Bird Control

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Bird strike certification requirements should be revised and made more consistent for transport category airplanes, and aircraft manufacturers should develop specific guidance to help pilots minimize damage in the event of a bird strike, the U.S. National Transportation Safety Board (NTSB) says.

The NTSB developed these safety recommendations and others, all addressed to the U.S. Federal Aviation Administration (FAA), as a result of its investigation of the March 4, 2008, crash of a Cessna Citation 500 that collided with a flock of large birds after takeoff from Wiley Post Airport in Oklahoma City.

All five people in the airplane were killed and the airplane was destroyed in the crash, which occurred about two minutes after takeoff for the flight to Mankato, Minnesota. The airplane was over the southeast corner of Lake Overholser, climbing through 1,800 ft above ground level, when it rolled left and spiraled, nose down, to the ground, witnesses said.

In its final report, the NTSB said that the probable cause of the accident was "airplane wing-structure damage sustained during impact with one or more large birds (American white pelicans), which resulted in a loss of control of the airplane."

The report said that American white pelicans typically weigh between 8 and 20 lb (4 and 9 kg), with wingspans from 96 to 114 in (2 to 3 m). The NTSB calculated that the accident airplane, which was traveling at 200 kt, would have generated kinetic energy of up to 35,416 ft-lb in a collision with just one pelican. However, the Cessna 500 wing structures are designed, in accordance with transport category airplane certification requirements of U.S. Federal Aviation Regulations (FARs) Part 25, to withstand a collision with a 4-lb bird while in cruise at 287 kt; according to NTSB calculations, such a strike would generate kinetic energy of 14,586 ft-lb — less than half the force generated by the accident airplane's collision with one pelican.

Although the 4-lb standard applies to airplane wings and other airframe structures, a stricter requirement applies to the empennage, which must be able to withstand the impact of an 8-lb bird. The empennage requirement

A Citation's collision with a flock of pelicans has prompted a call for more consistency in bird strike certification.

was implemented in 1970, after a review of bird strike data — ordered in the aftermath of a 1962 bird strike accident — prompted the FAA to conclude that, although "most existing transport airplanes were inherently bird resistant, a few types … were not sufficiently resistant in the empennage area."

The differing standards have persisted, and the NTSB said it is "concerned that the current airframe bird strike certification standards, which are inconsistent in that different criteria apply to different structures on the same airplane, have evolved piecemeal … and do not uniformly address the risks to aircraft presented by current bird populations."

These bird populations have shifted in the past 30 years, and although the total bird population has declined, populations of large bird species — those weighing more than 8 lb — have increased significantly, the NTSB said.

"Therefore, the NTSB concludes that the current airframe certification standards for bird strikes are insufficient because they are not based on bird strike risks to aircraft derived from analysis of current bird strike and bird population data and trends and because they allow for lower levels of bird strike protection for some structures on the same airplane."

The safety board's recommendation to the FAA called for a revision of bird strike certification requirements for Part 25 transport category airplanes so that the "protection from in-flight impact with birds is consistent across all airframe structures."

'Operational Strategies'

The NTSB said that, although most efforts to prevent bird strikes rely on wildlife hazard management, proposals also should be studied to identify operational practices, such as a slower airspeed, to reduce the severity of damage in the event of a bird strike.

"Pilots face many safety of flight considerations for airspeed selection during airport departures and arrivals," the NTSB said. "These may include, but are not limited to, air traffic control clearances, maneuvering requirements and desired climb performance or descent rates."

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Accident investigators developed a simulation-based illustration of the Citation's descent and ground impact.

In most cases, pilots would not select an airspeed solely because of the presence of birds in the area; nevertheless, the NTSB said, "Knowledge of the range of target airspeeds within which the aircraft can operate below the bird strike energy defined by the certification standards could be useful in scenarios in which flying within the target airspeed range is feasible without compromising other safety of flight issues."

The NTSB also recommended that the FAA require general aviation airports that receive federal funds and are surrounded by woodlands, water or wetlands to arrange for wildlife hazard assessments to be conducted by a wildlife damage management biologist and to "establish a distance of 5 mi" between the edge of the airport operations area and any area that could attract wildlife and result in "hazardous wildlife movement into or across the approach or departure airspace."

Included among the other recommendations was a call for the FAA to require operators of airports that serve air carrier aircraft, as well as aircraft operators regulated under FARs Part 121 (air carriers and commercial operators), Part 135 (commuter and on-demand) and Part 91 Subpart K (fractional ownership), to report all wildlife strikes — as well as the species involved — to the FAA National Wildlife Strike Database.

The NTSB noted that in the past, the FAA has said that data and species information are "critical for biologists developing and implementing wildlife risk management programs at airports because a problem that cannot be measured or defined cannot be solved."