

[News and Video](#) > [All News](#) > **Safety Pilot Landmark Accident: Unpredicted unadvised unaware**

Safety Pilot Landmark Accident: Unpredicted unadvised unaware

Severe icing brings down a turboprop

December 1, 2013 | By Bruce Landsberg



The loss of a TBM 700 turboprop over New Jersey two years ago surprised many pilots. The Pratt & Whitney-powered single-engine turboprop is certificated for flight into known icing (FIKI). For many experienced pilots, all FIKI means is that when the aircraft starts to collect ice, it's time to move elsewhere. Turbine aircraft don't usually succumb to a hazard that catches roughly five to eight non-FIKI piston-powered aircraft every winter—and although this accident occurred in some of the highest-traffic-density airspace in the world, surprisingly little warning was relayed to the pilot.

The plan and the forecast weather

On December 20, 2011, at 7 a.m. Eastern time, the pilot filed an IFR flight plan from Teterboro, New Jersey (TEB), to Dekalb Peachtree Airport (PDK) in Atlanta, using the Direct User Access Terminal System (DUATS). No weather briefing was recorded through DUATS, but the NTSB noted that the pilot might have obtained weather data elsewhere.

The weather looked deceptively benign. The area forecast in effect until 10 a.m. called for a 7,000-foot overcast with cloud tops to 18,000 feet. After 10 a.m. the ceiling was forecast to improve to 15,000 feet broken. There was no

discussion of icing hazards but there were numerous pilot reports, including several urgent ones that indicated danger aloft—although some came after the accident.

An airmet issued at 6:45 a.m. advised of moderate icing between the freezing level of 3,000 feet and 9,000 feet and 18,000 feet. A subsequent airmet for moderate icing between 2,000 feet and 8,000 feet up to 20,000 feet was issued at 9:45 a.m. that included the accident location. It's unlikely the pilot would have received that before departure.

On the ground, it looked like a good day to fly, with good visibility and high overcast. At Morristown (New Jersey) Municipal Airport (MMU), near the accident site, the 9:45 a.m. observation reported wind from 360 degrees at 8 knots with gusts to 13 knots; visibility of 10 miles or greater; ceiling overcast at 20,000 feet; temperature 6 degrees Celsius; and dew point minus 2 degrees C. At Teterboro, just 20 miles from the accident location, skies were clear with unrestricted visibility.

The flight

At 9:30 a.m. the pilot picked up an IFR clearance and subsequently departed Teterboro at 9:50 a.m. The TBM entered instrument meteorological conditions while climbing through 12,800 feet and was advised of moderate rime icing from 15,000 feet through 17,000 feet. The controller asked the pilot to advise him if the icing worsened, and the pilot said, "We'll let you know what happens when we get in there and if we could go straight through, it's no problem for us."

The controller said, according to the NTSB, "that he was coordinating for a higher altitude." While at 16,800 feet, the pilot confirmed that, "Light icing has been present for a little while and a higher altitude would be great." About 15 seconds later, the pilot stated that he was getting a "little rattle" and requested a higher altitude as soon as possible. About 25 seconds after that, the flight was cleared to Flight Level 200, and the pilot acknowledged. One minute later, at 10:04 a.m., the airplane reached a peak altitude of 17,800 feet "before turning sharply to the left and entering a descent." While descending through 17,400 feet, the pilot's last radio call was "and N-Seven-Three-One-Charlie-Alpha's declaring...."

The TBM came down very quickly from altitude, according to several witnesses, losing a wing and taking out part of the empennage before hitting the ground. The pilot and four passengers were fatally injured. The NTSB could find no mechanical problems with the airframe or the engine.

More than 80 pireps were received between 8 a.m. and 1 p.m., including an urgent report at 7:49 a.m. from a Cessna Citation reporting moderate to severe rime icing between 13,000 feet and 14,000 feet near the accident site. According to the NTSB, "an urgent pilot report was received at 8:08 a.m. from a flight crew operating an MD-83 airliner at 14,000 feet over Morristown. The pilot reported moderate to severe rime icing between 14,000 and 16,500 feet...the worst he had seen in 38 years of flying experience, and that he had never seen ice accumulate so quickly."

A regional jet operating close to the accident aircraft reported that the wing anti-ice system could not keep up with the accumulation. The pilot estimated 2.5 inches of ice on protected areas of the wing, and four inches accumulation on some unprotected areas, in about five minutes. Apparently those critical bits of information did not get into the system or were ignored.

The NTSB determined the probable cause of this accident to be: "The airplane's encounter with unforecasted severe icing conditions that were characterized by high ice accretion rates and the pilot's failure to use his command authority to depart the icing conditions in an expeditious manner, which resulted in a loss of airplane control."

Pilot and aircraft

The 45-year-old pilot held a private pilot certificate with an instrument rating. He had more than 1,400 hours and held a current second class medical certificate. His TBM flight time was not reported. The pilot had recently completed a simulator-based recurrent training program where icing procedures and escape were discussed. The TBM is prohibited from flight in severe icing conditions.

According to the NTSB: "Impact damage prevented functional testing of the aircraft deice systems. The airframe deice, propeller deice, pitot heat one and two, and stall warning heater switches were found in the On positions. The inertial separator switches were found in the Off positions."

Commentary

This Pratt & Whitney PT6 engine has an inertial separator which is switch-activated. It forces ice overboard rather than allowing it to enter the engine. Failure to deploy the separator could easily lead to a loss of power and a subsequent stall. The pilot's comment about "a little rattle" could indicate an engine problem because of ice ingestion, or possibly an airframe buffet warning of an impending stall.

The NTSB's analysis does not note if the engine was producing power at the time of impact, although there was rotation of the propeller and turbine rotors. The POH warnings about proper use of anti- and deicing equipment are depicted in bold print and capital letters because a miscue or complacency can lead to the loss of aircraft and lives.

The airmets warned of light to moderate icing between 2,000 feet to 9,000 feet and then all the way up to 20,000 feet. This is too broad to be of much use operationally. Research shows ice typically exists in bands of 2,000 feet to 4,000 feet. Moderate ice is nasty stuff and when jets with hot wings are reporting it, booted light aircraft should take that as a mandate to stay out. Non-FIK aircraft need not apply. Icing airmets do not distinguish severity based on aircraft type, but it does make a difference, and pilots should pay heed.

Where moderate icing locations are well established, as they seemed to have been on this December morning, controllers should consider providing unrestricted climb and descent clearances through those altitudes. Pilots, likewise, should ask for the same if there is any doubt about their ability to remain in the ice-impacted altitudes.

Pilots also must be actively inquisitive about ice, and they must ensure that aircraft anti-ice and deice systems are used early and often. In moderate to severe conditions, don't suffer in silence—immediately advise ATC that you've got a problem and if there's any doubt, declare an emergency.

It is troubling that in some of the busiest airspace in the world, critically urgent icing information was not passed to the pilot or to the forecasters. There were numerous pireps indicating potential danger lurking.

Icing/instrument meteorological condition forecasts and airmets can be verified by using pireps if we have enough of them. There should be more, and the process for feeding them into weather forecasting and dissemination needs attention. It's something that the Air Safety Institute has been advocating for more than a decade, and even tested with FAA collaboration in 2005 and 2006—with promising results. It's time to reopen that discussion.



License to Learn: Confirmation bias

Have you ever flown with someone who agreed with every decision you made, even the ones that played out badly? I'm speaking of someone who kept saying yes to your every muse.



Pilots: Big Mac pilot

"Every single time I leave the ground, I'm looking forward to the next time," says Reginald "Reggie" Webb, owner of a Lancair IV-P.



Visual Approach: Winter wonderland

Cameron Lawson is a rock and ice climber, whitewater kayaker, backcountry skier, photographer, and pilot.