Emergency and Pre-Accident Plans

by

Raoul Castro

Every flight operation should have comprehensive emergency and pre-accident plans to eliminate chaos, delineate responsibility and provide set procedures should an emergency or accident occur.

Emergency Definition

"Emergency is a sudden unforeseen occurrence or incident requiring immediate action." An emergency can be comprised of incidents or accidents that require immediate attention in an organized, sequential manner. Samples: fire, fuel spill, employee accidents, damage to equipment, damage or work stoppage due to weather, security incursions, aircraft air accidents, etc.

Reason for Emergency and Pre-Accident Plans

It is imperative that every flight operation have plans that employees can follow in the event of an emergency. Emergency and pre-accident plans present forms, and methods for proceeding with emergencies that require immediate response. The forms outline the methods of planned response, and how to proceed with required reporting.

Emergency Plan Distribution

The emergency plan should be part of the operations manual, but it should also be published as a separate document to be posted in conspicuous areas, and distributed to safety committee members as well as all involved supervisors. All department personnel should be familiar with the plan. Individuals on the IMMEDIATE and SECONDARY RESPONSE lists should have a current copy at home. The plan should be reviewed and updated on a regular basis.

Purpose of Emergency Plan

The plan is a checklist to be used in conjunction with the airport's Emergency Plan and Pre-Accident Plan. It is written to outline the actions to be taken by company personnel in the event of an incident or emergency within the area of responsibility of the company Flight Operations.

It is an **Action Plan,** and is to be used in coordination with the Airport Emergency Plan and the Pre-Accident Plan.

Be familiar with the plan!

Use pencil to record names and phone numbers.

Keep this plan in plain view.

Remember, there is no substitute for good judgment.

Immediate Response

The individual noting the emergency is responsible to:

1. Notify Airport Operations
   OR
   Notify Central Dispatch
   OR
   Notify Local Emergency Dispatch Center.

2. Take immediate action to prevent further damage or injury.

3. Only after the emergency has been satisfactorily controlled, proceed with Secondary Response Action.

Secondary Response

The individual on the scene of the emergency is responsible to initiate communication with company Flight Department management and act as coordinator until management personnel arrive.

All contacts are to be made in accordance with the following sequence:

Primary Contact	Alternate Contact	Alternate Contact
Aviation Department Manager	Chief Pilot	Safety Committee Chair Person
Work# _____	Work# _____	Work# _____
Home# _____	Home# _____	Home #_____

Will Call:

Executive In Charge Of Flight Operations

Work # _____ NTSB # _____

Home # _____ FAA # _____

Public Relations	Insurance	Legal Dept.
Work # _____	Work # _____	Work # _____
Home # _____	Home # _____	Home # _____

The following is a ready reference list of emergency contacts which may be useful in an emergency.

Additional Assistance Phone Numbers

Phone numbers checked on: (Date)_____

Fire Departments

_____ # _____

_____ # _____

_____ # _____

Ambulance Departments

_____ # _____

_____ # _____

_____ # _____

Pre-Accident Plan

The pre-accident plan uses the emergency ACTION PLAN format, but it goes beyond the geographical area of the flight operations responsibility. The pre-accident plan is mainly concerned with aircraft accidents. It outlines reporting procedures to company management and government agencies and the use of forms provided for that purpose.

Organizing procedures to be put into effect by manager, chief pilot or safety committee when an accident occurs:

1. Responsibility and authority.
2. Medical assistance.
3. Guarding the wreckage.
4. Inform top corporate executive with the latest status report.
5. Photographic coverage.
6. Locating witnesses.
7. Maintenance will proceed to accident site or dispatch mechanic to provide pertinent information regarding state of aircraft.
8. Manager or chief pilot will assemble all flight records, training records, and other information that the government agencies may require. Records to be released only to authorized persons or agencies.
9. Maintenance will assemble all maintenance records, logbook forms, all maintenance records of maintenance performed by outside contractors. Records to be released only to authorized persons or agencies.
10. All personnel in the aviation department will cooperate with government agencies assigned to the investigation.
11. Maintenance will prepare a repair and recovery plan to be submitted to the manager or chief pilot.
12. Members of the aviation department will confine statements regarding the incident/accident to the proper agencies only.
13. The Safety Committee will proceed with the accident investigation.

Company Incident And Damaged Airplane Report Form

1. Location of accident: _____
2. Pilot-in-Command: _____
3. Second-in-Command: _____
4. Type of airplane and registration number: _____

_____

5. Date and time damage occurred: _____
6. Location of crew and passengers, all necessary phone numbers:
7. Location of airplane when damaged:
   Ground: _____
   Air: _____
8. How was airplane damaged?
   (taxi, weather, hail, etc.)
9. Give brief description of events leading to damage.
10. Give as much detail describing damage to airplane, engines and equipment as possible.
11. Was all equipment operating properly?
12. Did crew or passengers sustain any injuries? (Give injured passengers' names)
13. Names of any other persons involved in accident.
14. Damage to other property.
15. Names of witnesses, if any.

Handling the Media: What Information to Give

Do give:

Routing and takeoff time (if available).

Type of aircraft.

Number of seats.

Number of crew.

Destination.

How to reach company Public Relations

personnel people.

Other information to authorities only: NTSB, FAA.

Do not:

Speculate on cause of accident.

Identify passengers or crew.

Comment on other company accidents.

Identify next of kin.

The sources of information:

Local police.

State police.

FAA.

Air Traffic Control.

At the scene:

Identify yourself as a member of the company.

Require credentials.

Don't touch anything.

Federal Government Requirements

The rules pertaining to aircraft accidents are published by the National Transportation Safety Board and are contained in Safety Investigation Regulations, Part 830. They are published, in part, in the Airman's Information Manual.

Definition of Pertinent Terms (NTSB 830)

A. "Aircraft accident" means an occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, and in which any person suffers death or serious injury as a result of being in or upon the aircraft or by direct contact with the aircraft or anything attached thereto, or in which the aircraft received substantial damage.

B. "Substantial Damage":

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

2. Engine failure and damage limited to an engine, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are NOT considered "substantial damage" for the purpose of this part.

Reporting Requirements — General (NTSB)

A. Any aircraft accident, as defined above, will require NTSB notification.

B. Minor accidents or incidents wherein there is not substantial damage, as defined above, nor any fatal or serious injury, will not require NTSB notification.

C. The operator of an aircraft shall immediately, and by the most expeditious means available, notify the nearest National Transportation Safety Board, Bureau of Aviation Safety Field Office, if reporting is required.

D. The notification required above shall contain the following information, if available:

1. Type, nationality and registration marks of the aircraft.

2. Names of owner and operator of the aircraft.

3. Name of pilot-in-command.

4. Date and time of the accident.

5. Last point of departure and point of intended landing of the aircraft.

6. Position of the aircraft with reference to some easily defined geographical point.

7. Number of persons aboard, number of fatalities and number seriously injured.

8. Nature of the accident, the weather and the extent of damage to the aircraft, so far as is known.

9. A description of any explosives, radioactive materials, or other dangerous articles carried.

Manner of Notification

The most expeditious method of notification by the operator to the National Transportation Safety Board will be determined by the circumstances existing at that time. The National Transportation Safety Board has advised that any of the following would be considered examples of the type of notification that would be acceptable:

A. Direct telephone notification.

B. Telegraphic notification.

C. Notification to the Federal Aviation Administration, which would in turn notify the NTSB by direct communication (i.e., dispatch or telephone).

Summary

When a company airplane is involved in an accident, it is imperative that the company determine who is involved, cause of the accident, the nature and extent of all injuries, and the extent of damage to company property and other property.

The company investigation should be conducted regardless of the extent of personal injuries or whether others are conducting a similar investigation.

The company that owns the airplane is legally required to cooperate with the investigation of the selected insurance carrier. The immediate investigation of the accident by the safety committee using the proper guidelines and/or checklist, can be critical in the collection of material that may disappear, or information that may be forgotten before the insurance investigator can arrive.

A thorough investigation, with files for future use, will greatly assist the insurance investigator, and can expedite the settlement of claims.

As aircraft incidents are not investigated by federal agencies other than to determine if a violation took place, it is very important that the company have a complete file of the incident, and that an aviation attorney be hired, in the event that the FAA starts violation proceedings against the company and/or crew.

A separate investigation by an outside consultant working with the attorney will save days of investigation time that can be of great value to the company. ♦

(Article is an excerpt from "Corporate Aviation Management" a book being published by Southern Illinois University Press.)

References

Excerpts from MARCOR operations manual

Air Accidents & the News Media. Aviation/Space Writers Association, 17 S. High St., Suite 1200, Columbus, OH 43215 U.S.

Conversations with Fred M. McGowan. Aviation insurance consultant. Amitec Inc., P.O. Box 686 Mt. Laurel, N.J. 08054 U.S.

Reports Received At FSF

Airborne Patient Care Management — A Multidisciplinary Approach. Sredl, D.M., R.N., B.S.N.,M.A. Medical Research Associates Publications, St. Louis, Missouri, 1983. (Contact Medical Research Associates, P.O. Box 1247, Ballwin, MO 63011 U.S. Price: $27.95 (U.S.) plus $1.00 postage/handling. Telephone enquiries: (314) 569-7763.

Summary: This book presents a detailed overview of the subject of medical evacuation aimed primarily at medical technicians, nurses and aircrew who will be involved in the movement of patients by air. Further information on any single area is available elsewhere in greater detail. FSF recommends that air carrier operations and safety officers as well as corporate flight departments have this book available as a good reference for training and general crew information about in-flight medical problems.

AC 61-98: *Scope and Content of Biennial Flight Reviews.* FAA Advisory Circular. 1 September 1987. AFS-840, FAA Hq., Washington, DC 20591 U.S.

Summary: This provides information for certificated flight instructors (CFI) to use in determining the scope and content of the flight review required by FAR Section 61.57(a). The AC discusses the background of the biennial flight review, and factors to consider before undertaking the review, e.g., type of equipment flown, nature of flight operations and current flight experience. An outline is provided as a possible format for use by the instructor in organizing the FAR Part 91 review. Discussion of what to consider in the review of maneuvers and procedures is also given in the AC.

GAO/RCED-88-14. FAA Staffing — *FAA's Definition of Its Controller Work Force Should be Revised.* General Accounting Office Report. 23 October 1987. U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20877 U.S.

Summary: The controller subset of air traffic service personnel, as defined by FAA, is comprised of the Full Performance Level (FPL) and developmental controllers and the Air Traffic Assistants (ATA). As such, this definition includes some air traffic service personnel who do not control air traffic and excludes others who do. GAO investigators maintain that using the current controller work force definition for budgetary purposes is creating staffing difficulties in that understaffing of the work force actually controlling traffic can create a safety hazard. GAO recommends revision of the definition of the controller work force to include only those who are responsible for separating and controlling air traffic, including first-line supervisors and traffic management coordinators. The revised definition should be used in reporting the controller work force count to the Congress for budgeting purposes.

Worldwide Airline Jet Transport Aircraft Fatal Accidents And Hull Losses Calendar Year 1987

by

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The following are operating data and statistics of fatal accidents and hull-losses of worldwide airlines operating certain large jet transport aircraft. The sources of most information were aircraft manufacturers. No information was received directly from the airlines.

First Generation Jet: B-707/720, SE-210, Comet, DC-9
Convair 880/990

Second Generation Jet: B-727, BAC-111, Trident, VC 10, B-737, DC-9, F 28

Widebody Jet: B-747, L-1011, A 300, DC-10, BAe 146.

New Generation Jet: B-757, B-767, A 310, MD-80,

In 1987, worldwide airlines operating these jet transport aircraft recorded 13 hull-losses and fatal accidents accounting for a total of 673 fatalities, including a suspected sabotage accident occurring on December 7. The following six tables present an overall review of the worldwide airline

Table 1 — Worldwide Airlines Jet Transport Aircraft Hours Flown Calendar Years 1986 and 1987

	1986	1987	Change
Worldwide Airline Total	17,433,000	18,224,000	+801,000 (4.6%)
U.S.	8,025,000	8,365,000	+340,000 (4.2%)
Non-U.S.	9,408,000	9,859,000	+451,000 (4.7%)

Table 2 presents the number of aircraft in service at the end of 1987, the flight hours by three different aircraft types and the accumulative flying hours since 1959. It appears that the airlines use the fuel efficient twin-engine more and more in recent years to reduce operating expenses. In 1987, the twin engine jet accounted for 53 percent of total jet transport aircraft fleet as compared with only 34 percent at the beginning of the decade.

Table 2 — Worldwide Airline Jet Transport Aircraft Hours Flown

1959-1987

Aircraft Type	No. of aircraft in service Dec. 1987	Hours flown CY 1987	Accumulative total hours 1959-1987
Two-engine	3,747	9,594,000	95,143,000
Three-engine	2,273	5,619,000	88,283,000
Four-engine	1,203	3,011,000	95,749,000
Total	7,223	18,224,000	279,175,000
Two-engine	52.5%	52.6%	34.1%
Three-engine	31.1%	30.8%	31.6%
Four-engine	16.4%	16.6%	34.3%
Total	100.0%	100.0%	100.0%
1st generation	568	662,000	80,580,000*
2nd generation	4,253	10,193,000	139,331,000
Widebody	1,468	4,677,000	47,320,000
New Generation	934	2,692,000	11,944,000*
Total	7,223	18,224,000	279,175,000
1st generation	7.9%	3.6%	28.8%
2nd generation	58.9%	55.9%	50.0%
Widebody	20.3%	25.7%	16.9%
New Generation	12.9%	14.8%	4.3%
Total	100.0%	100.0%	100.0%

* Readjusted

(information continued on next page)

Aircraft Type	No. of aircraft in service Dec. 1987	Hours flown CY 1987	Accumulative total hours 1959-1987
Two-crew	3,812	9,786,000	95,838,000
Three-crew	3,411	8,438,000	183,337,000
Total	7,223	18,224,000	279,175,000
Two-crew	52.8%	53.7%	34.3%
Three-crew	47.2%	46.3%	65.7%
Total	100.0%	100.0%	100.0%

Table 3 provides a comparison of daily utilization by different aircraft types. In 1987, there were no significant changes in the utilization rates of all types of aircraft.

Table 3 — Daily Utilization of Jet Transport Aircraft By Aircraft Type 1986-1987

Aircraft Type	Average daily utilization (Hours) 1986	1987	Change
Two-engine	6.4	6.9	+0.8
Three-engine	7.4	6.8	-0.6
Four-engine	6.2	6.9	+0.7
1st generation	3.2	3.2	—
2nd generation	6.1	6.6	+0.5
Widebody	9.3	8.9	-0.4
New generation	—	7.9	—
Two-crew	6.9	7.0	+0.1
Three-crew	6.5	6.8	+0.3

Table 4 shows the distribution of worldwide airline fatal accidents and hull-losses by phrase of operation. Table 5 shows the distribution of fatal accidents and hull-losses and rates by aircraft make/model entering into service in different time periods. Table 6 presents the fatal accident and hull-loss rates by aircraft with different number of engine and different number of flight crew. Note that this is the first year the statistics for those new generation jets are provided. The safety record of three-engine jet aircraft have been the best of all for many years. Obviously, advanced technology in aviation and higher experience levels contribute significantly to safer flying because the safety record for the second generation jet and widebody jet is much better than that for the first generation jet.

Table 4 — Worldwide Airline Jet Transport
Fatal Accidents and Hull-Losses
By Phase of Operation
1959-1987

Fatal Accidents (1)					Hull Losses (1)			
Takeoff/ Climb	Cruise	Approach/ Landing	Ground	Year	Ground	Approach/ Landing	Cruise	Takeoff/ Climb
14(43.8)	3(9.3)	15(46.9)	0(0)	59-64	1(2.4)	22(53.7)	4(9.8)	14(34.1)
14(25.5)	7(12.7)	34(61.8)	0(0)	65-69	6(8.1)	41(55.4)	7(9.5)	20(27.0)
18(24.0)	16(21.3)	41(54.7)	0(0)	70-74	6(6.6)	49(53.8)	12(13.2)	24(26.4)
16(28.0)	12(21.4)	27(48.2)	1(1.8)	75-79	4(4.9)	43(52.4)	11(13.4)	24(29.3)
15(27.2)	13(23.6)	25(45.5)	2(3.7)	80-84	6(9.0)	37(55.2)	8(11.9)	16(23.9)
5(45.5)	1(9.0)	5(45.5)	0(0)	1985	1(7.7)	6(46.1)	1(7.7)	5(38.5)
2(40.0)	1(20.0)	2(40.0)	0(0)	1986	1(11.1)	5(55.5)	1(11.1)	16(22.3)
.4(30.8)	3(23.1)	6(46.1)	0(5.6)	1987	1(7.7)	5(38.5)	3(23.1)	4(30.7)
88(29.1)	56(18.6)	155(51.3)	3(1.0)	59-67	26(6.7)	208(53.3)	47(12.1)	109(27.9)

(1) Numbers in parentheses are percentages within the Fatal Accidents and Hull Loss Groups

Table 5 (A) — Worldwide Airline Jet Transport
Fatal Accidents, Hull-Losses and Rates
1959-1987

Number of Fatal Accidents and Hull-Losses*

	1st Generation		2nd Generation		Widebody		New Generation	
	Fatal	Hull Loss	Fatal	Hull Loss	Fatal	Hull Loss	Fatal	Hull Loss
1959-1964	32	41	—	—	—	—	—	—
1965-1969	34	47	21	27	—	—	—	—
1970-1974	41	51	30	37	4	3	—	—
1975-1979	23	35	26	36	7	11	—	—
1980-1984	12	18	32	40	11	9	—	—
1985	2	1	6	8	3	4	—	—
1986	0	1	5	7	0	1	—	—
1987	3	3	6	6	2	2	2	2
Total	147	197	126	161	2	30	2	2

Table 5 (B) — Rates per 100,000 Flying Hours

	1st Generation		2nd Generation		Widebody		New Generation	
	Fatal	Hull Loss	Fatal	Hull Loss	Fatal	Hull Loss	Fatal	Hull Loss
1959-1965	.342	.438	—	—	—	—		
1965-1969	.115	.159	.197	.252	—	—		
1970-1974	.179	.236	.109	.135	.111	.082		
1975-1979	.133	.203	.075	.104	.062	.098		
1980-1984	.157	.235	.072	.090	.051	.050		
1985	.244	.122	.062	.084	.046	.063		
1986	—	.159	.047	.065	—	.014		
1987	.451	.451	.058	.058	.428	.428	.074	.074
ALL	.180	.243	.095	.122	.056	.063	.074	.074

*Aircraft destroyed on ground by force are excluded from computation of average and rates.

Table 6 — Worldwide Airline Jet Transport Fatal Accidents, Hull-Losses and Rates 1959-1987

Jet Transport Aircraft

Graphic not available

Accident/Incident Briefs

Depressurization Threat Defused

United States - April

B-747: Minor damage, no injuries to 322 plus crew.

One and one-half hours out on a flight from San Francisco to Frankfurt, the plastic layers of a cockpit side window began to come apart. Facing possible structural failure of the window and the threat of depressurization, the crew decided to turn back and made a safe emergency landing at San Francisco.

Engine Explosion

United States - April

Fokker F28: Substantial localized damage, minor injuries to some passengers.

En route from Charlotte, N.C., to Columbus, Ohio, at 31,000 feet, the starboard engine exploded, ripping a hole in the fuselage and blowing a restroom door partially through the other side of the fuselage, threatening to damage the remaining engine. The pilot made an emergency landing at Charleston, W. Va. During the descent, several of the 45 passengers reported ear problems because of the rapid decompression, and one flight attendant suffered a head injury after a fall.

Engine Fire On Takeoff

Egypt - March

DC-8: Aircraft destroyed, fatal injuries to four.

Seconds after takeoff from Cairo International Airport, an engine of the chartered Nigerian DC-8 caught fire. The aircraft crashed at the edge of the airport and was engulfed in a ball of fire, killing the four-man crew and its cargo of 50 cattle. The aircraft, en route from Denmark to Sharjah, had stopped at Cairo for refuelling.

Runway Overrun

Denmark - April

DC-8: Extensive damage, no injuries to seven.

Arriving at Billund to pick up a cargo of cows, the chartered Nigerian aircraft overshot the runway by 300 feet. The left main gear failed and the airplane sustained substantial damage. The seven persons aboard evacuated without injury.

Flying Seats

United States - November

Concorde: No damage, minor injury to one.

On takeoff from New York to London, a pair of forward seats separated from the floor rail and fell back onto the legs of a passenger in the seat behind. A passenger in the loose seat reported some back pain after he tried to restrain the seat assembly and himself.

The seat was reattached, the affected passengers were moved elsewhere in the airplane and the flight continued to its destination. Subsequent investigation found no mechanical fault with the seat attachments. Apparently the seat had not been positively locked into position, allowing it to come loose under the acceleration of takeoff. A technical note has been published emphasizing the need to ensure that the seat attachments and seat rail are in good condition and that the seat is positively locked in position.

Locked In The Loo

United States - (No Date)

B-747: Minor damage, minor injury to one.

A passenger became trapped in a lavatory during a flight from Los Angeles to London. While a purser was attempt-

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Accident/incident briefs are based upon preliminary information from government agencies, aviation organizations, press information and other sources. The information may not be accurate.

ing to free the door, the passenger forced it open. The door struck the purser on the head, bruising and temporarily dazing him.

A subsequent report was issued that the type of door involved in the incident has been replaced by modified doors and locks to prevent similar incidents.

Low Approach, High Ground

United Kingdom - June 1986

DHC-6 Twin Otter: Damage, injuries not specified.

The recently released final report of the 1986 accident attributed the accident cause to the aircraft commander's decision to allow the other pilot, who was at the controls, to make a visual approach in "unsuitable" meteorological conditions. A contributory cause was an error in visual navigation.

The accident aircraft was on a scheduled passenger flight from Glasgow Airport to the Island of Islay with two pilots and 14 passengers aboard. One pilot was operating the aircraft and the other was a supervisory pilot who was designated as the aircraft commander.

Prior to departure, the forecast indicated cloudy weather along the route and the probability of poor weather at the destination. The latest weather was radioed to the crew shortly after they began the descent to Islay; it included extensive low clouds and drizzle. Nevertheless, the Twin Otter was set up for a visual approach. The pilots reportedly misidentified a landmark and turned inland at the wrong place, striking rising ground about a mile from the coast at an altitude of 360 feet msl.

Single-Engine 737

United States - December 1987

B-737: Engine destroyed, no injuries to 65.

The aircraft was climbing through 4,000 feet after takeoff from Philadelphia when the number 2 engine fell off and landed in a field. When the pilots noticed the number 2 throttle retard and the engine instrument readings unwind, they pulled the fire handle. They could operate the flaps electrically but were unable to obtain more than 10 degrees for landing. The aircraft was turned around and made an uneventful return landing with no reported injuries among the 60 passengers and crew.

The NTSB accident investigation was joined by two Boeing representatives. Preliminary results showed that the aft engine mount cone bolt broke at the thread relief area where there was evidence of metal fatigue. The safety cable was also broken. The NTSB is evaluating the remaining bolt half along with the flight data and cockpit voice recorders.

Unscheduled Rock And Roll

United Kingdom - January 1986

Shorts 360: Minor damage, no reported injuries.

The recent released official accident report cited significant amounts of airframe ice as the main factor in the premature landing of the aircraft on approach to East Midlands.

The aircraft was on a flight from Dublin and was established on the rainy night ILS approach. When it passed below 1,000 feet, the airplane entered a series of rolling oscillations and a high rate of descent. The pilot was able to regain control just as the aircraft struck power lines, and it made what was described as fairly gentle contact with the ground. The airplane came to rest at the edge of a small wood about 1,500 feet after striking the wires. The passenger cabin received little damage and the occupants all evacuated the airplane with no trouble.

Besides mentioning the significant amount of airframe ice, the accident report stated that turbulence or a downdraft could have contributed to the accident, as could have a delay in applying go-around power. The fact that the airframe deicing system was not in operation because it is difficult to detect clear ice at night in this aircraft, led to three recommendations:

1. consideration by the CAA of inflatable boot de-icing for aircraft cleared for all known types of icing (accepted).

2. a requirement for exercise of pneumatic wing and tail deicing systems during final when the aircraft is, or has recently been, in icing conditions (accepted).

3. a review of the effectiveness of the SD-360's ice detection spotlight and whether these should be installed on both sides of the airplane (accepted).

Roadway Incursion

Philippines - October 1987

A 300B: Substantial damage, no reported injuries.

According to the official accident report, the aircraft encountered a shift from a headwind to a strong tailwind during touchdown at Manila International Airport after a flight from Singapore. The aircraft overran the runway and came to rest with its nose over the edge of a busy expressway, where it was hit by a gravel truck. During the wind shift, the nose gear collapsed on the runway and as the aircraft skidded along the runway, friction ignited a wing fuel tank. The fire was quickly extinguished by airport rescue equipment and the airplane's occupants were all evacuated safely through four emergency exits.

Fire On Board

South Africa - April

DC-3: Aircraft destroyed, fatal injuries to 23.

Halfway through a flight from Bloemfontein to Johannesburg, the pilot of the chartered aircraft carrying jockeys and trainers to a race meeting radioed, "I have got a fire on board." He was advised by the Bloemfontein control tower to land at the nearby town of Welkom. However, the aircraft crashed in flames and exploded in a field near the railway town of Hennenman, 155 miles southwest of Johannesburg. All 20 passengers and two crew members died on impact.

Stormy Approach

Australia - April

PA-31 Navajo: Aircraft destroyed, fatal injuries to three, serious injuries to two, no reported injuries to two.

The airplane was approaching to land at Sydney on a flight from Coolangatta in stormy weather. Shortly after radio contact with the pilot was lost, the airplane crashed off the New South Wales north coast, killing three of the seven aboard and sending two others to the intensive care unit of a nearby hospital.

Trouble On Takeoff

Tanzania - March

Cessna 402: Aircraft destroyed, fatal injuries to five.

The aircraft crashed on takeoff from Rubondo Island at the southern end of Lake Victoria, killing the pilot and four passengers. The weather was reported as clear. The chartered aircraft had earlier flown to the island to pick up the passengers.

No Go-Around

United Kingdom - October 1987

Cessna 210: Substantial damage, no injuries to five.

Premature flap retraction during a go-around contributed to the accident at Blackbushe Airport last fall. The airplane had bounced on touchdown, according to witnesses. The pilot considered the airspeed too high to continue the landing and began a go-around. He raised the flaps and the gear. Although the engine was developing full power, the Cessna sank back to the surface and slid to a stop at the end of the runway. The propeller and fuselage received substantial damage, but the five occupants evacuated the aircraft through the main doors without suffering any injuries.

A Scrape On The Nose

United Kingdom - April

Piper PA-31 Turbo Navajo: Significant damage, no serious injuries to seven.

The aircraft was landing after a flight from Biggin Hill to Le Touquet, when the nose gear collapsed. The aircraft received propeller damage and a broken nose gear strut. There were no serious injuries to the seven persons aboard.

Fatal Combination

Iceland - April

Piper PA-44 Seminole: Aircraft destroyed, fatal injuries to one.

The combination of ingredients included: overseas ferry

flight, snowstorm, low visibility, onset of night, high winds and possibly aircraft ice accumulation. During final approach, the PA-44 crashed into the sea one mile short of the runway at Reykjavik Airport.

Rescue operations were hampered by the very poor weather. When the airplane was found in 17-foot-deep water the next day, it was found that both wings had been torn from it, indicating to investigators that it might have been flown directly into the water. The body of the pilot was found inside the fuselage.

Lightplane Vs. Ice

United Kingdom - April

Piper PA-28 Cherokee: Substantial damage, serious injuries to two.

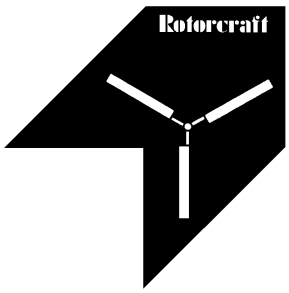
The pilot of the lightplane reported aircraft icing at 2,000 feet while on a flight from Halfpenny Airfield. Shortly afterwards, the aircraft crashed on the side of a hill near Ratlinghope. The two occupants of the Piper suffered serious injuries.

Not Enough Runway

United Kingdom - April

Piper PA-28 Cherokee: Aircraft destroyed, serious injuries to one of three.

Taking off on a flight from Eaglescott to Oxfordshire, the aircraft clipped a hedge and nosed down, crashing into a field. The pilot and one passenger escaped without being hurt but a second passenger received serious injuries. The airplane was destroyed.



Auto-Bounce

United Kingdom - April

Robinson R22: Substantial damage, no injuries to two.

The rotorcraft was making an autorotation landing. During the touchdown at Redhill Aerodrome, it bounced and turned over, resulting in substantial damage to the aircraft. The two occupants were uninjured.

Shifty Cargo

United Kingdom - April

Hughes 500C: Aircraft destroyed, no injuries to one.

During a local delivery run a mile south of Crubenmor, Scottish Highlands, the rotorcraft's cargo shifted and struck the tail rotor. During the forced landing the aircraft was destroyed but the pilot, the lone occupant, was not injured.

Tired Part Kills

United Kingdom - May 1986

Bell 214: Rotorcraft destroyed, fatal injuries to 18 passengers and crew.

The official report on the ditching of the Bell 214 in the North Sea stated that the accident was caused by the fatigue failure of a locking bolt in the rotor hub assembly. The aircraft was forced to ditch while on a flight to Aberdeen with 18 oil field workers aboard. The U.K. Air Accidents Investigation Branch noted that many problems experienced during the ditching could have been discovered earlier had there been ditching trials during aircraft certification. The Board recommended such trials for manufacturers.

Mechanical Difficulty

Australia - March

Bell 214: Aircraft destroyed, no reported injuries to 15.

The helicopter with a crew of two was transporting 13 oil field workers to a drilling ship off Northwest Australia when they encountered mechanical difficulties. A Mayday call was transmitted before the rotorcraft ditched in the Timor Sea approximately seven miles from Troughton Island. All 15 aboard were rescued.

What Was That Bang?

United States - March

Bell 47: Substantial damage, no reported injuries.

While hovering at 6,500 feet msl on a flight to round up wild horses, the pilot heard a loud bang and the rotor rpm began to decay. He performed a hovering autorotation that resulted in a hard landing, during which the main rotor severed the tail boom. The cabin was not damaged and the pilot evacuated without injury. The aircraft sustained substantial damage.

Student Freeze

United States - March

Hughes 269A: Rotorcraft destroyed, minor injuries to two.

During an instructional flight, the student pilot was performing aerial taxiing. He had turned the aircraft downwind when the helicopter began to turn to the right. The student pilot then reportedly "released some collective control" and the helicopter descended. Ground resonance occurred on landing. The flight instructor tried to add collective to lift the helicopter back off the ground but the student would not relinquish the controls. The aircraft was subsequently destroyed and the two pilots sustained minor injuries.

Grassy Entanglement

United States - March

Robinson R22: Substantial damage, no reported injuries.

The pilot was making a landing in a grassy area. The front skids became entangled in two-foot-high grass and the helicopter nosed over; it was damaged substantially. The pilot, who was not injured, reported he had improperly judged the height of the grass prior to the landing.