National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: March 2, 2011

In reply refer to: A-11-12 through -15

The Honorable J. Randolph Babbitt
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On October 19, 2009, about 0605 eastern daylight time,[1] a Boeing 767, N185DN, operating as Delta Air Lines flight 60, landed on taxiway M at Hartsfield-Jackson Atlanta International Airport (ATL), Atlanta, Georgia. The flight was operating as a 14 *Code of Federal Regulations* Part 121 flight from Rio de Janeiro/Galeão-Antônio Carlos Jobim International Airport to ATL with 11 crewmembers and 182 passengers. No injuries to the crew or passengers were reported, and the airplane was not damaged. Night visual meteorological conditions prevailed.[2]

During the descent and approach, the flight crew was assigned a number of runway changes; the last of which occurred near the final approach fix for runway 27L. While the flight was on final approach, the crew was offered and accepted a clearance to sidestep to runway 27R[3] for landing (see figure for a diagram of ATL runway configurations). Although the flight crew had previously conducted an approach briefing for runways 27L and 26R, they had not briefed the approach for runway 27R and were not aware that the approach light system and the instrument landing system (ILS) were not available to aid in identifying that runway.[4]

[1] All times are expressed in eastern daylight time unless otherwise noted.

[2] The report for this incident, National Transportation Safety Board incident OPS10IA001, is online at <http://www.ntsb.gov/ntsb/query.asp>.

[3] Runway 27R at ATL is 11,890 feet long, 150 feet wide, constructed of grooved concrete, and equipped with high intensity runway edge lights and centerline lights. Runway 27R is also equipped with a precision approach path indicator located on the right side of the runway.

[4] Control tower personnel indicated in postincident interviews that, due to construction at the airport, the approach lighting system for runway 27R was turned off at the time of the incident and that it would require about 20 minutes to coordinate with ATL technical operations to turn the system on. Control tower personnel also indicated that the localizer for runway 27R, which would normally be turned on unless an arrival was at or inside the outer marker on approach, was turned off at the time of the incident. ATL tower has since established a standard operating procedure for notifying flight crews about the status of the approach light system and ILS.

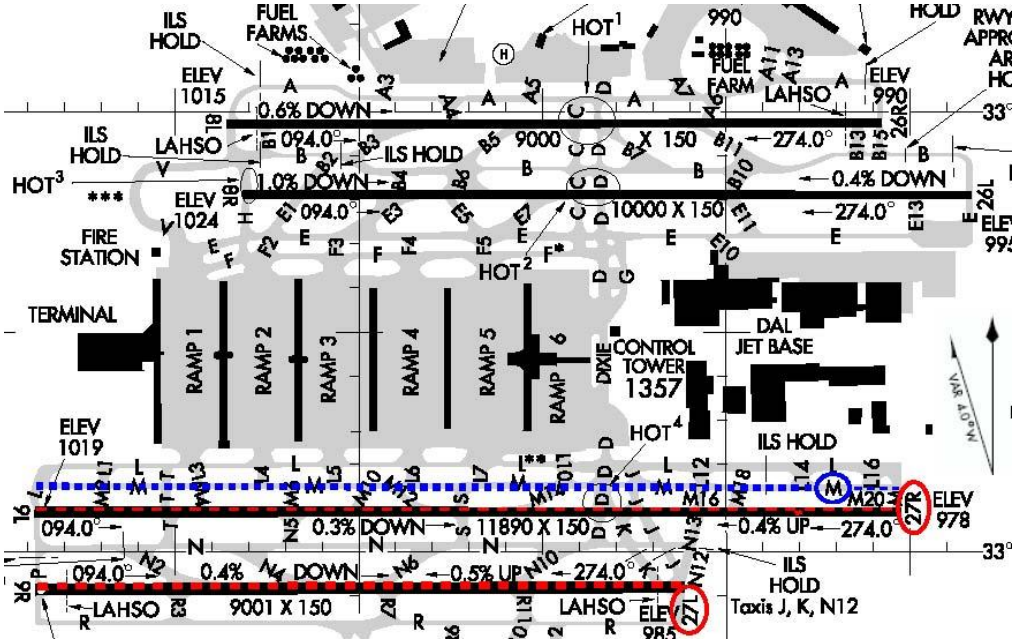

Figure. Diagram Showing ATL Runways 27L, 27R, Taxiway M

According to the captain, who was the flying pilot, he maneuvered for the sidestep from runway 27L to 27R and lined up on "the next brightest set of lights" he saw. He said that he saw "bright edge lights and centerline lights" and thought he had the runway in sight. The first officer was preoccupied during the final approach with attempting to tune and identify the ILS frequency for runway 27R. Just prior to the airplane touching down, the captain realized they were landing on a taxiway. The airplane landed on taxiway M, 200 feet north of, and parallel to, runway 27R. The local controller did not notice the crew's error until after the airplane had landed. The taxiway was unoccupied, and the flight crew was able to stop the aircraft safely and taxi to the gate.

The National Transportation Safety Board (NTSB) determined that the probable cause of this incident was the flight crew's failure to identify the correct landing surface due to fatigue.[5] Contributing to the cause of the incident were (1) the flight crew's decision to accept a late runway change, (2) the unavailability of the approach light system and the instrument landing system for the runway of intended landing, and (3) the combination of numerous taxiway signs and intermixing of light technologies on the taxiway.[6] As discussed below, the NTSB's investigation also identified noncausal aspects of this incident that present opportunities to improve air traffic control (ATC) detection of potential taxiway landings and management of taxiway light settings.

[5] The captain and first officer did not take their respective rest breaks during the flight because a third crewmember, a check airman who had been on the flight deck to conduct a line check for the captain, was ill during his rest break and remained in the cabin for the duration of the flight.

[6] The Operational Factors/Human Performance and Airports Specialist factual reports for this investigation, NTSB incident OPS10IA001, contain additional information about these factors and are available in the NTSB's public docket at <http://dmssvr/dms/public/>.

Airport Surface Detection Equipment–Model X Capabilities

ATL is equipped with airport surface detection equipment–model X (ASDE-X),[7] which includes conflict detection and alerting technology that detects potential collision risks in the approach corridor and airport surface and alerts controllers of these potential hazards. As presently configured, ASDE-X detects and alerts controllers of potential collision hazards on runways and situations in which aircraft appear to be landing on or departing from closed runways but not a situation in which an aircraft appears to be landing on a taxiway. Therefore, the system did not emit an alert when flight 60 lined up with and landed on taxiway M.

In a postincident interview, the tower controller explained that it is difficult to visually determine from the tower if an aircraft on approach is lined up for runway 27R or taxiway M because the distance between the runway and the taxiway edge is only 200 feet. He also stated that, as flight 60 approached runway 27R for landing, he checked the ASDE-X display and saw that the system's safety logic bars were raised, which indicated to him that the aircraft was lined up to land on runway 27R. In addition, no alerts were being emitted by the ASDE-X, which indicated to the controller that the runway was clear of other traffic and that it was safe to land.

The circumstances of this incident suggest that automated assistance would have augmented the tower controller's visual observations and possibly assisted him in detecting the flight crew's misidentification of the taxiway as a runway. NTSB investigators contacted the manufacturer of ASDE-X, Sensis Corporation, to examine whether modifications to the ASDE-X logic could expand the existing closed runway safety protection functions to include taxiways. At the NTSB's request, Sensis performed a preliminary technical review and found that software modifications could possibly enable ASDE-X to detect a potential taxiway landing at ATL at a distance of up to 0.75 mile from the runway threshold and 15 seconds from touchdown and provide an alert to controllers**.** Such a warning would afford air traffic controllers the opportunity to assess the situation and provide instructions to a flight crew that would prevent a taxiway landing or potential collision with aircraft or vehicles that may be on the taxiway. Because the Sensis review was preliminary and only evaluated the ASDE-X installation at ATL, a more thorough evaluation of the system should be conducted to determine whether ASDE-X logic can be modified systemwide to detect taxiway landings. Therefore, the NTSB recommends that the Federal Aviation Administration (FAA) perform a technical review of ASDE-X to determine if the capability exists systemwide to detect improper operations such as landings on taxiways.

Additionally, the NTSB recommends that at those installation sites where the technical review recommended in Safety Recommendation A-11-12 determines it is feasible, the FAA should implement modifications to ASDE-X to detect improper operations, such as landings on taxiways, and provide alerts to air traffic controllers that these potential collision risks exist.

[7] ASDE-X is a ground movement safety system that uses radar and other detection technologies to help air traffic controllers monitor the movement of transponder-equipped aircraft and ground vehicles operating in the airport environment.

Airport Lighting Control Systems and Preset Selections

Taxiway and runway lights at ATL are owned and maintained by the airport operator. They are controlled from the airport tower via a touch-screen control panel that provides a variety of preset selections for lighting intensity based on day or nighttime visibility conditions, as outlined in FAA Order 7110.65, "Air Traffic Control," and Advisory Circular (AC) 150/5345-56A, "Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)." However, the system does not provide information to tower personnel on the specific lighting intensity that results from use of the preset selections.

Given a nighttime visibility of more than 5 miles at the time of the incident, Order 7110.65 requires that taxiway and runway edge and centerline lights be operated at the minimum intensity level (step 1) for both 3- and 5-step systems.[8] For the same conditions, AC 150/5345-56A indicates that runway edge and centerline lights should be set to step 1 and that taxiway lighting should be set to step 1 for 3-step systems and step 3 for 5-step[9] systems. When asked during postincident interviews about the light intensity settings in place during the incident, the ATL tower supervisor did not recall the settings but believed that, based on the visibility conditions, he had selected preset values that should have set the edge lighting on the runway and taxiways to step 1. A review of ATL's airfield lighting logs revealed that the edge and centerline lights for runway 27R were set to step 1 at the time of the incident, the edge lights for taxiway M were set to the maximum settings, and taxiway M centerline lights were set to step 2.

During postincident discussions with airport operations personnel, NTSB investigators learned that the presets for taxiway edge lights at ATL were programmed to be either on at maximum intensity or off, while the taxiway centerline lights were programmed to turn on at step 2. This configuration, in addition to the control panel's lack of direct indication of light intensity settings, resulted in the ATC supervisor unknowingly setting the taxiway lights at levels that were not in compliance with FAA requirements.

The NTSB's ongoing investigation of an April 19, 2010, event in which a Boeing 737 and a Cessna C172 were involved in a runway incursion at Bob Hope International Airport (BUR) in Burbank, California,[10] has found that the BUR tower is also equipped with a lighting control panel similar to that used at ATL. As at ATL, controllers at BUR do not receive direct indication of the actual intensity settings on their control panel when using preset selections. The BUR tower manager was unable to explain how the tower ensured that the preset configurations were compliant with FAA requirements.

The NTSB is concerned that controllers at ATC towers equipped with airport lighting control panels that do not provide direct indication of airport lighting intensities lack the

[8] Runway 27R edge and centerline lights operate on a 5-step system. The edge lights at the east and west ends of taxiway M operate on a 3-step system, and the middle edge lights and centerline lights operate on a 5-step system.

[9] The FAA has indicated that it is aware of the discrepancy between Order 7110.65 and AC 150/5345-56A concerning the designated setting for 5-step taxiway light systems and plans to revise its standards to be consistent.

[10] The preliminary report for this incident, NTSB incident OPS10IA090A and OPS10IA090B, is available online at <http://www.ntsb.gov/ntsb/query.asp>.

information necessary to verify that runway and taxiway lights are set in compliance with FAA requirements. Therefore, the NTSB recommends that the FAA amend Order 7210.3, "Facility Operation and Administration," to direct that, at airports with ATC towers equipped with airport lighting control panels that do not provide direct indication of airport lighting intensities, the air traffic manager annually reviews and compares, with the airport operator, the preset selection settings configured in the tower lighting control system to verify that they comply with FAA requirements.

As mentioned earlier, at the time of the incident taxiway M centerline lights were set to step 2, the default setting when the lights are turned on. Postincident examination of ATL's lighting system revealed that, despite a selection for step 1 on the touch-screen control panel, the system installation in the tower lacks a distinct step 1 setting for taxiway M centerline lights; the intensity that results from selecting step 1 is the same as the intensity for step 2. Reducing ATL taxiway centerline lighting to the actual step 1 intensity can only be accomplished by using a manual override switch in the central lighting vault on the airfield. According to the ATL aviation maintenance supervisor, the taxiway M centerline light presets were determined based on an identified need to have the north and the south sides of the airfield look uniform in their light settings,[11] resulting in a divergence from the standards contained in Order 7110.65 and AC 150/5345-56A. ATL tower personnel were not aware before the incident that the full range of lighting intensities for the south side of the field was not accurately represented on the touch-screen control panel.

A representative of the FAA's Air Traffic Organization and the manufacturer of ATL's lighting system, ADB Airfield Solutions, indicated that an airport should submit a variance request to the Air Traffic Organization before installing a lighting system that differs from the standards contained in FAA requirements. AC 150/5345-56A states that the airfield lighting manufacturer should review all preset configurations with the FAA and airport representative and provide related training for ATC personnel but does not explicitly specify that airport operators should inform their local ATC tower facilities about variances to installed lighting systems. The NTSB's investigation found no record of a variance request or documentation that a review and/or training took place between ATL airport and FAA representatives.

The NTSB is concerned that the airport operator did not submit a variance request or otherwise notify the FAA before installing nonstandard lighting presets. As a result, ATC tower personnel at ATL were not aware that airfield lighting control system settings on their control panel did not provide the full range of available light intensities, which affected their ability to set light intensities as specified in FAA requirements. Therefore, the NTSB recommends that the FAA revise AC 150/5345-56A to state that airport operators should inform air traffic managers of variances for, or modifications to, airfield lighting preset standards prescribed in FAA requirements.

[11] The airfield's south side, where taxiway M is located, was built using a different lighting regulator system than that used on the north side; the preset to step 2 on the south side was selected to ensure the light intensity matched that on the north side.

Therefore, the National Transportation Safety Board makes the following recommendations to the Federal Aviation Administration:

> Perform a technical review of Airport Surface Detection Equipment–Model X to determine if the capability exists systemwide to detect improper operations such as landings on taxiways. (A-11-12)
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> At those installation sites where the technical review recommended in Safety Recommendation A-11-12 determines it is feasible, implement modifications to Airport Surface Detection Equipment–Model X to detect improper operations, such as landings on taxiways, and provide alerts to air traffic controllers that these potential collision risks exist. (A-11-13)
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> Amend Federal Aviation Administration (FAA) Order 7210.3, "Facility Operation and Administration," to direct that, at airports with air traffic control towers equipped with airport lighting control panels that do not provide direct indication of airport lighting intensities, the air traffic manager annually reviews and compares, with the airport operator, the preset selection settings configured in the tower lighting control system to verify that they comply with FAA requirements. (A-11-14)
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> Revise Advisory Circular 150/5345-56A, "Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)" to state that airport operators should inform air traffic managers of variances for, or modifications to, airfield lighting preset standards prescribed in Federal Aviation Administration requirements. (A-11-15)

In response to the recommendations in this letter, please refer to Safety Recommendations A-11-12 through -15. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

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

[Original Signed]

By: Deborah A.P. Hersman
Chairman