

# Guide to Mitigating Common Flight Risks

Top 10 Selected Flight Risk Factors in 2022



# The Most Common Risks Faced by Operators Day to Day

And what to do about them

Thousands of Risk Assessments are submitted to ARC every year. We've reviewed the data and found the top 10 selected risk factors flight departments are facing and have provided suggested mitigations.

How do these compare to your top 10 selected factors and selected mitigations?



## How to mitigate risk

### 1. Identify.

Complete a risk assessment to identify the primary hazards.

### 2. Assess Impact.

A good risk assessment tool will do this for you automatically. It should have a set risk value for each factor previously determined by your team, automatically tally the risk score, and notify you when you have reached a medium or high risk level.

### 3. Mitigate.

Assess any elevated risk values against the department's SOPs for guidance on implementing mitigations due to higher risk levels. There are four key strategies to mitigate risk:

<b>Avoid</b>	Eliminate the risk.
<b>Transfer</b>	Share or transfer the risk to another party.
<b>Reduce</b>	Implement actions to help reduce the likelihood or impact of the risk.
<b>Accept</b>	Accept the risk as is, but carefully monitor it.

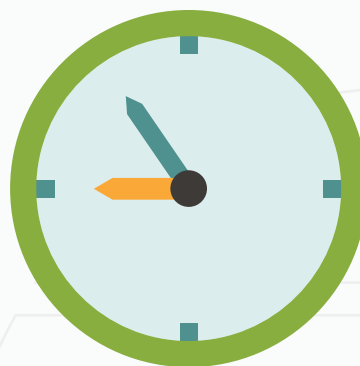
# Top 10 Selected Factors and Suggested Mitigations

## 10

### Duty day issues related to the timing of trips and circadian rhythm

#### Mitigations

- If crew members are departing from a time zone different from home base, consider the impact of the difference on crew fatigue.
- Ensure all crew members feel they can safely operate.
- If resources permit, consider utilizing an augmented crew (additional crew member(s)) to permit additional crew rest.
- If possible, permit for additional rest time prior to or after the planned mission.
  - If there is a prolonged period between flight legs, consider the use of a day room or hotel to get additional rest.



# Top 10 Selected Factors and Suggested Mitigations

## 9 Precipitation and storms

### Mitigations

#### Thunderstorms and convective activity

- Closely review weather forecasts for signs of wind shear.
  - Review PIREPs to see if other pilots are reporting shear, turbulence, or other hazardous conditions.
- Brief passengers, if carried, on potential turbulence encounters when operating near thunderstorms and convective activity, including the importance of adhering to the "Fasten Seat Belt" sign and/or command.
- If possible, change departure and/or arrival time to avoid operating when the thunderstorm / convective activity is forecast to be present at the airport.
- Review the aircraft deferral log to ensure wind shear detection and avoidance equipment and weather radar systems, as installed, are operative. If any of these items are inoperative, refer to the MEL for additional procedures and guidance.
- If thunderstorms are expected at the departure airport, select an alternate departure airport in the event an immediate return must be made and conditions are not suitable for landing.
- If possible, ensure an alternate destination airport is selected in the event conditions at the destination are not suitable for landing.

#### Heavy rain

- Closely review weather forecasts for signs of wind shear or convective activity.
- Brief and utilize guidance for wet or contaminated runway operation.
- If heavy rain is expected at the departure airport, select an alternate departure airport in the event an immediate return must be made and conditions are not suitable for landing.
- If possible, ensure an alternate destination airport is selected in the event conditions at the destination are not suitable for landing.

#### Snow and ice

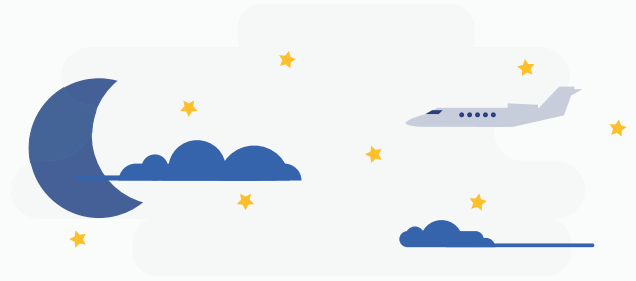
- Review the aircraft deferral log to ensure aircraft de-icing equipment and icing detection systems, as installed, are operative. If any of these items are inoperative, refer to the MEL for additional procedures and guidance.
- Utilize aircraft de-icing equipment in accordance with manufacturer guidance, as appropriate.
- For departure, ensure adherence to anti-icing hold-over times.

# Top 10 Selected Factors and Suggested Mitigations

## 8

### Nighttime and twilight operations

#### Mitigations



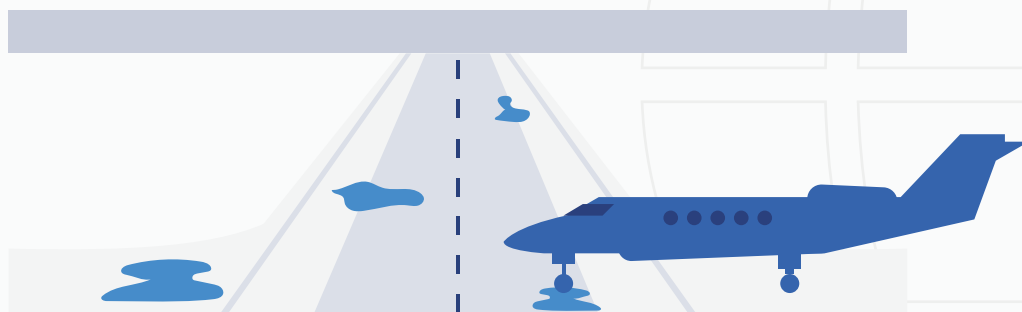
- Ensure crews are well rested. Try to avoid night operations in conjunction with extensions to duty or flight time limits.
  - If crew members are departing from a time zone different from home base, consider the impact of the difference on crew fatigue.
  - If any portion of the flight will be conducted during the Window of Circadian Low (WOCL), ensure crew members are provided additional rest opportunities prior to the flight.
- Ensure crews are familiar with the airport layout and have looked over the airport diagram. This will help with situational awareness and reduce chances of an incident during taxi, such as striking an object or crossing an active runway without clearance. Consider requiring the diagram to be readily available on the flight deck or open on an iPad during the flight.
  - Review airport procedures for any unique considerations (such as Runway Status Lights or "hot spots").
  - Encourage a progressive taxi if crews are unfamiliar with the airport.
  - Closely review airport publications and NOTAMs for construction on aprons or taxiways and runway closures.
- Select a destination and alternate with precision approaches. Consider the use of landing aids such as EFVS, if installed.
  - If using EFVS, ensure the department and crews are authorized to use EFVS at the airport, if required.
- Ensure passengers are always in a well-lit area and visible or escorted when in low-light areas.
- Check aircraft deferrals for any inoperative items that could affect aircraft performance or visibility (e.g., aircraft lights).
- If able, utilize additional aircraft lights (such as those mentioned in the FAA's "Operation Lights On" program) to make the aircraft easier to see.
- Consider whether the areas surrounding the departure, arrival, and alternate airports are populated or rural/overwater with very few lights and whether it is a full moon or moonless night. This will help set expectations for visibility during takeoff, approach, and landing.
- Carefully review aeronautical charts and aircraft performance data to ensure the aircraft can safely clear any significant obstacles that exist in the takeoff and climb path (particularly when conducting a VFR flight).
- Complete a report within your SMS to track the risk and the effectiveness of the mitigations that were implemented.

# Top 10 Selected Factors and Suggested Mitigations

## 7 Wet or contaminated runways

### Mitigations

- Request use of a longer runway (if available and operationally feasible)
- If aircraft-stopping performance is a concern, select an airport with a longer runway.
- Utilize a grooved runway if available.
- Apply an additional safety margin to calculated stopping distances.
- Suggest an alternate destination or departure time to avoid weather or to gain a more favorable headwind/crosswind component.
- Review the aircraft manufacturer's operating manuals for procedures for wet runway landings and any applicable landing distance increases.
- Review the aircraft deferral log to ensure braking, anti-skid, and thrust reverse systems (as installed) are operative. If any of these items are inoperative, refer to the MEL for additional procedures and guidance.
- Establish "intended landing" and "committed to stop" points and reiterate them during the approach briefing.
- Closely review missed approach procedures.
- Review the aircraft manufacturer's procedures for maintaining directional control on a contaminated runway.
- Complete a report within your SMS to track the risk and the effectiveness of the mitigations that were implemented.
- If icing conditions are observed or probable:
  - Utilize aircraft de-icing equipment in accordance with manufacturer guidance, as appropriate.
  - For departure, ensure adherence to anti-icing hold-over times.



## Top 10 Selected Factors and Suggested Mitigations

### 6 Duty day issues related to rest hours, length of duty day, or number of legs per day

#### Mitigations

- Ensure all crew members feel they can safely operate with the duty day deviation and agree to the extension.
- If resources permit, consider utilizing an augmented crew (additional crew member(s)) to permit additional crew rest.
- If possible, permit for additional rest time prior to or after the planned mission.
  - If there is a prolonged period between flight legs, consider use of a day room or hotel to permit for an additional rest opportunity.
- Remain conscious of time zones in relation to the crew members' "body clock".
- Avoid operations in the Window of Circadian Low (WOCL) - the hours between 0200 and 0600 for most individuals.
- Permit postponing "non-necessary" tasks if possible (such as non-essential paperwork).
- When arriving at home base, consider involving trained personnel not assigned to the flight to perform some postflight tasks, such as aircraft cleaning and towing, if possible.
- Complete a report within your SMS to track the risk and the effectiveness of the mitigations that were implemented.



# Top 10 Selected Factors and Suggested Mitigations

## 5 Repositioning flights with no passengers

### Mitigations

- Review SOPs and reiterate the importance of adhering to them.
- Review aircraft maintenance and deferral logs for any items that may have been recently worked on or are inoperative which may affect safety of flight.
  - If the aircraft is being operated with inoperative equipment, review the Minimum Equipment List (MEL) for any additional provisions, restrictions, and considerations.
- Review aircraft performance calculations closely. Aircraft performance may differ with a "light" aircraft.

If the repositioning flight is following a maintenance event, crews should:

- Review what is / was inoperative, repaired, or replaced.
- Discuss the procedures to be used in the event the aircraft does not perform as expected.
- Review weather to ensure conditions are appropriate for the flight.
- Debrief the personnel that conducted or supervised the maintenance to understand the full scope of the work performed.
- Allot more time to perform a very thorough preflight inspection, with particular emphasis on any switches or system controls that may differ from their standard setting.
- Review aircraft performance calculations to account for a lower or non-standard W&B.
- If the leg is being operated under different regulatory rules (e.g., 14 CFR Part 91 instead of 14 CFR Part 135), crews may still want to consider adhering to the more restrictive requirements.
- Complete a report within your SMS to track the risk and the effectiveness of the mitigations that were implemented.

### Did you know?

In 2008 the FAA reported: Approximately 25% of accidents involving turbine powered aircraft during the past decade have occurred during non-revenue flights (e.g., ferry flights for maintenance purposes or re-positioning flights to pick-up passengers)."

"Two common factors found by the National Transportation Safety Board to have been contributory in non-revenue flight accidents are:

1. The flight crew's failure to adhere to standard operating procedures (SOPs) and,
2. The flight crew's failure to operate the airplane within its performance limitations."

- FAA SAFO 08024



# Top 10 Selected Factors and Suggested Mitigations

## 4 Flights to and from non-towered airports

### Mitigations

- Conduct a thorough review of surrounding airspace, including other types of operations that may be occurring in the area (glider activities, pilot training, parachute operations, etc.).
- Review the digital chart supplement (Airport/Facility Directory) or airport-published procedures for any special airport procedures.
- Ensure crews have the applicable VFR sectional chart available.
- Check NOTAMs for the airport and surrounding area.
- When approaching the area, follow best practices with regard to outside scanning for traffic.
- Review the standard radio broadcast terminology to be used when operating at non-towered airports.
- Listen to and announce position and intentions on the applicable local frequency to coordinate actions with other traffic.
  - Utilize enhanced vigilance as not all aircraft may be communicating via radio.
- If able, utilize additional aircraft lights (such as those mentioned in the FAA's "Operation Lights On" program) to make the aircraft easier to see.
- Review flight planning to ensure it includes allowances for flight clearances as these may take longer to get at a non-towered airport.
- Increase takeoff and landing minimum requirements to allow for crews to identify other traffic more easily.
- Increase weather minimum requirements when inclement weather is expected.



# Top 10 Selected Factors and Suggested Mitigations

## 3 Mountainous airport

### Mitigations



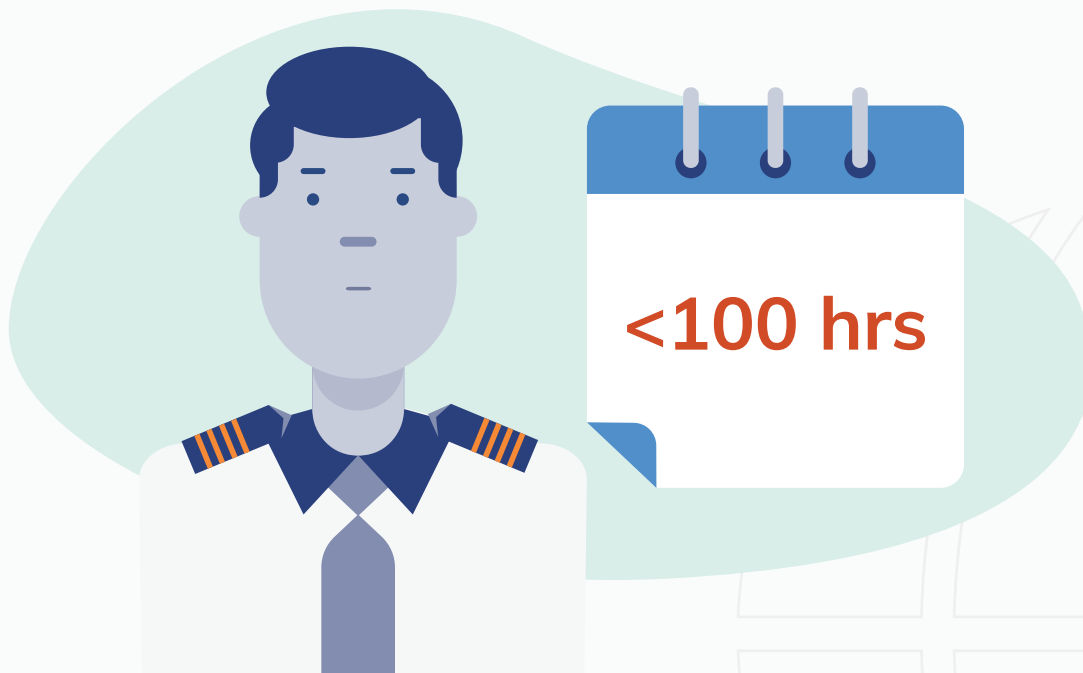
- Review weather for temperature (including its effect on density altitude) and wind conditions (wind shear, downdrafts, turbulence, and mountain wave activity).
- Increase weather minimum requirements when inclement weather is expected.
- Consider aircraft capabilities in relation to Minimum Enroute Altitudes (MEAs) / Minimum Obstacle Clearance Altitudes (MOCAs) of the surrounding area. This is particularly important if the aircraft has deferred, inoperative, or missing equipment that impacts performance.
- Review the airport's location in relation to terrain (CFIT, weather effects, etc.).
- Review runway information, particularly if operating on a sloping runway. Check the AFM for any landing or takeoff distance increases.
- If possible, adjust crew pairing to include a crewmember familiar with the airport and/or operating in mountainous regions.
- Closely review approach and departure procedures to ensure:
  - Aircraft performance can meet any restrictions or terrain clearance requirements.
  - The planned operation can be conducted in accordance with any approach or departure restrictions (such as airport curfews).
  - Crew members and/or the flight department are authorized to conduct the approach (if authorization is required).
  - The assigned crew members are comfortable with conducting the approach.
- Closely brief missed approach procedures, with particular emphasis on obstacle/terrain clearance requirements.
- Provide additional training to crew members in mountainous airport operations, particularly if a complex approach or departure procedure is required.
- Review PIREPs for any reported weather conditions.
- Adjust the departure time so that the mountainous airport operations occur during daylight hours.
- Review inoperative equipment (MEL items) to ensure systems relevant to terrain and ground proximity detection (such as the GPWS and radio altimeter) are operative.
- Complete a report within your SMS to track the risk and the effectiveness of the mitigations that were implemented.

## Top 10 Selected Factors and Suggested Mitigations

### 2 Low flight time or operations within a previous period of time

#### Mitigations

- Pair the crew member with another crew member that has more recent experience.
- Increase the flight minimums (weather, landing minimums, etc.).
- Assign a different crew member. If all crew members fall under this risk factor, assign crew members based on who is most familiar with the route, flight, and/or aircraft.
- Complete a thorough briefing of the flight from beginning to end. Crews may consider doing a tabletop to run through the flight and potential contingencies.
- Complete a report within your SMS to track the deviation from your normal procedures as well as the effectiveness of the mitigations that were implemented.
- Plan for additional time to conduct briefings, preflight inspections, and preflight / postflight paperwork.



# Top 10 Selected Factors and Suggested Mitigations

## 1 Low flight time in aircraft type

### Mitigations

- Pair the flight crew member with a more experienced crew member.
- Review aircraft checklists for normal, abnormal, and emergency operations prior to flight.
- Plan more thorough briefings with adequate time to discuss questions, comments, and concerns.
- Be sure to cover what each crew member will be responsible for during normal, abnormal, and emergency situations.
- Brief with more experienced crew members in type and/or maintenance for any specific issues to be aware of during the flight.
- Plan the flight during daylight hours and good weather conditions.
- Utilize the crew member on routes they are familiar with.
- Pair the crew member with another crew member they have worked with previously.
- Increase the flight minimums (weather, landing minimums, etc.).
- Conduct a postflight debrief to review items that went well, areas of improvement, lessons learned from the flight, and answer questions and talk through elements of the flight.
- Complete a report within your SMS to track the deviation from your normal procedures as well as the effectiveness of the mitigations that were implemented.



# Top 10 Selected Factors and Suggested Mitigations

## Overview 2021 vs 2022

- The top three factors remained the same between 2021 and 2022.
- Duty day issues both in terms of rest, length of day, legs per day, and issues surrounding circadian rhythm were new to the list in 2022.
- Precipitation and storm risks were also new additions in 2022.
- Risks related to non-towered airports and repositioning flights remained on the list and were selected more in 2022 than 2021.
- Wet and contaminated runways and nighttime and twilight operations remained on the list but were selected less often.

## Top 10 Selected Factors in 2022

1. Low flight time in aircraft type
2. Low flight time or operations within a previous period of time
3. Mountainous airport
4. Flights to and from non-towered airports
5. Repositioning flights with no passengers
6. Duty day issues related to rest hours, length of duty day, or number of legs per day
7. Wet or contaminated runways
8. Nighttime and twilight operations
9. Precipitation and storms
10. Duty day issues related to the timing of trips and circadian rhythm

## Other insights and thoughts

Currency, unique operational considerations, and airport-related issues were among the top three types of factors selected in 2022, while crew, weather, aircraft, and other issues made up less than half of the factor types selected. For some operators, currency may be the result of new hires with less time, increased usage of contract pilots, or modified flight schedules impacted by world events. Since contract pilots may not be familiar with your department's specific SOPs and policies, it is highly recommended to provide them with this information as far in advance as possible. Comprehensive pre-flight briefings are also recommended.

Additionally, the appearance of duty day issues to the top 10 list could be related to workforce issues and increased hiring by airlines. Operators may be forced to work with reduced personnel, thereby increasing workload per person and lengthening duty days. Operators experiencing personnel and staffing changes should utilize their SMS to help monitor and manage risks associated with this disruption.



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