

At the Verge of a Stall

The 747 flight crew was unaware that most of the leading-edge flaps had retracted on liftoff.

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The following information provides an awareness of problems in the hope that they can be avoided in the future. The information is based on final reports by official investigative authorities on aircraft accidents and incidents.



JETS

Thrust Reversers Were Unlocked

Boeing 747-400. No damage. No injuries.

Shortly after lifting off the runway, the flight crew was surprised by stall warnings that, unknown to them, were triggered by a loss of lift due to the uncommanded retraction of most of the wing leading-edge flaps. “The pilot flying was able to prevent the aircraft from stalling, with support from the other crewmembers, and to keep the aircraft flying until the leading-edge flaps re-extended and normal performance capability returned,” said the final report on the serious incident by the South African Civil Aviation Authority (CAA).

The incident occurred the evening of May 11, 2009, as the 747 departed from O.R. Tambo International Airport in Johannesburg for a scheduled flight to London with 265 passengers and 18 crewmembers. Takeoff weight was 365,000 kg (804,679 lb), or 31,890 kg (70,305 lb) below the maximum certified takeoff weight.

The flight crew had planned for a reduced-power takeoff from Runway 03L, which is 4,418 m (14,495 ft) long, and had calculated 150 kt for V_1 and 168 kt for V_R . The first officer was the pilot flying. He had 9,300 flight hours, including 1,950 hours in type. The pilot-in-command had

11,000 flight hours, including 8,500 hours in type. There was another pilot on the flight deck, but the report did not provide information on this crewmember.

The 747 was accelerating through 126 kt when an amber message appeared on the engine indicating and crew alerting system (EICAS) display, cautioning that the no. 3 (right inboard) engine thrust reverser was in transit. A similar EICAS message for the no. 2 (left inboard) engine thrust reverser appeared as the aircraft accelerated through 160 kt. The report did not say whether the pilots observed or reacted to the messages.

The first officer was rotating the aircraft for takeoff when all the “Group A” leading-edge flaps retracted. Each wing has 14 leading-edge flaps, with eight designated as Group A and six as Group B. Group A comprises three Krueger flaps between the wing root and the inboard engine pylon, and five variable-camber flaps between the inboard pylon and the outboard engine pylon; the six Group B variable-camber flaps are outboard of the outboard pylon.

Retraction of the Group A leading-edge flaps would have caused the EICAS flap indication display to change color. However, “this change is hardly visible, and the flight crew may not have noticed it,” the report said, concluding that “at no time was the aircrew aware that the Group A leading-edge flaps had retracted.”

Soon after the 747 became airborne at 176 kt, the stick shaker activated and “significant” buffeting occurred, the report said. “In order to counteract the stall warning and buffeting, the pilot flying (who also had aerobatic flying

experience and was familiar with aircraft buffet-ing) continued to fly the aircraft with the pilot-in-command calling out the aircraft heights AGL [above ground level].”

The leading-edge flaps remained in the retracted position for about 23 seconds but then extended when the crew retracted the landing gear at a height of 56 ft above the runway and at a calibrated airspeed of 177 kt. “After the automatic re-extension of the leading-edge flaps, the aircraft’s performance returned to normal,” the report said.

The pilots discussed the incident and, lacking a clear understanding of what had caused it, decided to return to the airport. They declared an emergency and, in coordination with air traffic control, flew the aircraft to 15,000 ft, where fuel was dumped to reduce weight below the maximum landing weight. The crew then landed the 747 without further incident.

“Ground testing revealed that the reversers were not fully stowed against the stops and that one of the four locking gearboxes on both no. 2 and no. 3 engines had unlocked,” the report said. “The other thrust reverser locks were still in place, and the translating reverser cowls did not move during the event. No evidence was found that the thrust reversers had in fact deployed.”

The Group A leading-edge flaps on the 747-400 were designed to retract automatically either when a reverse thrust lever is moved or when thrust reverser in-transit signals are generated by both inboard engines or by both outboard engines. The report said that this design feature was intended to reduce fatigue of the flap panel surfaces by preventing their direct exposure to engine exhaust flow redirected by the thrust reversers.

The report said that the U.S. Federal Aviation Administration in July 2009 issued an airworthiness directive requiring compliance with a Boeing service bulletin recommending that operators of 747-400s equipped with Rolls-Royce engines disable electronic connections that cause the leading-edge flaps to automatically retract in response to thrust reverser in-transit signals.

The South African CAA also recommended that 747-400 operators ensure that thrust reversers are fully stowed after maintenance is

performed and to require visual inspections “to ensure the thrust reversers have motored to the fully stowed position.”

‘Jolted’ by Turbulence

Airbus A320-232. No damage. Two serious injuries, two minor injuries.

No warnings of turbulence had been issued for the area, and the on-board weather radar system showed no precipitation returns within 20 nm (37 km) as the A320 neared Fort Myers, Florida, U.S., the afternoon of July 10, 2009. Nevertheless, the airline’s standard operating procedure was to illuminate the seat belt sign when descending through 18,000 ft.

Before beginning the descent from cruise altitude, the captain had made a public address system announcement that included instructions for the passengers to take their seats and to fasten their seat belts when the seat belt sign was illuminated. “Additionally, a flight attendant made a public announcement when the seat belt sign was illuminated,” said the report by the U.S. National Transportation Safety Board (NTSB).

About four minutes later, while descending through 12,500 ft, “the airplane was jolted as it flew through a small cumulus cloud,” the report said. “Specifically, the airplane dropped about 20 ft instantaneously, experiencing a positive g load of 1.98 followed by a negative g load of 0.43 less than one second later.”

A passenger who did not have her seat belt fastened suffered two fractured ribs when she struck the stowed tray table in front of her. Another passenger was in an aft lavatory and suffered two spinal fractures during the turbulence encounter. Two other passengers sustained minor injuries.

None of the flight attendants was injured. “The captain had instructed the flight attendants via intercom to sit down a few minutes prior to the turbulence encounter,” the report said.

Brakes Lock, Tires Burst

Boeing 737-500. Minor damage. No injuries.

Company personnel had complied with minimum equipment list provisions for operating the 737 with an inoperative anti-skid system, and the flight crew had discussed

A passenger who did not have her seat belt fastened suffered two fractured ribs.

The brake pressure caused the main landing gear wheels to lock, and all four tires burst.

the operating procedure for landing the airplane with the system inoperative before they departed from Oklahoma City with 118 people aboard for a scheduled flight to Houston the afternoon of March 27, 2008.

The crew also briefed the anti-skid-inoperative landing procedure several times during the flight, the NTSB report said, noting that the procedure included manual deployment of the speed brakes and thrust reversers after touchdown, and minimal manual application of the wheel brakes during the landing roll to avoid tire damage.

However, recorded flight data showed that the speed brakes and thrust reversers were not deployed after touchdown at Houston's George Bush Intercontinental Airport and that wheel brake pressure increased to 3,000 psi, the upper limit, "at the same time weight was transferred to the nose gear," the report said, noting that this indicated that the wheel brakes were manually applied on touchdown.

The brake pressure caused the main landing gear wheels to lock, and all four tires burst. The captain told investigators that he assumed control when he felt the 737 shudder on touchdown. "The captain reported that he did not apply brakes during the event, as the airplane was slowing rapidly," the report said. "He reported that he maintained runway centerline by utilizing the tiller. The airplane came to a stop toward the end of the runway, and the flight crew and passengers disembarked using airstairs." A small fire in the right main landing gear was extinguished by aircraft rescue and fire fighting personnel.

Hard Landing Not Reported

Airbus A321-211. Substantial damage. No injuries.

The copilot was undergoing his first two sectors of line training during flights between Manchester, England, and Ibiza, Spain, on July 18, 2008. The commander, a training captain, reviewed the copilot's file before departing from Manchester and found that the copilot, who had received base training in the A320, was having difficulty landing the A321, said the

report by the U.K. Air Accidents Investigation Branch (AAIB).

During the flight, the commander briefed the copilot on the differences between landing the A321 and the A320, which is smaller and lighter. "The commander instructed the copilot that he would 'talk him through' the landing and specifically that he would instruct him to check the rate of descent with a nose-up sidestick input at 20 ft above touchdown," the report said. The copilot had been taught to flare the A320 at 30 ft.

The copilot flared the A321 too late at Ibiza, and the landing was described as "firm." The commander decided to fly the return leg to Manchester and transfer control to the copilot for the approach and landing.

The copilot conducted the approach to Manchester with the autopilot disengaged and the autothrottle engaged. "The commander gave a coaching narrative during the final moments before touchdown but, as the copilot closed the thrust levers, realized that the landing was 'going to go wrong,'" the report said. "The aircraft touched down firmly and bounced. The commander stated that he considered taking control but noted that the copilot appeared to be holding the aircraft's attitude and that intervention was not necessary."

The copilot later told investigators that he had become confused by the commander's coaching. The report noted that despite the commander's perception of differences in landing technique, the procedure established for the A320 also is applicable to the A321.

After parking the aircraft on stand, the commander and copilot discussed the landing and agreed that it had not been a "hard" landing. However, the commander also asked company line engineers who had flown as passengers if they thought it had been a hard landing. "They replied that if no 'load 15 report' had been produced on the flight deck printer and the commander did not consider the landing to have been heavy, then in their opinion no action needed to be taken," the report said.

A load 15 report is generated when certain parameters — including descent rate, vertical

acceleration and gross weight — are exceeded on landing. A load 15 report and/or a commander's report of a hard landing typically requires a follow-up engineering inspection for structural damage. Although a load 15 report had been generated after the landing in Manchester, the aircraft's data management unit had not been programmed to automatically print the report. The commander was unaware that a load 15 report was available only by manual interrogation of the unit.

Two more flights were conducted in the A321 before the load 15 report was found during an unrelated engineering inspection of the landing gear. The report showed a vertical acceleration of 2.7 g during the touchdown at Manchester. Further examination of the aircraft revealed that the hard landing — categorized by engineers as “severe hard,” according to the report — had caused a crack in the forward lug of the left main landing gear support rib.

Misleading Parking Guidance

Boeing 747-400. Minor damage. No injuries.

Following a flight from Singapore to London Heathrow Airport with 237 passengers and 19 crewmembers the night of July 29, 2009, the commander visually checked to ensure that the aircraft parking information system (APIS, also called a visual docking guidance system) at the assigned stand had been activated. He also checked that the aircraft clearance zone was clear before turning the aircraft in to the stand.

“He noted that the APIS lateral guidance was illuminated and interpreted this as the system having been activated,” the AAIB report said. “He commenced the left turn onto the stand, monitoring the lateral guidance, which was functioning correctly.” However, the APIS had not been activated; a wiring defect was causing the lateral guidance to illuminate. The commander initially had not noticed that the APIS alphanumeric display of the aircraft type, “B747,” which indicates that the system is active and is programmed properly for the arriving aircraft, was not illuminated.

The “turn round manager” (TRM) had arrived on stand five minutes before the 747 and had noticed that a number of baggage containers had been parked improperly. Because of this, he did not activate the APIS before he went to the terminal building to seek help in moving the baggage containers and to summon a marshaller to guide the aircraft.

As he was about to enter the terminal building, the TRM heard the aircraft taxiing in. “He moved back onto the stand and approached the front left side of the aircraft, and attempted to signal the commander to stop, using his hands to form a cross above his head,” the report said. “His signal was not seen by the commander, and with the aircraft not stopping, the TRM ran around the front of the stand and activated the [APIS] ‘STOP’ button.”

During his visual check of the stand, the commander had not seen a baggage cart that was protruding into the aircraft clearance zone. “It was probably hidden behind other vehicles and containers as he turned onto the stand,” the report said.

As the commander taxied the 747, using the APIS lateral guidance, he became concerned that he did not see the aircraft type on the APIS display or a readout of distance to go. “He began to feel uneasy at the proximity to the terminal building and stopped the aircraft,” the report said. “This was coincident with the word ‘STOP’ illuminating on the [APIS].”

The cowling on the left outboard engine had been dented when it struck the baggage cart before the aircraft came to a stop 11 m (36 ft) beyond the correct stopping point.

TURBOPROPS

Wrong Engine Shut Down

Beech King Air A90. Substantial damage. Four serious injuries, four minor injuries.

While climbing through 3,900 ft after departing from Pitt Meadows Airport in British Columbia, Canada, for a skydiving flight the afternoon of Aug. 3, 2008, the pilot heard a bang and felt the aircraft “shudder” and



yaw right. He lowered the nose, shut down the right engine, feathered the propeller and moved the left engine power lever full forward. There was no response because it was the left engine that had failed.

The pilot turned back but was unable to reach the airport. The King Air touched down in a cranberry bog, bounced when it struck a mound, spun around when the left wing dug into the soft ground, and flipped over. Four skydivers were seriously injured. Although seat belts had been installed in the cabin floor when the airplane was modified for skydiving flights, all seven skydivers had been sitting on unattached wooden benches, said the report by the Transportation Safety Board of Canada.

The U.S.-registered aircraft had accumulated 13,257 flight hours since it was built in 1966. Investigators found that the left Pratt & Whitney Canada (PWC) PT6A-20 engine had been operated for 4,435 hours since its last overhaul, which exceeded the maximum time between overhauls (TBO) of 3,600 hours specified by the engine manufacturer.

The aircraft operator believed that the engines could be run “on condition” with no requirement for oil analyses, borescope inspections or condition-trend monitoring. The report noted that PWC did not offer an on-condition maintenance program; it did have a TBO-extension program, but the accident aircraft was not qualified for the program both because it was flown fewer than 300 hours a year and because it was used for skydiving flights.

An examination of the left engine revealed that the engine-driven fuel pump drive splines were worn and corroded “beyond the point of failure,” the report said. The worn drive splines likely had disengaged and then re-engaged momentarily, causing the left engine to surge before flaming out due to fuel starvation. The right yaw caused by the surge likely reinforced the pilot’s conclusion that the right engine had failed. “Moreover, the pilot had not received any training on the King Air for over two years, decreasing his ability to react appropriately,” the report said.

“The King Air A90 emergency checklist requires that, in the event of an engine failure, the pilot shall apply maximum power, confirm the power loss by reference to engine instrumentation, then shut down the failed engine and feather its propeller,” the report said. It noted, however, that the original, horizontal arrangement of the engine instruments in King Airs “makes it difficult to readily identify and confirm which engine is malfunctioning.” The newer, vertical arrangement of the instruments, on the other hand, “makes identification of engine malfunction intuitive,” the report said.

Stall During an S-Turn

Socata TBM 700. Destroyed. One fatality.

The single turboprop was at 960 ft AGL and about 3 nm (6 km) from the threshold of Runway 09 at Cobb County–McCollum Field in Kennesaw, Georgia, U.S., the afternoon of July 15, 2008, when the airport traffic controller asked the pilot to make an S-turn to accommodate a departing airplane.

Recorded air traffic control radar data indicated that groundspeed was 147 kt when the airplane was banked left to begin the S-turn. The pilot apparently did not increase power, and the recorded groundspeed was 89 kt when he entered a right bank at 960 ft. At this time, the controller told the pilot, “Half an S-turn was fine. You can turn toward the runway now.”

Witnesses saw the TBM enter a steep left bank toward the extended runway centerline. The airplane stalled, rolled inverted and descended in a steep nose-down attitude into a heavily wooded city park. “The airplane struck several trees and subsequently the ground, and came to an abrupt stop with no forward movement,” the report said. “There was a post-impact fire which consumed much of the airplane and the surrounding landscape.” No one on the ground was hurt.

During his most recent application for a medical certificate in December 2006, the private pilot, 66, had reported 975 flight hours. The accident report said that he had logged 44 flight hours in the TBM 700. “Toxicology testing

‘The pilot had not received any training on the King Air for over two years, decreasing his ability to react appropriately.’

indicated that the pilot had been using Tramadol, a prescription painkiller with potentially impairing effects,” the report said. “The pilot had not reported its use on his most recent application for an airman medical certificate. ... It is unclear what role, if any, the medication or the condition for which it might have been used played in the accident.”

Normal, Backup Gear Systems Fail

Cessna 441 Conquest II. Substantial damage. No injuries.

Night visual meteorological conditions prevailed when the air ambulance departed from Double Eagle II Airport (KAEG) in Albuquerque, New Mexico, U.S., to pick up a trauma patient in Socorro on July 3, 2009. “While en route, thunderstorms developed along the intended route of flight, so the pilot decided to return to KAEG,” the NTSB report said.

When the pilot attempted to extend the landing gear, the circuit breaker tripped. He waited one minute for the circuit breaker to cool and attempted to reset it, but the circuit breaker tripped again. The pilot then conducted the checklist for the emergency gear-extension system, which uses nitrogen pressure to “blow” the gear down, but the landing gear did not extend.

“The pilot attempted to maneuver the airplane in an attempt to lower the landing gear,” the report said. “The gear was confirmed in the retracted position by another pilot utilizing night vision goggles during a low approach at KAEG.”

The pilot decided to divert the flight to Albuquerque International Airport, which has a longer runway. “During the landing flare, the pilot shut off both engines, and the airplane settled onto the runway,” the report said. “The airplane slid to the right side of the runway and came to a stop.”

Examination of the 441 revealed a malfunction of the landing gear selector switch that caused the circuit breaker to trip and a loose fitting on the nitrogen bottle that rendered the emergency gear-extension system inoperative.

PISTON AIRPLANES

Propeller Separates, Hits Fuselage

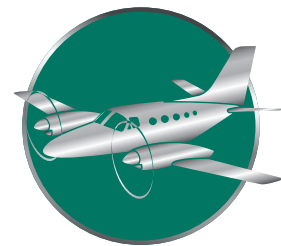
Britten-Norman Trislander. Substantial damage. Three minor injuries.

The pilot departed from New Zealand’s Great Barrier Island for a scheduled flight with 10 passengers to Auckland the afternoon of July 5, 2009. He heard a “pattering sound” and the sound of the propellers going out of synchronization as the three-engine airplane climbed through 500 ft. He was adjusting the engine and propeller controls when he heard a loud bang and a passenger scream.

“Looking back to his right, the pilot saw that the entire propeller assembly for the right engine was missing and that there was a lot of oil spray around the engine cowling,” said the report by the New Zealand Transport Accident Investigation Commission. “The aeroplane fuselage was extensively damaged and a passenger door was removed, leaving a large opening adjacent to some passengers.” Three passengers sustained abrasions when struck by debris from a shattered cabin window.

The pilot shut down the right engine, turned back to the airport and landed the airplane without further incident. Investigators found that corrosion had caused fatigue cracks to form in the right engine crankshaft flange, to which the two-blade propeller assembly is mounted. The flange had fractured during the accident flight, causing the propeller assembly to separate from the crankshaft. The assembly had then shattered a window before striking the passenger door. However, “no part of the propeller assembly entered the cabin,” the report said.

The Trislander was built in 1972 and had accumulated 18,289 hours. The engine had accumulated 2,230 hours since its last overhaul, exceeding Lycoming’s recommended TBO by 30 hours. Minor corrosion of the crankshaft flange had been found during an inspection of the engine in October 2004. “The flange had been removed and the area protected with etching and painting at that time,” the report said. “However, some time later the protection was compromised and the corrosion started.” Subsequent routine



inspections did not require removal of the propeller hub; thus, the corrosion on the crankshaft flange could not have been found.

The report noted that the crankshaft was “an older design that has since been progressively superseded by those with flanges less prone to cracking.”

Water, Mollusk Contaminate Fuel

Cessna U206F. Substantial damage. One minor injury.

While preparing the single-engine utility airplane for a cargo flight from Isleboro, Maine, U.S., to Rockland the morning of June 15, 2009, the pilot found water in samples of fuel drained from the tanks. “He continued to sump the tanks until the fuel samples were [free] of water,” said the NTSB report.

The pilot said that the takeoff was normal until the engine began to lose power at about 300 ft AGL. “The pilot rejected an open field to his left for landing due to lack of altitude/glide distance and chose to land straight ahead in heavily wooded terrain,” the report said.

Investigators found that the engine had failed because the airplane’s fuel supply was contaminated by water, grease “plasticizers” and “a mass that resembled a snail (land mollusk),” the report said. “The mass subsequently dissolved in the sample jar, but the remains were suspended in the water at the bottom of the jar.”

HELICOPTERS

Combustion Case Bursts

Bell 407. Substantial damage. No fatalities.

The helicopter was departing from a cruise ship in Talbot Bay, Western Australia, for a sightseeing flight the morning of Sept. 25, 2008, when the engine emitted a loud bang and lost power about 30 ft above the water. The pilot did not have time to activate the emergency floats before the 407 struck the water. “The cockpit and cabin quickly filled with water, and the helicopter rolled onto its side before rolling inverted,” said the report by the Australian Transport Safety Bureau.

The report did not provide information about injuries but said that two of the six

passengers were unable to exit the helicopter, and one lost consciousness. However, both passengers were rescued by the pilot and by cruise ship personnel before the helicopter sank.

“The investigation found that there had been a ‘burst’ failure of the engine outer combustion case as a result of ongoing high-cycle fatigue cracking during normal engine operation,” the report said.

The Rolls-Royce 250-C47B engine had accumulated 5,056 hours. The helicopter operator said that the original outer combustion chamber had been replaced in 2005 because of corrosion. As a result, the operator had required the addition of a cleaning and corrosion-inhibiting compound to the water for compressor rinses performed at the end of each flying day. A routine dye-penetrant inspection of the new combustion case was performed six months before the accident, and no cracks were found.

“The engine manufacturer reported being aware of only two combustion case failures of this type in more than 21 million flight hours with the 250 series of engines,” the report said. Nevertheless, Rolls-Royce initiated the development of modifications to reduce case stress.

Rotor Blades Strike Power Line

Hughes 269B. Destroyed. Two fatalities.

The pilot and a utility company employee were conducting a power line patrol flight near Salesville, Arkansas, U.S., the morning of July 15, 2008. About 1 1/2 hours into the flight, while the helicopter was being maneuvered parallel to a set of power lines, the main rotor blades struck a high-voltage line that passed 100 ft above and perpendicular to the lines that the crew was inspecting.

The pilot and passenger were killed when the helicopter struck terrain. “According to [the utility company], the passenger normally flew with a map that showed the terrain, obstructions and crossing power lines and annotated observations in a small notebook,” the NTSB report said. “The map and notebook were not located in the wreckage.”



Preliminary Reports, May 2010

Date	Location	Aircraft Type	Aircraft Damage	Injuries
May 1	Elba, Italy	de Havilland Canada DHC-8-300	minor	51 none
The Dash 8 was landed without further incident after a propeller severed a power line on final approach.				
May 2	New Albany, Indiana, U.S.	Jetprop DLX	destroyed	2 fatal
The airplane, a turboprop conversion of the Piper Malibu, was in a spiral when it struck terrain.				
May 5	Mitú, Colombia	Embraer 145LR	substantial	41 none
The landing gear collapsed when the 145 overran the wet, 5,770-ft (1,759-m) runway on landing.				
May 10	Amsterdam, Netherlands	Boeing 737-800	minor	186 NA
Two passengers were injured during an emergency evacuation at the gate when flames were observed near the 737's auxiliary power unit.				
May 11	Bristol, Virginia, U.S.	Bell 407	substantial	2 none
The helicopter landed hard during an autorotation initiated after the engine lost power during a state police training flight.				
May 12	Tripoli, Libya	Airbus A330-200	destroyed	103 fatal, 1 serious
Visibility was about 5 km (3 mi) in mist when the A330, inbound from South Africa, struck terrain about 1.5 km (0.8 nm) from the runway.				
May 12	Astrakhan, Russia	Antonov 2R	destroyed	12 none
The pilots landed the An-2R in an open field after the engine failed shortly after takeoff for a skydiving flight. All the occupants exited the biplane before it was engulfed in flame.				
May 13	Manaus, Brazil	Embraer 810C	destroyed	6 fatal
The airplane, a Seneca II built under license from Piper, struck terrain during a forced landing shortly after departing Manaus for a flight to Maués.				
May 13	Pikwitonei, Manitoba, Canada	Beech 55 Baron	substantial	1 none
The pilot used a mobile telephone to report a complete electrical failure during a positioning flight to Thompson. The Baron struck terrain on approach to the Pikwitonei airport.				
May 15	Poeketi, Suriname	Antonov 28	destroyed	8 fatal
Weather conditions were described as "rough" when the An-28 crashed in a forest about 10 minutes after departing from Godo Holo for a scheduled flight to Paramaribo.				
May 15	Godwin Glacier, Alaska, U.S.	Robinson R44	substantial	2 NA
Whiteout conditions prevailed when the R44 struck terrain and rolled over. The two occupants and seven sled dogs were rescued by a U.S. Coast Guard helicopter crew.				
May 16	Clearwater, Florida, U.S.	Piper PA-46-350P	substantial	2 serious, 1 minor
The pilot said that he retracted the flaps too early on takeoff for a relief flight to Haiti. The Malibu Mirage struck trees and a house.				
May 17	Kabul, Afghanistan	Antonov 24B	destroyed	44 fatal
The An-24B was in heavy fog when it crashed in a mountain pass north of Kabul during a scheduled flight from Kunduz.				
May 17	Lucena City, Philippines	Robinson R44 II	destroyed	4 fatal
One person on the ground was among the fatalities when the helicopter crashed in a residential area soon after departing from a high school field.				
May 19	Cascavel, Brazil	Embraer 110P Bandeirante	destroyed	2 none
The cargo airplane struck terrain short of the runway during an approach with 2,000-m (1.25-mi) visibility in fog.				
May 22	Mangalore, India	Boeing 737-800	destroyed	158 fatal, 7 serious, 1 none
Inbound from the United Arab Emirates, the 737 overran the wet, 8,030-ft (2,448-m) runway and came to a stop in a ravine.				
May 23	Mönchgrün, Germany	Fairchild-Hiller FH-1100	destroyed	4 fatal
The helicopter crashed near a highway during a sightseeing flight.				
May 26	Cartwright, Newfoundland, Canada	Piper Chieftain	destroyed	2 fatal
The Chieftain crashed in adverse weather conditions about 90 km (49 nm) from Cartwright during a flight from Goose Bay.				
May 26	Guatemala City, Guatemala	Piper Navajo	destroyed	4 fatal
One person on the ground was among the fatalities when the Navajo crashed into a factory while returning to the airport with a vacuum pump failure.				

NA = not available

This information, gathered from various government and media sources, is subject to change as the investigations of the accidents and incidents are completed.