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Flight Comment

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Distraction = DANGER

Already in ancient times, Homer described the devastating effects of distraction in the *Odyssey*. To prevent his mariners from being distracted by the song of the Sirens and putting their boat in danger, Odysseus blocked their ears with wax. Nowadays, bus drivers use other strategies to avoid distraction. As a safety measure, and to avoid distracting them, passengers are asked not to speak to bus drivers.

Most of the time, bush and helicopter pilots are alone to carry out all the tasks related to flying the aircraft while, at the same time, they are not isolated from their passengers. Team spirit often leads pilots to interact with passengers. By talking or by bringing their activities on board the aircraft, passengers can become a dangerous source of distraction. As much as possible, pilots must isolate themselves and concentrate on their work by remaining distant. If pilots get involved in their passengers' conversations or activities, their attention is greatly diverted from flying the aircraft. A distracted pilot is no longer able to control the situation, and his/her vigilance, which is essential during an emergency, is compromised. Conversations in flight should be limited to those that are required by the mission at hand — it's a matter of safety. Professional pilots explain this and enforce it from the cockpit. They can take the time to socialize and exchange opinions once they are on the ground.

Here's a classic example of distraction: Imagine the passenger in your helicopter is a geologist. You observe him from the corner of your eye between two "scans" of the instrument panel. You have been flying over a rocky countryside for a good half-hour. Suddenly, he changes colour and yells in the interphone to conduct a half-turn toward a heap of pebbles. You carry out the manoeuvre as an excited voice, raving about the mineral beauty of these rocks, resonates through your headset. The enthusiasm overcomes you as well; your wide eyes fixate on these stones and search to find the beauty in them, but you don't see it — you are not a geologist! Suddenly, you regain your composure and you notice, with a sinking stomach and a strident cuss, that you are only one hundred feet above the ground with a tailwind and no airspeed. You have put yourself and your passengers in a dangerous situation. You alone are responsible. You let yourself become distracted! You are very lucky if this story has a happy ending. Unfortunately, many fatal accidents (for example, collisions with power lines) have pilot distraction as a causal factor.

Other dangerous forms of pilot distraction include spilled coffee in the cockpit, problems with an instrument, or a passenger who is not feeling well. The pilot diverts his/her attention to the problem while the flight continues with no real control. The longer the flight continues at a low altitude, the more likely it is that this distraction could have disastrous results because the room to manoeuvre is reduced. Pilots, beware of the song of the Sirens! ◆

Bernard Maugis, System Safety Specialist, Quebec Region

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ICE ICE Baby!!

There we were, on an IFR flight plan from Shearwater to Moncton at 6,000 feet. The weather had been sunny and beautiful for the first half of our flight, when up ahead, we noticed a line of frontal cloud. As forecast, it was based at 3500 feet and topped at about 6500 feet.

As flight in known icing conditions is a bad thing in the helicopter world and the freezing level was 4000 feet, we decided to ask Centre for higher. As is often the case, Moncton Centre was busy with rush hour traffic and we were obliged to wait our turn. After several attempts we finally got through, but not before entering cloud. I wasn't really concerned as there seemed to be only a few hundred feet of cloud to break through in the climb.

We finally got through, requested 8000 feet, and were cleared for the climb. So off we went. I was doing one of my checks and noticed that we were pulling 94% torque, and we were only climbing at 200 feet per minute. Hmmm. I checked my sponson for ice build-up, and, sure enough, we were picking up ice. We had only been in cloud for about five minutes. Hmmmm!

I mentioned this to my co-pilot, and as he was checking his sponson, he noticed ice building on our windshield wipers. The area forecast had predicted light to moderate icing in the vicinity of the towering cumulus clouds. I checked the torque again and we were at 100% and a nil climb. We were at 6400 feet and the airframe started to vibrate lightly. At this point, we had been in cloud for maybe seven minutes, and we couldn't climb any higher.

We had a quick discussion about turning around or descending out of cloud and continuing the trip VFR. We called back the Centre to request lower, and of course, everyone for a hundred miles wanted to talk to them. I stepped on half a dozen transmissions trying to get hold of Centre. I didn't want to just descend without permission because there was obviously a lot of traffic around. When we finally broke in on the radios, we were descending at 100 feet per minute with pretty good vibrations and 102% torque. Not good! We had been in cloud now for about nine minutes before we were able to transmit.

> *"Moncton Centre, this is Talon 33. We are unable to climb to 8000 feet and unable to maintain 6000 feet due to icing. We are in the descent to 3000 feet to break out of cloud." There was silence on the radios. I guess everyone heard a little tension in my voice and decided to listen out.*
>
> *"Talon 33, roger. Cleared to descend to 3000 feet, your discretion. Say type and severity of icing."*
>
> *"Talon 33 in the descent. We've got moderate to severe mixed icing at 6000 feet."*
>
> *"Talon 33, roger. Air Nova flight 1422, are you picking up ice in your area?" I assumed the Air Nova flight was in the same cloud, but he didn't report his position.*
>
> *"Moncton, Air Nova 1422, negative. We're not…" There was an audible 'bong' on the radio. "Yep, there it is now. We're picking up some ice."*

At this point, Moncton asked Air Nova 1422 for type and severity, which they called light rime icing. Meanwhile, we were pretty much auto rotating down through cloud to get out of the icing conditions as quickly as possible, and we started to shed the ice as the temperature rose. We broke out of cloud at 3800 feet and the outside air temperature was five or six degrees.

We sorted ourselves out, cancelled IFR, thanked Moncton Centre, and switched off to file VFR to our destination and continued with the

trip. What would I do differently if I were faced with the same situation again? First, I wilfully flew into cloud above the freezing level, which is almost certainly asking for icing. When I did start to pick up ice, I did not make the proper decision to turn around and go back to the VMC conditions I had just left. Second, I misunderstood what light to moderate icing meant to our aircraft type. What was light icing to the Air Nova flight was much more severe from our point of view. The speed of ice build-up to the point where level flight could not be maintained was incredible.

If we hadn't had the escape routes we had, and the gas to deal with it, this incident would have been more frightening. It is better to have in your mind at the beginning of the icing season what your reaction will be when you find icing on your airplane, than to hope you'll have the time to make the right decision when time is more precious. ◆

Captain Savage

"I'm Experienced!"

After having completed a tour as an instructor in Moose Jaw on the Tutor, I was posted to fly the mighty C-130 Hercules mother-ship. After breezing through the Operational Training Unit (OTU), I was glad to finally be flying for an operational squadron. Now I could get some of that highly prized "real experience" I had heard so many speak of during my tenure in Moose Jaw.

Shortly after arriving to the squadron, I was scheduled to fly a trip that was tasked to carry some cargo from Trenton, across the country, to Comox. The aircraft commander (AC) and I sat down during the pre-flight briefing to discuss the flight and my understanding of the procedures. "No problem" I told him, I knew what it was like to fly across Canada. After all, I had done it many times before in the Tutor. After easily convincing him that I knew my stuff, we headed out for what I considered a routine, mindless trip. "After all," I thought, "I had a tour under my belt, and I was experienced!"

After take-off, the AC gave me control as we climbed to our cleared altitude of 16,000 feet. Air Traffic Control (ATC) came through on the radio during the climb and altered our routing, but no one recognized one of the identifiers we had been cleared to along the route. Both the navigator and the AC pulled out the enroute charts to find it. ATC came on the radio a short time later and asked us to confirm our altitude; all of us looked up from the maps and saw the altimeter passing through 16,600 feet. The loadmaster soon found himself practicing his floating techniques as we pushed over in our attempt to return to the proper altitude.

That was when the AC looked over at me and saw the egg smeared all over my face. Some "experienced" pilot I had turned out to be. I learned first-hand one of the simplest and most important rules in a crew cockpit — the one in control flies the airplane. My overconfidence allowed me to become complacent and could have cost the AC his ticket.

There are other fully qualified crewmembers in the cockpit who can find the required answer without my help. No matter how much experience you think you have, you can never get away from the old adage…."aviate, navigate, communicate." ◆

Captain Harbour

DON'T Take a

We had just started our night shift and we were getting debriefed for the flying requirements of the next day. A minimum of two serviceable Buffalo aircraft were required — one was for Search and Rescue (SAR) and the other was for the 426 Squadron Flight Engineer (FE) course. As luck would have it, we only had one!

The most promising aircraft required a Fuel Control Unit (FCU) change and some other minor work. Everything went quite well; I was surprised at how seldom we were pulled away to do other, more pressing, tasks — like parking, starting, after and before-checking, and refuelling the Labrador helicopters for night training. The FCU and the rigging were a "piece of cake." Our only problem was the wind — it had come up and increased until it was almost above the allowable limits. I was the only technician who was run-up qualified that evening and I felt extremely uncomfortable. I informed the crew chief of my concern, however, I was reminded of the school's need. They would have to cancel the course and reschedule the FE to come back at a later date. Due to the awkwardness of the situation and the fact that the wind was still *legally* within limits, I reluctantly opted to carry out the run-up.

The aircraft was towed outside and positioned into the wind to carry out the high power run-up. The run-up progressed quite well; the dry and wet engine rotations for the fuel leak check were uneventful. The ground/flight idle and the maximum power adjustment were both looking good, as was the high power four-point check. The part that worried me was the high power slam check. This is a quick movement of the throttle in one direction. It is done in three parts: first, a flight idle to maximum power forward slam response is carried out. Second, a flight idle to maximum power reverse slam is done and, thirdly, and most dangerous, is the maximum power forward to maximum power reverse slam. These are carried out to ensure that the engine does not flame out in an emergency abort situation. I saw no problem with the forward slam as the propeller was biting into the wind; it was the reverse part that I was uncomfortable with. I knew that in less than three to five seconds the propeller would be pushing hard against the high wind. I moved the power lever to full reverse slowly so I could feel the aircraft's response; nothing happened. So…I proceeded with the flight idle to full reverse slam. The nose tires lifted slightly but, according to the ground man, they never left the ground. Even though it

Chance

made me uneasy, I was reminded of the need for the aircraft. As I feared, when the power lever was slammed from maximum forward power to maximum reverse power, the aircraft weight shifted so fast that the nose jumped up approximately one to two feet into the air. A quick abort was carried out and the nose was brought back down to the pavement. An aircraft check was carried out for damage to the nose landing gear and surrounding areas.

We got extremely lucky; no damage was found and the engine never flamed out. This gave us a serviceable aircraft for the school's course. What I learned that day was that no matter how much pressure the section is put under, if all the conditions are not favourable…don't take a chance! ◆

Sergeant Bolduc

DRAIN IT BEFORE YOU DROP IT!

It was just another configuration change. Nothing special — just a couple of 480-gallon external fuel tanks to remove. I had just arrived at AETE, I was a Master Corporal, and had not worked on the CF-188 before. I had installed and removed many EFT's on the CF-104 and I had a good idea of how this should work…. back off the sway braces, unlatch the rack, lower the tank, and you're done.

Being new to the CF-188, I was just along to watch, lend a hand, and perhaps learn something. The fully qualified Master Corporal crew chief got his crew together and off we went.

The two most important things one must do prior to removing a tank is to remove the explosive cartridges and to ensure that the tank is empty. The cartridges were removed and the crew chief noted that there was a little fuel remaining in the tank but that it wasn't much and we were good to go. We used an MJ1A bomb jack to lower the tank from the wing pylon; so far, so good. The next trick was to get the tank from the jack onto the trailer. We decided to just manhandle it — two people at each end, lock hands, lift and lower, and the job was done.

We quickly realized that there was too much fuel for us to lift it. Undaunted, the Master Corporal got one of the technicians to get another jack with a boom and a sling and move it that way. We got the tank in the air and began to move it towards the trailer with a tech at each end to guide it. The nose of the tank started to drop; fuel in the tank was migrating rapidly to the nose and there appeared to be considerably more than was first thought. Instinct told me to put all my weight on the back end and the technicians on the front did all they could to lift the front end. We hoped this would reverse the fuel flow and level the tank off. No such luck! Before I knew it, I was being lifted off the ground and the nose of the tank was about to hit the floor. Luckily there was a mattress right beside us and one of the technicians, thinking quickly, put it under the nose while the jack lift driver slowly lowered the tank and me to the ground.

As luck would have it, no harm was done to the tank. We, on the other hand, had damaged our pride a little realizing that anyone who had seen this little fiasco must have been impressed. Needless to say, we all learned a lesson that day. If there is **any** fuel in the tank, drain it before you drop it! ◆

Sgt Schmidt

A Dark and Stormy Night

We had been in theatre for almost a month. It seemed like summer came early to Bosnia, with high temperatures and hardly any snow by the end of March. But, today had been different. We had already logged more than six hours of flying before leaving Split, Croatia and returning in the rain to Banja Luka (BL) with the Commander of Multi-National Division — South West (MND SW). It was dusk and the weather was deteriorating but, dodging low cloud and showers, we made it to BL near the end of our crew day.

Bosnia poses a number of difficulties for us as aviators, ranging from minimal safe landing areas to minimal weather reporting or forecasting. The Balkans region is very mountainous and the weather can change drastically from one valley to the next; it's as if each vale has it's own separate weather system.

The thought had occurred to us to stay overnight in BL, but a quick estimate of the time required to reach our base in Velika Kladusa (VK) had us getting home inside our eight hours flying limit. A weather call to VK confirmed the conditions there were still good. We strapped on our night vision goggles (NVG's) after refuelling and decided to go for it. Despite enroute showers and the occasional thunderstorm cloud that we were able to avoid, we almost reached our destination uneventfully. We were just seven miles out from VK when we noticed something odd. The usual scattering of lights on the hills all around were no longer on our left side and they were disappearing ahead of us as well! The cloud deck was lowering until it was engulfing the hills to our left and up ahead.

The rain was heavy now and we made a quick circuit to assess our options. We realized that the route we followed to get here was closing off behind us and a return trip to BL would be a risky venture. We followed the only open valley in sight, heading north and perpendicular to our intended track. I was starting to breathe heavily now and I could read the headlines back home already, "PRESSING PILOT PILES IN." I felt stupid, knowing I had been safe and sound in BL just forty minutes ago. Our crew day was nearing its end and we weren't at our best any more. Now we faced the most hazardous situation we had seen that day, that week, and, thus far, that tour! In Canada, we could have simply landed in a field to wait out the weather. But, that was only a last and desperate option in mine-strewn Bosnia.

I must have been through the third iteration of my "please, God, help me out of this mess" prayer when I saw the opening. I noticed a gap between the hills on our left and I could see the light of the valley beyond clearly. A way past the cloud!! We took it, hoping like crazy that our map was accurate and that there weren't any wires strung across the gap as we flew through it. The rain continued unabated but, beyond the gap, the ceiling was higher and we could breathe easier. We could already see VK ahead of us, glowing like a lighthouse in the fog, less than five miles away.

My arms and legs were rubbery, and the FE's NVG's were literally washed out by the downpour as we made

our descent. It took three passes before we landed safely in the helicopter-landing site and we could start breathing normally again.

It didn't take long for complacency to set in and, sometimes, our "can do" attitude gets in the way of good judgement. It took all the experience and skill we had as a crew to get us safely on the ground. A little more experience and we would have known to call it a day in BL. We all strive to be professionals and we all want to get the job done. We take pride in our ability to do so especially in trying circumstances, or with minimized resources. But, pride, on occasion, gets in the way of sound judgement. ◆

Captain Noppers

IT'S STILL DARK AT NIGHT

It would seem that we are all a little resistant to change, at first. Usually, we adapt, overcome, and go on to the point of dependency. An example of dependency is our use of computers. I recently purchased a microwave oven from a large warehouse. After purchasing the product, I was informed that they were in stock but that I couldn't take one with me because their computer had "crashed." It would seem that this company had grown so dependant on their computer system, that they couldn't allow me to take the item. The sales slip had to be printed, the item had to be removed from their stock, and the loading dock had to receive notification through the computer system to physically remove a microwave from their shelves and turn it over to me at the customer pick-up counter. I wonder what kind of future would lie ahead for this company if a virus were to invade their system and shut it down regularly or even permanently.

How does this apply to "Flight Safety" you ask? Well, the Canadian Forces were introduced to Night Vision Goggles (NVG's) for aircrew a number of years ago. When they were first introduced, there was some initial opposition and then, over time, aircrews have adapted. Are we now in the throes of dependency? I'm sure that you've all heard it said that NVG's do *not* turn night into day. In fact, they are tools and, subsequently, have limitations. First and foremost is that they must have ambient light to function. The light doesn't necessarily have to be in the visible spectrum, but it must be present never the less. Secondly, NVG's only provide us with a 40° field of view, when, if fact, we are used to having approximately 180°. Again, we can and do adapt, but there are still limitations.

So…what is my point? When flying with NVG's, don't forget that they are a tool and, as such, that they have limitations. If something occurs in flight and they no longer function, you should have enough situational awareness to allow you to transit to instruments and not be trapped flying blind. ◆

Remember…
it's still dark at night.

Master Corporal Lawrence

AS I SEE IT

ADDRESSING

Over the last year, I have visited almost all the Wings, Units and Headquarters in the Air Force. During those visits, I asked you, the people on the flight lines, in the hangars, and at staff desks who make our Air Force work, what you thought were the most significant threats to the safety of our flying operations. I received a great deal of very useful feedback.

You said that your biggest concern was experience levels; people in the aircraft and on the hangar floors were more likely to make mistakes because of their lack of experience. You noted that some factors exacerbate the experience shortage, such as low flying rates, complex yet ageing aircraft, broad mission scope, and high supervisory workload. You also told me that you were concerned about the shortage of people, especially fully qualified and proficient people. This was caused by higher than normal attrition, establishments set lower than necessary during downsizing, and by a high ratio of untrained people. You said that fewer people doing the same amount of work means more pressure on those who are qualified, and thus an increased likelihood of errors, whether in the air, during maintenance actions, or in a headquarters.

You have also mentioned that you don't believe there is enough time to train on essentials while there is too much mandated training which does not contribute directly to the mission; this constrains time for operational training and increases workload. Operational tempo is not allowing technicians to do trade restructure training, and is increasing workload for supervisors. Headquarters (HQ) reductions and understaffing, along with the demise of Group HQs has meant most HQ staff have insufficient time to pay attention to all parts of their jobs, and unit level people are sometimes being asked to do staff work which was previously done by Group HQs.

Many aircrew as well as their Commanding Officers (COs) told me they believe we have set currency requirements below what is required for real proficiency. As a result, they sometimes accept the risk of low proficiency in one area to allow for better training in a more hazardous regime (e.g., low level night vision goggle (NVG) flying).

I was told of many other concerns, but these were the biggest pan-Air Force issues. So what do we do about it? Firstly, you should know that our commanders at all levels are very much aware of these concerns and are doing all in their power to address them. But I want to focus on what **you**, the people on the flight line, can do to compensate for these factors. I think there are five main concepts that encompass virtually every action that can be taken. If you've seen the 2001-02 annual DFS briefing, you will recognize them, but let me go through them individually:

- **Risk Management.** This is the process of identifying the hazards associated with what we are about to undertake (perhaps with the aid of a list of potential hazards), assessing them in terms of likely severity and probability, finding ways of reducing the risk (possibly from a list of options), and deciding whether to amend the task or not do it. The process seeks to ensure that only necessary risk is undertaken, that benefit outweighs the risk and that risk decisions are taken at an appropriate level (i.e., someone who really knows how important the task is and understands the risks of doing it).
- **Crew Resource Management/ Human Performance in Maintenance (CRM/HPIM).** Central Flying School has been tasked to further the Air Force CRM and HPIM programs and is calling them Human Performance in Military Aviation (HPMA). This concept recognizes that people perform more effectively and are less likely to make mistakes if decisions consider the perceptions and knowledge of **every** member of the team; the program provides people with skills that help us to do just that.

THE HAZARDS

- **Supervision.** When experience levels are low, people don't think of all the potential hazards or the things they can do to mitigate the effects of those hazards, and supervision becomes an absolutely critical barrier to accidents happening. I believe that **everyone** who supervises flying should take the flying supervisors course that has been running again in Winnipeg for the last couple of years (similar maintenance supervisor training is being contemplated). When supervisors are also relatively inexperienced, we must provide them with the skills to recognize the hazards implicit in the activity, the hazards associated with the conditions of the people or equipment, as well as hazardous behaviours and attitudes, and to identify ways to reduce the risk. **Any** supervisor can significantly decrease the risk by being another set of eyes to look at the plan and another brain to think it through, but only if he or she takes the time to go through that with those about to undertake the mission or task. This is not about questioning the integrity or professionalism of the crews involved, it's about another line of defence.
- **Flight Discipline** applies to any flying related activity, not just flying. Why would discipline improve safety? Essentially because exercising discipline means taking only those risks that *need* to be taken to get the job done. It means that dangers, risks or hazards — things that could go wrong — are anticipated and planned for. It means that time is managed so that there is time to pay attention to the information most likely to threaten the success of what we're doing. It means that we recognize in others and ourselves the attitudes and behaviours that could prevent the safe conclusion of the task. It also means that we make the right decisions for the right reasons. A very important feature of flight discipline is **planning** — both before and during the flight or flying related activity. It all has to do with reducing the likelihood or uncertainty of something happening which will imperil our task — and that's why real professionals focus on planning.
- **Safety Culture.** Attitudes, behaviours, and expectations can affect individual and group discipline, so it's important to encourage an appropriate safety culture. Here, it's important to remember that everyone is a leader, because a leader is someone who influences other people. Even when we are at the lowest point in the chain of command, we influence the attitudes of those around us and above us by how we approach the things we do. In other words, we all contribute to the culture of our team, group or organization. A most important result of an appropriate culture is something called *organizational alignment* — this means that the behaviour of everyone within the organization is fully aligned with the stated policies and procedures. Everyone, at every level, recognizes the need for those rules, obeys them to the letter, makes it clear by both statement and behaviour that they support and obey them, and focuses on changing them when they're wrong rather than skirting them. Only in this way will the culture of the organization foster safe operations.

Why should we pay so much attention to safety when our accident rate does not seem to be that bad? Well, for a start, although it's not bad by historical standards and relatively few accidents have, thankfully, been fatal or catastrophic, the number of accidents was higher in 2001 than at any point in the last five years, and the accident rate (number of accidents per 10,000 flying hours) is the highest it's been in almost 20 years. Accidents cost the Air Force more than they ever have, so this trend is not a positive one. If you're not yet convinced, the safety issues listed at the beginning of this article tend to have a delayed effect — it takes several years for them to have their most serious impact. If we want to avoid feeling that effect, we're all going to have to concentrate on safety.

Finally, all the five measures described above have been proven not only to keep accidents from happening, but also to significantly improve operational effectiveness, so they offer a win-win approach — at least, **as I see it**. ◆

Colonel Ron Harder
Director Flight Safety

EPILOGUE

TYPE: **Schweizer 2-33 Glider C-FEAF**
LOCATION: **St-Jean-sur-Richelieu, QC**
DATE: **14 May 2000**

The glider was being flown in support of the Eastern Region Spring Familiarization Flying Program at the St-Jean-sur-Richelieu Airport near Montreal. The pilot was a member of a local Air Cadet Squadron and was building time in order to be qualified as a Familiarization Pilot.Immediately prior to the accident flight he had received a check ride from a Glider Instructor and then had proceeded on a solo flight. This flight was his fifth this season.

After a normal tow to 2500 feet above sea level (ASL) followed by some upper air work consisting of gentle and medium turns, the pilot joined a left downwind for the paved strip parallel to runway 29 at 1300 feet ASL. The elevation of the St-Jean airport is 136 feet ASL. Surface winds were reported by the St Jean Tower as 290° Magnetic at 20 Knots. He turned onto the base leg at 900 feet ASL and opened the spoilers to half. After turning final, he noted that he was low and closed the spoilers.

The left wing of the glider struck two trees approximately 30 feet AGL. The first, smaller impact at the wing tip initiated a slight flat turn to the left. The second, more severe impact at mid-wing caused the glider to pivot rapidly to the left in a flat attitude. The glider turned 180° and the tail raised as the glider was travelling backwards at this point. The glider struck the ground 1300 feet from the normal touchdown point on the gliding site in approximately a 70° nose down, wings level attitude, about 75 feet upwind from the tree it originally struck. The wind, blowing from the bottom of the glider then pushed the fuselage past the vertical to a 45° inverted attitude when the wings came to rest against some trees. The pilot unstrapped and egressed from the rear left window.

The investigation revealed that the accident was most likely caused by the pilot experiencing task saturation in the high winds and falling behind the aircraft to the point that he did not alter his circuit enough to compensate for the winds and unnecessarily deployed the spoilers during the base leg of the approach producing an excessive sink rate in the strong winds and preventing him from reaching the intended landing area. Also, the pilot's self imposed pressure to land at the launch point, in order not to cause delays in the operations of the site, probably led to "tunnel vision" or "task fixation" and prevented him from realizing that he would not reach the airfield and did not lead him to take alternative action.

It was therefore recommended that all Regional Cadet Air Operations Officers be made aware of the self-imposed pressure felt by some junior staff members. Site Commanders should continue to stress to their junior staff that they are not expected to be able to consistently land the glider at the launch point and that they have their full support if landing long or off the airfield is the safest course of action for the conditions. ◆

EPILOGUE

TYPE: **Cessna 172 C-GVWT**
LOCATION: **Bromont, Québec**
DATE: **26 July 2000**

On the morning of 26 July 2000, a solo Air Cadet undergoing private pilot training under the Air Cadet flying scholarship program, departed St-Jean PQ for Bromont PQ in a Cessna 172M. The purposes of the flight were to acquire more solo cross-country time in order to meet the 5 hours requirement for the private pilot licence and to practice touch and go landings away from the student's base at St-Jean, as that airport was also host to the Air Cadet League's regional glider school and the circuit was very busy.

The aircraft was established for a touch and go with a slight crosswind from the left (45 degrees at 5 to 10 Kts). On touchdown, flaps were selected up and full power was applied. The aircraft began to move left, then right of the centre-line. The student pilot elected to continue the take-off roll, went around the circuit and attempted another touch and go. Again, after touchdown, the aircraft moved left and right of the centre-line. The take-off roll was continued and a decision was made to carry out one more circuit to a touch and go, with the provision that if the aircraft exhibited the same tendency to cross the centre-line the student pilot would stop and phone his home base in St-Jean to report the aircraft's directional problems to the flying school staff.

The investigation revealed that the accident was most likely caused by the student not adequately compensating for the crosswind and the engine torque on take-off. This was most likely caused by a combination of inexperience and fatigue. Also, the student's lack of experience, combined with his overconfidence, led him to attempt to trouble-shoot a perceived mechanical problem at a critical moment in the flight. It was therefore recommended that All Regional Cadet Air Operations Officers ensure that the Officers supervising the Cadets on flying scholarship maintain an environment conducive to learning by more closely monitoring their cadet's rest and nutrition. They should also keep a closer watch on the cadets performance and attitude. Any observation should be immediately brought to the attention of the school's Chief Flying Instructor.

The investigation also revealed that the flying school owners were unaware of the requirement for DFS to investigate this accident. Since the Cadet Flying Scholarship is subsidized by DND, the aircraft are considered to be Military Conveyances and accidents are subject to DFS investigation under Article 18 (3)(4) of the Canadian Transportation Accident Investigation and Safety Board Act. It was therefore recommended that all Regional Cadet Air Operations Officers should ensure that the Supervising Officers of Flying Scholarship Cadets are aware of the requirement to follow the articles of the A-GA-135-001/AA001 in case of an accident. These officers should be made familiar with the publication and should more closely liaise with the school Chief Flying Instructor on matters of Flight Safety. ◆

EPILOGUE

TYPE: CH-124A419 Sea King
LOCATION: Shearwater, NS
DATE: 4 May 1999

During a maintenance ground run, the pilot started the number two engine without first starting the number one engine and spreading the rotor blades. The pilot had briefed the three-person start crew of his intentions to deviate from the normal start procedure, and to do so single pilot.

In order to accomplish the briefed start procedure, the pilot used the 'emergency start' switch to override the 'safety interlocks', which are designed to ensure that the number two engine cannot be started without the rotor system spread and number one engine running with the utility hydraulic system pressurized.

With the number two engine started, the pilot observed the Ng (engine RPM) was fluctuating, and two members of the start crew joined the pilot in the aircraft. In an attempt to stabilize the fluctuations, the pilot elected to advance the number two Speed Selector Level (SSL). When the SSL was advanced to between 85-95 % Ng, the rotor head shifted causing damage to the folded rotor blades, the tail rotor and the pylon structure. During this action, a loud bang was noted in the cockpit and the pilot secured the number two engine.

With the blades folded, the only mechanical device stopping the main rotor head from rotating was the rotor brake. It is designed to hold the folded head in a fixed position. The rotor brake's maximum holding capacity is about 80 shaft horsepower. The output shaft horsepower of a normal operating Sea King engine is up to 1350 shaft horsepower. When the SSL was advanced from ground idle towards the normal operating range (85-95 % Ng), the engine shaft horsepower exceeded the design holding capacity of the rotor brake resulting in the rotor head shifting and contacting the airframe. The rotation of the main rotor head in the folded position directly caused the C category damage. There were no injuries sustained in this occurrence.

The AOI for the CH124 contains a 'Caution' about not starting the number two engine without the rotor system in the flight-spread position. Also, the ground crew voiced concerns to the pilot about the proposed procedure; but they did not do so emphatically, nor did they seek advice from superiors. The pilot did not perceive the concern as an indication that his plan was ill advised, and proceeded to use the 'emergency start' switch to override a 'safety interlock' with the result being a badly damaged aircraft.

The investigation concluded that the pilot had contravened the operating instructions by intentionally starting the number two engine while the blades were folded. His decision to advance the throttle was a further error in judgement.

This was not the first time this pilot had demonstrated what could be called undisciplined behaviour and squadron supervisors may not have been as attuned as required to fully address the situation. The absence of Human Performance in Maintenance (HPIM) training was also noted as contributory to the occurrence.

It has been recommended that all flying supervisors be equipped with the knowledge and resources required to detect undisciplined tendencies and behaviour, and to address them formally through a recognized process. It was suggested that HPIM training be considered as mandatory training for all ground crew and that a case history of this accident be included in Crew Resource Management (CRM) training, as a preventative measure. ◆

EPILOGUE

TYPE: **CT11142**

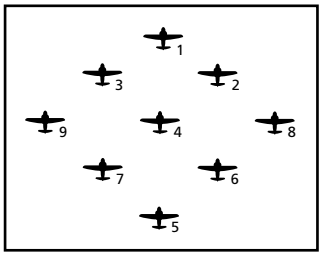
LOCATION: **Comox airport, British Columbia**

DATE: **10 Apr 2001**

The aircraft was number five of a 9-plane formation landing after an on-field air show practice at 19 Wing Comox. During touchdown on runway 29, the aircraft experienced a firm landing and the right-hand main landing gear and nose-gear collapsed.

The aircraft was kept on the runway and came to a stop without interfering with the rest of the formation. The pilot shut down the aircraft without further incident. There were no injuries.

The positions in the formation are depicted as follows:



As the formation touched down, number five overcorrected from being slightly high on number 4 and experienced a firm landing. The aircraft then bounced and became airborne. The aircraft then, being affected by the preceding aircrafts jet wash and down wash, quickly descended towards the ground, struck the runway surface again and all three landing gears contacted the runway surface heavily. The right-hand main gear was forced upwards through the top surface of the right wing and collapsed. The nose-gear also partially collapsed. The aircraft became airborne again as the pilot attempted an overshoot, however, the engine had been rendered non-functional, as it had ingested FOD from the damaged nose gear. The aircraft was then settled back down on the runway surface, slid along the runway on the right-hand smoke tank, left-hand main gear and partially collapsed nose-gear, and came to a stop. The pilot egressed from the aircraft with no injuries.

The investigation is now complete.

The damage sustained by aircraft #5 occurred due to a hard landing after a bounced touch-down exacerbated by preceding aircraft jet wash and down wash.

The inability to practice overshoots from this manoeuvre and possible ambiguity on overshoot options as well as a low level of experience during the "9" or "7" plane landing were potentially contributing factors in this accident.

Other peripheral issues with 431 (AD) Sqn such as; Team Lead duties; recent Team accident rates; internal pilot rotation and tour length, and generally lower CF pilot experience levels, were also highlighted.

The following safety actions have been taken or are recommended:

- A formal risk assessment was conducted assessing the viability of the "9" or "7" plane landings for 431 (AD) Sqn. This manoeuvre was subsequently removed from the list of manoeuvres performed by the Team.
- Any informal discussions and information, with respect to multi-plane landings and overshoots, should be reassessed for accuracy and included in both the SOPs and the computerized training package;
- The internal pilot rotation should be reassessed to confirm that its benefits outweigh its disadvantages;
- An independent assessment to determine whether the highlighted peripheral issues and/or other issues have negatively affected the likelihood of Snowbird accidents should be undertaken; and
- Action to reduce the Team Lead's Commanding Officer duties has been taken and should be monitored. ◆

FROM THE INVESTIGATOR

TYPE: **Bell 206 Jet Ranger**
LOCATION: **CFB Edmonton**
DATE: **10 October 2001**

On 10 October 2001 a civilian registered Bell 206 Jet Ranger (C-GBXK), operated by 408 Tactical Helicopter Squadron crashed while attempting a practice extended range autorotation, to a prepared grass strip, at CFB Edmonton.

The aircraft initially touched down short of the prepared surface in a flat attitude, at approximately 70 Knots indicated airspeed (KIAS). The aircraft then bounced approximately 50 feet in the air, rotated through 720 degrees and impacted the ground 200 feet from the point of initial ground contact. The pilots received minor injuries and the aircraft sustained "A" category damage.

The accident is under investigation ◆

TYPE: **CF188906 Hornet**
LOCATION: **Bagotville QC**
DATE: **31 July 2001**

This was a solo pilot mission in a dual CF18 accident aircraft conducting an IFR cross-country to Toronto. Shortly after take-off from runway 29 at Bagotville, yellow, acrid smoke began to fill the cockpit. The landing gear and flaps were selected up and although the gear indicators showed three wheels "up and locked", the light remained on in the gear selection handle indicating the gear doors were not completely closed. The pilot selected the gear down while carrying out the emergency procedures for smoke in the cockpit.

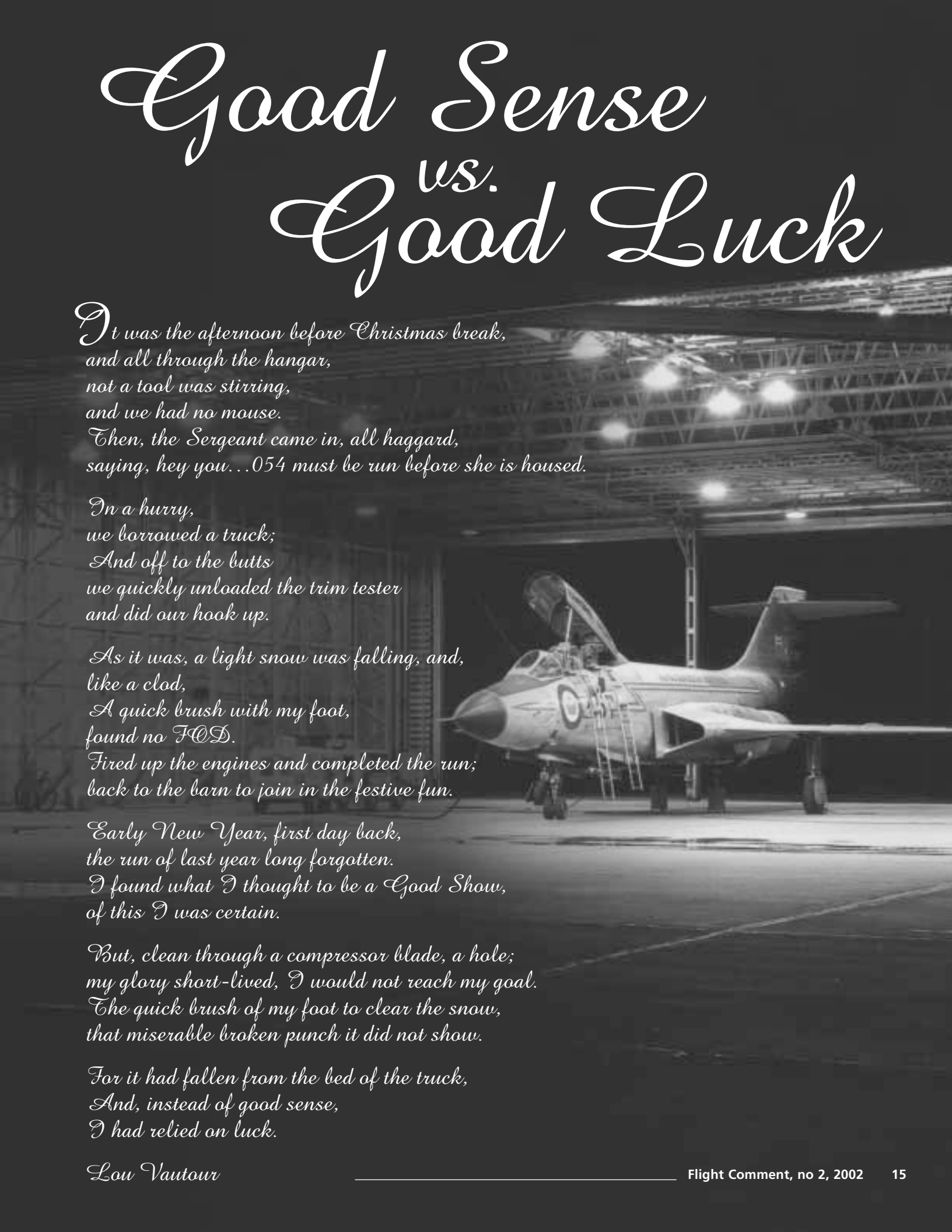
While informing ATC and Squadron operations of the situation, several system advisories were noted culminating in Bleed Air Closed (both left and right) and failures of the right Digital Display Indicator (DDI) and the DDI on the centre console (with the horizontal situation indicator).

The aircraft, which had been manoeuvred into the left downwind pattern for runway 29, was in position for an approach end arrestor gear engagement for runway 36 and decision was made to engage the cable on runway 36. During the engagement on runway 36, the arrestor gear failed damaging the aircraft's right side; since the airspeed was still high, the pilot took off. Attempts to jettison the fuel tanks resulted in the right tank remaining on the aircraft. Eventually, the aircraft was successfully landed on runway 29 (without the arrestor gear) and was taxied off the active runway without further incident.

Analysis of the arrestor gear system tape has revealed that the failure was likely the result of high aircraft engagement velocity rather than weight. DFS has recommended that all CF18 pilots be made aware of the risk of arrestor gear failure at high (above 180 KIAS) engagement speeds.

The investigation is ongoing and is now focused on the root causes of the multiple emergencies shortly after take-off; initial indications point to a bleed air problem. It will also refine the nature of the arrester gear failure. There were no injuries but the aircraft sustained C category damage. ◆

Good Sense vs. Good Luck



'Twas the afternoon before Christmas break,
and all through the hangar,
not a tool was stirring,
and we had no mouse.
Then, the Sergeant came in, all haggard,
saying, hey you…054 must be run before she is housed.

In a hurry,
we borrowed a truck;
And off to the butts
we quickly unloaded the trim tester
and did our hook up.

As it was, a light snow was falling, and,
like a clod,
A quick brush with my foot,
found no FOD.
Fired up the engines and completed the run;
back to the barn to join in the festive fun.

Early New Year, first day back,
the run of last year long forgotten.
I found what I thought to be a Good Show,
of this I was certain.

But, clean through a compressor blade, a hole;
my glory short-lived, I would not reach my goal.
The quick brush of my foot to clear the snow,
that miserable broken punch it did not show.

For it had fallen from the bed of the truck,
And, instead of good sense,
I had relied on luck.

Lou Vautour

SCHOOL NOTES

CANADIAN FORCES SCHOOL OF SURVIVAL AND AEROMEDICAL TRAINING

Decompression Sickness

The "*bends*" is a term that conjures up a physiological condition that you vaguely remember hearing on your basic or recertification Aeromedical training. You are probably saying "I think there is a page in our emergency checklist for this." But, what does having the bends or, more appropriately decompression sickness (DCS), actually mean? What are the possible consequences and, most importantly, what has to be done if someone is the victim of decompression sickness. Although there have been very few in-flight incidents in recent years, the possibility still does exist. Because of this possibility, an overview of DCS, its causes, symptoms, risk factors, and emergency procedures will be reviewed.

DCS is the physiological action of dissolved nitrogen being released from our internal tissues in response to Henry's Law (the mass of gas absorbed by a liquid or tissue is directly proportional to the partial pressure of that gas above the liquid or tissue) as we ascend to altitude. When we ascend, the atmospheric pressure decreases, and this decrease will in turn cause the partial pressures of all the gases present to become lower, one of which is nitrogen. A helpful illustration is to think of a pop bottle. The liquid in a soft drink is capped under pressure, when the cap is removed the internal pressure equalizes with the atmosphere causing a release of gas in the form of bubbles.

As an ascent is made a quantity of nitrogen in the tissues diffuses into the blood, to the lungs and is removed through normal breathing. However, this diffusion is not the same for all body tissues. An example of diffusion differences is fat versus lean muscle, with lean muscle diffusing nitrogen faster than fat tissue. If the nitrogen is not adequately removed, the tissue becomes supersaturated. Under certain circumstances, this super saturation may give rise to the formation of bubbles. Once a bubble is formed, it will grow in size as the altitude is increased (Boyle's Law). The good news is that there is a critical super saturation level that the body can tolerate without causing nitrogen to come out of tissues to form the bubbles. This altitude has been estimated to be 18,000 feet. This level may be lower if there are underlying factors such as diving prior to flying.

If a bubble is formed in the body, it may remain in one area or it may travel via the blood stream to another location where it will manifest itself in the clinical symptoms of DCS. The most common form of DCS in flying is the "*bends;*" a condition where the bubble is located in a limb joint or a major muscle. With the "*chokes*" a bubble has occurred in the lungs, and although considered a serious form of DCS, it is relatively rare. If a bubble's final resting place is under the skin it is known as the "*creeps*" or "*skin disturbances*." This form is considered minor and rarely progresses to the more serious forms. The most serious form of DCS is "*central nervous system disorders*" (CNS). The bubble in this case is located in the brain or spinal cord.

The symptoms that one may have will largely depend on the type of DCS contracted. Symptoms of the "*bends*" include pain, numbness, tingling and a gravelly sensation in or around the joint. Pain is usually the most common symptom and can range from mild to severe. Other symptoms may or may not be present. The "*chokes*" will usually give the person a sense of constriction around the lower chest and a dry persistent cough, especially if you take a deep breath. The "*creeps*" will give you the sensation of bugs crawling on the skin, rash and/or redness in the affected area. A CNS "*hit*" can give you a variety of symptoms depending on exactly where the bubble is located. Some of the more common symptoms include visual problems, orientation problems, numbness and/or tingling in an extremity, paralysis of a limb(s), speech problems, and headaches. Again, it must be stressed that not all the symptoms will be present or other symptoms not described above may be involved.

Now that we know what DCS is and some of the symptoms, we will look at some of the risk factors that can affect our susceptibility to DCS.

The biggest factor is altitude, the higher the altitude, the greater the risk. 18,000 feet has been the "accepted" safe altitude, with DCS being a rare occurrence up to about 25,000 feet. Secondly, in association with altitude, is the time spent at altitude. The longer you stay, the greater your risk of developing DCS as any bubbles present will gradually increase in size with time, with maximum occurrence between 20 to 60 minutes. A subsequent exposure to altitude greater than 18,000 feet within three hours will definitely increase possibility of DCS even if the first exposure (above 18,000 feet) was asymptomatic. If a person had symptoms on the first exposure, they will almost certainly have recurrence on the second exposure. In the Aerospace Medical Association Journal (November 1990 Vol 61, No 11 pg 1028), a report by the USAF Department of Hyperbaric Medicine concluded, "although the number of cases where sequential chamber and aircraft hypobaric exposures has initiated DCS is small, the potential for such occurrences remains a health concern." Other personal factors such as individual tolerance, dehydration, exercise, age, body build, previous injury to a joint/limb may increase risk to DCS. Another factor is the frequency of exposure; reports indicate that individuals who work in the hypobaric chamber environment and undergo two to four altitude exposures per week have a three-fold increase in susceptibility to DCS as compared to students ("Fundamentals of Aerospace Medicine," 2nd Edition, pg 138).

Prevention of DCS is very important. In-flight this can be accomplished by ensuring as low an altitude as possible, which is achieved automatically by pressurizing the aircraft. Limiting the time at altitude is an important consideration should a decompression occur. Descent to a "safe" altitude should be done as soon as possible. Another strategy to reduce the possibility of DCS is pre-oxygenation or denitrogenation. This entails breathing 100% oxygen for at least 30 minutes prior to an ascent to altitude. Pre-breathing enhances nitrogen elimination and "is the main protective measure against altitude DCS" (B. Stegmann, A.A. Pilmanis — "Prebreathing As A Means To Decrease The Incidence Of Decompression Sickness At Altitude;" 1991). However "even appropriate schedules (prebreathe) do not totally eliminate altitude DCS hazard" (B.J. Stegmann, "Prebreathing Theory," Krug Life Sciences). Although pre-breathing is impractical in current flying operations, it is done for hypobaric chamber flights above 18,000 feet.

So, what should you do if you suspect you have DCS during flight? The first and foremost thing you should do is to get on 100% oxygen; this starts the treatment process and you should stay on 100% oxygen until a Flight Surgeon or other competent authority (i.e. civilian doctor) says otherwise. A descent to a lower altitude and landing should be made as soon as possible. One thing to remember is that when a descent is initiated, the symptom(s) may disappear or decrease in intensity because of bubble shrinkage. Once on the ground, you should be examined by a Flight Surgeon to determine if further treatment is required.

Prior to 1959, there were eighteen deaths attributed to altitude DCS ("Fundamentals of Aerospace Medicine," 2nd Edition, pg 132). The last reported death was a U.S. aviator in 1988 ("Fatal Pulmonary Decompression Sickness: a case report;" Aviation Space Environmental Medicine 1988;59:1181-4). In light of these and other reports, DCS is a condition that aircrew should take seriously because there can be long-term effects.

This article has reviewed the condition of DCS, its cause, symptoms, risk factors, prevention and treatment. Even with the preventative measures of prebreathing and pressurized aircraft DCS, albeit rare, still **can** and **does** occur. If you are faced with this situation, it has to be treated as a physiological emergency and you have to seek medical referral as soon as possible. ◆

MCpl Keith Lamothe
CFSSAT Winnipeg

BE WISE

AND TAKE THE IFR APPROACH

Here I was in Moose Jaw in the late 1980's where I was put on "H" flight (Holdover flight) after wings graduation waiting for a posting to my Operational Training Unit (OTU). It was a beautiful sunny day and I was tasked to fly down to London, Ontario for a mobile repair party (MRP). I departed Moose Jaw late that afternoon, taking along a technician and an aircraft part for the broken aircraft.

After witnessing a magnificent sunset, I was starting my descent into London, where I had never been before. The weather was clear and the wind was favouring runway 33. As I was approaching the airport from the northwest, I was cleared to 6000 feet and asked to report the field in sight. Being unfamiliar with the airfield and its surroundings, and having limited night-flying experience, I had difficulty visually locating the airport. In order to help me out, Air Traffic Control (ATC) gave me radar vectors while pointing out the airport position and repeatedly asked me to advise when I had the field in sight. At approximately ten miles back from the runway on a 45° intercept to the final approach course and still at 6000 feet, I could now positively identify the airport. I immediately advised the controller who cleared me to the airport for the straight-in visual approach for runway 33 and handed me over to tower for landing clearance. While I was switching the radio to the tower frequency, I started to configure the airplane for landing and I initiated a steep descent. As I was descending through 3000 feet, the tower controller directed me to level off and overshoot straight ahead to join a right-hand circuit for the runway, stating that there was a Cessna 172 on final approach below me!

I proceeded as directed and joined the circuit. When I called "downwind" I was informed that I was number two behind a Navajo on base leg. I started slowing down to ensure proper spacing in order to land behind the traffic that, unexpectedly after landing, kept rolling down to the end of the runway. I was now on a very short final approach, without landing clearance, still hoping that the Navajo would clear the runway, when the tower told me to do a 360° to the right and to keep it tight as there was a DC-9 on final. At this point I was no more than 100 feet above the ground and, not without hesitation, I initiated a climbing right turn. I thought about raising the gear and flaps but I was confused; things just didn't look right. I gained a few hundred feet, rolled out momentarily on downwind and then started a descending turn towards the runway. I was feeling very uncomfortable; I was low and slow in a 30° bank turn. Tower now cleared me to land but I had to increase the bank in order to line up with the runway and then, suddenly, I got the stick "shaker." Thanks to my flying training, I recovered promptly, without incident.

I felt privileged to have learned early in my flying career that, ultimately, the safe operation of an aircraft rests with the pilot. Up to that point, my misconception led me to believe that, just as the young military officer does without question what he is told to do, so does the pilot.

So, if you, as the person responsible for the safe completion of your mission, are ever in doubt or feel uncomfortable with an ATC clearance or direction, don't hesitate to request something you know is more appropriate. In most cases, sticking to the standard operating procedures (SOP's) will keep you out of trouble. And, by the way, if you are landing at night at an unfamiliar aerodrome…be wise and take the IFR approach. ◆

Captain Lessard

I LEARNED ABOUT FLYING FROM THAT

The time frame was around mid-October and we were embarked on a Frigate for an exercise with SNFL (Standing Naval Force Atlantic). It was night and the fleet had divided for an encounter exercise. Our mission was to launch and locate the other half of the fleet. In order to stay hidden, our half of the fleet was EMCON (emissions control) silent. We were to launch "ZIPLIP" (silent) and proceed at least 20 nautical miles from the ship before using our radar.

The weather brief took place on time. The weather was forecast to be generally VFR with a small chance of isolated TCU/CB activity. We asked the meteorological tech if there were currently any TCU/CB cells in the area, but he was unsure as the ship was EMCON silent and he could not use the radar. The SAC (Ship Aircraft controller) then briefed our mission and added that two helicopters were already airborne. We really wanted to see a radar picture to check on CB activity, but other helicopters were flying and we could just avoid any "isolated" CB activity; right?

We completed our brief and proceeded to launch on time. We had just left the well-lit environment of the flight deck and continued into the black void. We completed our instrument departure and continued to turn eastward to start our mission. Our night vision was not yet developed as we flew into a pocket of light hail. We quickly turned 180° and flew out of the hail. Even though we were only ten miles from the ship, we decided to flash our radar to have a look and to stay clear of the cell that we had just flown under.

To our surprise, the AESOP (Airborne Electronic Sensor Operator) reported that there were big cells in all quadrants, including one between our ship and us! At this point, we attempted to contact our ship and pick our way through the cells to make an immediate recovery. To make a bad situation worse, the cells started releasing cloud-to-cloud lightning. The lightning was close enough to cause static in our inter-com system, and ruined whatever night vision we had built up to that point.

After several attempts to contact the ship, they finally answered and we picked our way through the cells and recovered without incident. It was an interesting mission, and we were anxious to show SNFL why we were the best. The "can do" attitude led to our decision to take off with incomplete weather information and put us into a bad situation. ◆

Captain Keddy

AIRCRAFT SAFETY IS EVERYONE'S RESPONSIBILITY

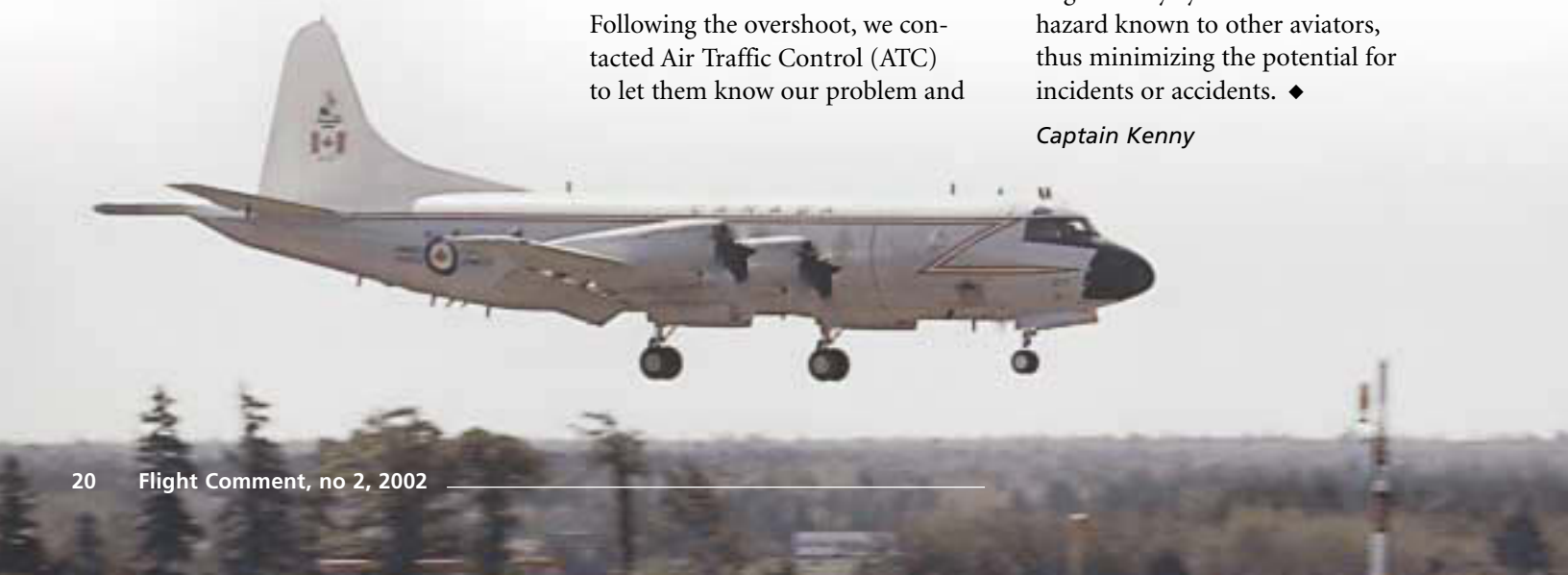
At the time of this story, I was acting as the fourth crewmember on a three-pilot crew on a CP-140 Aurora. The flight was meant to be a local training flight, however, we had been tasked to fly into Summerside, P.E.I. to pick up a passenger. I was new to the crew, having completed my training on type only a few weeks before. Normally, such trips would be planned entirely under Instrument Flight Rules (IFR), but since Summerside only had NDB and GPS approaches, both of which the Aurora is not authorized or equipped to conduct, approach and departure in Summerside had to be conducted under Visual Flight Rules (VFR). Weather there was near the minimum for a VFR flight, but we were confident that conditions would not deteriorate before the completion of our flight.

We departed and flew our first leg IFR to Charlottetown without incident. After that, we continued VFR for our trip into Summerside. As expected, ceiling and visibility were low but within limits for VFR flight. Having completed my duties as the fourth crewmember, I proceeded onto the fight deck with a map to assist in navigation. Upon our arrival, the flying pilot, who I assumed had been to Summerside before, chose to join the circuit on a right base. This profile would allow us to land and pick up our passenger with minimum delay. When we were about two miles back on final approach and configured for landing, I proceeded to my seat. On my way, I noticed something moving on the runway. I took a few seconds to analyze what I was looking at and soon realized that it was a large flock of seagulls that had just taken off from our intended runway. At this point, neither the flying nor non-flying pilot had seen or suspected anything, so I immediately brought it to their attention. After a few seconds of searching, they confirmed my sighting and conducted an overshoot. We estimated the number of birds to have been a few hundred to a thousand.

Following the overshoot, we contacted Air Traffic Control (ATC) to let them know our problem and asked if they could send someone out to disperse the birds. Our passenger was the only person present on the airport but he managed to get a vehicle and fulfill our request. Although the birds were still in the vicinity, we managed to land and get our passenger without incident. Upon our return to Greenwood, we filed a CF-218 Bird Strike Report. Other crews were made aware of the bird problem in Summerside through our story and, to my knowledge, no other crew has experienced any problems there since our encounter.

I believe the main lesson to be learned here is that everyone on an aircraft, including non-flying personnel, are responsible to help ensure aircraft safety. In this instance, I was able to advise the pilot of an upcoming hazard that was easily avoided nice and early in the approach. If the flock had not been identified as early as it was, a near miss or a bird strike could have occurred. In addition, reporting this event through the Flight Safety system made this hazard known to other aviators, thus minimizing the potential for incidents or accidents. ◆

Captain Kenny



ANXIOUS, BUT STILL METICULOUS

The white paint of the Slingsby aircraft gleamed in the mid-afternoon sun, accented by its red and black stripes. I studied its lines as I walked up to it. Certainly, it was a lot different then the C-152's I had flown just after high school. If definitely looked a great deal sportier. It was the first week of my flight training, and I was looking forward to getting into the airplane for this, my third, training flight.

I began my walk-around. This was only the first time I was doing it without the eye of my flight instructor watching me, and I tried to be as meticulous as possible. Nevertheless, I found myself increasing my pace as I went through, anxious to get in the air and take advantage of the beautiful, spring day. After checking the oil levels, I bent to examine the front nose gear and, suddenly, a small alarm went off in my head. The oleo and linkages were wet and a few drops were on the ground at the base of the gear. I traced the leak back up over the gear and found it dripping from inside the engine cowling. Maybe it was just water condensation beading on the cold metal. I bent and took a whiff and was rewarded with the strong smell of aviation gas.

A technician was walking down the line in the opposite direction and I called him over. He looked at the oleo, clucked and proceeded to pull the cowling off the front of the airplane. "Yup," he said, "that's fuel alright. Looks like the seal to the fuel filter is leaking. Good thing you caught it. There could have been a ground fire when you started it up."

…anxious to get in the air and take advantage of the beautiful, spring day.

Walking back to the operations desk to sign out another aircraft, I vowed that I would always take the time to be as thorough and meticulous as possible, regardless of my excitement level. ◆

Lieutenant Rutley

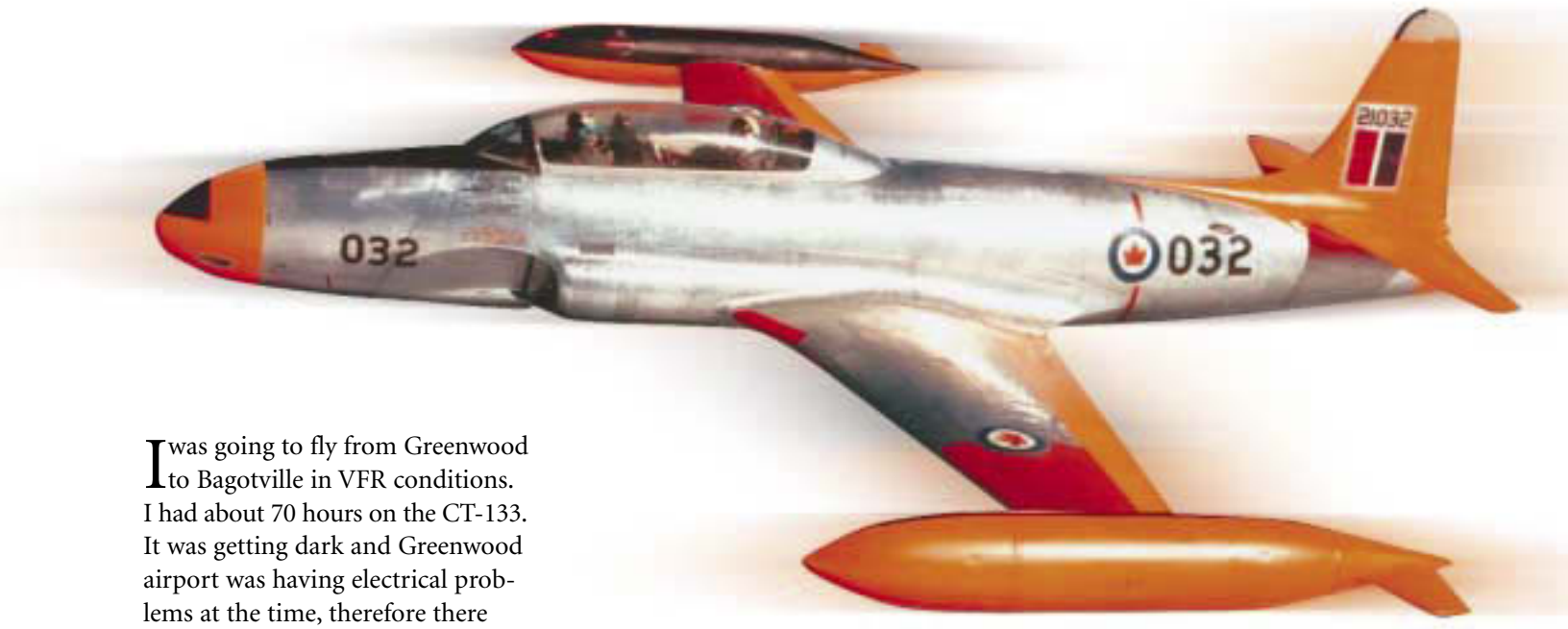
Discussing Weekend Plans

It was just another one of those hot Moose Jaw days; it was the type of day where you could think of a million other things you could be doing. I was a newly promoted corporal with around three years under my belt in this unit. Moose Jaw was one of the busiest bases then, owning approximately 100 aircraft. Flying started at around six in the morning and could carry over into the early part of the next morning if night flying was scheduled. Everyday around 1830 the sound of silence would finally blanket the flight line after twelve hours of constant flying. That particular evening, there was a lot of excitement in the air as it was the start of a three-day weekend. Amongst other tasks assigned to me that night, one was to change the two oxygen regulators on aircraft #162 as they were time expired. Being about a one-hour job pending no problems, I prepared the paper work, grabbed my tools, and headed out to the aircraft.

When I strolled out on the flight line, I spotted four of my friends standing around an aircraft so I joined them to discuss the weekend plans. After plans were made, I jumped into that aircraft and proceeded to remove the regulators. Removing and installing regulators was not a brain drain job, but the trick was not to drop the two very small nuts, which retained the electrical lugs, behind the dash. The job went easy and, just as I was completing it, I could see the Master Corporal coming over to do the independent check. With the independent check completed, we replaced the shroud covering the dash and chattered our way back to the servicing desk. On the way in, I turned to the aircraft to confirm everything was closed up for the evening when I had this gut feeling something was not right. I shrugged off the feeling and we cleared all the entries pertaining to the job. Everything was done so we were sweeping up and preparing to go out for the evening. Still, something was bothering me and I had to figure it out. I headed out to the flight line for one last look. I walked over to aircraft #162 and jumped in for a second look, and there it was staring right at me. When I had gone out to change the regulators earlier, I remembered walking up to talk to some of my friends, then climbing into the aircraft. Well, the aircraft they were standing by was tail number #114, not #162, which was the next aircraft and the one I intended to work on. So, by being distracted, I changed the regulators in the wrong aircraft.

What happened that evening was easy to figure out, but much easier to go undetected. Talking to my friends took my mind off the job and allowed me to jump into the wrong aircraft. The Master Corporal doing the independent check followed right into my tracks assuming that I was in the right aircraft. What was learned from this incident was very straightforward; it was a huge lack of attention on my part and on the part of my supervisor. From now on I save discussing my weekend plans until ***after*** my shift is complete. ◆

Do I Hate Greenwood That Much?



I was going to fly from Greenwood to Bagotville in VFR conditions. I had about 70 hours on the CT-133. It was getting dark and Greenwood airport was having electrical problems at the time, therefore there were no runway lights. I was pushing it because I didn't want to stay overnight in Greenwood. I took off solo with a full load of fuel and when I raised the gear, one main gear stayed down. I executed what was listed in the yellow pages to raise the gear, but without success. I wouldn't have enough fuel to go to Bagotville with gear down, and I couldn't come back to Greenwood because it was going to be complete dark after I burned enough fuel to be able to land. It was quite a stressful experience flying at night with many maps flying around in the cockpit, trying to find a place where I could land. I chose to go to Shearwater, but it was closed. Halfway to Shearwater, I had to change my destination to Halifax. As I was getting closer to Halifax, Greenwood tower called me on guard frequency. They wanted to advise me that the lights on the runway in Greenwood were back online. I came back to Greenwood without an incident. With my level of experience at the time, it was stupid to take off in those conditions. I was lucky that I was in VMC conditions. I still ended up sleeping in Greenwood, but I placed myself in a potentially dangerous situation because I was anxious to come back home. ◆

Captain Gagnon

I was pushing it because I didn't want to stay overnight in Greenwood.

MAINTAINER'S CORNER

WHAT IS OLD IS NEW AGAIN, AND AGAIN, AND AGAIN...

Loose Panels Can Be Deadly

Do you have any ideas for future articles? Do not hesitate to send them to DFS for submission, care of Sgt Anne Gale, DFS 2-5-4, via e-mail (Intranet or Internet at *Gale.ML@forces.ca*) or regular mail.

Prior to takeoff, the T-33 aircraft commander (AC) completed an external inspection and found everything satisfactory. In flight, the second pilot proceeded to perform certain instrument exercises. While the latter was under the hood doing a standard jet letdown, an unusual vibration in the rudders was felt at about 7000 feet. A visual check revealed nothing wrong, but the AC wisely proceeded directly to base. An inspection on the ground revealed that the upper access door to the port engine had been torn and twisted back for a distance of approximately four feet. The access door is directly behind the cockpit so the damage was not visible in the air.

Can you guess when this incident was written up? If you said last month, you were a bit off. This incident was published in the 1955 October issue of "*Flight Comment*." Can you guess the year of the following incident?

The aircraft experienced uncommanded yaw on departure. The pilot of the second aircraft confirmed that the incident aircraft's port upper plenum door was open. The pilot neutralized the yaw with the rudder, performed a controllability check and returned for landing. Upon landing, the door was inspected and no damages were found.

If you said 1955, you were wrong. Sorry! This one was entered in the Flight Safety Information System on November 21, 2001.

As you can see, both incidents are almost identical; they both occurred on a CT-133 (maybe even the same tail number), with the same door left unsecured and missed on the before-flight ("B") check. However, I'm fairly certain that it wasn't the same technicians or pilots that were involved in the incidents. Well, or so I think.....

This little trip down memory lane illustrates very well the old saying that there are no new errors, just new people making the same old mistakes. That cycle seems to be unbreakable but, maybe by giving our undivided attention to the task at hand, we can break that cycle. Maybe, one day, that old saying will be a fallacy touted only by old people! ◆

Sergeant Gale
DFS 2-5-4

GOOD SHOW

PRIVATE ERIC ARSENAULT

On the morning of 20 June 1999, Private Arsenault, along with another maintainer, was dispatched to park Hercules aircraft #317. When the aircraft was parked and the engines were completely shutdown, the technicians smelled the unmistakable odour of hot brakes. As they approached the aircraft to install chocks, they noticed the right-hand rear brake smoking profusely. Upon closer inspection, they noticed that the brake was on fire. Wasting no time, Private Arsenault retrieved the fire extinguisher from the ground power unit. Though the fire was rapidly spreading, he confidently fought the fire until it was completely extinguished. The other maintainer notified the Wing Fire Department.

Private Arsenault's alertness and quick response with decisive actions were instrumental in preventing further damage to the aircraft. The implications of a rapidly spreading brake fire are potentially catastrophic. Although, at the time, he was not an experienced technician, Private Arsenault was able to readily determine the correct action and react in a bold and daring manner. Private Arsenault is to be commended for the professionalism and dedication he displayed. ◆

CORPORAL AL DRAKE

On the evening of 7 March 2001, Corporal Drake was dispatched to complete an after-flight ("A") check on Hercules aircraft #130306. While attempting to start the ground power unit that was connected to the aircraft, he heard loud humming and cracking sounds. These noises, along with a burning smell, made him realize that the starter was not engaging. He immediately went for assistance and requested that the firefighters be notified. Upon return to the aircraft, it was evident that the power unit had caught fire while still connected to the aircraft. Wasting no time, Corporal Drake immediately towed the burning power unit to a safe distance away from the aircraft and proceeded to fight the fire. Although the fire was rapidly spreading, he confidently fought the fire until it was completely extinguished.

Corporal Drake's alertness, quick response and decisive actions were instrumental in preventing further damage to the ground power unit. His quick thinking also prevented the spreading of fire near an aircraft. Both situations were potentially catastrophic. Corporal Drake was able to readily determine the correct course of action and react in a bold and daring manner. He is commended for his professionalism and for the dedication he displayed. ◆

VAMPIRE 3 CREW

CAPTAIN GAVIN CROUCH
CAPTAIN FRED LORD
MASTER CORPORAL ABALSOM PIERCE

On April 6th, 2001, the Vampire 3 crew was conducting an enhanced sovereignty patrol at an abandoned RCMP outpost at Alexandra Fiord on Ellsemere Island with a ski-equipped Twin Otter aircraft #138803. While over open water at 1000' AGL, enroute between Grise Fiord and the Alexandra Fiord Base Camp site, the aircraft's right engine torque began to fluctuate. Captain Lord was in the left seat at the time and immediately initiated a climb. Captain Crouch, the Aircraft Commander (AC), was in the right seat at the time of the malfunction. He and the Flight Engineer (FE), Master Corporal Pierce, began troubleshooting the problem and determined that the best course of action would be to reduce the power on the affected engine to idle and feather the propeller.

After approximately ten minutes in this configuration the engine, without warning, flamed out. The crew made multiple attempts to contact various agencies via HF and VHF, but due to their remote location and high solar activity, radio contact was unsuccessful. The crew decided to continue to Alexandra Fiord. The temperatures in the area were considered extreme even for the region. Overnight lows were in the range of -40C to -48C, and daytime highs were reaching only -35C. After circling overhead for approximately twenty minutes, the crew determined that their best option was to land at Alexandra Fiord.

They executed a successful single engine ski landing, on sea ice, without further incident. Of note, sea ice landings are deemed to be the most challenging of ski landings. To be able to perform such a feat on a single engine required exceptional crew co-ordination and skill. Captain Crouch, Captain Lord, and Master Corporal Pierce displayed textbook Crew Resource Management (CRM) in a very high stress environment. It was their ability to remain focused under extreme conditions that helped prevent a tragedy. ◆

CORPORAL ROBIN WILLIAMS

On 16 September 2000, Corporal Williams was carrying out his post-start walk-around as the Flight Engineer on Rescue 416 during SAR HESSE. Though barely discernible, after the second engine start he noticed a small amount of oil on the left side of the Griffon helicopter, just forward of the oil cooler. To be more precise, the oil was located in the rearmost area, inside the door track on the left side of the aircraft. The detection of this leak is the direct result of the high level of vigilance routinely employed by Corporal Williams.

He investigated further by opening an additional panel not normally checked on the post-start walk-around, where he discovered the excessive oil leak. He returned to the front of the helicopter and signaled the pilot to shut down. Corporal Williams ascertained that the oil leak was from the combining (C) box rigid oil line that leads from the C-box to the oil cooler. The line had worn through, causing it to rupture. While no test data is available, it is strongly believed that loss of C-box oil pressure may result in the seizure of the main and tail rotors within seconds. The crew's flight profile for this mission was an initial climb to 10,000 feet; if this leak had gone undetected, the results may very well have been catastrophic.

Despite the fact that Corporal Williams had spent extensive hours searching for a missing plane and it's pilot in rugged terrain during the last five days, he remained totally focused on the task at hand. His professionalism, attention to detail, and dedication to duty quite likely prevented the loss of this helicopter and crew. ◆

CORPORAL VAL GREENWOOD

As a member of a Dash-8 engine change crew, Corporal Greenwood was tasked with acquiring new nuts for the engine front top mounts. During initial withdrawal from supply, she received two packages of nuts that were different but identified with the same part number. Upon query, supply verified that the nuts had been received with the proper part numbers. This heightened Corporal Greenwood's suspicions.

She contacted the Life Cycle Material Manager (LCMM) who subsequently determined that one of the packages was entirely incorrect. The investigation found that the supplier had procured the nuts from two separate civilian sources over a period of time, indicating that the wrong nuts had been issued and in use for years. Corporal Greenwood immediately removed the remaining stock of incorrect nuts from supply.

A fleet-wide special investigation was initiated and it revealed that a large percentage of the fleet had incorrect nuts installed. Corporal Greenwood's steadfast professionalism and persistence in this matter averted a very serious and potentially catastrophic failure of the engine mounting system on Dash-8 aircraft. ◆

MASTER CORPORAL PAUL NOLAN
CORPORAL BARRY HILDT
CORPORAL PIERRE RIOUX

On 31 December 2000, the aircraft pressurization system on Hercules CC130339 malfunctioned, producing an excessive rate of change in the cabin altitude. Unfortunately, this caused injury to a crewmember and to a passenger. This aircraft had suffered similar occurrences in the previous three months and had undergone many repairs to rectify the previous problems.

After the latest incident, Master Corporal Nolan, Corporal Hildt, and Corporal Rioux were assigned the task of repairing CC130339. In the course of their duties, the members attempted obvious solutions but were not satisfied with the results. It was only after intensive and time-consuming investigation into the bowels of the aircraft systems that they were able to discover a loose portion of the atmospheric line. This line provides required input into the pressurization system in order for its dual modes to function properly.

Master Corporal Nolan and Corporal's Hildt and Rioux not only displayed professionalism, they also showed tenacity and dedication to their work. Without their trouble-shooting, the problem would have likely continued to go undetected. ◆

PRIVATE MATT WALLACE

On 25 October 2000, Private Wallace was conducting a Daily Inspection on a CF-18 aircraft #188913. He noticed an O-ring protruding from the cabin defog diverter valve in the nose-wheel area. Upon further investigation, he noticed a clamp missing from the same area. He immediately informed his supervisors and initiated a flight safety report; the aircraft was quarantined. Although this area requires a daily visual inspection, it does not call for this specific item to be inspected. Had this situation gone unnoticed, it could have resulted in the loss of cabin pressure. This had the potential for causing an in-flight emergency and the subsequent loss of valuable resources.

Private Wallace's diligence and attention to detail resulted in the discovery of a serious unserviceability. He is to be commended for his outstanding professionalism, alertness, and dedication. ◆

SERGEANT GERRY GALWAY

On 19 April 2001, during a routine consultation of the Canada Flight Supplement (GPH 205), Sergeant Galway found that the page he required was missing. He initially suspected that a single copy of this book had been damaged, but realizing the vital importance of accurate Flight Information Publications (FLIPs), he immediately proceeded with a page check of the remaining copies held at the Flight Planning Center. Upon further investigation, he discovered that six of his eight books had 59 pages missing and/or large groups of pages out of sequence.

Considering that these FLIPs are carried aboard all 14 Wing aircraft, some of which were deployed overseas, Sergeant Galway immediately alerted the Wing Instrument Check Pilot while continuing his investigation. Within an hour, the problem was clearly identified. A temporary preventive measure (page check directive) and a partial solution (use of the GPH 205-S, which was found error-free) were immediately implemented. The rest of the Air Force was urgently warned via the Flight Safety

system, the Instrument Check Pilot network, and aeronautical service personnel at NDHQ. Corrected books were eventually reprinted to replace the spoiled batch.

This was the first time these errors were noticed since the faulty series of publications was issued on 22 March 01. An important flight planning document, the GPH 205 is often consulted in flight to gain essential information on communication, navigation, and flight services. Thanks to Sergeant Galway's vigilance and professional approach to his duties, a potentially serious occurrence was almost certainly avoided. ◆

MR. SAM SULAK

On 22 February 2001, Mr. Sam Sulak, an Aircraft Maintenance Engineer Apprentice, with the Regional Cadet Air Operations (Pacific) was conducting part of a 100-hour inspection on an L-19 Cessna tow plane, CF-TGF. He discovered what he believed to be was a cylinder-head crack. He brought this to the attention of his supervisor, and it was subsequently determined through Non-Destructive Testing (NDT) that the cylinder head was indeed cracked. The cylinder head was changed and the aircraft was returned to service.

On 02 March 2001, Mr. Sulak was again conducting an aircraft inspection when he thought he discovered another crack on aircraft CF-TGA. This time the crack was discovered on the engine-mount. It was in a very difficult position to detect clearly and could really only be viewed properly with a mirror and a flashlight. The mount was removed and X-rayed and was found to be cracked. Had this engine-mount crack gone undetected, the failure of the mount in the air could have led to severe vibrations and a very serious in-flight emergency. The mount was sent for repair and a new engine-mount was installed on the L-19.

Mr. Sulak, still working under supervision as an apprentice, has already demonstrated his professionalism and dedication to the Cadet organization. He is to be commended for his attention to detail and keen powers of observation in detecting these two cracks. ◆

MASTER CORPORAL DOUG CARLYLE

On 12 March 2001, the maintenance crew charged with re-installing the No. 1 power section in Griffon aircraft #146494 had noticed some damage to the fire detection wires for the accessory gear-box (AGB.) Master Corporal Carlyle was asked to confirm that the wires did, in fact, need replacing. After thoroughly checking the wires, he performed a quick visual inspection of the entire area. As he was briefing the installation crew on how difficult and tight the engine fit was, he then noticed a few scratches and a dent on the front firewall, for which he called an Aircraft Structures (ACS) Technician to inspect prior to proceeding with the engine installation.

He continued with his inspection and noticed a glossy shine inside the customer service bleed air valve. At first, it seemed just the glint from the stainless steel inside the valve, but it looked wrong. Upon closer examination, he discovered that the glint was actually oil. There was roughly 35 ml of oil inside the valve. A CF-349 maintenance form was raised and he instructed the crew to remove the valve and check for any oil that might have migrated past the valve.

Had the oil not been detected prior to engine installation, upon engine run-up the bleed air from the engine would have superheated the oil. Then, after selection of the heater, it would have caused toxic fumes to enter the cabin or even a fire in the mixing unit, placing both aircrew and aircraft at risk.

By taking the time to examine an unrelated problem and what he perceived to be unusual, Master Corporal Carlyle, acting in a timely and professional manner, averted an impending incident that could have potentially damaged CF resources. ◆

WARRANT OFFICER DAN DANIELS

On 18 May 2001, Warrant Officer Daniels, a Flight Engineer on the CC-130 Hercules at 424 Transport and Rescue Squadron, was completing his pre-flight inspection of Hercules #130306 when he discovered what appeared to be a bolt on the aileron boost quadrant cable guide installed incorrectly. This assembly had seven bolts installed facing aft and one bolt facing forward. Warrant Officer Daniels took the time to call the technicians to confirm this was not the correct installation.

The technicians confirmed that the bolt facing forward was indeed installed incorrectly. Further, the publication covering the installation of these bolts states, "Failure to ensure that the threaded ends of the cable clamp bolts are installed pointing aft may result in an aileron jam."

Warrant Officer Daniels went above and beyond the normal pre-flight requirements and took the time to inspect the aileron boost quadrant cable guide. His attention to the smallest of details prevented a potential accident or serious incident. ◆

Dear Editor,

I must say that there are some very good articles in the Fall 2001 edition of "*Flight Comment*," which I thoroughly enjoyed reading as well as learning something at the same time. However, and I don't want to appear to be picky, I would like to point out a discrepancy in the story entitled "A Link In The Chain". I know, having had the privilege and great opportunity of being a DFS member myself for four excellent years, that DFS prides itself on truthfulness and accuracy in the name of flight safety. It is therefore, with some reluctance, that I point out the fact that this article, which has a valuable lesson to learn, never the less, is misleading. This incident described did not take place at Canadian Forces Base Comox, which one would immediately assume when looking at the photograph on the same page as the article is printed, which says in plain English, (excusez-moi, in plain French) "BIENVENUE A LA BASE DES FORCES CANADIENNES COMOX." We have been mentioned in your magazine on enough legitimate occasions that we don't need this gratuitous accolade.

Major Kippel
Deputy Regional Cadet Air Operations Officer

Dear Major Kippel,

I can think of no better way of assuring my readers that this event did not take place in Comox than by printing your letter. The photo is merely meant to enhance the story, not to point a finger at anyone. Please accept my apologies.

Captain Tammy Newman
DFS 3-3

Dear Editor,

I was very surprised to see an article I wrote appear in the summer 2001 edition of "*Flight Comment*" magazine. I wrote this article some time ago, while attending the basic Flight Safety course in 1999. Part of our course curriculum was to write an "I learned about…" article, but I never expected mine to be chosen for publication. The article I wrote was "I Learned About Hypoxia From That."

I would like to inform you that the correct spelling for my last name is Ruston (not Rusta) and I no longer have the Master Corporal attached as I retired from the CF in July 2000, after 22+ years as an aircraft technician. I am now employed by Bombardier Aerospace as a senior technician on the Harvard II at the Nato Flight Training Centre in Moose Jaw. I am actively involved in the Flight Safety program here and am lucky enough to still read and enjoy your fine publication. I'm not sure if you print corrections, but I had to pass this on. Thanks.

Mr. Brad Ruston
NFTC, Moose Jaw

Dear Mr. Ruston,

I do, indeed, print corrections and, at the same time, I print apologies. I'm sorry for misspelling your last name. I would like to think that it won't happen again but, the truth is, I'm afraid it may. Most of the submissions I receive are hand-written and I am awful at deciphering the writing.

For others — please, if you are submitting something, even as a course requirement that may eventually be passed on to me, try either to use a computer or to ensure that your handwriting is very neat.

Captain Tammy Newman
DFS 3-3

IT CAN HAPPEN TO YOU

Have you ever had that warm and fuzzy feeling? Have you ever wondered how you would handle a situation? You are on a routine training mission with your student. You have briefed, checked the weather, done an aircraft pre-flight, checked the logbooks, and checked yourself. The mission is a "go." It is a beautiful, early evening flight; winds are calm.

This was a training flight where I was to ensure that the student would experience emergency training in the circuit. We would be simulating engine failure practice. After having previously conducted numerous circuits, the student was handling situations very well. I was a happy and content instructor. This student would be able to solo shortly. We departed for our last circuit. The take-off, the climb, and the post take-off checks were all normal. At 500 feet we turned crosswind in the climb. As an instructor, we are always contemplating introducing scenarios for emergencies. I was considering one more surprise for my student when, all of a sudden, silence!!!!!!!

Silence. Yes, silence!! That beautiful roar of the engine stopped dead. That reliable piston-powered aircraft had quit. It was like someone shutting off the magnetos in flight. What were we going to do now? Control, glide, carb heat; looking from crosswind the runway seemed tempting. I began a right turn toward the runway we had just departed from and quickly realized that the runway would not be reachable. Field? Field? Which one do we choose? Cornfield, tall crops? The choices in August were not great since the crops were grown but not yet harvested.

I picked a field next to a little gravel road. Restart, throttle…push the throttle in and out, nothing! Mixture-rich; carb heat-hot; mags-both; fuel-both tanks. Things were still and very silent. While doing this and flying the aircraft, I asked the student to notify FSS of our situation. The student did a beautiful job.

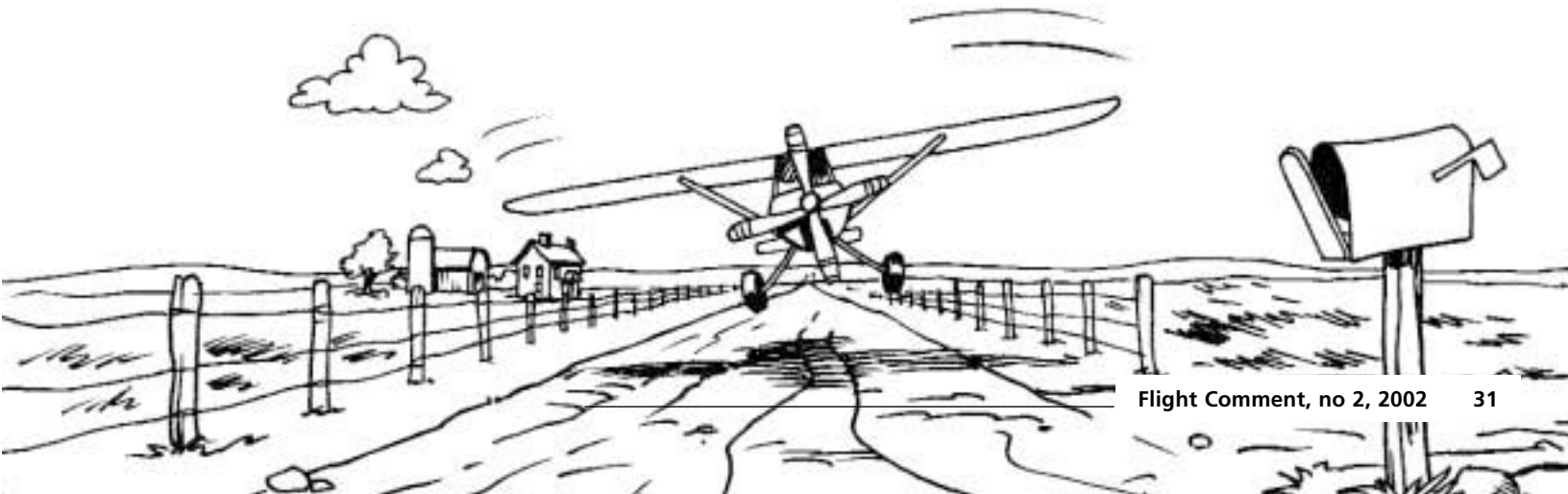
We were lined up on final approach and the aircraft appeared to sink much faster (like a rock)! As I was manoeuvring for the field, I decided to change my plan. The little gravel road was clear and so I lined up. In the distance I could see a house on the left side of the road. I remembered something an instructor had said to me many years before; "remember, if there is a house, there are probably power lines."

The road was clear now so I continued my approach….only a few hundred feet more. I continued the approach and then suddenly a car turned down this beautiful little gravel road. "OH NO! HEAD-ON!!!" What now?? Then suddenly, the car began to back up in the distance. The road was mine. My airspeed was fast but I had to get down before that house, just in case there was a power line. Time for round out, hold-off, and I finally rolled to a stop. You know — in those last few feet, we did roll under a power line that went to that house. I was so glad to be safe.

What did I learn? Take time to think and control your aircraft; analyse the situation; pick the largest field; know your emergencies; evaluate, re-evaluate, then choose; know your skills. I chose the road and it was narrow. The aircraft suffered no damage. If someone has an emergency, whether perceived as a hero or destroying an aircraft, I believe the pilot does his best. He needs your support in all cases.

If you are getting those warm and fuzzy feelings, consider your brush with death. Trust your gut feeling, it is telling you something. As an instructor, remember, never be too complacent. It can happen to you!!! Remember to pass on your knowledge and experience to your students. ◆

Mike Bohemier



Does The Clothing Make THE MAN?

During a recent Safety Systems briefing, a film was shown which concerned two American pilots who survived a helicopter fire. They were badly burned where they wore only one layer of clothing; the parts of their flying suits that were Velcro had melted into the flesh of these poor souls, and had to be surgically removed.

This was an extremely painful experience for them, one I hope never to feel. The film did invoke some thought, however, and made me think back to all the flight gear that I have worn. Yes…it has been a while, but during my early training, we were issued with four long-sleeved, white turtleneck t-shirts and four pairs of long johns. Two of each were lightweight for the summer, while the other two of each were heavyweight for the winter months. We were told that they would provide the required two layers of fire protection when worn under the flying suit, and that the turtleneck was a great design to protect our neck area from fire injury.

As I progressed through numerous squadrons, I collected a varied array of different coloured turtlenecks to satisfy each squadron's particular flavour, or I wore the white issued shirts. Today, the CO authorizes squadron apparel and, for the squadron I presently belong to, we have a T-shirt. It is still cotton, but now has short sleeves and no turtleneck. A long-sleeved turtleneck is available, but not too many are bought or worn. I also know that very few long johns are worn during the summer.

In the same vein, I can remember either sewing all rank and badges on the flying suits, or taking the lot to the base tailor to be sewn, free of charge. This also has become unfashionable with the advent of Velcro. Now the Velcro is sewn on the badges and the flying suit, and the two are stuck together. This method saves some money for us, because only one or two of each badge is needed instead of the four or five required for each article of light clothing. Just peel it off of one flying suit and stick it on the next. The "official" reason for the Velcro is to quickly sanitize the uniform during an escape and evasion scenario. It seems funny that, for years, aircrew have just been ripping the stitches and discarding the badge or not wearing the badge into combat. What really seems ironic though, is that our squadron number, our unofficial squadron name, and even a picture of our aircraft is emblazoned on our squadron T-shirt… just one zip away from being exposed to the enemy we are trying to fool!!

Since my inception into the Air Force, I have been taught and briefed innumerable times on the proper wearing and operation of each piece of kit. There are even orders to tell me when to wear certain clothing. Years of research have been done, millions of dollars have been spent, and the constant reminders from injured aircrew have determined the clothing and equipment requirements for aircrew. The goal is to protect the bodies inside the machine.

And what of the legal implications? Is your pension in jeopardy or your personal life or disability insurance void if you are not properly wearing the issued clothing? Can you ignore all of this because you think we have solved the problem of fire onboard aircraft? Do you really want to feel what those two helicopter pilots suffered through? So…does the clothing make the man, or make the man as safe as possible? ◆

Captain Brennan

EXTENSION IS THE BETTER PART OF VALOUR

The pursuit of personal perfection is an admirable goal, one that is the driving force behind many air traffic controllers. The job of an air traffic controller allows individual skills to be developed exponentially above that of the team, yet still allows highly developed teamwork. Unfortunately, the individual's pursuit sometimes allows hidden traps to be created for the unwary.

One quiet Sunday afternoon some time ago, one such trap developed just for me. Our active runway had just been changed to runway 31 when an A-310 Airbus, full of cadets ready for their summer training, showed up looking for a Precision Approach Radar (PAR) approach. Due to my aggressive control nature, all aircraft under my control are given tight patterns at the lowest possible altitude. Trying to save time for the flight crew, I descended the aircraft to the minimum radar vectoring altitude (MRVA) and adjusted the vector to provide a three-mile downwind leg. As runway 31 has a glide path angle of 3.2 degrees, I knew that an eight-mile base leg was not out of the question. The trap was now set.

As the aircraft took longer than expected to complete the base leg turn, I increased the turn and commenced descent. The trap started closing as the Airbus tightened the turn, ending up well left of the on-course at seven miles final. At that time, I probably should have taken the aircraft out of the pattern and tried again, but, while ignoring the growing dread, I decided to roll the dice and keep the aircraft inbound, anticipating a large course correction around two or three miles on final approach. After all, the cadets were enjoying all of the comforts of the Airbus while looking forward to military excitement, some of which I am sure I provided just prior to touchdown. This time, the trap did not succeed and the cadets were delivered safely.

What did I learn? Primarily, each aircrew is different and will react differently to similar control instructions. Secondly, don't expect all aircraft to have identical turn radii. Finally, remember that because itinerant aircraft are not familiar with local peculiarities, extension is the better part of valour! ◆

Corporal Banks

What Back-up

There I was, sitting in a VFR tower on a sunny, summer day. It was my first shift of the week, so I was feeling rested and confident, looking forward to a busy day. Alas, it was going to be more than just a busy day. In fact, I was about to learn a valuable lesson in just where my boundaries lay.

The first part of my day was uneventful. Traffic was moderate, although visibility was down to five miles in smoke, due to forest fires in the vicinity. The most exciting part of the morning was the scrambling of a pair of CL215 water bombers, along with their spotter, a Cessna 310.

Several hours later, after breaking for lunch, I was working a moderately busy traffic circuit, with several twin-engine aircraft flying circuits, and a Citation doing simulated approaches to the opposite end. The ground controller passed me an IFR estimate on an inbound Med-evac, a Jetstream, due in about fifteen minutes. At the same time, he asked if I would mind taking ground as well as working tower, as he was in dire need of a bathroom break, and a bite to eat. Although we were short-staffed as it was, I thought nothing of letting him go, expecting that he would be back shortly. Also, another controller was due to report for duty anytime soon. Anyway, things were going well, and I was teeming with confidence.

Away he went, when the Med-evac checked in, about to call the beacon outbound on an ILS approach. This was, after all, a procedural environment. Moments later, the Citation reported the final approach fix for the backcourse. I advised him this was to be a circling approach, and that he was to call downwind for sequencing. Moments later, one of the previously departed water bombers reported at eight miles and inbound for landing, and he requested I telephone his Ops centre, as they were not answering his radio calls. It seemed there might be a problem with one of his engines. I acknowledged his call, and I gave him clearance into the zone.

At this point, I'd been working alone for a mere five minutes, and I realized things were about to get a little hot around here. I quickly called the bomber's Ops, while at the same time hitting the bells to activate CFR (crash & fire response) for the CL215. I also advised my circuit aircraft to climb, and fly through until further advised. I fully expected my lunch-munching buddy downstairs to be up here by now. NO JOY!

Finally, I got things under control. The Med-evac landed; the water bomber followed suit, after reporting that he no longer had an engine problem. The Citation, hearing all the chatter, elected to climb, and follow the rest of the circuit traffic. And where was my relief? He showed up shortly after hearing the sirens outside; you see, he was having a cigarette. And the other controller who was due for work suffered a flat tire on the way in.

PLAN?

That day was perhaps one of the most intense moments I have ever experienced. I learned how quickly tasks could accumulate and exceed one's physical capabilities. I also learned to ensure I have a backup plan. In this case, a reasonable plan "B" would have been to ensure my ground controller came right back from his bathroom break, as scenarios can change instantly. ◆

Mike Fontaine

IT SEEMED TO BE A GOOD PLAN

It was the beginning of evening shift and our standby Labrador helicopter was performing a SAR mission. Our second helicopter, which had been away and gone unserviceable, was returning around suppertime with the mobile repair party (MRP) crew. While waiting for our aircraft to return, we were informed that it would require a quick turn-around since it was needed for a SAR mission to med-evac a child who had suffered head injuries.

The aircraft arrived and during our maintenance checks a small amount of fuel was detected under the fuel pressure transmitter of the #1 engine. As we AVN technicians were discussing an appropriate course of action, the medical staff began arriving and loading their equipment on the aircraft. Feeling like the mission was being delayed, we elected not to replace the transmitter. Instead, we would try changing only the transmitter Q.D. and call for an engine ground run. The Q.D. was replaced and the engine ground run was done with no evident leaks. The Labrador then departed for the mission.

Later that evening, we were informed that the flight engineer (FE) again checked the transmitter, which was now found to be leaking. The aircraft was forced to land and shut down at an isolated lighthouse. An MRP was dispatched with the standby helicopter and the mission was completed.

Why did we not replace the transmitter? Was it pressure? No one pressured us but we definitely felt a need to hurry. Why did we replace only the Q.D? It seemed to be a good plan. We got the aircraft turned around and ready to go quickly. In the end, we did that child no favours! ◆

Master Corporal Clarke

ASLEEP AT THE

What is fatigue? Fatigue and sleepiness are often considered to be the same. It is the state of tiredness due to prolonged work or insufficient sleep. Its effects are underestimated because there is no "Breathalyzer™" for fatigue, and sleepy pilots are reluctant to admit they fell asleep on the job, especially if an accident results. Fatigue impairs alertness and performance, often without your awareness. In fact, sleepiness/fatigue produces performance problems similar to those caused by alcohol. Fatigue is a significant risk factor in all aspects of aviation.

Is fatigue a big problem? Approximately 63 million Americans suffer from moderate or severe daytime sleepiness. Because of this, on-the-job concentration, decision-making, problem solving, and performance are adversely affected. Forty percent of adults say their daily sleep is inadequate. Many personnel find it impossible to stay alert during their night jobs because of inadequate sleep during the day.

When is fatigue worse? Our biological rhythms are set to 24-hour cycles by exposure to daylight, knowledge of clock time, meal intervals, and activity schedules. Because of this, we feel sleepier at nighttime and don't perform as well as we do in the day. Alertness is greater during the day than at night.

What is the cost of fatigue? In the USA, for example, fatigue costs 18 billion dollars in industrial productivity every year. Fifty percent of aviation mishaps are caused by human error, and fatigue is thought to be directly responsible for many of these.

Why are we so tired? Inadequate sleep and extended periods of wakefulness are the two main causes of fatigue. Many people sleep less than 6.5 hours per day (far below the recommended amount of 7.5 to 8 hours). Shift workers receive even less. This adversely affects job productivity, personal safety, and well-being.

What are the warning signs of inadequate sleep? Indicators of inadequate sleep include:

- Difficulty waking up without the aid of an alarm clock.
- Repeatedly pressing the snooze button to sneak in a few extra minutes.
- A strong desire to take naps during the day.
- Difficulty staying awake while in meetings, riding in a car, or watching TV.
- Falling asleep in less than seven minutes after going to bed at night.
- Looking forward to weekends when one can "catch up on sleep."
- Sleeping two or more hours than usual on days off.

How much sleep is necessary for alertness? Most adults need about eight hours of nightly sleep in order to be fully alert during the day, but there are individual differences. The only way to establish your sleep requirement is by trial and error. Determine your sleep needs and then ensure you receive enough to maintain on-the-job alertness.

How much sleep is right for me? Two ways to determine your sleep needs are:

1. While on vacation. Sleep without an alarm clock for several days, and record the amount of nightly sleep you receive. The average is how much sleep you naturally need. When trying this, start keeping records on the third day, after you've overcome any pre-existing sleep debt.
2. *While on your regular work schedule*. For a week, increase your usual amount of nightly sleep by one hour. At the end of the week, evaluate how alert you feel each day. If more sleep is needed, add an hour the next week and so on.

Can I train myself to need less sleep? No. Simple tasks can be made resistant to sleep loss by practicing them until they become automatic; but this will not work with tasks that require vigilance, thought, and/or judgment. Sleep deprived individuals perform poorly, but often are unaware of their level of impairment.

THROTTLE

How can I improve my nightly sleep? Sleep problems often stem from behavioral or environmental factors. If you repeatedly are unable to fall asleep at night, do the following:

- Stick to a consistent bedtime and wake-up time.
- Use the bedroom only for sleep.
- Develop a soothing nighttime routine (read or take a warm bath just prior to going to bed).
- Resolve daily problems before bedtime.
- Once in bed, avoid watching the clock.
- Include aerobic exercise in your daily routine, but not within three hours of bedtime.
- Don't take naps during the day.
- Don't consume caffeine within four hours of bedtime.
- Don't drink alcohol within three hours of bedtime.
- Don't smoke cigarettes within an hour before going to bed.
- If you can't fall asleep, don't lie in bed awake. Instead, do a quiet activity until sleepy.

Correcting problems due to poor sleep practices may take several days or weeks.

Does shift work make me sleepy? Shift lag is fatigue caused by an inability to adjust to disruptions of body rhythms when changing work/rest schedules. Daytime sleep is not normal and because of this and other factors, night workers tend to get two to four hours less sleep than day workers. It is difficult for people to adjust to new schedules.

How do I adjust to a new work shift? The following can help you adjust to a new schedule and minimize how long feelings of fatigue and discomfort will last:

- Maintain the new sleep/wake schedule, even when off duty.
- Adjust meal times to agree with the new schedule.
- Talk to friends and family about your need to sleep at a different time than they do.
- Unplug the phone, disconnect the doorbell, put blackout shades on the windows, and turn on a fan to mask out noise.
- Take naps if it's impossible to get an eight-hour block of sleep.
- If possible, (with medical officer permission), use a sleeping medication for the first three days to promote sleep.
- Timely use of caffeine can enhance on-the-job alertness, but don't use caffeine within three to four hours before your scheduled sleep period.
- If trying to sleep during the day, minimize morning light exposure with dark glasses and avoid being outside before bedtime.

How can I improve my alertness on night shift? Avoiding fatigue during night flights is difficult. If there is no flexibility in establishing when a flight will take place, the following strategies should be implemented:

- Obtain plenty of sleep before the flight.
- If the flight is late in the day or at night, take a 45-minute nap before takeoff.
- Avoid alcohol consumption within 24 hours prior to night flights.
- During the flight, swap tasks between pilot and copilot to minimize boredom.
- Consume caffeine immediately before and/or during the flight.
- Avoid hot refueling in favour of shutting down and walking around for a few minutes.
- Note that increasing radio volume and exposure to cold air do not fight off sleep.
- Remember that after being awake for a long time, you may involuntarily fall asleep, despite your best efforts.

What are some fatigue warning signals? When there is no choice but to fly when tired, be aware of these indicators that you are at serious risk for falling asleep:

- Eyes go in and out of focus/
- Head bobs involuntarily;
- Cannot stop yawning;
- Thoughts become wandering and disconnected;
- Cannot remember things you did;
- Navigation checkpoints are missed;
- Routine procedures are not performed;
- Control accuracy degrades.

If you experience even one of these symptoms, the safest course of action is to end the flight as soon as possible and get some sleep.

Can napping really help? Research studies have shown that long naps can help restore the performance of sleep-deprived people to near normal levels. Also, naps taken shortly before a period of sleep deprivation can improve alertness and performance.

How long should a nap be? The longer the nap, the better its ability to lower the impact of fatigue. Although two-hour naps will not restore performance to normal levels, they are very beneficial because they provide sufficient time to go to sleep and complete one full sleep cycle. However, short naps of only 30-45 minutes are far better than getting no sleep at all. Even a ten-minute nap is better than nothing.

How should I plan my naps? When implementing naps, do the following:

- Establish a relatively quiet, dark, and comfortable place for napping.
- Use sleep masks or earplugs if necessary to block out sunlight and noise.
- Place the nap when sleep is naturally easy (1400-1600 or 0300-0600), if possible.
- Make the nap as long as possible.
- Consider napping in the afternoon prior to an all-night mission.
- Plan the nap early in the sleep deprivation period.
- Allow 15-20 minutes after awakening to become fully alert before resuming work tasks.

No nap, now what??? Aircrew who find themselves in situations where the flight must be done despite inadequate sleep and heavy fatigue should:

- Be sure to eat high protein foods like yogurt, cheese, nuts, and meats.
- Avoid high fat foods (candy bars and potato chips) and high carbohydrate foods (sweets, cereals, and breads, etc.).
- Drink plenty of fluids.
- Converse with other crewmembers and rotate tasks to minimize boredom.
- If possible, try to move around in the cockpit. Definitely exercise during refuels.
- Consume caffeine once fatigue becomes noticeable.

Remember that any of these counter-measures (with the possible exception of caffeine) are only minimally effective after someone has been awake for 18 hours or more.

Awake at the Throttle!!!!
Recognizing the threat posed by on-the-job sleepiness, identifying the causes of insufficient sleep, implementing countermeasures to ensure proper rest, and developing crew rest cycles that will ensure well-rested and alert crews is the best defense against fatigue. ◆

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