



Common Risks Report

Top selected risk factors in 2024



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The Most Common Risks Faced by Operators

Thousands of assessments are submitted to Nimbl's risk assessment tool every year. We've reviewed the data and discovered the top 10 selected risk factors departments are facing and have provided example mitigations and insights into the list.

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:

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

Most Common Flight Risks



10 | Time of Operation

Flights operating during the window of Circadian Low or with early/late starts.

These flights present the greatest fatigue risks as they go against the natural human physiology of peak alertness. Operators who repeatedly face this issue with tight flight schedules may consider additional staffing or contract personnel to ensure crews have sufficient rest time.

Mitigation Examples

Crew

- Crewmembers have been given additional time off prior to the flight to ensure they are adequately rested.
- Crewmembers will receive additional time off post flight to ensure they are rested prior to their next flight.





Area Congestion



Flights in busy areas such as Class B airspace or in the vicinity of high amounts of student/training or small aircraft activity.

Congested airspace can bring challenges unique to each area. Class B airspace will be busy often with airline and helicopter traffic, while regions dense with small aircraft may bring unexpected flight maneuvers and see and avoid risks. Operators regularly transiting these areas can benefit from training specific to those regions and the unique risks encountered.

Mitigation Examples

Aircraft

- Landing lights will be illuminated immediately after receiving takeoff clearance and at all times when operating at or below 10,000 ft.

Crew

- Crewmembers will conduct a briefing specifically regarding traffic density, areas of concern (such as airport hot spots and training areas), and the division of responsibilities for maintaining situational awareness and a vigilant visual scan.

Procedural

- Approach briefings will include considerations specific to high density operations, such as student traffic, enhanced visual scan, and confirmation that a go-around will be performed if any crewmember feels the approach may become unsafe due to traffic.



Flights crossing borders and transiting oceanic airspace.

Flights crossing oceanic regions call upon procedures that, for many operators, are only used once or twice a year. It may also include regulations from foreign entities and routes through remote areas that leave few options in emergencies. Taking the extra step to do a thorough and professional review of relevant information prior to flight, makes the process smoother and more relaxed.

Mitigation Examples

Aircraft

- Review deferred and inoperative equipment to ensure the aircraft will be appropriately equipped for the areas of operation.
- Ensure survival equipment appropriate to the route to be flown is on board.

Crew

- Ensure travel documents (e.g., visas, passports, vaccination records, etc.) are current and on board the aircraft, for passengers and crew members.
- Review health guidance at the destination and for any return flights.
 - Consider carrying additional medical supplies based on the health situation.

Procedural

- Review normal and emergency procedures in your International Operations Procedures Manual for the applicable areas.
 - Ensure your IOPM has been updated within the last 8 months, as international procedures and requirements are constantly changing.
- Review the flight plan to ensure aircraft capabilities are accurately represented by the listed equipment codes.
 - This is critical as incorrect codes may exclude you from preferred routing even if your aircraft is capable.
 - Have questions about which codes to use? Check out our [Flight Planning Guide](#).
- Create a plan for an expedient departure from the destination if an emergency were to arise. Brief crewmembers and passengers on the plan.



Convective Activity



Operations in the vicinity of thunderstorms or areas of reported turbulence.

Even small amounts of turbulence can pose a significant disruption, particularly in business aviation where occupants may feel more inclined to be unbuckled or move about the cabin freely. A simple stumble can lead to a medical incident necessitating a diversion or change in plan. Some sources of turbulence can be well tracked and simply avoided, but others cannot, which makes open and clear communication with passengers key.

Mitigation Examples

Aircraft

- 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.

Crew

- Utilize well rested crew members as flights with extended turbulence can increase fatigue.

Procedural

- 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.
- Closely review weather forecasts and PIREPS for signs of wind shear.



Flights completed for maintenance checks or to reposition the aircraft where no passengers are carried.

Business aviation has seen several notable accidents on flights where no passengers were carried. Although passengers themselves can present risks, the lack of passengers can do the same. Without passengers on board it can create an atmosphere that lends itself to being less strict about compliance with SOPs. Crews should place special emphasis on operating in the same manner with or without passengers.

Mitigation Examples

Aircraft

- Review aircraft maintenance, deferral logs, and the MEL for any items that may have been recently worked on or are inoperative which may affect safety of flight or require special procedures.

Procedural

- Review SOPs and reiterate the importance of adhering to them.
- Review aircraft performance calculations closely. Aircraft performance may differ with a “light” aircraft.
- Set aside extra time to perform an extra thorough preflight inspection, with particular emphasis on any switches or system controls that may differ from their standard setting.



05 | Nighttime Operation



Flights occurring predominately during twilight and nighttime hours.

Low light operations and flights outside of the normal Circadian rhythm are counter to natural peak effectiveness for most people and create issues surrounding fatigue. These types of flights need to be monitored to ensure they don't create negative patterns of switching between daylight hour duty days and night duty days enhancing these fatigue risks. Flight departments that regularly face this risk can look to non-aviation examples of shift work best practices for ideas that protect against fatigue.

Mitigation Examples

Aircraft

- 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.

Crew

- Ensure crews are well rested. Try to avoid night operations in conjunction with extensions to duty or flight time limits.
- 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.

Procedural

- Ensure passengers are always in a well-lit area and visible or escorted when in low-light areas.
- 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).

04 | Non-Towered Airport



Flights to airports without towers or during hours where the tower is not operational.

For some departments non-towered airport operations may be common and the procedures familiar to their crews. However non-towered airports are also more likely to bring VFR traffic, small aircraft, and hobby pilots which may have varying levels of experience. The onus of situational awareness being placed solely on all aircraft in the area can present unexpected risks in flight. Taking the time prior to flight to become familiar with the airport and the traffic it commonly accommodates will allow you to identify the difficulties you may face.

Mitigation Examples

Aircraft

- Landing lights will be illuminated immediately after receiving takeoff clearance and at all times when operating at or below 10,000 ft.

Procedural

- 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.
- Review flight planning to ensure it includes allowances for flight clearances as these may take longer to get at a non-towered airport.
- Listen to and announce position and intentions on the applicable local frequency to coordinate actions with other traffic.
 - Keep in mind that VFR traffic may be less familiar with the location of IFR and instrument approach waypoints.

03 | Contaminated Ground Surfaces

Takeoff, landing, and aircraft ground movements on wet or contaminated runways, taxiways, and ramps.

With the majority of accidents happening during the takeoff and landing phases of flight, crews should pay particular attention to the risks presented by contaminated surfaces. A notable number of runway excursions, which have become a prominent talking point of the industry in recent years, include contaminated runways as a contributing factor. Giving time, even a few minutes, for water to drain away from surfaces or crews to clear contamination can help improve the conditions you will face.

Mitigation Examples

Aircraft

- Apply an additional safety margin to calculated stopping distances.
- Review the aircraft manufacturer's procedures for maintaining directional control on a contaminated runway.
- 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.

Procedural

- Establish "intended landing" and "committed to stop" points and reiterate them during the approach briefing.
- Closely review missed approach procedures.
- Request use of a grooved or longer runway (if available and operationally feasible), particularly if aircraft stopping-performance is a concern.

02 | Mountainous Airport



Operations to and from an airport in or surrounded by mountains.

Airports in mountainous regions will bring additional risks such as reduced aircraft performance, terrain at altitude and in close proximity, and unusual weather characteristics. Thankfully, many of these risks can be foreseen and mitigated by a thorough pre-flight to become familiar with the terrain and aircraft performance for that particular flight. The more familiar you are with what to expect the more attention you can give to other risks that may exist concurrently.

Mitigation Examples

Aircraft

- 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, is inoperative, or missing equipment that impacts performance.

Crew

- Provide additional training to crew members in mountainous airport operations, particularly if a complex approach or departure procedure is required.
- If possible, adjust crew pairing to include a crewmember familiar with the airport and/or operating in mountainous regions.

Procedural

- Review runway information, particularly if operating on a sloping runway. Check the AFM for any landing or takeoff distance increases.
- Review weather for temperature (including its effect on density altitude) and wind conditions (wind shear, downdrafts, turbulence, and mountain wave activity).

01 | Crew Recency



Flights where the Captain and/or First Officer have a lower number of flight hours or flight hours in aircraft type than company policy, within a specified preceding number of days.

This factor has topped the list for several years, becoming particularly prominent since the global COVID-19 pandemic. Although pilots are often quick to recover physical motor skills after periods of low flight time, they can be slower to recover cognitive skills like application of procedures, regulatory compliance, maintenance of situational awareness, and workload management. Crews facing these issues should not only use study as a method of preserving their skills but, more importantly, practice the application of knowledge through cognitive rehearsal activities such as table top and scenario based exercises.

Mitigation Examples

Crew

- Pair the crew member with another crew member that has more recent experience.
- Be sure to cover what each crew member will be responsible for during normal, abnormal, and emergency situations.
- Utilize the crew member on routes they are familiar with.
- Pair the crew member with another crew member they have worked with previously.

Procedural

- Plan for additional time to conduct briefings, preflight inspections, and preflight / postflight paperwork.
- 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.
- Increase the flight minimums (weather, landing minimums, etc.).
- Review aircraft checklists for normal, abnormal, and emergency operations prior to flight.



Insights

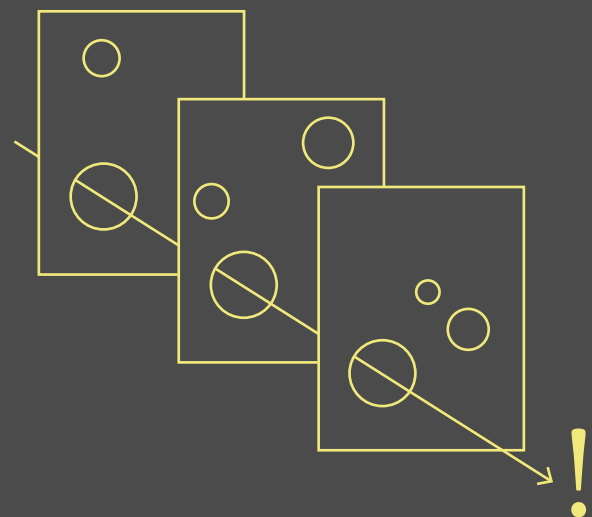
- Crew recency and mountainous related factors held their spots as the two most common risks faced.
- Contaminated surfaces such as wet runways move up to the third most common factor. For operations in the United States, this may reflect the fact that the average annual precipitation last year was 1.66 inches above average making 2024 among the wettest years in the last 130 years. Runway excursions are too common an issue, and surface contamination can really contribute to this.
- Use of non-towered airports, along with nighttime / twilight operations rounded out the top 5 factors. With the increase in night flights this may have led operators to utilize airports more often during hours when towers are likely to be closed, creating a double increase in risks.
 - The risk can easily stack with an inexperienced or non-current crew as well as with the contaminated surfaces — if the airport is non-towered and doesn't have regular runway condition reporting, that risk can run higher as well.
 - It's important for operators to identify this and put in appropriate mitigations. Mitigations will vary based on what the operator wants to (or even can) do with their resources.
- International trips moved up on the list as we see operators return more and more to conducting flights overseas.
 - As we see international trips increase, it is important to note that there were a lot of changes in oceanic airspace lately, and it is crucial that operators stay informed.
- Factors related to congested areas with high amounts of aircraft activity, training flights, and light aircraft enter the list for the first time.
- It was not surprising to see Non-Towered operations on the list with the increase in the Nighttime operations. It is often that these risks will stack as many medium and small airports close tower operations over night. The risks these two factors present are different and though may often times be related, should be considered as two separate stacked risks for a flight.

It's important to note that crew recency, the #1 risk factor, seems to be specifically tied to the first officer. This may be a consequence of departments hiring newer pilots, which would make sense as they try to address the pilot shortage.



In 2024, issues related to wildlife and aircraft were the most uncommon flight risks faced. While uncommon, operators still need to be very aware of these risks. On December 29, 2024, there was an accident with a bird strike being a suspected cause. Consequences of this sort of thing can be very high.

Risk assessments aren't just about looking at individual risks and mitigating them, it's about recognizing when multiple risks exist which can align and lead to an incident. Remember the old swiss cheese model many of us were taught back in early flight training — in isolation no one risk is very notable, but as more and more risks become present, it creates more and more opportunity for holes in protections to line up leading to an incident or accident. Knowing the risks you face most often will help you to determine what types of procedural updates you need to make to eliminate or reduce their impact. Not only will this make you a safer operator, it will reduce delays and inefficiencies in your day to day by removing errors, hiccups, and frustrations.



A grayscale photograph of an aircraft engine and wing. A man in a white jacket is working on the engine. The image is dark and moody, with the text 'Most Common Maintenance Risks' overlaid in yellow.

Most Common Maintenance Risks

10 | High Workload

A single individual working on more than one aircraft at a time.

As previously mentioned, with staffing issues that are affecting all of aviation many teams are having to do more with less. This often leads to high workloads and working on multiple projects at once for many departments. Humans are generally poor multi-taskers so maintenance facilities will need clear processes for working on more than one aircraft at a time to prevent confusion or missing checklist items when switching projects.

Mitigation Examples

- Have clear procedures for documenting work completed and where work needs to be picked up from.
- If work is to be resumed from earlier, reconfirm that the prior two steps of the maintenance task were performed.
- Before starting work, reconfirm what type of aircraft is being worked on, the type of work to be done, and what stage the work is in. This process is similar to what many have experienced in the medical field — there is a reason why they will ask you several times for your name, birthday, and what you are there for.





Environmental elements under which the work is being performed including precipitation, wind, temperature (hot or cold), etc.

Unfortunately, maintenance can't wait for a beautiful sunny day. With last year being one of the wettest on record for the United States, maintenance teams had to face issues like wind and rain more often than usual. As local weather may change over time, departments will need to monitor these risks and determine if more permanent mitigations can be put into place.

Mitigation Examples

- If the environment under which the work must be performed cannot be adjusted (warmed, cooled, covered, etc.), take more frequent breaks to recover from the effects of the weather. For operations in cold or hot weather: Ensure a warm or cool rest area is available.
- Consider shorter duty days as many environmental factors can significantly increase fatigue.



08 | Familiarity with Operation

Maintenance work where the technician has a low level of familiarity with work tasks, aircraft type or has not had recent training.

Whether it is new hires (when they can be found) or smaller teams requiring technicians to take on new types of work, tasks not often performed or new to employees are a common risk factor. The better departments can document work processes and pair those with less experience on a task with someone more familiar with it, the more prepared everyone can become to take on new maintenance work.

Mitigation Examples

- Pair the technician with an employee more familiar with the maintenance to be performed.
- Perform an in-depth briefing of the maintenance task before starting.
- Ensure you document the processes of more experienced team members to make it easier for newer employees to access this expertise and prevent the sole source of education being tribal knowledge.
- Develop initial and recurrent training programs along with pathways for employees to expand their skills.



| Aircraft System

Work done on specific aircraft systems that have inherent hazards such as electrical, hydraulic, engines, etc.

Many aircraft systems, such as electrical and hydraulic, have hazardous components that can seriously harm technicians. Well documented and developed procedures, safety equipment, and emergency procedures can reduce risks and ensure personnel are well versed on how to handle each aircraft system.

Mitigation Examples

- Regularly audit safety equipment to ensure that protective devices are in good condition and available for use when needed.
- Document specific safety procedures tailored for working with different aircraft systems to address the specific risks and hazards present.
- Use a buddy system at all times when conducting work on inherently hazardous systems (such as oxygen, hydraulic, and electrical).



06 | Solo Work

Work done by one technician without any other personnel in the vicinity.

Due to challenges like scheduling limitations and worker shortages, departments are increasingly having to take on solo work activities. Departments may need to leverage non-technician personnel to help with monitoring on/off text notifications.

Mitigation Examples

- Create an on/off protocol where a second person (even a non-technician) is texted by the person performing the work when they have started and when they have ended. Agree ahead of the work commencing a maximum period of time that may pass before welfare check procedures are initiated.
- Provide an additional rest opportunity to the solo worker prior to the event to ensure they are well rested.
- Utilize a non-technician to perform a quick walk-around after the task is complete to examine the area for FOD.



05 | Contract Personnel

Use of employees that work for more than one maintenance department.

Using contract personnel is a good solution for many maintenance operators facing staffing shortages, however it does come with new risks. If you utilize external personnel, you will need to ensure they understand your process for doing things and follow it the same way your own team does.

Mitigation Examples

- Have a set process for onboarding contract employees so they understand the way you do things.
- Do recurrent reminders with contract personnel, so they don't misremember or confuse your procedures with another maintenance department's procedures.
- Perform an in-depth briefing of the maintenance task before starting.
- Ensure contract employees have received a copy of your maintenance SOPs in advance of the work to be performed.
- Have a member of the department perform a quick spot-check of work after the task is complete (even if just a FOD check).
- Ensure a member of the maintenance team is available (either remotely or in person) to answer questions on-demand.



04 | Injury Hazards

Work with and around items that pose an injury hazard such as cords, high work locations, wet floors, or without safety equipment.

The need for equipment and to conduct repairs in and on aircraft creates environments full of injury hazards. Although the type of work generally doesn't allow for elimination of these hazards, implementation of procedures that reduce distractions for personnel and regular auditing of adherence to company safety policies will diminish the likelihood of injuries.

Mitigation Examples

- Brief all hangar occupants on the task to be performed and areas to be avoided prior to the activity.
- Ensure area marking equipment (caution tape, wet floor signs, etc.) is available and used.
- Conduct work with two or more personnel, at a minimum.



03 | Unplanned Work

Unscheduled maintenance activity.

Unplanned work creates unique risks as the nature of the work can necessitate work at unusual times of day, pressure of getting work completed quickly, an addition to existing workload, etc. Departments should have specific procedures for how to best handle unplanned workload that personnel can follow.

Mitigation Examples

- If unplanned work will interrupt existing work, then have clear procedures for documenting work completed and where work needs to be picked up from.
 - When the existing work is resumed, reconfirm that the prior two steps of the maintenance task were performed.
- To counter the pressures of getting pop-up work done quickly, before starting work, reconfirm what type of aircraft is being worked on, the type of work to be done, and what stage the work is in. Again, like in the medical field, it's better to reconfirm multiple times.



02 | Specialty Equipment

Work necessitating specialty equipment such as tugs, scissor lifts, high voltage equipment, high pressure equipment, shop equipment, etc.

The requirement to use specialty equipment is a common occurrence in maintenance. Thorough initial training followed by regular recurrent training in various conditions is important. Personnel must be practiced in using this equipment in environments where distractions may occur such as sudden or loud noises, weather, and movement.

Mitigation Examples

- Utilize multiple trained personnel: Ensure personnel operating the equipment are current from a training standpoint, or use a buddy system (one current, one near end of currency).
- Perform a safety briefing prior to use: Possibly even including a walkthrough of the task (a “dry run”) to make sure everyone is comfortable with the procedure.
- No use of specialty equipment when duty day is extended (or use it earlier in the day if possible).



01 | Inspection and Task Type

Risks associated with type of work or inspection: major repair, walk around, runup, pre/post flight inspection, etc.

Most risks stem from the type of work being performed. Since maintenance departments may face any number of inspections and repairs, they should take special precautions to think through the unique inherent risks for each type of activity.

Mitigation Examples

- Perform a safety briefing prior to use: Possibly even including a walkthrough of the task (a “dry run”) to make sure everyone is comfortable with the procedure.
- Regularly audit safety equipment to ensure that protective devices are in good condition and available for use when needed.
- Document specific safety procedures tailored for working with different aircraft systems to address the specific risks and hazards present.
- Use a buddy system at all times when conducting work on inherently hazardous systems (such as oxygen, hydraulic, and electrical).





Insights

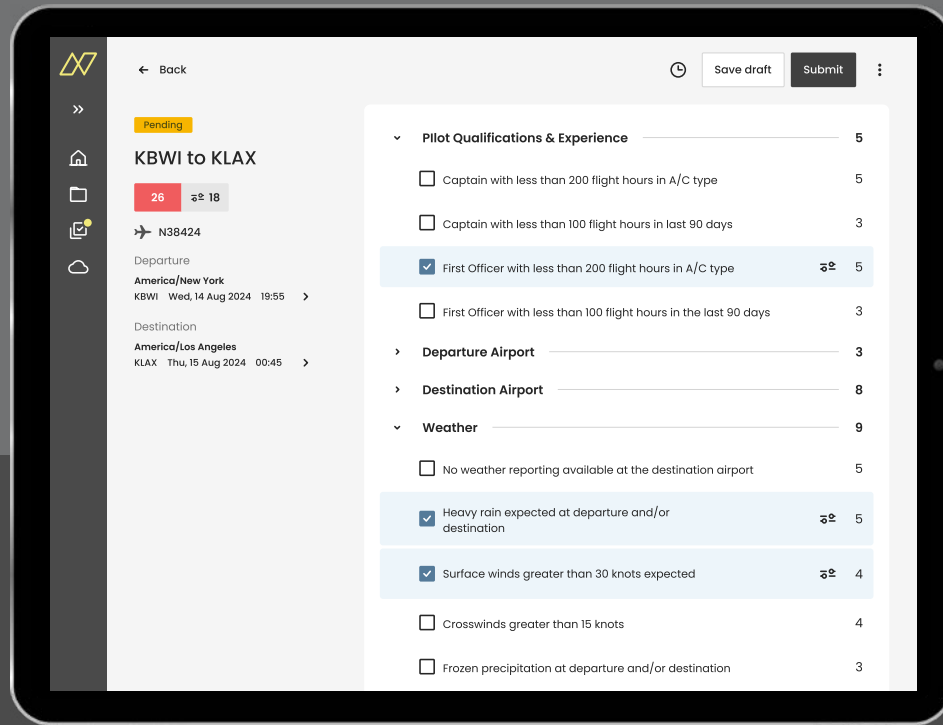
It was not surprising to see that most of the top five risks surrounded the type of work being performed, the tools required, and the working environment. Maintenance activities have a number of inherent risks with exposures to high or confined workspaces, unexpected maintenance needs with time pressures, and specialty shop equipment. Although these are the common elements of maintenance work, they should still be taken into consideration especially when multiple risks are present which can greatly increase the odds of an incident or accident.

Although not in the top four risk factors selected, special attention should be paid to those that round out the rest of the list of ten. Many maintenance facilities are facing personnel shortages and this has affected the risks we see including use of contract personnel, higher amounts of solo work, and higher workloads. This issue is likely something to which there is no quick fix. Departments may face this issue for some time to come and will need to pay special attention to implementation and monitoring of mitigations.

Risk Assessments are a key element in ensuring the safety of your operation but are not meant to be a burden. The process and tool should be customized to the needs of your department, so it is easy for you to integrate into your day-to-day.

The more frequently you can perform a simple risk assessment, the better understanding you will have about the risks and hazards you face, perhaps without even realizing it. This will pay dividends when it comes to you deciding the best way for you to conduct your operation efficiently and safely.

Remember: It's on the routine flights and maintenance tasks that have been done a thousand times where complacency can set in.



KBWI to KLAX

Departure
America/New York
KBWI Wed, 14 Aug 2024 19:55 >

Destination
America/Los Angeles
KLAX Thu, 15 Aug 2024 00:45 >

Pilot Qualifications & Experience

- ☐ Captain with less than 200 flight hours in A/C type 5
- ☐ Captain with less than 100 flight hours in last 90 days 3
- ☒ First Officer with less than 200 flight hours in A/c type 5
- ☐ First Officer with less than 100 flight hours in the last 90 days 3

Departure Airport 3

Destination Airport 8

Weather 9

- ☐ No weather reporting available at the destination airport 5
- ☒ Heavy rain expected at departure and/or destination 5
- ☒ Surface winds greater than 30 knots expected 4
- ☐ Crosswinds greater than 15 knots 4
- ☐ Frozen precipitation at departure and/or destination 3

Nearly 40,000 risk assessments submitted every year.



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Join the safety movement and start tracking your top risks today.

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