Off Into the Mud

High speed and heavy rain factor in a runway excursion.

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

JETS

Approach Procedure Faulted

Boeing 727-200. Minor damage. No injuries.

The flight crew's use of a "pilot-flown approach" rather than a "pilot-monitored approach" at night and in heavy rain likely contributed to a higher-than-necessary approach speed, a late touchdown on a runway contaminated with standing water and the 727's overrun into deep mud, said the Transportation Safety Board of Canada (TSB).

The accident occurred about 0300 local time on March 24, 2010, during a scheduled cargo flight from Hamilton, Ontario, to Moncton, New Brunswick. None of the three flight crewmembers was hurt, and damage to the aircraft was minor.

Gusting winds and light rain had been forecast for Greater Moncton International Airport. When the aircraft arrived, the surface winds were from 110 degrees at 8 kt, gusting to 17 kt, visibility was 4 mi (6 km) in heavy rain and mist, and the ceilings were broken at 600 ft and overcast at 1,000 ft. The last runway surface condition report had been issued about eight hours before the 727 arrived.

The TSB report noted that, at the time of the accident, there was no requirement to issue a special weather report when light rain changes to heavy rain. However, the International Civil Aviation Organization adopted an amendment in November 2010 (eight months after the accident) requiring a special report to be issued when moderate or heavy precipitation begins or ends. The Canadian Aviation Regulations (CARs) were revised accordingly.

The pilots previously had conducted several flights to Moncton but usually had landed on Runway 11/29, which is 8,000 ft (2,438 m) long and has two nonprecision approaches. Because of the wind conditions, however, the crew chose to conduct the instrument landing system (ILS) approach to Runway 06, which is 6,150 ft (1,874 m) long and 200 ft (61 m) wide. "Neither runway … has a grooved surface or a runway end safety area, nor are they required by regulations," the report said. The captain, the pilot flying, had landed on the shorter runway only once before. The first officer had not landed on Runway 06 previously.

Questioning the crew's decision to use Runway 06, the report noted the crew's lack of experience in landing on that runway and that "the weather was above the nonprecision approach minima to Runway 11, which was within acceptable crosswind limitations and offered an additional 2,000 ft [610 m] of landing distance."

Using performance information from the aircraft flight manual (AFM), investigators determined that under the existing conditions and aircraft weight and configuration, the 727 would have required 5,990 ft (1,826 m) to land on Runway 06. This calculation was "based on the AFM and [does] not reflect the effect of outside air

temperature, reverse thrust usage, or an adjusted V_{REF} [reference landing speed]," the report said.

The crew planned to conduct the ILS approach at 157 kt, based on a V_{REF} of 139 kt with 18 kt added to compensate for the wind conditions. According to the company's operations manual, "the approach speed is to be decreased as the aircraft nears the ground," the report said. "The gust correction is retained until touchdown, while the steady wind correction should be bled off as the aircraft approaches touchdown. In this case, the gust correction was 10 kt, which would make the target touchdown airspeed 149 kt."

The aircraft had entered heavy rain shortly after the crew established visual contact with the runway.

Shortly after the 727 was established on the ILS localizer and glideslope, the captain disengaged the autopilot and hand-flew the aircraft. Nearing the final approach fix (FAF), the aircraft drifted above the glideslope. The first officer and second officer called out the deviation, and the captain took corrective action. The aircraft crossed over the FAF about 50 ft higher than the published altitude. "The aircraft then was re-established on the glideslope and remained on the glideslope until it crossed the runway threshold," the report said.

The aircraft had entered heavy rain shortly after the crew established visual contact with the runway about 2 nm (4 km) from the threshold. It crossed the threshold at 165 kt and touched down at 157 kt — 8 kt above the target touchdown speed — nine seconds later. The touchdown point was between 2,000 and 2,500 ft (610 and 762 m) from the threshold. "From threshold crossing to touchdown, the aircraft's average rate of descent was calculated to be approximately 400 fpm," the report said.

The speed brakes activated automatically on touchdown, and the crew applied maximum manual anti-skid braking and full reverse thrust about three seconds later. Hydroplaning on the standing water, the 727 veered about 8 degrees right of the centerline. The crew responded by reducing reverse thrust until the aircraft was re-established on the runway heading about three seconds later.

With full reverse thrust and maximum manual braking still being applied, the 727 ran off the ends of the runway and the paved 197-ft (60-m) runway end strip at about 50 kt. "The aircraft came to rest in deep mud, the nosewheel approximately 340 ft [104 m] beyond the runway end and 140 ft [43 m] beyond the edge of the paved runway end strip," the report said.

The airport's aircraft rescue and fire fighting (ARFF) operation had closed on schedule at 2345. "There is no requirement for designated airports to provide ARFF for cargo-only flights," the report said. "A local fire department responded and arrived on-scene approximately 20 minutes after the aircraft departed the runway. The flight crew exited the aircraft using a ladder provided by the firefighters."

Neither the CARs nor the company's standard operating procedures required a pilot-monitored approach (PMA) in the conditions that existed at Moncton. During a PMA, the pilot flying keeps the autopilot engaged until reaching the decision height or minimum descent altitude on approach and then transfers control to the pilot monitoring, who completes the approach and landing.

The report said that Transport Canada found that PMAs "improve the transition from instruments to visual conditions, as well as improve the captain's decision-making ability in the high-workload terminal approach and landing environment."

Windshield Fire Prompts Diversion

Airbus A330-203. Minor damage. No injuries.

The A330 was at Flight Level (FL) 390 (approximately 39,000 ft) and 365 nm (676 km) northwest of Cairns, Queensland, Australia, the night of March 22, 2011, when an odor was detected in the cabin and on the flight deck. "The flight crew actioned the aircraft quick reference handbook checklist for 'Smoke/Fumes/Avionics' in an attempt to minimize the smell, and cabin crew confirmed that this was successful," said the report by the Australian Transport Safety Bureau (ATSB).

Shortly thereafter, however, an arc in the electrical circuit for the left windshield heating system produced a small flame that appeared in the bottom left corner of the windshield. The pilots donned their oxygen masks, used a fire

extinguisher to douse the flame and engaged the window heat computer reset button in compliance with the "Cockpit Windshield/Window Arcing" checklist.

About 20 minutes later, the electronic centralized aircraft monitor generated a fault message, "L WINDOW HEAT," and displayed the procedure for correcting the fault. "Despite following that procedure, a further four occasions of arcing and flames occurred over the next six minutes, all of which were extinguished," the report said. "The aircraft operator's maintenance watch advised the crew to deselect the probe window heat, although there was no assurance that action would remove power from the windshield."

The crew decided to divert the flight — which was en route with 147 passengers and 11 crewmembers from Manila, Philippines, to Sydney, New South Wales — to Cairns. "The crew also advised ATC [air traffic control] that they had extinguished repeated fires, the result of electrical arcing from an electrical short circuit in the captain's windshield heater," the report said. The A330 subsequently was landed at Cairns without further incident.

The windshield was among those that had been identified by a May 2010 service bulletin as requiring replacement. According to the report, Airbus issued the service bulletin after receiving several reports of overheated windshield heat connectors in A330s. When the incident occurred, the operator's plan was to replace the affected windshields in its A330 fleet by September 2011, which "was well within the Airbus recommended compliance date of May 2012 for this operator," the report said.

On the Brakes During Takeoff

Gulfstream G150. Minor damage. No injuries.

The commander briefed the copilot that he would conduct a static takeoff, applying full power while holding the wheel brakes, because of the relatively short runway at RAF Northolt Airport in London. In addition to the pilots, there were two passengers and a cabin attendant aboard for the intended return flight to Moscow the afternoon of Feb. 6, 2011.

The crew began the takeoff from the approach threshold of Runway 25, which is 5,535 ft (1,687 m) long. As the G150 reached rotation speed, 122 kt, the commander pulled the control column back, but the aircraft did not respond. He then pulled the column fully back, but the aircraft pitched up only about 1 degree, said the report by the U.K. Air Accidents Investigation Branch (AAIB).

The crew rejected the takeoff just before the aircraft reached 129 kt, or V_2, the takeoff safety speed. "Full braking was applied, and the aircraft came to a stop at the end of the paved surface," the report said. "A fire broke out around the left main wheels, which was suppressed quickly by the rescue and fire fighting service."

Investigators found no pre-existing technical faults and were unable to identify the probable cause of the incident. "The most likely explanation for the lack of acceleration and rotation was that the brakes were being applied during the takeoff, probably as a result of inadvertent braking application by the commander, which caused a reduction in acceleration and a nose-down pitching moment sufficient to prevent the aircraft from rotating," the report said.

The commander, 32, had 1,750 flight hours, including 490 hours in type. "He had recently completed his qualification to fly as pilot-in-command on type, and this was his first flight as commander," the report said.

The commander pulled the control column back, but the aircraft did not respond.

Gear Neglected During Approach

Boeing 767-300. No damage. No injuries.

Interruptions and distractions during an approach to Sydney, New South Wales, Australia, led to a breakdown of situational awareness and resulted in the flight crew not realizing until the 767 descended below 500 ft that the landing gear was not extended, according to the ATSB's recent report on the Oct. 26, 2009, occurrence. The pilots conducted a go-around and subsequently landed the aircraft without further incident.

Before beginning the descent to Sydney, the crew had briefed the ILS approach to Runway 16R, using the operator's noise-abatement procedure, which required in part that the landing

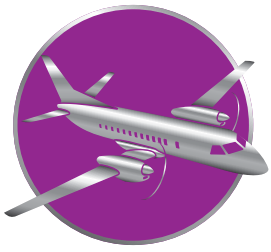
gear and landing flaps be extended at a radio altitude (RA) of 2,000 ft rather than on intercepting the glideslope.

Based on weather reports, the crew expected to transition from instrument to visual meteorological conditions well before reaching decision height.

The 767 was established on the ILS and descending through 2,500 ft above ground level when ATC instructed the crew to establish radio communication with Sydney Tower. "The pilot flying [the first officer] stated that he considered [the ATC instruction] a late requirement to call the tower, which distracted him from the 2,000 ft RA procedural point in the operator's noise-abatement procedure," the report said.

Among further distractions were a weak outer marker signal, which prompted the captain to perform a mental check of the aircraft's profile, and showers in the vicinity of the runway. Both pilots also told investigators that, after the aircraft descended below 1,000 ft, they focused their attention on potential conflicts with an aircraft ahead on the approach and with another aircraft that had been cleared for takeoff on Runway 16R. The first officer said that, in response, he mentally rehearsed the go-around procedure a number of times during final approach.

"As the aircraft was approaching 500 ft RA, clearance to land was given by ATC and, almost simultaneously, both pilots identified that the aircraft was incorrectly configured," the report said, noting that the enhanced ground-proximity warning system generated a "TOO LOW GEAR" warning about the same time. The crew immediately initiated the go-around.



TURBOPROPS

'Trace of Ice' Induces Stall on Takeoff

Cessna 208B. Substantial damage. No injuries.

Statements obtained from the seven passengers indicated that there was ice on the Caravan's wings when the aircraft departed in freezing rain from Kwigillingok, on the west coast of Alaska, U.S., for an air taxi flight to Kipnuk the evening of Feb. 17, 2010.

The airplane was about 200 ft above the ground shortly after takeoff when engine power began to fluctuate. The NTSB report said that although the pilot was able to restore power by moving the emergency fuel control lever forward, the Caravan stalled, struck the surface of a frozen lake and became airborne again.

"For safety reasons, the pilot chose to fly straight ahead for 8 mi [13 km] to Kongiganak, Alaska, where the flight landed without further difficulty," the report said. Examination of the Caravan revealed that the right wing had been substantially damaged when the airplane bounced off the frozen lake.

When interviewed by an investigator, the pilot said that there was a "trace of ice" on the wings when the airplane departed from Kwigillingok. The report noted that takeoff with any ice on the wings is prohibited and that the Caravan AFM contains the following warning: "Even small amounts of frost, ice, snow or slush on the wing may adversely change lift and drag. Failure to remove these contaminants will degrade airplane performance and may prevent a safe takeoff and climbout."

Faulty Valve Causes Depressurization

Bombardier Q400. No damage. No injuries.

The aircraft was nearing its assigned flight level, 230, during a scheduled flight from Southampton, England, to Dublin, Ireland, the morning of Jan. 5, 2010, when the copilot, the pilot monitoring, noticed an excessive climb rate (1,500 fpm) on the cabin altimeter — an indication of a pressurization system malfunction.

Shortly thereafter, the pressurization fault annunciator illuminated, the AAIB report said. The commander changed pressurization system control to manual, then back to automatic, but the fault indication persisted.

The pilots donned their oxygen masks, declared an emergency and conducted an emergency descent to 10,000 ft, where they changed their flight status to an urgency. The crew then

returned to Southampton and landed without further incident.

When the pressurization problem occurred, both cabin crewmembers were completing snack service to the 23 passengers and noticed that the "sandwich packets and coffee cup foils were beginning to burst," the report said. "One cabin crewmember stated, 'As I was walking to the rear of the galley, my ears were popping and I felt short of breath, my legs felt weak.' Both cabin crew utilized oxygen bottles to regain composure and to refocus."

One cabin crewmember told investigators that after an unsuccessful attempt to contact the flight crew on the interphone, "I was worried that they were OK." Shortly thereafter, the commander used the public-address system to inform the passengers and cabin crew that the "emergency descent is now complete."

The cabin crewmembers said that several passengers complained of sore ears. However, after the aircraft landed, the "cabin crew and passengers were checked and found to be fit and well," the report said. "Post-incident investigation indicated that a faulty aft pressure outflow valve was the probable cause of the pressurization failure."

Loose Bolts Cause Aileron Separation

Beech E90 King Air. Substantial damage. No injuries.

The airplane had undergone maintenance that included an inspection of the ailerons requiring their removal and reinstallation. The pilot ensured that the ailerons were moving freely and correctly before departing from Des Moines, Iowa, U.S., to conduct a post-maintenance functional check flight the morning of Feb. 15, 2011.

The pilot and a maintenance technician performed a variety of checks of the engines and flight instruments at FL 180. "After completing the checks, the pilot requested a left, 180-degree turn back to [Des Moines]," the NTSB report said. "ATC approved the turn, and the pilot selected the autopilot heading switch for a left turn [to the airport]. Approximately 140 degrees into the turn, the autopilot jerked, stabilized and jerked again during the turn to level off."

The pilot noticed that the right aileron had separated from the King Air but was able to land the airplane without further incident.

The aileron was not found, but examination of the hinge brackets on the aft spar revealed that the attachment bolts had not been aligned properly in the nut plates when the aileron was reinstalled. As a result, the bolts "fell out" during the functional check flight, the report said.

PISTON AIRPLANES

Detached Boot Causes 'Violent Roll'

Piper Chieftain. Minor damage. No injuries.

During a cargo flight the morning of Feb. 9, 2011, the pilot felt a "slight shudder" when he activated the wing deicing boots on initial descent to Weston Aerodrome in Dublin, Ireland. "About 10 minutes later, the aircraft suddenly experienced a violent rolling motion but had no adverse pitch movements," said the report by the Irish Air Accident Investigation Unit. "The pilot scanned outside the aircraft and noted that the starboard deicing boot had partially detached and was flailing against the wing and aileron."

The pilot had difficulty controlling the aircraft and declared an urgency. "Dublin ATC immediately offered the pilot the option to land at Dublin [International Airport]," the report said. The pilot accepted this offer due to the fact that the Dublin runway was longer and wider than those available at [Weston]."

During approach, however, the control problems ceased, and the pilot noticed that the detached portion of the deicing boot had separated from the aircraft. The pilot requested and received clearance to proceed to Weston, where he landed the Chieftain without further event.

Examination of the aircraft revealed that a 1.6-m (5.2-ft) section of the inboard deicing boot, which had been installed in 2007, had "peeled away" from the wing leading edge, the report said, noting that further detachment was prevented by

the stall warning vane bracket. The flailing section of boot had damaged the wing, flap and aileron.

"Inspection of the aircraft and examination of the maintenance records indicated that the aircraft was well maintained and offered no likely reason for the separation of the deicing boot," the report said.

Snow Was Deeper Than It Looked

Cessna 340A. Substantial damage. Three minor injuries.

The airport in Grove City, Pennsylvania, U.S., was unattended, and no notices to airmen about runway condition had been posted the morning of Feb. 27, 2010. "The pilot overflew the airport and noted what he believed to be a light coating of snow on the runway," the NTSB report said.

The pilot told investigators that the surface winds were from 260 degrees at 10 to 15 kt when he landed on Runway 28, which was 4,500 ft (1,372 m) long and 75 ft (23 m) wide. "After landing on Runway 28, the pilot realized that approximately 1 to 1 1/2 in [3 to 3 3/4 cm] of snow was present on the surface of the runway," the report said.

The 340 slid off the right side of the runway, struck a snowbank and spun 180 degrees. The pilot and his two passengers sustained minor injuries, and the aircraft's horizontal stabilizer was substantially damaged.

Control Lost in Severe Turbulence

Piper Twin Comanche. No damage. No injuries.

The aircraft entered an uncommanded dive when it encountered severe turbulence while cruising at 9,000 ft in instrument meteorological conditions (IMC) near Albury, New South Wales, Australia, the morning of Feb. 16, 2011. The pilot disengaged the autopilot and attempted to raise the nose of the aircraft, but the rapid descent continued.

"At about 6,000 ft and after a number of uncontrollable steep descents and climbs in dark cloud and rain, the pilot eventually regained control of the aircraft," the ATSB report said. The pilot told ATC that he was experiencing navigation and control difficulties due to severe turbulence and requested radar vectors to avoid high terrain.

The Twin Comanche then entered strong drafts, and the gyro instruments tumbled. "The pilot reported that after recovering from another uncommanded descent, the aircraft was thrust upward through 10,000 ft, where it started to shake violently and entered a stall," the report said. "On recovering from the stall, [the aircraft] entered another downdraft and descended uncontrollably again. It was reported that [the aircraft] climbed and descended continually for nearly 35 minutes, at times becoming inverted."

Eventually, the pilot saw terrain through a break in the clouds, flew the aircraft out of the IMC and landed without further event at Albury. According to the report, the pilot and his passenger were not hurt, and the Twin Comanche was not damaged.

HELICOPTERS

Low Contrast, NVGs Factor in CFIT

Aerospatiale AS 350-B2. Substantial damage. Three fatalities.

The mission was a practice emergency medical services flight to a remote desert area near El Paso, Texas, U.S., on a moonless night on Feb. 5, 2010. The pilot was making his first unsupervised flight with night vision goggles (NVGs) after receiving company NVG training that consisted of flights in populated areas with plentiful lighting providing high contrast among objects.

"Ground personnel observed the helicopter orbit [the landing zone] one or two times," the NTSB report said. The AS 350 then entered a steep bank and nose-down pitch attitude, and struck the ground, killing the pilot and the two paramedics.

"The lack of attempted recovery prior to ground impact suggests that the pilot did not recognize the helicopter's descent rate and bank angle," the report said.

NTSB determined that the probable cause of the accident was "the pilot's loss of situational awareness" and that a contributing factor in the controlled flight into terrain (CFIT) accident was "the pilot's unfamiliarity with the hazards of a low-contrast area while using NVGs."

Preliminary Reports, December 2011

Date	Location	Aircraft Type	Loss Type	Injuries
Dec. 1	near Baton Rouge, Louisiana, U.S.	Bell 407	total	1 none
The helicopter lost power and rolled inverted after an autorotative landing in the Gulf of Mexico.				
Dec. 2	Midland, Texas, U.S.	Beech King Air C90	total	1 minor
The King Air struck a house on short final approach after the pilot reported an engine problem. The occupant of the house escaped injury.				
Dec. 3	Larat, Indonesia	Indonesian Aerospace 212	minor	1 serious, 21 minor/none
One passenger was seriously injured when the aircraft veered off the left side of the runway on landing.				
Dec. 4	Pointe-Noire, Congo	Beech King Air 100	major	2 minor/none
The landing gear collapsed when the King Air veered off the runway while landing.				
Dec. 5	Oranjestad, Aruba, Netherlands Antilles	Shorts 360	minor	33 minor/none
The right main landing gear, which had struck a donkey on takeoff from Venezuela, partially collapsed on landing.				
Dec. 7	near Las Vegas, Nevada, U.S.	Eurocopter AS 350	total	5 fatal
The helicopter struck high terrain near Lake Mead during a sightseeing flight at sunset.				
Dec. 8	Antarctica	Kamov 32	major	1 minor, 1 none
After transporting supplies to the Zhongshan research station, the helicopter was involved in a forced landing for unknown reasons while returning to a research vessel.				
Dec. 13	Tikokino, New Zealand	Bell 206B	major	1 minor/none
The main rotor pitch links were damaged during a wire strike on final approach. The subsequent forced landing caused further damage to the JetRanger's skids, tail boom and stabilizers.				
Dec. 15	Val-d'Or, Quebec, Canada	Beech King Air 100	major	2 minor/none
The fuselage, landing gear and right propeller were damaged when the landing gear, rather than the flaps, was inadvertently retracted after touchdown.				
Dec. 15	Puerto Ordaz, Venezuela	Eurocopter BO-105	total	1 fatal, 1 minor/none
The helicopter crashed shortly after the pilot reported a technical problem during a post-maintenance functional check flight.				
Dec. 17	Abmisbil, Papua, Indonesia	Pacific Aerospace 750XL	total	2 fatal, 3 serious
The pilot and a passenger were killed when the aircraft veered off the runway on landing and entered a ravine.				
Dec. 17	Ko Samui, Thailand	ATR 72	major	42 minor/none
While being taxied for a night departure, the aircraft ran off the taxiway into a ditch and struck a wall.				
Dec. 17	Mesquite, Nevada, U.S.	Cessna 208 Caravan	major	2 minor
The landing gear collapsed when the Caravan overran the runway on landing.				
Dec. 20	Yogyakarta, Indonesia	Boeing 737	major	131 minor/none
The nose landing gear collapsed when the 737 overran the 2,200-m (7,218-ft) runway while landing in heavy rain.				
Dec. 20	Harding, New Jersey, U.S.	Socata TBM 700	total	5 fatal
The airplane crashed on a highway shortly after taking off from Teterboro Airport.				
Dec. 22	York, Pennsylvania, U.S.	Cessna 441 Conquest II	total	1 fatal
The airplane crashed in a wooded area 2 nm (4 km) from the airport during a night approach.				
Dec. 25	Karachi, Pakistan	McDonnell Douglas MD-80	minor	72 minor/none
The flight crew was unable to extend the nose landing gear on approach to Quetta and diverted to Karachi, where the MD-80 was landed with the gear still retracted.				
Dec. 26	Dalatka, Florida, U.S.	Bell 206	total	3 fatal
The pilot, a physician and a medical technician were killed when the helicopter crashed in a wooded area during a night emergency medical services flight.				
Dec. 28	Osh, Kyrgyzstan	Tupolev 134	total	1 serious, 80 minor/none
The right wing separated, and the Tu-134 rolled inverted during a hard landing in dense fog.				
Dec. 28	Fort Lauderdale, Florida, U.S.	Cessna Citation VII	major	6 minor/none
The nose landing gear collapsed when the Citation overran the runway on landing and struck the airport perimeter fence.				

This information is subject to change as the investigations of the accidents and incidents are completed.

Source: Ascend