Transport Canada Transports Canada

Aviation Safety Letter

Learn from the mistakes of others; you'll not live long enough to make them all yourself . . . **Issue 3/2003**

Night VFR Approach Strikes Again

On October 11, 2001, a Fairchild SA226TC (Metroliner), with two pilots and a flight nurse on board, departed Gods Lake Narrows, Manitoba, at approximately 23:00 central daylight time, on a flight to Shamattawa. Approaching Shamattawa, the crew began a descent to the 100 NM minimum safe altitude of 2 300 ft ASL and attempted a night, visual approach to Runway 01. The aircraft was too high and too fast on final approach and the crew elected to carry out a "missed approach." Approximately 30 seconds after the power was increased, the aircraft flew into trees slightly to the left of the runway centreline and about 2 600 ft from the departure end of the runway. The aircraft broke apart along a wreckage trail of about 850 ft. The captain and first officer were fatally injured on impact and the flight nurse was seriously injured. This synopsis is based on the Transportation Safety Board of Canada (TSB) Final Report A01C0236.

The aircraft was equipped with a cockpit voice recorder (CVR) that indicated the aircraft was under controlled flight and the crew did not express any concern prior to impact. The aircraft weight and centre of gravity (C of G) were within limits throughout the flight and site examination, along with the CVR information, revealed no indication of any system malfunction or failure prior to impact. The captain and first officer were both properly qualified and experienced, and had also completed controlled flight into terrain (CFIT) training in December 2000.

Shamattawa is a small community 400 NM northeast of Winnipeg. It is served by a certified airport with a 4 000-ft long gravel runway with low-intensity runway lighting. Each end of the runway has green threshold and red edge lighting, and all were functioning on the evening of the occurrence. Neither runway at the airport was served by a ground-based, visual approach slope indicator. There were no ground lights beyond the end of the runway in the direction that the missed approach was conducted. The absence of any celestial light due to overcast conditions meant the missed approach was being carried out in total darkness.

The crew used a global positioning system (GPS) for the initial descent and became visual at about 3 000 ft ASL about 5 NM from the airfield. They flew a left hand visual approach. At 3 NM, they were about 700 ft above the desired approach path. They completed the final landing check, and the airspeed and altitude were still too high. Both pilots concurred that a missed approach was necessary, and the captain initiated it by calling for maximum power. The aircraft was seen over the threshold of the runway at about the height of the trees that were parallel to the runway along the airport boundary. During the missed approach, the aircraft's nose

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moved upwards initially, but the aircraft did not climb away, staying at the approximate height of the trees along the airport boundary.

As the first officer was setting the engine power, the captain called positive rate and gear up. The first officer raised the landing gear, retracted the flaps, and set the engine torque for the missed approach. Approximately 20 seconds after starting the missed approach, and 7 seconds before impact, the captain indicated that he would climb to 1 300 ft ASL and go around left hand. Two seconds later, the aircraft struck the trees.

What makes this CFIT accident particularly painful is its resemblance to a similar CFIT accident in 1989 involving a Metroliner aircraft at Terrace, British Columbia (TSB File A89H0007). The following explanation of two relevant flight illusions, somatogravic and somatogyral, was presented in the Terrace report.

> *Errors in the perception of attitude can occur when aircrew are exposed to force environments that differ significantly from those experienced during normal activity on the surface of the earth where the force of gravity is a stable reference and is regarded as the vertical. The acceleration of gravity is the same physical phenomenon as an imposed acceleration, and hence, in certain circumstances, one may not be easily distinguishable from the other.*
>
> *When the imposed acceleration is of short duration such as the bounce of a car or the motion of a swing, one can separate perceptually the imposed motion from that of gravity. When the imposed acceleration is sustained, however, such as the prolonged acceleration of an aircraft along its flight path, the human perceptual mechanism is unable to distinguish the imposed acceleration from that of gravity. The body senses the sum of these two accelerations, and this resultant sum becomes the reference acceleration, which is regarded as the vertical. Illusions of attitude occur almost exclusively when there are no outside visual references to provide a true horizon.*
>
> *In the absence of visual cues, the perception of motion and position is sensed primarily by the vestibular organs, and hence the term vestibular illusion is used to describe the circumstances where these organs do not correctly sense motion and/or position. Experiments have shown that there are large individual differences in the magnitude of such illusions and in the time required for the illusions to develop.*
>
> *If one considers an aircraft flying straight and level and accelerating along the direction of flight because of an increase in power, for example, then the direction of the inertial force due to the acceleration is to the rear of the aircraft and, for the purposes of this discussion, can be assumed to be along the longitudinal axis of the aircraft. This inertial force combines with the force of gravity to produce a resultant which is inclined to the rear of the aircraft. If this resultant is then used by the pilot as the vertical reference, then the pilot will incorrectly sense that the aircraft is in a nose-up attitude. If the pilot then trims or eases forward on the control column to correct for this nose-up perception, the nose of the aircraft will drop and the airspeed will increase. This change in attitude will change the direction of the resultant force vector in such a manner as to maintain and perhaps magnify the illusory perception of a nose-up attitude.*
>
> *Significant errors in perception can develop within the first few seconds of a change in the force environment. Experiments carried out in flight have shown that there is little lag in the onset of the illusion and that there is a relatively rapid increase in its magnitude during the initial six to eight seconds. This illusion is known as the somatogravic illusion, and it is particularly dangerous when it occurs on takeoff or when overshooting, especially at night or in poor visibility. An aircraft deceleration will result in the opposite effect, that is, a perceived nose-down attitude.*

"The loss of visual references and the aircraft's acceleration forces were ideal for the onset of somatogravic illusion."

Analysis —Although reference is made to the term "missed approach," the crew was conducting a visual approach and overshoot. After the rejected landing, the crew intended to fly a 1 000-ft AGL circuit for another landing attempt. However, given the absence of any celestial or ground lights in the area, the aircraft had to be flown with reference to the flight instruments.

The descent was started late, which led to the aircraft being high and fast on approach. The absence of ground-based approach slope indicators made the determination of the approach angle more difficult for the crew. The presence of an approach slope indicator would have enabled the crew to take earlier, more positive corrective action to avoid the missed approach.

The ground-based observation, that the aircraft did not climb, indicates that the required 8 to 10° pitch attitude was likely not set by the captain. Neither pilot revealed any awareness or concern that the aircraft was not in a climbing attitude. This lack of concern is an indication that the captain, at least, lost situational awareness after the missed approach was initiated, and that the first officer was either not monitoring the flight or

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he also lost situational awareness.

The loss of visual references and the aircraft's acceleration forces were ideal for the onset of somatogravic illusion. Even 7 seconds prior to impact, the captain believed that he was climbing to 1 000 ft AGL. The captain's performance was consistent with his being unable to distinguish the imposed acceleration as the aircraft speed increased from that of gravity and, although he probably thought the aircraft was climbing, it was not.

The first officer may also have been influenced by the somatogravic illusion. During the 30 seconds of the missed approach, his tasks were to react to the captain's commands and to monitor the instruments. Apparently the first officer did not observe anything remarkable or he would have alerted the captain that the aircraft was not climbing. The TSB noted that the non-directional beacon (NDB) receiver was turned off just prior to impact, and since the control head is on the first officer's side of the cockpit, it was likely he who turned the NDB off. Given the short duration of the overshoot and the tasks that the first officer was performing, it is probable that he had a false perception that the aircraft was climbing.

Even though the conditions were present for the crew to be affected by somatogravic illusions, these illusions could have been overcome by at least one of the crew. During the visual approach, the pilots were able to fly with visual reference to the surface. However, pilots are required to transition to instruments when entering, or about to enter, weather or environmental conditions where visual flight conditions do not prevail, as was the case when the overshoot was initiated. Had this transition been made, the fact that the aircraft was not climbing would have been evident.

Following the accident, the operator made changes to their procedures and increased crew training. Among those, the standard operating procedures (SOPs) were amended to include a "three positive rates of climb" call to be made by the pilot flying in response to the "positive rate" call made by the pilot not flying. A new section was added to specify missed approach procedures in detail. Crew training has increased the emphasis on missed approaches and the similarities between northern night flying and instrument flight. The company has also introduced crew evaluations in a generic simulator during semi-annual recurrent training. △

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Dr. Robert Waldron Wins the Transport Canada Aviation Safety Award

The Minister of Transport, the Honourable David Collenette, presenting the award to Dr. Robert Waldron.

Transport Minister David Collenette presented the 2003 Transport Canada Aviation Safety Award to Dr. Robert Waldron for his commitment to aviation safety in Canada. The award was presented in Montreal on April 15, 2003, at the 15th annual Canadian Aviation Safety Seminar (CASS). CASS is an international event hosted annually by Transport Canada for all sectors of the aviation community.

"Throughout North America, Dr. Waldron is recognized as an expert in aircraft accident investigation, and though his technical achievements are impressive by themselves, his integrity and perseverance has also gained him the respect of his peers, manufacturers, the insurance industry, and the international aviation industry," said Mr. Collenette. "Through his accident investigations, Dr. Waldron has contributed to aviation safety worldwide in a profound and tangible manner. I congratulate him on receiving this well-deserved award." Dr. Waldron received his Ph.D. in metallurgical engineering at the University of British Columbia. He established the firm R.J. Waldron & Co. Ltd., specializing in aviation and accident investigations. He has worked on more than 500 air accident investigations in 25 countries involving various types of airplanes and helicopters. One of Dr. Waldron's most noteworthy cases was his investigation into a fatal accident in 1979 of a de Havilland Twin Otter aircraft. His investigation prompted Transport Canada to issue an Airworthiness Directive requiring inspection of Twin Otter aircraft worldwide. As a result, the entire flight control system of this aircraft was modified.

The Transport Canada Aviation Safety Award was established in 1988 to increase awareness of aviation safety in Canada, and to recognize individuals, groups, companies, organizations, agencies or departments that have contributed, in an exceptional way, to this goal. △

Call for Papers—CASS 2004: The Future of Aviation Safety

The 16th annual Canadian Aviation Safety Seminar (CASS) will be held in Toronto, Ontario, April 19-21, 2004. The theme for CASS 2004, "The Future of Aviation Safety," calls for nothing less than gazing into the crystal ball to get a sense of the safety issues the industry and regulatory authorities will face between now and the end of the decade.

Over time, the industry has experienced various shocks, such as 9/11, war, and economic peaks and troughs. Sometimes, these have short-term effects and tactical responses mitigate the risks. Other times, however, the impacts have been more serious and required strategic or systemic changes. Inevitably, the industry will be confronted with these and other such shocks between now and the end of the decade.

Plenary topics: Speakers from all facets of the industry and academia are called upon to provide, in plenary, their perspectives and insights into what they think these shocks may be and their effects on safety. They will also be asked to propose ways and means of eliminating the shocks or mitigating their associated risks.

Workshop topics: Notwithstanding these system shocks and their potential impact on safety in the future, aviation companies can build a degree of resilience against them by developing and implementing Safety Management Systems (SMS). Therefore, building on the theme, a series of workshops to guide companies in the "safety proofing" of their organizations will also be on offer. Notionally, these workshops will address some of the following safety management topics:

- Safety Leadership
- Safety Planning
- Organizing for safety
- Controls
- Managing Safety Performance
- Continuous Improvement Strategies
- Managing Safety Partners and Suppliers
- Managing Human Resources
- Safety Communication
- Tools

Submission Form: If you wish to present a paper at CASS 2004, please complete the instructions found at http://www.tc.gc.ca/CASS/. Abstracts must be submitted by Monday, August 25, 2003. Papers will be selected on the basis of content and applicability. Written papers and formal presentations are due on Monday, February 23, 2004. For more information, contact Bryce Fisher, Manager, Safety Promotion and Education, System Safety.
E-mail: fisherb@tc.gc.ca △

Personal Currency—And We're Not Talking About Pesos...

While listening to the monotonous checklist being read out by my co-pilot, who happened to be one of our training pilots spoon-feeding me through a recurrent training flight, my right hand was blindly fiddling on the lower electrical panel trying to locate those two items he had mentioned a minute earlier. The battery was not even on and I was already hanging by the tailpipe…bad start indeed, but also a good wake-up call…

Of course I had several good excuses for my apparent lack of familiarity; as is often the case when you are flying a desk more often than the real deal, I had not flown that aircraft type much in the previous months, maybe three or four short trips where I was able to hide behind the checklist and just go through the motions. As circumstances would have it, my training flight kept being delayed by inexplicable forces of fate—weather, aircraft, training pilot, travel, kid got sick, car broke down, etc. I assume such delays never happen to others. I hadn't spent much time in the books either…I guess I wasn't able to find a couple hours in my busy schedule to remind myself how to save my neck at 20 000 ft if things went wrong, which they never do I reassured myself…

This little episode opened-up a debate with my colleagues: how can a pilot really remain current? How do you know if you are at the apex of your aircraft knowledge curve? The difficulty, as I understand it, is that the standards of proficiency and currency for each individual pilot vary wildly given the array of personal and professional circumstances. Therefore, it is practically impossible to formulate an all-in-one solution because of the myriad of different conditions and situations.

Airline, commuter and commercial helicopter pilots who fly frequently, and often on one aircraft type at a time, can normally be confident that they are current. Of course, these operators also have desk-bound part-time pilots who may fit squarely in that round hole…

On the private side, there are a lot of serious pilots who fly often, who own their own aircraft and who keep up with the books. Those are the "enthusiasts," and they too can feel reasonably comfortable with their knowledge and skills. It is the significant gap between these two extremes that should concern us.

Take for instance the young commercial pilot who flies three or four aircraft types in a small, single-pilot IFR operation; or the "mature" private pilot who earned his licence before the zipper was invented and claims to fly regularly (i.e., once a year); or pilot managers, who are dealing with the daily headaches of staffing, drumming-up business, juggling schedules, putting out fires all day long in an office environment, and who are suddenly thrust into a cockpit for impromptu flying? Under these conditions, how can anyone claim to be on top of it, at all times?

And the ultimate, unanswerable question… how many hours a month or per year does it take to remain current? Well, we don't know two pilots who will have the same answer to that one. "It all depends…" is what we hear most often. It depends on each individual pilot's history, qualifications, experience, type of flying, and so on. A pilot with several thousand hours of experience may have a good flying background, but still requires, like rookie pilots, regular exposure to remain sharp. Take a few minutes to analyze your own situation and currency level—for all aircraft types you may be flying. Indeed, when everything works as advertised, flying is relatively easy. But how many of us feel sometimes, like I did on that day, that we are hanging by the tailpipe? △

More Lessons Learned in 2002...

The following occurrence descriptions were randomly selected from the TSB's-Class 5 investigations for the year 2002. As you will see, there are very few new accidents. The occurrences have been slightly edited and de-identified, just enough to protect the innocent, the foolish or the simply unlucky aviators. Some locations were left in where needed for proper context.

A Piper PA18-150 had departed Fort Nelson Gordon Field (CBL3), with 2 people on board. On touchdown at an unimproved farm field, the pilot was not satisfied with the speed of the aircraft and decided to abort the landing. Shortly after liftoff, the aircraft struck a power line, control was lost and the aircraft overturned into a small pond. Both occupants sustained minor injuries, and the aircraft was substantially damaged.

Aborting a landing is OK, as long as you have room for it. —Ed.

A Nanchang CJ6A (Yak 18) aircraft was on a local familiarization flight with the pilot/owner occupying the rear seat and his passenger occupying the forward crew position. The aircraft crossed over Osoyoos Lake and commenced a climb toward rising terrain on the east side of the lake. During this climb, the airspeed decreased rapidly. The aircraft made a slow turn to the right and entered a box canyon where it subsequently stalled and crashed. The pilot sustained serious injuries; the passenger was released with minor injuries. The aircraft was destroyed.

Considering the past history of flying into "box *canyons," these two people were lucky. If you fly in mountains, valleys and canyons, you must be twice as vigilant about knowing your aircraft performance capacities.—Ed.*

A DHC-2 Beaver amphibious float-equipped aircraft departed the Sudbury airport, in Ontario, and was destined to Lake Temagami. After takeoff, the landing gear was not retracted. Upon touchdown on the water surface at Lake Temagami, the aircraft nosed over and came to rest in an inverted position. Egress from the aircraft was unhampered and the uninjured pilot was picked up by boaters who observed the occurrence.

Amphibious aircraft are wonderful, until you land on the water with the wheels down.—Ed

A Cessna 180 on floats was landing westbound on the Fraser River at the Pitt Meadows float base. Shortly after the aircraft descended out of the tower controller's view, behind a tree line along the riverbank, an ELT signal was received in the control tower. The left float had dug in upon touchdown and the aircraft nosed-over and eventually became inverted. The two occupants had time to exit the cabin and were rescued uninjured by a water taxi about 40 minutes after the accident. Both occupants had been wearing the lap and shoulder restraint belts, and the pilot was wearing an inflatable coat.

Good example of use of safety and emergency equipment.—Ed.

As a Cessna 206 was about to touch down on a 1 200-ft-long dirt strip, the sun broke through the clouds, blinding the pilot. When vision was restored a few seconds later, the aircraft was poorly positioned and the pilot aborted the landing. The aircraft could not out-climb the uphill slope of the strip, and impacted shrubs and small trees at the end. The aircraft was substantially damaged, and the occupants, who wore the available shoulder harnesses, were uninjured.

A setting sun can seriously affect your vision. See the article on proper sunglasses in this issue of ASL. —Ed.

The crew of a Bombardier CL-415 was taxiing for departure at Pickle Lake, Ontario, for a local firefighting flight. As the aircraft was manoeuvring, its left wingtip struck a standing Bell 205A helicopter, which was parked on the ramp. No injuries resulted. The CL-415 sustained damage to its left wing. The Bell 205A sustained damage to its main rotor system.

Taxiing in tight quarters? If unsure of clearance, use a marshaller.—Ed.

A DHC-2 Beaver on floats was en route from Holinshead Lake to Kashishibog when the pilot encountered deteriorating weather conditions. As the flight progressed, the ceiling became increasingly lower until it was nearly at tree top level. Shortly thereafter the pilot located a cabin at the destination outpost camp. On final approach to the camp, the aircraft struck the water while in a turn, tearing off one float, and it eventually sank. The pilot and four passengers exited the aircraft and attempted to swim ashore. While swimming, one of the passengers went missing and was not located.

Continued flight into deteriorating weather conditions—why?—Ed.

A Piper PA28-180 was en route from Pickle Lake, Ontario, to International Falls, Minnesota. Approximately 16 NM north of the Fort Francis airport, the engine lost power and the aircraft was forced to land on a logging road. Two of the three people on board received minor injuries and the aircraft was substantially damaged. The operator advised that the aircraft had run out of fuel.

Run out of fuel—why?—Ed.

A Cessna 182 aircraft was in level flight at 10 500 ft, preparing for a parachute jump. A jumper was outside the aircraft on the step and holding on to the strut in preparation to jump, when his parachute deployed prematurely, pulling him rearwards off the step. The helmet of the jumper struck the horn of the right-hand elevator, injuring the jumper and damaging the elevator. The right-hand elevator was buckled and torn off the outboard hinge, but the pilot was able to control the aircraft and land safely, noticing only a restriction during the flare. The critically injured jumper was found about eight hours later.

The reason for the premature opening of the parachute was not in the report. If you fly in support of sport parachuting, look into this with the Canadian Sport Parachuting Association.—Ed. △

Recreational Aviation

Serge Beauchamp, Section Editor

Missing Bolt Fatal

(This article was originally published in Aviation Safety Ultralight and Balloon, Issue 2/95)

The Beaver ultralight was on a local practice flight with an instructor and student on board. At about 500 ft altitude, the wing was observed to detach from the aircraft and the occupants lost their lives in the ensuing crash. Findings during the preliminary investigation were that the bolt on the left wing rear attachment point was missing. Reasons for the missing bolt have not been determined. Unless the bolt is found, the exact cause may never be determined.

The following three points on safety are suggested as a result of this tragedy:

1. Prior to installation, inspect bolts and safety devices that attach wings and tail components to ensure that they match the manufacturer's material specifications.
2. Prior to any flight, inspect visible high-stress points such as wings, spars, struts, tail assembly and flight controls for security and correct bolts, lock nuts, safety pins, cotter keys and lockwire as specified by the manufacturer.
3. If the wings or other major flight components have been removed for repair or transport, have a second knowledgeable person inspect the reassembled ultralight for security and properly installed locking devices prior to flight.

There are numerous models of the Beaver ultralight available on the used market. Since the Beaver factory is no longer in business, it is difficult for the Beaver owners to obtain ongoing maintenance information and spare parts.

There have been a number of very serious ultralight accidents and incidents resulting from carelessness or ignorance of basic mechanical assembly details of these machines. The ultralight community can learn from these occurrences and become more safety conscious as a result.

Things Haven't Changed Much Since 1959...

The pictures above are dated August 1959 and were sent to me graciously by Mr. Don Wright of Ardrossan, Alberta. The story is summed-up as a short field, high density altitude takeoff, in 3-4 in. tall dry grass, over obstacles on a hot summer afternoon! The field was about half a mile long, elevation of 2 350 ft. ASL, and with the trees as seen in the photos. The aircraft, a Helio Courier, had four people on board. Mr. Wright assesses that the high temperature, combined with the type and condition of the field, were the major contributing factors to this accident. Weight was likely a factor as well. The aircraft failed to achieve sufficient airspeed to climb clear of the trees and it stalled, but the pilot was able to affect a hard flat landing in the next field.

COPA Corner—How Do We Do Risk Management?

by Adam Hunt, Canadian Owners and Pilots Association (COPA)

In my last article I suggested that putting an emphasis on “safety” is misplaced—if by safe you mean “without risk.” There is nothing “safe” about flying, and as long as we keep focusing on “being safe,” we are not going to reduce accidents. I concluded that what we should be thinking about is “managing risks.”

So how do you do “risk management” when you are one pilot flying one aircraft? It really isn’t that hard. There are lots of models that will tell you how to do this—they all really give you the same kind of tools. Pilots are familiar with checklists, so that approach is an easy one to use. This is the risk management pre-flight checklist:

Possible hazards	– identify
Risks	– assess
Unacceptable risks	– reduce
Equipment and resources	– get anything that you need to reduce risks
Remaining acceptable risks	– identify and accept
Post flight	– assess and debrief

Here is a little more detail on each of these items:

<u>Possible hazards</u>: These are all things that can affect your flight. What is broken on the aircraft or suspect? What hazards were identified in the weather briefing—fog, thunderstorms, high winds? How are you feeling—hung over, less than 100%, tired, sick?

<u>Risks</u>: These can be anything that the hazards-list flags as notable—weather moving in about the time that you will get to your destination, near dark.

How severe are the consequences? They could be:

Catastrophic	– death, loss of aircraft
Critical	– severe injury, serious damage to aircraft
Marginal	– minor injury, minor damage to aircraft
Negligible	– no injury, no damage

How likely is it that the event will occur?

Frequent	– likely to occur
Probable	– will occur several times in your flying career
Occasional	– likely to occur at least once in your flying career
Remote	– unlikely but possible
Improbable	– very unlikely, assumed that it won’t happen

The next step is to plot it on this table:

	Catastrophic	**Critical**	**Marginal**	**Negligible**
Frequent	Unacceptable	Unacceptable	Unacceptable	Consider carefully
Probable	Unacceptable	Unacceptable	Undesirable	Consider carefully
Occasional	Unacceptable	Undesirable	Undesirable	Acceptable
Remote	Undesirable	Undesirable	Consider carefully	Acceptable
Improbable	Consider carefully	Consider carefully	Consider carefully	Acceptable

Unacceptable risks: Do not fly. Take steps to reduce these risks to a level acceptable to you. That may mean waiting until the next day for daylight or better weather, getting maintenance action, or getting a good night’s sleep.

Undesirable risks: Only fly under circumstances where no other options are available to reduce the risks.

Consider carefully: Does this flight really have to be flown, or could it be delayed until circumstances are better?

Acceptable: Note the risks and proceed. The risks may be important to consider in your enroute decision-making.

<u>Equipment and resources</u>: Is there anything or anyone that could help you reduce the risk? Perhaps you need to rent a life raft or bring along a co-pilot?

<u>Remaining acceptable risks</u>: The acceptable risks that are left require identifying. Keep these things in mind while you conduct your flight—they should influence enroute decision-making. If the headwind is more than expected, and you are required to leave the landing gear extended due to a maintenance problem, then the risks of that approaching weather system and flying after nightfall will need to be reevaluated.

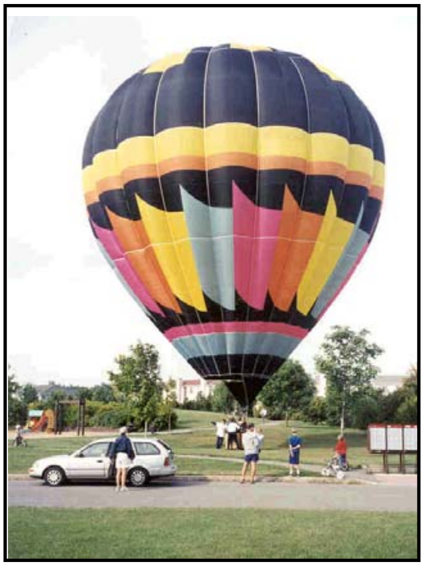
<u>Post flight</u>: How did you do on today’s flight? Did you only just get away with it? Were you lucky that the headwind abated before you ran out of gas? Always evaluate your risk management—that way, with practice, you can get better at it!

Remember “superior use of luck” can’t be relied upon every time! Good risk management doesn’t take all the risks out of flying. As long as we choose to fly, there will be risks. Good pilots are good risk managers. If you use all the tools at your disposal, you can reduce those risks to an acceptable level, complete your flight, and live to fly again another day!

More information about COPA is available at www.copanational.org

Balloon Safety

Balloon Landing in the Burbs...



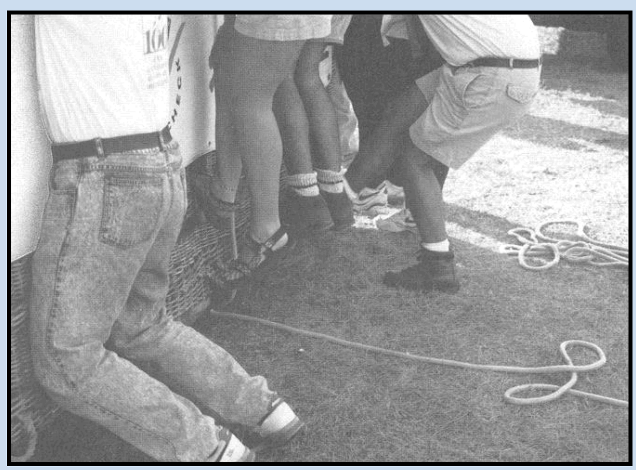
Tight quarters for landing.

Spectators, particularly children, are plentiful after a landing in the burbs.

Hot air balloons are as plentiful in summer as dandelions in the spring, and one early morning in August, I woke up to see both specimens standing side-by-side across from my house—and I mean directly across from my house. The left picture is a testament to the pilot's landing skills. Landing between a children's play structure, a suburban street complete with a community mailbox, trees and paths is something balloonists sometimes have to face—albeit reluctantly.

This was hardly a feat, however, as another balloon landed in a neighbour's backyard at the exact same moment. A balloon recovery also attracts large crowds, as shown in the second picture, but somehow I suspect balloonists prefer open spaces and more discreet surroundings. Something to think about next time you fly in "the burbs."

Basket Launch Safety



During the excitement of the launch, it is always possible to get feet caught up in the lower lift points on the basket. For the balloon to takeoff with a foot stuck in such an opening, a trapezoidal lock occurs where the unwitting person cannot get the foot out without help and may be carried aloft head down. This happened at a local festival, but fast thinking on the part of those in the basket saved the day. The unfortunate helper was pulled into the basket, the right thing to do under the circumstances, and of course went for a balloon ride in the departing balloon. It is safer to plan an ascent rather than be forced aloft through careless placement of feet.

Weather To Fly vignettes now on CD-ROM!!

The 26 *Weather To Fly* vignettes, exploring the effects that weather (seasonal and otherwise) has on flying in Canada, are now available on CD-ROM!
To order contact the TC Civil Aviation Communications Centre at 1-800-305-2059. △

How to Avoid Glaring Errors

A pilot who can't see is an accident waiting to happen. Without good glare protection, flying on bright, sunny days can be tiring and hazardous—and it can affect night flying too. Exposure to bright sunlight for a whole day without protection interferes with proper night adaptation for 12 to 24 hours! The following brief summary will focus on how to choose your sunglasses and the advantages and disadvantages of the various types.

Photo courtesy of Randolph Engineering Inc.

There are three problems caused by bright sunlight: glare, infra-red (IR) radiation and ultraviolet (UV) radiation. Glare, although the most obvious nuisance—causing tearing, distraction and fatigue—is responsible for less serious problems than IR or UV radiation. Cutting down glare by using very dark sunglasses, however, can cause problems because reducing transmitted light reduces visual acuity, as anyone who has driven from a bright road into a dark tunnel whilst wearing sunglasses can verify. Even moderately dark sunglasses can, on a bright day, cut your vision down from 20/20 to 20/40.

On the ground, UV is partially filtered by the earth's atmosphere, but the higher you go, the less the protection. UV light is not filtered equally by all types of sunglasses and can damage the eye, causing early cataracts (lens opacities). Cheap sunglasses should be avoided as they may only cut down glare. Good sunglasses reduce light transmission to 12-20 percent, but should cut down UV transmission by at least 90 percent. Looking directly into the sun should be avoided as IR can quickly injure the sensitive retina at the back of the eye. Prolonged and unprotected exposure in bright sunlight, particularly if combined with a wide snow cover, can seriously degrade vision. As you can imagine, mountain climbers are quite familiar with the need for top-quality eye protection.

Sunglasses may be constant-gradient, photochromic or polarized. Polarized lenses are great for fishing, but bad for flying. Due to manufacturing stresses, there may be small areas of polarization in an aircraft canopy or windscreen and, if the angles of polarization in the glasses and the windscreen differ, a blind spot can be produced. Polarization may also interfere with depth and distance perception, particularly during a bank. Just what you need turning on final!

Photochromic lenses that darken with increasing UV light are good for driving, but polycarbonate aircraft canopies shield out much of the ultraviolet rays and may interfere with their proper darkening. Additionally, going from bright sunlight into cloud the glasses may take several minutes to lighten. Constant-gradient glasses come in various colours and are the most commonly used. All are about equally effective for glare, but green or grey lenses have the least adverse effect on your vision. Yellow lenses are good in haze, but less effective in bright sunshine. Sports orange lenses should not be chosen because they interfere with blue-green discrimination and may make red warning lights more difficult to see. Pilots with colour deficiencies should not use coloured lenses and should stick to a quality grey lense.

What is best? Where vision is concerned, do not gamble your eyes by using cheap sunglasses; also keep in mind that price is not always a good gauge of quality, as some trendy polarized models costing well over $150 are not what you need at all. You should budget anywhere between $75 and $150 for good aviation sunglasses. Constant-gradient lenses that reduce light transmission to 15-20 percent and block 90 percent of UV light are ideal. Neutral grey, green or brown lenses are the most popular. Blue, orange or polarizing lenses should not be worn while flying. If in doubt, ask your Civil Aviation Medical Examiner for advice. In the long run, it is wiser to save your eyes than to save your money!

This article was originally published in ASL 3/1994, and has been slightly updated by our Civil Aviation Medicine Branch.—Ed △

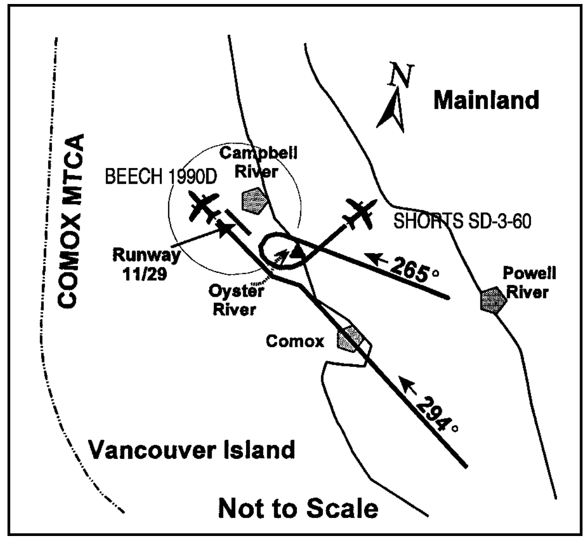
Did You Know...

…that ATC will issue information on significant weather and assist pilots in avoiding weather areas when requested? The assistance that might be given by ATC will depend upon the weather information available to controllers. Frequent updates by pilots are of considerable value. Such PIREPs receive immediate and widespread dissemination to aircrew, dispatchers and aviation forecasters. For more details, read **A.I.P. MET 1.3.8.** △

From the Investigator's Desk: Undue Risk at Uncontrolled Aerodromes?

by Glen Friesen, Transportation Safety Board of Canada (TSB), Pacific Region

On January 8, 2002, two airplanes were on scheduled passenger-carrying flights from Vancouver to Campbell River, British Columbia. One of the airplanes, a Shorts SD-3-60, was operating in accordance with VFR, intending to land on Runway 29, while the other, a Beech 1900D, was operating in accordance with IFR, and had been cleared by ATC for a straight-in LOC(BC)/DME approach to Runway 29. The crews of both aircraft were in contact with the Campbell River Flight Service Station (FSS) on the mandatory frequency (MF). The VFR aircraft first reported on a non-standard right base leg to arrive first but, at the shoreline, the flight encountered weather conditions below VFR limits. The crew aborted the visual approach by turning left nearly 230° and climbing to the east. The aircraft under IFR, which was established on the back course and behind the Shorts, then received a resolution advisory from the traffic alert and collision avoidance system (TCAS) on board; the crew of the Beech executed a missed approach with an avoidance manoeuvre to the left of track (see diagram). Both aircraft were in each other's proximity as they climbed in opposite directions. Both crews later asked for radar vectors to IFR approaches and landed without further event.



This risk-of-collision incident, as described in TSB Final Report A02P0007, involved two commercial aircraft, both flown by professional two-pilot crews, and the airport was served by an operating FSS. The *Canadian Aviation Regulations* (CARs) do not limit air carriers to flight solely in accordance with IFR, so when weather conditions along selected routes meet the minima specified in the operator's operations manual, many realize time and cost savings by conducting flights in accordance with VFR, which allow for more direct routing. In this case, an IFR routing from Vancouver to Campbell River may take the aircraft on a longer, southbound and westbound routing before proceeding north. Such a routing ensures terrain clearance but increases flight distance. VFR flights can result in more direct flights, but the practice bypasses several safety defences built into the IFR environment.

Once again, the contributing issues identified in the TSB investigation included non-standard or ineffective communication and non-standard circuit procedures at an uncontrolled airport within a MF area.

In 1999, there were three midair collisions in British Columbia involving a total of six aircraft. Nine of the 12 people involved died in the accidents. Two of these accidents occurred at uncontrolled airports—one within an aerodrome traffic frequency (ATF) area and one within a MF area served by an operating FSS. In both of these accidents, the TSB investigation, *Findings as to Causes and Contributing Factors,* included non-standard or ineffective communications and non-standard circuit procedures. With the increasing concerns brought on by these accidents, agencies such as NAV CANADA, Transport Canada and the TSB have participated in pilot-education briefings to emphasize the issues associated with midair collisions. In issue 5/2000 of the *Aviation Safety Vortex,* a fictitious accident scenario was described. The author concluded the story by writing, "This accident didn't take place, but it is just a matter of time before it does." It would appear that the author was unaware that an amazingly similar accident had already occurred in Penticton, British Columbia the previous year (TSB file # A99P0108) between two privately operated fixed wing aircraft.

The non-standard procedures used included things like late and incomplete inbound position reports, conducting circuits on the non-circuit side of the aerodrome, joining the circuit at points which are not authorized or not recommended, using frequencies other than the published MF or ATF. Other elements have included flight service specialists not obtaining, or not passing on all available and pertinent information and not clarifying ambiguous information. Is all of this the result of sloppiness, laziness, poor airmanship, lack of recurrent training, difficult or confusing procedures, or shortage of enforcement resources? Perhaps that extra two or three minutes of air time required to join the circuit in a recognized manner is too expensive?

Safety in aviation is based primarily on the concept of defences built into the system. Recommended procedures, technical equipment, and communication provide forms of defences.

Procedures are published to encourage commonality of operations and to ensure that poor performers at least meet a minimum acceptable standard. By disregarding standard procedures, especially within uncontrolled airspace, all pilots are deprived of a primary defence for conflict detection and resolution. When the defences are compromised, the risk of conflict increases.

Pilots are required to make a number of standard radio calls directed to the FSS, and to monitor the MF frequency when operating within a MF area. The responsibility of the FSS is to provide an aerodrome advisory service (AAS) that includes the dissemination of traffic information pertinent to the existing conditions[1]. Research conducted by the Lincoln Laboratory showed a 50 percent improvement in the visual target acquisition rate by pilots alerted to the presence of other aircraft, and the median range of visual acquisition improved by 40 percent[2].

Why don't we follow the basics? Users of the system are probably the best source of that information. Is the *Aeronautical Information Publication* (A.I.P.) *Canada* section RAC 4.5 easy to understand? Does training cover these procedures adequately? Are you prepared to operate confidently and safely at an uncontrolled aerodrome? If readers have specific examples regarding this area of operation, the TSB would like to hear of constructive, workable suggestions or comments. Please fax hard copy to 604 666-7230 or forward electronically to glen.friesen@tsb.gc.ca. △

[1] *NAV CANADA, FSS MANOPS, parts 810 and 811.*

[2] *J.W. Andrews, "Modeling of Air-to-Air Visual Acquisition,"* The Lincoln Laboratory Journal, Volume 2, Number 3 (1989) p 478.

Short Take on Human Factors Basics

Approximately 80 percent of aviation accidents are primarily caused by a human error, while the remaining 20 percent almost always involve a human factors component. The following is the fourth, and last, of a series of short passages from TP 12863E, Human Factors for Aviation—Basic Handbook. *We hope this encourages you to look further into this fascinating, and relevant, topic. —Ed.*

The Importance of Judgement

Some writers see judgement as the process of choosing which alternative will give the safest outcome in a given situation. However it is defined, we need good judgement in order to fly safely. But there is much more to it than that.

Judgement and Regulations

In aviation, more than any other field we can think of, regulations are based on the assumption that practitioners will interpret them in accordance with their own skill. Though applying at face value to all pilots, the regulations are actually geared to the pilot who is extremely proficient, flying a well-equipped aircraft. Thus, whereas any pilot may be *legally entitled* to fly a cross-country flight in marginal VFR conditions, it is up to the individual pilot to judge whether such a situation exceeds his or her own personal limits, based on experience and currency.

Likewise, all performance data in the aircraft operating manual are derived from perfect situations. The take-off roll, for example, assumes a hard dry runway in a well functioning aircraft with an engine developing maximum horsepower. In real life, of course, any deviation from this ideal lengthens the required runway distance: if the engine is a little older, if the runway is contaminated with snow or water, or if the tires of the aeroplane are not at the correct pressure, then the numbers in the manuals are not accurate. So, once again, the individual pilot has to interpret the situation and apply judgement in determining what numbers to use. Using the data in the aircraft manual blindly, without interpretation, is likely to prove a bad judgement.

Judgement as the Basis of Aviation

Judgement is important in flying because the pilot is given a great deal of latitude in making decisions. The whole aviation system is based on the assumption that pilots will exercise good judgement in securing the safety of themselves and all others in the system. In other words, the aviation system is based on trust. Pilots are expected to honour the responsibility they have been given. Each time you exercise bad judgement, you are not only endangering yourself and others, but also undermining the very basis of aviation.

Good judgement, therefore, is much more than the means of safety. It is the cement that keeps all aspects of flying together.

Excerpt from TP 12863E, Chapter 10, page 145. You can obtain your own copy of this publication by calling the TC Civil Aviation Communications Centre Services at 1 800 305-2059. △

Got a few minutes to spare?
Review transponder operations in A.I.P. RAC 1.9

What Wires?

by Garth Wallace

My first passenger that drizzly morning, owned a cottage on a remote lake. He and I were sitting in a four-seat floatplane, which was tied to the dock. The weather had started to lift but we were waiting for more ceiling and visibility before taking off. He talked. I listened.

This was his first time using the air service. "I live in the city, but I come north to my cottage every chance I can get," he said. "I always drive my car to the marina at the other end of my lake and then go the last five kilometers by motorboat. When I come to town for supplies, I often stop here to watch the airplanes. I decided to charter an airplane some day as a little adventure for myself, so here I am."

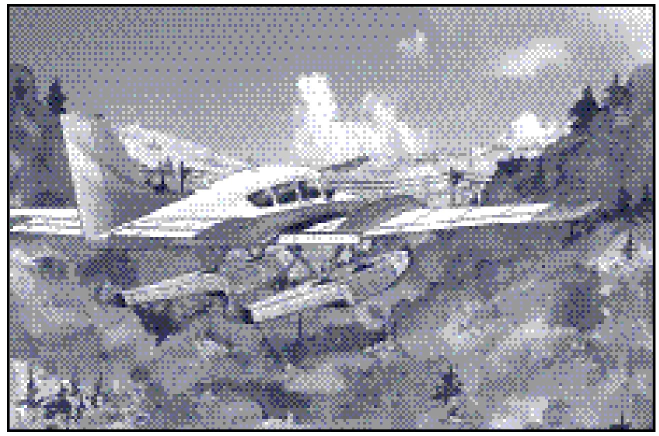
He said he didn't mind waiting for the weather. He had never flown before and was enjoying being part of the goings-on at the air service. He considered the delay a bonus.

Normally we flew customers to their fishing camps or cottages and returned empty. At the end of their stay we'd fly back empty and pick them up. This did not seem cost-effective at all to this customer, so he had arranged just one flight. I was to fly him to his cottage, drop off his gear and then he was going to fly back to town with me to pick up his car, and finish the trip his normal way. This gave him two airplane rides for the price of one and avoided the cost of another roundtrip flight to bring him out.

The weather soon picked up enough to depart. I signalled the dock boy to cast us off. When we were clear, I fired up the engine and taxied out. My passenger showed an interest in the airplane's controls and instruments so I explained the basics while circling to warm up the engine. Our load was light. We departed easily.

The customer stayed glued to the window, looking down on the lakes and forest rolling by, throughout most of the trip. He had shown me on the map that his cottage was on the long arm of a large lake. I had never been there before. When we arrived I flew a slow pass over his section of the water before landing. His face lit up when he saw his place from the air. I inspected the long bay for rocks, logs and wire crossings, while my passenger checked out what his neighbours were doing to their properties. The dark water looked deep and clear on that grey morning. I did not see any obstructions. There was no wind so I set up an approach toward the open end of the bay, touched down smoothly and stopped close to my man's dock.

We unloaded his things and re-boarded for the return flight. It was an easy takeoff. There was no boat traffic, the airplane was light and I had the entire length of the bay and four kilometres of lake beyond. Conversation in flight was difficult over the noise, but I pointed out some of the local landmarks as we flew back to the base.



Wires, wires, wires... what the floatplane pilot's nightmares are made of...

After landing, the passenger thanked me while we taxied to the dock. He was visibly excited by the flight. "I always wondered if the pilot would fly over or under the wires crossing the bay when I took a plane into my place," he said.

I didn't reply. I felt the colour drain from my face. There were no wires crossing the bay; at least I hadn't seen any.

I contemplated how close we might have come to snagging hydro lines. We must have passed them on the landing and the takeoff. Shivering at the thought, I was late cutting the power on my approach to the dock. The dock boy knew what was going to happen next. The left float whacked the tires along the side and mounted the planks. The airplane stopped at a crazy angle, with the left float almost clean out of the water.

I opened my door and hopped down. The dock boy helped me horse the airplane back into the water. My passenger said nothing but smiled nervously as he climbed out and scurried off to his car. He is the only one who knows how close we came to the wires, but he may never fly again. He thinks that docking a floatplane is dangerous.

The chief pilot talked to me later. "I heard you were rearranging the docks this morning."

I told him the whole story. "I did everything you taught me about approaching a new destination. I could not see any wires. What else could I do?"

"You could have asked."

"Asked who?"

"Who knew there were wires?"

*Garth Wallace is an aviator, public speaker and freelance writer who lives near Ottawa, Ontario. He has written seven aviation books published by Happy Landings (*www.happylanding.com*). He can be contacted via e-mail:* garth@happylanding.com.

The ASL Interview—Denis Ford, Manager of System Safety, Vancouver Island Helicopters Ltd.

by Gerry Binnema, System Safety Specialist and ASL Contributing Editor, System Safety, Pacific Region

Denis Ford is the Manager of System Safety at Vancouver Island Helicopters Ltd. (VIH), a company with about 70 aircraft working primarily in British Columbia and Alberta, as well as other areas of Western Canada, and various International locations.

ASL: Where do you fit into the structure of the company?

DF: I have a reporting relationship that allows for direct access to the President of VIH, although on a day-to-day basis I work with the General Manager or the Departmental Managers themselves. My responsibility is anything that has to do with safety. That's not to say that nobody else is responsible for safety in the various departments. My job is to help pull everything together—to oversee what other people are doing about safety issues in their respective areas and assist in the identification and procurement of the resources required to fill in the gaps.

While I do not have a specific safety budget, I have never been restricted in the operation of the Safety Department. When, as a result of investigations, major changes to procedures or equipment modifications are required, overall budgetary consideration is given. Those items that require immediate attention due to imminent safety issues are treated as a priority, with those of lesser urgency being budgeted for and implemented over a longer period of time. The actual Safety Department has a relatively fixed set of operating costs. While the Safety Department is often involved in the identification of issues as a result of independent or joint investigations, the recommendations and costs of implementing them will normally fall within the Maintenance, Operations, or Training Departments.

ASL: Do you believe that your company possesses a strong safety culture?

DF: Yes, and it's getting stronger all the time. Although I am relatively happy with the *safety culture* here, I'm a perfectionist so I always want it to be better. Perfectionism is of course, not something that can be obtained in safety-related matters, for as we all know, there is always room for continued improvement and to believe otherwise would be foolish.

ASL: How do you do that? How do you get people to think safety?

DF: You need to get everyone actively involved in the Safety Program. Safety crosses all of the departmental boundaries within a company. We need to work towards eliminating as many of the cultural divisions that have existed between administrative office personnel, pilots and maintenance staff as possible. Mistakes happen because of a breakdown in thought processes such as judgment and decision-making. Those distractions or interferences are the same, regardless of who you are or what you are doing. Safety is a frame of mind you must strive to carry with you 24 hours a day, at work, at home, or at play. Safety is most effective when it becomes a habit as a result of routine, and not treated as something that only needs to be thought of while at work.

Contributory cause and risk management training is provided to all of our personnel. In doing so, they become more aware of their own thought processes and begin to think about causes and contributory factors of events that have occurred in their own life. Our training also brings people together from the various departments and exposes each of them to the different priorities and ways of thinking that these other departments often require. One of the things we do during the training is take an example of a typical helicopter job that, at face value, most of the people in attendance would not consider doing because it appears to be too risky. We then have a look at what steps can be taken to reduce the risk and then reassess whether it has been brought to an acceptable level. Most people are surprised to find that you can often reduce the risk significantly, and in many cases to a manageable level, by the implementation of seemingly small changes in procedures.

Most people are already practicing risk management, but they had never attached that label to it. Doing a walk around, a daily check or an inspection, or checking the sling gear before using it, are simple examples of risk management in practice.

ASL: Can you describe your reporting system?

DF: We have three different reports: *Accidents or Incidents Involving Aircraft and Vehicles*, *Occupational Injuries or Illness*, and *Unsafe Conditions*. The forms are available at every base and in every aircraft. The forms have very colorful borders so they don't easily get lost on someone's desk. Although we have three distinctive methods of reporting, the investigation and follow-up are the same for each. The formal reports would usually come directly to me. I attach a report number and identifier and then forward them to the respective departmental manager. In most cases that manager has been aware of the problem right from the time of occurrence or submission of the report, and has already started an investigation. The circulation of the actual report form does not delay that investigation.

The most critical step is to make sure that the report follow-up does occur. It's relatively easy to do the investigation and find out what contributed to the event. The challenge is to ensure that the resultant recommendations are implemented and that any procedural changes or equipment modifications are consistently supported. If you don't do the follow-up, and visible implementation has lost its momentum, you will ultimately lose employee participation in the reporting system, which will lead to an ineffective safety program.

ASL: What is the greatest challenge of being a safety manager?

DF: As a comparison, from an operations or maintenance manager's perspective when you see something that needs to be done, you can often take charge and make that change within the system yourself. In safety, much like instructing, you may know what needs to be done, but you need to motivate others to achieve the desired result. Because the possible negative effect of doing something in an unsafe fashion is not always obvious or measurable, the long-term success in implementing a change requires understanding and personal "buy in." This may involve a few people, an entire department or even the company at large, and that will take time.

One of the biggest challenges is keeping the safety program free from the departmental barriers that often exist within an aviation company. Transport Canada tends to deal with the maintenance and operational aspects of a company separately, and while quality assurance and emergency training are very specific and to a large degree effective, there are many other aspects of safety that are not unique to a particular department. However, when it comes to ensuring that the same urgency is paid to the company safety program, safety can often find itself competing for the time of a specific department, with the regulatory nature of Transport Canada. In other words the temptation is there to set aside general safety issues while those of an externally regulated nature are dealt with. Obviously that is not acceptable and while the company tries to ensure that doesn't happen, there is a continual tug of war with respect to the time and energies of the departmental managers.

Flight 2005 will help bring many of those issues to the same level of urgency and importance, but my concern is that the responsibility for the control of safety within an organization will be assigned to one of the traditional departments and embedded for example within the Operations Manual. The success of a safety program and how it contributes to accident prevention is often dependent on immediate response to a situation or a hazard and the typical ops and maintenance methods of implementing regulated change can take too long. Remember, there are a lot of people within an organization who are not assigned to operations or maintenance, and yet their involvement and effect on safety is just as important.

Other than the specific Safety Systems, such as Quality Assurance and Emergency Procedures that are already embedded in maintenance and operations departments, I feel that in general safety should stand on its own. All of the procedures and policies within a company's ***Safety (and Health) Program*** should be cross-referenced by the other traditional departments where required, but be available for immediate change as the need arises. In doing so, the departmental cross-reference requires no change, and procedures can be improved throughout the company in a very timely and efficient fashion.

ASL: What benefits have Vancouver Island Helicopters seen as a result of having a strong safety program?

DF: While the statement could be made that our safety program gives us a higher competitive standing in the industry, particularly in those markets where the clients now demand that their suppliers have a visible and effective safety program, the *real benefit* is a feeling of pride and professionalism from within our own organization and knowledge that the ***safety of our personnel is what really matters***. That makes our motivation for safety *internal* and that is where the long-term success of the safety program and the company itself will be generated. In terms of proposed safety management system (SMS) legislation, we are already four fifths of the way there, so we don't see any big change coming in order to comply with SMS regulations. △

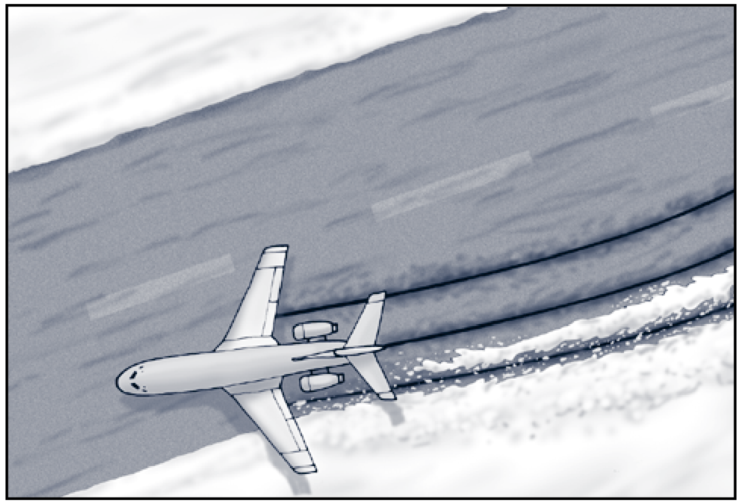
Fuel Requirements Review for VFR Flight

An aircraft operated in VFR flight shall carry an amount of fuel that is sufficient to allow the aircraft, in the case of an aircraft other than a helicopter, when operated during the day, to fly to the destination aerodrome and then to fly for ____ minutes at normal cruising speed, or, when operated at night, to fly to the destination aerodrome and then to fly for ____ minutes at normal cruising speed.

Answer Key : 30 , 45. Ref : A.I.P. RAC 3.13.1

Inaccurate CRFI Contributes to Runway Excursion

On March 27, 2002, a Fokker F-28 was on a night flight from Toronto, Ontario, to Saint John, New Brunswick, with 4 crew members and 51 passengers on board. The aircraft landed on the centreline of Runway 05 in Saint John at 00:30 local time. After the nose wheel touched down, the aircraft started to drift uncontrollably to the left and the left main wheels went off the side of the runway for approximately 900 ft before regaining the runway surface. The left main gear track was 15 ft from the runway edge at its furthest point. Aircraft damage was limited to minor cuts in the tires of the right main gear and the nose wheel. There were no injuries to the passengers or crew. This synopsis is based on TSB Final Report A02A0038.



Artist's impression of runway excursion.

The crew had been provided with a Canadian Runway Friction Index (CRFI) measurement for Runway 05, taken at 00:12, of 0.52—well above the recommended minimum CRFI. A value of 0.52 is equated with good friction characteristics, approximately equivalent to a wet runway covered with 0.02 in. of water. With this information in hand, even though Runway 05 was reported to be 100 percent snow-covered with up to 1/4 in., the crew declined an offer for a centreline sweep. Conditions were deteriorating rapidly however, and the non-landing Runway 14/32 was measured at 00:22 with a CRFI reading of 0.23, with an equal amount of contamination. The significance of the discrepancy in the CRFIs was not recognized by ground personnel and consequently, there was no re-assessment of the validity of the Runway 05 CRFI measurement.

The value of the CRFI for the non-landing runway was not passed on to the crew. It is not known if the provision of this information would have altered their decision to land on Runway 05, or to reconsider the offer for snow clearing. The CRFI for Runway 05 had been measured 20 min prior to the landing and was reported to the crew 10 min before touchdown. Given this relatively short time, the crew would not expect a significant change to the friction characteristics and consequently relied on the Runway Surface Condition (RSC)/CRFI report to establish the suitability of Runway 05 for landing.

As the temperature was slightly above freezing, melting under the snow cover on Runway 05 was likely either undetected at the time of the CRFI run, or it happened mostly after the measurement was taken. In either case, the CRFI reading of 0.52 was considered valid when the measurement was taken, but was not an accurate indication of the runway's friction characteristics at the time of landing.

The TSB concluded that the poor friction characteristics of the runway, due to slush contamination, did not allow the crew to correct the aircraft's ground track after touchdown and the aircraft slid off the side of the runway.

Safety action taken—In May 2002, the TSB forwarded a safety advisory to Transport Canada (TC) regarding the adequacy of RSC/CRFI reporting and crews' knowledge of the limitations of these reports. The advisory suggested that TC consider a means of advising aircrews and other members of the aviation community of the limitations of RSC and CRFI reports, particularly when airport ambient temperatures are near freezing and precipitation or visible moisture is present. In addition to this article on the Saint John occurrence, TC published the article "Just a bit of slush…" in *ASL* 1/2003, and a third article on how much performance is affected by slush is planned for *ASL* 4/2003.

The operator of the occurrence described in this article took steps to reduce the likelihood of further runway excursions in conditions where slush might be encountered, including the publication of a *Flight Operations Bulletin* advising flight crews of the potential for CRFI reports to become invalid soon after the reading was taken, particularly during changing weather conditions where temperatures are at or near the freezing level and surfaces are contaminated with snow, slush, ice or standing water, or where precipitation or visible moisture is present during the approach and landing. It also directed crews to consider delaying a landing and consider the validity of CRFI reports only after the runway has been swept, giving due consideration to depth of contaminates between the time of the CRFI measurement and the landing.

TAKE FIVE...

for safety

Five minutes reading could save your life !

Thunderbolts and Thunderstorms

Thunderbolts :

Seen as the most spectacular part of a thunderstorm, thunderbolts do not pose a serious risk to aeronautics: “in a metal airplane, the crew is sheltered from the direct effects of an electrical discharge:”

— A flash of lightning can temporarily blind the pilot.
— The radios and electronic equipment can be damaged, and the thunderbolt’s “tracks” can be left on the aircraft’s fuselage.
— Serious accidents caused by lightning are extremely rare.
— However, lightning is a good indication of the force of the thunderstorm.
— The more frequent the flashes of lightning, the more violent the thunderstorm may be, and therefore should be avoided.
— Conversely, when the frequency of the flashes of lightning decreases, the thunderstorm is starting to dissipate.

Thunderstorms :

There are certain requirements for a violent thunderstorm to occur:

— unstable air from the surface to high altitude;
— high relative humidity at low levels;
— dry air at high altitude;
— a lifting factor such as a mountain or cold front.

“A thunderstorm can contain all the dangerous meteorological conditions known to aviation:”

— low ceilings and poor visibility;
— hail, icing;
— wind, wind gusts, microbursts (wind shear effects);
— turbulence;
— squall lines;
— tornadoes;
— thunderbolts (lightning).

Recommendations when there is a thunderstorm :

— Do not takeoff or land: turbulence may cause a loss of control.
— Flying under a thunderstorm, even with good visibility, is dangerous because of the effects caused by wind shears and turbulence.
— If a thunderstorm covers more than half of a region, by pass it visually or with a radar.
— Frequent lightning flashes indicate a violent thunderstorm.

In a thunderstorm (when it cannot be avoided):

— Fasten your seat belt and secure all loose objects in the cabin.
— Plan your route so that you spend the least amount of time possible in the thunderstorm.
— To avoid the worst icing conditions, determine a path where the temperature is below –15°C.
— The carburetor and Pitot tube heating must be activated.
— Turn on the lights in the cockpit to reduce temporary blindness by the lightning flashes.
— Concentrate on the aircraft instruments.
— Do not modify the instrument adjustments; maintain a reduced cruising speed.
— Avoid any unnecessary manoeuvring through turbulence; corrections will only increase the strain on the structure of the aircraft.
— Never turn around once you have entered a thunderstorm.


Hey young fella... what brings you here so SOON?!
Well... I was 15 minutes late... now I'm 25 years early!!