Safety All Ways!

NEXUS Safety Newsletter, Volume No. 3
Issue No. 1, 2016

GREETINGS EVERYONE!

This is our 5th Safety All Ways! Newsletter.

This month, an Airbus A320 (X-XXX) departed with a wrong thrust setting during an intersection takeoff from Luton Airport (EGGW), and became airborne with just 180 metres of runway remaining!

The AAIB report states that the aircraft was on a scheduled flight from London Luton Airport to Montpellier Airport, France. The co-pilot was to be the pilot flying (PF) and the Commander the pilot monitoring (PM).

Prior to pushback the Commander calculated the takeoff performance figures for a departure from runway 08, assuming its full length was available and the use of flap 1, using his Electronic Flight Bag (EFB). These were crosschecked by the co-pilot and entered into the aircraft's Flight Management Guidance Computer (FMGC).

When the aircraft reached Holding Point Bravo One, there was an aircraft holding on the threshold of runway 08. This aircraft (also an A320, bound for Rome) was advised by ATC that there was a problem obtaining its clearance from the next ATC sector. The departing aircraft Commander (X-XXX) asked ATC if it would be appropriate to plan for a takeoff from Intersection Bravo One; they advised it was.

The Commander then calculated the takeoff performance for runway 08 using flap 2 and the full length of runway 08. This was crosschecked by the co-pilot, with an emphasis on the change in configuration to flap 2. The new takeoff speeds and engine thrust setting were entered into the FMGC.

The takeoff proceeded normally but, as the aircraft approached V1, the Commander noticed that the remaining runway was shorter than expected so he decided to commit to the takeoff without adjusting the engine thrust. The aircraft became airborne with approximately 180 m of runway remaining and passed over the runway end at a height of 117 feet (36 metres). The pilots discussed the takeoff en route and re-calculated the takeoff performance, and realised that the engine thrust setting and takeoff speeds used were incorrect. The remainder of the flight was uneventful.

The Commander later commented that he did attempt to change the runway selected to reflect a departure from Intersection Bravo. However it is likely that, when trying to select this, runway 08 remained selected due to the combination of his finger size and the calibration of the EFB's touch screen. He also believed he was distracted from confirming the runway selection by the need to confirm the change in the flap setting with the co-pilot.

Comment: The above incident shows clearly the severity and the hazards of not crosschecking all performance calculations and also highlights the importance of crosschecking takeoff performance calculations when ***late changes are made*** as a result of intersection departures or other last-minute changes to aircraft configuration or takeoff distances.

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RECOGNIZING CIRCADIAN RHYTHM DISRUPTION (CRD)

Here are some interesting guidelines on coping with rapid time zone changes and flying at night for both crew and passengers

Pilots or passengers who are suffering from CRD may experience one or more of the following symptoms:

- Difficulty falling and staying asleep, late-night insomnia.
- Increased daytime sleepiness.
- A general lack of energy in the morning.
- An increase of energy in the evening or late at night.
- Difficulty concentrating, being alert, or accomplishing mental tasks.
- Oversleeping and trouble getting up.
- Increased negative moods.

The most debilitating symptom of CRD is, of course, fatigue, which is typically characterized by:

- General discomfort.
- Sleepiness.
- Irritability.
- Apathy or loss of interest.
- Decreased concentration.
- Loss of appetite.
- Impaired sensory perceptions.
- Mood changes.
- Impaired decision-making.

Fatigue, itself, is a very dangerous condition for any pilot or crewmember attempting to operate an aircraft. Realizing the cause of the fatigue (in this case, CRD) is the first and most important step in treating it.

Jet Lag is a CRD!

Of all the stressors in aviation, *jet lag*, or *rapid time zone changes* consist of symptoms that include excessive sleepiness and a lack of daytime alertness in people who travel across time zones.

Other Symptoms are: Fatigue, insomnia, disorientation, headaches, digestive problems, light-headed-ness.

Remember: Jet lag is more evident if you fly from west to east because it is more difficult for your body to adjust to “losing time” when you journey east than to “gaining time,” when you fly from east to west.

RECOGNIZING (CRD) CONT'D.

Tips to Help Minimize Jet Lag

- Adjust your bedtime by an hour a day a few days before your trip. This will adjust your sleep pattern to match the sleep schedule you will keep at your destination.
- Reset your watch to the destination time at the beginning of your flight to help you adjust more quickly to the time zone you will be visiting.
- Drink plenty of water before, during, and after your flight. The air you breathe on airplanes is extremely dry, and some experts believe that dehydration is a predisposing cause of jet lag. Virtually everyone agrees that dehydration can make jet lag worse.
- Eat lightly but strategically. What you eat can have a direct influence on your wake/sleep cycle. Remember that high-protein meals are likely to keep you awake, while foods high in carbohydrates can promote sleep, and fatty foods may make you feel sluggish. Complex carbohydrates (polysaccharides) have three or more sugars. They are often referred to as starchy foods and include beans, peas, lentils, peanuts, potatoes, corn, parsnips, whole-grain breads and cereals.
- Relax on the first day at your destination. If you have the luxury of arriving at your destination a day or two before you have to engage in important activities that require a lot of energy or sharp intellectual focus, give yourself a break and let your body adjust to the time change a little more gradually.

As a Passenger:

- Avoid drinking alcohol or anything with caffeine in it during your flight (includes many soft drinks, coffee, and tea.) Both alcohol and caffeine increase dehydration.
- Sleep on the aircraft if it is night time at your destination. Use earplugs, headphones, eye masks, or other sleep aids to help block out noise and light, and a travel pillow to make you more comfortable so you can sleep.
- Stay awake during your flight if it is daytime at your destination. Read, talk with other passengers, watch the movie, or walk the aisles to avoid sleeping at the wrong time.

CRD Affects Your Flying Skills

CRD-induced fatigue that goes untreated or ignored will have both physiological and psychological ramifications that not only can jeopardize your personal health but can also become a safety-of-flight issue. A few of the more well known undesired personal affects are:

1. Increased reaction time:

- Impaired responses in sequential tasks that require time synchronization.
- Need to increase the magnitude of sensory stimulation to elicit response.

2. Decreased attention:

- Omission or displacement of individual elements in sequential task.
- Channelized attention to one task at the expense of others.
- Impaired visual monitoring patterns.
- Difficulty in self-identifying performance impairment.

3. Impaired memory:

- Difficulty remembering recent events during flight.
- Tendency to forget secondary tasks.

4. Personal conduct of isolation:

- Tendency to avoid interpersonal interactions.
- Tendency to avoid tasks that require low workload.
- Increase distraction due to discomfort.
- Emotional irritability.
- Indifference.

Consequences of CRD on the Flight Environment

Increased frequency and severity of piloting errors during aircraft operations
Increased frequency of operational incidents.
Increased risk in aviation operations.

RECOGNIZING (CRD) CONT'D.

Resetting Your Biological Clock and Recovering

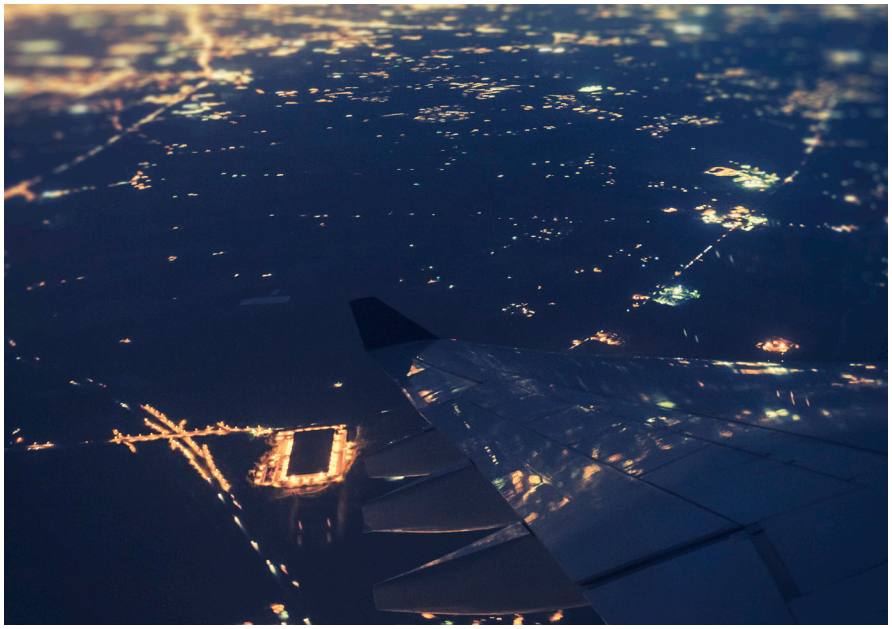
Once you have fallen victim to CRD, it is imperative to reset your biological clock. Here's how:

- Catch Some Rays. Exposing yourself to as much daylight as possible is a good idea, because it has been scientifically shown that bright light helps reset circadian rhythms. In addition to resetting the clock, light has a direct and positive affect by increasing brain serotonin levels. Serotonin can affect mood and social behavior, appetite and digestion, sleep and memory function.

- Be Active. When you arrive, taking a nap is the worst thing you can do because it sets your body's rhythms back to home time. Staying active on arrival will help the body adjust to the new time zone. Eating and sleeping are your body's time indicators, so it's important to fit in with what the locals are doing when you arrive. Consequently, if it's breakfast time, eat breakfast.

Coping With CRD While On Duty

- Sleep well at home before any flight.
- Try to get at least as much sleep per 24 hours as you would normally at home.
- If you are sleepy, try to sleep. Employ strategic napping techniques as follows:



1. Whenever possible, take a 30-minute nap prior to a long flight.
2. Avoid naps of more than 30 minutes, as they involve deep sleep.
3. Taking a nap is better than not sleeping at all.

- Avoid pilot adaptation to a local circadian rhythm following transmeridian (time zone changes) flights that are followed by short layovers.
- Try to maintain the circadian rhythm from your place of origin, and at the same, time try to sleep longer.
- Use caffeine strategically during the flight to counteract circadian rhythm sleepiness.
- While in the cockpit seat, converse with others, stretch your legs and arms, and take regular breaks.
- Try to avoid night flights following a transmeridian flight with a greater than 3 hour time zone change.
- Crossing time zones should be alternated with internal and short regional flights, enabling you to return to your normal circadian rhythm.

Remember: Circadian rhythm disruption can lead to acute or even chronic fatigue. Fatigue in the cockpit has shown to be just as bad as drugs and alcohol. Do not let CRD-induced fatigue become a hindrance to you and your passengers' safety.

[The above article has been modified from an FAA publication (No. AM-400-09/3)].

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DEEP VEIN THROMBOSIS (DVT)

A growing concern is the more frequent occurrences regarding deep vein thrombosis being suffered during flights.

- Deep Vein Thrombosis (DVT) is a clot that forms in a leg vein.
- DVT can cause harm by obstructing blood flow to a limb or if a part of the clot flows to the heart or lungs.
- DVT can be caused by some medical problems, medications, and long periods of inactivity.

The risk of developing DVT can be reduced during flight by:

- Occasional muscular activity (rotate ankles, exercise knees, walk the cabin).
- Maintaining hydration.
- Limiting alcohol and caffeine intake .
- **And, if indicated by a physician:**
  - Support socks or stockings (available at any large pharmacy in KSA and when visiting any major city).
  - Blood-thinning medications.

CREW RESOURCE MANAGEMENT (CRM): ATTEMPTED GO-AROUND AFTER LANDING

How important is CRM for the Safety of NEXUS Flight Operations?

The following is based on a summary of a fatal accident in the United States of America which underlines the importance and relevance of continuous CRM training within a flight operations department. The summary below highlights what I mean as it has significant crew resource management (CRM) implications and fatigue considerations.

Summary of the Event

The crew of a Hawker Beechcraft HS125-800A attempted to reject a landing at Owatonna, Minn., USA, after a prior deployment of the lift-dump system, but their aircraft overran the runway then briefly became airborne before crashing. The aircraft was destroyed and both crew members and all six passengers were killed. *[This aircraft type had a lift-dump system as it had no engine thrust reversers installed].*

The investigation attributed the accident to poor crew judgement and general cockpit indiscipline in the presence of fatigue. The investigation also considered that it was partly due to the absence of any emphasis or training for pilot CRM and a lack of operator standard operating procedure (SOP) specific to the type of aircraft operation being undertaken.

The Investigation

An investigation was carried out by the NTSB. Recorded data relevant to the investigation was recovered from the cockpit voice recorder (CVR), but the aircraft was not fitted with a Flight Data Recorder (FDR) and was not required to be so equipped. No evidence was found to suggest that the aircraft had been anything other than airworthy. It was also concluded that the aircraft had been loaded within normal weight and balance limitations.

The Focus therefore moved to the performance of the Pilots.

It was established that the 40-year-old aircraft captain had been the pilot flying (PF). He was experienced in command on the aircraft type and had the same role on the company's Lear Jet fleet. The First Officer (P2) had joined the operator directly from flight school some nine months earlier and had accumulated about 300 flying hours since that time, nearly all of it on the HS125.

[NEXUS policy per our OM-A 5.1. minimum co-pilot (P2) experience requirements requires a minimum of 3,000 flying hours].

CREW RESOURCE MANAGEMENT CONT'D.

The aircraft was radar vectored around the worst of some widespread and active convective weather as it neared the destination and eventually went onto the instrument landing system (ILS) for Runway 30 at the request of the PF. The ILS approach was uneventful and visual reference was acquired in good time. The aircraft subsequently touched down within the touchdown zone (TDZ) at the correct speed. It was concluded that the captain had probably "applied sufficient pressure on the brakes during the initial part of the landing roll to take full advantage of the available runway friction", but that he had not deployed the lift-dump system (a mechanically interconnected combination of an extreme trailing edge flap deflection and air brake lift spoilers installed as an alternative to thrust reversers) immediately after touchdown in accordance with company procedures and normal operating practice for this aircraft type.

About 20 seconds after touchdown, the lift-dump system appeared to have been stowed followed by thrust being applied to initiate a go-around. The aircraft then overran the end of the 1,676 metre long runway by approximately 300 metres before striking the ground ILS antenna as it became briefly airborne for about another 360 metres before finally coming to a stop in a field - beyond an unsurfaced access road that borders the airport some 650 metres from the end of the runway.

Subsequent calculations indicated that at the time the go-around was initiated, the rate at which the aircraft was decelerating was such that had that action not been taken, the aircraft would have left the runway at a ground speed of between 23 and 37 knots and stopped with a maximum overrun of 90 m, well within the 305 m runway end safety area (RESA). It was concluded that "it can be reasonably assumed that, at some point during the landing roll, the captain likely became concerned that the airplane would run off the runway end and had to decide whether it was preferable to overrun the runway or attempt a go-around". It was noted, however, that there was no evidence to indicate that the captain was "prepared for the possibility of a go-around".

About 8 minutes prior to landing, the final weather given to the crew by ATC was a surface wind of 320° at 8 knots, but the controller cautioned that this was already about 20 minutes old. The weather conditions subsequently found to have been recorded by the airport automated weather observation system at the time of the accident gave a wind direction of 170° at a mean speed of 6 knots, which now meant an 8-kt tailwind component for the landing. However, although it was raining and the runway had been wet, there was no evidence that either reverted rubber or dynamic hydroplaning had occurred on what was found to be an ungrooved concrete runway in good condition and not prone to the accumulation of standing water.

It was noted from the CVR evidence that during the descent and approach, both pilots repeatedly failed to complete the various required checklists properly, "demonstrating that neither was focused on proper checklist execution". It was considered that the captain had "allowed an atmosphere in the cockpit that did not comply with well-designed procedures intended to minimize operational errors, including sterile cockpit adherence and this atmosphere permitted:

- inadequate briefing of the approach and monitoring of the current weather conditions;
- inappropriate conversations;
- nonstandard terminology and
- a lack of checklist discipline throughout the descent and approach phases of the flight.

It was also concluded that both pilots had "exhibited poor aeronautical decision-making and managed their resources poorly, which prevented them from recognizing and fully evaluating alternatives to landing on a wet runway in changing weather conditions, eroded the safety margins provided by the checklists, and degraded the pilots' attention, thus increasing the risk of an accident".

It was noted that "both pilots had excellent performance records as individual pilots but functioned less

CREW RESOURCE MANAGEMENT CONT'D.

effectively as a crew". The first officer had essentially been treated as a trainee and was given minor tasks such as contacting ground operations and resetting the transponder at critical times during the approach "when both pilots should have been attentive to the landing". It was considered of particular note that "the captain [had] never discussed the first officer's role in initiating or supporting a go-around decision, a role which may have provided a decisive advantage in the accident situation".

Finally, a review of the evidence led the investigators to conclude that the performance of both pilots was probably "impaired by fatigue that resulted from their significant acute sleep loss, early start time, and possible untreated sleep disorders" and that "fatigue might have especially degraded the captain's performance and decision-making abilities when he had to decide while under time pressure whether to continue the landing or initiate a go-around". It was discovered that the first officer had taken "a prescription sleep aid for which he did not have a prescription" the night before the accident, but concluded that "because of the short duration of its effects for most individuals", it was unlikely that this would have degraded his performance by the time the accident occurred.

The investigation found that the probable cause of the accident was "the captain's decision to attempt a go-around late in the landing roll with insufficient runway remaining".

It was additionally determined that contributory factors were:

1. fatigue, which likely impaired both pilots' performance;
2. the pilots' poor crew coordination and lack of cockpit discipline *and*:
3. lack of CRM and SOP training.

The above report highlights the importance of proper rest before every flight, ensuring regular CRM training for all crew & reinforcing the critical importance of following company established Standard Operating Procedures (SOPs).

BIRD STRIKES

Airports reduce the risk of wildlife strikes though integrated wildlife management programs. These programs include changes to the habitat at and in the vicinity of the airport and methods to disperse or remove the birds and other wildlife that pose a risk to aviation safety. Although almost every airport has a birdstrike management program, as the population of birds have increased so has the number of reported aircraft bird strikes. In the UK, the number of birdstrike reports increased significantly in 2013 from the previous year – from July 2012 reports of 360 birdstrikes increasing to 480 birdstrike reports during July 2013.

The lowest number of reported birdstrikes consistently occurs in the winter months of December, January and February each year.

But in all of the data that is published, not much is said about how to handle a Birdstrike should it occur. Fortunately, a little preparation, common sense, and thoughtfulness can help you avoid a potential birdstrike

Overview
The numbers alone given above won't prepare you for the actual event.

Unlike an engine failure or a stall, a birdstrike event can't be practiced. But you should prepare for it.

If a collision with a bird is imminent, protect your eyes while maintaining situational awareness. Assume that any impact will result in a shattered windshield. Prepare yourself for a lot of confusion, but above all else, fly the airplane!

Your immediate defensive reaction will be to duck under the instrument cowling, which is the best initial reaction. There will be a lot of wind and noise, and debris will be thrown around. Wearing sunglasses will help avoid eye injury and keep your vision from being impaired.

If the bird hits an aerofoil, it's best to assume there's damage. Slow down

BIRD STRIKES CONT'D.

to manoeuvering speed and maintain control as best you can while you assess the situation. If the damage is significant, or you suspect it is, land as soon as practicable or declare an emergency.

A Typical Birdstrike Incident
A Southwest aircraft was descending through 4000 feet msl when the Boeing 737 struck a "large bird." The force of the impact shattered the windshield and drove glass into the cockpit and forward galley. Thankfully no one was hurt and the aircraft landed without further incident.

The captain and first officer landed the aircraft safely, but both crewmembers spent time that afternoon in the hospital having glass fragments removed!

Before Flight
Part of your pre-flight preparation should include checking AIPs and Notams issued for possible bird activity at each destination and particularly during the summer months.

Check the Automated Terminal Information Service (ATIS) broadcast early during your descent. If hazardous bird activity is occurring at the time, the ATIS will report this. Also consider calling the FBO at destination and ask them about bird activity around the airport and around the active runway.

Birds tend to congregate in lakes, low-lying areas or marshy areas. Landfills are also a big attraction for birds. Take these areas into account when determining whether an airport is a likely candidate for excessive bird activity. It is good practice to make yourself aware of bird activity within regions you fly to regularly.

More collisions occur between July and October – which is the prime migration time. Take extra care by maintaining a vigilant lookout when flying during these months.

Reduce (Mitigate) The Risks
If you notice significant bird activity on the airfield as you are taxiing out, consider asking airport personnel to disperse them. Some airports have remotely triggered cannons that are controlled by tower personnel and used specifically to scare off birds.

Switching on the landing light while taxiing makes you more visible to birds and gives them more time to vacate the area. Waiting a few more minutes is advisable, and the cost of the extra fuel burned may be minimal compared to the cost of an insurance claim or worse.

Levelling off for the en route portion of flight doesn't mean you're out of the woods. Bird strikes have been reported above 10,000 feet above ground level (agl).

Studies reveal that more strikes occur during the approach and landing phases of flight so don't fly the approach any faster than necessary. Speed plays a larger role in the amount of damage

BIRD STRIKES CONT'D.

from a bird strike than the mass of the bird does. While you may not be able to control the size of the bird approaching you, you can control how fast you hit it. Striking a 4-pound bird will inflict less damage at 120 knots than at 170 knots.

Finally, always consider a go-around if bird activity is such that it gives you concern for the landing.

On The Ground

A thorough post flight check must be undertaken by the P1 and if any aircraft damage has occurred, inform our Maintenance Department to arrange for an Engineer to look things over. The aircraft must not fly again until approval from the VP Flight Operations ***and*** the Director of Maintenance is received approving the next flight.

After any Birdstrike you will need to fill out a company Birdstrike Form (SMS Manual Section 7) with as much detail as possible including altitude, speed and flight conditions. Always ensure you inspect the aircraft thoroughly after landing and inform the VP Flight Operations and FOC soon after landing. The VP Flight Operations is required to forward a copy of the Birdstrike Form to the Civil Aviation Authority (GACA), so detailed and comprehensive information is essential.

HEALTH NEWS

The outbreak of the **Zika Virus** continues to expand across the tropical areas of *Central America, the Caribbean, South America, Africa, Southeast Asia and some Pacific Islands. It is soon expected to break into the southern part of the USA.* If you intend to travel to any of these destinations during the year please seek advise on how to ensure that your health and your family's health will not be affected by this new virus.

- The virus is transmitted through mosquito bites (Aedes mosquitos).
- There are ***no vaccines*** currently available to treat the virus.
- Symptoms include headaches, fever, conjunctivitis.
- This illness is often mild and lasts up to 7 to 10 days. Most people fully recover without further complications.
- However, the virus is suspected in causing brain defects in babies and therefore expectant mothers are particularly vunerable.
- Prevention requires avoiding contact with mosquitos, using insect repellent, covering up and keeping windows closed/screened.
- The only recommended treatment at the moment, if you suspect you have caught the virus, is to rest, drink plenty of fluids and seek medical advice.

Thank you all for your continuing contributions to Safety!

Until next time – fly safe!

Carl Flynn
VP Safety & Security