Questions, More Questions

The author says cavalier disregard for company procedures prompted the captain of a CASA C-212 flight to make some incorrect decisions during his landing at a Detroit airport.

by

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On March 4, 1987, a Construcciones Aeronautics, S.A. (CASA) C-212-C, crashed just inside the threshold of Runway 21R at Detroit Metropolitan Wayne County Airport, killing nine of the 19 persons on board.

The U.S. National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the captain's inability to control the airplane in an attempt to recover from an asymmetric power condition at low speed following his intentional use of reverse thrust (beta mode) of propeller operation to descend and slow the airplane rapidly on final approach for landing. Other factors that contributed to the accident were an unstabilized visual approach, the presence of a departing DC-9 on the runway, the desire to make a short field landing and the higher-than-normal flight idle fuel flow settings of both engines.

When an accident analyst digs deep into NTSB/AAR-88/08, a number of interesting facts emerge which give rise to a number of questions.

History of the Flight

The flight departed Mansfield for Cleveland at 1305 with two pilots, a flight attendant, four passengers, a company manager and three deadheading crew members. Company procedures allowed the captain and first officer to alternate flying legs of the flight. On this leg, the first officer should have been flying, but the captain was the pilot.

Weather was not a factor — 2,500 thin broken, visibility 20 miles.

After ATC handed the flight off to the control tower, the first officer made the call and reported ". . . six out for 21R." At 1431:14, the tower controller replied, ". . . Runway 21R, cleared to land. Winds one seven zero at five." The first officer's immediate acknowledgement was the last transmission received from the flight.

At 1431:21, the tower instructed a DC-9 to taxi into position and hold on Runway 21R, and the transmission was acknowledged. At this point, the tower controller began copying inbound landing sequences for all flights from the TRACON coordinator over internal communication lines when he advised TRACON, "Okay, gotta go." At 1432:47, the tower instructed the DC-9, ". . . turn left, heading one eight zero. Runway two one right cleared for takeoff." The flight acknowledged at 1432:52, began its takeoff roll and departed.

About 1434, the CASA struck the ramp area 1,010 feet inside and to the left of the Runway 21R threshold. It then skidded 398 feet, struck three ground support vehicles in front of gate F-10 at concourse F and caught fire.

Deadhead Crew Comments

A captain who had flown this aircraft on previous flights earlier in the day was seated in 7B. He reported that he was aware that the airplane was being vectored for a left downwind approach. At 60 to 70 feet the airplane yawed violently to the left, banked 80 to 90 degrees in a descent, then banked to the right and hit the ground, he said.

A first officer seated in 7A reported that the flaps were extended, the airplane was 75 to 100 feet above the ground and was between the international terminal building and the Runway 21R threshold when it rolled abruptly into a 60 to 90 degree left bank in a nose down attitude. He said power was reduced on the right engine, but the sound of the left engine remained constant. The airplane then banked to the right and hit the ground.

Eyewitness Comments

The captain of an airplane holding short of Runway 21R awaiting takeoff clearance reported that the airplane appeared to be very high on final approach. The nose then pitched up as if the pilot were about to make a go-around, followed by a 15-to-20 degree right bank and then a roll into about a 60-degree left bank. The left bank continued, and the airplane descended in a "slip" or "skid until it was 50 feet above the ground when it rolled into a right bank. He said the right wing struck the ground and broke at about midspan.

A company captain who was standing on the ramp of the company gate area and about 3,500 feet east of the Runway 21R threshold said that the aircraft appeared to be on a normal approach when the DC-9 taxied onto the runway and took off without stopping. He said the interval between the departing

DC-9 and the landing CASA appeared "slightly snug." He said that the CASA leveled off momentarily over a service road, resumed its descent and he then heard an increase in engine noise as the airplane neared the normal approach path. The left wing dipped, the airplane started toward the ramp, the nose pitched up appreciably and the left bank increased 45 to 60 degrees. He noted that the airplane decelerated rapidly as it passed over the grassy median between the runway and the ramp. The airplane then snapped back to a wings-level attitude before it continued to about a 70-degree right roll. The nose then dropped, and the airplane struck the ramp.

Flight Path Reconstruction

The airplane's flight path was reconstructed using recorded radar data. In addition, one data point was obtained from an eyewitness' observation, another from the point where the airplane initially struck the ground, and the third from the location where the airplane came to rest.

Manual calculations and airplane performance computer programs defined a range of flight paths consistent with the accuracy of the recorded radar data. The data showed that at 1432:43, the airplane was at a point 2.5 miles from the runway threshold, descending from 2,000 feet at 1,000 feet per minute and traveling at 170 KIAS and it continued to descend at 1,000 feet per minute. At about 1/2 mile from the threshold, it started slowing from about 140 KIAS to about 80 KIAS within 20 seconds. The airplane started leveling off during the last part of the deceleration. The descent increased about the time 80 KIAS was reached.

Another computer program calculated the net forces that would generate the accelerations and rates of climb derived from the performance program, and then subtracted the known forces such as lift and drag in order to obtain the required thrust levels. Various drag levels were calculated by using standard drag coefficients modified by assuming sideslip angles and flap extension angles of various magnitudes. The program was also used to correlate the power lever (PL) positions, thrust levels and the airplane performance from flight test information obtained from a test of an airplane flown with the power levels in the beta range.

Computations indicate that about 3,000 pounds of negative thrust were required to decelerate the airplane to match its computer-generated profile. The power levers would have been in the beta mode near the ground idle gates for 15 to 20 seconds in order to have produced the 3,000 pounds of negative thrust.

Crewmember Training

The airline reported that the basis for crew coordination training was the use of approved checklists and standard callouts which were designed to reduce workload and to identify crew errors and system malfunctions at the earliest moment. The standard callouts were designated as memory items and the responsibility of making them was assigned to the non-flying pilot. The pilot flying was responsible for verifying the callout and acknowledging the appropriate action. Failure to follow the appropriate procedures should alert either pilot to correct a mistake. For example, an airspeed indication of 10 knots below or above Vref would require a callout by the non-flying pilot.

According to the airline, a normal visual approach to the Detroit Metropolitan Airport would consist of first completing the descent and in-range checklists before entering the downwind leg of the approach. The airspeed should be stabilized at 120 KIAS on the downwind leg. Just before approaching a position abeam the runway threshold, the flaps should be extended to 15 degrees, or 37.5 percent, and the approach and landing checklists completed, except for moving the engine speed levers full forward.

The speed should stabilize at 105 KIAS without having to change the power. After the crosswind (base leg) turn, a rate of descent of 400 to 500 feet per minute should be maintained at 105 KIAS. Beginning with the turn onto final approach, flaps should be maintained at 15 degrees and power should be adjusted to maintain Vref plus five KIAS and a three degree glide path to the runway established at a point about one mile from the threshold. The approach should be planned to cross 50 feet above the threshold at Vref.

However, the airline reported that the versatility of the CASA C-212 permitted flying the airplane at a wide range of approach speeds. A slow speed with full flaps (40 degrees) was used for operation to short runways at small airports, although this speed and flap setting would be inappropriate for operations at a major airport under heavy traffic conditions. It was noted that 105 knots is six knots above Vref with 15 degrees flaps and 12 knots above Vref with 40 degrees flaps at the airplane's maximum landing weight. Under the circumstances of the accident, the airline reported that they would have expected the airplane to be at 100 to 120 KIAS about 1/2 mile from the runway threshold.

A captain for the airline reported that the company had used a previous incident of improper use of beta as a training session for all pilots. The incident involved an approach where a pilot (not the captain involved in the accident) had intentionally retarded the PLs into the beta mode to see what would happen. Although the airplane was at several thousand feet in a descent at the time, it yawed violently and the experience startled the crew and passengers. The airline issued a strongly worded memorandum forbidding such actions in the future.

Use of Beta Mode

The NTSB believed that the pilot flew an unstabilized visual approach, and that he used the beta mode in flight to decelerate the airplane rapidly, a technique not authorized by the company. Factors that the NTSB said would have led the captain to use the negative thrust available in the beta mode on this approach were the speed of the airplane, the shortened base leg approach, the location of the departing DC-9, his tendency to use this technique occasionally to make short field landings

and, possibly, his desire to make up for the delay in the arrival time. Since airspeed was high, said the NTSB, the captain did not have the benefit of the increased drag that the flaps could have provided because the speed was above that which would allow use of the maximum extension of flaps (135 KIAS).

The manner in which the approach was flown (as depicted on radar) appeared consistent with reports that the captain flew the CASA "sportier" than other company pilots, and that he had his own method and philosophy about flying into the Detroit airport. The NTSB said that because of noise abatement considerations in that area, air traffic control kept airplanes relatively high when close to the airport before allowing them to descend and land. The airline pilots referred to this high, close-in situation as the unpressurized "slam dunk" maneuver as it applied to their operation. In addition, the company's gate area was close to the threshold of Runway 21R. It was these conditions, said the NTSB, that may have explained why the captain of this flight flew a steeper approach than other company pilots.

According to the NTSB, moving the PLs behind the flight idle stop and into the beta mode would have produced significant deceleration, propeller cyclic noise, stickfree nosedown pitch (which is correctable) and potentially high rates of descent. The CASA-approved flight manual contained the warning, "Power lever must not be retarded aft of flight idle when in flight. Excessive drag may result." The NTSB noted that the design of the beta latch mechanism of the PLs permitted use of the beta mode in flight. The Board believed that the captain placed the PLs into the beta mode to slow the airplane rapidly while continuing the descent to land. This produced a significant asymmetric power condition and control difficulty from which the pilot could not recover, given the low altitude of the aircraft.

The Crew Make-Up

The captain was employed by the company in 1970, held an Airline Transport Pilot certificate with type ratings in the CASA and the Shorts 360. He received his initial type rating in the CASA in September 1980, and was designated a line check airman in April 1984. At the time of the accident, he had accumulated about 17,953 hours of total flight time, of which about 3,144 hours were in the CASA 212. He had been offered and accepted employment as a chief pilot for another commuter air carrier and was due to report there two weeks following the date of the accident. Although the NTSB gave no significance to the following, the captain was 5 feet 5 inches tall and weighed 140 pounds.

The first officer was employed by the company in July 1986 and held a commercial pilot certificate issued in July 1985. He completed his proficiency check in the CASA satisfactorily in August 1986. He had a total flight time of about 1,593 hours.

What Other Pilots Thought

The NTSB interviewed 22 company pilots who had flown with the captain to determine his flying habits, pilot techniques and adherence to the company's operational practices. Of the 22, 13 were first officers. The majority thought highly of the captain. He was a senior pilot in the airline and one of the most experienced. He was reported as loyal to the company, one who flew "pretty much by the book," a "good stick and rudder man," a good stable pilot and well liked by his peers.

What is particularly curious and gives rise to questions are the other comments those same pilots made about the captain. He never used the shoulder harness in the CASA, and he was considered a "cowboy" by some. He used steeper angles in descents and high rates of descents on visual approaches than other company pilots. He frequently made short field landings, flying at or below Vref to see if he could use the least amount of runway, and he always turned off at the first taxiway for Runway 21R at Detroit.

The captain handled the CASA "sportier" than others, used 2,000 feet per minute rate of descent, especially at Detroit, and "pressed" approaches more aggressively than other pilots in order to salvage an approach rather than go-around. He had "his own method and philosophy concerning the tactic of flying the unpressurized 'slam dunk' arrival into Detroit."

He was known to reduce the fuel condition levers on the Shorts 360 to obtain a faster deceleration and to occasionally ease the PLs aft of the flight idle gate in both the CASA and the Shorts just as the main landing gear touched the runway. (In the Shorts, it required releasing another safety lock, air/ground lever) before the power levers could be retarded below the flight idle gate. First officers were shown how to do this in the Shorts in order to achieve better deceleration on landing.

The captain had retarded the PLs in the CASA 212s behind the flight idle gate inflight, according to three first officers who had flown with him on those occasions.

There were no negative comments about the first officer. Coworkers described him as a sharp, professional pilot, very thorough, amiable toward accepting instruction and advice and well-liked by his peers.

Consider The Questions

It does not stretch one's imagination too much to come up with a portrait of the captain. Short in stature and certainly highly experienced, he struck his coworkers as a pilot who flew by the book, was a good stick and rudder man and a good stable pilot.

That is one perspective. But, another picture would be of a pilot who did not pay a whole lot of attention to company procedures and who believed that his own methods and philosophies of flying the airplane were far superior to the "book."

The company procedures for approaches at Detroit appear to be rather clear. Why weren't those good enough for this captain? If his own procedures were so much better, why

weren't they adopted by the company? Although the company policy allowed for the pilots to alternate flying legs of the flight and it was the first officer's turn to fly, did the captain elect to fly this leg in order to facilitate arrival by using his methods?

If the company issued a "strongly worded memorandum" forbidding intentionally retarding the PLs into the beta mode and this captain ignored those instructions, what prevented other pilots who witnessed this captain ignoring those orders from bringing those indiscretions to the attention of the company?

Since there was no cockpit voice recorder on board the CASA, no one can tell what conversations took place. The company training procedures required standard callouts by the pilot not flying and an acknowledgment by the pilot flying. "Failure to follow the appropriate procedures should alert either pilot to correct a mistake. For example, an airspeed indication of 10 knots below or above Vref would require a callout by the nonflying pilot."

From the NTSB's reconstruction of the flight path, it is apparent that altitudes and airspeeds were considerably off the normal procedures. Did the first officer call those out? If he did and there was no acknowledgment from the captain, what should have the first officer done? Was the first officer constrained from taking action in deference to the captain's greater flight time and experience? (The captain had more than 10 times the flight time of the first officer — 17,000 hours vs 1,500 hours).

The NTSB makes no mention of the airline having cockpit resource management training or, more specifically, assertiveness training. Even if that training had been provided, would this first officer have been able to overcome the "macho" flight tendencies previously demonstrated by the captain?

Why wasn't this captain's flagrant disregard for company procedures and the aircraft flight manual exposed before the NTSB found out about them following the accident? Is there, or can there be, a guiltless procedure that does not induce short-term employment for pilots who report on the behavior of fellow pilots in the cockpit? In any case, if the company knew about the flying habits of this captain, would they have taken any action?

Given this captain's characteristics what sort of chief pilot would he have made for his new employer if the accident had not spoiled his opportunity to move on? What would have been his motto? "Don't do as I say. Do as I do! "?

Conclusions of the NTSB

What the NTSB said about the causal factors speak for themselves. Steep and fast approach, higher-than-normal fuel flow settings contributing to the speed of the airplane, a departing DC-9 causing a decision to slow down rapidly, intentionally placing the power levers in the beta mode to slow the airplane rapidly and make a short field landing, design of the power lever beta latch mechanisms that permitted use of the beta mode in flight, loss of control as a result of operating propellers in the beta mode and too low an altitude to allow for a successful recovery.

What the NTSB left unsaid may be more important in terms of accident prevention. There really is no room in any airplane cockpit for a pilot who chooses to fly in his own inimitable way with cavalier disregard for company procedures, flight manual restrictions, aviation regulations and the safety of the other people aboard the aircraft. In any circumstance, a pilot who displays these characteristics should stick out like the proverbial sore thumb and be identified for the world to see.

And if that sort of pilot is recognized for what he is, the final question should be: Do we keep that pilot on the payroll? ♦

About the Author

John A. Pope established John A. Pope & Associates, an aviation consulting firm located in Arlington, VA, U.S., after retiring in 1984 as vice president of the U.S. National Business Aircraft Association. He specializes in developing comprehensive operation manuals for corporate flight departments.

Pope is Washington Editor for "Aviation International News" and is a frequent and able contributor to Flight Safety Foundation's publications. He is equally at home as an aviation safety speaker.

He served as a command pilot in the U.S. Air Force and the Air National Guard. He retired as a colonel from the U.S. Air Force Reserve after 33 years service.

Reports Received at FSF

New Books

Report Series Codes Dictionary. 3rd ed. Gale Research, Inc. 1986. 647p. ISBN 0-582-2147-5.

Provides a report number to issuing organization, and issuing organization to report series directory for over 20,000 alphanumeric codes.

Transportation Deregulation and Safety. Conference Proceedings, June 23-25, 1987. Transportation Center, Northwestern University. 932p. (Selected papers to be published as: Transportation safety in an age of deregulation. Edited by Leon N. Moses and Ian Savage. ISBN 019505797X.

An investigation into the linkages between economic deregulation and safety performance in the U.S. aviation and motor carrier industries. "Airline accident statistics for the commercial sector do not support the position that safety has been denigrated. The 40-year downward trend in the number and rate of accidents, fatal accidents and fatalities has not been reversed under deregulation. Supporters of regulatory reform rest their case that safety has not been compromised with these numbers. However, there is serious debate about what the future is likely to be in safety terms. . . .Up to this point in time, there is no evidence that regulatory reform has denigrated safety in the motor carrier and airline industries. However, it is clear, and broadly understood by economic and other experts, that changes in economic, including regulatory, conditions can lead to decisions that change safety conditions. The role of the government, the amount and nature of safety surveillance, and the quality and quantity of physical infrastructure should adjust accordingly."

Using 1-2-3. Special Edition. Que Corporation. 905p. ISBN 0-88022-332-4 (pbk).

Practical guide for using Lotis 1-2-3.

Fifth Annual International Aircraft Cabin Safety Symposium: proceedings, February 22-25, 1988, Claremont Resort Hotel, Oakland, California. Co-sponsored by the University of Southern California, Federal Aviation Administration-Western Pacific Region, Southern California Safety Institute. Published by Southern California Safety Institute. 320p.

Topics: Fire Standards & Cabin Crew Training, Passenger Considerations, Health Care and FAA-Passenger/Cabin Safety Activities.

Juran's Quality Control Handbook. 4th ed. J.M. Juran, ed. 1808p. ISBN 0-07-033176-6.

Statistical Abstract of the United States. 1988. 108th edition. U.S. Department of Commerce. Bureau of the Census. 943p.

A great source for statistics on any and every subject, from the exchange rates and the CPI to population, education, income and transportation.

Reports

Aviation Services. Automation and Consolidation of Flight Service Stations. U.S. General Accounting Office. February 1988. Report No. GAO/RCED-88-77. 28p.

Presents a review of the FAA flight service station modernization program. Four key issues are addressed: Required services — are the automated FSS performing all the services FAA requires, weather observations — are weather observations equal to or better than those the FSSS had provided, technology — are technical problems experienced at the automated FSS adversely affecting FAA's ability to provide services, and staffing — are staffing constraints having an adverse impact on the operation of FSS.

Aircraft Noise. Implementation of the FAA's Expanded East Coast Plan. U.S. General Accounting Office. August 1988. Report No. GAO/RCED-88-143. 62p.

Reviews several aspects of the FAA's three-phase revision of air traffic control routes and flight procedures in the eastern United States. Focuses specifically on changes in air routes and the resulting citizen complaints following implementation.

Aviation Safety. Measuring How Safely Individual Airlines Operate. U.S. General Accounting Office. March 1988. Report No. GAO/RCED-88-61. 37p.

Provides information on areas of importance to airline safety, the availability and quality of data in these areas, and ongoing research on measuring airline safety. The report indicates that FAA inspection results have potential for use as measures of airline safety in the areas of pilot competence and maintenance quality if FAA can address current deficiencies.

Aviation Weather. Status of FAA's New Hazardous Weather Detection and Dissemination Systems. U.S. General Accounting Office. September 1987. Report No. GAO/RCED-87-208. 28p.

Summarizes the GAO review of the FAA's efforts to develop better ground-based hazardous weather detection systems and disseminate the information to pilots in a more timely manner.

Air Traffic Control. Efforts to Expand the New York Terminal Area Automatic System. U.S. General Accounting Office. July 1988. Report No. GAO/IMTEC-88-29. 22p.

This report discusses the status of FAA's actions to enhance computer capability at its New York Terminal Radar Approach Control (TRACON) facility.

The Advanced Automation System: A Benefit/Cost and Risk Analysis. Joseph H. Sinnott, et al. Mitre Corporation. December 1987. MTR-87W235. FAA Contract No. DTFA01-84-C-0001.

This report presents the results of a benefit/cost and risk analysis of the Advanced Automation system. The study analyzed seven alternative systems incorporating different levels of air traffic control automation capabilities, different levels of facility consolidation and different acquisition strategies.

Airport Capacity Enhancement Plan. Final Report, February 1986 — February 1987. U.S. Department of Transportation, Transportation Systems Center. 1987. Report No. DOT-TSC-FAA-87-3. 168p.

This report identified the causes and extent of capacity and delay problems currently associated with the U.S. air system, projects the effects of increased air traffic on airport capacity over the next decade, and outlines various planned and ongoing FAA projects intended to reduce capacity-related problems.

Federal Aviation Regulations

Airman's Information Manual. Official Guide to Basis Flight Information and ATC Procedures. October 20, 1988. U.S. Federal Aviation Administration.

This manual is designed to provide airmen with basic flight information and ATC procedures for use in the National Airspace System of the U.S. The information contained parallels the U.S. Aeronautical Information Publication distributed internationally. The manual contains the fundamentals required in order to fly in the U.S. NAS. It also contains items concerning health and medical facts, factors affect slight safety, a pilot/controller glossary of terms used in ATC, and information of safety, accident and hazard reporting.

International Flight Information Manual. Volume 36, April 1988. Amendment No. 2, October 1988. U.S. Federal Aviation Administration.

The manual contains foreign entry requirements, directory of aerodromes of entry, and pertinent regulation and restrictions (including visa information.)

U.S. Civil Aviation Safety Records Calendar Year 1988

The 1988 safety statistics of U.S. civil aviation released by the National Transportation Safety Board (NTSB) show that the accident totals and accident rates were generally lower. General aviation accidents and fatalities fell to record lows in 1988. Accident totals and accident rates for major air carriers, as well as commuter air carriers and air taxi declined in 1988 from the previous year. Table 1 is a comparison of accidents, fatal accidents and fatalities of U.S. civil aviation by operation category for the years of 1987 and 1988:

Table 1 — Accidents, Fatalities and Rates U.S. Civil Aviation Calendar Year 1987
(Preliminary Data)

Operation Category	Accidents				Fatalities		Accident rates Per 100,000 aircraft hours			
	Total Accidents		Fatal Accidents				Total		Fatal	
	1988	1987	1988	1987	1988	1987	1988	1987	1988	1987
All Civil Aviation	2477	2633	474	479	1153	1177				
Air carriers operating under 14 CFR 121 (Major Airlines)										
All scheduled service@	29	33	3	4	285	231	0.275	0.320	0.020	0.030
Non-scheduled service	1	5	0	1	0	1	0.187	1.019	0.000	0.204
Air carriers operating under 14 CFR 135										
All scheduled service (Commuter Air Carriers)	20	34	2	12	21	61	0.991	1.740	0.099	0.614
Non-scheduled service (On-Demand Air Taxi)	97	99	28	29	57	64	3.360	3.341	0.97	1.01
General aviation	2332	2471	438	435	782	830	7.95	8.46	1.49	1.49

@One suspected sabotage accident excluded from total and fatal accident rates
Source: NTSB

General Aviation

General aviation aircraft in 1988 were involved in 2,332 accidents, 438 of which were fatal, resulting in 782 fatalities. The 2,332 accident totals and 782 fatalities were the lowest number on record. The 438 fatal accidents were three more than 435 in 1987, which was the lowest since the NTSB began compiling such statistics since 1966. The 1988 accident rate declined to 7.95 per 100,000 aircraft hours flown from 8.46, the sixth consecutive improvement. The fatal accident rate, however, held at 1.49 for the second consecutive year. The following pie-chart shows the distribution of aircraft hours flown and accidents by type of flying. Note that corporate/executive flying, which accounted for more than 15% of total general aviation flight time, accounted for less than 1% of total accidents. Table 2 is a comparison of general aviation accidents, fatal accidents and rate for the past 10 years.

Distribution of General Aviation Aircraft Hours Flown and Accidents by type of Flying

Accidents
1987

Aircraft Hours
Five-year Average
(1983-1987)

Graphic not available

Table 2
Accidents, Fatalities and Rates
U.S. General Aviation*
1978-1988

	Accidents		Fatalities			Accident Rates@ Per 100,000 Aircraft Hours	
Year	Total	Fatal	Total	Aboard	Hours Flown#	Total	Fatal
1978	4216	719	1556	1398	34,887,000	12.08	2.06
1979	3818	631	1221	1203	38,641,000	9.88	1.63
1980	3590	618	1239	1230	36,402,000	9.86	1.69
1981	3500	654	1282	1261	36,803,000	9.51	1.78
1982	3233	591	1187	1171	32,095,000	10.06	1.84
1983	3075	555	1064	1057	31,048,000	9.90	1.79
1984	3010	543	1039	1018	31,510,000	9.54	1.72
1985	2741	498	950	941	30,590,000	8.95	1.62
1986	2581	471	961	874	29,317,000	8.80	1.61
1987P	2471	435	830		29,208,000	8.46	1.49
1988P	2332	438	782		29,350,000	7.95	1.49

P Preliminary data.
Source of estimate: FAA.
* All operations other than those conducted under 14 CFR 121 or 14 CFR 135.
@ Suicide and sabotage accidents excluded from rates as follows:
Total - 1978 (2) 1980 (1), 1982 (3), 1983 (1), 1984 (3), 1985 (3), 1987 (1)
Fatal - 1978 (2), 1980 (1) 1984 (2), 1985 (2), 1987 (1)

Commuters and On-Demand Air Taxi

Air carriers operating under 14 CFR 135 in scheduled (commuter) and non-scheduled)on-demand air taxi) service in 1988 also had very encouraging safety records. Number of accidents involving commuter air carrier fell to 20 from 34 in 1987. Two were fatal, resulting in 21 fatalities, down from 61 in 1987. The accident rate was .991 per 100,000 aircraft hours as compared with 1.74 in 1987. The rate is the second lowest in the decade. The fatal accident rate for 1987 was .099 per 100,000 aircraft hours, down from .614 a year before, the lowest in the decade.

Air Carrier

In 1988, major air carriers were involved in 29 accidents in all scheduled service and one accident in all non-scheduled service. Three of them were fatal, accounting for a total of 285 fatalities, 274 passengers and crew members aboard the aircraft and 11 persons on the ground. The three fatal accidents were:

- An Aloha Airlines Boeing 737 that lost a top portion of its fuselage on April 28, near Maui, Hawaii, causing the death of a flight attendant;

- A Delta Airlines Boeing that crashed on takeoff on August 31 near Dallas, killing 14 persons aboard the aircraft;

- A Pan Am Boeing 747 that crashed December 21 at Lockerbie, Scotland, fatally injuring 270 persons.

The 29 total accidents with three fatal accidents occurred in 1988 in airline scheduled service are lower than 33 total accidents with five fatal accidents recorded in 1987. The total accident rate and fatal accident rate per 100,000 aircraft hours was 0.275 and 0.020 as compared with 0.320 and 0.030 in 1987. The following Tables 3 and 4 are a comparison of accidents, fatal accidents and fatalities for operations of all scheduled service and non-scheduled service for the past decade. Note that for the non-scheduled service, the major airlines, with only one non-fatal accident, enjoyed its best year since 1981. Briefs of all 29 accidents are shown in Table 5 on page 10.

Table 3
Accidents, Fatalities and Rates
U.S. Air Carriers Operating Under 14 CFR 121
All Scheduled Service
(Airlines *)
1978-1988

Year	Accidents Total	Accidents Fatal	Fatalities Total	Fatalities Aboard	Aircraft Miles Flown#	Aircraft Hours Flown#	Departures#
1978	20	5	160	150	2,520,165,000	6,031,743	5,015,939
1979	23	4	351	348	2,791,120,000	6,713,094	5,399,652
1980	15	0	0	0	2,928,955,000	7,069,481	5,567,044
1981	25	4	4	2	2,811,348,000	6,834,140	5,420,342
1982	16	4	234	222	2,806,885,000	6,697,770	5,162,346
1983	22	4	15	14	2,920,909,000	6,914,969	5,235,262
1984	13	1	4	4	3,258,910,000	7,736,037	5,666,076
1985	17	4	197	196	3,452,753,000	8,265,332	6,068,893
1986	21	2	5	4	3,868,852,000	9,451,541	6,973,927
1987	33	4	231	229	4,149,280,000	10,009,387	7,169,642
1988P	29	3	285	274	4,168,080,000	10,199,000	7,200,000

P Preliminary data.

* Includes accidents involving deregulated all cargo air carriers and commercial operators of large aircraft when those accidents occurred during 14 CFR 121 operations.

\# Source of estimate: FAA

@ The following suicide/sabotage cases are included in “Accidents” and “Fatalities” but not in “Accident Rates”:

Date	Location	Operator	Fatalities Total	Fatalities Aboard
8/11/82	Honolulu, HI	Pan American	1	1
4/2/86	Near Athens, Greece	Trans World	4	4
12/07/87	San Luis Obispo, CA	Pacific Southwest	43	43
12/21/88	Lockerbie, Scotland	Pan American	270	259

Accident Rates

Per Million Aircraft Miles		Per 100,000 Aircraft Hours		Per 100,000 Departures	
Total	Fatal	Total	Fatal	Total	Fatal
0.008	0.002	0.332	0.083	0.399	0.100
0.008	0.001	0.343	0.060	0.426	0.074
0.005	0.0	0.212	0.0	0.269	0.0
0.009	0.001	0.366	0.059	0.461	0.074
0.005	0.001	0.224	0.045	0.291	0.058
0.008	0.001	0.318	0.058	0.420	0.076
0.004	0.000	0.168	0.013	0.229	0.018
0.005	0.001	0.206	0.048	0.280	0.066
0.005	0.000	0.212	0.011	0.287	0.014
0.008	0.001	0.320	0.030	0.446	0.042
0.007	0.000	0.275	0.020	0.389	0.028

Table 4
Accidents, Fatalities and Rates
U.S. Air Carriers Operating Under 14 CFR 121
All Nonscheduled Service
(Airlines*)
1978-1988

Year	Accidents Total	Accidents Fatal	Fatalities Total	Fatalities Aboard	Aircraft Miles Flown#	Aircraft Hours Flown#	Departures#
1978	2	0	0	0	88,197,000	202,883	96,351
1979	6	1	3	3	68,018,000	165,817	86,550
1980	4	1	1	0	114,867,000	310,100	162,364
1981	1	0	0	0	109,449,000	291,558	154,537
1982	4	1	1	1	131,628,000	342,555	188,787
1983	2	0	0	0	148,409,000	383,830	209,112
1984	4	0	0	0	169,153,000	429,087	232,776
1985	5	3	329	329	178,264,000	444,562	237,866
1986	3	1	3	3	186,695,000	472,751	268,899
1987	5	1	1	1	223,049,000	490,703	279,656
1988P	1	0	0	0	236,351,000	534,800	288,800

P Preliminary data.
* Includes accidents involving deregulated all cargo air carriers and commercial operators of large aircraft when those accidents occurred during 14 CFR 121 operations.
# Source of estimate: FAA.

Accident Rates

Per Million Aircraft Miles		Per 100,000 Aircraft Hours		Per 100,000 Departures	
Total	Fatal	Total	Fatal	Total	Fatal
0.023	0.0	0.986	0.0	2.076	0.0
0.088	0.015	3.618	0.603	6.932	1.155
0.035	0.009	1.290	0.322	2.464	0.616
0.009	0.0	0.343	0.0	0.647	0.0
0.030	0.008	1.168	0.292	2.119	0.530
0.013	0.0	0.521	0.0	0.956	0.0
0.024	0.0	0.932	0.0	1.718	0.0
0.028	0.017	1.125	0.675	2.102	1.261
0.016	0.005	0.635	0.212	1.116	0.372
0.022	0.004	1.019	0.204	1.788	0.358
0.004	0.0	0.187	0.0	0.346	0.0

Table 5 — Fatal Accidents and Fatalities
U.S. Air Carriers Operating under 14 CFR 121
Major Air Carriers
Calendar Year 1988

Fatal Accidents

Date	Location	Aircraft	Fatal-ities	A/C Damage	Phase	Reported Type of Accidents
4/28	Maui, HI	Boeing 737-200	1	Subst	Cruise	Portion of top fuselage tore away in flight.
8/31	Dallas,	Boeing 727-232	14	Dest.	Takeoff	Crashed shortly in initial climb.
12/21	Lockerbie	Boeing 747-100	270	Dest.	Cruise	Exploded in mid-air, suspected sabotage.

Non-Fatal Accidents

Date	Location	Aircraft	Damage	Injuries S M NN	Service	Phase	Accident Type
1/10	Dallas TX	DC-10-10	None	1 0 286	S/D/P	Standing	A Passenger was injured in deplanement.
1/13	Bogota, Colombia	Boeing 707-33	Subst.	0 0 3	S/I/C	Landing	Nose gear collapsed.
1/19	Chicago, IL	Boeing 767-200	None	1 1 145	S/D/P/C	Decent	Encountered air turbulence.
1/19	Hickman, KY	DC-9-82	None	1 1 95	S/D/P	Cruise	Encountered air turbulence.
1/25	Block Island, R.I.	Boeing 767-332	None	2 6 149	S/D/P	Descent	Encountered air turbulence.

1/27	Decatur, MI	DC-9-82	None	1	0	81	S/D/P/C	Cruise	A Passenger received serious burns.
2/2	Durango, CO	CV-580	Subst.	0	4	0	S/D/P	Landing Roll	Collided with high ground.
2/3	Nashville, TN	DC-9-80	Subst.	0	6	121	S/D/P	Approach	Hazardous material spilled and caused minor fire.
3/29	Miami, FL	DC-6	None	2	0	0	N/I/C	Takeoff	Collided with object on takeoff.
4/3	Sarasota, FL	Boeing 727	None	1	0	144	S/D/P	Standing	A passenger was injured in deplanement.
4/14	Charleston SC	F-28	Subst.	0	1	61	S/D/P	Cruise	Engine tore away.
4/15	Seattle, WA	DHC-6	Dest.	6	5	29	S/D/P	Climbout	Had partial power loss.
5/21	Dallas, TX	DC-10-30	Subst.	2	6	247	S/I/P/C	Takeoff	System failure.
6/26	Salisbury, MD	Boeing 737	None	1	0	108	S/D/P	Descent	Turbulence.
7/11	St. Paul, MN	Boeing 727	Subst.	0	0	93	S/D/C	Taxiing	Collided with object.
8/10	Little Rock, AR	Boeing 737	None	4	3	0	S/D/P	Takeoff Run	Airframe failure.
8/20	Honolulu, HI	DC-9-51	Subst.	0	0	144	S/D/P	Landing	Landed hard, dragged tail.
8/26	Charleston, S.C.	Boeing 767	None	1	6	55	S/D/P	Cruise	Turbulence.
8/27	Chicago, IL	Boeing 727	Subst.	0	7	61	S/D/P	Approach	System failure.
9/9	Minneapolis, MN	Boeing 727	Subst.	0	0	73	S/I/C	Taxiing	Collided with objects.
9/12	Denver, CO	Boeing 727	Subst.	0	1	206	S/D/P	Landing	Loss of control veered off runway.
9/12	Albany, NY	DH-7/58C	Minor	1	0	3	S/D/P	Cruise	Loss of power due to engine failure.
9/21	Guyana	Boeing 747	None	1	8	117	S/I/P	Cruise	Air turbulence.
9/29	San Jose Costa Rica	Boeing 757	Subst.	0	0	128	S/I/P	Takeoff	Crashed on ground run.
10/30	Memphis, TN	DC-9-31	Subst.	0	0	42	S/D/P	Landing Roll	Collided with objects.

Date	Location	Aircraft	Damage	Injuries S M NN	Service	Phase	Accident Type
12/23	Enroute Japan-USA	Boeing 747	None	1 1 222	S/I/P	Cruise	In flight turbulence.

Injury Index: S = Serious
M=Minor
NN=None

Service Index: S= Scheduled
D= Domestic
I=International
P= Passenger
C= Cargo
N= Non-scheduled

Source: NTSB

Accident/Incident Briefs

Low on Final

India — October

Boeing 737: Aircraft destroyed. Fatal injuries to 130 of 135.

The air carrier from Bombay was approaching to land at the Ahmedabad airport in western India while the airport was shrouded in early morning haze.

Airport officials said contact with the airplane was lost two minutes before it was due to land, but received no emergency messages. According to a ground witness, the airplane appeared to be too low on final approach. Three miles short of the airport, the aircraft hit some treetops, then dived into a field, hit an embankment and severed power lines. It broke up and caught fire. Although the aircraft was completely destroyed, there were five survivors of the 129 passengers and six crew members aboard. Three of the five who were pulled from the wreckage were burned critically.

The airplane had had several defects repaired during the week preceding the accident, and had a total of 42,756 flying hours during its 18 years in service.

Heavy Landing In Rain

Nigeria — October

Boeing 737: Substantial damage. Unspecified injuries to 40.

The air carrier was en route from Lagos. It was attempting an early evening landing at Port Harcourt in poor visibility during heavy rain.

The aircraft landed hard and was damaged substantially; the engines were torn off, the gear collapsed and the wings were damaged severely. It came to rest on its belly off of the runway. Forty of the 125 passengers and seven crew members were injured; there were no fatalities.

Third Try In Fog

Italy — October

Boeing 707: Aircraft destroyed. Fatal injuries to 32 of 52.

The flight from London Heathrow to Entebbe via Rome was approaching Leonardo da Vinci Airport at approximately midnight during a period when the airport was subject to shifting banks of fog.

Officials noted later that the airplane made two approaches to a runway equipped with ILS but was unable to land at the Rome airport because of fog. A third approach was made to another runway that was believed to have better visibility but was equipped only with a radio beacon as an electronic approach aid.

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

Less than a mile short of the runway and slightly outside of the airport perimeter, the airplane's gear and one wing hit a house and hangar being built. The pilot tried to go around but the damaged wing separated and the airplane fell into the garage of a rental car company, setting a fire. It slid across a highway, hit trees and electric wires and broke in two and burned.

The airplane was destroyed and 28 of the 52 aboard died immediately, four died later of burns and other injuries.

Slippery Runway

West Germany — October

McDonnell Douglas DC-10: No damage reported. No injuries.

The widebody jet was on a flight from Frankfurt to Toronto. During a stop at Dusseldorf in rain, the aircraft slid off the runway. The tires became mired in the soft grass area and airport operations were restricted for several hours until recovery operations could be concluded. No one was injured and there were no reports of damage to the aircraft.

Costly Seagull Ingestion

Turkey — October

Boeing 747: Two engines damaged, some lower fuselage damage.

The widebody air carrier was en route from Islamabad, Pakistan, to London and had made a stop at Istanbul, Turkey. Almost immediately after becoming airborne out of the Istanbul airport, the aircraft collided with a flock of seagulls and the captain had to shut down two engines.

After circling over the Sea of Marmara just south of the city to burn off about more than 40 tons of fuel, the airplane returned to the airport for an uneventful emergency landing. There were no injuries, but there was extensive damage to the aircraft. Besides heavy damage to the two engines, there was impact damage to part of the lower fuselage, and bodies of gulls were said to have clogged many of the aircraft's hydraulic systems.

The aircraft was carrying a crew of 18 and 415 passengers, who were sent to local hotels to await a replacement 747.

Heavy Slider

Hong Kong — October

Boeing 747: Landing gear damage. No injuries.

The Boeing heavy had just landed at Hong Kong's Kai Tak Airport in mid-afternoon. It skidded off the runway onto a grassy area on its way to the terminal. There was damage to the undercarriage but no one was injured. The airplane was carrying more than 300 passengers, who were stranded on the airplane for an hour after the incident.

Delay Gremlins

United Kingdom — October

Vickers Viscount: Nose gear damaged. No injuries.

The non-scheduled air carrier had been running into departure delays during preparations to take off from London's Gatwick Airport. Turnaround time had been extended by an earlier technical delay, and a further delay was caused when a start clearance could not be obtained until three minutes prior to the outbound slot time.

When the pushback was begun, the nose gear collapsed. The handbrake had not been released. There was nose gear damage but no injuries to the 32 passengers and five crew members aboard.

Tough Crosswind

Scotland — September

McDonnell Douglas DC-8-73: Damage to Number 4 engine-cowling and gearbox. No injuries.

The scheduled cargo carrier was landing on Runway 31 at Prestwick after a flight from New York. The wind was from 220 to 230 degrees at 15 kt., a direct crosswind.

Although the crew did not realize it at the time, the far right engine cowling scraped the runway during the landing. Marks were later found on the runway and an inspection of the Number 4 turbofan engine confirmed that it had struck the runway.

Bird Strike

Ethiopia — September

Boeing 737-200A: Aircraft destroyed. Fatal injuries to 35 of 104.

The air carrier was departing Bahir Dar for a flight to Asmara when it flew into birds during the rotation phase of takeoff. Initially, partial power was lost on both engines and the pilot attempted to return to the airport. However, all power was subsequently lost and the pilot was forced to make an emergency landing on marshy ground about five miles short of the runway.

The airplane broke in two and was destroyed by fire. Of the 92 passengers and 12 crew members, there were fatal injuries to 33 passengers and two of the crew.

Nose Slide

United Kingdom — October

Shorts 330: Damage to nose wheel and nose. No injuries.

The commuter carrier was landing at Barrow-in-Furness after a flight from Southampton. After touchdown, the nose gear collapsed. The aircraft suffered damage to the underside of the fuselage in the nose area and to the nose wheel, but there were no injuries.

Approach In Downpour

India — October

Fokker F.27 Friendship: Aircraft destroyed. Fatal injuries to 34.

The aircraft with 30 passengers and a crew of four was attempting to land at an airport outside of Gauhati, the capital of Assam State in the northwest corner of India. The arrival of the mid-morning flight coincided with that of a heavy downpour.

The aircraft crashed into a jungle-covered hill three miles short of the runway. The airplane reportedly exploded on impact, killing all 30 passengers and four crew members. Because of the inaccessible terrain, search crews had to be dropped by helicopter, and hiked in driving rain through thick underbrush to reach the site of the accident, approximately 20 miles south of the city. They found no survivors and reported that the wreckage was widely scattered.

Unsuccessful Takeoff

Peru — October

Fokker F.28 Fellowship: Aircraft destroyed. Fatal injuries to 12, various injuries to 44.

The aircraft, with 56 aboard, was taking off from Manco Copac Airport in Juliaca, high in the Andes Mountains southeast of Lima. The mid-morning flight was bound for Lima, with a stopover in Arequipa.

Immediately after the takeoff in clear weather the airplane lost altitude. Witnesses said the tail dropped dangerously low, as the pilot fought to keep the aircraft airborne, until it hit the ground. The pilot lost control after the tail impacted and the airplane veered across farmland and into a river a mile away. The fuselage broke into two sections and caught fire. Twelve persons, including one crew member, were killed in the accident and 44 were injured, sustaining severe burns, broken bones and cuts.

Too-Fast Food Service

United Kingdom — October

BAE 146-100: Wing leading edge and tip damage. No injuries.

The aircraft was being serviced prior to the arrival of the passengers. A catering vehicle had finished loading the meals and was departing the area when it collided with the right wing tip of the airplane. The force of the impact caused the airplane's nose to pivot 2.5 feet to the right even though it was still attached to the tow tug. Some fuel leaked from a wing tank in the damaged area and fire services were called, but there was no fire and there were no injuries. The airplane sustained damage to the right wing leading edge and wingtip, including light fittings.

Double Engine Failure

Philippines — October

Beechcraft Queen Air A65: Damage and injuries not reported.

The corporate aircraft was ferrying nine passengers from Manila to El Nido, Palawan.

In the vicinity of Rosario, Cavite, both engines reportedly failed inflight and the airplane made a forced landing nearby. There were no reports of damage or injuries.

Overran Runway

Japan — July

Beech B-55 Baron: Aircraft destroyed. No injuries to one.

The business aircraft was landing at Suwanosejima Airport in mid-morning after a flight from Kagoshima.

The aircraft overran the 2,300-foot runway and came to rest in

an area of shrub approximately 330 feet beyond the end of the runway. The pilot, the only occupant, was not injured but the airplane was destroyed.

Airplane in the Sun

Austria — October

Cessna 172; Cessna Citation: Both aircraft destroyed. Fatal injuries to six.

The Cessna 172 was carrying a pilot and three parachutists near the Salzburg Airport. The Citation, with a pilot and a copilot on board, had just taken off from Salzburg headed for Innsbruck. The sun was setting at the time and the Citation had intended to turn from a heading of north to south.

The Citation struck the 172 at a height of approximately 1,300 feet and exploded. Flaming wreckage from both aircraft landed in a meadow close to the West German border. Both aircraft were demolished, the pilot and copilot in the Citation and the pilot and the three parachutists in the 172 were killed. There were no injuries to persons on the ground.

It was considered possible that the Citation pilot was blinded by the setting sun and did not see the 172 in time to avert a collision.

Good Follow Through

United Kingdom — October

Cessna 152: Substantial damage to nose gear. No injuries.

The student pilot was doing touch-and-go's at Shoreham Airport on Sussex in the late afternoon. After the second touchdown the airplane bounced. Although the following takeoff was successful, the pilot realized that the nose gear had been damaged during the previous landing and he called for assistance.

The crew of a police helicopter observed the Cessna and confirmed the pilot's suspicions about the damaged nose gear. During the subsequent landing, the pilot held the nose wheel off the surface as long as possible and shut down the engine. The Cessna sustained little additional damage and there were no injuries.

Trim, Trim, Trim — Oops!

United Kingdom — October

Cessna 152: Right main gear sheared off, propeller bent, damage to fuselage. No injuries.

The student pilot was doing touch-and-go's in the pattern and was taking off after successfully completing a number of circuits. He had taken off with 30 degrees of flaps and retained that setting until reaching 200 feet of altitude when he raised them to 20 degrees. At 300 feet, he retracted the rest of the flaps and stated later that he retrimmed the airplane to maintain the climb to pattern altitude.

As he reached 600 feet and turned crosswind, the pilot noticed that it took an increasing amount of back pressure on the control column to maintain level flight. The airplane descended to 500 feet and continued to lose altitude. The pilot could observe no indications of malfunction from cockpit indicators.

Enough altitude was lost by this time that the pilot realized he would be unable to land at the airport. He radioed his problem and then made a forced landing in a nearby field. The pilot was unhurt during the emergency landing but the airplane's right main landing gear was sheared off, the propeller was bent and there was damage to the cowling and fuselage skin.

A technician who arrived on the scene soon after the landing noted that the elevator trim wheel was in the full nose-down position. The pilot subsequently attributed the need for heavy back pressure on the control column to an improper trim setting.

Water, Water, Everywhere

United Kingdom — October

Grumman AA-5B: Minor damage to left wing. No injuries.

The pilot had just taken off from Biggin Hill Airport for what was to have been a pleasure flight. When he reached an altitude of 400 feet, however, he experienced a total loss of power. He made a forced landing into a field straight ahead on the runway centerline.

After a successful landing that produced only minor damage to the airplane's left wing and no personal injuries, the pilot assessed the situation. Because there had been a heavy rainfall the previous day, he surmised that water contamination had caused the power failure, despite his having thoroughly drained the tanks and having run the engine for 25 minutes prior to takeoff. He had made a steep takeoff climb that could have moved undrained water to the outflow tube.

A technician confirmed the pilot's diagnosis when he drained a half pint of water from the fuel tanks.

Whoa, Nellie!

United Kingdom — September

Jodel D120: Extensive damage. No injuries.

The pilot, the sole occupant, was practicing a forced landing. After closing the throttle at 1,500 feet, he had to make a number of changes to his flight path to reach the field he had selected. On final approach, he realized he was too low and opened the throttle to go around. At that point he saw a powerline ahead and tried to fly over it, but the airplane's tail gear spring caught the power cable. The cable broke at a point to the right of the airplane, but the other end, still attached to its pole, wrapped around the rear of the fuselage and stopped the airplane, which sank to the ground. The Jodel swung to the right, broke the cable on the left side, and slid into a fence before coming to rest.

The airplane was extensively damaged but the pilot was uninjured. The left wing, fuselage and landing gear were damaged, the propeller was broken, and there was minor damage to the tail and the right side of the fuselage.

The pilot reported that the power line was difficult to see because it was parallel to, and apparently at the same height as the pathway and fences he eventually struck.

Tipped Tri-Pacer

United Kingdom — September

Piper PA-22-160 Tri-Pacer: Damage to propeller and minor damage to nose gear strut and right wingtip.

The wind was reported to be coming from 300 degrees and the airplane was landing on runway 03 at Gamston Airport. Wind speed was six kt. gusting to 16, but the pilot later said he had not been advised of the gust level.

After touchdown, the left wing lifted and the airplane weathercocked into the wind. It tipped forward and stopped with the right wingtip on the ground.

There were no injuries to the pilot or the one passenger, but the airplane sustained damage to the propeller, the nose gear strut and the right wingtip.

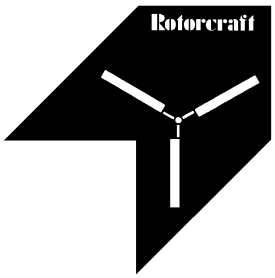
Aeronautical Garrote

United Kingdom — September

Piper PA-25 Pawnee: Minor damage to propeller and flaps. No injuries.

The airplane had completed the last glider tow of the day and was taxiing from the tow strip to the hangar. There also was a winch tow in operation at the airport and the Pawnee was travelling along the cable.

While the Pawnee was taxiing through a dip in the terrain and not visible to the operators of the winch, a glider launch was begun there. The winch cable lifted, fouling the taxiing airplane's propeller and hitting the underside of the left wing. There were no injuries but there was damage to the propeller and wing flaps on the left side.



Rescuers Downed

United Kingdom — October

Sikorsky S-61N: Aircraft abandoned at sea. No reported injuries to four.

The Coastguard helicopter was on a rescue mission responding to an accident involving a 16-foot fishing boat. The latter had run aground on a rock off the northwest coast of Scotland during the night.

The helicopter ran into its own problems and the crew was forced to ditch, subsequently abandoning the rotorcraft. The four crew members were rescued by an RAF Sea King helicopter and the Sikorsky was abandoned.

One of the fishermen was picked up by a yacht and a search was mounted for the other one.

Tripped Over Bucket

Japan — October

Bell 212: Substantial damage. Minor injuries to two.

The helicopter was hauling ready-mixed concrete for construction of a skiing facility. The cement bucket impacted the ground within the construction site and caused the rotorcraft to strike the surface. The helicopter was substantially damaged but the two occupants, a pilot and a technician, were only slightly injured.