

# Dead-Stick Landing

**Ice crystals cause dual flameout.**

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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

### No Training or Guidance on Hazard

Raytheon Beechjet 400A. Minor damage. No injuries.

The Beechjet was on a fractional ownership operation positioning flight from Indianapolis to Marco Island, Florida, U.S., the afternoon of Nov. 28, 2005. The airplane had been flown at Flight Level 400 (approximately 40,000 ft) for 30 minutes and at FL 380 for about 15 minutes when the flight crew received clearance from air traffic control (ATC) for further descent to FL 330.

“The flight was operating in visual meteorological conditions [VMC] in the vicinity of cumulonimbus buildups,” said the final report on the incident, issued in June by the U.S. National Transportation Safety Board (NTSB).

The first officer, who had 3,100 flight hours, including about 20 hours in type, was flying the Beechjet from the left seat. When he pulled back the throttles to begin the descent, the pilots heard loud pops and saw that both engines had flamed out. They donned their oxygen masks, declared an emergency, established a glide speed of 180 kt and diverted the flight to nearby Jacksonville International Airport.

The captain, a check airman with 8,200 flight hours, including 1,800 hours in type, attempted

unsuccessfully to restart the engines using battery power. Descending through FL 260, the crew increased airspeed to 230 kt to attempt a windmill restart, but there was no indication of engine rotation.

“During the descent, ATC provided vectors to the ILS [instrument landing system] approach to Runway 7 at Jacksonville,” the report said. “The flight was in clouds during the descent, with moderate to heavy rain beginning at about 10,000 ft. As the airplane neared the airport, ATC provided continuous callouts of the distance remaining to the runway that the pilots later stated was very helpful in managing their descent and approach to the airport.”

The captain assumed control at about 9,000 ft. The landing gear was extended manually, and the Beechjet broke out of the clouds at about 1,200 ft. “After they landed and rolled off the runway onto a taxiway, the right landing gear tire deflated,” the report said.

Investigators determined that ice crystals had caused the flameouts (*ASW*, 6/08, p. 12). “Research revealed that convective storms can lift significant amounts of water into the upper atmosphere and that the blow-off from the tops of these storms can contain significant amounts of ice crystals,” the report said. “A post-incident study showed that the ice crystals could partially melt passing through the low-pressure compressor of the [Pratt & Whitney Canada] JT15D-5 engines due to the increase in temperature of the air being compressed.

“Further, the study determined that with the engine anti-ice turned off, it was possible for the



ice crystals to accrete on the leading edges of the front inner compressor stator leading edges. If a significant buildup of ice had occurred, any change in the airflow angle-of-incidence that would occur as power is reduced would cause any ice that had accreted on the leading edges of the stators to break away and would result in the engine surging and possibly flaming out.

“The study also revealed that after the engine had flamed out, the radiant heat from the oil tank, which is in the core of the engine, between the low- and high-pressure compressors, could cause the ice on the front inner compressor stators to melt, and the water could run back and refreeze in the high-pressure compressor impeller, acting like a wedge to prevent engine rotation and restart.”

The report said that research and flight tests also have shown that ice-crystal icing can temporarily block an orifice designed to trap water in the combustion chamber pressure-signal (P3) line and cause an abnormally rapid drop in fuel flow to a level that will not support combustion.

The report said that lack of training and guidance on the hazard of high-altitude ice-crystal icing was a contributing factor in the incident. Pilots interviewed during the investigation said that they did not know about the hazard or the need to activate the engine anti-ice system when flying near convective weather activity.

### Glass Cockpit Goes Dark

Airbus A319-131. No damage. No injuries.

A major electrical failure occurred as the A319 neared FL 200 during departure in VMC from London Heathrow Airport for a scheduled flight with 76 passengers to Budapest, Hungary, the night of Oct. 22, 2005. “The crew reported that there was an audible ‘clunk’ and the flight deck suddenly became very dark, with a number of systems and flight information displays ceasing to function,” said the U.K. Air Accidents Investigation Branch (AAIB) report.

The flight crew’s primary flight displays and navigation displays went blank, as did the upper electronic centralized aircraft monitor (ECAM). The master warning sounded as the autopilot and autothrottles disconnected. The VHF radio

and interphone failed, and most of the flight deck lights went out. “A number of other, less-critical systems were also affected,” the report said.

The commander, the pilot flying, referred to the standby instruments and the external horizon to establish level flight at FL 230, which conformed to the last ATC clearance, and attempted unsuccessfully to transmit a mayday call. Meanwhile, ATC had noticed the loss of radio communication and information from the A319’s transponder.

The commander told investigators that the integral lighting for the standby instruments also had failed, and the instruments were poorly illuminated by the remaining flight deck lights. “The commander concentrated on flying the aircraft while the copilot worked sequentially through the checklist actions that had appeared automatically on the lower ECAM display,” the report said. “The pilots were using active-noise-reduction headsets, and the loss of the flight interphone made communication between them difficult.”

The lower ECAM indicated that the primary fault was the no. 1 transformer rectifier, which converts alternating current to direct current. About 90 seconds after the electrical failure occurred, most of the affected systems were restored when the copilot selected the “AC ESS FEED” (alternating current essential bus feed) switch to “ALTN” (alternate). The commander declared an urgency, reported the electrical failure to ATC and requested and received clearance to fly a holding pattern. “The commander handed over control of the aircraft to the copilot, so that he could assess the situation,” the report said. “While in the hold, the cabin crew and passengers were briefed as to the situation, and the auxiliary power unit was started as a precaution.”

The commander established radio communication with a company maintenance control engineer. After discussing the situation for 40 minutes with the engineer, the commander decided to continue the flight to Budapest, where the aircraft was landed without further incident.

“This is the sixth reported occurrence of a failure involving the loss of the same five electronic flight displays on A320-family aircraft,”

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the report said, noting that such failures also have occurred in other types of aircraft. As a result of the incident investigation, the AAIB recommended that the European Aviation Safety Agency consult with other civil aviation authorities in considering whether pilots should receive initial and recurrent training for flight with sole reference to standby instruments.

### Blown Tire Disables Hydraulic System

Boeing 747-400. Substantial damage. No injuries.

There were 424 people aboard the 747 when it departed from Los Angeles International Airport before dawn on Oct. 20, 2007, for a flight to Brisbane, Australia. “As the aircraft became airborne, a tire on the left body landing gear disintegrated and a section of tire debris impacted a line of the no. 1 hydraulic system in the left body landing gear well,” said the report by the Australian Transport Safety Bureau (ATSB). “That caused fluid and pressure loss from that system.”

The flight crew saw a warning of the hydraulic system failure on the engine indicating and crew alerting system (EICAS) and received a report from the cabin crew that a “bang” had been heard just before the 747 became airborne.

“The crew reported that they completed the appropriate checks and were advised by [ATC] that tire debris, but no other material, had been recovered from the runway,” the report said. “The crew confirmed that all other aircraft systems were functioning normally and, after considering the status of the aircraft and the option of dumping fuel and returning for a night landing at Los Angeles, decided to proceed toward the planned destination while closely monitoring the aircraft’s systems and fuel usage.” Airline maintenance control personnel concurred with the crew’s decision.

The 747 was landed without further incident at Brisbane but had to be towed from the runway because the nosewheel steering system had been disabled by the failure of the no. 1 hydraulic system.

In the report, the ATSB noted conflicting information in the flight crew operations manual (FCOM) and the flight crew training manual

(FCTM). The FCOM recommended landing at the nearest available airport if more than one of the 747’s four hydraulic systems failed; however, “for a single hydraulic system failure, the checklist listed the aircraft services that the relevant system operated,” the report said. “It did not suggest a course of action.” The FCTM recommended that following a tire failure on takeoff, the flight crew should not consider continuing the flight to the destination if other damage, such as a hydraulic system failure, also has occurred.

The report said that although pilots primarily use the FCOM for guidance in flight, the conflicting information in the 747 FCOM and FCTM “create the potential for confusion and a less-than-optimal response by the crew.” The airline recommended that Boeing review “operational policy statements” in the FCTM. “The manufacturer accepted that suggestion and indicated that an examination would be undertaken as part of its ongoing standardization program,” the report said.

### Distraction Blamed for Incursion

Boeing 737, Cessna Citation. No damage. No injuries.

VMC prevailed the morning of Sept. 7, 2006, when the flight crew of a 737-800 with 178 people aboard was cleared by ATC to taxi to holding position A1 for departure from Runway 01L at Oslo Airport in Gardermoen, Norway, and the crew of a Citation IISP with two pilots and an unspecified number of charter passengers aboard was cleared to holding position C1 for departure from the runway.

A1 is near the approach end of the 3,600-m (11,812-ft) runway, and C1 is about 1,462 m (4,797 ft) from the approach end and close to the general aviation ramp.

After clearing the 737 crew for takeoff, the airport traffic controller noticed that the Citation had passed the assigned holding point and was about to enter the runway. The controller told the 737 crew to abort the takeoff, which was accomplished “without any real danger of a collision,” said the report by the Accident Investigation Board of Norway.

The Citation had crossed lighted stop bars and markings at the holding point. The com-

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mander told investigators that his vision was impaired because the airplane was taxiing toward the rising sun. He also said that his attention was diverted to other tasks, including helping his relatively inexperienced first officer complete before-takeoff checks.



## TURBOPROPS

### Too Fast for Landing on Short Runway

Beech A90 King Air. Destroyed. One fatality, one serious injury.

The pilots were conducting a local flight from Sarasota, Florida, U.S., to disperse Mediterranean fruit flies under contract to the U.S. Department of Agriculture the afternoon of June 12, 2006, when both propeller secondary low-pitch stop lights illuminated. The right propeller then feathered, and the pilots diverted to “an airport with short runways approximately 3.2 nm [5.9 km] from their present position, rather than to an air carrier airport located 8.5 nm [15.7 km] away,” the NTSB report said.

The pilot entered a close right base to the 2,688-ft (819-m) runway at 155 kt — 51 kt above the appropriate single-engine approach speed — and overshot the turn to final approach. The landing gear and flaps were retracted when the King Air touched down on a taxiway near the departure end of the runway and then struck several obstacles and a house. The pilot was killed, and the copilot was seriously injured.

NTSB said that probable causes of the accident were the pilot’s “poor in-flight planning [and] his failure to establish the airplane on a stabilized approach for a forced landing.” Investigators were unable to determine why the propeller-governing systems failed.

### Pitot/Static Icing Causes False Indications

De Havilland Canada Dash 8. No damage. No injuries.

The aircraft was climbing in moderate icing conditions and nearing the assigned cruise altitude, FL 160, during a scheduled flight with 71 passengers from Edinburgh, Scotland, to Belfast, Northern Ireland, the night of Dec. 10, 2006, when the primary flight displays (PFDs) showed an “ALT MISMATCH” alert.

The altitude displayed on the commander’s PFD was 150 ft lower than the altitude displayed on the copilot’s PFD.

“Soon after reaching FL 160, the crew began to experience further discrepancies between both indicated altitudes and airspeeds,” the AAIB report said. “The autopilot then disconnected automatically.” The altitude and airspeed information on the captain’s PFD then was replaced by red failure indications. The crew reported the instrument problems to ATC and requested and received clearance to descend to FL 80.

The copilot’s air data computer was selected to provide information to both PFDs. During the descent, the altitude and airspeed indications decreased rapidly and were replaced by failure indications. The crew declared an urgency and conducted the emergency checklist. “The controller assisted by providing the crew with groundspeed readouts and Mode C altitude information,” the report said.

“Recorded flight data indicated that the standby pitot/static probe heat switch had not been selected ‘ON’ prior to flight, and the investigation concluded that, in all probability, the remaining two pitot/static probe heat switches also had not been selected ‘ON,’” the report said.

While discussing the icing conditions and aircraft systems during the emergency descent, the pilots noticed that the pitot/static heat switches were off. They apparently turned the switches on, and altitude and airspeed indications subsequently returned to normal. The aircraft was nearing Belfast, and the crew decided to continue to the destination.

The investigation found that the copilot habitually turned the probe heat switches on before the action was called for by the “Taxi” checklist but that, while preparing for departure from Edinburgh, he had been distracted by an abnormal engine indication before the commander called for the checklist. “The copilot had become used to responding to the checklist item ‘pitot static’ with the knowledge that he had already moved the switches and therefore

probably did so on this occasion without positively checking the switches,” the report said, noting that neither pilot noticed the pitot-heat alert on the caution/warning panel.

### Line Technician Killed by Turning Prop

Pilatus PC-12/45. Minor damage. One fatality.

The single-engine turboprop, with eight people aboard, was landed at about 0220 local time at Wiley Post Airport in Oklahoma City on Jan. 3, 2008. “Upon reaching the FBO’s [fixed base operator’s] dimly lit ramp, a line technician ... used lighted wands to marshal the airplane to a parking spot,” the NTSB report said.

The pilot set the parking brake and was shutting down the engine when he heard a loud “thud” and felt the airplane vibrating. “He looked up and saw the line technician rolling on the ramp toward the airplane’s left wing tip.”

One of the passengers, a physician, administered first aid until emergency response personnel arrived. However, the line technician’s injuries were fatal.

The technician had completed professional line service training in September 2007. “This training included the dangers associated when working around propellers,” the report said. In October, the technician received a written warning from the FBO for nonadherence to company procedure after he chocked the nosewheel of a King Air while the engines were still running.



## PISTON AIRPLANES

### CFIT During a Nighttime Approach

Piper Seneca III. Destroyed. One serious injury.

The pilot had conducted a charter flight to Plymouth, England, and was returning to his home base at Oxford the night of Dec. 19, 2007. The Oxford automatic terminal information system (ATIS) indicated that visibility was 3,500 m (about 2 1/4 mi) in haze and the ceiling was overcast at 500 ft.

During his initial radio call to the airport traffic control tower, the pilot said that he was

establishing the aircraft on a 10-nm (19-km) final approach to Runway 01, the AAIB report said. He did not say that he had the current ATIS information or request information on weather conditions at the airport. The controller told the pilot to report 2 nm (4 km) from the runway.

However, in his next call, the pilot said that the Seneca was 4.5 nm (8.3 km) from the runway. The controller told him to report the runway lights in sight. “The pilot acknowledged this instruction, but no further transmissions were received from him,” the report said.

The ILS approach to Runway 19 was not available, and the pilot apparently conducted from memory the NDB/DME (nondirectional beacon/distance measuring equipment) approach to Runway 01. Radar data recorded by a nearby ATC facility indicated that the aircraft began descending below the initial approach altitude 2.3 nm (4.3 km) before reaching the final approach fix and continued the descent below the 870-ft minimum altitude for a stepdown segment of the final approach.

The wreckage of the Seneca was found near the summit of a 539-ft hill on the extended centerline and 3.6 nm (6.7 km) from the runway. “The pilot was found 9 m [30 ft] from the burning wreckage,” the report said. “He was hypothermic and suffering from chest and limb injuries, as well as burn injuries to his lower legs. He was taken to a hospital in Oxford and survived the accident.

“No technical faults or defects were identified as contributory factors to the accident, which the investigation concluded was an instance of controlled flight into terrain (CFIT).”

### Leaking Fuel Pump Fitting Causes Explosion

Beech B55 Baron. Substantial damage. No injuries.

The pilot was starting the Baron’s right engine in preparation for a positioning flight from Atlanta’s Fulton County Airport the night of March 19, 2007, when he heard a “thump” and saw fire emerge from the engine cowling. The fire went out when he shut down the engine.

The NTSB report said that the right wing, from the nacelle to the wing tip, had been damaged by an explosion. Investigators found that a B-nut fitting on the fuel pump was leaking. “Examination of maintenance records revealed that the right main fuel cell was replaced approximately three months and 12 flight hours prior to the accident,” the report said.

NTSB said that the probable cause of the accident was “improper maintenance of the B-nut fitting adjacent to the fuel pump.”

## HELICOPTERS

### ‘Piece of Cake’

Bell 407. Destroyed. Two fatalities.

The pilot had flown a charter customer from his residence in Virginia to a golf course in Ocean View, Delaware, U.S., about midday on Dec. 14, 2006. She then repositioned the helicopter to an airport in Georgetown to refuel. A pilot who spoke with her at the airport said that she seemed to be nervous about the weather and checked forecasts, surface observations and other information several times, the NTSB report said. The pilot had more than 3,300 flight hours as a helicopter pilot-in-command but did not have an instrument rating.

The pilot departed from the airport under visual flight rules (VFR) at 1650 to pick up the passenger for the return flight to Virginia. However, she reversed course after entering fog and landed the 407 in a farm field about 7 mi (11 km) from the golf course.

The pilot notified the passenger of her whereabouts, and he was driven to the landing site at about 1800. “By the time her passenger arrived at the helicopter, darkness had fallen and dense fog had formed,” the report said. “The driver stopped his vehicle in front of the helicopter and greeted the pilot. He then asked the pilot if she felt comfortable with the conditions. He specifically pointed out the power lines, irrigation equipment and a tree line adjacent to the helicopter. The pilot replied that it was a ‘piece of cake’ and pointed to the sky above. The driver

recalled that, at the time, the stars could clearly be seen.”

The driver moved his vehicle away from the helicopter to watch its departure. “Due to the dark lighting conditions and the foggy weather, the driver was unable to see the helicopter or its lights,” the report said. “He drove away shortly thereafter.”

A farm worker heard the helicopter’s engine start and walked outside to watch the takeoff. He said that the helicopter lifted off vertically to a height just above the treetops and utility lines, hovered momentarily while the landing light was cycled twice and then pitched nose-down and began to accelerate. “The witness expected to see the helicopter climb, as he had seen other helicopters do in the past,” the report said. “However, it just accelerated forward in a shallow descent until it impacted the ground.”

Examination of the wreckage revealed no sign of any preimpact mechanical malfunction. NTSB said that the probable cause of the accident was “the pilot’s improper decision to depart under VFR into night IMC.”

### Disorientation Cited in Tail Strike

Eurocopter BK117. Substantial damage. No injuries.

A n 11,300-hour flight instructor was training a 16,800-hour commercial pilot on confined-area operations in Slaton, Texas, U.S., on Aug. 20, 2007. Both pilots were familiar with the training area, and, before approaching it, the pilot conducted a high reconnaissance to gauge the surface winds and approach and departure paths, the NTSB report said.

The pilots planned to terminate the approach in a hover. The grass in the landing zone usually is less than a foot long but, due to unusually high rainfall, had grown 3–4 ft (1–1.2 m). While hovering, “the tall, waving grass disoriented the pilot, [who] allowed the helicopter to drift backwards into trees,” the report said.

The pilots felt a vibration from the tail rotor and immediately landed the helicopter. Both tail rotor blades had been destroyed, and the tail fin gearbox mounting spar had been damaged by the impact. ➤





Preliminary Reports				
Date	Location	Aircraft Type	Aircraft Damage	Injuries
July 2, 2008	Caracas, Venezuela	Piper Cheyenne II	destroyed	3 fatal
Soon after the pilot reported a technical problem to air traffic control (ATC) during a nighttime approach, the Cheyenne crashed in a forest.				
July 6, 2008	Saanen, Switzerland	Beech King Air F90	substantial	6 NA
The King Air touched down long and overran the runway. No fatalities were reported.				
July 7, 2008	Bogotá, Colombia	Boeing 747-200	destroyed	2 fatal, 3 serious, 6 minor
Soon after departing for a cargo flight in nighttime visual meteorological conditions, the flight crew radioed that they had an engine fire and were returning to the airport. The 747 crashed on a farm about 8 km (4 nm) from the airport, killing two people on the ground.				
July 7, 2008	Saltillo, Mexico	McDonnell Douglas DC-9-15	destroyed	1 fatal, 1 serious
The freighter crashed in an industrial area short of the runway during an approach in nighttime instrument meteorological conditions. The captain was killed.				
July 10, 2008	Puerto Montt, Chile	Beech 99A	destroyed	9 fatal
The airplane crashed while departing for a scheduled flight to Melinka. Witnesses said that an engine caught fire after the 99 was rotated for takeoff.				
July 15, 2008	Kennesaw, Georgia, U.S.	Socata TBM-700	destroyed	1 fatal
ATC asked the pilot to conduct an S-turn on final approach to accommodate two departures. Witnesses said that the turboprop single rolled inverted and descended in a steep nose-down attitude.				
July 17, 2008	Mount Isa, Queensland, Australia	Piper Navajo	destroyed	1 NA
The Navajo was descending to land when it struck rugged terrain about 29 km (16 nm) north of the airport. The pilot used a mobile telephone to alert rescuers.				
July 19, 2008	Gapyeong, South Korea	Sikorsky S-92A	destroyed	2 serious, 14 minor
The Helibus struck trees during an attempted precautionary landing after the crew encountered low visibility in heavy rain.				
July 19, 2008	Chicago	Airbus A320	minor	142 none
The A320 came to a stop in an engineered materials arresting system bed after overrunning Runway 22L at O'Hare International Airport.				
July 22, 2008	Ocean Ridge, Florida, U.S.	Cessna 402B	destroyed	1 serious
The 402 crashed in a police station parking lot after an engine problem occurred.				
July 23, 2008	Beni, Bolivia	Fokker F27-400	substantial	37 NA
About 25 minutes after departing from Guayaramerin for a scheduled flight to Trinidad, the crew reported an engine problem and conducted a forced landing on a road. No fatalities were reported.				
July 25, 2008	Manila, Philippines	Boeing 747-400	substantial	365 none
The 747 was at 29,000 ft over the Pacific Ocean, en route from Hong Kong to Melbourne, Victoria, Australia, when an oxygen cylinder apparently exploded and caused a rapid cabin decompression. The crew conducted an emergency descent and landed in Manila without further incident.				
July 28, 2008	Colorado Springs, Colorado, U.S.	Raytheon Cobra	substantial	none
The unmanned aircraft system overshot a programmed final-approach waypoint and struck a light pole during an automatic approach to the U.S. Air Force Academy.				
July 28, 2008	West Chester, Pennsylvania, U.S.	Eclipse 500	substantial	2 none
The airplane crossed a road and struck an embankment after overrunning the 3,347-ft (10,982-m) runway at Brandywine Airport.				
July 31, 2008	Owatonna, Minnesota, U.S.	British Aerospace 125-800A	destroyed	8 fatal
Reported visibility was 10 mi (16 km) in rain, and surface winds were from 170 degrees at 6 kt when the Hawker struck the localizer antenna beyond Runway 30 during an attempted go-around and crashed in a cornfield.				
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.				