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Aviation Safety Letter

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Learn from what others are doing right... **Issue 2/98**

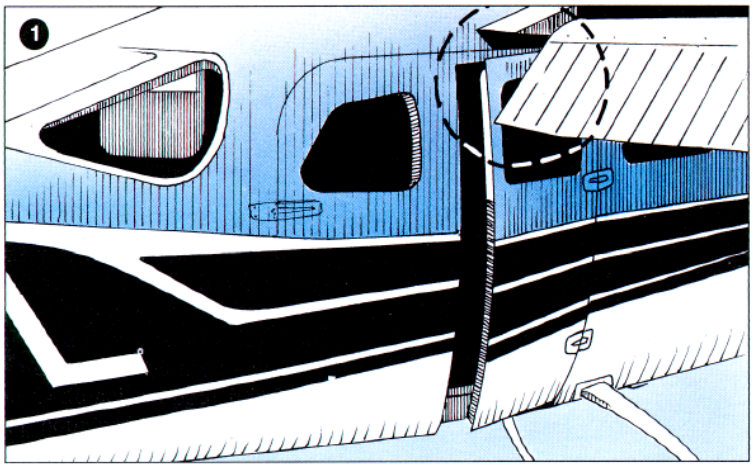
Underwater Egress – Revisited

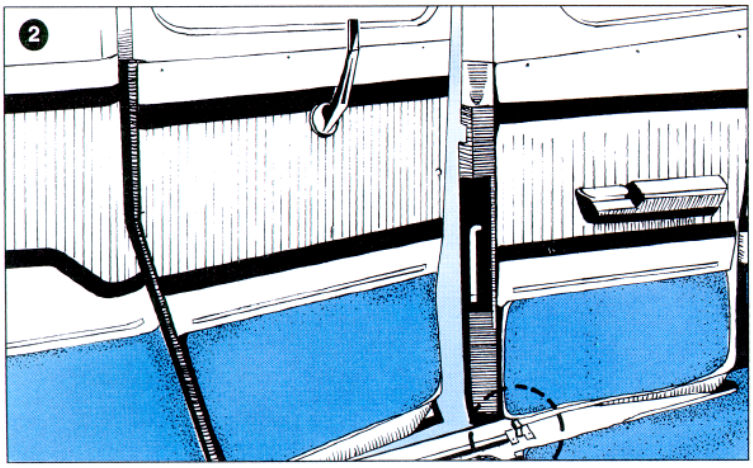
The following accident represents a nightmare for all pilots (what accident doesn't?), but particularly for seaplane pilots. It was the subject of "Learning From Others," an excellent letter from a reader in *Aviation Safety Letter 2/97*, but the recent release of Transportation Safety Board (TSB) Final Report A96Q0114 gave us no alternative but to highlight this tragic accident before the summer of 1998 arrives. We will also address specific issues relating to the aft emergency exit on the Cessna 206 series floatplane and emergency egress from an inverted, water-filled aircraft. The following has been condensed from information contained in the TSB Final Report, which is available on the TSB's Web site (http://bst-tsb.gc.ca).

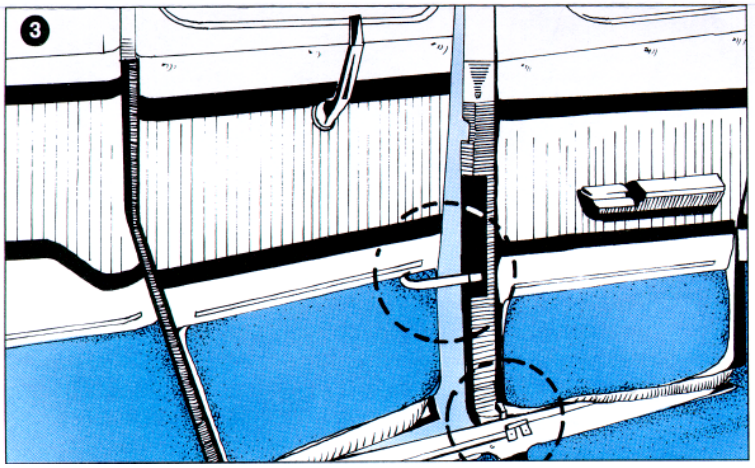
On July 20, 1996, the float-equipped Cessna U206F with six persons on board started its takeoff run on Rivière des Prairies, Quebec, on a water surface agitated by strong crosswinds from the right. The aircraft lifted out of the water at very low speed, travelled about 1000 ft. before taking off, and fell back on the water in a pronounced nose-up attitude. The pilot continued with the takeoff, and the aircraft lifted out of the water a second time. The left wing then struck the surface of the water, the left float dug into the water, and the aircraft capsized. The pilot told the passengers to unfasten their seatbelts as the aircraft rapidly tilled with water. He then went toward the rear to try to open the two cargo doors to let the occupants out. A witness immediately proceeded to the site to assist the occupants. He opened the left front door, and the female passenger and her child evacuated the seaplane. As they had no life jackets, these two persons clung to the floats until the other rescuers arrived. The first firefighters and police officers arrived at the site about 15 min after the accident. The pilot and the other three passengers had drowned inside the aircraft.

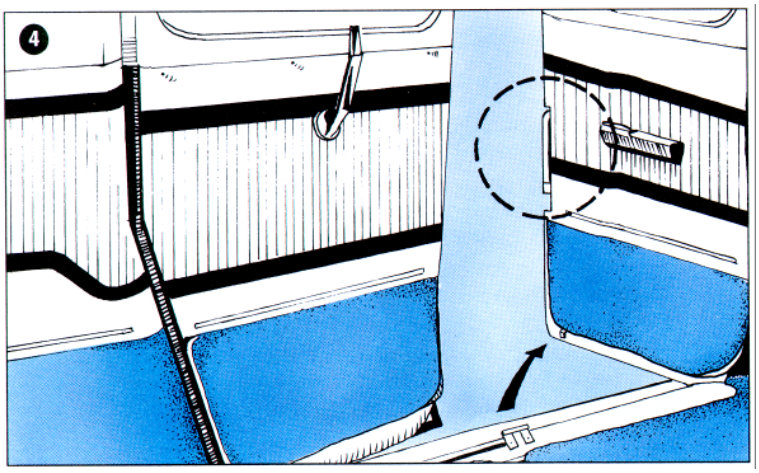
The TSB determined that the pilot had been unable to maintain control of the aircraft, which was equipped with Robertson and Flint Aero kits, during a takeoff with 20° of flap in strong crosswind conditions. It also determined that the distribution of the passengers and the complexity of opening the leaves of the rear cargo door with the flaps extended to 20° contributed to the difficulty of the evacuation. There are several issues worth looking into here, but we will limit our discussion to two main areas: (1) the pilot's decision-making process before and during the short flight, and (2) the aft emergency exit of the Cessna 206 and emergency egress from a water-filled, inverted aircraft.

The facts as provided in the TSB Report would lead many to question why this flight was attempted. Unfortunately, we will never know for sure what led the pilot to go ahead with it. Some









would postpone a pleasure flight in a seaplane with three children on board when faced with strong crosswinds and agitated waves, but it often becomes a personal judgement call; it can be assumed that other experienced seaplane pilots might also have decided that the conditions at the time were acceptable. In any event, the pilot was obviously confident in his ability to handle the crosswind; perhaps the fact that the aircraft was equipped with a short takeoff and landing kit and auxiliary wing-tip tank kit, which increase lift and reduce the stall speed of the aircraft, reinforced his confidence.

The second question mark arises from the fact that, during the initial takeoff, the aircraft fell back on the water in a pronounced nose-up attitude, but the pilot decided to continue with the takeoff. The only answers to these questions reside in the complex world of human factors, as they apply to the pilot's own motivations and self-imposed pressures to go ahead with the flight. As stated in the ASL 2/97 article, remember this particular occurrence the next time that you are faced with similar circumstances.

Emergency Exit

A second fatal accident in less than 12 months brought the issue of the Cessna 206 emergency exit to the forefront. On June 1, 1997, a U.S.-registered float-equipped Cessna 206 had a similar accident at Carroll Lake, Ontario, when the aircraft nosed over in the water, and two passengers were unable to evacuate the aircraft and drowned (TSB A97C0090). In this particular case, the pilot had left the wheels down when he touched down on the water.

The Cessna 206 is equipped with a double cargo door on the right rear side that doubles as an emergency exit. When the flaps are extended to 20°, the forward leaf of the cargo door can open only about 8 cm, and this makes it difficult to fully open the aft leaf of the cargo door. The emergency-exit instructions found in the owner's manual say that, if it is necessary to use the cargo doors as an emergency exit and the wing flaps are extended, the doors are to be opened in accordance with the instructions shown on the red placard mounted on the forward cargo door. According to the TSB Final Report, the instructions found on the placard of the accident aircraft were as follows:

Emergency exit operation:

1. Rotate forward cargo door handle full forward then full aft.

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2. Open forward cargo door as far as possible.
3. Rotate red lever in rear cargo door forward.
4. Force rear cargo door full open.

In ASL 7/90, as a result of a safety information letter from the Canadian Aviation Safety Board, we showed the correct procedure for opening the doors with the flaps down. The procedure is repeated below, along with the original graphic, which clearly illustrates the difficulty:

A. unlatch the forward cargo door;
B. open the forward cargo door as much as possible (about 3 in.) (figures 1 and 2);
C. unlatch the rear cargo door by pulling down on the red handle (figure 2);
D. partially open the rear door until the door latch at the base of the door is clear of the floor (figure 3);
E. close the rear cargo door latch by placing the red handle into the well in the door jamb (the locking pins will now be extended, but clear of the fuselage); and
F. push open the rear cargo door (figure 4).

This sequence shows that the placard leaves out some of the above steps. Now this procedure is quite demanding for most people under normal circumstances. Picture the process in the dark, in an inverted airplane, in rushing water and with two or three distressed passengers trying to escape.

The Cessna 206 emergency-exit issue has been addressed extensively in the past by, among others, the TSB in 1985 and 1989; the ASL 7/90 article referred to above; Cessna service bulletin (SB) SEB91-04, issued on March 22,1991; and many letters exchanged among the industry, Transport Canada (TC), the TSB and the Federal Aviation Administration (FAA) since the last two fatal accidents. In addition, you — the owners, operators and associations — are well aware of the problem. Although the SB simplifies somewhat the steps required to open the double aft cargo door, the procedure does not eliminate the jamming of the forward cargo door against the flaps when they are lowered. TC clearly stated to the FAA its position that, even with the modification, when the flaps are down, the Cessna 206 emergency exit procedure remains a multistep procedure that can be difficult to execute under emergency conditions.

Following the Carroll Lake occurrence, TC reiterated its concerns to the FAA, and, in its November 1997 reply, the FAA said that new series 206H and T206H would incorporate the provisions of SEB91-04. The FAA also said that, if TC were to issue an airworthiness directive (AD) against 206 series airplanes, the FAA would examine it for possible similar action in the United States. However,

cont. on page 7

New ASL Editor

The new *Aviation Safety Letter* editor is Mr. Paul Marquis, who was an aviation safety analyst with the System Safety Directorate from 1991 to 1996 and continued in the same role when the Headquarters System Safety office was integrated in late 1996 with the newly created Safety Programs, Strategies and Coordination Directorate. Mr. Marquis has flown a variety of fixed- and rotary-wing aircraft during his eighteen-year (and counting...) aviation career, which includes nine years in the military. In the past seven years, Mr. Marquis has worked closely with the Transportation Safety Board of Canada, provincial coroners and all Transport Canada regional offices in identifying, validating, tracking and eliminating safety hazards and deficiencies within the aviation system. He can be reached at (613) 990-1289.

to the letter

Watch for Heli-seismic Activity

Dear Editor,

Following a recent conversation with and suggestion by Mr. Moe Baile, System Safety, Prairie and Northern Region, we wish to make you aware of an aviation safety issue that has arisen from some near misses that have happened to our company and its contractors in the past two summers. We also wish to have you consider whether these incidents might be appropriate for publication to make the aviation community aware of the safety issue.

Background Information

Throughout western Alberta and eastern British Columbia, especially during the summer season, a petroleum industry activity known as helicopter-assisted seismic activity, or heli-seismic activity for short, is conducted. Generally, this activity involves one or several light to medium helicopters that conduct multiple low-level missions (below 500 ft. above ground level (AGL)) from dawn until dusk within a defined geographical area.

The helicopter missions involve a variety of tasks, including the transport of crews and equipment, reconnaissance and scouting, and the slinging of portable drills and other equipment. Helicopters have proven to be an indispensable tool for this activity. Risk management is a vital part of engaging in this activity safely. Rugged terrain, mountain weather conditions, and operations at high density altitudes provide a variety of safety challenges for the crews.

Recent Near Misses

Almost all of the activity described above is conducted under visual flight rules within Class G (uncontrolled) airspace. In the past two summer seasons of operation, there have been near mid-air collisions between one of the helicopters working for us and other aircraft transiting our areas of operation.

In August 1996, a Douglas DC-6B conducting a simulated forest-fire-suppression mission passed uncomfortably close to an AStar B-2 helicopter working within one of our heli-seismic jobsites. Our internal near-miss investigation made the following findings:

- The local forestry agency that dispatched the aircraft to our area had been advised of our presence as part of our risk-management program.
- The forestry dispatcher had neglected to inform the water-bomber crew of our helicopter's presence in their practice drop zone.
- Simulated fire-suppression missions are randomly conducted with the prior knowledge of industry or members of the public who may be present in the intended mission area.

In August 1997, two British Armed Forces helicopters flew at a low level (below 500 ft. AGL) through our area of heli-seismic activity and caused the AStar B-2 seismic pilot to take evasive action to avoid an anticipated mid-air collision. Within a couple of days of this incident, the Canadian Forces Snowbirds demo team had flown through one of our seismic jobsites at a low level (altitude unknown) while "warming up" just prior to commencing an air show at an airport about 40 NM from our jobsite. Crews on the ground warned the helicopter pilots of their presence and no conflict occurred. There might have been the potential for a conflict had the ground crews not warned the nearby pilots. Our internal near-miss investigation made the following findings:

- A written notice of our presence (including a map of the jobsite location) had been faxed by me to the local forestry agencies and to a nearby NAV CANADA flight service station prior to the start of the job.
- A request by me for the issuance of a Class I NOTAM regarding this jobsite and the associated helicopter activity just outside a nearby Class D control zone had been denied by NAV CANADA. This activity had been deemed not to meet the criteria for the issuance of a Class I NOTAM.
- The British Armed Forces helicopters had no way of knowing of our helicopter's presence at a low level in the same area as their low-level training mission.
- The British Armed Forces and Canadian Forces conduct low-level flights in Class G airspace without the prior knowledge of industry or members of the public who may be present in the area of their missions. However, we do acknowledge that specific potentially dangerous military activities are confined to Class G restricted airspace.

Safety Awareness Issues

If our experiences of near mid-air collisions during low-level heli-seismic missions are typical, then many of the similar mission-specific activities — such as heli-logging, aerial surveying, remote sensing, pipeline patrol and air ambulance — must be experiencing similar incidents.

It seems that, because of the number of aircraft, the variety of missions and the resultant

demands upon the flight crews, and the fluid nature of the geographical areas involved, there is no simple panacea for reducing the risk of mid-air collisions in Class G airspace.

The potential for mid-air collisions during low-level missions will probably increase in the future as new applications from new technology are found for aircraft.

Conclusion

We strongly urge Transport Canada to use all means available to raise the awareness of the Canadian aviation community (civil and military) about the increasing potential for mid-air collisions during low-level missions conducted in uncontrolled airspace.

We intend to make other aviation-industry agencies and associations aware of these issues to generate discussion and explore possible ways to mitigate some of the risks of mid-air collisions in uncontrolled airspace.

Thank you for your attention. I would be happy to communicate with you at any time regarding this letter.

W.K. (Bill) Gillespie
Chief Pilot
Shell Canada Limited

Keen-eyed Readers Comment on Monocular Vision

Dear Editor,

I refer to the article entitled "Through the Mountains" on page 6 of *Aviation Safety Letter* 4/97. I was a monocular-rated private pilot for approximately 20 years. Two years ago, I had laser surgery on my offending right eye. Now, albeit with the aid of glasses, I can qualify for a slick new commercial licence.

When flying or driving, I see virtually no difference from my vision before the surgery. When I do see a remarkable difference is during a rare visit to the grocery store. While walking down the aisles with the huge banners strung about, I finally do see in 3-D, or while in a forest with branches all around or during my first visit to the Skydome after surgery, again, I see in 3-D.

Where I feel our fellow aviator went wrong was with his map-reading ability. Map reading is an art. Not many people possess this seemingly simple skill. Of course, it does help to have a decent map! Usually pilots, as they get older, slowly start to lose their precious vision, whereas, because of modern technology, I have rapidly improved my vision and can now compare the two kinds of vision. Thanks for a really good *Safety Letter*.

Bob Wilson
Pickering, Ontario

Dear Editor,

I would like to comment on the "Through the Mountains" article in ASL 4/97. It is very far off the mark and certainly misleading. The accident involved a monocular pilot, and the article appears to suggest that the pilot's visual handicap contributed to the accident.

In fact, it must be understood that human eyes are only binocular for a focal length of approximately 40 to 50 ft. This is because of the proximity of the eyes to each other, a distance averaging only 2.5 to 3 in. Beyond 40 ft., a monocular and a binocular pilot see the same monocular image because the angle of convergence is more acute the farther you are from the source being viewed. In effect, there is no binocular depth perception beyond 40 ft., even with two perfect eyes. Both pilots would see and use the same perceptive visual clues, but not binocular ones. Furthermore, the ability to perceive visual prompts when flying into the sunlight has nothing to do with whether the pilot does so with one or two eyes. The same goes for map reading. The problem was pilot error, for sure, but not a visual handicap.

The question of landing procedures for monocular pilots is another myth requiring debunking. The visual clues used by monocular pilots are different only close to the ground and, in fact, monocular pilots appear to have the advantage as their clues are less sensitive to the visual illusions so well documented with normal-sighted pilots. My own experience is that, in a learning environment, monocular pilots have a much better spatial awareness and consequently learn to land the aircraft in less time than the average binocular pilot does.

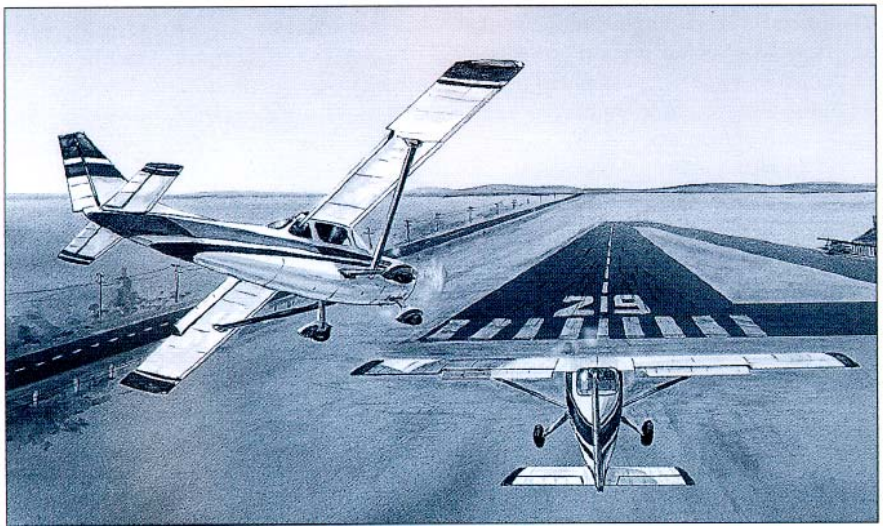
The only time truly monocular pilots (as opposed to those rated monocular but having normal peripheral vision) are impaired is in the area of peripheral awareness. However, pilots suffering such an impairment are very aware of their condition and compensate accordingly, even when not flying. In fact, a study of aircraft incidents will reveal that there is little difference on safety issues between monocular and binocular pilots and, corrected for percent head of population, monocular pilots would appear to have the better record.

It is clear that the accident had no relation to the pilot's monocular rating and it is regrettable that such should have been introduced into an otherwise excellent report. I hope that you may find it appropriate to offer editorial comment to correct the misconception.

Thomas R. Sommerville
Guelph, Ontario

Editor's comment: The Transportation Safety Board's final report on this accident (A94W0157) concluded that, although the pilot was monocular, this was not considered to be a factor in the occurrence. In addition, our Civil Aviation Medicine staff agree with Mr. Sommerville's comments. Thanks to our readers for these eye-opening remarks.

Mid-air Collision at Mascouche



On Sunday, December 7, 1997, two small aircraft collided on short final to Runway 29 at the Mascouche airport near Montreal, killing all four people aboard the aircraft. The weather was visual flight rules and there were only three aircraft in the circuit at the time. The Transportation Safety Board is investigating and a final report (TSB A97Q0250) should be available in a few months.

This unfortunate event could have happened at any uncontrolled aerodrome, but the fact that it happened in Mascouche caused some knee-jerk reactions and raised some old questions about the level of service there. For many years now, Mascouche has been known as a very busy aerodrome, but mostly in the summer months. In 1993, an internal Transport Canada working group recommended the operation of a mobile control tower for the summer of 1994 to analyze the traffic. The town of Mascouche requested the mobile tower once again for 1995, but Transport Canada refused, stating that the traffic did not meet the minimum criteria for the establishment of a control tower. In the end, Transport Canada decided to operate the mobile tower for one more season, combined with increased promotional activities, after an internal review concluded that one more season would be beneficial from a training perspective.

The ASL will report fully on this accident once the final report has been released, but, as mentioned above, it is important for all of us to realize that this could have happened at any other uncontrolled aerodrome and not to jump to conclusions about the specific site where it happened. I doubt that new lessons will be learned as a result of this accident, but, in the meantime, let's keep that one in mind and pay particular attention to basic airmanship issues such as proper communications, circuit procedures and spacing and, of course, look out for all other traffic.

Learning how to fly takes approximately 45 hrs... Learning when to fly can take a lifetime.

Casual Radiotelephony and Assumptions Cause Near Tragedy

On March 8, 1997, at Toronto-Lester B. Pearson International Airport, a Boeing 737 had to reject the takeoff because there were snow-removal vehicles on the runway. The crew was able to slow down the aircraft to taxi speed and exit the runway prior to reaching the snow-removal vehicles but had to return to the ramp for a brake-cooling period and inspection by maintenance. (TSB Final Report A97O0037)

The Board determined that the cause was an incorrect response from the ground vehicles' foreman to an ambiguous clearance issued by the ground controller, which had led the snow-removal convoy onto the active runway without authorization. Contributing to this occurrence was the fact that the ground controller had not made a proper visual assessment of the location and direction of travel of the convoy when the request had been made by the foreman to proceed on the active runway and had assumed that the convoy was still clearing snow on another taxiway. Taped air traffic control communications revealed a number of instances of non-standard and casual radiotelephone communications between the ground controller and the snow convoy.

This very serious occurrence could have had much more tragic consequences had the snow convoy been near the middle of the runway rather than the other end. In addition, had the visibility been poor, the snow vehicles might not have been spotted by the controller or the pilot in time to avoid a collision. In the 1987 Canadian Aviation Safety Board *Report on a Special Investigation into the Risk of Collisions Involving Aircraft On or Near*

the Ground at Canadian Civil Airports, it is stated, "Positive vehicle control is predicated upon effective information transfer between ATS personnel and vehicle operators." It obviously didn't happen that particular time.

The Board makes valid points on marginal and non-standard communications in its final report and also addresses other factors such as long working shifts for the drivers, high noise levels in the vehicles, the use of noise-attenuating headsets, and difficult shift cycles for air traffic controllers. As a result, the Greater Toronto Airport Authority has undertaken a number of safety initiatives to address these concerns and has established a working committee on runway incursions. The committee has a mandate to review the operational procedures and practices that were in place last winter and identify problem areas, develop recommendations and ensure their implementation with the aim of reducing the risk of future runway incursions.

Now what role pilots can play in a situation such as this? Not much of one, you might say, as the crew of that 737 had received a proper takeoff clearance, had no reasons to expect vehicles on the runway, and could not have seen them because of the runway slope. Even if the crew had been monitoring the ground frequency, the clearance given to the snow convoy was not a clearance to proceed onto the active runway. Now think about *that* the next time that you are cleared for takeoff from a runway that disappears into the distance.

Underwater Egress - Revisited *cont. from page 3*

owing to the proportionally wider use of floatplanes in Canada than in the United States, the FAA could not say at that time whether an AD with the same intent would be supported by the evidence available from its U.S. databases.

Meanwhile, on November 16, 1997, TC issued Service Difficulty Alert AL-97-04, which strongly recommends that owners and operators of all Cessna 206, U206 and TU206 aircraft incorporate SB SEB91-04; instruct flight crews to brief passengers and demonstrate the steps necessary to open the exit when flaps are lowered; and ensure that flight crews periodically practice the procedure for opening the emergency exit from outside the aircraft when the flaps are down. It also recommends that there be a maximum of four occupants in the aircraft when waterborne operations are being conducted.

At this time, there is no modification available that completely resolves the emergency-exit issue. Discussions are still ongoing among TC, the FAA and the industry about the possibility of AD action.

Underwater Egress

The TSB's final report refers to a study relating to escape and survival from a ditched aircraft. It states that the rotation of the body underwater and loss of gravitational reference makes disorientation inevitable for survivors prior to their escape from an inverted aircraft. In addition, the darkness produced by water flooding into the aircraft aggravates the disorientation. Survivors who were questioned in this study reported having experienced confusion, panic and disorientation in the occurrences. The study concludes that only those who have experienced disorientation in an underwater trainer understand the problem and know how to deal with it to get out and survive.

Having personally experienced an underwater escape trainer twice, I can attest to the fact that the above statements reflect the reality of an underwater egress situation, except that, in the trainer, you expect the situation to arise (there is no surprise effect); you have a plan or escape route in your mind (or at least you think that you do...); and you are in a clean pool with safety scuba divers. Not so in the real world. Nevertheless, underwater egress training is invaluable for any pilot who flies regularly over water, regardless of the type of aircraft flown. As a matter of fact, passengers or non-pilot crews who also fly regularly over water should consider underwater escape training. Once you have had the training, you will also be in a better position to brief your passengers about what to expect... should the unexpected occur.

Finally, ASL 2/95 featured "Seaplane Accident Survival" as its lead article, and it contained excellent information on this subject. If you do not have a copy of that article, we will be pleased to send you one upon request.

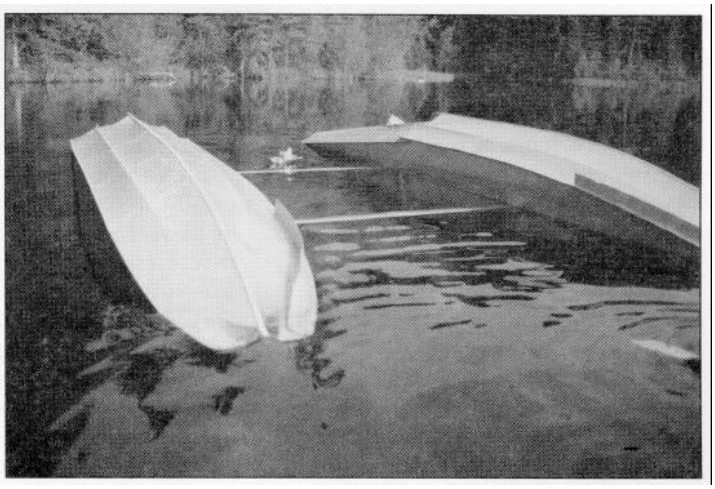
Risky Business

by Gerry Binnema, Regional System Safety Officer, Pacific Region

A pilot must always be on the lookout for risk factors that might affect the flight. Once risk factors have been identified, the pilot must decide whether to accept them or make a change in the flight plan to reduce or eliminate them. See how many risk factors you can identify in the accident narrative below. How could the pilot have reduced or eliminated these risks?

The pilot and his three passengers had departed Little Shuswap Lake, British Columbia, in the cool air of a summer morning for a day of fishing at another small lake 50 mi. to the northwest. Besides the four men, the float-equipped Cessna 180 was carrying an outboard motor, fuel, tools, fishing gear, and a collapsible boat lashed to the floats. The weight of the aircraft was later calculated to be about 210 lb. above the maximum certificated gross weight of the aircraft. Journey log-book calculations made by the pilot prior to takeoff indicate that he thought that the aircraft was actually 80 lb. under the maximum gross weight. This error was caused by a number of factors, including inaccurate weighing, addition errors, and the fact that an incorrect figure for the maximum gross weight had been pencilled into the front of the journey log.

The takeoff was uneventful and the fishing party arrived safely at the destination, a small lake at an elevation of 3900 ft. above sea level with an available takeoff or landing distance of over a mile. The foursome enjoyed a day of fishing and, around mid-afternoon, decided to head home. The group loaded up the airplane again and the pilot taxied to the west end of the lake. The wind normally blows from the west at this lake, offering the pilot a relatively unobstructed takeoff path in that direction. Unfortunately, the wind on this day was out of the east, forcing the pilot to take off towards taller trees and higher terrain to the east. The temperature had climbed to 25°C by that time, yielding a density altitude of about 6000 ft.



The combination of these risks proved to be too great and the operation ended tragically. Apparently, after the aircraft made an unsuccessful first attempt to become airborne, one of the passengers volunteered to disembark and wait for a second trip. The pilot declined the offer because he felt that the problem could be resolved by shifting the centre of gravity further forward. On the second attempt, the aircraft did become airborne, but it struck several trees on a small island and crashed into the lake, coming to rest inverted in about 10 ft. of water. One of the aircraft's occupants managed to escape and swim to shore, but the other three drowned inside the aircraft.

The aircraft journey log-book indicates that the pilot had been to the lake on previous occasions, but never with more than three people on board. His normal departure route towards the west had probably given him confidence that the aircraft had plenty of performance to handle more weight and still take off safely from the lake. Perhaps he did not factor in the additional risks of the higher temperature and the obstacles on the departure path towards the east. There were a number of ways that he could have changed his plan to reduce the risks in this high, hot, and heavy operation. His destination was only 50 mi. away, and so flying the group out in two flights would not have been difficult at all. However, if we are not looking out for mounting risks in our everyday flying, we cannot reduce them and we could end up gambling with our lives.

I Thought That I Heard...

by Brad Gibbons, Regional System Safety Officer, Ontario Region

When asked why he had taxied onto the active runway without clearance from air traffic control (ATC), the pilot's answer started with "I thought that I heard...." We've all been there, we know it can happen to us, and it *has* happened to many of us! Usually a little embarrassment is the sole-result, but the potential for disaster lurks behind every ATC taxi authorization if the message isn't sent with clarity, received with careful attention and applied with a healthy skepticism.

Recently, on two consecutive nights, at the same airport, Boeing 727's from two different companies taxied onto the active runway without clearance. The potential for disaster was there,

and it was there in some 51 other incidents involving runway incursions in Canada in 1997. The situation gets even more complicated when the taxi equation also involves NORDO aircraft; uncontrolled airports with a mandatory frequency, aerodrome traffic frequency or universal communications (UNICOM); vehicles; and ground handling equipment.

A wise pilot once told me, "The potential for miscommunication exists every time two people talk to each other." Perhaps a little cynical, but accurate. In a cockpit or flight deck full of distractions, there is ample opportunity for partial or complete misunderstanding of taxi instructions. The best protection is in the use of standard defined phrases. The *Air Traffic Control Manual of Operations* and *A.I.P. Canada* (see RAC 4.2.5 to 4.2.9) provide this standard terminology. For taxi authorization, ATC will give the following:

(a) runway (number);
(b) wind (in magnetic degrees and knots);
(c) time;
(d) altimeter; and
(e) taxi (runway or other specific point, route).

Some important points to remember about these communications are the following:

(a) If authorization is given to taxi without restriction to the runway in use, no further authorization is required to cross any non-active runway en route. Under no circumstances may a taxiing aircraft taxi onto an active runway without specific authorization to do so.
(b) Upon receipt of a normal taxi authorization, a pilot is expected to proceed to the taxi-holding position for the runway assigned for takeoff.
(c) If further authorization is required before the aircraft crosses or enters any of the runways en route to this limit, it will be given in the taxi authorization as a "Hold," "Hold on," or "Hold short of..." restriction. This restriction *must* be read back by the pilot. Likewise, any instruction to enter, cross, backtrack or line up on any runway *should* be acknowledged by a readback.

The same wise pilot also gave me words I now live by: "If in doubt...ASK." I have never met a pilot or an air traffic controller who would risk a runway incursion rather than confirm a clearance.

With standards phrases that we have sent with clarity, we should be able to listen with careful attention and be ready to confirm an instruction if in doubt. It is more important, though, to apply the message with a healthy skepticism. Why? Because when we get busy, we hear what we expect to hear, fill in the blanks with what we want to hear, or simply get it wrong. This is as natural as breathing. We must be aware of it and compensate for it. Canadian aviation gives us extra reason to be vigilant. Many airports don't have tower and ground facilities, and so pilots and ground equipment operators must build a mental picture of local traffic based on mandatory radio calls and use it to provide their own separation and safety margins. The need for active listening and a good dose of skepticism is obvious. The visual check (as per A.I.P. RAC 4.5.7 (a)(ii)(B), "Ascertain by radio... and by visual observation that no aircraft or vehicle is likely to come into contact with the aircraft during takeoff...") may be the last line of defence against an accident.

Remember, there *are* excuses for ground accidents, incidents and runway incursions; there are, however, *no good* excuses. Send with clarity, listen with careful attention and apply with a healthy skepticism. Finally, and most importantly, when in doubt, confirm the taxi instructions.

Safety Reporting on the Internet

Did you know that you can report safety issues, concerns, suspected violations or reckless flying through the Transport Canada Internet Web site? The Safety Issues Reporting System (http://www.tc.gc.ca/aviation/incident/incident.htm) is there for that purpose. This system is not intended to compete with the SECURITAS program (see *A.I.P. Canada*, GEN 3.6), the long-standing and successful confidential reporting program of the Transportation Safety Board (TSB). The Transport Canada site can be used for issues or information that, in your opinion, does not necessarily warrant the involvement of the TSB or that does not demand confidentiality. Information on incidents and accidents is welcome, but note that this is not the primary reporting system for reportable *aviation incidents* and *reportable aviation accidents* (see *A.I.P. Canada*, GEN 3.2), which must be reported to the TSB pursuant to the *Canadian Transportation Accident Investigation and Safety Board Act*.

If you have something to say or to report and you are in doubt about how to proceed, the best thing to do is to call your regional System Safety office and ask for advice. If confidentiality is essential, call SECURITAS at 1-800-567-6865. The professional staff at those offices will help you determine which reporting system is best suited to your particular situation, and staff members may even help you right on the spot. Do not hesitate to call upon their expertise — your input to the system is essential!

A Reminder about Bird Strikes

by Bruce MacKinnon, Aerodrome Safety, Transport Canada

There are still a few skeptics within the aviation community who, like many of us, have forgotten everything that they learned in Physics 101 or don't have time to read occurrence reports. Birds *can* do a lot of harm to an aircraft. Rather than bore you with mass and velocity calculations, let's just take a look at some attention-grabbing near misses and smoking holes.

On the night of Friday, January 9, 1998, Delta Airlines Flight 1783, a B727, departed Houston International Airport and struck a flock of geese at 3000 ft. on climb-out. The No. 1 engine was destroyed, the No. 2 engine was severely damaged, the radome was torn off, and the right wing was significantly damaged.

On August 18, 1997, Air Canada Flight 502 began the takeoff roll at 07:25 local time in Thunder Bay, Ontario, with 52 passengers and 5 crew members on board. At V_r, the DC-9 struck a large flock of herring gulls and the No. 1 engine had to be shut down because of severe vibration. The crew declared an emergency and returned to Thunder Bay. Bird remains were found in the No. 2 engine, on the first officer's windshield, and on the right wing root.

Yes, But These Things Don't Happen to Turboprops!

On November 24, 1997, in Tegucigalpa, Honduras, a commuter aircraft crashed after an engine exploded following a bird strike. Seventy per cent of the aircraft was destroyed by fire, and 12 people were injured, 4 of them seriously.

On May 17, 1996, in Broome, Washington, a Dash 8 with 3 crew members and 14 passengers on board struck a wedge-tailed eagle while descending through 4800 ft. The bird punctured the wing-to-fuselage fairing and damaged the forward wing spar and electrical components, which were attached to the spar. Multiple system failures resulted, and the No. 1 engine was shut down. The crew was unable to maintain control during the landing and the aircraft left the runway.

Well, At Least We're Safe in General Aviation Aircraft!

On September 24, 1997, in Boundary Bay, British Columbia, a student pilot on his first solo flight struck a mallard duck, which penetrated the windshield of the Cessna 150. The bird continued on through the right-hand side of the passenger cabin and hit the rear wall.

On October 13, 1997, near Lethbridge, Alberta, a Cessna 172 struck a mallard duck, and the bird penetrated the windshield. The pilot suffered facial lacerations and a broken nose. He was able to land the aircraft at Brooks, Alberta.

OK, But Rarely Do Fatalities Result!

On November 15, 1997, at the Pic du Midi observatory in France, 2 adults and 2 children were killed in a light aircraft after a bird strike in the Pyrenees. Unfortunately, the 2 crew members in the rescue helicopter were also killed when they struck a wire while departing the accident scene.

In January 1994 in Le Bourget, France, all 10 people on board a Falcon 20 were killed when the crew lost control of the aircraft on final approach while attempting an emergency landing after a bird strike destroyed one engine.

On September 22, 1995, at Elmendorf Air Force Base in Alaska, 24 crew members were killed when their E-3B airborne warning and control system (AWACS) aircraft struck a large flock of Canada geese at rotation. Both the No. 1 and No. 2 engines were destroyed.

On July 14, 1996, in Eindhoven, Holland, 34 passengers and crew were killed when a C-130 Hercules struck a flock of birds on final approach and burned in the ensuing crash.

On October 22, 1997, the pilot of an F-16 flying over California manoeuvred sharply to avoid birds and collided with an AT-38B trainer. The trainer was destroyed, and both crew members died in the crash. The pilot of the F-16 was able to land his damaged aircraft safely at Edwards Air Force Base.

Yes, But Such Accidents Don't Happen All That Often!

Over 6000 bird strikes are reported annually in North America.

Canada purchased 250 CF104 fighters. During their Canadian service life, 106 were lost. Of these losses, 16 were the result of confirmed bird strikes.

The United States Air Force (USAF) has never lost an E-3 AWACS since the aircraft went into service in 1972, except for the fatal accident in Elmendorf. However, the USAF has lost 3 B-1 bombers since they went into service in 1974. One of these losses was to an American white pelican over Colorado and resulted in the death of 3 crew members. A 185,000-lb. state-of-the-art fighting machine was destroyed by a 15-lb. bird!

Since 1950, over 170 military aircraft have been lost to bird strikes in Europe and Israel.

On July 15, 1996, a North Atlantic Treaty Organization E-3 was destroyed in a runway excursion in Greece after the takeoff was rejected because of a bird strike.

The Israeli Air Force has lost a total of 22 aircraft in air-to-air combat and 8 aircraft to bird strikes. The number of aircraft lost to bird strikes is more than one third of the number lost to enemy aircraft!

But Are These Accidents Expensive?

Between 25 and 30 per cent of foreign object damage to transport aircraft is related to bird

strikes. An airline loses approximately $10 000 an hour in revenue when a jet transport aircraft is taken out of service because of a bird strike. It costs $12 million for one engine on a B777, and approximately one third of bird strikes to turbofan engines cause damage. It is estimated that bird strikes cost the North American aviation industry $500 million a year in direct and indirect costs.

There Can't Be Any More?

Actually, there is; a lot more, but we think that you get the point.

But It's Not My Problem!

Well, actually, it is. If you are involved in the aviation industry, then you can do many things to prevent the types of incidents and accidents described above. Bird-strike prevention can't easily be achieved through standards and regulations, but a cooperative effort by everyone in the industry can go a long way towards saving lives and preventing unnecessary damage.

If you are an aerodrome operator, you are responsible for managing a safe facility, particularly if you invite aircraft operators to your site. You must do everything possible to deter birds from your facility and disperse them. If you are a pilot, you can contribute by reporting bird activity to airport operators, air traffic managers, and other pilots. You can also reconsider your takeoff decision if you see birds in the runway environment, avoid low-altitude flying, reduce speed at low altitudes if it is safe to do so, and wear sunglasses. If you are an air traffic controller or flight service station attendant, you can advise pilots of bird activity, offer alternate runways if necessary, and provide pilots with the option of slowing down if there is bird activity near your airport. Everyone can benefit by taking the time to learn about bird activity in the local area, and everyone can contribute by reporting bird strikes. Transport Canada has tried to make this as easy as possible. You can make a report on a self-addressed postage-paid form available at most facilities, over Transport Canada's toll-free bird-strike reporting line, or on our Bird Hazard Web Site.

Unfortunately, rapidly increasing populations of some large flocking birds that adapt well to the human landscape and increasing numbers of aircraft make it inevitable that some bird strikes will occur. However, it is *not* inevitable that damage will occur or lives be lost. Since over 80 per cent of bird-strike incidents occur within the airport environment and below 1500 ft. above ground level, there is much that can be done to prevent serious incidents and accidents. If everyone in the industry works together in a cooperative manner, it is highly probable that Canada can be spared the pain of a fatal hull-loss aircraft accident resulting from a bird strike.

For additional information on bird hazards to aircraft, please contact:

Bruce MacKinnon, Wildlife Control Specialist
Transport Canada Safety and Security
330 Sparks Street, Place de Ville, Tower C
Ottawa, Ontario K1A 0N8
Phone: (613) 990-0515
Fax: (613) 990-0508

Upcoming Events

Prairie and Northern Region Aviation Safety Council (ASC) Meeting

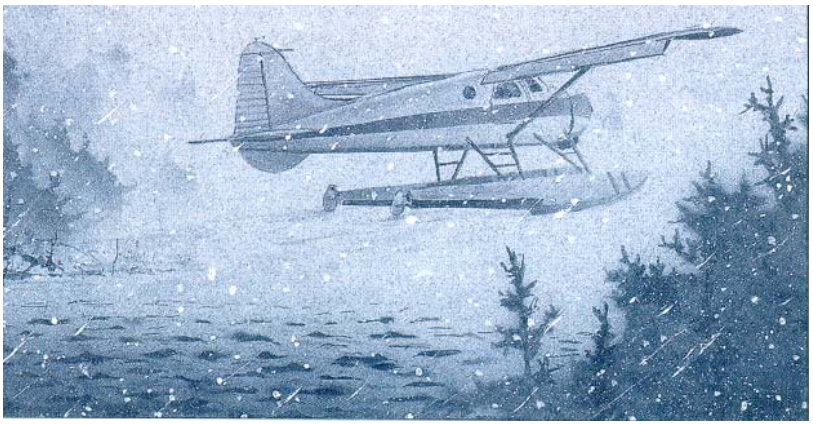
The second quarterly meeting of Aviation Safety Council government and industry representatives was held on January 22, 1998, in Calgary with 40 people in attendance. A number of safety issues were identified and will be reviewed by Transport Canada, NAV CANADA and industry participants for resolution.

In order to ensure the success of future meetings, representation from various facets of the industry is encouraged. These meetings allow aviation participants to raise their safety issues in an open forum of government and industry. If you are interested in attending the next meeting, we recommend that you forward your agenda items to our office in the form of a background paper for distribution at the meeting.

The next ASC meeting is scheduled for: ***Thursday, May 14, 1998, 1300: Winnipeg, Manitoba***
Confirmation of your attendance is requested to ensure that appropriate seating is available.

For further information, please contact Carol Beauchamp:
Phone: (403) 495-2258, Fax: (403) 495-7355 , Internet Address: beaucca@tc.gc.ca
Mail: Transport Canada, System Safety, 202-63 Airport Road, Edmonton, Alberta T5G OW6△

VMC Into IMC Claims Two Lives



The float-equipped DHC-2 Beaver was being operated privately by a mining company, mostly for visual flight rules (VFR) flights between the company base camp at Ugly Lake and Goose Bay, Labrador. On September 30, 1996, after delivering material to Ugly Lake, the pilot departed with one passenger for the return flight to Goose Bay.

The weather conditions at Goose Bay had deteriorated since the pilot's departure, and two other aircraft had reported seriously deteriorating conditions while en route south to Goose Bay; one of them had had to scud-run its way back as low as 100 ft. above ground level and follow shorelines, while the other had entered a band of snow showers. This, however, must not have come as a surprise to the pilot, as terminal area forecasts for Goose Bay on that day showed a significant deteriorating trend throughout the day, going as low as an overcast ceiling of 600 ft., with visibility 1 mi. in light rain and mist.

The Beaver pilot landed on a pond during the return flight, and, since there was no evidence to suggest that it was because of a mechanical problem, it was most likely to wait for improving weather conditions. With nighttime approaching, the pilot had to decide whether to find a suitable spot around the pond to camp for the night or attempt a return flight. He relayed his intention to depart the pond, which would prove to be his last radio transmission. In its final report (A96A0175), the Transportation Safety Board (TSB) concluded that it was probable that the pilot had been unable to maintain visual reference with the surface sometime after takeoff from the pond and that the aircraft had struck the water when the pilot had attempted to regain visual reference or because the pilot had lost control of the aircraft in reduced visibility.

What lessons can be drawn from this accident? You be the judge; this doesn't look like anything new. Let's go back in time to the 1990 TSB *Report of a Safety Study on VFR Flight into Adverse Weather*. The following statements appeared in the report's conclusion, and I have added some personal comments in the context of this particular accident:

"Accidents involving continued VFR-into-IMC account for a disproportionate number of fatalities each year." *I agree.*

"The causes [of] and contributing factors to these accidents have recurring themes." *I agree.*

"These include inappropriate pilot qualifications or proficiency for the conditions encountered ..." *I agree.*

"... and serious shortcomings in the permissable *[sic]* weather minima for VFR flight..." *Well... not necessarily so in this case. No matter what the VFR weather minima were at the time, the pilot didn't really care about that; he just wanted to go home.*

"... in pilot training, and in pilot licence privileges." *I agree somewhat; pilots are trained to meet a standard and to respect their licence privileges. Again, in this case, the pilot went beyond his limits, and que sera sera...*

"In some cases, current industry practices and limitations in aircraft equipment and weather briefing facilities exacerbated the circumstances leading up to the accidents." *I agree on the point about industry practices, but not on the other two points. As Dirty Harry would say, "a man's gotta know his limitations ... punk." That includes weather conditions and aircraft limitations — stay within them.*

Erratum in ASL 1/98

A reader noticed an error in ASL 1/98. The mistake appeared in the third column of the "Mountain Flying — Part II" article on page 12 and concerned visibility limits at night in uncontrolled airspace at or above 1000 ft. AGL. The required flight visibility at night is 3 mi., not 2 mi. The appropriate reference is *Canadian Aviation Regulation* 602.115, "Minimum Visual Meteorological Conditions for VFR Flight in Uncontrolled Airspace." This section states, in part, that no person shall operate an aircraft in visual flight rules flight within uncontrolled airspace unless the aircraft is operated with visual reference to the surface and, where the aircraft is operated at or above 1000 ft. AGL during the night, flight visibility is not less than 3 mi. Figure 2.8 on RAC 2-8 in the A.I.P. also illustrates the proper limits. A thank-you to Alain Joly for calling this to our attention. △