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AVIATION SAFETY LETTER

In This Issue...

TP 185E

Cover photo: Lucas Klassen, Citabria 7GCBC underneath the northern lights, Three Hills, Alberta
Prairie Aviation Training Center

Canada

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TIPS AND TOOLS

Like a Boat Without an Anchor

By Dave Olessen, a 14,000-hour bush pilot based at Hoarfrost River, Northwest Territories. He owns and operates a Part 702 and 703 Commercial Air Service

"If you wanted to design a really lousy boat, it would end up looking a lot like a floatplane!"

That is a declaration I trot out when I am giving pre-flight safety briefings to my floatplane passengers and customers. At the start of a floatplane flying gig, it serves us all well if I remind them about the constraints of our beloved flying boats. Constraints such as: extreme sensitivity to winds and currents; the challenges of getting into shallow water and getting people onto shore; the challenges of planning to pick people and gear up at a specific location, later on, not knowing what the wind and wave conditions will be by then, and so on.

Figure 1: Photo taken from the deck of the left float. Bush Hawk holding fast at anchor.

A lot of my work in the Northwest Territories (NWT) and Nunavut involves multi-day contracts with "-ologists" of various disciplines–hydrologists, geologists, seismologists, biologists, etc. I often start a job by reminding these people that in a piston-engine floatplane there is usually only one direction of movement, and that is **forward**. From the moment the prop begins to spin, and the "floating boat" is set free of its tethers, it is an awkward single-minded beast obsessed with only one path: **ahead!**

Many floatplane pilots are also enthusiastic sailors, cruisers, and paddlers. They love water, the interplay of wind and water, the movements of waves and currents, and all the other delights of physics that boating and float-flying allow us to sample. Given that enthusiasm, I am surprised by the blank look I almost always get from other float pilots when I mention the topic of anchoring, or anchors, or some neat trick that the clever use of an anchor (or two) has made possible in a day's work.

"Anchor? You carry an anchor?"

"Oh yes, and often two. And plenty of rope."

The need for rope, they get that. The paddle, also. In these enlightened times full-time life jackets are mandatory equipment. We take Underwater Egress Training, and most of us would not leave the dock without some bug dope, some basic survival gear, an axe, some waterproof matches and fire-starters, a small tool kit, a tarp, and so on.

But an anchor? "Isn't that really heavy?" fellow pilots ask. Picturing, perhaps, the 35-pound CQR dangling from the yachts at the local marina. An anchor does weigh something, yes. So do ropes, tool kits, your lunchbox, and the survival kit. The eight-pound Danforth anchor I depend on in our Found Bush Hawk (gross weight 3800 pounds on floats) accomplishes so much for me in a day's work that I would never consider setting off without it.

Figure 2: An anchor and rope with a foam-lined blue cloth bag, to be carried in the pilot side float compartment

What does an anchor do for a floatplane pilot? In a nutshell, it gives the captain of that single-minded forward-motion beast the option of ***stopping and staying put on the water.*** In a floatplane, the option of stopping and staying put on the water is an absolute game-changer.

This being the *Aviation Safety Letter*, we can focus on the safety aspects of carrying an anchor and knowing how to use it. A dozen or more scenarios leap immediately to mind. For instance, the nightmare of an engine that has just quit while taxiing in or out from shore on a big remote lake, with a brisk offshore wind eager to push the airplane out into miles of open water. And out there—where the suddenly quiet plane is rapidly being pushed—the waves just get taller and taller, the water gets deeper and colder, and, well, like I said, it is a nightmare. ***Unless*** you can scramble out, drop anchor while the bottom is still in reach, and **Stop!**

I came to the aid of a fellow pilot one day, who had just made a smooth dead stick landing in a Turbine Single Otter on a tundra lake north of my home base. It was a bluebird summer day, and at first, I was not sure what was going on. I taxied to within shouting distance of the Otter, where the pilot and his swamper were standing out on the floats. The plane had drifted downwind on the steady eight-knot breeze, and it was being crunched into a nasty cove of jagged boulders. Without an anchor, where else was the powerless boat going to end up? (Not a trick question.)

I shut down my engine and stepped out onto my float, pulled the anchor bag and coil of rope out of the float compartment, tossed out the anchor and made the line off to the float ballard. We shouted back and forth, and the first thing he said was, "Good idea, that anchor!"

I think I can just stop the stories there. I could go on all day.

One further important point on the topic of carrying an anchor is to be sure to carry it in a padded bag of some kind. My anchor bags are just simple durable sacks sewed up at home, lined with closed-cell foam. The anchor slides quickly in and out, and its sharp edges are padded from damaging the interior of the float compartment. The bag also keeps any muck from the anchor tines from dirtying the inside of the compartment or the plane.

Oh, and there is this: I have spent many a fine afternoon over the past 30 years drifting gently at anchor, napping or reading on the smooth top of a float, a little ways offshore and away from the insect hordes, waiting for hours for "-ologist" customers to come sweating back across the tundra with their hammers and bags of rocks or their plant samples. Then I just ease out the anchor line, let the plane drift in toward shore, and we load up. Pull back out, lift and stow the anchor, and off we go.

Try carrying an anchor in your flying boat. You will like what it can do. And it just might save your bacon. △

Seaplane Summer Safety

by Bry the Dunker Guy, Kevin Elwood & Doug Ronan

Spring has passed and summer is here, so where are the floatplanes we hold so dear?

They are coming out of hangars, barns and offshores of lakes, but what might have happened since last we flew to increase the stakes.

Simply put, we must realize, even when sitting in a warm dry building, aircraft may still be subjected to mice who decided a tail section may be a great home for winter.

As well with all the movements involving other machines over the past several months, wing tips and surfaces such as ailerons could have been bumped, bent, or bruised.

Photo credit: Kevin Elwood
Seaplane beside dock

Prior to your first flight, a thorough check out of your prized possession, which should include more than looking over not only the bird droppings on wings is required.

This should be followed by a complete control check to be certain moving parts are doing exactly what they were originally designed to do.

The ELT should be tested for competency, as well battery life and, in the event your aircraft has been outside for any appreciable time, bird nests which are often found at a variety of locations.

Obviously, any maintenance required above and beyond the normal must be completed annually.

All of this should be followed by a reasonably long warm up then shut down, confirming mag drops and oil pressures or leaks have been noted.

Water in fuel has brought down more than one aircraft shortly after take-off on its first flight of the season, especially bad timing as not only the machine was ill prepared but as well the pilot.

You have to admit first flight after a long break from being at the controls leaves a bit of guesswork as to where certain gauges are located.

Be patient as it may take a while to recall where they are all on a moment’s notice until muscle memory returns.

For those of us who fly year-round with wheels or skis fitted to the undercarriage, it’s not such a huge transition, although the latest change in wheel to eyes height has fooled more than one aviator.

With that being said, a checkout from a pilot with more recent experience may be money well invested.

Once back in the saddle, so to speak, when your confidence is fine tuned for the season, it’s time to consider your passengers.

They often have little interest in flight and more only in arriving at a destination, thus a lesson in aircraft etiquette is in order.

A pre-flight briefing is imperative for each and every person who flies with you as their survivability is greatly enhanced when there is no warning prior to an accident.

Explaining how the doors operate and where each one is, including emergency exits and any roof hatches if applicable, is an absolute necessity in the event the pilot is incapacitated.

Also include mention that you never exit the aircraft until the aircraft engine has been shutdown and aircraft secured to the dock.

As per above information, float pilots are not only required to indicate where personal floating devices (PFD) are located, but also how to wear them and when to inflate them in the unlikely event they are required.

Plus, an understanding of where first aid kits and other items such as fire extinguishers are located should be mentioned. Always bring to their attention that seatbelts must be fastened with the buckle facing outwards, similar to the airlines’ rendition prior to flight.

This is particularity important for the non-frequent flyers who would instinctively head for whatever hip release their Honda belts were installed with.

Remember, even though you may not be a commercial operator, there is still a professional standard to be adhered to, as you are responsible for each and every soul entrusted to you in flight.

The fact is that, with float flying, there are far more variables to be contended with each flight than when operating on wheels.

First off, a windsock is often the flag hanging in someone’s front yard or being able to read the wind direction off of the water surface a thousand feet below.

While taxiing out of a marina, you are more prone to be guided by mother nature between those other vessels in whatever wind speed and direction provided, without the ability to stop.

The same goes for docking on a moving river or strong tidal waters, again with a wind that may be less than helpful.

Unlike a runway, water surfaces change constantly from rough to glassy and everything in between, some more demanding than others.

Then there are the retractable gear aircraft, including amphibious seaplanes and flying boats, where a checklist is highly recommended to avoid a costly mistake, which could be life threatening.

For all commercial pilots operating seaplanes or flying boats, be advised that, as of March 6, 2023, Egress Training is now mandatory, and highly recommended for private pilots as well.

Fly safe and have fun this summer. △

Transport Canada links:

- Seaplane/Floatplane: A passenger's guide
- Underwater egress

Wire, The Invisible Enemy

by Flight Safety Australia

To think of wire as something small, still and insubstantial is the wrong mindset for a pilot. A purely physical description does not describe the problem sufficiently.

A more useful frame of mind would be to think of power and communication lines as something like an alien or predator from science fiction; invisible, ever-present, hiding amid the treetops and leaping across the valleys and always tense for its combat against alloy, plastic and flesh.

Wire strike is the main hazard of low-level flight, and a consistent cause of injury, death and destruction. Numbers of wire strike accidents rise and fall—2016 was a bad year with 14 accidents (six of them involving helicopters), one death and 11 injuries. At the time of writing, there had been five accidents in 2017, with one death (of the pilot of an R22 helicopter) and no injuries. But the problem will never be solved as long as electricity and communications networks use wires on poles.

For most private pilots the best strategy to avoid wire strike is three words: don't go there. But those who make their living down in the wire environment must live by a different creed. They must learn to see and avoid—easy words to say but hard to do in the case of oxidized aluminium wires that blend into the blue of the sky, copper cables green as a forest canopy, or rusted steel wires that blend into the brown of the earth.

Wire is no respecter of experience. About 52 per cent of wire strikes have been by pilots with more than 5000 hours, says founder of wire strike consultancy Utilities Aviation Services, Robert Feerst. 'It is not a rookie mistake.'

About 40 per cent of wire strikes are with a wire that pilots and crews knew was nearby, Feerst says, and about 60 per cent of wire strikes result in a fatality.

Civil Aviation Safety Authority rotorcraft senior flight standards officer, Dale South, says the clean-up run, when an agricultural aircraft attends to the odd shape areas that are a part of any job, is often when it hits the wire.

Figure 1: Wires

'The pilots know the existence of the wire. It's been part of their check on every spray run, then they do a clean-up run and, bang. Human memory is fallible.'

Wire impacts happen either in the clean-up run or in manoeuvering for it, South says. 'By definition, it's the last run of the day. People want to get home, but this is just the time when the risk is highest.'

More than meets the eye: how wires can disappear

Wire is effectively invisible, Feerst says. In his *Flying in the wire environment* course, run in Australia every southern winter, Feerst declares, 'To a low-level flight crew, wire **must** be classified as an invisible hazard.'

Several factors make wires invisible much of the time, even to a trained and observant crew. These include:

- atmospheric conditions
- cockpit ergonomics
- dirt or scratches on cockpit windows
- viewing angle
- sun position
- visual illusions
- pilot scanning abilities and visual acuity
- flight deck workload
- camouflaging effect of nearby vegetation

Older wires may be difficult to see because their colour often changes with age. Copper wires oxidise to a greenish colour that makes them well camouflaged with vegetation. Some electricity transmission towers, including in the NSW Hunter Valley, are actually painted green to blend in with the environment. This is soothing for residents, but not for pilots.

A wire that is perfectly visible from one direction may be completely invisible from the opposite. The exact location of specific wires may change throughout the day because of fluctuating ambient temperatures, which may cause wires to sag or tighten. Even on a cloudless day, the blue of the sky can change to reveal, or hide, wires. Long spans of wire may be blown by the wind, with displacements of tens of metres for wires crossing valleys.

Then there are optical illusions, including the:

- High-wire illusion. When you are looking at two parallel wires from 200 m away or more, the highest wire will appear further away when it may not be.
- Phantom-line illusion. A wire running parallel to others can become camouflaged.

Speak now or … the art of low-level CRM

Feerst's helicopter-focused course emphasises the vital importance of developing crew resource management (CRM) specifically for low-level operations. 'The core of low-level CRM is recognising hazards and speaking out at once, regardless of inhibition or perceived rudeness,' he says.

'Mitigated speech is disastrous. The way to speak assertively is to make it about what's right, not who's right,' he said, adding that this concept of CRM covers all crew members on the aircraft, in addition to flight crew.

'Low-level CRM is distinctly different from the airline version of the concept,' Feerst says. 'It's the opposite of what airlines teach. When they have an engine failure they fly the aircraft then analyse. We can't ever do that, there isn't time,' he says.

He gives the example of a powerline inspection helicopter in the southwest United States. 'The linesman knew there was an earth wire and asked the pilot "Do you see it?" The pilot said, "No, I don't see it, where the hell, it's got to be here somewhere?" You know what? They found it. Pilot killed.'

'Had they been trained to back away the instant there was a wire they knew about but couldn't see—if they had initiated a high reconnaissance they would have found it before they hit it'.

You need to immediately recognise and react to a code red. Don't waste time trying to be congenial. A trained pilot will respond.

'What you say is critical, and when you say it is critical—the instant you think you see a problem, speak up! Don't sugar coat it—you don't have time. Say it as you see it.'

Fatal fallacies

'There are some tenets you have to understand, in the wire environment, and if you don't you're operating on luck,' Feerst says. 'It doesn't matter if you have 100 hours or 10,000 hours.'

He lists three deadly assumptions:

1. That you will see the wire in time. You can never count on that. It's a mindset you have to get out of your head.
2. Never assume you and the pilot are seeing the same thing. Never assume the pilot has seen wire.

3. Never assume airspace is protected by marking and lighting. You just can't count on that.

In 2011, Flight Safety Australia wrote 'wire strike avoidance requires much more than running through a checklist—or reading a magazine story.' That's still true; the examples and tips mentioned here are to illustrate the nature of the problem, and are only a small part of the skills needed to fly safely in the wire environment. If you don't have to fly in the wire environment, don't go there. If you do have to, seek training, and regular retraining. Wire is an enemy that must be taken seriously. △

Maintain VFR!! Thoughts About VFR Communications

by Claude Roy, pilot with 6,700+ hours of VFR flying

If you are like me, occasionally, you feel that VFR pilots could do a better job at communicating when flying around at uncontrolled aerodromes.

Photo credit: iStock

For disclosure, OK, I may not be your usual pilot. I was an air traffic controller for ten years (1972-1982) before becoming a pilot myself (1985 until now). My background, I admit, makes me more sensitive to communications than the average pilot.

To start, all VFR pilots are supposed to state these four pieces of information: (1) who you call; (2) who you are; (3) where you are, including your altitude; and (4) what your intentions are. You may call this your "Four Ws."

Simple enough, isn't it? Yet, over the years, I recall at least two instances in the Ottawa Valley where lives of friends were lost in the VFR circuit at an uncontrolled aerodrome. In both cases, the conditions were VFR, the aircraft were radio equipped and the pilots were transmitting.

How can this be? How can we prevent instances like these from happening?

We can start by working together at communicating better to prevent any "wrong place, wrong time" chance of VFR encounters.

First, let's review the theory on communication. NAV CANADA is the expert source of information on the matter of effective communications. Their VFR Phraseology Guide is the best reference available on the subject.

Although the VFR Phraseology Guide is geared towards the phraseology to be used between pilots and air traffic services (ATS), there is a paragraph on page 36 which states that general position reports "may also be broadcast on the appropriate area frequency to allow others who may be flying in the area to know where you are."

To me, this is the essence of any VFR communication: to let others know where we all are. If the others know where you are, what you are doing and what your intentions are, they can easily stay away from any potential conflict with you. And vice versa.

Alas, communications are but just one part of the safe flying equation. Here are three ways we can work towards eliminating all plane-to-plane VFR collisions: (1) Look out more; (2) Talk less; and (3) Be more patient.

Look out more

When you know that most airfields do not have any mandatory frequency rule in place, you can easily understand why safe VFR operations depend, first and foremost, on the "See-and-be-seen" principle.

To VFR pilots, eyes are more important than ears. Your primary operational duty, as a VFR pilot, is to stay away from all other aircraft. If you fly VFR, you maintain VFR!

So, please, make a conscious effort to look out and ensure there is no airplane—or drone—anywhere near you.

Talk less

For more assurance, VFR pilots can use radios to find out if anybody is near them as well as help others to stay away from their own path.

Radios are especially good as situational awareness tools. They help pilots to figure out in advance from where other airplanes will come and when they will be within visual range and within potential conflict.

Like a pre-warning system, radios help VFR pilots to get a mental "radar" picture of how the traffic will develop around airports and before airplanes get too close to each other.

Yet, VFR pilots, for a host of reasons, talk more than they should. Like on social media, pilots seem more interested in telling the world about themselves than learning about others and their evolving situation.

So, talk less and listen more to what is being said. Strive to get that mental picture of who is where around the airport, now and 30 seconds from now. Keep your transmissions as standard, clear and concise as possible, so your position and intentions are easily understood by all.

Be more patient

Like in a wheel-and-spokes arrangement, airports are hubs of traffic and activity. Airports are like aircraft magnets. In general, aircraft go away from an airport or fly directly towards an airport.

Not only that, but VFR pilots also want to go in good weather and at a convenient time for themselves and their passengers. What is, to you, a convenient time and place to fly is generally the same choice made by other pilots.

The result is that we always encounter bursts of traffic at airports. Airplanes either all come in at the same time or they all go out at the same time.

So, be more patient. If you can delay your departure or your arrival by just a few minutes, you can easily operate in less congested traffic situations.

Conclusion

My hopes are that, by using these three little tips above, we will all be better able to fly safely and communicate efficiently with each other, working towards reducing and eliminating any risk associated with VFR operations around airports.

Happy flying!△

REGULATIONS AND YOU

Transport Canada documents published recently

Document number (R-Revised)	Issue number (Date issued)	Subject
AC 700-063	Issue 02 2023-06-15	North Atlantic—High Level Airspace Operations (NAT HLA): Special Authorization/Specific Approval and Guidance
AC 505-006	Issue 01 2023-04-03	Aircraft Certification Authorized Persons Located Outside Canada
AC 700-024	Issue 03 2023-04-01	Required Navigation Performance Authorization Required Approach (RNP AR APCH): Special Authorization/Specific Approval and Guidance
AC 601-009	Issue 01 2023-03-30	Criteria for Initiating a Blasting NOTAM
AC 601-008	Issue 01 2023-03-30	Repair of Obstacle Marking and Lighting

ON THE RADAR

A picture is worth 1,000 words

by NAV CANADA

In May 2017, a crew reviewed the following NOTAM information:

```
NORTH SIDE 75FT RWY 06L/24R FULL LEN CLSD. SOUTH SIDE AVBL ACFT WINGSPAN MORE THAN
78FT 48 HR PN.
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Using this information, the crew formed a mental model of how the runway was closed, but unfortunately, their understanding of the NOTAM information did not reflect the actual partial closure. The aircraft landed partially outside the intended confines of the runway, striking 7 temporarily installed runway edge lights and sustaining substantial damage.

While the NOTAM wording has since been adjusted to improve understanding in similar cases, NOTAMs are alphanumeric messages and have limitations. Had the crew been provided with an illustration to support their understanding of the situation, the outcome would quite likely have been different.

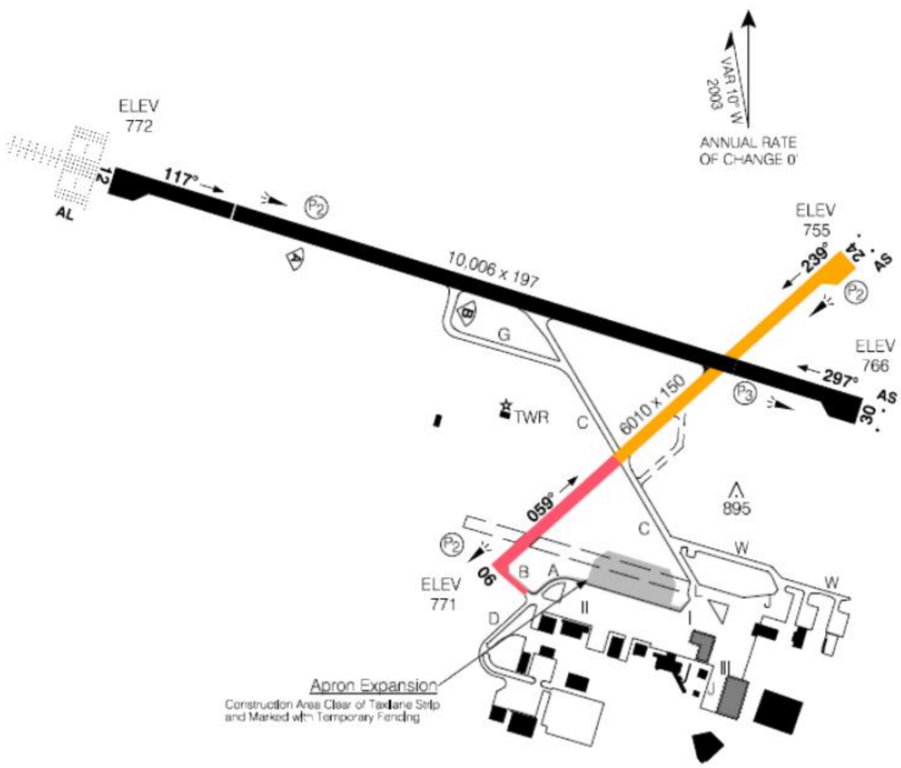

Photo credit: NAV CANADA

JOHN C. MUNRO HAMILTON INTERNATIONAL AIRPORT (CYHM)
Construction Area Depictions

Visual supports for situational awareness

The use of illustrations can go a long way to improve situational awareness, helping to prevent outcomes like the one above. While a NOTAM contains text only, there is another mechanism that can include detailed information and illustrations to help pilots form more accurate mental models. That mechanism is an AIP Supplement, and it is part of Canada's *Aeronautical Information Publication* (*AIP Canada*).

AIP Canada contains information on airspace, airways, navigational aids, air traffic control procedures, and aerodromes, critical to pilots and other aviation professionals, including creators of third-party aeronautical products. It is the official state source of aeronautical information and is updated every 56 days.

AIP Supplements, like NOTAMs, are used to make temporary changes to the information contained in *AIP Canada*. While NOTAMs are used for dynamic changes and are limited in message length, AIP Supplements are used for longer-term changes (3 months or more) or shorter events where the inclusion of an illustration or additional details are necessary to convey more accurately what's going on.

Mitigating risks through modernization

Airport construction projects can create several dynamic changes to surfaces, services, and procedures, often requiring dozens of NOTAMs relating to the activity, which can be difficult to accurately visualize.

To help mitigate the risks of complex closures or changes to procedures that could easily be misunderstood in a NOTAM, an improved **AIP Supplement for Aerodrome Construction** template is now available, featuring a standard format and chronological order of information, making it intuitive and quick to find information. See an early example of this type of AIP Supplement.

But our efforts are for more than just airport construction.

NAV CANADA is working to modernize how AIP Supplements are published to increase their effectiveness and make them an option in situations where NOTAMs used to be the only choice. Other changes you can expect in the coming months include:

- **Frequency**. To allow for information changes to be relayed in a timelier manner, AIP Supplements will be updated on the website every 14 days, instead of every 28 days. Information will be made available further in advance of the effective date in cases where enough notice is provided to NAV CANADA.
- **Standardization**. To ensure consistency and improve usefulness, in addition to the new AIP Supplement for Aerodrome Construction, all AIP Supplements will be standardized in content, layout, and graphics.
- **Website updates.** To improve the overall user experience when accessing AIP Supplements, the website will undergo a number of updates, including improvements to search functionality.

As NAV CANADA starts publishing AIP Supplements more frequently, you can expect an increase in use and, over time, a reduced reliance on NOTAMs. AIP Canada is available on the NAV CANADA website, where you can also sign up for the Aeronautical and Service Updates newsletter, which can help you stay up to date on new AIP Supplements, AICs and more.

With increased insight into *AIP Canada* and its various associated products, be sure to incorporate it into your next briefing to ensure you get the full picture before taking to the skies.

Fly Safe. △

The gold standard: Multi-agency systems simulation testing: A real-life case example of integrating aviation, medicine, protective services, crane operation and construction to proactively mitigate risk

by Mirette Dubé, John Griffiths, Janice Cullen, Maxine Gruener, Nick Pettipas, Michael Suddes, Aviva Sheckter, Ron German

STARS Air Ambulance

Simulation is the recreation of a real-to-life situation, state of affairs, space, or process. Traditionally, healthcare simulation was focused on training teams in crisis resource management and medical management. Simulation, which includes expert debriefing, encompasses a range of activities that share a broad, similar purpose, which includes to improve the safety, effectiveness, and efficiency of services and to integrate people with their system. Safety science is shifting to more proactive strategies such as simulation to identify and mitigate harm within healthcare and other industries. Historically, where simulation programs may have been considered ancillary to healthcare organizations, there has been a rapid acceptance and evidence informed transition of simulation as a necessity to high reliability organizations over the past 10 to 15 years. Using simulation ensures that all team members know in advance what they are expected to do; they can practice within any system, process, or even work in a given space while testing assumptions; they are comfortable and confident with the execution of their next steps and the steps of others; and they can ensure that the plans and tools hold together under the stress of any circumstance. Simulation identifies systems issues and latent threats to safety that otherwise would go unnoticed until the unthinkable happens. When multiple members of the team have an opportunity to practice through simulation, rather than in a high-pressure real-life situation initially, relationships and trust have an opportunity to be formed and carried into the real-life, higher-pressure situations that follow.

Now consider simulation in the context of our real-life high-risk process and case example. Perhaps the risk associated with flying a helicopter for landing at a hospital heliport to deliver a critically ill patient, or to pick up a key staff member to transport them to the scene of an accident is routine and obvious. After all, this happens all over the world.

Then consider the added complexity of a construction crane situated near the helipad or nearby hospital and its influence on the many responsible team members. Consider the operating procedures in place for the helicopter flight crews. Factor in the processes for health care teams. Layer onto this the requirements upon the construction teams, and how the systems each of these teams use either enable or create barriers to how they function within their role and the resulting outcomes that ensue. This "thinking in systems" is the foundation behind why we need to look wholistically at the many complex elements of a system and how they work together before making our best analysis of a situation.

Our project was directly applied to the safety, risk mitigation, and quality improvement for system performance and resilience. Our work brought together representatives from five different organizations in Alberta involved in aviation (STARS Link Center), simulation (eSIM), construction (Ellis Don), medicine and leadership (Alberta Health Services), crane operation (Mammoet), Protective Services (Alberta Health Services) and Heliport consulting services. These organizations were used in simulation to test the communication pathways between the helicopter pilot, the communication hub, protective services, the helipad management and security team, the construction site superintendent, and the crane operator. We wanted to test, using simulation, the complex communication that might occur in various scenarios before we implemented the final plan. This interaction of complex communication would occur every time the helicopter would land at our trauma center (Foothills Medical Center). Simulation is one of the best ways to uncover the difference between work as we imagine it will occur (i.e., as written on paper or discussed in a meeting), to how it actually occurs, encompassing all the human and system factors at play.

McCaig Link Project
October 2022

In this case example, multiple questions arise, such as:

- How does the crane operator know when the helicopter is landing?
- How does the helipad manager and multiple hospital protective services staff respond, and have they been adequately trained in the process and communication pathways?
- Does the entire collaborative team of organizational representatives understand the implications of a helicopter crew flying near a crane?
- What about the downdraft of air from a helicopter on a crane and how it may impact the stabilization of the crane and its load?
- Does everyone involved understand the risks to the flight crew and patients, construction crew on the ground, and to staff, patients and visitors under the path of a crane carrying heavy construction materials?
- What about the load of the crane and impact of the wind on any given day?
- And then together, how does each of these micro-teams and elements work together to prevent a major potential catastrophe from occurring?

- How does each organization ensure the safety of all systems, the buildings, and the staff and patients that could be affected?

Any gaps in communication, process or near misses pose the highest risk to everyone involved, and potentially the loss of life. If we want a resilient system, how can we analyze what works well to ensure everyone knows that too?

Yet, despite the risks, there are significant gaps in how multi-agencies come together or "integrate" within a system to first test their processes and ensure (not just assume) safety, efficiency, and operational infrastructure are in place. How can we be sure that people understand the risks and their roles; that they have clear cognitive aids to follow a process and communication pathway; and that we have a means in which we **always** test prior to implementation? We must take into consideration the role of simulation in this context as a 'field test' before launch.

McCaig Link Project
October 2022

Various simulation scenarios were co-developed with all stakeholders during a one-week timeframe (as to not delay the construction schedule or have any impact on flights) and lead by a simulation consultant specializing in systems simulation. Examples included the notice of arrival of the helicopter within 15 minutes with a critically ill patient on board, or while the crane was fully extended up and transporting material. Real time communication occurred using the designed pathways between all the various parties involved in the process. Communication pathways were tested and validated, flow process maps were developed and standardized in order to train the many staff involved. Roles were clarified and relationships between the various independent organizations and participants were forged. Most importantly, confidence was built in the roles and responsibilities of each party and their ability to manage the potential conflicts in crane position and helicopter arrival.

During post implementation, additional scenarios arose which enabled the teams the ability to rapidly connect with each other and practice further landing approaches, explore additional improvement efforts, and make much quicker decisions together. Simulation was extremely valuable for all teams to ensure safety, efficiency, and effective process. When risks are so incredibly high, the return on investment does not necessarily need to be calculated in cost savings, but rather in the prevention of catastrophic events, the safety of staff and patients, the confidence to work effectively in your role, and to ensure there are no delays to critical lifesaving care in the healthcare and other settings. It was noted that this was the first time a multi-stakeholder collaboration, with revision specific communication pathways, and pre-implementation simulation have been used for the aviation organization and hospital helipads. There are 13 helipads at tertiary care hospitals in Western Canada and so many more internationally. In future, this model provides a template and standard for which to manage multi-stakeholder risk mitigation in similar circumstances and beyond.

In the end, no one system functions in silos and using simulation to integrate systems and processes is the sure way of the future.

Acknowledgements: The author team would like to acknowledge all of the team members involved in the simulations and for their commitment to safety and systems testing using simulation. Thanks to Darren Emes (Heliport manager, FMC) for his contributions.

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- Aviva Sheckter—Protective Services Site Manager, Foothills Medical Centre, Calgary, Alberta, Canada

Disclosure Statements: MD is the CEO and simulation consultant for a Healthcare Systems simulation incorporation which provides systems simulation education and consulting services. △

Submission of Aviation Safety Letter (ASL) articles

Do you have an aviation safety topic you are passionate about? Do you want to share your expert knowledge with others? If so, we would love to hear from you!

General information and guidance

The ASL's primary objective is to promote aviation safety. It includes articles that address aviation safety from all perspectives, such as safety insight derived from accidents and incidents, as well as safety information tailored to the needs of all holders of a valid Canadian pilot licence or permit, to all holders of a valid Canadian aircraft maintenance engineer (AME) licence and to other interested individuals within the aviation community.

If you are interested in writing an article, please send it by e-mail to TC.ASL-SAN.TC@tc.gc.ca, in your preferred language. Please note that all articles will be edited and translated by the Transport Canada Civil Aviation (TCCA) Aviation Terminology Standardization Division and will be coordinated by the ASL team.

Photos

In order to captivate our readers' interest, we recommend that you include one or two photos (i.e., photo, illustration, chart or graphic) for each article, if possible. Please send us your photos as an e-mail attachment (preferably as a jpeg).

We look forward to hearing from you! △

INSTRUCTOR'S CORNER

The wind broom: Taxi stability is good airmanship!

By John Picone, private pilot licence/instrument rating (PPL/INRAT) Ground School Instructor–Brantford Flight Center

Do you ever feel like skipping that part of the walkaround where you get on your knees in a cold hangar to check the fuel from under the wing of your Piper? You watched the rampie fill your tanks yesterday; you know the fuel is blue and moisture free. But you check anyway. It's good airmanship. It's the kind of attitude and habit that might one day save your life.

But how about taxiing in the wind? This aircraft was taxiing in strong winds at Calgary-Springbank in January of 2022. As the Cessna 182 was turning a corner, a left quartering tailwind picked it up and flipped it over.

Figure 1: Cessna 182 upside down

While we may never encounter wind speeds of 40 knots gusting to 50 on the maneuvering area, as was the case in Springbank, good airmanship dictates that we execute control inputs to maximize our stability while taxiing in the wind.

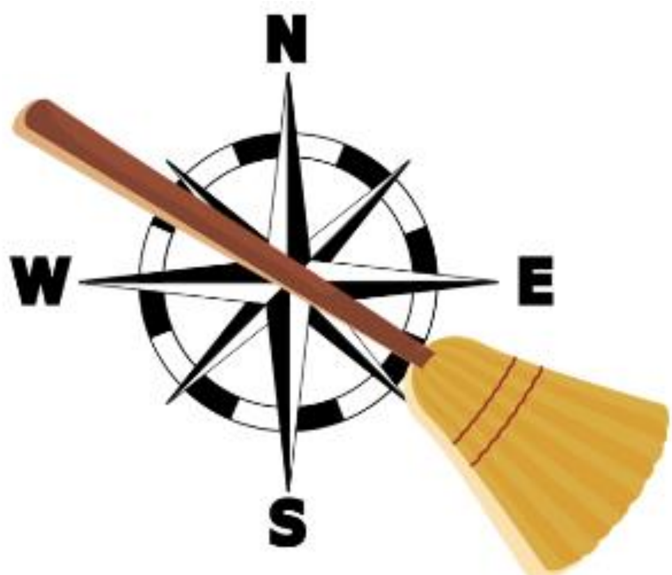

Figure 2: Compass rose overlaid by a broom

Teaching my ground school pilots what these inputs are in certain surface wind conditions is not difficult. I can even invite their deductive reasoning to come up with these inputs on their own: "Ok, so we have a wind coming from behind us off to our left. What do we NOT want to happen?" *Don't let the wind pick up the tail or the left wing.* "Yup, that makes sense. So which control surfaces can we move and in what way to manipulate that wind to keep our tail and left wing down?" They quickly deduce that down left aileron (control yoke turned to the right) and down elevator (control yoke forward) will work to our advantage. From here we arrive at "Dive away" from a quartering tailwind and, if the breeze is coming from in front of us, "turn into the headwind, neutral elevator." Top it off with the well-known diagram in the Cessna 172 pilot's operating handbook (POH). They will memorize it for the exam.

That's all well and good. But how can we have our ground school students *practice* these inputs so that they become second nature? Automatized. The way we activate our turn signal as we approach a corner or change lanes when driving. After all, we rarely taxi in one direction. The pilot in Springbank was doing fine until he turned a corner, and the quartering headwind became a quartering tailwind.

Figure 3: heading indicator (HI) overlaid by a broom

Introduce the Wind Broom!

Imagine your household sweeper as the direction indicator of an anemometer: the straw end is the direction from which the wind is blowing. Simply place the broom on your living room floor and taxi about the carpet changing inputs accordingly. I like to do this with my whole class out on the ramp. In suitable weather, of course. I even ask them to imagine they are taxiing out to the actual runway which I've chalked on the pavement along with the taxiways. Once they get the hang of this, and they've practiced it at home, I'll ask them if there's any instrument in the cockpit that might help them "remember" where the wind is blowing from. They'll quickly come up with using the heading bug on the heading indicator (HI): set it to the direction from which the wind is blowing. There's a lot to do taxiing for takeoff; a quick glance at the HI is all that's needed to know your orientation to the wind and maintain stability as you head out to the threshold for takeoff. △

Demonstration of the wind broom from to the class out on the ramp

TSB FINAL REPORTS SUMMARIES

The following summaries are extracted from final reports issued by the Transportation Safety Board of Canada (TSB). They have been de-identified. Unless otherwise specified, all photos and illustrations were provided by the TSB. For the benefit of our readers, all the occurrence titles are hyperlinked to the full report on the TSB Web site. —Ed.

TSB Final Report A22Q0084—Collision with cable

History of the flight

At approximately 1530 on 17 July 2022, the privately registered, float-equipped, single-engine Bellanca 7GCBC (Citabria) aircraft took off for a local visual flight rules (VFR) flight from Trois-Rivières Airport (CYRQ), Quebec, to Shawinigan, Quebec. The purpose of the flight was for the pilot, who was alone on board, to position his aircraft on the Saint-Maurice River, near downtown Shawinigan, for the summer season. Given that the aircraft was not equipped with amphibious floats, the departure from CYRQ was conducted by towing the aircraft on a trailer behind a pickup truck. Less than an hour after departure, the aircraft was seen flying over the Saint-Maurice River, from west to east, in Shawinigan. Approximately 10 minutes later, the aircraft was seen flying over the river once again, near the same location, but this time it was flying from east to west at low altitude, until it collided with the lower cable of a power line, which was at a height of about 20 m. After the impact, the aircraft fell into the river in an inverted position. The pilot was fatally injured.

Pilot information

The pilot held a Canadian private pilot licence–aeroplane, issued in July 2009, and a medical certificate which, according to Transport Canada (TC) records, had expired on 01 March 2020. The investigation was unable to determine whether the pilot had renewed his certificate after that date.

He had the ratings needed to fly single-engine landplanes and seaplanes.

Although the pilot was quite familiar with the Shawinigan area, this was the first time he was using this particular portion of the Saint-Maurice River to dock his aircraft.

Aircraft information

The Bellanca 7GCBC (Citabria) is a single-engine 2-seat tandem aircraft that is commonly equipped with floats. According to the wreckage examination, there was no indication that an aircraft system or component malfunction had contributed to this occurrence.

Accident site

The accident occurred over the Saint-Maurice River in Shawinigan, not far from the destination dock, where a Hydro-Québec power line crosses the river, 3.5 NM west of a hydro dam. While flying over the landing site, the aircraft struck the lower cable on this power line (Figure 1).

The damage to the lower cable matched the damage to the aircraft wreckage (Figure 2). Clear signs of contact with the cable were visible on the propeller blades, the left windshield post (Figure 3) and the left-wing strut (Figure 4).

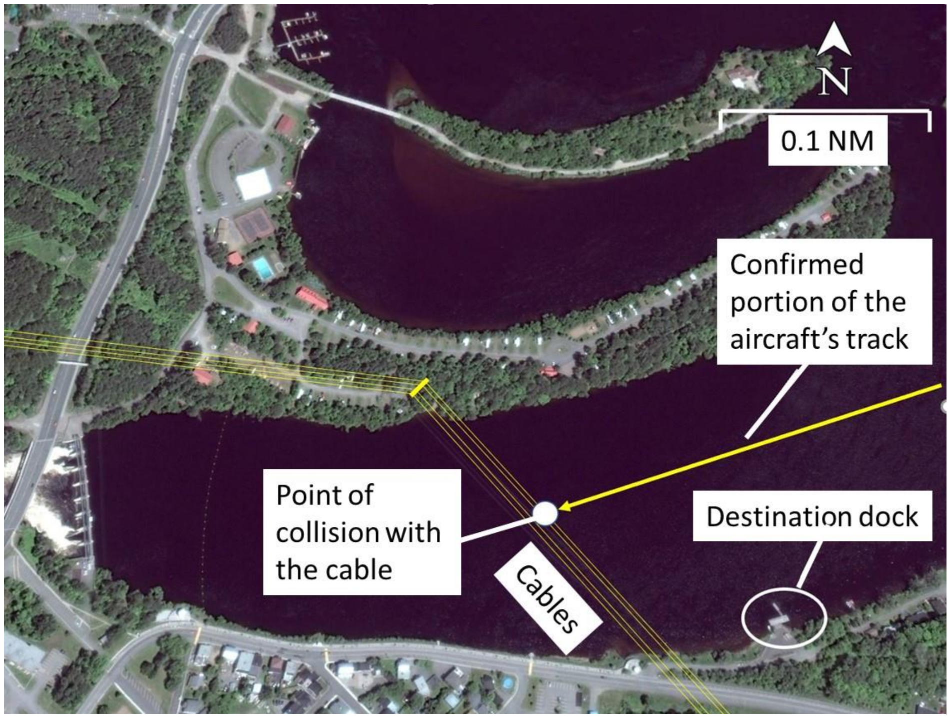

Figure 1: Image of the occurrence site, the aircraft's known route, and the point of collision with the cable (Source: Google Earth, with TSB annotations)

Low-altitude flight

Intentionally flying at low altitude increases the risk of an accident: the pilot's field of vision is reduced and consequently, the pilot has less time to take action to avoid obstacles and terrain. It is also recognized that flying at low altitude reduces the margin of safety in the event of engine failure, a loss of control, or any other unexpected circumstances, while increasing the risk of an impact with the ground or an obstacle. The *Canadian Aviation Regulations* (CARs)[1] and other publications make specific mention of these risks.[2] Furthermore[3], over the years, the TSB has investigated numerous occurrences in which low-altitude flight was identified as a contributing factor.

Under certain circumstances and for a variety of reasons, a pilot may decide to fly over a point of interest on the ground at low altitude. For instance, the pilot may wish to inspect a planned landing area and the potential obstacles near a destination dock. If the pilot's attention is fully focused on observing this point of interest on the ground, the pilot stops watching where the aircraft is heading and may not detect obstacles along the route.

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[1] Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, section 602.14.

[2] Transport Canada, TP 14371E, *Transport Canada Aeronautical Information Manual* (TC AIM), AIR – Airmanship (24 March 2022), section 2.4.

[3] Transport Canada, TP 1102, *Flight Training Manual*, 4th edition (revised 2004), Exercise 21: Precautionary Landing, p. 121.

Landing area inspection

When a pilot doubts the suitability of a site's landing surface or does not have information about it in advance, "the area and surface must be visually inspected to provide sufficient information for the pilot to make the best decision on circuit, approach, and landing procedures."[4]

Figure 2: Photo of the damage to the lower cable of the power line (Source: TSB)

In its simplest form, this inspection, which is part of a procedure known as a precautionary landing, includes the following two parts:

1. A normal circuit flown to a low approach over the intended landing site to visually inspect the potential landing area.
2. Another normal circuit ending in a safe landing.

Among other things, this procedure allows the pilot to identify any obstacles, such as power lines. More specifically, in the case of a floatplane, TC's *Flight Training Manual* stresses the importance of flying over the planned landing area to identify all obstacles such as boats, floating debris, and submerged obstacles. This overflight allows the pilot to not only identify all potential obstacles, but also to note watercraft positions and direction of motion.

More specifically, with regard to the inspection of landing surfaces, the *Flight Training Manual* states the following:

> The inspection work associated with precautionary landings can be completed at low or high altitudes. If appropriate, both high and low passes provide their own important information.

[4] Transport Canada, TP 1102, *Flight Training Manual*, 4th edition (2004), Exercise 21: Precautionary Landing, p. 121.

Some pilots suggest that when both a high- and low-level pass are planned, the high pass should tell you about the particular flight path to follow. It should also let you identify any obvious reasons not to land at the location. Subsequent low-level passes must provide good reasons to land at the site. […]

When inspecting an unknown area in which there are numerous obvious obstacles, some pilots suggest a number of inspection passes at progressively lower altitudes to prevent encountering unexpected obstacles on an initial low pass.

Figure 3: Photo of the damage to the left windshield post caused by collision with the cable (Source: TSB)

Marking of obstacles to air navigation

Cables may be difficult to see during a flight. According to an article published in *Flight Safety Australia*, "[t]o a low-level flight crew, wire **must** [emphasis in original] be classified as an invisible hazard. […] A wire that is perfectly visible from one direction may be completely invisible from the opposite."[5]

The *Transport Canada Aeronautical Information Manual* (TC AIM) contains the following information regarding high voltage powerlines:

> The line of structures of high voltage powerlines are easy to see, but when flying in their vicinity, pilots must take the time to look for what is really there and use safe procedures. The human eye has limitations, so if the background landscape does not provide sufficient contrast, pilots will not see a wire or cable. Although hydro structures are big and generally quite visible, a hidden danger exists in the wires between them.

According to subsection 601.24(2) of the CARs, marking and lighting are required for any building, structure, or object that constitutes an obstacle to air navigation. The hydro towers at the occurrence site were no higher than 58 m (190 feet) above ground level (AGL), and the cables were lower than the top of the towers. Even though the cables were within 3.7 km of the centreline of a recognized VFR route — the St-Maurice River—, according to the CARs, they were not considered an obstacle because their height did not exceed 90 m (295 feet) AGL. The cables

[5] Australian Civil Aviation Safety Authority, "Wire, the invisible enemy" in: *Flight Safety Australia* (20 November 2017), (last accessed on 10 February 2023).

had no markers to make them more visible; these markers are not required when the height of the cables is 90 m (295 feet) AGL or less.

In general, power lines are indicated on VFR navigation charts (VNC) because they are useful landmarks that can facilitate visual navigation; however, portions of a power line may be deleted or hidden to make the chart clearer and easier to read. The occurrence power line did not appear on the relevant VNC (Montréal) and there were no regulations requiring that it appear on the chart.

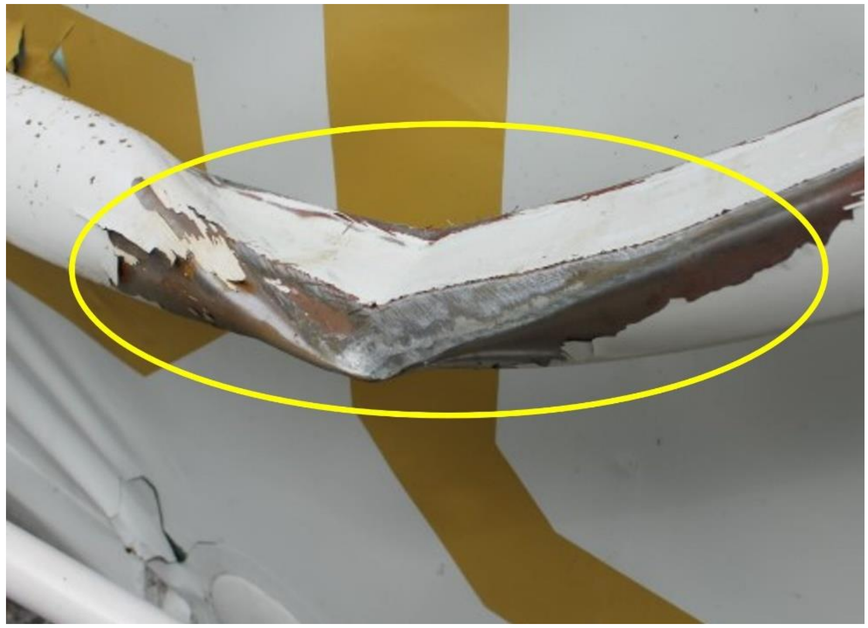

Figure 4: Photo of the damage to the left-wing strut caused by the collision with the cable (Source: TSB)

Safety message

When inspecting an unknown landing area, pilots are encouraged to conduct a number of inspection passes at progressively lower altitudes to have a better chance at identifying obstacles such as cables, which may not be marked or indicated on charts, and can be extremely difficult to see.

Australian Transport Safety Bureau (ATSB)—Uncommanded power reduction

Safety summary

What happened

On the night of 19 August 2021, the pilot of a Beechcraft King Air B200C aircraft, commenced the take-off from Essendon Fields Airport, Victoria on a medical retrieval flight to Albury, New South Wales. During the take-off, there was a reduction in power on the left engine and an uncommanded left yaw. The pilot initially managed the situation as an engine power loss and focused on maintaining directional control. However, when troubleshooting, the pilot identified that the left engine power lever had migrated rearwards to the idle position. In response, the pilot moved the power lever back to take-off power and adjusted the friction lock to prevent further movement. The flight continued to Albury without further incident.

What the ATSB found

The ATSB found that the left engine power lever had migrated rearwards as the friction lock had not been sufficiently adjusted during the pre-flight checks. It was also established that power lever friction locks fitted to the Beechcraft King Air series aircraft required careful adjustment to prevent power lever migration, particularly during take-off. This was more prominent on the left engine, which was a characteristic generally known among King Air operators and pilots.

What has been done as a result

The operator provided additional training to all King Air pilots to demonstrate how the power lever system operated, when power lever migration could occur, and how to check that the friction locks were adequately adjusted to ensure the levers remain at take-off power. A component on friction locks was also included in the King Air pilot ground school training. In addition, the operator published a notice to air crew, which stipulated that all take-offs on sealed runways must be conducted using a standing start take-off. Further, the operator amended the take-off checklist for a standing start to include checking the friction locks to prevent a power lever migration during the take-off sequence.

The ATSB has released a safety advisory notice to all operators and pilots of King Air aircraft advising of power lever migration and the need to be aware of the careful adjustment required for the power lever friction lock.

Safety message

This incident highlights the importance of having a detailed understanding of the characteristics that may be specific to an aircraft type. In the case of the King Air series of aircraft, the design of the power lever system meant that the friction locks required careful adjustment to prevent power lever migration particularly during take-off.

The occurrence

On 19 August 2021, a Beechcraft B200C King Air aircraft, was scheduled to depart Essendon Fields Airport, Victoria on a medical retrieval flight to Albury, New South Wales. On board was a pilot, paramedic, and doctor.

At about 2300 Eastern Standard Time, the pilot began to prepare the aircraft for departure as per the before engine starting checklist. One of the requirements was to set the power lever friction locks. The pilot recalled moving the power levers to the mid-range position to gauge their movement and adjusted the friction locks to establish adequate friction. They also recalled that their usual practice was to check the friction locks were correctly set before take-off.

Soon after, the aircraft was taxied to the runway and the pilot commenced a rolling take-off with their left hand on the control column and right hand on the power levers. When at about 94 kt, the pilot moved their right hand onto the control column and rotated the aircraft. When about 50 ft above ground level, the aircraft suddenly yawed left. Automatic dependent surveillance-broadcast data showed the aircraft tracking immediately left from the runway. The paramedic also recalled being pushed to the right and the aircraft not being aligned with the runway. The pilot looked at the engine instruments and observed that the left engine was showing a power loss, but the right engine appeared to be producing take-off power. Based on these indications, the pilot managed the situation as an engine power loss.

The pilot recalled focusing on maintaining directional control by applying right aileron and rudder. They then assessed the reason for the power loss and whether the propeller was feathered, which they believed it was not. The pilot scanned the cockpit again and observed that the left power lever had migrated rearwards towards the idle position. While moving the left power lever back in-line with the right power lever, the aircraft yawed right as the pilot was still applying right rudder. The power increased on the left engine, the pilot reduced application of right rudder and retracted the landing gear. Immediately after, the left power lever started moving rearwards again. The pilot re-tightened the friction lock on the left power lever, which resolved the issue. At that time, the aircraft was climbing through 200-300 ft. The paramedic reported that the pilot said the power lever had migrated as the friction lock had not been correctly set.

The flight continued to Albury without further incident. The pilot noted the power lever migration on the aircraft's maintenance log as that they believed the friction lock was not adequately functioning. The subsequent engineering inspection did not find any technical issues with the power lever assemblies and friction locks.

Context

Pilot information

The pilot held a valid Air Transport Pilot Licence (Aeroplane), multi-engine command instrument rating, and a type rating for the B200C obtained in July 2021.

Friction locks

Four friction locks were located on the engine control pedestal. One each for the left and right power levers, one for the propeller levers, and one for the condition levers (Figure 1).

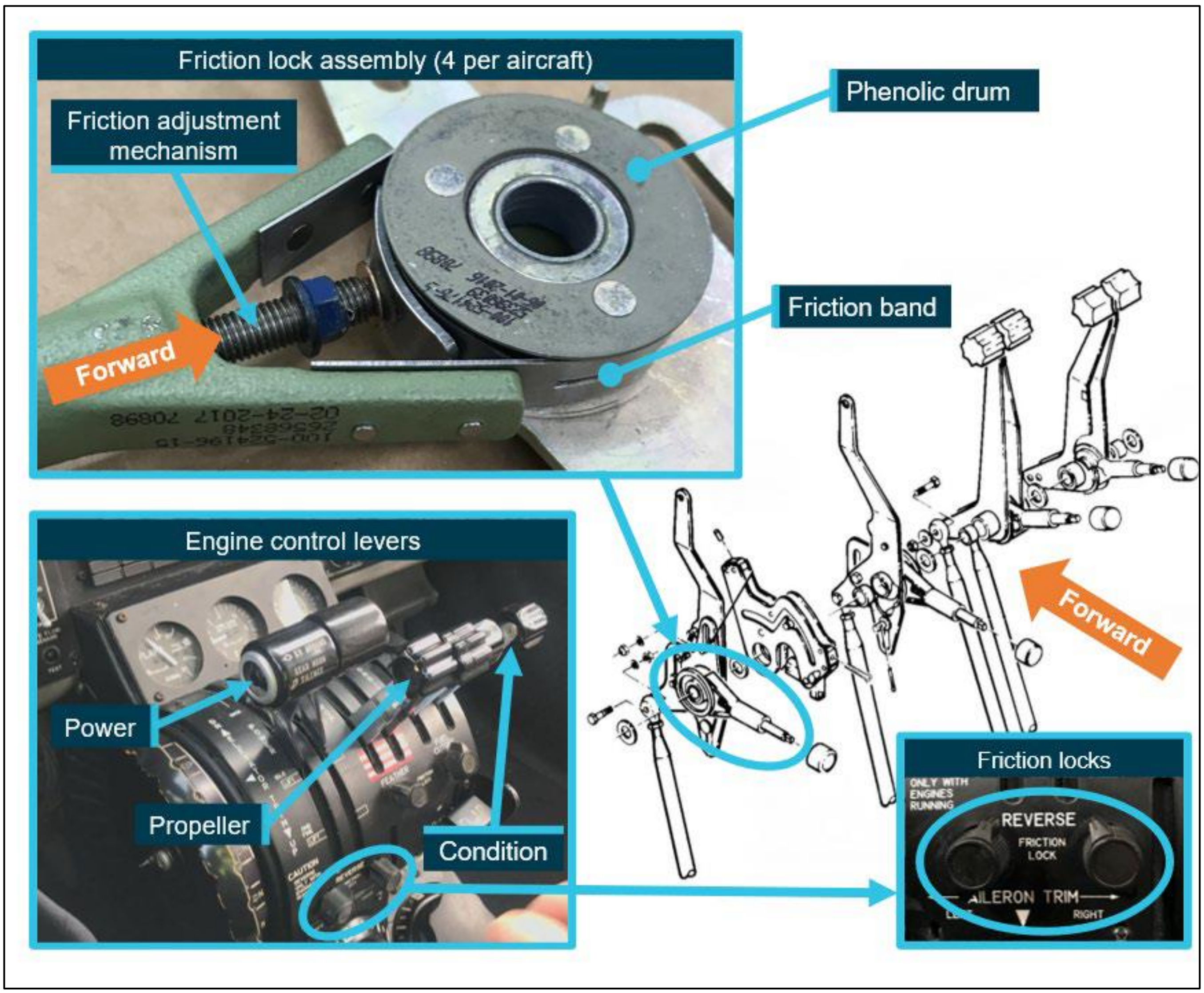

Figure 1: Engine control levers and friction locks
Source: Pel-Air and Textron Aviation, annotated by the ATSB

A characteristic of the King Air friction locks was that they required careful setting as some aircraft had a narrow range between no friction and too much friction. The operator reported that there was no consistency in setting friction locks for a desired resistance between power levers in the same aircraft and other aircraft, and this changed over time due to wear. Worn friction locks were required to be replaced.

The maintenance log for the aircraft indicated that the left and right power lever assemblies, including both friction locks, were replaced in November 2020 after being observed to be worn, resulting in a reduced range of adjustment. Before the assemblies were replaced, pilots had reported to engineering staff that the friction locks were difficult to adjust.

The operator's *Flight Crew Operating Manual* for the B200C aircraft included the following checklists where the friction locks were to be checked by the pilot prior to take-off:

- Internal daily inspection: This checklist was completed prior to the first flight of the day[1] and included checking the power levers friction lock settings in the idle position.
- Before engine starting: After the first flight of the day, the internal daily inspection was replaced by the 'before engine starting' checklist, which included a scan procedure beginning at the left side of the cockpit. This checklist required the power levers to be at idle and the friction lock setting checked. Further detail on how to adjust the friction locks was also included:
    - Place the power lever to the approximate position for take-off power and let go. If they roll back, set them again but tighten the friction.
    - The power levers have a spring retention configuration that increases resistance the more the levers are advanced. The result of this is the roll back of power levers if the friction lock is set too loose.

Before take-off: In the before take-off checklist, the pilot would check the friction locks were set. After this, there were no further requirements to check the locks.

These checklists were consistent with the manufacturer's *Pilot Operating Handbook*. The ATSB noted that the handbook did not contain further detail on how to adjust the friction lock and the potential for power lever migration.

The operator advised the ATSB that in 2019, there were a number of reported rejected take-offs with serviceable aircraft with no faults found, which were assessed to be related to friction locks not being set correctly prior to take-off. As a result, the operator published an operations note to pilots about friction locks in the before take-off check for the King Air aircraft, with details about their proper adjustment. It was unknown if the incident pilot, who had commenced with the operator in 2021, was aware of this notice.

Power lever migration

Power lever migration on the King Air referred to an uncommanded spring back or migration of the lever towards the idle position. This was typically experienced when the pilot removed their hand from the levers during take-off.

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[1] *The incident flight was the tenth flight of the day.*

If unnoticed, this could result in the aircraft yawing towards the engine experiencing the power lever migration, a significant loss of propeller torque on that engine, and the auto-feather system disarming.

This migration occurred when the friction locks were not appropriately set, and could affect King Air 90, 200 and 300 series aircraft. The propeller and condition levers were not susceptible to migration.

The cockpit to engine nacelle power lever control cables were connected to a cam assembly on the right side of each engine via a lever. This lever was spring loaded towards idle to prevent an uncommanded acceleration in the event of a power lever cable malfunction that could damage the engine when torque and temperature limits were exceeded. The springs also reduced the effect of hysteresis[2] when power was reduced, which could cause the rate one engine's power reduced relative to the other to be different. An additional spring could be fitted during production or maintenance to further balance the rate of power reduction between both engines. This additional spring was not fitted to the incident aircraft. The effect of the springs migrating the power levers toward idle during normal operations was overcome by setting the friction locks.

In addition, as the power lever cables were connected to the right side of each engine, the cable for the left engine was shorter than the right, and therefore less affected by hysteresis. Due to this, if the friction locks were not correctly set, the left power lever could migrate further aft than the right, resulting in an uncommanded left yaw. The operator demonstrated this on the ground without the engines running. With both power lever friction locks loosened and the levers full forward, when they were released the left engine power lever migrated further aft than the right (Figure 2).

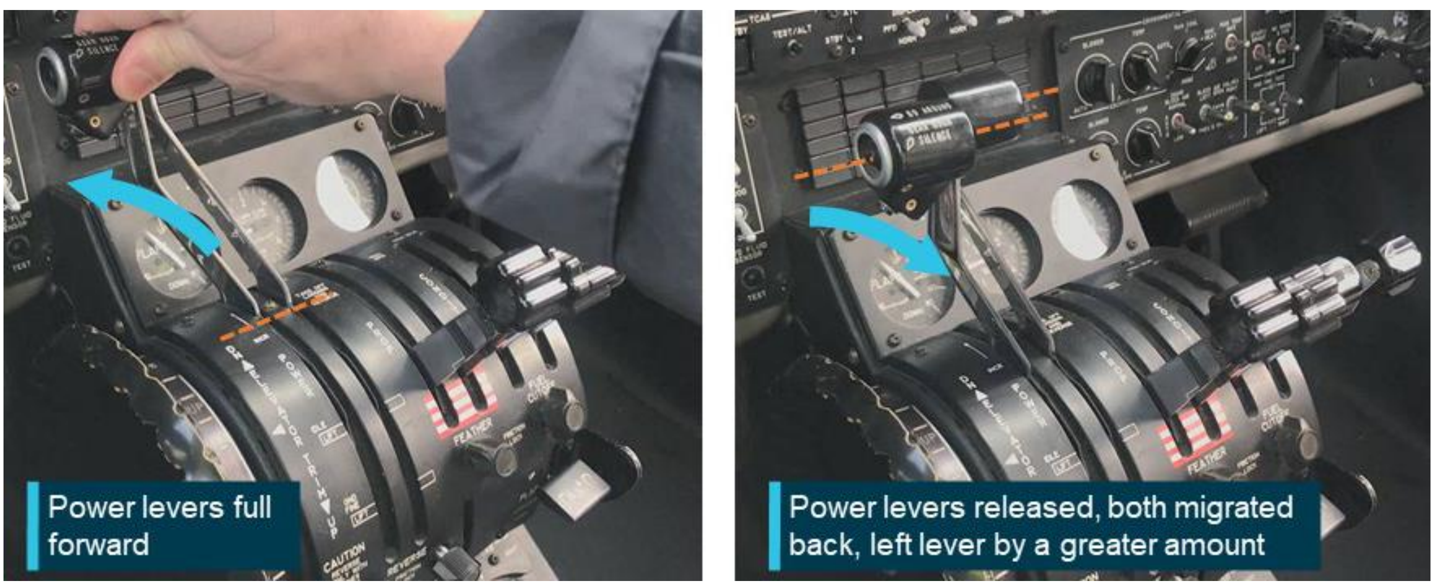

Figure 2: Power lever migration demonstration

Source: ATSB

Prior to the incident, the operator's training for pilots converting to the B200C was limited to the operation of the friction locks. At interview, the pilot reported that they were new to the B200C aircraft type and unaware that power

[2] *In this context, hysteresis is the lost motion (or backlash) in the cables used in the power control system. For a given input by the pilot, the cable's movement may be impeded mechanically by friction and/or non-linear movement of the cable within its housing.*

lever migration could occur during take-off. Another pilot from the operator noted that, until a pilot experienced a power lever migration, then it could be difficult to know how much to tighten the friction locks.

In addition, the King Air magazine included articles that emphasised the importance of adjusting the friction locks adequately to avoid power lever migration. The articles also described techniques to check that the friction locks were set sufficiently to prevent migration.

Safety analysis

Uncommanded left yaw

Just after take-off at night, the pilot reported that the aircraft suddenly yawed left. This was consistent with the recorded flight path and the paramedic's observations. When the yaw occurred, the pilot's immediate response was to manage the situation as a left engine failure by applying right rudder and aileron to maintain directional control. The pilot then noticed the left power lever had migrated to the idle position and responded by pushing the power lever forward. After resetting the power lever friction lock, the flight continued without incident.

Insufficient friction applied

The friction locks were adjusted by the pilot to a level they believed to be sufficient prior to take-off. However, as the post-flight engineering inspection did not find any technical issues with the power lever and friction lock assemblies, and the left power lever had migrated twice during the take-off sequence, it was likely that the friction lock had not been sufficiently set during pre-flight checks. This was consistent with the paramedic's recollection of the pilot indicating that the friction lock had to be re-set.

King Air friction lock characteristics

Due to the spring loading of the power levers on the King Air series aircraft, there was a tendency for the levers to migrate towards the idle position, particularly during take-off, if the friction locks were not appropriately set. This was more prevalent on the left power lever due to the shorter length of its cable. There was also an awareness of the possibility of a narrow range of adjustment, inconsistency in friction lock settings between the left and right engines, and from aircraft to aircraft, which could change due to wear.

While the incident pilot was not aware of the possibility of power lever migration, the need to carefully adjust the friction locks to prevent migration was more broadly known by B200C pilots and operators. This characteristic had been experienced among different operators and pilots as demonstrated in the reported occurrences and had also been considered as a potential factor in two fatal accidents.

Findings

From the evidence available, the following findings are made with respect to the uncommanded power reduction involving Hawker Beechcraft King Air B200C, VH-VAH, Essendon Fields Airport, Victoria, on 19 August 2021.

Contributing factors

- During a night take-off from Essendon Fields Airport, the left-engine power lever migrated to idle, which resulted in an uncommanded left yaw.
- During the pre-flight checks, it was likely that the pilot applied insufficient friction to prevent the left power lever migrating.

- The power lever friction locks fitted to the Beechcraft King Air series aircraft required careful adjustment to prevent power lever migration during take-off, particularly on the left engine. This characteristic was broadly known among operators and pilots.

Safety action by the operator

As a result of the incident, the operator undertook the following safety actions.

Training

The engineering department and flight operations manager provided additional training to all King Air pilots demonstrating how the friction lock system worked, how power lever migration could occur, and how to check the friction locks were adequately adjusted. In addition, a course on power lever migration has now been included as part of the ground school pilot training for the King Air aircraft.

Revised take-off procedure

The day after the incident, the operator published a notice to air crew, which stipulated that all take-offs on sealed runways must be conducted using a standing start take-off. Further, the take-off checklist for a standing start in the *Flight Crew Operations Manual* was amended to include a requirement for pilots to check that the friction locks were set to prevent power lever migration when take-off power had been set.

Safety advisory notice to King Air series aircraft operators

SAN number:	**AO-2021-034-SAN-01**

The ATSB advises pilots and operators of the King Air series aircraft (90, 200, and 300) that the power lever friction locks require careful adjustment to prevent power lever migration towards the idle position, particularly during take-off. Inadvertent migration of one power lever towards idle can result in power reduction and yaw that, when occurring at low height, can result in catastrophic outcomes. Operators should ensure pre-flight checks provide opportunities to confirm friction lock settings before the take-off run, and ensure pilots have adequate knowledge of friction lock sensitivity to help prevent and recover from inadvertent power lever migration.

Forest Fire Aircraft Operating Restrictions for Pilots and RPAS

by the Saskatchewan Public Safety Agency and the Airtanker Forest Service Safety Board

Last summer, there were numerous occurrences of airspace incursions with private aircraft while fighting forest fires and a similar trend in the previous four years. This adds an added safety risk to fire response personnel and pilot's regular duties as they not only communicate to the fire response aircraft on the fire, but they also communicate to the lead incident command and operations personnel on the ground. To add additional unauthorized aircraft flying through the fire, adds a serious safety concern to all involved.

Photo credit: Jeffery Dawe-CL415 Training Captain, Transportation and Infrastructure, Air Services Division

Canadian Aviation Regulations (CARs) 601.15 states that:

> No person shall operate an aircraft:
>
> a) over a forest fire area, or over any area that is located within five nautical miles of a forest fire area, at an altitude of less than 3,000 feet AGL; or
> b) in any airspace that is described in a NOTAM issued pursuant to section 601.16

In addition to the itinerant aircraft airspace incursions, agencies across the country continue to see airspace incursions caused by remotely piloted aircraft systems (RPAS) within the defined forest fire area which have the potential to suspend firefighting operations until the airspace incursions can be resolved.

This reminder is in the interest of agencies and operators, to have safe and efficient firefighting operations across Canada. Pilots should check local NOTAMs during the fire season, when they see a fire while flying, they are to report it and remain clear of it to help crews out as they fight the fire. △

BE WEATHER WISE

It's deadly to minimize bad weather

- Cancel or delay the flight
- Respect the limits, yours and your aircraft's
- Expect the worst, plan ahead, consider all your options

YOU ALWAYS HAVE A CHOICE

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