FLIGHT SAFETY

An In-house newsletter of Operations Dept.
Kuwait Airways Corporation

KUWAIT AIRWAYS
IOSA CERTIFIED

Flight safety & Quality Assurance Division

Issue no.14, December 2006

Introduction

Welcome to the December issue. This month brings cold weather and occasional rain in Kuwait resulting in a possible take-off and landing on a wet runway. But KAC destinations in Europe and US present icing conditions and ice contaminated runways. This reminds us to refresh safety issues related to operations in icing conditions. Some of these are discussed in this issue. We thank Capt. Yacoub Al-Najjar, Manager Ground training, for sending us articles of relevance to flight safety.

Your feedback is very important. We welcome your feedback, suggestions and contributions to this newsletter in the form of articles, anecdotes, pictures, etc. which can be sent to the address given below.

Southwest Airlines Boeing 737 overrun accident

Based on NTSB and other reports

On December 8, 2005, Southwest Airlines Flight 1248, a Boeing 737-700 was scheduled to touch down at Midway Airport, Chicago, Illinois from Baltimore, Maryland and then continue on to Las Vegas and Salt Lake City International Airport. The flight circled over a small area in northwest Indiana several times before attempting to land in a snow-storm. The snowstorm had reduced visibility from 1/2 to 1/4 mile visibility. At around 7:15 p.m. CST, the pilot attempted a landing with nearly eight inches of snow on the ground in the area. However, airport officials stated that the runway was cleared of snow at the time of landing. The latest reported weather had the wind from between east and east-southeast (100°) at 11 knots. This would normally favor landing on runway 13C. The runway visual range was below the minimums for the instrument landing system approach on runway 13C. The only available ILS runway with a lower minimum was landing opposite direction on 31C.

The plane, however was then forced to land with the tailwind. The plane skidded during landing; subsequently, witnesses said the nose gear collapsed, crashed into a barrier wall surrounding the airport, and stopped on S. Central Avenue just south of the 55th Street intersection (the north-western edge of the airport). The intersection was full of traffic, and at least three cars were hit, killing a six-year-old boy named Joshua Woods, critically injuring five occupants of one car (two adults, three children), and seriously injuring four occupants of a second car. All were quickly taken to area hospitals. Three passengers from the plane were taken to hospitals with minor injuries. Twelve people were taken to hospitals after the incident. The third car hit was parked & unoccupied. This was the first fatal accident involving a Southwest Airlines aircraft in the 35-year history of the company.

This Next Generation model, was equipped with the latest anti-skid & braking technology. Federal investigators said that the thrust reversers did not immediately kick in when deployed and the pilots applied brakes manually as soon as they noticed the plane wasn't slowing down. Because of blowing snow, none of the air traffic controllers actually saw the plane land. NTSB report has determined that the aircraft touched down in the touchdown zone with 4,500 feet of the 6,522-foot runway remaining; however, under the conditions at the time, the aircraft needed 5,300 feet of runway to stop safely. The FDR data revealed that about 18 seconds passed from the time the airplane touched down to the time the thrust reversers were deployed.

In this issue

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Further, the investigation found that in permitting thrust reverser consideration, the FAA provisions left very little safety margin should thrust reversers fail or are inadvertently not utilized when landing on contaminated runways. The FAA allows operators to take credit for thrust reversers when landing on short contaminated runways. For example, the required runway length for 737-700 model airplanes is about 1,000 feet less with thrust reversers than the required runway length without the reverse thrust credit. In the Midway accident, the accident airplane could not be stopped on the runway because of the delay in thrust reverser deployment combined with the absence of an extra safety margin.

On January 27, 2006, the Safety Board issued an urgent recommendation for the FAA to "immediately prohibit all 14 CFR Part 121 operators from using the reverse thrust credit in landing performance calculations."

FAA's new Landing distance assessment rule

Based on Dr.Patrick R.Veillette's article in Business & Commercial aviation, Aug.2006 , FAA and NTSB announcements and other articles

On June 7, the FAA posted an announcement in the Federal Register that all FAR Part 121, 135 and 91(K) operators will be issued a new Operations Specification (Ops Spec) or Management Specification (MSpec) requiring completion of a new en route landing distance assessment for all their turbojet aircraft. This calculation must take into consideration current runway conditions and allow a full-stop landing with at least a 15-percent safety margin beyond the actual landing distance, on the runway to be used, in the conditions existing at the time of arrival, and with the deceleration means and airplane conditions to be used. The calculation must occur as close to the time of arrival as practicable. (Currently, regulations only mandate such calculations occur prior to departure of the aircraft). The FAA wanted operators to file their proposed procedures for compliance with their respective principal operation inspectors by Sept. 1.

The Southwest Boeing 737 runway overrun discussed in the previous article, spurred the FAA to evaluate the adequacy of regulations and guidance information in areas that might come under scrutiny during the investigation of the overrun accident that claimed the life of a little boy riding in a car struck by the Boeing.

The problem of aircraft running off the ends of slippery runways is not new. An FAA analysis of accident & incident data for 1978 to 1993 uncovered 769 instances of aircraft overruns and excursions where ice, snow and slush were contributing factors. These included aircraft used in scheduled airline service as well as air taxi and general aviation. According to Transport Canada's Transportation Development Center, the risk of a jet aircraft overrunning the end of the runway on landing when the runway is slippery is approximately 13 times greater than when the runway is dry. The risk of overruns on landing for aircraft without reverse thrust are approximately four to seven times greater than for aircraft with reverse thrust.

The FAA's post-Midway internal review found that approximately half the operators' manuals lacked policies for assessing whether sufficient landing distance exists at the time of the arrival, even when runway or aircraft conditions were different from those planned at the time the flight was released. Additionally, it found that not all operators who perform landing distance assessments at the time of arrival have procedures that account for various runway surface conditions or reports of reduced braking action. Many operators who do perform landing distance assessments at the time of arrival do not apply a safety margin to the expected actual (unfactored) landing distance. Some operators have developed their own contaminated runway landing data and in some cases, these data are less conservative than the airplane manufacturer's data for the same conditions.

While these findings support action, the FAA's proposal has following weak points.

- The landing distances determined under 14 CFR Part 25, section 25.125 and published in FAA-approved AFMs are considerably shorter than the landing distances achieved in normal operations since the former are determined using flight test methods and analysis criteria not representative of everyday practices. For example, test pilots often use high touchdown sink rates (as high as eight feet per second) and approach angles of -3.5 degrees to minimize the airborne portion of the landing distance. There is only enough flare to keep the touchdown sink rate structurally tolerable. (The flight crew of a DC-9/MD-80 doing landing performance tests at Edwards Air Force Base back in May 1980 came down so hard the empennage broke off).
- The time taken to activate deceleration devices is markedly different between the flight test setting and out in the operational world. Test pilots initiate maximum braking as soon as possible after landing. In daily operation pilots try to be smoother and easier on the hardware. Many major air carriers prefer the use of thrust reversers during the high-speed portion of the landing rollout to reduce the wear & tear on the brakes, and allow for a "quick turn" on the ground. Such everyday practices result in significant differences with AFM data.
- Flight tests are typically conducted in ideal atmospheric conditions, allowing the test pilot to easily establish a stabilized approach without having to compensate for the turbulence created by afternoon thermals or gusty winds, so common in line flying. Out in the real world, flight path deviations do occur, and professional pilots try to smoothly correct back to the flight path without giving passengers a roller coaster ride. If a sudden wind gust or thermal balloons the aircraft 100 feet over the threshold instead of the usual 50, landing distance will be affected. According to Flight Safety Foundation's "Approach and Landing Accident Reduction (ALAR)" task force report data, such a gust would result in 1000ft increase in landing distance.
- It is not uncommon that the actual wind at landing is different than that reported in ATIS(Automatic Terminal Information Service). Line pilots also have to deal with crosswinds, which has a negative impact on braking effectiveness in line operations. The AFMs generally give maximum crosswind for landing and their reduction due to runway conditions. But there are no direct landing distance performance adjustment figures for crosswind landings. The AFMs

do not contain Landing performance data for the residual ice on the wings after activating de-icing boots.

- In cross wind landings, the amount of reverse thrust applicable also comes into play. With tail-mounted engines further limitation due to rudder blanking effects has to be considered.

FAA has stated that it has not found thrust reversers reliable enough to allow landing distances to be based on their use. This policy provides some additional safety margin for airplanes with reversers that are operable and used in combination with (not in lieu of) maximum braking from wheel brakes and spoilers. This is consistent with the treatment of reverse thrust by the FAA for airplane type certification purposes, which has not allowed landing distances to be based on the use of reverse thrust.

The FAA announcement says that it considers a 15-percent margin between the expected actual (unfactored) landing distance and the landing distance available at the time of arrival as the minimum acceptable safety margin for normal operations. The agency defines "actual landing distance" as "the landing distance for the reported meteorological and runway surface conditions, airplane weight, airplane configuration and ground deceleration devices to be used for the landing. It represents the best performance the airplane is capable of for the conditions."

The greater concern, however, is making flight operations safer. And to accomplish that in calculating landing distances pilots must have accurate timely runway condition information, and it must be in a form that can be easily used. Currently, when a Mu-Meter friction reading is received, there are no means to translate that directly into the amount of landing distance actually needed. None of the charts available have any correlation between the Mu-Meter and runway needed. Braking action reports? Well that's another story.

Pilots must have readily accessible and easy-to-use charts in the cockpit that will enable them to take the present runway surface conditions, environmental conditions and the aircraft's braking configuration, and determine if the runway is long enough for a safe landing. At present there are few, if any, charts or methods that make this easy to do. Let's be realistic, there are a lot of pilots who are uncomfortable making relatively simple math calculations in a benign classroom environment. Trying to load them up with additional mental workload in the terminal area environment is asking for more human error. As one colleague put it, "Keep It Simple Stupid!" It's hard to disagree with that admonition.

The FAA directed operators to use flight training programs that include procedures for ensuring optimal stopping performance on contaminated runways and added that "All flight crewmembers must be made aware of these procedures for the make/model/series of airplanes." The procedures are to be incorporated into training curriculum, and all flight crewmembers must have hands-on training and demonstrate proficiency in the procedures during their next flight training event.

This FAA announcement immediately drew strong opposition from the National Air transportation Association (NATA) which urged FAA to put it on hold. Following the in-depth discussions with National Business Aviation Association (NBAA) FAA issued in August 2006 a Safety Alert For Operators (SAFO 06012) regarding " Landing performance assessment at time of Arrival" for turbojet aircraft. This SAFO urges the operators to adhere to 15% safety margin and adds that Operators engaged in Air transportation have a statutory obligation to operate with the highest possible degree of safety in the public interest.

In November 2006, NBAA has urged FAA that the requirement of the FAA announcement and incorporated into SAFO06012 should undergo a more deliberate and considered process and create an Aviation Rulemaking committee to assist the agency in this matter.

Flight Operations in icing conditions

Based on NTSB/EASA safety alerts, and articles in Business & Commercial aviation.

Icing conditions the world over are a concern to flight operations. Icing could affect any phase of flight. No amount of ice is safe for takeoff as even minute amounts of ice on the wing upper surface can cause severe aerodynamic and control penalties. Pre-flight de-icing is very important to ensure safe takeoff.

NTSB continues to step up pressure on FAA to reduce the risk of icing on aircraft surfaces. NTSB is urging FAA to require increase in minimum safe airspeeds in icing conditions. It is also pushing for the disengagement of the autopilot during icing conditions, to allow pilots to "sense tactile cues associated with the aerodynamic effects of the airplane icing and enhance their ability to control the airplane." FAA has previously disagreed with a NTSB recommendation to turn off the autopilot during icing conditions.

Even with the icing systems in place, the residual ice on the wing leading edges could pose safety issues. It is more dangerous as its effect on aerodynamics is unpredictable.

As in the last year, this year too, NTSB issued a Safety Alert (NTSB SA006) and warned pilots of icing and urged pilots to carryout pre-flight tactile inspections of the wing upper surface and liberal use of de-icing. Its recommendation to FAA included visual and tactile inspection of the wing and horizontal stabilizer before flight where temperatures are conducive to frost or ground icing.

Following the NTSB safety alert, European Aviation Safety Agency (EASA) in November 2006 issued an Emergency Airworthiness Directive AD no. 2006-0348E on "Ice Protection-Takeoff with Frost, Ice, Snow or slush contamination and Flight Into Icing conditions– Operational Limitation" which required the operators to comply with the following :

1. *Take off with frost, ice snow or slush on the wing , control surfaces, horizontal tail and air intakes and flight into icing conditions are prohibited.*

2. *Under icing conditions on ground as described in SB 76-053-30, it is mandatory to perform a visual/tactile inspection prior to takeoff. No visible trace of frost is acceptable particularly on stabilizers and wing upper surfaces and leading edges as well as intakes.*
3. *All persons who may fly the aircraft have to be informed about this operational procedure.*
4. *A copy of this AD has to be inserted into Aircraft Flight Manual.*

Small amounts of ice on the wing and other lifting surfaces appears to be more deadly than the fully developed double horn leading edge ice formation. Small amounts of ice can cause very adverse aerodynamic effects. This would lay trap, just waiting until the pilot is in the approach and landing phase when it shows up. While approaching in an icing environment, one could end up with a thin layer of ice with some degree of roughness on the wing leading edge and upper surface. The effect is a substantial drop in the stall angle of attack as well as the loss of lift. The aircraft could stall much before the activation of stall warning system.

Some icing conditions may be insidious because they may not present the usual cues to the pilot before hazardous and sometimes irreversible degradation or loss of performance, power, control or handling characteristics occurs. Modern airfoils are sensitive to contamination and even a 100 micrometer thick ice could make a difference.

Based on the icing accidents, NTSB has stepped up the pressure on FAA for new icing regulations. Among the many NTSB's recommendations two focus on raising minimum safe speeds in icing conditions and installation of ice speed switches. NTSB believes FAA should develop an industry panel to determine feasibility of requiring low speed alert system in part 121/135 aircraft, and if that is possible, to establish requirements for these systems.

So when you are on sector with icing conditions, remember the safety alerts on flight in icing conditions.

On the ground, and dangerous

Based on William Garvey's article of the same title in Nov.2006 issue of Business and commercial Aviation

On January 16, 2006 at El Paso, the first officer went on the ramp and began the walk-around inspection of the Boeing 737. Reaching the right engine, he noticed a puddle of fluid on the tarmac below the nacelle and told the captain. The captain strode out under the nacelle, examined the puddle and declared the turbofan to be leaking oil. Reentering the cockpit, the captain called the flight ops and asked for the OK to have contract maintenance to look over the engine. Meanwhile, the passengers were boarding the aircraft for a short trip to Houston.

Three mechanics arrived, opened the cowls on the CFM56-3 and began investigating the leak. Unable to find any leak with the engine at rest, they asked the captain to run the engine to see if that would generate further leakage. The pilot complied. Mechanics stood on either side of the engine and the third, who was receiving on-the-job training stood in front but clear of the engine and inlet hazard area, to watch.

Once the engine stabilized at idle for nearly three minutes, the mechanics checked for the leak again. As nothing was found, one of the mechanic called captain on the ground intercom and asked that power of the engine be increased to 70% for further checking. The pilot complied.

After a minute and half after reaching the high power setting, the captain felt a slight buffeting that increased rapidly in intensity, and was followed by a compressor stall. The captain immediately retarded the throttle to idle position. Just then, the first officer said that something had gone into the engine, and immediately cut off the start lever, shutting down the big turbofan. It turned out that during the high-power run, the mechanic who had been at the outboard side of the engine stood up and for some reason stepped into the engine's inlet hazard zone. So exposed, he had been sucked into the engine's large spinning fan blades and was killed.

Fatalities of ground personnel are unusual accidents for NTSB Investigators, a fact that results in part from the safety board's restricted definition of an aircraft accident as an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.

The injuries to mechanics or ramp personnel at times other than when readying an aircraft for a flight, and associated incidents should be of concern to safety as they can impact what goes on the aircraft itself. Nearly 17 percent of all aircraft accidents have " a maintenance component".

Even when the aircraft is on ground and chocked, aviation is still a dynamic activity involving powerful machines, systems under pressure, veteran and inexperienced personnel and urgency making a dangerous mix demanding vigilance and care.

Phonetic fun

In November, Oscar wanted his Papa to play Golf in a Hotel in India. But papa wanted to be in Quebec, go around with Juliet in an Alpha Romeo, or a Sierra, and have Whiskey, Foxtrot and Tango with her. Over the Mike he told Oscar "Quebec is better than Zulu and it is not a Uniform Yankee idea". Oscar said "Bravo, you don't want to be a Charlie, Delta or Lima but only an Echo. You are the Victor but don't add a Kilo and get X-rayed".

The Confidential Aviation Hazard Reporting System (CAHRS) provides a means of reporting hazards and risks in the aviation system before there is loss of life, injury or damage. It is open to anyone who wishes to submit a hazard report or safety deficiencies confidentially and non-punitively. Reports help to identify deficiencies and provide safety enhancement in areas of aviation. CAHRS forms can be collected at different location of KAC (i.e. Flight Dispatch) Premises. Completed forms can be dropped in FS&QA allocated box at Flight Dispatch or e-mailed to kwioeku@kuwaitairways.com or faxed to 00965-4749823 or mail to Flight Safety and Quality Assurance office, Operations Department, P.O. Box 394, Safat 13004, Kuwait Airways –Kuwait.