HOLD SHORT FOR RUNWAY SAFETY

Runway RISKS

Reducing Incursions, Excursions, and Confusion

October 2008

Volume 1
Issue 7

Dear Fellow Pilots:

I hope that you have enjoyed the past six issues of the Runway Risks *newsletter, which has been our pleasure to bring to you. When we conceived this publication in early 2008, we envisioned a six-issue project, concentrating on runway incursions to support the FAA's "Call to Action" of last year.*

The feedback that we have received suggested that our runway incursion information was helpful, so now we want to turn our attention to another serious runway safety issue: excursions. In fact, excursions historically account for substantially more damage and loss of life than do incursions. Consequently, we concluded that we could not ignore this very significant topic. Therefore, upon the recommendation of Captain Bob Perkins (ACJ), chairman of the Airport Ground Environment Group, we intend to publish four additional issues of the newsletter—including this one—concentrating on runway excursion risks.

This issue focuses on the importance of stabilized approaches. We all know that it is preferable to be stabilized by 1,000 feet, putting you and your aircraft "in the slot" for landing at the touchdown zone. However, do you know how little destabilization it takes to make a large difference in that touchdown point or how little of a deviation above glide path will result in running out of runway? By presenting a classic example of a destabilized approach, we hope to heighten your awareness of the importance of being solidly "in the slot" on all your approaches.

I hope you enjoy this seventh issue of Runway Risks *and that you find it helpful in operating safely. It is certainly our pleasure to bring it to you.*

Fraternally,

Captain Rory Kay (UAL)
Executive Air Safety Chairman

Factors Contributing to Runway Excursions

The causal factors contributing to runway excursions and the dangers associated with them can be grouped into four basic categories:

- *destabilized approaches*
- *runway surface braking coefficient/contamination*
- *aircraft performance*
- *post-excursion survivability*

By examining these four items individually over the next four issues and presenting associated case studies from around the world, we hope to raise the collective runway safety awareness of all of ALPA's membership.

Case Study—

Air France Flight 358, Toronto, Ontario, August 2, 2005

The following is excerpted from the Transportation Safety Board of Canada (TSBC) accident report number A05H0002. The entire report is available at the following link: HTML PDF [4678 KB]. The Cockpit Voice Recorder (CVR) and Air Traffic Control (ATC) transcripts are not yet available.

The Air France Airbus A340-313 aircraft (registration F-GLZQ, serial number 0289) departed Paris, France, at 1153 Coordinated Universal Time (UTC) as Air France Flight 358 on a scheduled flight to Toronto, Ontario, with 297 passengers and 12 crew members on board. Before departure, the flight crew members obtained their arrival weather forecast, which included the possibility of thunderstorms. While approaching Toronto, the flight crew members were

continued on page 2

Case Study—
Air France Flight 358
continued from page 1

advised of weather-related delays. On final approach, they were advised that the crew of an aircraft landing ahead of them had reported poor braking action, and Air France Flight 358's aircraft weather radar was displaying heavy precipitation encroaching on the runway from the northwest.

At about 300 feet above ground level (agl), the surface wind began to shift from a headwind component to a 10-knot tailwind component, increasing the aircraft's groundspeed and effectively changing the flight path.

With the autopilot and autothrust systems disengaged, the pilot flying (PF) increased the thrust in reaction to a decrease in the airspeed and a perception that the aircraft was sinking. The power increase contributed to an increase in aircraft energy and the aircraft deviated above the glide path and ground speed increased. The aircraft crossed the runway threshold about 40 feet above the glide slope [~120 feet above runway threshold].

When the aircraft was near the threshold, there were ominous thunderstorms with lightning strikes on the missed approach path. At this point, the crew members became committed to landing and believed that their option to go around no longer existed.

Approaching the threshold, the aircraft entered an intense downpour, and the forward visibility became severely reduced.

During the flare, the aircraft traveled through an area of heavy rain, and visual contact with the runway environment was significantly reduced. There were numerous lightning strikes occurring, particularly at the far end of the runway. The aircraft touched down about 3,800 feet down the runway, reverse thrust was selected about 12.8 seconds after landing, and full reverse was selected 16.4 seconds after touchdown. The aircraft was not able to stop on the 9,000-foot runway and departed the far end at a groundspeed of about 80 knots. The aircraft came to rest in a ravine at 2002 UTC (1602 eastern daylight time) and caught fire. All passengers and crew members were able to evacuate the aircraft before the fire reached the escape routes. A total of two crew members and 10 passengers were seriously injured during the crash and the ensuing evacuation.

In fact, 20 such accidents [i.e., those involving difficult approaches] involving large commercial operators have occurred in the last five years. Furthermore, a number of recent incidents, with similar factors involved, clearly had the potential for catastrophic results. If this trend continues, the resultant risk of loss of life and damage to property will increase considerably. This is worrisome because it is a clear indication that, in spite of the efforts of all concerned, and although we are learning from these accidents or the experiences of others, we seem unable to develop adequate tools to mitigate this specific risk. Some or all of the following conditions were present in all of these accidents:

» The crews were on approach behind or in front of other aircraft that were landing or intending to land

» A CB cloud or monsoon storm was approaching or was over the landing area at the time of landing

» Heavy rainfall was occurring

» The runway was contaminated by water

continued on page 3

Weather at threshold about two minutes before landing.

AFR358 on short final.

Photos from TSBC accident report.

Air France Flight 358
continued from page 2

- Poor braking action was either reported by previous aircraft or was experienced by the crew of the accident aircraft
- There was a strong crosswind, tailwind, or combination of both
- The aircraft deviated from the target speed and glide slope on short final
- There was a wind shear, perhaps associated with downdrafts
- A missed approach or balked landing was not considered or attempted
- The aircraft landed long
- The after-touchdown actions by the crews were non-standard
- Most often present, the accident crew members were subjected to sudden reduced visibility, which they had not anticipated or prepared for properly.

In spite of all the warning signs evidenced by the above conditions, the crews of the accident aircraft were confident in their ability to perform a safe landing. The decision to continue the landing after visual contact with the runway environment was lost was most often the final condition leading to the accident.

Lessons Learned

- Make the decision to land independently of the experience of other aircraft.
- Maintain continual readiness to go around.
- Know landing distances required for possible environmental conditions.

The IFALPA Perspective on Stabilized Approaches

The International Federation of Air Line Pilots' Associations (IFALPA) is also focused on the importance of maintaining a stabilized approach. Please see the article entitled *"Scoring in the Touchdown Zone"* from the July–August 2008 edition of *InterPilot* magazine to learn the views of Captain Gavin McKellar, the chairman of the IFALPA Accident Analysis and Prevention Committee.

FAA Information for Operators *(InFO)*

The following passage is an excerpt from Federal Aviation Administration (FAA) InFO publication #08029, dated 05/16/08, entitled *Approach and Landing Accident Reduction (ALAR): Recommended Flightcrew Training*. It deals with the topic of "go-arounds."

SPECIAL NOTE: Proactive Go-Around Policy. The CAST [Commercial Aviation Safety Team] and the NTSB found that the unwillingness of pilots to execute a go-around and missed approach when necessary was the cause, at least in part, of some approach and landing accidents. This unwillingness may stem from direct or indirect pressures to sacrifice safety in favor of other considerations, such as schedules or costs. The FAA, ATA, and FSF training materials (paragraphs A, B, and C, respectively) all stress the importance of a corporate safety culture promoting a proactive go-around policy.

See the whole InFO [link].

Airbus Flight Operations Briefing Notes

Descent Management

The following information is contained within the Airbus Flight Operations Briefing Notes (FOBN) on "Descent Management – Being Prepared for a Go-Around."

Go-around below the minimums:

- When the need for go-around is identified, the decision should not be delayed.
- Go-around can be decided until the selection of the reverse thrust.
- If the go-around has been initiated, it must be completed.
- Reversing a go-around decision can be hazardous (e.g., F/O initiating a late go-around; captain overriding and trying to land the aircraft).

Related material for further reading is available from:

- Flight Safety Foundation (http://www.flightsafety.org/cfit_reading1.html)
- Airbus Industries (http://www.airbus.com/en/corporate/ethics/safety_lib/)

Flight Safety Foundation

The information contained in the following two articles is excerpted directly from the Flight Safety Foundation (FSF) Approach-and-Landing Accident Reduction (ALAR) Tool Kit

Flight Safety Foundation (FSF) Approach Hazards

Overview – Section 5.1

"Failure to recognize the need for a missed approach and to execute a missed approach is a major cause of approach-and-landing accidents."

Flight Safety Foundation Flight Safety Digest, August–November 2000

The Flight Safety Foundation (FSF) took on approach and landing accidents as a dedicated mission after determining it was such a significant cause of accidents and technology existed to avoid them. It analyzed 76 accidents of this type occurring from 1984 to 1997 and found that:

53%	occurred in non-precision instrument approaches or visual approaches
50%	occurred where no radar service was available
67%	occurred in hilly or mountainous terrain
59%	occurred in instrument meteorological conditions
53%	occurred in darkness or twilight
33%	involved adverse wind conditions
21%	involved flight crew disorientation or visual illusions
29%	involved failure to equip available safety equipment (GPWS)
18%	involved runway conditions
21%	involved inadequate ground aids

The lesson here is that it is important to increase awareness that these hazards increase the risk to a flight. Anticipate the approach, by asking, "What if…?" and being prepared to respond to the possible situations. *The use of Standard Operating Procedures, including confirming the approach is stabilized, is important*. The following criteria should be part of the check:

1. The aircraft is on the correct flight path.
2. Only small changes in heading/pitch are required to maintain the correct flight path.
3. The aircraft is not more than Vref + 20 knots indicated airspeed and not less than Vref.
4. The aircraft is in the correct landing configuration.
5. Sink rate is no greater than 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 fpm, a special briefing should be conducted.
6. Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual.
7. All briefings and checklists have been conducted.
8. Specific types of approaches are stabilized if they also fulfill the following:
   - ILS approaches must be within one dot of glide slope and localizer.
   - A Category II or III ILS approach must be flown within the expanded localizer band.
   - During a circling approach, wings should be level on final when the aircraft reaches 300 feet above airport elevation.
9. Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing. An approach that becomes unstabilized below 1,000 feet above airport elevation in IMC, or below 500 feet above airport elevation in VMC, requires an immediate go-around.

Flight Safety Foundation, Flight Safety Digest, August–November 2000

Flight Safety Foundation (FSF) Approach Hazards

Overview – Section 8.2

Ensuring a safe landing requires achieving a balanced distribution of safety margins between:

» the computed *final approach speed* (also called the *target threshold speed*) and

» the resulting landing distance.

The Flight Safety Foundation (FSF) Approach-and-Landing Accident Reduction (ALAR) Task Force found that "high energy" approaches were a causal factor in 30 percent of 76 approach-and-landing accidents and serious incidents worldwide in 1984 through 1997.

Factors affecting the final approach speed "usually are not cumulative"; only the highest airspeed correction should be added to VREF (unless otherwise stated in the AOM/QRH):

» Airspeed correction for wind

» Airspeed correction for ice accretion

» Airspeed correction for autothrottle speed mode or autoland; or

» Airspeed correction for forecast turbulence/wind shear conditions.

Do you have a best practices recommendation for safe airport operations?

Through personal experience, many pilots have learned or developed their own best practices for safe operations. If you have a suggestion regarding safe operating procedures in the airport environment, please share it with us by clicking on the button below. All suggestions will be reviewed and considered for publication in subsequent newsletters.

Thank you for your contribution. SUBMIT

Thank you for your continued interest in maintaining runway safety. In our next issue of *Runway Risks,* we will focus on the impact of runway contamination on surface braking coefficient. Please contact us at runway-safety@alpa.org with your concerns.

FLY SAFELY!

ALPA has developed a special website dedicated solely to runway safety. There you will find links to runway safety educational material and video re-creations of several high-profile incidents. Material on this website is being added on a regular basis, so stop by for the latest information on runway safety. Previous issues of this newsletter can also be found there. The website address is **holdshort.alpa.org.**

Our Goals

While our main goal of distributing this newsletter is to increase your education and awareness of runway safety hazards, ALPA is also committed to providing access to educational resources on our website. In addition, we strive to:

1. immediately provide you with awareness tools,
2. conduct this educational campaign to provide information to line pilots,
3. continue the pursuit of long-term system mitigations of runway safety hazards.