CAUSE(S)
  WEATHER - TURBULENCE IN FLIGHT,CLEAR AIR
  PERSONNEL - FLIGHT PERSONNEL FLIGHT ATTENDANT
FACTOR(S)
  MISCELLANEOUS ACTS,CONDITIONS - SEAT BELT SIGN ON
WEATHER BRIEFING - BRIEFING RECEIVED-METHOD UNKNOWN
WEATHER FORECAST - UNKNOWN/NOT REPORTED

SKY CONDITION
  UNKNOWN/NOT REPORTED
CEILING AT ACCIDENT SITE
  UNKNOWN/NOT REPORTED
VISIBILITY AT ACCIDENT SITE
  UNKNOWN/NOT REPORTED
PRECIPITATION AT ACCIDENT SITE
  UNKNOWN/NOT REPORTED
OBSTRUCTIONS TO VISION AT ACCIDENT SITE
  UNKNOWN/NOT REPORTED
TYPE OF WEATHER CONDITIONS
  UNKNOWN/NOT REPORTED
TYPE OF FLIGHT PLAN
  IFR
REMARKS- CABIN STEWARD RETURNING TO SEAT AFTER INITIAL ENCOUNTER.STRONGER TURBC ENCNTRD.STEWARD BROKE LEG.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0003	10/20/75	SAN JUAN,PR	DOUGLAS DC-6A	CR- 0 0 3	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 39, 15130 TOTAL HOURS, 965 IN TYPE, INSTRUMENT RATED.
	TIME - 1415		AN-BFO	PX- 0 0 0		
			DAMAGE-SUBSTANTIAL			

NAME OF AIRPORT - PUERTO RICO INT'L
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
  MANAGUA,NICARAGUA
INTENDED DESTINATION
  SAN JUAN,PR
TYPE OF ACCIDENT
  AIRFRAME FAILURE ON GROUND
PHASE OF OPERATION
  LANDING ROLL

PROBABLE CAUSE(S)
  PILOT IN COMMAND - INADEQUATE PREFLIGHT PREPARATION AND/OR PLANNING
  AIRFRAME - LANDING GEAR NOSEWHEEL ASSEMBLIES
  MISCELLANEOUS ACTS,CONDITIONS - IMPROPERLY SECURED
  MISCELLANEOUS ACTS,CONDITIONS - DISCONNECTED
FACTOR(S)
  MISCELLANEOUS ACTS,CONDITIONS - OVERLOAD FAILURE
REMARKS- IMPROPERLY SECURED NOSE GR TORQUE LINKS DISCONNECTED. NSE WHL VIBRATION. FUSELAGE FRACTURED.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0004	12/16/75 TIME - 2055	ANCHORAGE,AK	BOEING 747 JAL122 DAMAGE-SUBSTANTIAL	CR- 0 1 19 PX- 0 1100	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 53, 17305 TOTAL HOURS, 3252 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - ANCHORAGE INTL
OPERATOR - JAPAN AIRLINES
DEPARTURE POINT
PARIS,FRANCE
INTENDED DESTINATION
TOKYO,JAPAN
LAST ENROUTE STOP
ANCHORAGE,AK
TYPE OF ACCIDENT
GROUND-WATER LOOP-SWERVE
COLLIDED WITH DIRT BANK
PHASE OF OPERATION
TAXI TO TAKEOFF
TAXI OTHER

REMARKS- WND GUSTING 33K,TAXING COND WERE DIRT,AMGNT FAILED TO ANCPT PREDICTABLE UNSAFE ICING COND.

A-0002	10/13/76 TIME - 1415	MIAMI,FL	BOEING 727 HI-717 DAMAGE-SUBSTANTIAL	CR- 0 0 8 PX- 0 0 3 OT- 0 0 1	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, UNK/NR INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT
MIAMI,FL
INTENDED DESTINATION
SANTO DOMINGO,D.R.
TYPE OF ACCIDENT
MISCELLANEOUS
PHASE OF OPERATION
STATIC PARKED-ENGINES NOT OPERATING

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL DRIVER OF VEHICLE
REMARKS- TRUCK DRIVER DID NOT FOLLOW ESTABLISHED PROC. HIT ACFT. OPERATOR-COMPANIA DOMINICANA DE AVIACION.

C-0001	12/26/76 TIME - 0228	JAMAICA,NY	DOUGLAS DC-10 XA-DIG DAMAGE-MINOR	CR- 0 0 14 PX- 0 0 78	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE UNK/NR, 21085 TOTAL HOURS, 2746 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JF KENNEDY INTL
OPERATOR - AERONAVES
DEPARTURE POINT
MEXICO CITY,MEX
INTENDED DESTINATION
JAMAICA,NY
TYPE OF ACCIDENT
OVERSHOOT
COLLIDED WITH RUNWAY OR APPROACH LIGHTS
PHASE OF OPERATION
LANDING LEVEL OFF/TOUCHDOWN
LANDING ROLL

PROBABLE CAUSE(S)
PILOT IN COMMAND - MISJUDGED DISTANCE AND SPEED
FACTOR(S)
AIRPORTS/AIRWAYS/FACILITIES - AIRPORT CONDITIONS SNOW ON RUNWAY
MISCELLANEOUS ACTS,CONDITIONS - RAN OFF END OF RUNWAY

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0001	2/8/77 TIME - 1413	NR.SAN JUAN,PR	CURTISS C-46A HI-208 DAMAGE-DESTROYED	CR- 0 0 2 PX- 0 0 0	NS/CTR REVENUE CARGO INTL	AIRLINE TRANSPORT, AGE 40, 8200 TOTAL HOURS, 3500 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - PUERTO RICO INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT — INTENDED DESTINATION
SAN JUAN,PR — DOMINICAN REPUBLIC
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
DITCHING
PHASE OF OPERATION
IN FLIGHT CLIMB TO CRUISE
LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
PILOT IN COMMAND - ATTEMPTED OPERATION W/KNOWN DEFICIENCIES IN EQUIPMENT
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE MAINTENANCE AND INSPECTION
POWERPLANT - IGNITION SYSTEM IGNITION HARNESS,SHIELDING
POWERPLANT - PROPELLER AND ACCESSORIES HYDRAULIC PITCH CONTROL MECHANISM
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
MISCELLANEOUS ACTS,CONDITIONS - IMPROPER EMERGENCY PROCEDURES
FACTOR(S)
SYSTEMS - ELECTRICAL SYSTEM GENERATORS/ALTERNATORS
SYSTEMS - ELECTRICAL SYSTEM BATTERIES
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
EMERGENCY CIRCUMSTANCES - FORCED LANDING OFF AIRPORT ON WATER
REMARKS- PROP DISTRIBUTOR VALVE LOOSE.#2 GEN INOP.BATTERY WEAK.OPERATOR-ARGO,S.A.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
0003	4/6/77 TIME - 1736	MIAMI,FL	LOCKHEED L-188C TI-LRN DAMAGE-SUBSTANTIAL	CR- 0 0 3 PX- 0 0 0	SCHED INTERNATL CARGO SRV	AIRLINE TRANSPORT, AGE 31, 6052 TOTAL HOURS, 162 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - MIAMI INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT — INTENDED DESTINATION
SAN JOSE,COSTA RICA — MIAMI,FL
TYPE OF ACCIDENT
WHEELS-UP
PHASE OF OPERATION
LANDING LEVEL OFF/TOUCHDOWN

PROBABLE CAUSE(S)
PILOT IN COMMAND - LACK OF FAMILIARITY WITH AIRCRAFT
PILOT IN COMMAND - FAILED TO FOLLOW APPROVED PROCEDURES,DIRECTIVES,ETC.
MISCELLANEOUS ACTS,CONDITIONS - IMPROPER EMERGENCY PROCEDURES
MISCELLANEOUS ACTS,CONDITIONS - INTENTIONAL WHEELS-UP
FACTOR(S)
PERSONNEL - MAINTENANCE,SERVICING,INSPECTION INADEQUATE INSPECTION OF AIRCRAFT (MAINTENANCE PERSONNEL)
AIRFRAME - LANDING GEAR LANDING GEAR WARNING AND INDICATING COMPONENTS
REMARKS- NOSE GR LITE MALF.OPERATOR-LACSA. MALFUNCTION,NO OTHER MALFUNCTION FOUND.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0004	8/13/77 TIME - 04[illegible]	[illegible],HI	BOEING 747 81860 DAMAGE-NONE	CR- 0 0 22 PX- 0 0345 OT- 1 0 0	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - HONOLULU INTL
OPERATOR - OTHER-FOREIGN FLAG CARRIER
DEPARTURE POINT: HONOLULU,HI
INTENDED DESTINATION: TOKYO,JAPAN
TYPE OF ACCIDENT: MISCELLANEOUS
PHASE OF OPERATION: TAXI TO TAKEOFF

PROBABLE CAUSE(S)
PERSONNEL - MISCELLANEOUS-PERSONNEL GROUND CREWMAN
REMARKS- CHINA AL BEING TOWED FROM PAX GATE,GRND CREWMAN FELL OFF TUG,RUN OVER BY ACFT NOSE AND BODY GEAR.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
A-0005	8/19/77 TIME - 0540	HONOLULU,HI	DOUGLAS DC-10 RP-C2003 DAMAGE-MINOR	CR- 0 0 14 PX- 0 [illegible]51	SCHED INTERNATL PASSG SRV	AIRLINE TRANSPORT, AGE 50, 20000 TOTAL HOURS, 900 IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - HONOLULU INTL
OPERATOR - PHILIPPINE AIRLINES
DEPARTURE POINT: HONOLULU,HI
INTENDED DESTINATION: MANILA,RP
LAST ENROUTE STOP: [illegible]OM
TYPE OF ACCIDENT: ENGINE FAILURE OR MALFUNCTION; MISCELLANEOUS
PHASE OF OPERATION: TAKEOFF RUN; TAKEOFF ABORTED

PROBABLE CAUSE(S)
POWERPLANT - COMBUSTION ASSEMBLY OTHER
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
FIRE AFTER IMPACT
REMARKS- INJURIES OCCURRED DRG EVACUATION.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0001	7/1/77 TIME - 1130	JAMAICA,NY	VICKERS SVC-10 G-ASGC DAMAGE-MINOR	CR- 0 0 9 PX- 0 0140	SCHED INTERNATL PASSG SRV	CERTIFICATE OTHER, AGE 31, 5066 TOTAL HOURS, UNK/NR IN TYPE, INSTRUMENT RATED.

NAME OF AIRPORT - JF KENNEDY
OPERATOR - BRITISH AIRWAYS
DEPARTURE POINT: JAMAICA,NY
INTENDED DESTINATION: LONDON,ENGLAND
TYPE OF ACCIDENT: ENGINE FAILURE OR MALFUNCTION
PHASE OF OPERATION: TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
POWERPLANT - COMPRESSOR ASSEMBLY DISC, COMPRESSOR ROTOR
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
REMARKS- #6 DISK FAILED FOR UNDETERMINED REASON.

FILE	DATE	LOCATION	AIRCRAFT DATA	INJURIES F S M/N	FLIGHT PURPOSE	PILOT DATA
C-0002	9/3/77 TIME - 0623	NR.HAMPTON,NY	BOEING 747 IDEME DAMAGE-MINOR	CR- 0 0 16 PX- 0 0315	SCHED INTERNATL PASSG SRV	CERTIFICATE UNKNOWN, AGE UNK/NR, UNK/NR TOTAL HOURS, UNK/NR IN TYPE. UNK/NR INSTRUMENT RATED.

OPERATOR - ALITALIA
DEPARTURE POINT
HAMPTON,NY
INTENDED DESTINATION
MILAN,ITALY
TYPE OF ACCIDENT
ENGINE FAILURE OR MALFUNCTION
PHASE OF OPERATION
TAKEOFF INITIAL CLIMB

PROBABLE CAUSE(S)
POWERPLANT - TURBINE ASSEMBLY BLADE,TURBINE WHEEL
MISCELLANEOUS ACTS,CONDITIONS - MATERIAL FAILURE
COMPLETE POWER LOSS - COMPLETE ENGINE FAILURE/FLAMEOUT-1 ENGINE
REMARKS- RUPTURE FATIGUE DUE TO THERMO-MECHANICAL STRESS.

LIST OF ABBREVIATIONS USED IN BRIEFS

AERIAL ADVERTISE	AERIAL ADVERTISING
ATR.FLIGHT INSTR.	AIRLINE TRANSPORT INSTRUCTOR
AIR SHOW/RACING	AIR SHOW/AIR RACING
AIR TAXI-CARGO	AIR TAXI-CARGO OPERATIONS
AIR TAXI-PASSG	AIR TAXI-PASSENGER OPERATIONS
APPROACH CTL-DEPARTURE	APPROACH CONTROL-DEPARTURE
APR CTL-TOW ENRT CTL SRV	APPROACH CONTROL-TOWER EN ROUTE CONTROL SERVICE
ASSOC CROP CTL ACTIVITIES	ASSOCIATED CROP CONTROL ACTIVITIES
ASSOC FIRE CTL ACTIVITIES	ASSOCIATED FIRE CONTROL ACTIVITIES
COMMERCIAL.FLIGHT.INSTR	COMMERCIAL FLIGHT INSTRUCTOR
CORP/EXEC	CORPORATION/EXECUTIVE
CR-	CREW
CTR CARGO-D	CONTRACT/CHARTER-CARGO-DOMESTIC
CTR CARGO-I	CONTRACT/CHARTER-CARGO-INTERNATIONAL
CTR PASSG-D	CONTRACT/CHARTER-PASSENGER-DOMESTIC
CTR PASSG-I	CONTRACT/CHARTER-PASSENGER-INTERNATIONAL
LAST ENROUTE STOP	LAST PLANNED EN ROUTE LANDING POINT
MAPPING/PHOTO	AERIAL MAPPING/PHOTOGRAPHY
MIL CONTRACT CARGO INTL	MILITARY CONTRACT-CARGO-INTERNATIONAL
MIL CONTRACT PASSG INTL	MILITARY CONTRACT-PASSENGER-INTERNATIONAL
MILITARY CTR CARGO DOM	MILITARY CONTRACT-CARGO-DOMESTIC
MILITARY CTR PASSG DOM	MILITARY CONTRACT-PASSENGER-DOMESTIC
MIL/CTR CARGO	MILITARY CONTRACT-CARGO
MIL/CTR PASSG	MILITARY CONTRACT-PASSENGER
NR.	NEAR
NS CTR CARGO	NONSCHEDULED/CHARTER REVENUE CARGO-INTRA-STATE
NS CTR PASSG	NONSCHEDULED/CHARTER REVENUE PASSENGER-INTRA-STATE
NS CTR REVENUE CARGO DOM	NONSCHEDULED/CHARTER REVENUE CARGO-DOMESTIC
NS CTR REVENUE CARGO INTL	NONSCHEDULED/CHARTER REVENUE CARGO-INTERNATIONAL
NS CTR REVENUE PASSG DOM	NONSCHEDULED/CHARTER REVENUE PASSENGER-DOMESTIC
NS CTR REVENUE PASSG INTL	NONSCHEDULED/CHARTER REVENUE PASSENGER-INTERNATL
OT-	OTHER AIRCRAFT AND GROUND
PARAJUMP	PARACHUTE JUMP
PRIVATE.FL.INST R.	PRIVATE FLIGHT INSTRUCTOR
PX-	PASSENGERS
RADAR CTL/SURVEILLANCE	RADAR CONTROL/SURVEILLANCE
SCHED CARGO SRV	SCHEDULED CARGO SERVICE
SCHED DOM PASSG SRV	SCHEDULED DOMESTIC CARGO SERVICE
SCHED DOM CARGO SRV	SCHEDULED DOMESTIC PASSENGER SERVICE
SCHED INTERNATL CARGO SRV	SCHEDULED INTERNATIONAL CARGO SERVICE
SCHED INTERNATL PASSG SRV	SCHEDULED INTERNATIONAL PASSENGER SERVICE
SCHED PASSG SRV	SCHEDULED PASSENGER SERVICE
S-D	SCHEDULED DOMESTIC
S-I	SCHEDULED INTERNATIONAL
UNK/NR	UNKNOWN/NOT REPORTED

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16. ABSTRACT (200 words or less)

The accidents occurring to U.S. air carriers during the years 1956 through 1977 are listed, with those resulting in impact within five miles of airports in the contiguous U.S. being considered in detail as to location of impact relative to the airport runways.

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