Testimony of Robert Sumwalt, Vice Chairman
National Transportation Safety Board
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Subcommittee on Aviation
Committee on Transportation and Infrastructure
on
Runway Safety
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Good afternoon, Chairman Costello, Ranking Member Petri, and Members of the Subcommittee. Thank you for allowing me the opportunity to present testimony on behalf of the National Transportation Safety Board on runway safety. I am truly privileged to represent an agency that is dedicated to the safety of the traveling public.

As you know, the Safety Board is charged with investigating aviation accidents and incidents, determining the probable cause, and making recommendations to prevent similar accidents from happening again. The Safety Board is especially concerned about runway safety, including runway incursions and runway excursions, due to the number of and potential severity of such events.

In March 1977, in what remains the world's deadliest aviation accident, two passenger jumbo jets collided on a runway at Tenerife, Canary Islands, causing the deaths of 583 passengers and crew. The deadliest runway incursion accident on U.S. soil involving two aircraft was a collision between a USAir 737 and a Skywest Metroliner commuter airplane at Los Angeles International (LAX) Airport in February 1991, which killed 34 people. Another accident, involving a Comair Bombardier CL600 that departed the wrong runway, killed 49 people in Lexington, Kentucky, in 2006. The Safety Board has also investigated numerous runway excursions, including the accident involving a Southwest Boeing 737 that killed one person at Chicago's Midway Airport in 2005.

Runway Incursions

On October 1, 2007, the Federal Aviation Administration (FAA) adopted the International Civil Aviation Organization's (ICAO) definition of runway incursion. Prior to that date, the FAA classified events that did not result in a loss of required separation as "surface incidents" not incursions. Incursions at that time involved a loss of separation with another aircraft, person, object, or vehicle. Since October 1, however, all surface incidents are now classified as runway incursions and are categorized based on the severity of the incident. Category A and B incursions represent the highest likelihood of a collision. Between October 1, 2007, and January 31, 2008, 300 runway incursions were reported, with 10 of those classified as a category A or B. The current number of reported As and Bs are 3 times as many as occured in the same period last year.

From May 2007 to the present, the Safety Board investigated 11 serious runway incursions involving over 1,000 people on board the airplanes involved. Most notably, in May 2007, there was a runway incursion that happened at approximately 1:30 in the afternoon at San Francisco International Airport involving a Republic Airlines Embraer 170 and a Skywest Embraer 120 Brazilia. These two aircraft, carrying a total of 92 people, nearly collided at the intersection of runways 1 left (L) and 28 right (R). The tower controller forgot about the Skywest airplane when he cleared the Republic airplane for takeoff from an intersecting runway. The Skywest airplane came to a stop in the runway intersection and the Republic airplane lifted off and overflew the Skywest airplane by about 35 feet. Another incident occurred on July 11, 2007, at approximately 2:30 in the afternoon when a United Airlines Airbus 320 and a Delta Airlines Boeing 757 almost collided in the intersection of runway 9L and taxiway Mat at Fort Lauderdale-Hollywood Airport, Florida. The Delta 757 was inbound for landing on runway 9L and United A320 was taxiing for departure on the same runway. The United crew missed a turn, and was heading toward the runway when the tower controllers told United to stop and told the Delta pilots to go around. Although the Delta 727 touched down briefly, the crew was able to depart again and a collision was averted. Alert controllers and quick actions by the crew saved 307 people from a catastrophic accident.

The runway safety issue has been on the Safety Board's Most Wanted List of Transportation Safety Improvements since its inception in 1990. In the late 1980s, the Board issued numerous safety recommendations addressing this issue due to an inordinate number of runway incursions/ground collision accidents that resulted in substantial loss of life. As a result of the Comair accident at Bluegrass Airport in Lexington, Kentucky, in 2006, the Board issued several more recommendations to the FAA regarding runway safety. Additionally, the Safety Board held a Runway Incursion Forum on March 27, 2007, with a goal to promote runway safety.

Incursions occur because both pilots and controllers make mistakes. Improper or misunderstood instructions continue to place aircraft, vehicles, and their passengers in danger despite improved signage, more visible painted runway and taxiway markings, ongoing safety briefings and seminars for controllers and pilots, and informational brochures. The reason is simple and complex – human error. Pilots may misunderstand a clearance or read it back incorrectly and controllers fail to catch the error. Pilots may take a wrong turn when they are taxiing. Controllers may clear an aircraft to take off or land on a runway already occupied by a vehicle or another aircraft.

There isn't any single solution that will eliminate the problem of runway incursions. In July 2000, the Safety Board made recommendations to address the issue in a variety of ways, including procedural changes, educational efforts, and technology improvements that require a direct warning of an incursion to the flight crews. This direct warning is critical because it would give both controllers and those operating the aircraft increased time to react. Information needs to be provided directly to the flight crews as expeditiously as possible to prevent runway accidents.

The issue is one of reaction time. Safety Board investigations have found that AMASS/ASDE-X alone are not adequate to prevent serious runway collisions, because too much

time is lost routing valuable information through air traffic controllers. After an alert, the controller must determine the nature of the problem, determine the location, identify the aircraft involved, and determine what action to take. Only after all of these determinations have been made can appropriate warnings or instructions be issued. The flight crew must then respond to the situation and take action. Simulations of AMASS performance using data from actual incursions show that alerts may occur as little as 8 to 11 seconds before a potential collision. In recent incidents, AMASS did not alert controllers in time to be effective, and the situations were instead resolved by flight crew actions. Additionally, during periods of heavy precipitation, the ASDE-III radar data can provide false returns to AMASS. AMASS treats the false returns as an errant aircraft which results in nuisance alarms. When that occurs, controllers put the system into "limited mode" which disables the alerting functions. However, controllers still have a display, but will not get any alarms, valid or nuisance. Until there is a system in place to control ground movements of all aircraft with direct warning to pilots, the potential for this type of disaster will continue to be high.

On-going Initiatives

Since 2005, the FAA has been conducting field tests of runway status lights at Dallas/Fort Worth International Airport. Runway status lights are red lights that activate on the runway when an aircraft is taking off, landing, or crossing an active runway. Initial test results have been promising and the FAA is expecting to extend those tests to more complex airports, such as Chicago O'Hare and LAX. The FAA is also testing final approach runway occupancy signals that alert pilots on final approach when the runway is occupied. They are also reviewing a flight deck–based direct warning system.

The FAA has also promoted Automatic Dependent Surveillance – Broadcast (ADS-B) as a method of mitigating the number and severity of runway incursions. On September 9, 2005, the FAA officially committed to establishing ADS-B as the basis for air traffic control in the future. On October 5, 2007, the FAA published a Notice of Proposed Rulemaking (NPRM) that proposed performance requirements for certain avionics equipment on aircraft to facilitate the use of ADS-B. According to the NPRM, ADS-B will be available nationwide in 2013 for aircraft surveillance by FAA and Department of Defense air traffic controllers. ADS-B will be beneficial for expanding surveillance coverage to areas of the United States that are not covered now, such as the Gulf of Mexico, Hawaii, and Alaska.

For ADS-B to provide maximum safety benefits, the system should support both ADS-B Out and ADS-B In. ADS-B Out provides basic aircraft information (location, altitude, etc) to air traffic controllers to provide traffic separation. ADS-B In would permit users access to additional services, such as data-linked weather and traffic information, and would also provide a means of transmitting surface conflict warnings directly to pilots via the ADS-B In communications link. However, the NPRM states that aircraft will not be required to be equipped with ADS-B Out until 2020, and the FAA will not mandate ADS-B In at this time because, according to the NPRM, it "has not been identified as a requirement for maintaining the safety and efficiency of National Air Space (NAS) operations." The NPRM only states that operators may equip their aircraft with ADS-B In "if they so choose." The Safety Board is concerned that this NPRM does not require ADS-B In. The ability of ADS-B In to support data

sharing between aircraft and controllers would be a major contributor to improved situational awareness and would reduce the likelihood of both airborne and surface conflicts.

The Safety Board believes that many of these technologies available today may offer added safety benefits. And although the Safety Board is encouraged by the efforts of the FAA, its progress has been slow in responding to the recommendations issued 7 years ago. Further, national implementation for any one of these technologies is many years away, and not all airports with passenger service would be equipped.

Actions Remaining

The FAA has made progress with lighting and improved signage at airports, but some improvements in air traffic control procedures are needed. In July 2000, the Safety Board recommended that all runway crossings be authorized only by specific air traffic control clearance and that controllers issue a takeoff clearance only after previous runways have been crossed. Both of those recommendations are contained in the Manual on the Prevention of Runway Incursions prepared by the ICAO, which is the guidance material used internationally for implementing national or local runway safety programs. Yet, the FAA has not implemented either procedural change. In completing its investigation of the Comair accident in Lexington, Kentucky, the Safety Board concluded that if those procedures had been implemented, the Comair accident might not have occurred.

The Safety Board supports the use of ADS-B and believes that ADS-B Out will provide a safety benefit in the NAS in areas without sufficient radar coverage. However, the adoption of ADS-B In, direct delivery of warnings to aircraft pilots via datalink, as well as recommended procedural changes, will increase the level of safety during ground operations and should be expeditiously incorporated in FAA's ongoing regulatory process.

Runway Excursions

Recent accidents, such as the December 2005 Southwest Airlines runway excursion at Chicago's Midway Airport, indicate that more efforts are needed to prevent these types of accidents. Over the last 10 years, 73 runway excursion accidents involving turbine-engine-equipped aircraft were reported in the United States, resulting in 15 fatalities. Because runway excursions only are reported to the Safety Board if there is substantial damage to the airplane, serious injury to a person, or if an emergency evacuation is required, it is likely that the number of runway excursions is under-reported.

Landing distance calculations are critical to flight safety, especially when runway conditions limit braking effectiveness. As a result of the Southwest Airlines accident, the Safety Board issued an urgent recommendation on January 27, 2006, asking the FAA to prohibit operators from using reverse thrust credit in landing performance calculations to ensure adequate landing safety margins on contaminated runways. The FAA responded that it would issue an Operations Specification that would have established mandatory actions by aircraft operators and met the intent of the recommendation; however, the FAA subsequently issued a Safety Alert For Operators (SAFO). SAFOs are not regulatory and compliance is therefore voluntary. On

October 4, 2007, the Safety Board superceded the previous urgent recommendation, issuing a new recommendation asking that the FAA require crews to make a landing distance assessment with an adequate safety margin for every landing. To date, the FAA has not made this a requirement. We cannot continue to depend on the last minute alertness of pilots and controllers. We need the extra protection of additional procedures and advanced technology to compensate for human mistakes. We strongly urge action on these critical safety issues.

Fatigue

The Safety Board has long been concerned about the effects of fatigue on persons performing critical functions in all transportation industries including flight crews, aviation mechanics, and air traffic controllers. In 1989, the Board issued three recommendations to the Secretary of Transportation calling for research, education, and revisions to existing regulations. These recommendations were added to the Safety Board's Most Wanted List of Transportation Safety Improvements in 1990, and the issue of fatigue has remained on this List since then.

The Board's recommendations on the issue of human fatigue and hours-of-work policies have had a substantial effect on encouraging the modal agencies to conduct research and take action towards understanding the complex problem of operator fatigue in transportation and how it can affect performance. However, the modal administrations, and FAA in particular, have taken little if any action directly related to revising existing regulations and work scheduling practices.

Currently, the Board has several objectives for the FAA related to human fatigue that can directly impact runway safety:

- set working hour limits for flight crews, aviation mechanics, and air traffic controllers based on fatigue research, circadian rhythms, and sleep and rest requirements; and

- develop fatigue awareness and countermeasures training programs for controllers and those who schedule them for duty.

The FAA has recently indicated its intention to convene a working group to develop workable scheduling practices that minimize controller impairment due to fatigue, and the National Air Traffic Controllers Association has indicated its willingness to support this effort. The Safety Board supports these efforts and continues to believe that further action must be taken, especially in issuing scientifically based duty-time regulations and policies that minimize fatigue among air traffic controllers, flightcrews, and maintenance personnel. Operating or controlling an aircraft without adequate rest for the flightcrew or controller presents an unnecessary risk to the traveling public.

That concludes my prepared testimony and I would be happy to answer any questions you may have.