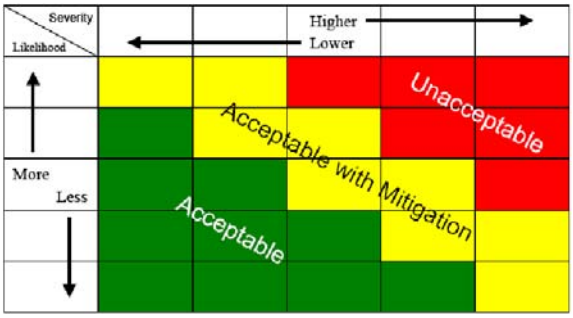
RESEARCH BRIEF

Research Request:

Research Request (Jan 2010):

Mitigation Strategies For Company Specific Identified Flight Risk Factors

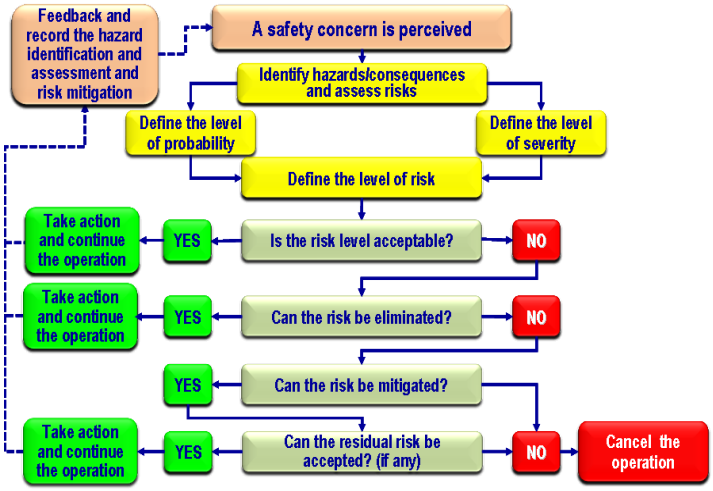
Research Response:



When a condition of any operation presents significant or unusual hazards, a formal risk assessment is recommended. The probability and severity of the hazard are assessed, defining the risk level and clarifying the required level of action. When making the initial assessment be sure to address all risks stemming from the original hazard. For example, when performing a risk assessment on winter operations, include runway contamination, fuel contamination, in-flight icing, etc. When the composite level of risk is determined by taking into account all associated risk, the proper controls may be implemented. Using the thought process depicted below, will yield one of three results:

1) eliminate the risk **2)** mitigate the risk **3)** cancel the operation.

Eliminating the risk, in the case of winter operations, is simply not feasible. Mitigating the risk to a level that allows accepting the residual risk, is in this case the necessary option.



Outlined in this brief are common mitigation strategies that have been recommended from various sources for the following operational risks:

1) Winter Operations
2) Contaminated Runway Operation
3) Operating at Uncontrolled Airports
4) Repositioning Flight
5) SIC with less than 200 hours in type
6) Night Operation
7) Single Pilot Flight

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Winter Operations

SAFO 09002 **Date 2/11/2009**

Subject: Operational Considerations for Airport Winter Operations

Recommended Action: Directors of Operations, Directors of Training and flight crews should review and emphasize operations guidance and procedures in the following areas:

1) Preflight and In-Flight Planning: Aircraft operators and flight crews need to be proactive in obtaining accurate and timely airport surface condition information. These actions may require direct contact, via landline or radio, with the airport operator, air carrier's local operations facility, and the controlling ATC facility. It may be necessary for the inquiries to be very specific as to the conditions of the specific surfaces that the aircraft will utilize on its arrival and/or departure. When an air carrier flight is involved, the air carrier's operations center must get the most accurate and timely information possible to the flightcrew to use in their decision making process.

2) Ground Operations: Flightcrews must use caution if there is a possibility that airport surfaces are contaminated. Plan and execute flights for the worst surface condition possible:

a) Ask for updated surface condition information from all parties that could have the information such as ATC, operations, dispatch, and the airport operator. If necessary ask for the information in plain language to develop a clear understanding of the actual surface conditions.

b) Slow the aircraft to a fast walking speed on the centerline of the landing runway prior to attempting to exit the runway. Taxi at a fast walking speed until parked at the ramp or until aligned with the centerline of the runway for takeoff.

c) When the surface conditions may be slippery, do not accept ATC clearances to expedite taxiing or exit the runway sooner than prudent. Be certain of the aircraft's controllability under the degraded surface conditions.

d) If not absolutely certain of where the paved surfaces are, **STOP** the aircraft until certain of the true aircraft and pavement relationship. Do not taxi through thick contamination that could bog the aircraft down and cause it to be stuck or require high power settings to keep rolling. If adequate and safe stopping and cornering control cannot be assured **STOP** the aircraft.

e) In ramp areas, if the air carrier has responsibility for maintaining the ramp surfaces, the carrier should maintain the ramp in a condition that provides for safe operations of aircraft and service vehicles. If this can't be accomplished, the carrier may need to close the ramp area until the ramp is properly prepared. In this situation it may be necessary to tow aircraft to and from parking areas rather than allow the aircraft to taxi in and out. These same precautions should apply if the ramp surfaces are maintained by other organizations on the airport. This implies the added burden of coordination with the appropriate authority and other ramp users.

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Related reading material:

AC 91-6A - Water, Slush, and Snow on the Runway

AC 91-13C - Cold Weather Operation of Aircraft

AC 135-16 - Ground Deicing & Anti-icing Training & Checking

AC 135-17 - Pilot Guide Small Aircraft Ground Deicing

AC 120-58 - Pilot Guide for Large Aircraft Ground Deicing

AC 120-60B - Ground Deicing and Anti-Icing Program

AC 120-71A - Standard Operating Procedures for Flight Deck Crewmembers

Contaminated Runway Operation

SAFO 09015 **Date: 10/20/2009**

Subject: Training For Maximum Performance Landings on Contaminated Runways

Recommended Action: Directors of safety, directors of operations, chief pilots, check airmen, pilot instructors, line pilots of certificate holders, and training providers should develop a program with the following minimum elements:

• Standard operating procedures (SOP)/profiles should incorporate the stabilized approach terminating with a landing in the touchdown zone, the proper application of aircraft landing performance data, the proper deployment of aircraft deceleration devices, and the proper braking concept. SOPs should specify minimum altitudes for the airplane to be established in a stabilized approach condition. If the airplane is not stabilized, SOPs should emphasize that pilots should execute a go-around rather than attempt a landing from an unstabilized approach.

• SOPs should outline proper procedures to use during the flare and touchdown to ensure a landing in the touchdown zone. Training curricula should emphasize the proper deployment and application of ground spoilers and thrust reverse (if installed) and the correct use of brakes during the ground roll.

• Landing distance calculations should include the safety margin required by company SOPs and the appropriate regulation. Company SOPs should also articulate a process for conducting a landing distance assessment under the conditions existing at the time of arrival. These procedures should ensure that a full stop landing, with a reasonable safety margin beyond the actual landing distance, can be made on the runway to be used.

Related reading material:

AC 91-79 Runway Overrun Protection

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Operating To/From Uncontrolled Airports

The following are NBAA recommended operating procedures for operating on or in the vicinity of an uncontrolled airport. When approximately 15 miles out, pilots should ask ATC if there is any conflicting traffic and monitor the ATC frequency for traffic alerts.

Approximately ten miles out, pilots shall broadcast, in the blind if necessary, position and intentions on the Common Traffic Advisory Frequency (CTAF) or Local Airport Advisory (LAA). Calls recommended on CTAF or LAA are:

- ⇒ Ten miles out
- ⇒ Entering downwind
- ⇒ Base
- ⇒ Final
- ⇒ Exiting the runway

IFR flight plans should not be canceled until after landing at uncontrolled airports so that search and rescue will be initiated for overdue aircraft. On instrument approaches, it is recommended that pilots broadcast the following on CTAF:

- ⇒ Departing final approach fix
- ⇒ On final approach
- ⇒ Approach completed.

It is the responsibility of the PIC to ensure that the runway is clear. If conditions permit, an approach overhead the airport helps to verify that the runway is clear, the wind direction, the runway in use, and increases the probability of visual acquisition by other aircraft.

When departing from the airport, broadcast departure intentions before taxiing and before taking the runway. Pilots should comply with the departure procedures for the airport including noise abatement procedures. Recommended procedures are:

- ⇒ Make frequent radio calls. Request any traffic in the vicinity of the airport identify themselves so that you are aware of each other's presence.
- ⇒ Turn all exterior lights on. Dim interior lights as much as possible during night operation for better outside visibility.
- ⇒ BE ALERT. Complete as many checklist items as possible before entering the pattern.
- ⇒ Call the airport manager or the FBO prior to departing on the trip to inquire about runway conditions, weather, NOTAM, runway lighting, obstacles or any possible hazards.
- ⇒ Review charts prior to flight and note minimum altitudes for terrain clearance.

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Repositioning Flight

Historical safety data shows the risk of an accident/incident dramatically increases during a repositioning flight or empty leg. The reinforcement of standard operating procedures to flight-crew when no passengers are aboard is crucial. Flightcrew should perform with the same level of professionalism with an empty cabin, and this must be continually emphasized and de-manded by company leadership.

SIC with less than 200 hours in type

Traditionally, the risks associated with having a low-time second-in-command pilot have been mitigated by pairing with an experienced captain. Other mitigation strategies for low-time pilots have been to prohibit them from manning a flight under abnormal conditions, such as, less than “good” braking action, a crosswind component greater than 15 knots, approaches to minimums etc.

Night Operation

FAA-H-8083-3A Airplane Flying Handbook Chapter 10

NIGHT VISION
Generally, most pilots are poorly informed about night vision. Humans are not nocturnal, and therefore our eyes never function as effectively at night. However, if pilots can learn how to use their eyes correctly and understand their limitations, night vision can be improved signifi-cantly. There are several reasons for training to use the eyes correctly.

NIGHT ILLUSIONS
In addition to night vision limitations, pilots should be aware that night illusions could cause confusion and disorientation during night flying. One of the more common danger situations that cause concern are illusions associated with black hole approaches. Avoid long, straight in approaches in these conditions.

AIRPLANE EQUIPMENT AND LIGHTING
An operation’s MEL should indicate when specific aircraft lighting malfunctions will not allow for night flight IAW Federal Regulations. Each operator should also specify the minimum airplane equipment required for night flight as unique aircraft models or equipment necessitate.

PILOT EQUIPMENT
Before beginning a night flight, carefully consider personal equipment that should be readily available during the flight. At least one reliable portable flashlight is recommended as standard equipment on all night flights. Remember to have a spare set of batteries.

AIRPORT AND NAVIGATION LIGHTING AIDS
Pre-flight familiarity with the lighting systems used for destination airports, runways, obstruc-tions, and other visual aids at night is imperative.

PREPARATION AND PREFLIGHT
Night flying requires that pilots be aware of, and operate within, their abilities and limitations. Although careful planning of any flight is essential, night flying demands more attention to the details of preflight preparation and planning.

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Single Pilot Flight

Business Aviation Insider- June 2009

Calling It Out' and Other Tips for Safe Single-Pilot Flights

As people in the business aviation community well know, flying single-pilot is dramatically different than operating as part of a two person flightcrew. The airplane doesn't know the difference, of course, but the pilot flying – especially an owner/operator – performs in a vastly different environment than a two-person crew in the same aircraft. The human-factors issues that come into play in single-pilot operations include checklist discipline, procedures monitoring and risk management – and that's when everything onboard is working properly. Throw in some equipment failures or other emergencies, and the level of discipline required of a single pilot greatly exceeds that demanded of each member of a multi-person crew.

Do More Than Simply Read the Checklist

"The biggest thing I see [in some single-pilot operations] is that the checklist tends to be neglected," says Pat Cannon, vice president at San Angelo, TX-based Turbine Aircraft Services who conducts instructional flights in the Mitsubishi MU-2 and other aircraft.

Checklist discipline is crucial – not just the use of the checklist, but also creating a challenge/response method that ensures the items on the checklist are accomplished rather than simply read.

Call It Out

"It's really important to maintain the challenge/response method of checklist usage, even to yourself," Cannon says. "It may sound stupid to a person sitting in the back of the aircraft, but you can make a little joke about it."

Single pilots also should make it a point to verbalize procedures at critical points rather than just thinking about them. Verbally stating takeoff plans and calling out airspeed reference points on takeoff, for example, will keep the single pilot up to snuff almost as well as a copilot would. On an approach, calling out "1,000 feet to go" or "500 feet to go" when approaching target altitudes or approach minimums serves the same purpose.

Don't Assume Operations Will Be Normal

Cannon says the biggest threat to single-pilot operations comes when something forces the pilot out of the normal mode of operations. Such incidents have the potential to put an aviator firmly behind the airplane at precisely the wrong time.

One defense against this phenomenon is to make sure every piece of equipment onboard is working – and that you know how to use it. Many older aircraft have marginal ergonomics to begin with, which is compounded when the instrument panel is upgraded piecemeal. The result is that pilots don't fully understand the various equipment failure modes and how they can manifest themselves. Pilots should take the initiative to thoroughly understand how the equipment in their aircraft functions and be prepared to handle possible equipment failures.

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The issue becomes even more significant in modern aircraft, says Ben Marcus, co-founder of JetAviva, a Van Nuys, CA-based company that specializes in acceptance flights and checkout training in aircraft.

"It all boils down to human factors," Marcus says. "I actually believe there should be a type rating in some of these avionics." Marcus points to the Garmin G1000 glass panel system as an example. The avionics system is so powerful that, "I think some pilots might feel as if they need a type rating to take advantage of all the features. It's really important to understand exactly how everything works, and it doesn't really matter what airframe it's installed on," he says.

Avoid 'Convenience Over Safety'

Another safety consideration is "get-there-itis," which is more likely to afflict the single pilot than a multi-pilot crew, whose give-and- take when making operational decisions can sometimes help prevent the pilot in command from making a decision based on convenience or opportunity rather than safety.

Having a second pilot on board can improve the odds of correctly assessing marginal weather conditions or preventing the dispatch of an aircraft in spite of equipment malfunctions. Single pilots don't have that onboard safeguard, but a lone aviator facing a tough weather call or a pre-takeoff equipment issue can stack the odds in his or her favor by simply making a phone call to a trusted colleague, flight instructor or mechanic. Often, merely describing the situation will help clarify the best course of action just as clearly as will having to justify taking a more risky approach.

Stay Focused on Good Maintenance Practices

One other area in which the operator differs from a two-person flown airplane is in the area of maintenance management, especially in turbine-powered aircraft. While piston aircraft usually can be maintained on the basis of fixing what breaks, turbine aircraft need a more proactive approach.

Generally speaking, the more you demand from an airplane – in terms of speed, altitude or carrying capacity – the more dangerous a malfunction can be. Operators stepping up from less capable equipment often are caught by surprise by the jump in maintenance requirements that accompanies turbine power and pressurization.

For example, compressor washes are often neglected in turboprops, which can lead to very expensive engine repairs. In addition, even a casual glance at the Learjet accident that killed golfer Payne Stewart shows the potential danger in neglecting the pressurization system.

Single-pilot operations are common in aircraft used for business purposes, and the aircraft can be as simple as a single engine fixed-gear piston single or as complicated as a turboprop or business jet.

The critical issue is not so much the capability of the aircraft as the attitude of the pilot flying it. Knowing the airplane and how to use all of the equipment on board is a good start. Responsible, conservative decision-making is a good next step. The goal, after all, is not necessarily always going to be completing the planned flight, but rather being around to fly another day.

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