National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: September 4, 2012

In reply refer to: A-12-50 and -51

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The National Transportation Safety Board (NTSB) has investigated 12 accidents since 1993[1] that occurred during taxi when a large airplane's[2] wingtip collided with another airplane or object on the taxiway. These accidents, which include the three recent accidents discussed below, highlight the need for an anti-collision aid, such as a camera system, to help pilots determine the wingtip clearance and path during taxi.

On May 30, 2012, about 1300 central daylight time, American Eagle Airlines flight 4265, an Embraer 135, N834AE, was struck by EVA Air flight 661, a Boeing 747-400, Taiwan registration B16481, while the 747 was taxiing at Chicago O'Hare International Airport, Chicago, Illinois. The Embraer was stopped at the ramp area and awaiting ground personnel to guide it to gate G20. Its tail section was protruding into taxiway A. The 747 was taxiing westbound on taxiway A when its right wingtip contacted the Embraer rudder and vertical stabilizer. No injuries were reported on either airplane. The Embraer experienced substantial damage to the rudder and vertical stabilizer, and the 747 experienced minor wingtip and slat damage. The Embraer was registered to and operated by American Eagle Airlines under the provisions of 14 *Code of Federal Regulations* (CFR) Part 121, and the 747 was registered to and operated by EVA Air under the provisions of 14 CFR Part 129.[3]

[1] The airplane models involved in these accidents include Boeing 747, 767, and 777; Airbus A380; and McDonnell Douglas MD-10 and MD-11. More information about these accidents (NTSB case numbers NYC93FA137A/B, MIA96FA068A/B, NYC99LA029, LAX99FA218A/B, NYC01LA094A/B, ANC02FA023A/B, LAX04LA007A/B, CHI06LA038, CHI07FA184A/B, DCA12FA082A/B, DCA11FA045A/B, and DCA11FA084A/B) can be found online at http://www.ntsb.gov/aviationquery/index.aspx.

[2] For the purposes of this letter, "large airplane" means an airplane of more than 12,500 pounds maximum certificated takeoff weight in which the pilots are unable to see the wingtips from the cockpit unless a cockpit window is opened.

[3] The preliminary report for this accident, NTSB case number DCA12FA082A/B, will be available online at http://www.ntsb.gov/aviationquery/index.aspx.

On July 14, 2011, about 1933 eastern daylight time, Delta Air Lines flight 266, a Boeing 767-300ER, N185DN, was taxiing on taxiway B for departure on runway 4R at Boston Logan International Airport, Boston, Massachusetts, when its left winglet struck the horizontal stabilizer of Atlantic Southeast Airlines flight 4904, a Bombardier CRJ900, N132EV. The CRJ900 was on taxiway M, which is perpendicular to taxiway B, awaiting departure on runway 9. No injuries were reported on either airplane. The CRJ900 sustained substantial damage, including damage to the horizontal tail and vertical tail, and the airplane lost fluid in all three hydraulic systems. The 767 sustained substantial damage; parts of its winglet were sheared off and embedded in the tail of the CRJ900. The 767 was registered to and operated by Delta Air Lines under the provisions of 14 CFR Part 121, and the CRJ900 was registered to and operated by Atlantic Southeast Airlines under the provisions of 14 CFR Part 121.[4]

On April 11, 2011, about 2006 eastern daylight time, Air France flight 7, an Airbus A380, F-HPJD, collided with Comair flight 263, a Bombardier CRJ701, N641CA, while the A380 was taxiing for takeoff from John F. Kennedy International Airport, Jamaica, New York. At the time of the accident, the CRJ701 was stationary with the forward part of its fuselage on the parking ramp and its tail extended onto taxiway M, which intersects and is perpendicular to the taxiway on which the A380 was taxiing. No injuries were reported on either airplane. The A380 sustained substantial damage to its left wingtip and winglet, and the CRJ701 sustained substantial damage to its left horizontal stabilizer and rudder. The A380 was registered to and operated by Air France under the provisions of 14 CFR Part 129, and the CRJ701 was registered to and operated by Comair, Inc., under the provisions of 14 CFR Part 121.[5]

Although these accident investigations are ongoing, preliminary information from the investigations revealed that the pilots of the large airplanes could not easily view the airplanes' wingtips from the cockpit. The pilot of the 767 saw the other airplane and moved slightly to the right on the taxiway to allow more clearance. The pilot of the A380 did not see the other airplane when he looked out of the window. In all 12 of the accidents referenced in this letter, the pilots of the large airplanes were either unable to determine or had difficulty determining the separation between the airplane's wingtips and the other airplane or object while taxiing. Typically, pilots look out the cockpit window at the wingtips to determine wingtip path and clearance. On large airplanes (such as the Boeing 747, 757, 767, and 777; the Airbus A380; and the McDonnell Douglas MD-10 and MD-11), the pilot cannot see the airplane's wingtips from the cockpit unless the pilot opens the cockpit window and extends his or her head out of the window,[6] which is often impractical. Thus, determining the wingtip clearance and path on large airplanes is difficult and reliant mainly on the pilot's judgment.

The A380 is equipped with an External Taxi Aid Camera System (ETACS) consisting of two exterior cameras (the Belly Taxi Aid Camera System [BTACS] and the Fin Taxi Aid

[4] The preliminary report for this accident, NTSB case number DCA11FA084A/B, can be found online at http://www.ntsb.gov/aviationquery/index.aspx.

[5] The preliminary report for this accident, NTSB case number DCA11FA045A/B, can be found online at http://www.ntsb.gov/aviationquery/index.aspx.

[6] In most other airplanes, pilots can see the wingtips from the cockpit with the windows closed. If it appears that the object or other airplane is close, it is common practice for one of the pilots to look at the wingtip and whatever the airplane is passing to judge clearance.

Camera [FTAC]), which display the nose and main landing gear positions before and during taxi for the pilots in the cockpit, and an external landscape camera.[7] The BTACS, which is located on the underside of the fuselage just aft of the nosewheel, displays a picture of the nosewheel and the taxiway and is used by the pilots to verify their position on a taxiway centerline or the condition of the nosewheel. The FTAC is located on the vertical tail and displays a view of the airplane that extends from just outside the number one outboard engine to just outside the number four outboard engine to show the location of the outer edge of each of the main landing gear. However, neither camera shows the airplane's wingtips; thus, several feet of the outboard portion of the wings are not visible to the cameras.

The live views from these cameras can be displayed on either primary flight displays (PFD) or on the system display (SD) when the airplane is on the ground and below 60 knots.[8] The figure shows the view from the A380's BTACS and FTAC as shown on the PFD and SD.

Figure. Live camera views on an A380 as shown on the PFD and SD.

The NTSB notes that the A380 and other large airplanes do not currently have camera systems that display wingtips or wingtip paths. The NTSB is concerned that pilots of large airplanes where the wingtips are not visible from the cockpit may have difficulty determining wingtip clearance and path. The NTSB concludes that an anti-collision aid, such as a camera system that displays the airplane's wingtips, would give pilots of large airplanes a clear

[7] The landscape camera is primarily for providing exterior views for passengers, rather than use by the flight crew.

[8] When the airplane is on the ground, the ETACS is not displayed above 60 knots. When in flight, the camera views can only be displayed on the SD.

indication of the proximity of the airplane's wingtips to other airplanes and objects, thus providing information to the pilots to avoid a collision. The NTSB notes that such a camera system is feasible since the A380 is already equipped with the ETACS.

Therefore, the National Transportation Safety Board makes the following recommendations to the European Aviation Safety Agency:

> Require the installation of an anti-collision aid, such as a camera system, on all newly manufactured and newly type-certificated large airplanes and other airplane models where the wingtips are not easily visible from the cockpit to provide a cockpit indication that will help pilots determine wingtip clearance and path during taxi. (A-12-50)
>
> Require all existing large airplanes and other airplane models where the wingtips are not easily visible from the cockpit to be retrofitted with an anti-collision aid, such as a camera system, to provide a cockpit indication that will help pilots determine wingtip clearance and path during taxi. (A-12-51)

The National Transportation Safety Board made two similar recommendations to the Federal Aviation Administration.

In response to the recommendations in this letter, please refer to Safety Recommendations A-12-50 and -51. We encourage you to submit updates electronically at the following e-mail address: correspondence@ntsb.gov. If a response includes attachments that exceed 5 megabytes, please e-mail us at the same address for instructions. To avoid confusion, please do not submit both an electronic copy and a hard copy of the same response.

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in these recommendations.

Sincerely,

[Original Signed]

Deborah A.P. Hersman
Chairman