Transport Canada Safety and Security / Transports Canada Sécurité et sûreté

Aviation Safety Letter

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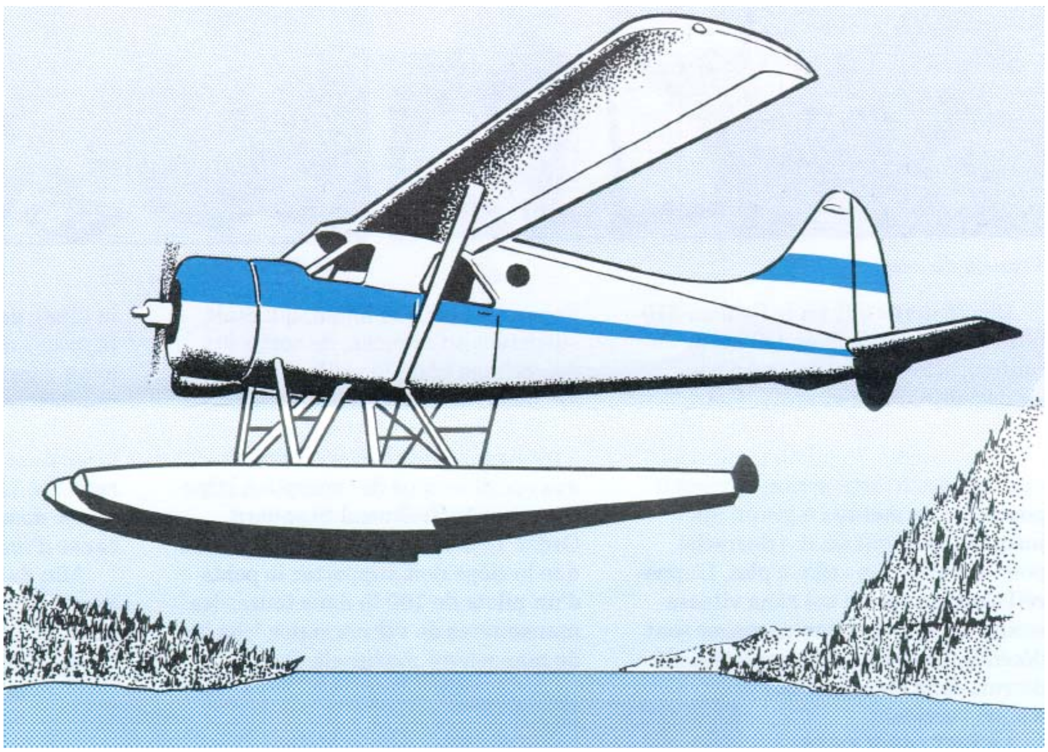
Learn from what others are doing right...

Issue 2/97

Shoulder Harnesses, Seats, and Lap Belts



Shortly after take-off, the Pratt & Whitney engine quit. The Beaver pilot manoeuvred around higher terrain and was heading back to the lake when the aircraft stalled at low altitude and crashed into the water. The accident was deemed survivable by the TSB investigators (A93Q0145). However, due to a combination of several factors, only one of the six people on board survived.

Mining crews stationed at an isolated lake were going to a nearby town for a crew change. The lake is surrounded by 700- to 1000ft. mountains. The takeoff/landing distance is about 2 km. in an east-west direction. Conditions on this day were conducive to serious carb icing: the temperature was 13° and the dew point, 12°. Winds were from the south-southwest at 10 to 15 kt.

On the second flight, the pilot loaded five passengers on board. He taxied to the *middle* of the lake and began his takeoff in a northeasterly *downwind* direction. Once airborne, he climbed southward through a valley. At that point, mountains on both sides prevented a 180° turn back to the lake when the engine quit. He had not stacked the odds in his favour with a mid-lake downwind takeoff.

He had, however, completed the Engine Failure Check, including Carb Heat ON. But he didn't have enough altitude to both manoeuvre around the mountain and stretch his glide to reach the water safely. The aircraft stalled and struck the water in a 60° nose-down, left-wing-low attitude.

The front and centre seat belts were anchored to the seat frames, not the airframe; thus, when the pilot's and co-pilot's seat-attachment points failed, as did the centre-seat attachments, the two front-seat occupants were thrown into the instrument panel. The pilot suffered incapacitating head injuries and drowned. The right-seat occupant's injuries were fatal.

The centre-seat passengers were thrown forward against the metal backs of the front seats. Like the pilot, the left centre passenger suffered incapacitating head injuries and drowned. The right centre passenger died at impact.

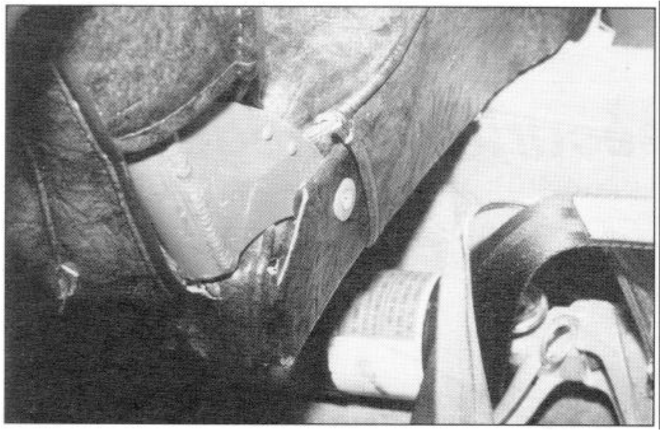
Canada

The two rear-seat passengers, whose seat belts were anchored to the airframe, remained in their seats and survived. However, one died three hours later from abdominal injuries.

The limited deformation of the aircraft fuselage made the accident survivable. Impact forces did not exceed the limits of human tolerance.

Investigators also reasonably concluded that if all seat belts had been anchored to the airframe, and if shoulder harnesses had been installed and used, more of the aircraft occupants would have survived.

Seat-Back Failure Causes Loss of Control



Seat attachment.

Failure point.

The Cessna 310 was observed in a cruise-configuration low pass over the private strip. As the aircraft reached the end of the runway, the pilot pulled the aircraft into a steep climb. The aircraft continued to climb steeply until it stalled and entered a flat spin. It hit the ground with no forward speed. The pilot and his passenger died. The aircraft was destroyed in the ensuing fire.

The TSB (A95O0078) concluded that, when the pilot initiated the abrupt pull-up, his weight overloaded the design specifications of the seat back, causing it to fail rearward. With the sudden G-loading, the pilot fell backward when the seat failed, pulling the control column fully aft. Hanging back from the yoke, he was physically unable to recover from the low-altitude stall/spin.

The TSB Engineering Laboratory confirmed that the seat met the design specifications set out in Technical Standard Order TSO-25a. The TSO requires that the seat support a 190-lb. pilot throughout all normal flight manoeuvres (maximum manoeuvring load of 2G). If the 380-lb. pilot (at double the weight in the certification standard) pulled the aircraft nose up to 45° in a smooth 2G manoeuvre, his weight on the back of the seat would have greatly exceeded the ultimate load limit. The Lab found that the seat back had failed in overload.

Non-survivable.

Recognizing that people today are bigger, TSO-25a was changed in 1969 and again in 1983. However, there are still a lot of older aircraft built to the old design standards. Creative solutions might see periodic dye-penetrant testing or the x-raying of seat fittings, medical restrictions on pilots' weight or a placard on the aircraft seat with a weight restriction on the pilots who fly these older birds.

Transport Canada Safety and Security / Transports Canada Sécurité et sûreté

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Sécurité aérienne — Nouvelles est la version française de cette publication.

Stacking the Odds in the Mountains

The MU 300 Diamond touched down in the first thousand feet of the bare and dry 4500-ft. Jasper-Hinton runway. The captain applied maximum braking, but he quickly realized that he would not be able to stop on the runway remaining. He initiated a series of "S" turns, believing that, by increasing the distance travelled, he would improve his chances of stopping before running off the pavement. He could not.

The aircraft skidded to a stop 225 ft. off the end, with the left main and nose gears collapsed. Numerous wrinkles in the fuselage skin and structure indicated serious airframe damage. Jet fuel leaked into the ground from the ruptured left-wing tank (TSB Report A95W0034). Thankfully, fire did not break out, and the four on board walked away uninjured.

Both pilots had flown into Jasper-Hinton before. So how did this experienced crew stack the odds so high against a successful landing?

At the pre-flight planning stage, the crew might have noted that there are no readily available weather observations for the Jasper-Hinton aerodrome. *(There are automated observations recorded at Jasper-Hinton, stored and forwarded twice daily to Environment Canada. Human observations have since ceased at Jasper, also replaced by an auto-station. Neither of these auto-stations meet aviation standards. There is an Automated Weather Observation System (AWOS) in Edson, 45 mi. east of Jasper-Hinton. Since 1991, these observations have been available on normal weather information circuits and were available to ATS. They are not available by local voice generator module.)*

At the time, the nearest official weather observations were taken at the Jasper townsite, 7 NM from the Jasper airstrip, and 30 NM from the Jasper-Hinton aerodrome and separated from it by 8000-ft. mountains. When the FSS briefer gave them the "Jasper" weather, the crew members assumed that they were getting Jasper-Hinton information and the specialist was merely abbreviating the name. They made the same assumption later when the Edmonton Centre controller passed them the latest "Jasper" weather before clearing them for descent. *The regulations require ATS to give pilots the nearest official weather and altimeter setting.*

Potential name confusion is not unique to these two aerodromes. There are numerous opportunities across Canada to duplicate the mistake: Moose Jaw/Moose Jaw Muni; Edmonton Intl/Edmonton Muni; Cold Lake/Cold Lake Regional; Gods Lake/Gods Lake Narrows; and La Grande-3/La Grande-4, just to name a few. So if you are aiming for Gods Lake and are told that "Gods Lake Weather is...," beware: Gods Lake does not report weather. Gods Lake Narrows does, but it's 30 NM to the west of your destination.

While the weather was basically clear at both sites, the winds at Jasper were calm, while the winds at Jasper-Hinton, on the other side of the mountain range, were out of the southwest at 14 kt., gusting to 21 kt.

Subsidence of the air coming out of the mountains and the funnelling effect of the valley to the west of the airport both mean that the Jasper-Hinton winds are generally stronger. Because of the unpredictable variable winds, Jasper-Hinton has three windsocks serving the one runway: one at each end, and a lighted sock at centre field.

It is not unusual for winds and weather in the mountains to vary widely over short distances. Previous experience (both pilots had been there before) and a pre-departure review of aerodrome information should have reminded the crew that, except for the first 400 ft., Runway 02 has a distinct downslope.

Arriving at Jasper-Hinton, the crew did not follow the procedures recommended for uncontrolled aerodromes. Those procedures suggest that a pilot should overfly the aerodrome prior to landing to determine wind and verify that the runway is unobstructed.

Believing that the winds were calm, and with 25 mi. visibility, the pilots did not feel that a visual inspection was needed. They proceeded with a straight-in approach for landing on Runway 02.

On approach, the captain decided to add 10 kt. to the reference speed (V_{ref}) to compensate for subsiding air, turbulence and airspeed fluctuations. *(All of these factors should have alerted the crew to strong winds. Observing smoke, trees and water during their descent would also have warned them of the wind's strength and direction.)* On short final, the crew observed the windsock extended parallel to the ground and varying in direction. What they failed to take in was that it was not varying off the nose, but straight up the tailpipe.

So here's how the odds stacked up:

- inadequate preflight planning;
- winds and weather for a site 30 mi. away, on the other side of a high mountain ridge;
- a lack of appreciation of mountain weather;
- unclear preflight briefing and en route radio communications;
- disregard for recommended practices;
- failure to use the clues the strong winds were giving;
- observation of, but failure to see, the windsock; and
- a landing downwind, downslope, at 10 kt. above V_{ref}.

A last-second rejected landing might have saved the day, but, with those odds, the result was almost a sure bet.

Fog and Fatigue

The official accident report stated that the cause of the accident was "failure of the pilot to maintain altitude and proper climb during the missed approach."

The 5000-hr pilot was flying a night charter. Destination weather was forecast to be 10,000 ft. broken, with 2 mi. visibility in fog and haze. However, on arrival, he found that the weather was much worse. The AWOS reported a 300-ft. overcast ceiling and 1/2 mi. visibility. Nevertheless, he reported that he could see the runway through the fog. He requested and was cleared for a contact approach. But during his descent, fog moved over the runway, and he missed the approach. Since he still had 2.5 hrs of fuel on board, he decided to hold for a while to wait for the fog to clear.

Only a few minutes later, he changed his mind and requested clearance to his alternate, which had been reporting an 8000-ft. ceiling with 2 mi. visibility in fog and a temperature-dew point spread of one degree. By the time he arrived at the alternate, the weather there had deteriorated significantly (a pilot on the ground reported visibility near zero in fog).

His first attempt at the ILS approach missed. So did the second. During the second missed approach, he flew into the ground and died.

The pilot routinely worked for his family's business all day and then flew all night for a charter company. At the time of the accident, he had been flying for only about 6 hrs, but he had been awake for more than 21.

The real cause of this accident was fatigue.

Highly Recommended Reading

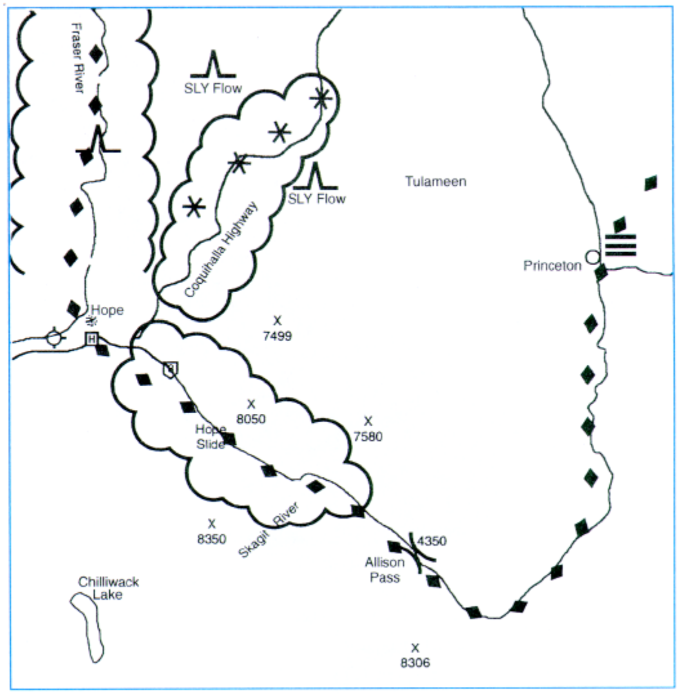
Aviation Weather Hazards of British Columbia and the Yukon is a real gem recently published by Environment Canada meteorologists.

Mountain and coastal weather can be highly variable over short distances, and the heart of this outstanding book is Chapter 4, which focuses on common visual flight rules (VFR) flyways through the mountains and west-coast Canada.

Local, small-scale aviation weather is presented by brief narratives, along with maps and symbols depicting where and when you are likely to encounter problems such as low ceilings, fog, turbulence, etc. along a given flyway. The maps simply and effectively show significant terrain features like narrow mountain passes, rivers, major roads and spot heights that relate exceptionally well to your VFR map.

The Hope Slide area on the Princeton-Hope flyway has turned more aircraft into scrap aluminum than has any other location in Canada. Page 98 contains a map of this area and the following narrative:

"If Hope is impassable then the Hope-Princeton west of Allison Summit is likely impassable. The Hope Slide area is particularly treacherous as the barren hillside reflects light, especially when snow-covered, causing a "brightening" in the cloud and making pilots think that conditions are improving ahead. 'Visibility falls rapidly along this route once steady precipitation begins. As little as ten minutes can see the route change from passable to closed. When travelling westbound, low cloud will begin to force aircraft to descend just east of the Skagit Valley but it still remains that visibility will be the main problem.



"When travelling eastbound from Hope to Princeton, experts recommend that aircraft pass Hope with sufficient altitude to safely cross Allison Pass. East of the Skagit River, the valley rises very steeply to the summit. This gradient exceeds the climb capability of most conventional aircraft and the rapidly narrowing valley makes turning dangerous or impossible."

To make it self-contained, the manual starts with some basic meteorology, followed by sections on specific weather hazards to aviation, local weather and larger-scale system weather. This leads to some understanding of mountain weather phenomenon that can be related not only to areas of British Columbia and the Yukon not covered in the book, but also to other mountainous areas of Canada.

This book should be a "must-read" for any pilot new to Western Canada, but it can also be valuable for the experienced mountain pilot planning to fly to unfamiliar regions.

Aviation Weather Hazards of British Columbia and the Yukon is available for your use at flight planning centres throughout British Columbia and the Yukon.

System Safety Training

Prairie & Northern Region:

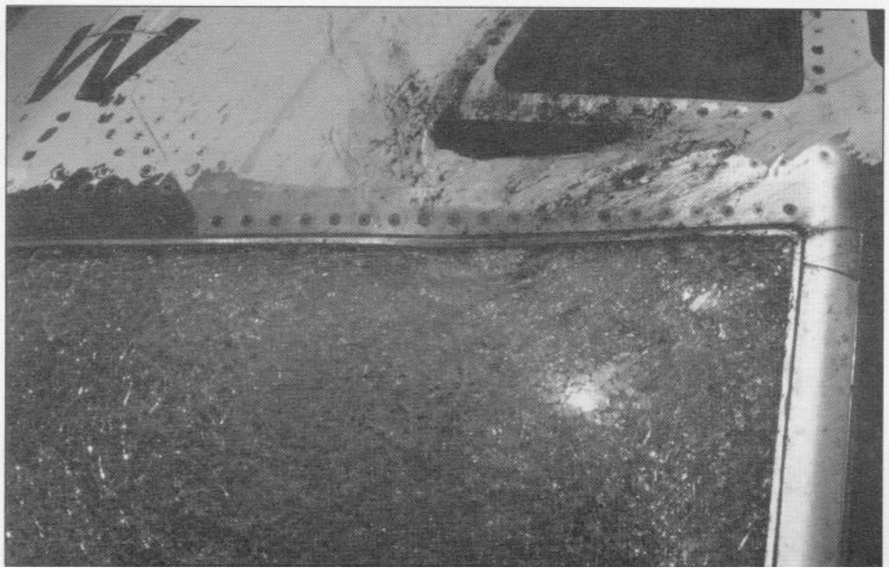
Pilot Decision-Making: One day. Course fee: $50/participant
(meet CARs Training Standards 722.17, 723.28 & 724.24 for VFR Flight Minimum in Uncontrolled Airspace)
Yellowknife, NT: April 16 or 17, 1997
Whitehorse, YT: April 19, 1997
Edmonton, AB: May 13, 1997
Calgary, AB: May 15, 1997

Command, Leadership Resource Management:
Two days. Course fee: $100/participant
(meets CARs Training Standard 725.124 item 39)
Saskatoon, SK: May 8-9, 1997

Company Aviation Safety Officer:
Two days. Course fee: $100/participant
(meets CARs Training Standard 725.07 item (3))
Winnipeg, MB: November 18-19, 1997
Calgary, AB: November 25-26, 1997
Saskatoon, SK: December 9-10, 1997

All of the above courses are available upon request with a minimum of 20 participants. Contact Carol Beauchamp at (403) 495-2258/3861 for further information.

Birds and Windshields



B737 windshield.

All airplane windshields are manufactured to the same airworthiness standards? The windshield on your general aviation (GA) airplane or light helicopter offers protection from more than just rain, snow and bugs? If you believe these statements, then you could be in for a rude surprise.

In *ASL 3/96,* we discussed the loss of a PA-28 pilot and airplane en route from Brampton to Hamilton, Ontario, in February 1994. The cause of the crash was most likely a gull penetrating the windshield and blinding the pilot.

In *Vortex 4/95,* we described the results of a western grebe striking the windscreen of a Bell 206 helicopter over Kelowna, British Columbia. If it weren't for the fact that the pilot was wearing a helmet with the clear visor down, the story might have ended in a fashion similar to the PA-28 accident.

Worldwide, numerous fatal accidents are reported involving civilian and military airplanes that are lost owing to bird strikes on windshields. The reports follow a pattern similar to that of a Cessna 402 in Kenya that struck an eagle over Masai-Mara in 1985. The pilot was killed instantly, and the airplane crashed, killing everyone on board.

GA airplanes and helicopters are not the only aircraft vulnerable to bird-strike windshield damage. The photograph shows the damage caused to a Kenya Airways B737 that struck a European white stork at 10,000 ft. in 1993. The strike destroyed the windshield and penetrated the fuselage, and broken glass seriously injured the captain. The first officer was able to perform an emergency landing, thereby avoiding tragedy.

Closer to home, on November 14, 1996, an Air Ontario DHC-8 made an emergency landing at Ottawa after the windshield was damaged by a bird strike. Data from ICAO member states from 1980 to 1992 describe 25 significant strikes to windshields involving transport airplanes. Of these, 4 resulted in injury to the flight crew and 8 required precautionary landings. Current airworthiness standards for transport category airplanes (over 12,500 lb.) require that windshields and surrounding structures be capable of withstanding a 4-lb. bird strike at cruise speed from sea level to 8000 ft. Concerns have been raised by ICAO members, particularly India, that the standard should be revised, owing to an increasing number of damage reports involving larger birds. Studies conducted by the USAF support the need to raise the standard to 4.5 lb., and recent developments by the Wright Laboratory have led to the use of injection-molded transparencies in some military aircraft that can withstand remarkable impact forces.

Standards for commuter-category airplanes (between 12,500 and 19,000 lb. and/or 10 to 19 passengers) require that the windshield in front of the pilots be able to withstand a 2-lb. bird strike at maximum flap speed, and transport-category helicopters (over 6000 lb.) must be able to withstand a 2.2-lb. bird strike anywhere on the structure, allowing for continued safe flight and landing for category A operations, and safe landing for category B operations.

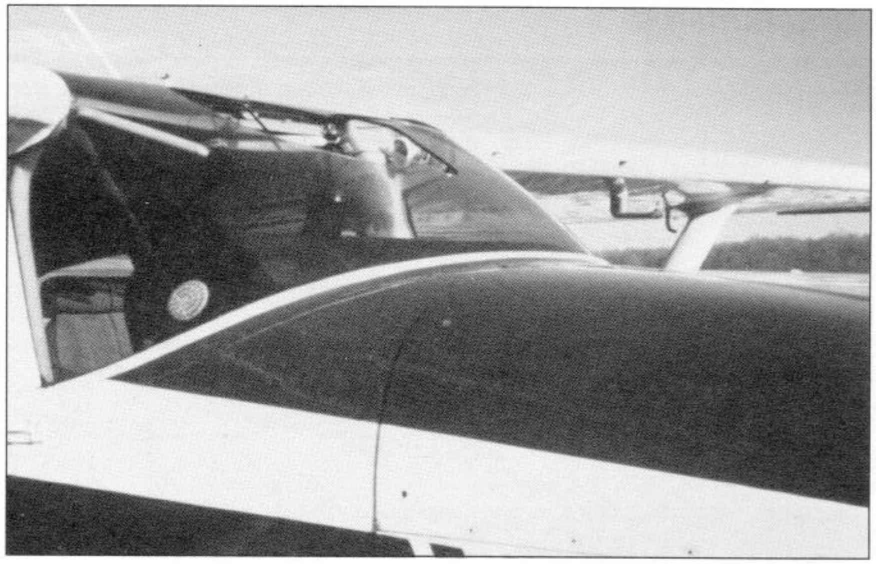
Now that we know about the airworthiness standards for transport- and commuter-category airplanes, what about the standards for normal-category airplanes (under 12,500 lb. and 9 or fewer passengers) and helicopters (under 6000 lb. and 9 or fewer passengers)? The page here is blank; there are no requirements. The fact is that the windshield on your normal GA airplane or helicopter is only designed to keep out rain, snow and bugs. Knowing that, at 110 kt., the force of a l-lb. bird (a small gull) striking the windshield of your light airplane can exceed 1200 lb. per square inch, you may wish to read on and learn how to avoid becoming part of our database.

In 1995, 81 incidents reported to Transport Canada involved bird strikes to windshields. Of these reports, 7 involved damage to the windshield structure. As a GA or helicopter pilot, what measures can you take to ensure that you do not become a statistic? First of all, don't fly in the same airspace as the birds. Birds seldom fly above 1500 ft. AGL, so it makes sense to plan your flights to spend as little time as possible at lower altitudes.

If you fly routinely in the same area, you might want to do some research to determine where birds such as gulls (the most commonly struck bird) feed and spend the night. You don't want to be flying at low altitudes on the flight paths that gulls use to move between their roosting sites on lakes or rivers and feeding sites such as landfills. You should also avoid flying over freshly plowed or harvested fields, and, during the spring and fall migrations, you definitely want to keep your eyes open for flocks of waterfowl such as Canada geese. These birds will fly at altitudes up to 15,000 ft. ASL, so be wary. Caution is advised when you are flying in areas where there may be strong updrafts, such as the windward side of hills and mountains. Birds of prey and some flocking birds will take advantage of an opportunity to gain free altitude.

Don't underestimate the damage that a bird can do to an airplane. Several accident reports from the United States describe GA pilots intentionally flying into bird flocks to see what might happen. They didn't survive to tell the story.

Fly with your landing, strobe and navigation lights on at all times. It can't hurt to make your airplane as visible as possible. Try to keep your speed low whenever it's safe to do so at lower altitudes. The force of a bird strike is determined by the square of your speed multiplied by the mass of the bird, and so the most important factor is your speed. If you see birds, and can safely pull up, do so: birds under threat tend to dive, so don't dive with them. Finally, if your airplane is stabilized on final approach and you experience a bird strike, continue on and land. There are numerous reports of accidents occurring because of an unsuccessful overshoot following an otherwise non-damaging bird strike.



Skylane's shattered windshield.

At the airport, you may wish to reconsider your takeoff decision if you see large numbers of birds in the vicinity of the runway. Call ATC, the Flight Service Station (FSS) or the airport operator to request that the birds be dispersed. If you consistently see large numbers of birds in the airport environment, you might want to lobby the airport operator to do a better job of managing its facility. Remember, the operator is in the business to provide a service to pilots and airlines, and is required to operate a safe facility.

If you happen to be unlucky and a bird penetrates your windshield, remember that your primary focus should be on flying the airplane. If you can see it coming, duck your head below the instrument panel, or at least cover your face to protect your eyes from debris. Try to ignore the wind blast, bird remains, noise, and the fact that your headset will likely blow off and you will be unable to see your instrument panel. (If you have trouble with this part, try sticking your head out of your car at highway speeds, then imagine the turmoil at twice that intensity.) Follow correct flying procedures, and find an airport to make an emergency landing.

All helicopter pilots should be wearing helmets with the visors down, and those in fixed-wing airplanes may prevent eye injury by wearing good-quality sunglasses: (It may not look cool, but wearing a helmet and visor in a light fixed-wing aircraft isn't such a bad idea.)

Finally, if you are a flight instructor, or are associated with a flying school or club, advise your colleagues or students that bird strikes are a serious matter and deserve to be part of your risk-management program.

Sky High

This dynamic new television aviation program begins on the TSN/RDS network during the last week of April (check your local listings). Each week will highlight four minutes of safety advice in *Through the Overcast,* with host Mike Doiron, Regional Director, System Safety, Atlantic Region. △

Skydiving

As the freefalling skydiver deployed his main parachute and stabilized under the blossoming canopy, the sight of an aircraft in close proximity shocked him out of his freefall high. The aircraft almost immediately banked into a steep turn to avoid the imminent mid-air collision.

That scene has been repeated all too often and has resulted in fatal accidents. There are numerous skydiving clubs across Canada, mostly at uncontrolled aerodromes, but a few operate at larger airports with a control tower or FSS. And over the past few years, I have watched the comings and goings of numerous pilots across our local drop zone. Overflying pilots appear to be unaware of the skydiving activity and often fail to respond when I try to contact them on the radio.

At the Drop Zone

Parachutists normally leave the plane somewhere between 2500 and 12,500 ft. AGL. If they exit the plane at 2500 ft., they will open their parachutes almost immediately. If they exit at 12,500 ft., they will freefall for about 60 seconds before opening their parachutes at 2500 ft. Parachutists always exit the plane upwind of their intended landing site. If the wind is calm, they will exit directly overhead the landing site. If the wind is 10 to 20 kt., they will exit about 1/2 mi. upwind. On very windy days, the exit point could be a mile or more upwind.

Planes used for skydiving are either climbing or descending. There is never a level-off, cruise phase. As a result, the pilot is never in the best position for seeing out of the plane. All due caution is exercised, but it is difficult to see out of the windscreen when the nose is high. The descent phase is very rapid. The plane is flying quickly and has a high rate of descent.

If you wish to land at, or fly past, an airport where skydiving is taking place, the best tool is your radio. On the right frequency, you can determine where the jumpers are, and you can advise the jump-plane pilot of your position and intentions.

Arrival Procedures

If there is an FSS or a control tower at the airport, it is easy. Simply follow the directions you are given. The specialist or controller has the big picture and can keep you clear of any jump operations.

However, most drop zones are at uncontrolled airports, and arrivals there are not quite so easy. There usually is no one to give you the wind direction or the preferred runway. You have to overfly the airport in order to see the windsock. Once you know the wind direction, you can decide on the best runway. Using this technique at an airport where skydiving is in progress can be hazardous, simply because there will likely be open parachutes below 2500 ft. AGL in the area.

Arrival at a drop zone should start well back from the airport. Listen for a while; jump pilots make general broadcasts when the jumpers are getting close to exiting and again right at exit time. If you hear a jump plane, you can ask for the winds and runway in use. If you do not hear any activity, make a blind broadcast. To be safe, make this request or broadcast a few times as you get closer. Depending on how busy the drop zone is, it may take a couple of tries before you get an answer.

Plan your arrival such that you do not overfly or fly upwind of the airport. This may necessitate a wide circuit of two or more miles from the airport. If the drop zone is active, it might be safer to do a right-hand circuit, entering on the base leg or even doing a straight-in approach. Ensure that you keep the other traffic informed of your intentions.

If you do not get a response to your radio calls, perhaps no one is in the air, or perhaps the jump-plane either does not have a radio or the pilot is not using it. Err on the side of caution and assume that there are parachutes in the air. Fly as close to the airport as necessary to determine the wind direction, but no closer. Make this pass on the downwind side of the airport at 90° to the forecast wind. This will minimize the time that you are in the area where parachutes might be. If you have two people on board, give the non-flying person the job of looking for parachutes while the pilot assesses the wind direction. Make frequent radio broadcasts informing other traffic of your intentions.

Transiting the zone

The best advice is simply not to overfly a drop zone. Pass at least 5 mi. away from the aerodrome. Monitor the published frequency and broadcast your position, altitude and intentions. If you do overfly, broadcast when overhead and when clear of the zone so that the pilot knows when it is safe to let the skydivers exit their aircraft. Keeping people informed is your best defence.

Donald Gravelle
Gananoque, Ont.

Don is a commercial pilot who flies jump planes and is an active parachutist.

Cool as Ice

The Embraer EMB-121 was in cruise flight at 7000 ft. near Araxá, Brazil, when the captain noticed a pressurization problem with the aircraft's door. He went back to check. As he was checking the door, it blew open, and a steel door-anchor cable severed his left hand.

"Luckily, I managed to grab hold of a handle with my right hand. When the co-pilot noticed that half my body was outside the plane, he made a sharp 45° turn to the right and I was hurled back inside."

The captain returned to the cockpit "to calm the co-pilot down and help him land the plane safely." He convinced one of the passengers to put the hand on ice. Doctors subsequently reattached it.

Our cool captain is not alone in making an unscheduled exit. Several years ago, a King Air pilot was outside his aircraft when the co-pilot landed. He was hanging on to the door-anchor chain.

ASL 1/94 featured a story of a 1985 accident in which a PA-31 crashed 10 min after taking off. Analysis of the wreckage showed that the autopilot was engaged, the pilot's seat belt was undone, and both halves of the clamshell cabin doors were open prior to impact. The pilot was not on board. Damage indicated that the upper half had come open in flight. To secure the upper half, you must first open the lower half and then close it again after securing the upper half. It was suspected that the pilot had engaged the autopilot and then attempted to close the doors in flight, but was flung out of the aircraft when he opened the lower half of the door. He was never found.

The lesson is clear: unless you are wearing a parachute and planning to jump, stay away from open doors in flight. Fix the problem on the ground. △

Landed OK... but Couldn't Call for Help!

Recently, a Cessna pilot in the Yukon Territory did a great job of landing his aircraft in a swamp after the engine oil vacated the premises. Neither the pilot nor the aircraft was damaged during the few moments of stark terror that punctuated his many hours of routine flying.

Just before the landing, the pilot transmitted a "Mayday" that was overheard by two overflying aircraft and relayed to a nearby FSS. However, the position transmitted was more generic than it was exact. The FSS notified the rescue coordination centre (RCC). A major search began promptly, employing about six aircraft. The searchers found nothing the first day.

The next morning, an RCMP aircraft aiding in the search found the undamaged aircraft sitting forlornly in its swamp. A search and rescue (SAR) aircraft sped to the scene and lifted out the uninjured pilot. So what's the problem?

A couple of things might have sped the rescue and reduced search costs. According to a report filed by the RCC after the event, "The pilot was unaware of effort put into search. Also had no clue that ELT could be picked up by satellite, his radios could be heard by overflights, or that numerous grizzly bears were in the area."

The pilot was not unique in not knowing how to attract SAR's attention to an emergency site. Other survivors have also awaited ... and awaited... and awaited rescue while neglecting to flash up the ELTs or radios to summon help quickly.

Rather than concentrate on the things that could have been done better, let's focus first on what went right. The "Mayday" call alerted two aircraft, the FSS and the RCC. The position was a bit vague but, in northern Canada, that's to be expected. Then there was the landing, which was apparently a superb piece of airmanship.

Could more have been done? As it turned out, yes. The aircraft contained an automatic fixed ELT and a portable ELT. The arrival did not excite the fixed ELT, and the pilot didn't think to turn on the portable. Thus, search aircraft had nothing to home to.

After the landing, the pilot did not attempt to use the aircraft radios to contact high flyers. Oddly enough, not using the radios may have been the prudent course of action. A forced landing may have resulted in an unnoticed fuel leak. Flashing up the aircraft electrics could have resulted in a spark — a spark sufficient to ignite the spilled fuel. Although the resulting fireball and smoke plume might have attracted search aircraft, it's not a recommended technique.

Now let's sort out a few ground rules to help SAR pluck you from the site of your emergency landing. If, someday, you find yourself in the same

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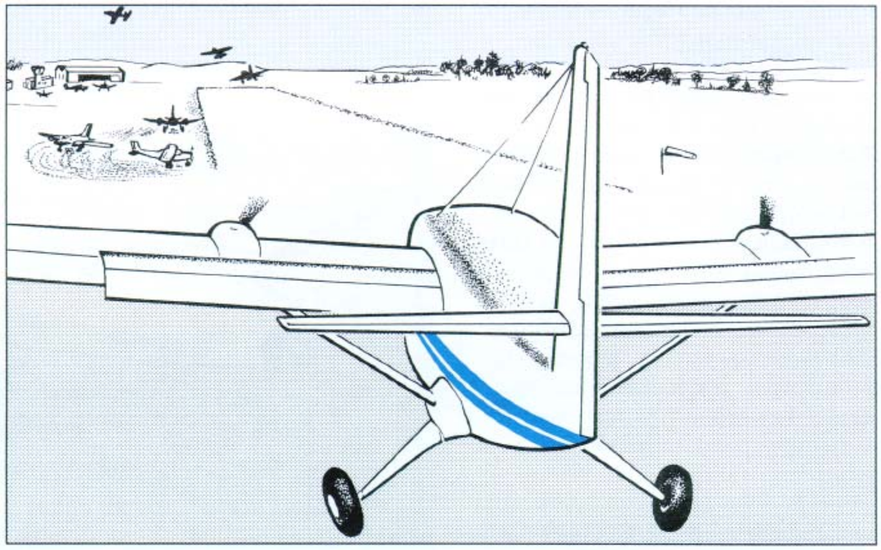
Dangerous Practices Becoming Common at Uncontrolled Aerodromes



Few small aerodromes benefit from the luxury of parallel taxiways or holding bays near the runway threshold. They are one-runway operations. Arriving and departing aircraft have to sequence themselves properly to avoid conflict. It can be particularly annoying when the parking area is at the far end, and a long taxi is involved before a pilot can get into position to safely do a run-up and depart. Some pilots have to wait to taxi, or others have to wait to land.

As a result, in the interest of expediting traffic, pilots are developing dangerous habits. Habits that are not only being accepted but also, on occasion, being taught by instructors.

Pilots create their own parallel taxiways, in the grass, just off the runway. These are being used while other aircraft are arriving and departing. Aerodrome standards require that parallel taxiways be far enough from the runway to guarantee wingtip clearance plus a big safety margin. This means several hundred feet away, not just off the runway surface on the nicely graded and prepared area.

Many small strips have incorporated a turn-around bay at the runway threshold. It's there so that pilots don't have to stand on the brake and power their way around the 180° turn to line up for takeoff. It is not a run-up or holding bay. Holding/run-up bays have similar requirements to parallel taxiways when it comes to distance back from the centreline, and the bays must be clearly marked.

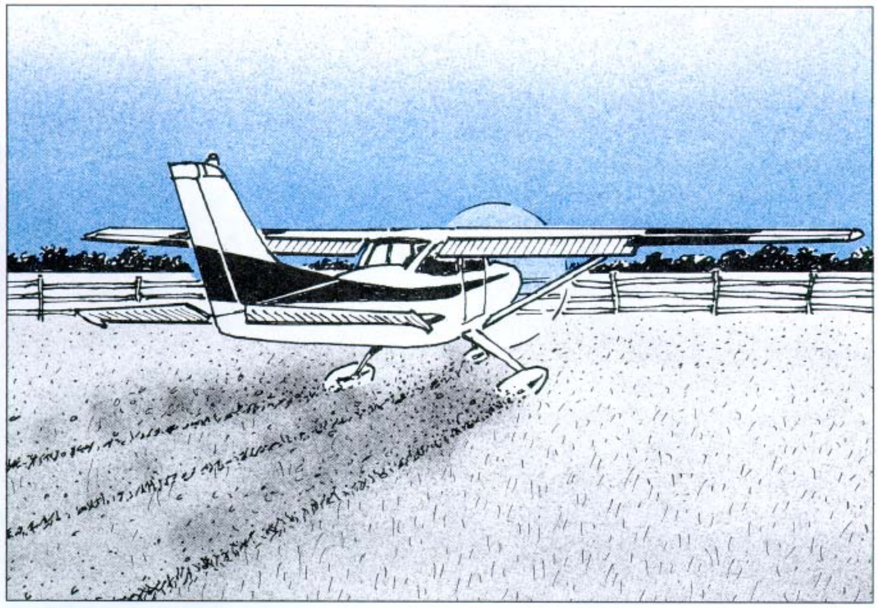
By mutual arrangement, some pilots are landing over top of other aircraft occupying the runway, some are backtracking, and others are waiting for take-off on the threshold.

Last, but not least, parallel takeofflanding operations occur, with some pilots using the runway while others use the adjacent grass. The runway users conform to the recommended left-hand circuit pattern; the grass users do both left- and right-hand circuits.

These are very dangerous practices. Picture a sunny weekend when everybody wants to fly. Picture a couple of arriving and departing transient pilots who don't know the local habits. Picture a collision.

Sometimes you just have to wait your turn.

Spring Runways



Springtime runways on grass and gravel can be uncertain at the best of times. Ground thaws and April rains can deteriorate these runways without notice. Before departing for a place you haven't visited since last year, call ahead; likewise, do a physical check of the full runway length before takeoff. These precautions might prevent you from turning turtle or making an unplanned diversion into the toolies.

The departure runway was 1800 ft. long. The surface was grass and moss on a sand/soil base. It was May 1994. Our Cessna 182 pilot had used this runway many times and, prior to this departure, had walked the beginning portion of the runway to check conditions. The engine run-up was normal, and our pilot used the recommended 20° flap short-field takeoff procedure.

Halfway down the runway, the pilot felt resistance to the takeoff roll and noted that the aircraft was not accelerating. He rejected the takeoff and taxied back to try again. From a rolling start, the aircraft accelerated more quickly, but the pilot still felt resistance. A few hundred feet from the end, he tried to rotate but, fearing that the aircraft would stall, he rejected the takeoff again. This time, however, there was not enough room for a safe stop. The aircraft ran off the end and through a cedar rail fence, finally ending up in a ditch, substantially damaged. Our pilot and his passenger escaped with minor injuries.

On firm and dry grass, under the ambient conditions, and at the same weight, the takeoff roll should have been about 800 ft. However, had our pilot inspected the *full* length of the runway, he would have discovered that the second half was softer than the first and made a different takeoff decision, particularly after the first aborted attempt.

Landed OK... but Couldn't Call for Help! *cont. from page 10*

situation as this pilot-that is, down and undamaged but immobile — place the ELT function switch to the ON position. Leave it on. Within 90 min, COSPAS-SARSAT will hear it. Within three hours, SAR will have a fix. Someone will come to get you. As well, most military aircraft monitor 121.5 MHz, and if they or other high flyers in the area report your ELT, SAR might get there even sooner.

Are you using the aircraft radios to talk to local high flyers? If your forced landing was relatively jolt-free, there is no obvious damage, and you can't smell avgas, it's probably OK. But remember, avgas is distilled to be susceptible to small sparks. Turning on electrics may trigger a fireball that will alert SAR agencies three provinces away.

ELTs were intended to attract SAR to emergencies. A forced landing in a swamp with an oil-free aircraft constitutes an emergency. In this case, the company had two ELTs aboard the aircraft. Either one could have been used to summon help to an aircraft and pilot that were going no farther that day. Fewer search aircraft would have been needed and the pilot would have spent less time contemplating nature. Fortunately, he did not have to contemplate the grizzly bears that are a formidable part of that area of nature.

And, contrary to popular opinion, grizzly bears don't have 121.5 MHz ears, so turning on the ELT won't attract them. It will attract the SAR aircraft that will prevent you from having to outrun them.

Learning From Others *cont. from page 12*

water, short take, a heavy load, etc., I will be thinking of this accident, and my decisions will be more conservative because of it.

The tragedy that overtook the Meloche family just happens to be my aviation nightmare. This is certainly why it affected me so. If it is any comfort at all, please know that at least one float pilot is changing the way he does things as a result of their tragedy. I know that I will never forget the story that you told in your post. It will become part of the training that I give to all future seaplane students."

Learning From Others

On July 20, 1996, Pierre Meloche, President of the *Association des pilotes de brousse du Québec* (the Quebec bush pilots' association) died in a tragic seaplane accident. He drowned while trying to save his passengers after his Cessna 206 flipped as he was attempting a heavy-water takeoff from Rivière des Prairies.

Pierre managed to rescue two of his six passengers, but, sadly, he and four others drowned.

"Learn from the mistakes of others; You'll not live long enough to make them all yourself..." has long been the banner of Transport Canada, System Safety.

The following letter by George C. Velguth was originally published on the Internet and in the November/December 1996 issue of *Water Flying.* It sets an example we can all follow in learning from others:

"The tragic Meloche accident has catalyzed me to stop merely thinking about steps to enhance my ability to egress an inverted floatplane and start implementing them. I was especially moved by the fact that his friend had apparently established his own avenue of escape, then drowned while attempting to save the children. Of course, any of us would probably do the same.

However, in an attempt to avoid having to make such a choice, these are the steps I have decided upon:

1. Installing Citabria-type, emergency door-hinge releases on all floatplane doors. Had these been in place in the subject 206, the tragedy Louis reported might have been reduced to the level of an embarrassment. This actually sounds like a good idea for all airplanes. I have seen these devices on a Cessna 175 floatplane, but know nothing about their availability. Anybody have any info?

File C206 photo.

2. Replacing my lap-belt-only restraint system with front- and rear-seat harnesses. It will do no good to install quick-release door mechanisms if I am knocked unconscious during a roll-over. Does anyone have experience with the BAS inertia reel retrofit?
3. Outfitting each occupant with CO, type PFDs (personal floatation devices). While I am certainly concerned about my ability to extricate my children from an inverted floatplane, I am just as concerned about them drowning after extrication. Once inverted, it is too late to locate and don life vests. I will equip my personal PFD with first-aid supplies, matches, space blankets, etc. and a two-way radio.
4. Stopping using a hand-held GPS (Global Positioning System) with wires dangling all over the cockpit. I will install connectors for the GPS so there is no risk of becoming entangled during egress. My portable intercom is due for the same treatment.
5. Giving every passenger a thorough preflight briefing on egressing an inverted floatplane, to include practice removing seat belts and opening doors. I have often forgone this briefing for fear of alarming passengers. Louis' tragedy has finally shaken some sense into me: I'd rather lose a ride (I do this commercially) than fly a passenger who is mentally unprepared for the most likely accident scenario.
6. Installing and utilizing baggage tiedown anchors. During many flights I am required to carry ballast for C of G. To date, this has consisted of a couple of concrete blocks, unsecured, in the baggage compartment. Leaving these heavy objects unsecured has been stupid. The above-mentioned safety steps would be for naught if a 36-lb. chunk of concrete were to smash into the back of my head during a roll-over.
7. Finally, resolving to heighten my own level of awareness and diligence. I know that I too have made poor takeoff decisions. The next time that I am facing high winds, rough

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