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Flight Comment

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Flight Comment

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As I See It

Improved Analysis of Human Error

In the early years of flight safety programmes, we saw dramatic improvements in the aviation accident rate. In fact, this lasted through to the early 80's, attributable partly to improved attitudes, but largely to improvements in aircraft design, materials, and better and more standardized training. In the last two decades, further reductions have eluded us, but costs of accidents have gone up at the same time that society is becoming less tolerant of them. Furthermore, the majority of these remaining accidents are caused by what appears to be both our greatest strength and our greatest weakness — the human being.

As a result we are looking at better ways to analyze the effects that people have on accidents. Until now, we have assigned personnel cause factors such as "inattention" or "judgement". But how do you correct a problem relating to inattention or judgement except to remind people to exercise better judgement or be more attentive? What's more, we have tended to focus on the individual who made the active failure, the one to whom the accident actually happened. But current work in the area of accident prevention has shown that an accident does not happen to an individual, but to the organization — every layer of that organization has somehow contributed. In fact, the individual who was the direct cause is only the last (and least manageable) failure in a chain of events. If we want to reduce accidents caused by people, we needed a new system, one that steers us toward more effective corrective action at all levels.

Clearly we need to look at our own susceptibility to error with openness and understanding (and humour). There are some principles that help us to understand and reduce human error:

- Error is applicable to everyone! — regardless of age, race, height, sex, native language, national origin, rank or intelligence.
- The first step in understanding error is to consider error apart from its consequences. This is important so we can look at the error without emotion and defensiveness.
- This approach attempts to enlist the people doing the work as scientists in the understanding of their own mental processes by encouraging openness.
- And finally, once the defining characteristics of any error type are determined, counteracting strategies can be developed.

As I noted earlier, accidents are normally caused by the whole system of the organization. A way of looking at the human factors of the whole organization has been devised by some behavioural psychologists at the UN Navy Safety Center which we have found particularly useful; it divides the human factors into: unsafe acts, preconditions for unsafe acts, unsafe supervision, and organizational influences. In this way, we look not only at the individuals involved in the final stages of an accident, but also at the whole organization that has affected the conditions that allowed the accident to ultimately occur.

Because activities at each level affect those below, it is helpful to look at the organization from the top down. Imperfect decisions of upper-level management directly effect supervisory practices, as well as the conditions and actions of operators, maintainors and support personnel. The organization allocates resources, and sets the operational tempo, time pressures, procedures, incentive systems, and schedules. Supervisors know (or should know) the capabilities of their people, decide which people to assign to which jobs, and sometimes decide which missions will be undertaken.

Looking one level lower, people do not normally make mistakes or commit violations "out of the blue". There are normally circumstances, or "pre-conditions" which either cause them to make the mistake or increase the likeliness of their making it. This area is worth examining in a little more detail.

Medical or physiological conditions such as spatial disorientation, visual illusions, G-induced loss of consciousness (G-LOC), hypoxia, physical fatigue, and the myriad of pharmacological and medical abnormalities known to affect performance are equally important. If, for example, an individual were suffering from an inner ear infection, the likelihood of spatial disorientation occurring increases. Consequently, the medical condition must be addressed within the chain of events leading to an accident.

In today's complex environment, people usually work in teams.

continued on page 9

Impressed by

I promised myself that from that moment on, I would not be intimidated or impressed by another pilot's experience or skill if he attempted to endanger my or any crew member's life.

As the guys in the back were making fun of me, I once again told John that we should turn back a few miles to the last valley I could remember on the map and start again. He smiled and said nothing as he gave his head a nod indicating to me that he knew where we were and not to worry. It was a nice clear afternoon and we had been searching the same mountain range for the past few days. I figured that if he wasn't worried, then why should I be? After all, he was a SAR veteran, full of stories and loved by all. I, on the other hand, was a pipe liner, fairly new to the squadron and had still to earn the trust and respect of many on the helicopter side of the house.

I tried to cover up the fact that I had no clue as to our location in the B.C. mountains, but it was just as the guys in training said it would be, simply look away once or lose track of a valley and you're lost. The old Omega and Loran were not accurate enough to be of any help, so I tried to recognize any feature to pinpoint our location, but it all looked the same. John seemed to be in control, adding his little comments to the crews on how it was just like a newbie to get lost.

At that point, we agreed that it would be best just to head back to Stuart for the night and resume covering our assigned search area in the morning. After a few more humorous attempts at getting John to go back, he surprised me by heading over a ridge into a new valley. The crew seemed indifferent at this point, except to make encouraging remarks about John's experience in SAR and his time on the West Coast and that he surely must know where we were. It did not take long before John was over a few more valleys, and I knew that I would never recognize any features being so far away from my last known position.

We suddenly found ourselves over a valley with low-lying cloud below us and I could not believe how much altitude we had gained in such a short time. John still had the crew worked up and I thought that I was the only one who was getting nervous. I remembered another SAR pilot once telling me that if I felt uncomfortable in flight, that there

would always be someone else on the crew who felt the same and that all I had to do was speak up and the others would follow. At that point, I told John that I thought that we could be in some trouble soon if we didn't figure something out. Sure enough, a few crewmembers agreed and we finally got serious about our situation.

As we kept climbing, hoping to get visual over the next range, we found ourselves in the worst situation possible. The flight engineer (FE) echoed our thoughts about our diminishing fuel state and that we should think about putting down somewhere. The problem with that was that we were now at over ten thousand feet above sea level with a solid layer below us. Not a reassuring feeling when you have no clue where you are or what is below you. The Stuart airport did not have a precision approach, which eliminated the hope of shooting an ILS back to solid ground. The FE had calculated our VNE (Velocity Never Exceed speed) for ten thousand feet to be around fifty-five knots. The blades overhead were struggling for dense air as they went around and I think that it was at that point that the last comic on board realized we were no longer making fun of being uncertain of our exact position.

Silence turned to cheers when we heard the crew of a SAR Twin Otter calling the Stuart airport. Silence soon took over again as they informed us that since the weather was down at Stuart, they would be heading direct for Terrace with their fuel sate. All thoughts of the Twin Otter vectoring us to the airport vanished and no mention of our situation was ever passed to the Twin Otter crew. I think John felt guilty and did not want details of our little adventure passed all over search headquarters and the squadron for fear of ridicule if we ever made it back.

We were circling with uncertainty when we spotted the only mountain peak above the cloud layer. Upon examination of the map, we headed for the peak since it was within ten miles of Stuart. John handled the old Labrador like the seasoned pro he was, as we descended the side of the mountain barely maintaining VFR with the hope of breaking out. Our fuel situation was critical and we agreed to put down anywhere when we made it through. Visual again, I quickly found our position and we decided to head for Stuart until our low fuel light came on. Luckily, we made it without any further incident and it was strongly recommended by John that we keep our little trip to ourselves. Being the new guy on the block, I wondered how many little trips other guys had been on and though that this was all part and parcel of being a SAR pilot.

I think the biggest shock I got was not from the fact that John had just lead his crew to death's door, but on shut down, one of the guys came forward and congratulated John on what a great job he had done of bringing us down. He went on to say that not many pilots on squadron could have brought us home safely if they found themselves in the same situation. I sat in amazement as the cheers for John echoed the cabin and could not help but wonder where this crewmember was for the past two hours. I wanted to ask him who he thought got us into the situation that required John's skill and experience to bring us back in one piece.

The following week, John was downgraded to first officer and a re-evaluation of his IFR skills were ordered. No reason was given, but I am certain our little trip was the cause. Rumours spread of who might have spoken out, but I promised myself that from that moment on, I would not be intimidated or impressed by another pilot's experience or skill if he attempted to endanger my or any crew member's life.

I later went on to instruct at the helicopter flight school for ab initio students and of all my SAR stories, I made sure that they listened and understood my little story about my flight with John. ◆

Getting Home Early for *Christmas*

Christmas in Germany is full of good cheer and hail-fellows well met. Christmas Eve found F-18 Phase busy as always attempting to complete two inspections. Both aircraft required run-ups for leak checks. With the completion of paperwork, and assuming there would be no problems, the skeleton crews hoped to be at home for the holidays by the early afternoon, and anticipation was driving this goal.

Both aircraft were towed out, and, as they were only low power run-ups, they could be completed unchained on the taxiway by Snags/Phase. As with any plan that assures success without amendments, there was an immediate problem. Immediately upon start-up, a fiery object exited the left-hand engine. The conversation between the run-up person and the ground man decided to press on with the leak run and shut down to check out the situation.

With the successful run completed, both techs had their heads up the afterburner trying to discern what might have been ejected from the back-end. Best guess ran to a rag that may have been wedged between the bypass ducts, accounting for its fiery state. Working on the philosophy that one can never do too much, it was decided to tow the aircraft back in and have a closer look with strong flashlights. The most experienced technician, intent upon concurrent activity, would complete the run on the second aircraft. In the hangar, the less experienced fitter was under the impression that the flame holder may be missing a piece of material. Working under that assumption, the decision was made to change the engine, not a labour-intensive project on the F-18.

The engine change was in the preliminary stage of opening cowlings and pulling circuit breakers, notably those that cut off fuel to the engines. It was at this time that the more experienced technician appeared. Upon further consultation, and a bit of head slapping, it was concluded that the flame holder was normally shaped like this, and in fact, the engine was serviceable. The paperwork, which up until this time had been used to record all the maintenance activity, was ripped up and everything was put back to its proper state. Everything, that is, except for the circuit breakers which controlled the fuel to the engines.

The final result of this was that the engines flamed out while the aircraft was on the runway preparing for its take-off roll. The flight was aborted and a catastrophe was averted.

Lessons Learned

Five minutes saved is never five minutes saved. Always record everything that is a pertinent maintenance action. This is a problem that crops up constantly, information passed on verbally, assumptions made, and the good old halo effect. This was a tasking that started off with the best of intentions. A problem was observed, and a plan of action was devised. Unfortunately the plan forgot that the most important step, a successful conclusion, does not necessarily entail everyone getting home early for the holidays. Secondly, the crew that day was at the barest minimum. This added to the perception of pressing that existed. Doing the job these days with fewer personnel and resources is a problem that all supervisors must be aware of. Part of this awareness entails realizing that completing maintenance actions quickly does not necessarily translate into better. Finally, if it's written down, at least it can be questioned and confirmed. There are constants in society that always put pressures on the flying world; there will always be holidays… funerals too. ◆

TEACHING A LESSON

Sam needed a lesson and I was the one who would teach it to him. After all, I was the gliding instructor who got Cathy over the hump, when the other instructors had all but given up. At the top of winch launch, Cathy insisted on handing control to the instructor, as soon as she encountered a little negative "G", put in place to take pressure over the nose hook and initiate a cable release. Aware of this peculiar behaviour and knowledgeable of the glider flight characteristics, I devised a plan. Cathy was seated in the front seat of the 2-33A and initiated the launch sequence and climb-out. At the precise moment of experiencing negative "G," Cathy urgently announced "Sir, you have control." My plan and answer was a simple "No." Cathy, having never flown with me and perhaps expecting some serious situation to develop, immediately grabbed the joystick, released the winch cable, and continued the flight. Cathy was on her way to becoming a successful pilot.

Sam, on the other hand, had difficulty judging height and appropriately judging when to join the circuit. Glider launching off of a winch seldom gives lots of height to work with and a pilot had to know when to stop his 360º turns and other maneuvers. A pilot has to be in position to join the circuit at mid-field with sufficient height and the correct distance from the landing site. This afternoon, we reached 1100' with a light breeze blowing straight down the runway.

Several flights prior, Sam appeared to be getting the hang of it. After a few turns and gentle stalls, we were heading downwind slightly outside the circuit mid-field entry point of 800'. I was thinking that this was a prime time to challenge if Sam was learning anything from the previous concepts. I know that students will initiate almost any action an instructor might ask. I asked Sam to initiate a 360° turn to the right and away from the airfield. This is a "No-No" at this height and distance and the student should decline the suggestion. While thinking I would allow Sam to turn 90° and then take control, Sam had quickly initiated an uncoordinated steep turn and was past the 180° point before I could react. At this point, I decided to allow him to continue, assuming he would head the glider straight for the landing area since we would be low in the circuit. However, not taking control at that point was another mistake. Sam, coming out of the turn, continued as if the situation was normal and proceeded with the circuit. Again, I did nothing! I suggested to Sam we cut off some of the circuit. As we proceeded over the trees, I noticed our sink rate increase. Sam was pulling the nose up as if to avoid the trees. At that moment I took control, probably three to five feet over the 30-foot trees. I felt as if I could touch them. As we passed over the edge of the tree line, the glider was all but stalled and settled to the ground like a falling leaf rolling three or four feet and then stopping one foot from an embankment. The heat from the trees must have provided just enough lift to get us over the tops.

My complacency and poor judgement almost resulted in a serious accident. It was a lesson I have never forgotten. Sam finally received a license, but never flew after that summer. ◆

Maj. Lomond

Change of Plans

Flight safety will most likely get your attention when you least expect it to. Such was the case for myself and my crew on a local Search and Rescue (SAR) trainer near Winnipeg. The day started out as any other with each crewmember taking care of their assigned duties to enable us to launch within our 30-minute posture in the event of an actual callout. Our assigned area of responsibility seemed to be quiet for the time being, so we decided to carry out SAR training consisting of various equipment and personnel paradrops. A discussion on choosing an aerodrome where this training could be carried out took place.

The weather was not a factor since it was CAVOK but a system had passed through the previous night leaving most runways very slippery. The condition of the runway is a very important aspect to consider if you are planning to operate an aircraft on the airfield. It can seriously affect how the aircraft will handle during takeoff, landing, and taxi.

After all factors were taken into account we decided to go to Saskatoon where the runways were reported to be 100% bare and dry. When we arrived at the servicing desk to sign out the aircraft we were informed that a problem with the aircraft had developed. The problem could not be rectified until late in the afternoon, which meant training for the day would be cancelled.

With only a few hours left in the day, the servicing crew gave us the good news that the aircraft was ready to go. We decided to complete our proposed training, but, since we were time restricted, we opted to train in Gimli. Since it is an ideal place to train due to its close proximity to Winnipeg, the SAR pilots at our squadron are very familiar with Gimli. With the plan set in motion we checked the weather, filed a VFR flight plan, and set off for Gimli — without considering the runway conditions!

We completed the paradrops without incident and set up for a normal landing to pick up our gear and personnel. After touchdown, I went for the nose wheel steering which we use to steer the aircraft during low speed ground operations. The aircraft started to veer to the left. Increasing my input on the nose wheel steering had no effect and we continued to veer left, ever closer to the runway edge. I then inserted right rudder, which straightened us out immediately. With coordinated reversing and careful use of the brakes we came to a stop. While our gear was being loaded we could see just how slippery the ramp and runway were by watching our crewmembers struggle to stay on their feet; it was completely ice-covered. Once the gear was loaded we taxied and took off without incident.

Slippery runway conditions were factored into our morning planning but in the afternoon they were ignored. The runway condition was overlooked due to the false sense of urgency to complete our training in the time allotted and the false sense of security of going to a place with which we were very familiar. Important lessons were learned that day. Never become complacent and do not let a change of plans, change your planning!! ◆

Capt. D.R. Bjerke

LESSONS LEARNED

It was a beautiful day throughout the Maritimes and my CC144 Challenger crew were setting out from Ottawa on a two-day trainer down East. Things went smoothly until we approached Shearwater, our intended destination for the night.

As a final approach for the day, and, in order to maximize the training benefit, a TACAN approach was to be flown to the non-active runway, and then the aircraft would circle in a flapless configuration to the active runway for a flapless, full stop landing. The weather was VFR and therefore not a factor.

The flapless TACAN approach was completed to circling minimums and then the aircraft was visually positioned on a downwind leg for a flapless, full stop landing to the active runway. Unfortunately the pilot flying did not provide adequate lateral spacing on downwind and therefore the aircraft overshot the extended runway centerline during the final turn. Fairly aggressive maneuvering brought the aircraft back into a reasonably stabilized approach by approximately 200'AGL. The very rushed short final and flare resulted in two hard bounces before an overshoot was performed. As the aircraft climbed to circuit altitude, tower informed us that the right-hand (RH) gear looked damaged. A series of low passes were flown by the Control Tower to try and clarify the position of the gear, but on the fourth such pass the RH main gear departed the aircraft. Several other complications ensued as a result of the missing gear. These included a torn RH fuel feed line to the RH engine, and a RH engine failure. This also generated a fire because the torn fuel feed line allowed residual fuel to travel along the aircraft skin to the APU exhaust where it was ignited. This fire forced the crew to complete an urgent, flapless, single-engine crash landing. Due to the missing gear, shortly after touchdown the aircraft departed the runway and eventually came to rest against a chain-link fence at the edge of the airfield approximately 6000' from the landing threshold.

Many lessons were learned from this accident. We learned to keep training sequences simple and realistic. Avoid the temptation to combine different elements of training in one sequence (in this case, a circling approach with a flapless full stop landing) as you run the risk of vastly increasing the level of difficulty of the sequence without realizing it. If you still must combine sequences to meet training commitments, then make sure they are thoroughly briefed.

We also realized we should have insisted on a stabilized approach. If the approach for landing is not stabilized on heading, altitude, and airspeed by 1000'AGL, seriously consider overshooting and re-attempting the approach. This philosophy will ensure that pilot workload remains appropriately balanced between the approach itself and the landing phase. In our case, the demands of manoeuvering the aircraft into the proper stabilized approach window on short final (approximately 200'AGL) left little time for the pilot flying to mentally prepare for the flapless landing. Landing and take-off are the most demanding phases of flight and they should not be attempted unless all flying crew have had appropriate time to mentally prepare for the potential challenges ahead.

Most importantly, trust your instincts. If you don't like what you see — take action. As the training pilot on this ill-fated flight, I was not particularly comfortable with the excessive maneuvering on final but the pilot flying was doing a very reasonable job of trying to re-stabilize the approach. What I failed to consider was what state of mind the pilot flying would be in on very short final. After all that manoeuvering on final was he truly mentally prepared for the flapless full stop landing ahead? Probably not, and as such, I should have called for an overshoot!

As I look back on this accident, an increased emphasis on any one of these three points may have averted this accident and the loss of a valuable resource. ◆

Capt. Fitzsimmons

Conversion Nightmare

Prior to the avionics update on the CC130 fleet, we operated E-model C130's with cockpit instrumentation from the 1950's. This included altimeters that only had an inches sub-scale. During operations overseas, where altimeter settings are given in millibars, the crews would either carry with them conversion charts for millibars to inches or they would request inches settings for their altimeters from ATC.

The mission was a routine re-supply of troops in Europe, not an unusual sortie for the experienced crew of the C130. It was to depart Trenton in the afternoon and arrive in Europe the next morning. The mission began as any other in the C130, with a good check of the weather along the route and at the final destination. The briefing was thorough and covered all aspects of the mission. The destination weather was not great, but suitable, and the alternate's weather was good. The general influence over our destination was a low pressure that was causing some lower ceilings (remember this a little later on).

Next was the crew briefing, standard for any C130 departure. The AC started the briefing and covered all of the finer points, including destination weather and the influencing low pressure. The trip was authorized without hesitation, and the crew was seen as very experienced. Between the pilots there was probably at least 10,000 hours and the navigator had more than 5,000 hours, all on type. The crew then walked to the aircraft, all of them looking forward to spending some time on TD. The crew day for this mission was a standard 16 hours, not a maximum crew day but certainly a challenging one given the overnight hours of flying. Enroute, the trip went without hiccups; there was the standard stop for fuel and a final weather check in Gander, Nfld. Then the uneventful but busy trip across the ocean towards Europe.

By the time the aircraft coasted in over England, the crew had been awake about 24 hours, but this was nothing new for the experienced crew. Approaching Lyneham, the activity level picked up as the aircraft was picked off for radar vectors for the approach. During these vectors, the aircraft was cleared "to maintain 3000' on 992." Without hesitation the crew began their descent and called 2992 set throughout the cockpit (remember that low pressure over England). Once the aircraft leveled at 3000', ATC came back with "for vectors steer heading — and confirm level at 3000'". The co-pilot read back the heading and confirmed that we were maintaining 3000'. The crew never queried this ambiguous question as they happily flew the radar vectors they were given. As the aircraft approached the airport and was handed off to the final controller, the final controller announced what the minimums for the approach were and that the altimeter setting was 992 millibars. It was at this point that the crew had finally realized their mistake and requested an inches setting for their altimeter in order to shoot the approach. The aircraft then landed without further incident but plenty was said in the debrief.

This incident seems harmless enough taken in the context above, but think about the consequences if everything had compounded against the crew. The crew flew around on radar vectors with at least a 200' error due to the mistake in the altimeter setting. ATC asked why the aircraft was low, but in such an ambiguous fashion, the crew did not understand the meaning. Now, what if the precision approach in Lyneham was down and the crew elected to fly a non-precision approach. Had the crew not picked up the mistake on the altimeter setting in time, they could have leveled 200' below the safe altitude for the approach. If you then allow the pilot to make a mistake and fly 100' below minimums for the approach on top of the 200' error, they could have impacted a tower on approach and killed everyone onboard. The critical mistakes here are crew complacency and fatigue, which nearly led to a fatal accident. ◆

Continued from page 1

Anywhere communication between individuals is required, there is potential for miscommunication, or simply poor resource management to result in an accident. Another aspect considered in the analysis is a person's readiness to perform at optimal levels — sufficiency of sleep, medication, exercise, etc.

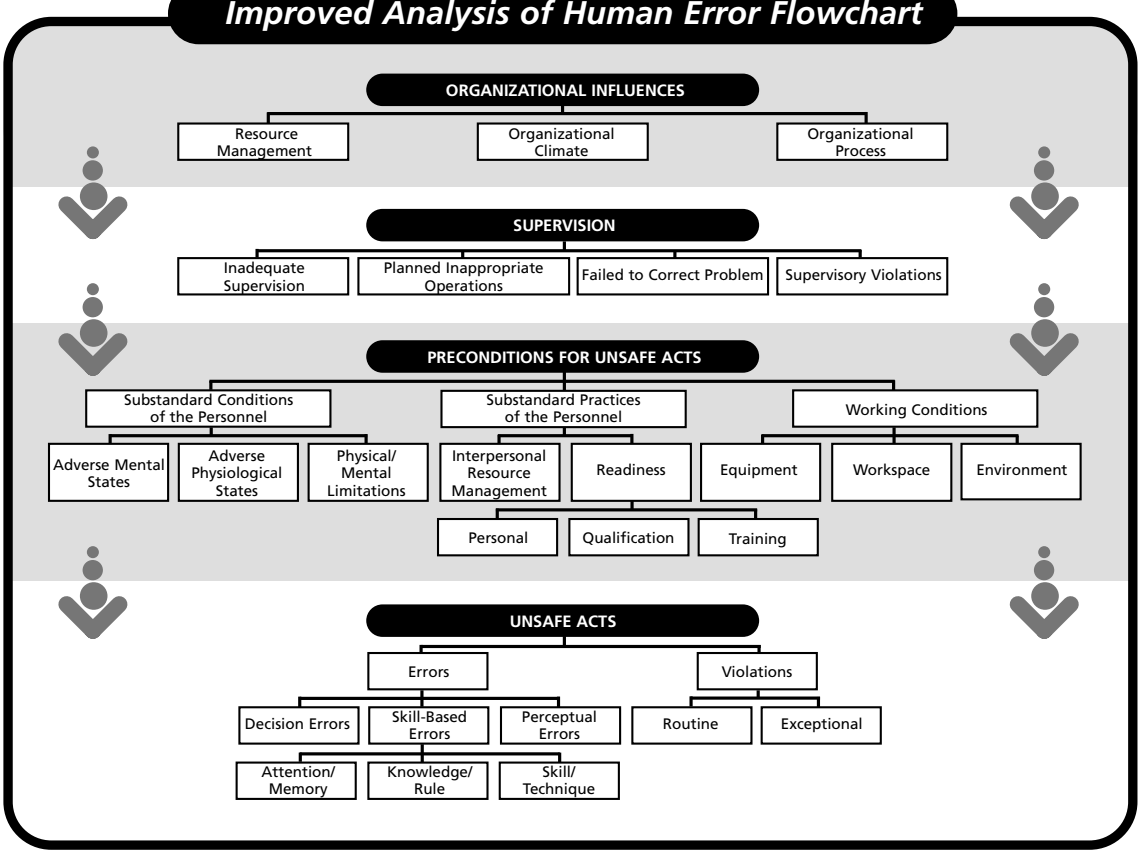
Environmental conditions are conducive to accidents as well. A person who is working at night on the flight line and does not see the tool he/she left behind in the engine compartment has fallen prey to his environment. We also consider equipment, space and layout. This involves working in confined, obstructed, or inaccessible workspaces.

Finally, the actual actions of the person who causes the mishap must be evaluated. The unsafe acts committed by personnel generally take on two forms, errors and violations. The first, errors, are not surprising given the fact that human beings by their very nature make errors. Consequently, errors are seen in most mishaps — often as that last fatal flaw before a mishap occurs. Violations, on the other hand, represent the willful disregard for the rules and typically occur less frequently.

The categories being assigned under these new Human factors Analysis within FSIS not only leads to an analysis of the whole organization, but also point toward some kind of corrective action. That is why we are moving toward replacing the old Personnel cause factors with this system. It will help us to better understand the whole situation leading to an accident or potential accident, especially if everyone reports incidents and hazards to prevent them from turning into accidents. An open, non-threatening environment, where information flows freely is the best defence. This new analysis of human error will help us analyze that information and maximize the likelihood of preventing the next accident. ◆

Col. R.E.K. Harder
Director of Flight Safety

Improved Analysis of Human Error Flowchart



Where Will You Be When CRM Breaks Down?

It was going to be an easy workday in the C-5 Galaxy. Takeoff was at 0800 local from Charleston AFB, South Carolina. We were enroute to South America. A "short" 16-hour day with planned stops in Panama and then on to Puerto Rico for the night.

The crew was a basic C-5 crew, consisting of two pilots, two flight engineers (FE) and one student flight engineer, along with three loadmasters (LM). Onboard this trip was the usual load of 110,000 pounds of miscellaneous cargo and 40 passengers returning home to Panama after the Christmas holidays.

About 20 minutes after levelling off at 35,000 feet over the Gulf of Mexico, I settled into my box breakfast. Shortly thereafter, the chief engineer who was eating in the aft flight deck, came forward and reported a terrible odour. The chief was known as a jokester, so the pilots and the FE at the panel joked about who inappropriately used the flight deck latrine.

The chief FE said the fumes were real and smelled toxic — "like burning plastic or burning chemicals." The crew donned oxygen masks. The passenger compartment (located aft of the wing on the upper deck of the C-5) was yet unaffected by the odour. The chief FE, with a portable oxygen mask, kept searching for the fume source with the aft flight deck LM while the pilots and panel FE's worked to descend, clear the air in the plane, and land.

Here is the point where our crews (and my) CRM breaks down, specifically the "M" — Management. Both pilots were focused on the descent and locating an appropriate airfield. The two FE's at the panel were working to ventilate the aircraft while the aircraft was pressurized (since we were above 10,000 feet). I worked to find an airfield and worked with the panel FE's. I checked with the two LM's with the passengers; they were fine and no fumes were present, yet.

Another problem entered the scenario — it was the first of January, New Year's Day and all USAF airfields in Florida (the closest land) were closed. Our best airfield with hospitals and crash response (if required) was either Tampa International or St. Petersburg. MacDill AFB was very close to both of these airfields and we were desperately trying to get permission to land at MacDill AFB.

The Chief FE was now reporting the fumes were getting worse by the minute, even with the ventilation process underway (while pressurized). The passengers were still fine, but the cargo compartment (lower deck) was also saturated with the fumes. The FE's now decided (appropriately) to depressurize the aircraft to be able to more adequately ventilate. The other pilot and I were trading off flying duties as required, and he was coordinating with Air Traffic Control for the descent, updating destinations, emergency status, etc. I was fully engrossed in opening MacDill or arranging an alternate airfield. I heard something about depressurizing and concurred with a nod of the head while I was talking to MacDill command post to get the airfield open.

Why the intent on opening MacDill when two other airfields were readily available? Well, a C-5 is a large and heavy aircraft; it requires certain taxiways and hard surfaces to land and manoeuvre on the ground. The only taxi routes for the C-5 clear of traffic, we were informed, were to land and remain on the runway — regardless of which airfield, Tampa or St. Pete, thus closing the majority of either airfield. Great, I can see the camera crews and media attention now…

While we descended through 15,000 feet, the chief FE had isolated the fumes and he thought the air conditioning system was moving the fumes up from the cargo compartment. At this point, the theory was a cargo hazard spill or leakage. The ventilation checklist relies heavily on using the air conditioning fans to circulate air and clear the area — that will not work now, it seems, and we enter into uncharted territory from the C-5 AOI's (aircraft operating instructions).

We were now below 10,000 feet and almost fully depressurized. The passengers were still fine, although wide-eyed with no fumes present yet, but the LM's could smell the fumes from the cargo. The FE's were trying everything in their power to get fresh air into the system and bypass the cargo compartment. Attempts had reduced the fume spreading, but the fumes were still very heavy in the cargo compartment said the chief FE.

The other pilot and I were now fully engrossed in gaining clearance to land at MacDill and having crash crews and medical people ready for our arrival if possible. The back-up plan was St. Pete, with less traffic than Tampa during this part of the day. The landing plan was set and now the pilots could focus more on the fumes while we awaited landing clearance. We were only 30 miles out and descending through 7,000 feet. I reassessed the situation inside the aircraft — finally again. The FE's said we were unpressurized and trying to ventilate as much as possible without the cargo fans operating. It sounded like a viable set-up and the passengers were still okay.

The Wing Commander of MacDill was now on the airfield in his staff car surveying the runway for us, we were told. We obtained landing permission just as we passed overhead MacDill. We performed a quick turn and set up on a nice final to MacDill with a huge sigh of relief from ATC, Tampa Int'l and St. Petersburg airport. After landing, we exited the airfield and opened up every window, hatch, and door to ventilate. Thankfully, the passengers were fine — they were already asking when we would depart to Panama.

Looking back on the whole event, CRM wasn't too bad. But there were some definite points to learn from my experience. I was lucky in the fact that my crew was very experienced. The FE's worked very well together keeping each other informed and working to properly identify the problem, and then ventilate the aircraft. The LM's worked very well to secure the passengers, properly brief them for an emergency landing and egress, as well as keep them calm and updated about our problem and our destination.

Because of this fact alone, the effects of the break down in communication between the pilots, LM's and FE's were minimal. From the moment we descended from 20,000 feet until short final to MacDill, I as the AC, was only minimally involved with the trouble shooting and passenger concerns. Training of the aircrew and experience took over. Everything just happened to come together on short final at MacDill.

There are some minor things I would do differently, but one I would definitely change. If you noticed, the chief FE was doing a lot of moving around the aircraft. I just assumed he was on oxygen the whole time, but I was wrong. The only way to know if the fumes were still there was to smell them, and he was only on oxygen for part of the time. I would have ensured *everyone* was on oxygen. The passengers should have had oxygen readily available with the masks deployed and ready for passenger use, if required.

Luck was on our side that day. In a situation like this, it is impossible to keep abreast of everything going on. Hopefully your CRM bag is filled with enough tricks and experience to keep you out of trouble. But, remember these lessons from my experience; first, ensure, as much as possible, everyone understands the problems, the situation and their duties and goals; second, keep everyone abreast of plan changes and major occurrences that could modify the plan; and, finally, develop a game plan, execute and revise as required with everyone (as much as possible) in the loop.

You are probably wondering what the cause was? Well, after three days of research, special maintenance teams and cargo handlers going through all of the cargo, the offending item was finally found. The main air conditioning fan from the cargo compartment to the aft flight deck and crew compartment had been layered with dirt, grease, and oil from years of use. This build-up finally started to burn as the fan turned and that was the source of the odour. The ventilation procedures rely heavily on this fan to ventilate the aircraft with the outside air. As long as we complied with the procedures, the odour was still present. ◆

Letters to the Editor

Hi Captain Vogel,

Congratulations and thank you for your response. You are right, DFTE stands for Designated Flight Test Examiner. Technically, you are the second person to get it right, but the first person had an unfair advantage. Besides having many years as a high time military pilot of many fixed and rotary wing aircraft, he just finished three years as the head of the terminology section here. So, I have declared him disqualified and you get the official honours.

Without diminishing your achievement, I think the fact that it took almost eight months to get the answer proves my point: our use of acronyms is counter productive. Many other people took a guess, and even when I told them that FT stood for Flight Test, none got it right.

Michael Phelan
Analyst, Life Cycle Product Management
Directorate Information Resource Product Management (DIRPM)
National Defence

ALSE Aerospace Life Support

It's near the end of the second day of our regular Aerospace Life Support Equipment (ALSE) Project Review Meeting (PRM). The room is stuffy; emotion is high, and I can sense that the time is ripe — it's about time that someone launched us into a philosophical debate about why ALSE in the CF seems so neglected and why it takes so long to acquire new and better ALSE for our aircrew. "Why don't we just buy it off-the-shelf? It's faster than waiting for NDHQ to approve new kit. Our Wing Commander can just authorize local procurement — nothing wrong with that, is there?"

We in the ALSE community have heard this many times before. And I have to admit that on the surface, some of the complaints being voiced from the field have merit. Approval and procurement of new ALSE does take a long time — sometimes far too long. However, there are reasons for this, ones that at first may not be obvious. The CF ALSE procurement approach and process often need some explanation. You may not like it but at least there is a fundamental procedure to be applied. Furthermore, it is significant to note that the way in which we authorize ALSE use is very similar to procedures in place in the USAF, USN and other foreign military users of ALSE.

First, let's examine the need to conduct independent test and evaluation (T&E) of ALSE. The idea that off-the-shelf is the fastest and best method of procurement has been debated in depth — it currently is the fastest, but is it really the best? In many cases industry has taken the lead in new product development — you will get no argument from me on that point. So why bother enunciating requirements and evaluating products?

The ALSE procurement process stresses the question, "what is the requirement"? Too often ALSE staff asks operational staff what the requirement is and it is surprising to see the diversity in responses. Unless we have a clear, concise, statement of operational need, we may end up buying equipment that doesn't serve our aircrew well, if at all.

Let us assume that the requirement has been established. Rather than simply making a direct acquisition, the CF has always insisted on evaluating manufacturer's products. The rationale for this is sound — manufacturer's statements about their products cannot be accepted at face value. This is not always or only because of exaggeration or even misrepresentation of their product capability. Sometimes it's due to limited understanding of the

PROTECTIVE EQUIPMENT

application and the environment of use, that is, the complete requirement. In the ALSE community, we have seen this far too often. In fact, in many cases the testing that organizations such as DCIEM, QETE, and AETE conduct is far more extensive than that which original equipment manufacturers themselves conduct. The moral of the story — "buyer beware" by knowing precisely what you need and ensuring your needs will be satisfied. Yes, T&E adds time to the procurement cycle, but omitting this step can be costly and dangerous. It is worthy of note that DND organizations involved in T&E are frequently asked to conduct independent third party evaluations for civilian clients.

Next, the question of why ALSE seems to be neglected relative to other equipment used by aircrew. This perception is shared by many in the ALSE community. How is it that the people using it on a daily basis neglect the equipment that could save someone's life? Clearly, the attention that ALSE gets at all levels needs to be heightened. My contact with NDHQ and 1CAD staff suggests that there is a great desire to elevate ALSE issues to required levels, however these people are meeting with limited success in that regard. I believe that not much will change until there is a strengthening of the ALSEO system at the squadron and wing level. ALSEO's are trained and appointed to conduct important jobs as outlined in CFAO 55-16 (Aerospace Life Support Equipment Management). Unfortunately, it is rare to find an ALSEO who can give ALSEO duties at the squadron level the priority they'd like to. ALSEO's often complain that their CO's don't give them the support that they need. The result — the brand new squadron ALSEO's (probably a Lieutenant) major objective at work becomes a burning desire to get rid of this secondary duty. A weak ALSEO network results in staff officers at higher headquarters and individuals at T&E establishments not receiving good operational feedback. And good operational feedback is essential in ensuring that we get the proper ALSE out to aircrew for any given operational environment.

ALSE tends to be an after-thought in capital procurement. This trend was seen years ago with the CF-18 acquisition and has not improved much in the two decades since this project. Identifying, evaluating, and integrating ALSE for new weapon systems are typically addressed late in those procurement programs. The result often is panic-mode decisions being made with failure to meet the needs of our aircrew. Recent projects such as the Harvard II and Griffon are examples of this problem. Clearly, this way of doing business must change. Project management staff must consider and plan for ALSE acquisition. ALSE is part of the weapon system and must be treated just like the aircraft, the weapons, and the spares. Too often follow-on ALSE problems stemming from inadequate acquisition are blamed on the LCMM's in Ottawa — which is not only wrong, but unfair as well.

On a final note, I want to stress that there are many people working very hard behind the scenes to ensure that our aircrew are equipped with the best ALSE that is available. Research and Development organizations such as DCIEM have made great strides in developing ALSE that is the envy of other military forces. The STING G-suit is but one example of Canadian-developed ALSE that has set the standard in acceleration protective garmentry. The level of protection afforded to our aircrew has been steadily improving and some exciting new advancements are being made. Yes the system is slow, but procurement without proper independent testing is not the answer. As I write this article, a new and radical change to the way in which ALSE is managed in the CF is being contemplated (Integrated Logistics Management Services For Aviation Life Support Equipment) that will rely more heavily on contractor support. With this change, it will be more important than ever for ALSEO's, squadron COs, and indeed all aircrew to take a proactive role in ALSE issues. The need to make wise, well informed decisions in ALSE procurement could thrive only with good support from the end users. ◆

Major Zenon D. Myshkevich

A Good Day for Traffic

It was a beautiful, sunny day in June 1998 — the first nice day we had had in a few days, so we knew it would be a busy traffic day. In addition to our locally based traffic, we had several multi-national helicopters visiting the Wing who were looking for some airfield training while their warships were alongside. Everybody knew it would be a good day for traffic.

As expected, the traffic picked up fairly early and remained fairly steady all day. As is usually the case, there were spurts of moderate traffic with launches and recoveries, followed by lulls of low activity with one or two aircraft operating on the airfield. The traffic wasn't out of the ordinary — Cessna's and Sea Kings departing for various training areas and then returning to the base for a few circuits to a landing. Also, the Waterbird Sea King was doing training on a lake east of runway 34.

One interesting thing about working with helicopters is the flexibility a controller has in what we can do with them. This can, as I found out, be a double-edged sword in that it solves some problems, but can increase the complexity of the scenario quite dramatically, creating a whole new set of problems. For example, when the number of light aircraft starts to interfere with helicopter operations, we give the Sea Kings the option of doing circuits to the parallel taxiway. The Cessnas do right-hand circuits to runway 34, the Sea Kings do left-hand circuits to the parallel taxiway Alpha, and the wake turbulence problems, plus the circuit congestion problems, are solved. But, now the controller is working two separate circuits, which requires much more concentration.

On this particular day, there were quite a lot of Cessnas coming and going, so, in order to better accommodate the Sea Kings, this was the solution I chose. As the day went on, the number of aircraft continued to grow. Several of the foreign aircraft decided to join the helicopter pattern on taxiway Alpha, and, in addition to the arriving and departing Cessnas, there were a couple of them that went up into the circuit, and a few Sea Kings elected to do on-field operations. So, now I am running a fixed wing pattern off of the runway, a helicopter pattern off of the taxiway, and a Sea King pattern off of Morris Lake (immediately adjacent to runway 34). There is also a slung load Sea King pattern off of a different taxiway, and Sea Kings doing hover work on the heliport, which is adjacent to taxiway Alpha. I am quite busy, to say the least, but I was excited by the challenge, and expected it to die off at any time.

Unfortunately, this did not happen. The traffic continued to grow with a couple of overflights through the zone, more Cessnas and Sea Kings arriving and departing, a Medevac helicopter coming inbound to the harbourfront landing pad, and some media aircraft requesting to fly over the harbour to film the warships alongside. To put it simply, I was controlling a lot of aircraft, all within my 5 NM zone, in an extremely complex traffic scenario. I realized I was getting mentally fatigued but was sure that it would slow down any minute and that I would be able to take a "breather" as soon as I landed several aircraft. But as each landed, two more showed up and I began to struggle with holding onto the air picture. I was talking continuously to aircraft and felt that if I let down my guard for even a second, I would lose the air picture. I became so focused, that I completely lost all appreciation of time and failed to see any option but to continue. I was sure it would either slow down, or a supervisor would come up to the tower to give me a break. I considered calling, but was so afraid of losing situational awareness that I just decided to carry on. It was three hours later when the break in intensity came.

Because my senses were so acute due to the duration of the heavy traffic, I responded to every call as if there were 10 more to follow. I didn't realize the traffic had slowed down and was waiting for the next aircraft to call with each transmission. A Cessna called final for the touch-and-go to runway 34 to which I responded with a clearance. Another aircraft called in for some-

thing and I immediately responded, diverting my attention away from runway 34. That call was followed by a request from the Waterbird Sea King, to proceed across the active runway for a landing at the North Gate. I scanned the runway, didn't see the Cessna and cleared the Sea King across. As the Sea King approached the runway, I saw the Cessna emerge from behind the beam in the tower window, and lift off (about 4000' down the runway from the Sea King). I immediately advised both aircraft of the other, they responded "visual" and continued without further incident.

This incident drove home some very important points to me. Firstly — "Know my limitations." I found out after the fact that I had worked 15–20 aircraft continuously for over three hours in an extremely complex scenario. I knew I was fatigued and I knew I was struggling, but I didn't consider restricting the number of aircraft to a number I could handle until I could recover.

Secondly — "Know my options." Once I realized that I was getting fatigued mentally, I should have looked at my options. The only one I could see was reactive rather than pro-active; let the traffic slow down or the supervisor show up rather than calling for him. Although I was too focused and too busy to call myself, I could easily have asked another member of the crew to call on my behalf.

Thirdly — "Adjust my technique." Although the traffic had slowed down, I continued to control at a level well above what was required. There was no urgency when the Sea King requested to cross the runway; I had plenty of time to verify the position of the Cessna. But, not seeing him in a quick runway scan, I cleared the Sea King across in anticipation of many more calls to follow.

Lastly — I put undue pressure on myself to handle everything on my own rather than calling on other members of the team to help me. ◆

It Almost Cost a Life

CFB Summerside was regularly tasked to provide aircraft for fish patrols, coastal patrols and SAR missions. The CP-121 Tracker was tasked with these missions and based at St. John's airport in Newfoundland. As an air weapons technician, I was tasked along with an augmentee loader to provide air weapons support. This included loading/unloading SKAD's (survival kit, air dropable), photo pods, and pyrotechnics on the aircraft.

On one particular day, a second aircraft arrived. While enroute, the aircraft was tasked to conduct a SAR operation, which required the upload of a SKAD, as per SOP's. The plan was for the aircraft to land, be loaded with the SKAD, fueled, and proceed to the search area.

As the aircraft rolled in, I noticed that it already carried a photo pod on the wing rack. I made a mental note and began my pre-load checklist. I gathered up my augmentee loader and began the loading functionals for the SKAD upload. Early on in this procedure, it became obvious that this individual was not very comfortable or knowledgeable with his task. Realizing the limited experience of this technician, I decided to follow him around and help him with his responsibilities, and ensure that he followed my instructions. As his major responsibility was cockpit switches, I found myself going in and out of the aircraft as he had difficulty locating the various switches.

When we reached the point in the checklist, which called for an emergency jettison check, I was in the cockpit and told him to activate the switch. I checked the one side I was going to load and verified that indeed the hooks had opened. I didn't check the other side of the aircraft as I had no intention of loading it. We loaded the SKAD and signed the paperwork.

When the aircrew arrived, my augmentee was tasked as part of the start crew. Part of his job was to pull pins prior to the pilot's arrival. When he reached the side with the loaded photo pod, he pulled the pin (it seemed harder to come out than usual) and the photo pod, weighing close to 300 pounds and costing $750,000, dropped, missing him by inches.

Looking back, I now realize the importance of maintaining situational awareness. My thinking was channeled into ensuring that the augmentee loader did his job. I lost focus on the overall task, and it almost cost a life. ◆

Safe Beginnings Mean Safe Endings

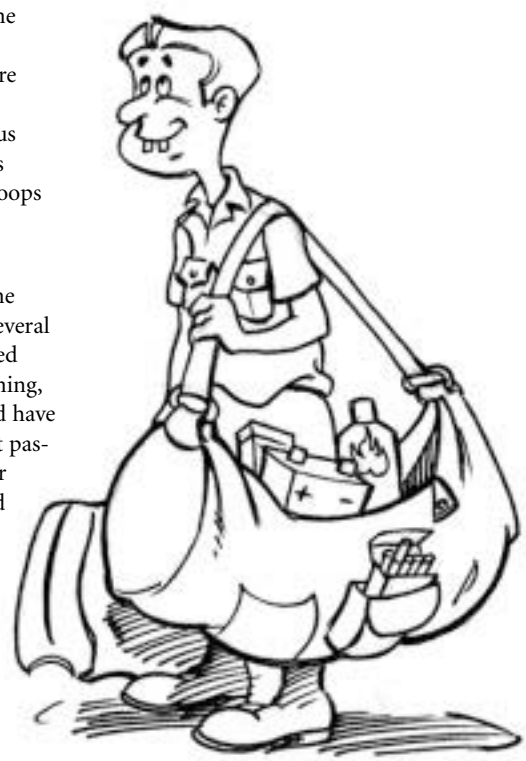
This is an account of a trip that I was tasked with as a loadmaster shortly after my arrival to one of our transport squadrons. In June of 1997, I was tasked to be a restricted Load Master (LM) on a long-range trainer to western Canada and then down to the United States and South America. The first leg was to fly from Trenton to the East Coast to pick up 60 ground troops and take them to Medicine Hat, Alberta.

We arrived at the airport at approximately 1600Z and were scheduled to take off at approximately 1730Z. The other LM and I met with their Unit Emplaning Officer (UEO) and were informed that the passengers were going to be late by at least 30–45 minutes. We confirmed with the UEO that all of the passengers had been briefed and checked for any dangerous cargo they might be bringing with them in their personal kit. As a rule, we always do a spot check of approximately 10%.

Shortly thereafter, the passengers showed up. They proceeded to the aircraft where we randomly took ten individuals and their kit aside for an inspection prior to loading the aircraft. As we were about to start this, the front-end crew were asking us how long it would take to complete the inspections; we wouldn't know until it was complete! Once we started, we found dangerous cargo in just about all of the kit of the ten individuals. It prompted us to do a full kit inspection of everyone and this was going to delay us by at least one hour. It was at this point that we had to deal with the chalk commander, who was more than a little upset at the thought of us doing a full inspection since they had already done so back at their unit. This was easily solved with the full backing of the aircraft commander.

We gave all of the passengers the opportunity to turn in the different dangerous cargo items we listed for them and then we proceeded with the checking of their kit. The amount of things we found was too much to list in this article but some of the things we found were: hexamine tablets in a pouch with ronson lighter fluid and strike anywhere matches, lithium batteries just thrown in a rucksack, numerous bottles of lighter fluid, matches in about every pouch. Some troops even had their own mountain stoves with naphtha still in it.

This inspection took almost one and a half hours. There were several things that could have prevented this need right from the beginning, but the biggest thing that could have ensured a smooth trip was that passengers need to know that their safety is first and foremost, and when they are asked to leave behind the items that are considered dangerous cargo, it is for a reason. Believing that it is okay is an excuse for disaster, and UEO's must be vigilant in ensuring that a full inspection is carried out. LM's must be willing to take the time to complete inspections regardless of the time it may take. Just one last note for personnel traveling on any aircraft — it's not that you're not trusted (that was some people's response to being inspected), but, if even one person has dangerous cargo on them, it creates the sense that others do as well, therefore everyone must be inspected. If in doubt, we ask; it will always be to the passenger's benefit. ◆



TRAIN AS WE FIGHT

On a recent exercise during a troop move, we experienced an aircraft event that, of itself, was minor. However, the situation surrounding it was potentially dangerous, and the risk level could have been reduced.

The mission was simple — pick up eight troops with rucksacks and drop them off to let them play for a while. We were then to pick up the commander for a tour of the exercise area, return, refuel, and wait for the troop extraction time.

We departed for the initial pick-up just a little after sunset; flew our route to the pick-up zone, landed and took off with eight troops on board. This put our all-up-weight at 11,500 lbs., quite close to our maximum gross of 11,900 lbs. We proceeded to the given grid to find a suitable landing zone. Conditions at the time were southwesterly winds at five to ten knots, sky clear with the sunset about 15-20 minutes prior. This left the sky bright, yet the ground quite dark — unsuitable conditions for night visions goggles.

We identified a suitable area, conducted a quick crew brief — something like "we're downwind now, we'll conduct a 180-degree turn into the wind for a two-stage approach over the tall pines." On short final we confirmed that there were no other obstacles and noted that the ground was quite uneven with many small, undulating hills and valleys, and further briefed our landing spot atop one of the hills. Once clear of the barrier, we began our descent and were given a "steady down" by the flight engineer at approximately ten feet to reposition for tail rotor clearance. To arrest our descent, the collective was checked up. The Aircraft Commander called "no more power" and there was a subsequent torque spike to 100.5% — enough to make the overtorque light flicker on and then off. We continued with the landing, offloaded, and returned to base. Unfortunately the commander would not get his ride that night. We were, however, ready for the extraction after the necessary paperwork and visual inspection were completed.

In looking back — what was the problem? The overtorque, and the commander not getting his ride were really small items and consequences of a bigger picture. A picture that was potentially dangerous and, I believe (as flying pilot at the time), was completely preventable without compromising the mission. I believe the contributing factor (aside from the torque sensing problems of the Griffon) was that we were looking into a bright, post-sunset sky and could not easily see the ground below. Furthermore, I did not anticipate the sudden "steady down," and had to abruptly stop our descent. The winds were not excessive, so perhaps an out of wind approach would have been preferable. An easterly approach path would have put the bright sky behind us, taken the tall pines out of the picture, but given us a tail wind at about our four o'clock position. In addition, a single stage approach might have been possible.

This may have come up had a more thorough confined area briefing been conducted. In efforts to be tactical and spend a minimum time circling the landing zone ("Train as we Fight"), the maneuver was carried out quickly and thus the subsequent overtorque. As previously mentioned, the results of the above events were minor, nonetheless, the mission could have been safer and more complete had an extra minute been taken and a little more foresight used. ◆

Maritime Patrol's Flight Safety Record: Good Enough?

The Maritime Patrol mission is demanding. Large aircraft, variable weather, long distances and low-level operations, not to mention the potential for hostile action, all demand the best from MPA aircrew. Yet, despite the demands, it can be seen that this branch of military aviation has achieved a creditable flight safety record. In the major countries that operate MP aircraft, there exists a variety of operational styles, missions and even operational authorities, with many nations operating their MPA fleets as Navy, Air Force, Coast Guard or Customs entities. What is evident, however, is a common thread of training, professionalism and sound operational practices, which ensure their continuing safe operation.

Most nations' Military air arms have in place a process to review and analyze system failures that result in accidents or incidents. They are often called Flight Safety organizations and can operate in parallel to airworthiness bodies and/or the chain of command. Independence is usually granted to the Flight Safety function in order that it can concentrate on its primary objective: reducing the accidental loss of aviation resources. By a variety of means this organization collects and analyzes data to determine trends and prevent accidents and incidents. This information is then distributed via e-mail, messages, magazines, videos etc. with the aim of preventing a recurrence. Many of us have read incidents of various kinds and walked away scratching our heads wondering how a crew could possible have put themselves in that position, and how certainly we never would. Unfortunately, year after year similar situations arise. The air show or air-show practice that got out of hand, the inappropriate application of power in an asymmetric situation, either in the air or on the ground, or the overly aggressive G application which led to structural failure and ditching are examples.

When we look to prevent these and similar events we often turn to a familiar cast of cause factors. Supervision, training, knowledge and/or experience are very common themes. We are familiar with the issues surrounding loss of experienced personnel and reduced flying rates. Have we really hoisted aboard the notion that we can't expect people to upgrade as quickly or as completely as in the past, when an overabundance of purely operational experience kept us all busy? Often junior MP aviators have only been exposed to certain specific roles. Other skills may have been paid only lip service in order to maintain an appearance of relevance to political or military masters. Hazards are also present when new equipment or roles are being introduced in a haphazard or incomplete manner, lacking in training and documentation. Certainly the typical young instructor has a limited experience pool to draw on. Teaching 90% of 90% to successive generations of MP aviators will quickly see us losing the hard-learned lessons of the past.

There are positive initiatives that can and do make a difference. At a time when many nations are upgrading their MP aircraft, a timely upgrade of simulators to current commercial standards can allow the more realistic practice of demanding emergency procedures. Simulators are also excellent for drilling the fundamentals of Cockpit Resource Management (CRM) and honing the critical crosscheck and backup roles that all crewmembers must have. It was a tactical compartment crew member's alertness in hollering "altitude!" to a flight deck that recently prevented a tragedy on a routine night ASW exercise. We can utilize tools such as Operational Risk Management to carefully analyze roles, flight profiles and procedures to see if they are in fact the best way to accomplish the mission. Those countries that have a multi-engine phase in their pilot training can utilize this period to emphasize Crew Resource Management prior to the individual showing up on a squadron. Training or standards personnel need the consistent support of senior leaders to provide the essential time, on ground-training days, to effectively impart lessons concerning tactics, procedures and safe and effective ways to complete the mission.

Utilizing examples from other countries can assist in increasing the flight safety knowledge and awareness of all MP aviators. Furthermore the experiences of fellow aviators should not be disregarded on Wings or Bases where MPA are not the sole occupants. These professionals are also in the business of safe mission accomplishment and routine cross-pollination of ideas can yield great safety initiatives and reveal common problems. MPA aircrew also need to play an active role on their home bases, attending the necessary meetings that deal with bird control, ATC concerns, snow and ice control and the like. All of these items make up the environment you will be returning to after that long deployment or all-night flight. On another front, an offshoot of CRM of interest to MP aircrew is the relatively new HPIM. Human Performance in Maintenance is an initiative to recognize and mitigate many of the same types of cause factors that recur in aircrew incidents, and are shared in the maintenance hangar. In many ways maintenance organizations are affected by the same restraints as the aircrew. Knowledge of training, spares, and experience level concerns of your maintenance team is essential to planning safe operations, particularly on deployments.

In years past, the MPA community worldwide went about its business in a largely unsung manner. That has changed and MPA are likely to find themselves in the vanguard of highly visible operations. The mid-air collision of two MPA a few years ago and the recent successful ditching of a severely damaged one indicate that despite our best efforts there will always be risks. By analyzing our weaknesses, rigorously auditing our procedures and selecting only the most capable supervisors, the MPA community can continue its tradition of mission accomplishment in a safe and effective manner. The AIM: Safe mission accomplishment. ◆

Major Al Harvey, CF

Corporate Knowledge

The unit had just lost 50% of its technicians due to retirement. Recruiting had just begun the year before for the first time in ten years. This unit was just awarded the "transient servicing" award for the Canadian Forces for the third year in a row. It was 2300 hours on a summer night and the weather was seasonally warm and clear.

Transient servicing had just towed 15 aircraft into the hangar and this tow job was the last one. The hangar would only fit one more aircraft. The tow crew chief had 23 years experience, and the driver, wing walkers, and tail man all had 22 years experience. The only person ever to work on a CF101 was the tail person. The brake person had six months experience and had towed many types of aircraft, but never a CF101. As the tow mule drove over the hangar door rail, the four bolts holding the hitch onto the mule sheared.

The CF101 rolled towards the wall. The crew chief yelled "brakes." The brake person applied pressure to the tow brakes but the aircraft did not stop. At the same time, the driver applied brakes to the mule and stopped it but left it in gear. The crew chief yelled "brakes" again. The brake person was still trying. The driver jumped off of the mule and ran to the aircraft with a chock to stop the aircraft. The mule drove toward all of the aircraft parked in the hangar. The wing person ran toward the mule and stopped it before it hit anything.

The brake person yelled "pull the handle on the left." The brakeman saw one marked drag chute. He said he couldn't find it. The brakeman yelled at him to pull it so he did. The tail man dodged the drag chute and yelled "pull the other one." The brake person found it and did. The aircraft stopped in time. No damage, no injuries.

God protects drunks and fools. They weren't drinking at the time. This is an old story but a true one. We are now downsizing. People are retiring. We haven't recruited for years. Sound familiar? ◆

20-20 Hindsight

In August, 1996 I was the aircraft commander on a redeployment from Tinker Air Force Base, Oklahoma to Geilenkirchen, Germany. We were in a NATO E-3A with an international crew of 30. The flight deck was comprised of an augmented crew.

Having flown the first leg of our flight from Tinker Air Force Base to Goose Bay, Canada, the second half of our crew went in to file their flight plan and the engineers did their usual walk around. I remained on board to keep an eye on things in the cockpit. When the other half of our crew was ready to take over, I retired to the back of the aircraft (my first "bad judgement call") as someone else wanted to be in the jump seat.

My buddy John, a weapons controller, and I strapped in for takeoff. Everything seemed ops normal during the takeoff roll except for a slight "thunk" right about lift off. I turned to John and asked, "What was that?" and John replied, "You're the pilot, you tell me what that was." "I'm always up front on takeoff, how should I know what sounds are normal!" To which John said, "Well, I don't know, I've never heard that before. This plane makes all kinds of noises, though." Then John observes, "Well, no one up there seems concerned." After a little more thought I concluded, "It could have been the wheels bottoming out on the struts on lift-off." And then we settled into our usual pre-nap magazines and books. The remainder of the flight was uneventful as well as the landing back at NATO Geilenkirchen.

After landing, Maintenance came out and asked the crew if they knew that a tire was shredded? We were all surprised, but we were not sure when it occurred. No one "felt" anything.

After a deployment, it is usual for the people on board to help unload all of our baggage onto the waiting truck. Instead, we all had a look at the shredded tire and examined the wheel well first (mistake #2). Then we proceeded to unload the aircraft and then go on to the squadron.

Several days after the incident, I received a call from the safety office to come in and discuss their findings about the "shredded tire incident." The safety officer greeted me and made a point of telling me that there was nothing to be gained from this particular incident by finger pointing. Rather, he stressed, it was more important that all agencies involved learn from it instead.

The investigation revealed that the tire actually had shredded on takeoff at Goose Bay. There they found pieces of shredded tire approximately 5,000 feet down the runway. At Geilenkirchen they found no shredding on the runway. Therefore, they based their assumption on the more obvious findings.

There were several possible consequences of flying with a shredded tire. The hydraulic lines could rupture and result in a fire. In our case, we were lucky; the tubing had only been bent.

On a more personal note, we discussed some of the judgement errors on my part. First, even though we were an augmented crew, I still had signed for the aircraft and I was ultimately responsible. I should always remain in the cockpit, even if only in the jump seat. Once on the ground, when there is a shredded tire, all personnel should remain clear of the tire. There is a possibility of a hot tire exploding which could result in tragic consequences. Fortunately, I was able to learn from this incidence with 20-20 hindsight. ◆

Trouble

Finds You

Ah, The Prairies; open spaces, flat ground, cloudless skies… nothing to worry about on a fine VFR day… or so we thought!

Our crew was ferrying a Sea King back to Shearwater from Victoria, BC. The first day through the Rockies to Calgary was uneventful except that the engines were not performing to 100% and would need a tuning and topping at the first opportunity. Day two would see us through to Winnipeg with gas stops in Medicine Hat and Moose Jaw. The first leg out of Calgary was to Medicine Hat...a flight of about 1.2 hours. The route was clear and simple… basically follow the Trans Canada Highway. There was the Army Range at Suffield but we'd be well south of that… no problems. We left Calgary at 0815; it was drizzly and ceilings were about 1000 feet. Twenty minutes east and the skies began to clear and by 0900 we were in severe clear and enjoying the Alberta geography at 500 feet.

With a tail wind and good fuel consumption the navigator figured that it might be possible to bypass Medicine Hat and go directly to Moose Jaw thus saving an hour in our crew day. The Sea King altered about 20 degrees to the north to take up a more direct route to Moose Jaw. Another fuel reading on the half-hour would confirm either direct to "The Jaw" or to Medicine Hat as originally planned.

With the great weather and ceilings the aircraft captain decided to tune up the engines. For the next 15 minutes, both pilots and the navigator became busy with monitoring engine settings and adjusting the topping screws. With all three heads inside the cockpit and busy, nobody noticed that we were drifting north of track and that our Gyro Heading and Reference System (GHARS) had developed a 20 degree error. Once the engine calibrations were done the crew got back to their map reading and fuel monitoring. It was then that the navigator determined that with the planned alteration to a more northerly track, the drifting north and the GHARS error that we were well north of track, in fact, far enough north that we had just entered the Suffield Range… a restricted area! Now we were only a mile or two in at the very southwest corner but, we had, albeit inadvertently, entered a restricted area.

We immediately turned south and exited with great speed (Sea King mind you) and were clear of the Range in about five minutes. Shortly after that Medicine Hat FSS called to ask if we were aware of the Range and that the army was very concerned about our transgression. Yep, we messed up. The crew was busy, situational awareness was down and our compass system failed us. All this combined to make a routine VFR transit a bit of a nightmare. Trouble **will** find you if you are not always diligent. It certainly found us! ◆

Major Whitehead

Photo by Mike Reyno/Skytech Images

You Can Never Be Too Sure

In October 1993, an F104 crashed on a hill 6500' high north of Aviano Air Base in Italy. The pilot was killed. The pilot had 600 flying hours total and 300 hours on type. His flying proficiency was very low (50 hours flown in the last six months) because he was posted to a desk job at Base Ops.

The flight safety investigation found that the pilot got disoriented while attempting to fly the Hi-Tacan procedure for Runway 05 and intercepted the Initial Approach Fix (IAF) on a position 180 degrees from the correct one (he had mistaken the point with the tail of his RMI). He started a descent from a wrong position and entered IMC at 10,000 feet and impacted the hill soon after.

Aviano Approach didn't have radar so the ATC controller had to rely on the pilot's position reports to monitor the progress of the approach. The pilot got disoriented while attempting to use a standard procedure for F104 pilots that requires manoeuvring in such a way as to intercept the IAF properly aligned, so as not to have to enter the holding pattern and waste time.

Well, this is a happy ending story because that pilot is me, and I didn't crash on that hill. Why? Because an ATC controller at Padova Radar, who was not too busy monitoring the traffic on the airways, noticed something strange about my airplane. He called the controller at Aviano Approach and asked him to query me about my position. My answer was that everything was correct. He asked again a minute later and at that point I decided to plug in the afterburner, climb on top, and assess my situation. I cleared that hill by less than 1500 feet (I found that out later!)

Two reasons why I decided to abort the instrument procedure were that firstly, I knew that my proficiency was very low and secondly, after being questioned twice in a few minutes about my position made me think that something was wrong. I flew back to my home base, asked for a PAR to a full stop, and I went right away to my squadron commander to tell him what had just happened. When all the clues pointed to something being wrong, I decided to double check…you can never be too sure! ◆

By: Major Antonio Vianello

I LEARNED ABOUT FLYING FROM THAT

It was day two of a three-day long-range trainer as part of my Twin Otter operational training. Long range trainer is a bit of a misnomer in the Twin Otter world, as it took us a whole day to make it to Calgary from Yellowknife. All airspeed jokes aside, myself and the other pilot in training were getting comfortable with the aircraft and were starting to have some fun now, applying what we learned to enroute operations.

The first leg of the day we planned to go IFR to Cold Lake and stay the night. The weather was not terrible, but there were local snow showers and broken cloud based at 3000 feet. While we flight planned, the flight engineer went outside and performed his pre-flight checks. Once he was done he replaced the pitot covers and engine inlet covers, as heavy, wet snowflakes were starting to fall. At this point it is important to mention that the large red "remove before flight" flag had ripped off one of the pitot covers the night before. All that remained was the leather cover, and it was this that was placed over the pitot tube to protect it from the falling snow.

Flight planning finished, we hurried out to the aircraft. The quicker we got going, less were the chances of us having to spend time de-icing. The covers were removed, engines started, clearance received, and off we taxied.

Takeoff procedure in the Twin Otter calls for a 60-knot airspeed check to confirm that both airspeed indicators are working properly. When the aircraft commander called "60 knots" off his airspeed indicator, I glanced down at my airspeed to see it flickering right around the zero mark. Because of the Twin Otters short takeoff ability, our lightweight, and my momentary hesitation, we were airborne. The aircraft commander in the right seat confirmed that his airspeed was working and that the aircraft felt normal then took control. There was still several thousand feet of runway remaining, but a rushed, overweight landing is not always the best idea. We elected to remain VFR and returned for the visual approach. While airborne we analyzed the problem and on a hunch I looked out my window — there was the pitot cover snugly in place on the left-hand pitot tube! The pitot heat circuit breaker was pulled and we landed without further incident.

What went wrong? Many things: Firstly, the flag attached to the pitot cover had been gradually coming apart for some time. It was meant to be replaced, but came apart before that happened. Unfortunately, we didn't pay particular attention to it on the trip.

Secondly, four aircrew walked out to the plane, and not a single one noticed the pitot cover was still in place. Scanning an aircraft during the last-chance check may work sometimes, but if you are not expecting to see something wrong, chances are you won't. Visually confirm each item in your check.

Thirdly, speak up! When I noticed the lack of airspeed, I should have called it out immediately. An abort may turn out to be unnecessary, but it is far less embarrassing then running off a runway, or worse.

The incident was well handled by the aircraft commander and was a good lesson for me. The most important thing to do is relax. Don't run through red pages too fast for your crew to follow through. When an incident occurs, follow the old adage: aviate, navigate, and communicate — fly the aircraft first. Make sure that there is always someone looking outside. Have someone concentrate on the flying — and only the flying — while the rest of the crew concentrates on the emergency. Calgary is a busy airport and the weather wasn't perfect, but when you prioritize your actions things go a lot smoother — as did the rest of our long-range trainer. ◆

Lieutenant Crouch

MAINTAINER'S CORNER

Welcome to the newest section of the Flight Comment Magazine. This page is dedicated to the men and women of the Canadian Armed Forces who specialize in keeping our fleets in flying order.

The aim of this page is to provide a means of sharing trends and concerns developing in the maintenance world. The intent is not to focus on any particular fleet but to discuss as many subjects as possible.

Throughout the year various maintenance issues will be tackled. Your participation is welcomed. If you have anecdotes, photos, or article ideas forward them to DFS for review and possible inclusion in the magazine. Send your submissions to Sgt Anne Gale, DFS 2-5-3, via e-mail or regular mail.

THE ROUTINE TOW JOB... NOT!

"Not another tow job? Isn't there anyone else to do it this time? I just came back from one." How many people have these thoughts when they are told they have to do a tow job? It's a no-brainer, a boring job… or so we thought!!!

Tow jobs have become routine and we are not taking the time to prepare before we connect the mule to the aircraft. In 2000, there have been 37 towing mishaps; that's 3 a month! Four are still under investigation, but out of the remaining 33, 22 were caused by personnel factors (carelessness, expectancy, complacency, information/communication, judgement, technique, channelized attention, fatigue, training, and inattention). Also, 6 technicians were injured to various degrees. A lot of additional maintenance resulted from these incidents. So, to save us the extra work (not to mention headaches when filling out the paper work) why not start treating the tow job likes any other maintenance action: lets take the time to prepare for it. Remember the following points for your next tow job:

- If you're a crew chief, know the members of your crew and their qualifications. If you're a crew member and you are not sure of certain procedures, ask. Better to ask then try to explain an accident later.
- Confirm the intended parking spot before you start towing and inform the crew. Many incidents were caused because the tow crew didn't have clear directions as to where the aircraft was supposed to go.
- Do a "pre-flight" — ensure crew, equipment, and aircraft are ready for the move. Does the crew know their area of responsibilities and where the aircraft is going? Is the mule serviceable? Review basic emergency procedures.
- Cover all the bases: wing tips, tail, AMSE around the aircraft, etc. It's easier to ask for additional spotters in congested areas than reporting an incident to the boss!
- Once the aircraft is parked, ensure it is secured.
- If you think it may not be safe to move the aircraft — **SPEAK UP!**

It seems like a lot but it only takes a minute to run through these steps. A little bit of prevention will save you tons of work later. ◆

No Potential for Severe Weather

A few years ago the day started as per normal in the weather office. A ridge of high pressure dominated the weather picture with the temperature expected to reach 28 degrees Celsius. Prior to the scheduled morning briefings all preparations were progressing normally. A daily check of the stability indices indicated no potential for severe weather.

By 0930 the aircrew briefings were complete and it was time to settle into the office routine. It was just another quiet day at the office until 1130 at which time a call was heard on metro from two CF5's enroute to the range. They reported a line of TCU's, which appeared to be developing rapidly 40 NM northwest of the base with a southeasterly motion. This was not previously forecasted and nothing was showing on the weather radar. I immediately contacted the forecasting centre and informed the forecaster of the PIREPs I had received. He promptly told me of the weather situation and of the lack of support for any convective activity.

However, at 1215 a second call was received on metro from the CF5's now reporting the original line had developed into CB's with the tops reaching 40,000 feet. The weather radar had by now painted that line of CB's and the motion previously reported was indeed correct. In fact, the cells would reach the base in one hour and fifteen minutes. By now, time was of the essence. Without any further delay, I issued a weather warning for thunderstorms with a real threat of hail. I subsequently briefed the Base Operations Officer and he immediately had the aircraft towed into the hangar. This turned out to be an extremely wise decision. At 1340 the weather report showed a ceiling of 1000 feet with heavy thundershowers, moderate rain showers, and hail. The size of the hail was marble size and it lasted for ten minutes.

This situation demonstrated the utmost importance of timely PIREPs. Without that early warning, I doubt very much that this severe weather situation would have been detected soon enough to avoid damaging aircraft. ◆

MWO Houde

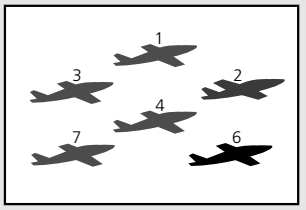
From the Investigator

TYPE: **CT114172 Tutor (#4)**
CT114006 Tutor (#1)

DATE: **04 September 2000**

LOCATION: **Toronto ON**

The accident occurred after the 9 plane formation of 431 Air Demonstration (AD) Squadron had departed Pearson International airport to fly a display for the Canadian National Air Show in Toronto. The aircraft directly involved were Snowbird Lead (114006) and the number four aircraft (114172) of the formation. The departure from Pearson was conducted as three separate elements of three aircraft, each in "Vic" formation. The number four aircraft was lead aircraft of the second element. The briefed rejoin was to be completed shortly after take-off with the first two elements rejoining as depicted below:



As the second element was positioning for the rejoin, Snowbird Lead called a speed reduction and "easing right" into a turn. The number four aircraft overshot Snowbird Lead aircraft and attempted to regain position by moving backwards. During this manoeuvre, number four's left elevator and tail contacted Snowbird Lead's left wing leading edge and left belly smoke tank.

The number four aircraft left the formation and recovered at Pearson International Airport. Snowbird Lead co-ordinated the recovery of the remaining aircraft and all recovered at Pearson without further incident.

The number four aircraft sustained damage to the fibreglass cover at the top of the 'T' tail with contact marks and torn metal found on the left elevator and tail section. The Lead aircraft had contact marks and dents on the left belly tank and a torn left wing leading edge.

The investigation is being conducted by DFS in Ottawa. ◆

For Professionalism

Corporal Arsenault and Corporal Turgeon from 413 (T&R) Squadron, Greenwood were proceeding from the ramp of #10 Hangar toward the servicing area when Corporal Turgeon noticed what appeared to be a piece of FOD. Retrieving the item, he recognized it to be the remaining portion of a broken fastener. Consulting Corporal Arsenault, an experienced AVN technician on the Labrador aircraft, she immediately determined it to be the shank of a Droop Stop stud on the Aft Rotor Head of aircraft CH113304. Furthermore, a second stud was found sheared wedged in place by the Droop Stop block, making it very difficult for technicians to see.

Corporal Arsenault and Corporal Turgeon are highly commended for their attention to detail, immediate response, and perseverance in preventing a very serious flight incident during start up or shut down. If left undetected this could have progressed into a very serious incident where there was potential for a tunnel strike by Aft Rotor Head blades during a start up or shut down. Corporal Arsenault and Corporal Turgeon's actions prevented possible airframe damage and/or personal injury.

CORPORAL ANDRÉ TURGEON

CORPORAL MURIEL ARSENAULT

CORPORAL J.P. LESPERANCE

In April 1999, Corporal Lesperance was conducting an after-flight check on aircraft #188736. He noticed an unusual number of washers under the nut of the left trailing edge flap servo bolt. Further investigation revealed that a bushing had been omitted during the last periodic inspection carried out 1.9 flight hours earlier. Corporal Lesperance's only clue that something was wrong was the excessive amount of washers on the bolt; the bushing is not visible without partly disassembling the servo attachment bolt. Over time, abnormal wear on the hinge point could have caused extensive damage to the aircraft. Furthermore, serious flight control problems may have resulted had this problem gone undetected.

In June 1999, while carrying out a before-flight check on aircraft #188766, Corporal Lesperance discovered a nut missing on the left main landing gear door uplock hook assembly. Even though the landing gear door is inspected after and before each flight, the emphasis is put on the roller assembly. The uplock hook is not specifically identified as an inspection item. The area is confined and the nut is very difficult to see. Corporal Lesperance's thoroughness possibly averted a serious in-flight emergency.

Corporal Lesperance's diligence and attention to detail resulted in the discovery of serious unserviceabilities. These two incidents could have resulted in serious and extensive damage on the aircraft and potential flight control problems. Corporal Lesperance demonstrated a dedication that exemplifies professionalism.

For Professionalism

CORPORAL SHANNON WATTERS

On 10 July 1999, during her tour of duty as Ground Controller, Cpl Watters observed an inordinate amount of smoke coming from the main landing gear of a CC130 aircraft that had just completed a full stop landing. Although the smoke dissipated quickly, Cpl Watters was certain that the amount of smoke was excessive for an otherwise ordinary landing. The aircrew wished to continue with their local training mission, but through Cpl Watters insistence, they decided to exit the runway and carry out a visual inspection. The inspection revealed a dangerously soft tire on the left main landing gear. Consequently, the aircrew terminated their training and taxied to the ramp without further incident.

Cpl Watters displayed adept Crew Resource Management through her surveillance of not only ground traffic but air traffic as well. Her assertiveness that there was indeed a problem with the aircraft and encouragement to initiate an inspection, which ultimately led to the decision to abort the training mission, averted a possible airfield disaster.

Cpl Watters attention to all aspects of her duties, and her insistence that the aircrew check the situation out may well have prevented a serious aircraft incident.

MASTER CORPORAL MIKE STACEY

MCpl Stacey, an Aviation Technician with 442 (T&R) Squadron, was tasked to conduct a primary inspection on a Buffalo aircraft. During his inspection, MCpl Stacey discovered that the brake unit felt loose but was told by more experienced technicians that this was normal for this aircraft and not to worry. A short time later, he again ran into this problem and decided to investigate further.

On his own, MCpl Stacey went to the component shop to learn how the brakes were built up. After researching the CFTO's he realized that the two bolts that hold the torque plate to the piston housing must be torqued to 60-inch pounds and then lockwired thereby preventing any movement of the two halves. All Squadron aircraft were checked, and at least one brake unit on each airframe was found to be loose. In addition, four of the seven brake units sent as replacements had the same problem.

As a result of MCpl Stacey's outstanding professionalism, perseverance, and superior dedication a serious hazard was identified and rectified. His attention to detail and refusal to accept the "norm" clearly averted the potential for a serious incident.

On 22 February 00, Cpl Huculak was tasked to carry out the cockpit survey phase of the periodic inspection on aircraft CF-188780, her first periodic inspection. She discovered that the IFF Emergency Bail Out tone switch was in the "disable" position. Unfamiliar with this switch, she investigated with the MOD/SI coordinator, MCpl Monpetit, to determine if the aircraft was properly modified.

Their investigation revealed that this modification was only to be carried out on aircraft flying in operational theatres. CF-188780 should have been demodified on return to Canada, because, with the switch in the "disable" position, the bail out tone would not have functioned on ejection. Her closer examination of the other aircraft in periodic inspection, CF-188798, indicated it was also modified incorrectly so that the IFF Emergency Bail Out Tone could not be disabled. MCpl Monpetit conducted further investigation and discovered six other CF-188 aircraft at 3 and 4 Wing and AETE with the modification still in place and with the switches in the "disable" position.

Cpl Huculak's discovery showed exceptional attention to detail and an unwillingness to allow a seemingly minor problem to go uninvestigated. Her unwillingness to stop with only her area of responsibility ensured that both periodic inspection aircraft were closely examined. This discovery could have been easily overlooked, and without her perseverance, would not have been carried onto all unit aircraft.

MCpl Monpetit's dedicated and intense research was instrumental in discovering the other six fleet aircraft with the IFF Emergency Bail Out Tone switch modification still embodied and with the switches in the "disable" position. His research and effort in this case was well above what would be normally expected in the everyday performance of his job.

These two individuals detected, investigated and took immediate steps to correct a serious problem to the CF-188 fleet. This could have resulted in delayed recovery of an ejected pilot in Canada, or enemy detection of an ejection in a theatre of operations.

CORPORAL PATTY HUCULAK

MASTER CORPORAL FRANK MONPETIT

PRIVATE GILLES FRENETTE

On 01 June 1999, Pte Frenette, a 514 Aviation technician, noticed an accumulation of fuel on the hanger floor from Aircraft #478. He took the initiative to inspect the area and, upon investigation, found that the #1 engine pressure switch required replacement. The aircraft was returned to service without further incident.

On 16 July 1999, Pte Frenette was conducting a 25-hour inspection on Aircraft #497. While conducting this inspection, he noticed that the orange and green drive links were installed improperly. The washer on the swash plate stud was found installed under the nut. Pte Frenette correctly utilized CFTO references and ensured the aircraft was returned to service.

On 29 September 1999, Pte Frenette was conducting a 600-hour inspection on the CH146. While inspecting the number one engine AFCU forward drain line, he noticed an anomaly on the drain line. On further inspection he noticed that the line was chaffed. If this had gone unnoticed, there was potential for serious damage. Further inspections on other squadron aircraft indicated the same chaffing problem.

Pte Frenette has shown his professionalism, dedication and loyalty to his unit and the Canadian Forces as a whole, and his awareness surely contributed to averting very serious hazards.

MASTER CORPORAL JEFF WALLACE

On 22 February 2000 Master Corporal Jeff Wallace was the Flight Engineer scheduled for a local training trip on aircraft #CH146431. During his pre-flight he noticed a pin sitting by the transmission filler cap scupper drain. Master Corporal Wallace investigated further by removing the forward cowling and gaining access to visually inspect the area in which the pin had been found.

A detailed inspection was conducted and it resulted in that the pin found was one of two pins attaching the collective lever assy to the swashplate and support assy. He immediately informed his supervisor of the situation. As a result of the severity of the snag all 408 squadron aircraft were grounded and a local special inspection was immediately carried out. Further examination revealed that the wrong bolt had been used to install the pin and during removal only two threads held the bolt in the insert. All other aircraft checked had wrong bolts installed.

Had the flight proceeded, and the collective lever broken free in flight, the result could have been catastrophic. If it had not been for Master Corporal Wallace's attention to detail and technical expertise this incident may have gone unnoticed and possibly resulted in a serious accident.

PRIVATE PATRICK McVEIGH

On 15 March 1999, Pte McVeigh was tasked to start a transient RAF Tornado. A second Tornado start was being performed concurrently on an adjacent parking spot. The starts were without incident until Pte McVeigh observed that a refueling access door panel was open on the nearby aircraft. Using hand signals he communicated with the commander of his aircraft who in turn alerted the other aircrew. A crewmember appraised the situation, exited the aircraft and secured the open panel.

Pte McVeigh's alertness and quick response with decisive actions were instrumental in preventing damage to an aircraft. Although not familiar with the Tornado aircraft, Pte McVeigh was able to ascertain the criticality of this access door and ensure that the potential loss of an aircraft panel was averted. He demonstrated to a foreign ally the commitment to the task at hand of CF technicians and is to be commended for the professionalism and dedication he displayed.

SERGEANT KIM BLAKE

On the night of 22 March 2000, Sergeant K. Blake's superior professional attitude averted the possibility of an aircraft accident or serious incident. While completing a post engine start check on a CH146 Griffon helicopter for a night vision goggles training mission with troops, Sergeant Blake noticed that the port cargo door was too far aft. Additionally, the aft portion of the door was loose while the door was pinned fully open. After the second engine was started and the other cargo door (starboard) was pinned open, Sergeant Blake compared the two doors and found there was a discrepancy between the two.

After informing the pilots of the problem, Sergeant Blake recommended shutdown due to the unserviceability of the aircraft. After shutdown, further investigation revealed that the bottom track of the cargo door guide securing hardware was broken off. This caused the looseness of the cargo door and the more than normal aft positioning.

If this unserviceability had gone unnoticed the potential loss of aviation resources or life may have occurred if the cargo door had departed during flight. Sergeant Blake is to be commended for his attention to detail and superior knowledge of aircraft systems that enabled him to notice an unserviceability that could have easily been missed.

SERGEANT CLAUDE POTHIER

Sergeant Claude Pothier was conducting a routine pre-flight inspection a CP-140 Aurora when he noticed a small piece of plastic lying on the bottom of the Doppler well. On retrieval of the FOD, it was discovered that the plastic piece was in fact a terminal board cover. Determined to locate the origin of the cover, Sergeant Pothier promptly proceeded into the tight confines of the Doppler well. There, he discovered the terminal board with the missing cover, a broken electrical wire, and a second wire that had become disconnected from the terminal board and arced as it came in contact with the aircraft skin. At this point, Sergeant Pothier immediately notified the servicing crew.

The technicians were initially unable to locate the terminal board and faulty wires due to their concealed location. Sergeant Pothier then crawled into the well for a second time and successfully pointed out the area of interest. Further investigation revealed that the terminal board cover had broken off and that the disconnected wire feeds the radiant floor heating, a system that requires considerable amperage. Hanging freely with no support, this live wire presented a grave fire hazard.

Sergeant Pothier's exceptional attention to detail and professional actions resulted in the detection of a critical unserviceability and prevented an aircraft with a dangerous condition from going airborne.

FOD Walk or Talk Walk

I remember the morning in question well because it was a Friday morning. Spring had sprung, the sun was out, and even though we had a little wind coming from the west, being outside felt nice; the temperature was around zero degrees Celsius.

At just about 0745, the call was made over the P.A., like every working day, that it was time for our usual morning FOD walk. This meant that it was time to get out to the flight line, form a line which is usually composed of 30–35 people (which curiously can go up to as many as 50 when the weather is at its best!) and wait for the Sergeant in charge of the walk to give the go-ahead. Like most of us should know, the goal is to pick up what most aircraft engines, particularly low intake jet engines, like to ingest for food (or course, I mean FOD).

The area that we have to cover is about 75 meters wide for a distance of about 300 meters, and the whole process takes no more than five minutes. Everyone seemed cheerful given the Friday morning and the nice forecast that was being announced for the weekend. To top it all off, my favourite hockey team had won a big game the night before, and I was eager to share with my co-workers all the details about important plays that had helped the team win the game. With this in mind, I squeezed myself between two hockey fans and started to chat with them about the now famous outcome of the game. The Sergeant in charge gave the OK to start walking, so we did. We were still talking about the game when we found ourselves heading for the canteen for that well deserved morning coffee. I noticed that some people had their coffee in hand on the FOD walk, something I thought I would definitely do one morning. Why wait until after the walk after all? I can hold my coffee in one hand and pick up FOD with the other.

Not even ten minutes after we came in, we heard a P.A. announcement calling a meeting for all personnel. That seemed unusual because all the meetings were usually held in the afternoon. To our disbelief, we were told by the Sergeant in charge of the FOD walk that we had to go out and do it again! He explained that he had just been on the phone with the UFSO who had watched the FOD walk from the second floor office of the hangar. The UFSO had said that if we are to carry out a FOD walk the way we had done it, we might as well not do it, because it was useless.

So there we were out again, but this time it was made very clear to leave all coffee cups behind and to pay more attention to the ground. Strangely, no one talked during the walk, and all of us were looking down at the tarmac.

Needless to say, even though I was not alone in this, I felt a little responsible when I thought about the way I had behaved. It made me realize that even though the task is done every morning, it takes all but five minutes of the day, so it should be done correctly and with professionalism. From then on, I decided to pay more attention to the FOD walk and wait for coffee-time in the canteen to chat with co-workers. ◆