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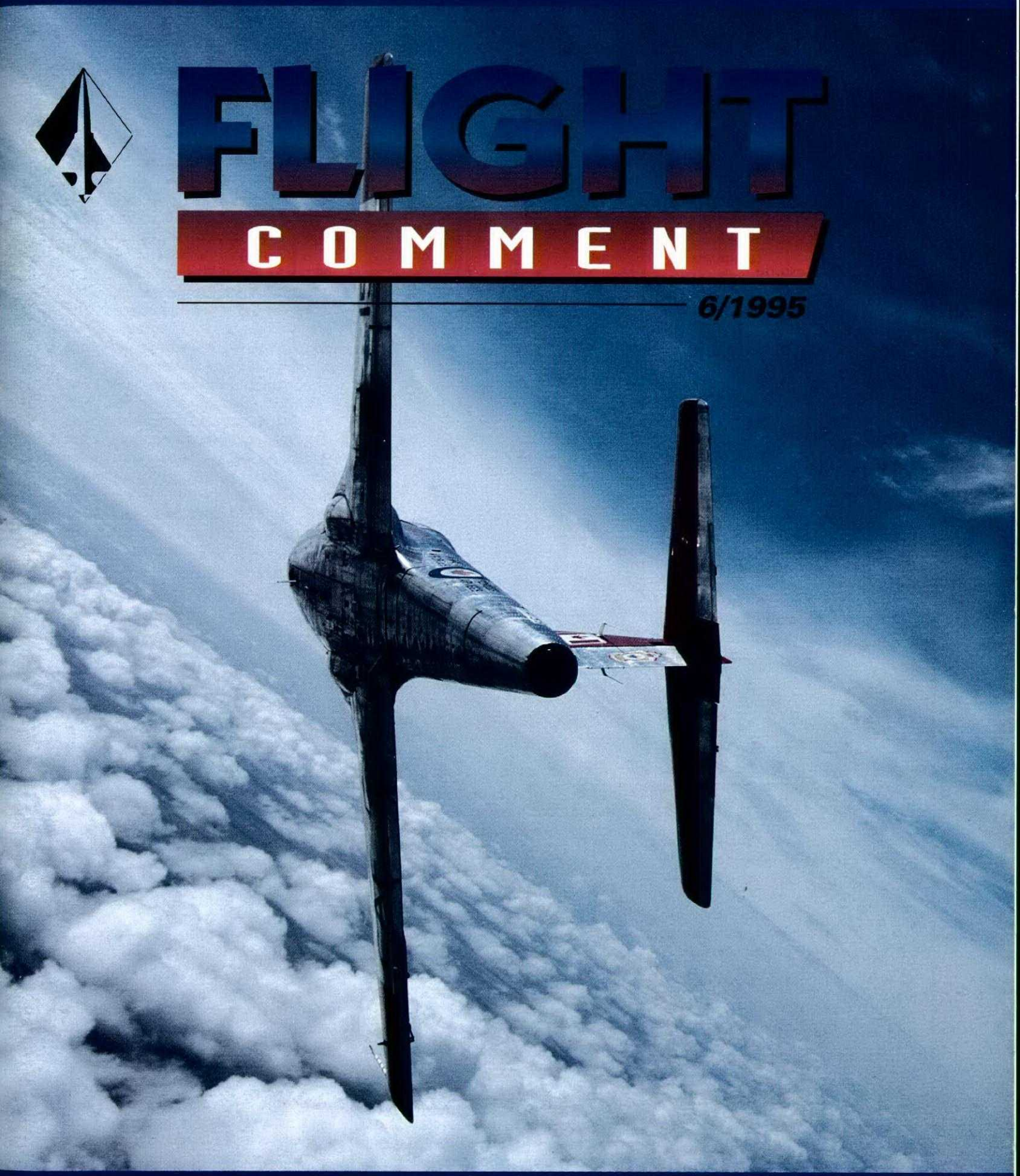
FLIGHT COMMENT

6/1995



Canada

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AS I SEE IT

by Col M.J. Bertram, Director of Flight Safety

In my contacts with over 40 countries in the past year, it is readily apparent that the CF flight safety program is universally held in very high regard. We do have an excellent system - born out of necessity. The early '50s safety record was dismal. In 1954 alone we wrote off 111 aircraft and killed 96 aircrew. A crisis was at hand, action was taken, and over the intervening years visionary people created the system we have today. At the core of our system is the concept of open and honest reporting. This has been acknowledged by each Air Commander's affirmation that flight safety information will not be used for disciplinary purposes. As a result we have over 3000 occurrences reported and investigated annually which contribute to our successful program of flight safety promotion and education. The program has worked - our low accident rate the pay off.

We understand and acknowledge that accidents happen to organizations.

We must acknowledge, however, that over the last ten years we have stagnated at an average of 12 accidents per year - this despite a continuing reduction in hours flown. We continue to assign 80% of our cause factors to personnel - read human error. Is this acceptable? Is this the cost of doing business? If so, perhaps the fiscal constraints under which we labour are not as serious as we think.

I submit this is not the case and that we must consider our flight safety program to be at a watershed. Like in the early '50s it is time to take a leap forward. In accidents we habitually look at the immediate situation, ie. the personnel involved in the accident.

It is time that we understand and acknowledge that accidents happen to organizations - individuals are only the players - and that risk management is the way ahead.

What is risk management? There are many convoluted complex definitions but simply put, it is smart decision-making based on careful consideration and reflection on what is possible and being prepared to deal with the consequences of that decision. We cannot escape risk nor should we for without risk there is no benefit. The essence lies in taking smart risks versus dumb risks. Dumb risks usually arise from ignorance. People who choose not to consider hazards associated with actions or leave things to chance are gamblers. I believe it was Rommel who said that you cannot recover from a gamble but you can recover from a risk. If our air force is to become more effective and efficient at mission accomplishment we must incorporate risk management as an intrinsic part of our decision-making process. A by product is certain to be a reduction in our accident rate.

How does one go about managing risk? There are many methods and different tools that can be used. Each organization must find its own way but the following principles must be observed:

a. all hazards must be identified;

b. the risks associated with the hazards must be assessed in terms of likelihood and severity;

c. the risks must be ranked in terms of not only, what the organization is prepared to take action on but what it is not prepared to take action on (all organizations have limited resources and therefore cannot take action on every risk);

d. control measures must be determined based on whether the risk is being eliminated, reduced or ignored;

e. decisions on what is to be implemented must be based on feasibility, affordability, and effectiveness; and

f. all control measures must be monitored, enforced and re-evaluated periodically for validity.

Who manages risk? Everyone involved in aviation plays a part but it is those in control of the resources who have the deciding vote. It is therefore imperative that Commanders at all levels be fully involved in the process and not just sign the cheque. DFS, in its role as advisor to the Commander, is pressing forward in promoting and assisting in the development of process and data that can be used by Commanders and their teams in effectively managing risk. It is incumbent on all of us to become more aware of risk and its benefits and detriments. We take pride in our ability to get things done despite adverse conditions. Let us become smart risk-takers and not gamblers. As I see it. ◆

ACCIDENT RESUME

Type: **"Polaris" CC15005 (Airbus 310)**
Date: **26 October 1995**
Location: **Vancouver, British Columbia**

Circumstances

The contractor had been carrying out heavy maintenance (four and eight year checks) on the aircraft. The aircraft was positioned on the ramp adjacent to the contractor's hangar to conduct engine run-ups. The run-ups proceeded normally until the aircraft rolled over its chocks, travelled 220 metres across the ramp, and struck a storage building. After coming to rest, the aircraft was shut down and the four technicians evacuated the aircraft. The lower fuselage, wing leading edges, and engines were damaged by the impact but there was no fire.

Aerial view of crash site.

View of left hand engine.

Investigation

During the run-up, the right engine Fuel Flow Indicator was found to be inaccurate. In an attempt to display fuel flow information on the right Electronic Centralized Aircraft Monitor (ECAM) - information which would normally only be displayed while airborne - both landing gear proximity and relay control system flight/ground circuit breakers were pulled. Approximately three seconds later the aircraft rolled over its chocks. Attempts to stop the aircraft with normal braking and thrust reversers and to steer the aircraft with nose-wheel steering had no effect.

The investigation determined that pulling the circuit breakers would not have displayed the desired information. It would, however, put the aircraft into flight mode, disabling normal brakes, thrust reversers and nose-wheel steering. Additionally, it would cause the engines to go to "approach idle" speed after the throttles are retarded - producing significantly greater thrust than they would at a normal "ground idle" setting and increasing the aircraft's rate of acceleration across the ramp.

DFS Comments

The Canadian Forces and the Transportation Safety Board of Canada are conducting a co-ordinated investigation of this accident. A number of issues are being pursued as the investigation is ongoing. One lesson which can be learned from the accident is the importance of following published procedures. Unless an emergency situation demands immediate action, we must consider all available options and weigh the consequences before deviating from those procedures. This point is emphasized in Crew Resource Management (CRM) training and it applies equally to aircrew and groundcrew. ◆

Rear view of aircraft.

CONTACT . . .

by Capt D.W. Collier, DFS 3-2-2

I was the first officer on our crew and as our VPCC was away we were to have a "guest" VPCC for a 10 hour patrol (day surface surveillance). Once in the area, the weather was clear except for a surface cloud deck, which was later determined to be from the surface to 500 ft.

We were to visually identify all contacts in our area by name. We descended to identify a contact and at 500 ft (RAD ALT) we were just above the cloud deck. Still running in on the contact, we descended further to 300 ft (RAD ALT) in cloud. Visibility straight down was 1/8th mile and the forward visibility was maybe a 1/4 mile. The "guest" VPCC was in the left seat flying the aircraft and I was in the right seat. The VPCC instructed the radar operator to direct us past the stern of the contact offset by 1/4 mile. As we ran in on the contact, I was concerned we might overfly the contact and the height of the contact was unknown (oil rig?). I continually looked ahead and monitored the flight instruments as we were now at 200 ft in cloud.

I commented to the VPCC that we were still in cloud and that we should climb back up to 300 ft. His comment was "we were all right at this altitude as we had an offset of 1/4 mile." As we closed the contact and the radar was directing us for the offset I was becoming increasingly concerned as the only real visibility was straight down. Just after the call "standby on top" (offset 1/4 mile?), I observed a surface contact (high in the water with large yellow kingposts) directly on the nose. We were about to fly directly over the contact! The ship was approximately 1/8th of a mile on the nose. **I grabbed the yoke and pulled back to climb the aircraft.**

The "guest VPCC" immediately asked why I had taken control and I informed him that we had over flown the contact. We stayed at 500 ft and above for the remainder of the trip.

Thinking back, what if the contact had been an oil rig or a larger ship with high antennas? Did I do the right thing? Should I have been more forceful about my concerns? Rules and regulations are made to be interpreted in the spirit in which they were intended.

A first officer should not be intimidated by an older, more experienced VPCC and he must feel free to voice his opinions without the feeling of them affecting his PER or his upgrading.

Author's note:
I was uncomfortable as Sqn Orders I believe at the time said "Not to descend below 300 ft if in cloud and reduced/low visibility". Although this event occurred in the early '80s, its lessons are still valid today. ◆

PROBLEMS WITH THE ICS

by Capt Joe Graham, 425 Sqn

The following occurred while on deployment to our southern neighbours for a weekend DACT exercise.

The briefed mission was a 2v2 against F16Cs. Lead a/c of the CF18 formation was a B-model, two seat version. Both the pilot and passenger were experienced second tour CF18 pilots. While taxiing for takeoff an ICS snag developed which inhibited the passenger from talking to the pilot (he could hear everything but was unable to transmit). The problem was intermittent and the pilot-in-command decided to press. While commencing takeoff roll the pilot heard the passenger shouting something from the back but was unable to understand the meaning. The pilot - with a big question mark over his head - immediately scanned the cockpit and verified that all indications were correct for flight. Uncertain of the problem the pilot elected to abort at 70 kts without further incident.

After shut-down discussion between the pilot and passenger revealed that the rear-seat flap indication light was U/S. As a result, the passenger believed that takeoff was being attempted in the Flaps-Up configuration, a dangerous situation in the CF18. Due to the snag with the ICS, the passenger was unable to communicate with the pilot in the normal manner. Therefore, he lowered his mask and tried to shout over the noise of the engines to "check flaps" which are not selectable from the back-seat. As mentioned earlier, the pilot was unable to understand and plenty of question marks began to light-up at a critical moment - full A/B, short runway, #2 behind you.

Bottom line:
You always have to be in communication with those in your aircraft regardless of passenger experience or routineness of flight. Common sense, eh? Not always. ◆

FOR PROFESSIONALISM

CAPTAIN AND CREW HMCS WINNIPEG

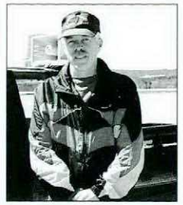
HMCS WINNIPEG was sailing south of Halifax harbour on acceptance trials when it received a distress call from an airborne Sea King. The Sea King had been tasked to complete a passenger transfer to the submarine HMCS ONONDAGA.

While in the vicinity of the submarine, the helicopter received a call to return to Shearwater due to rapidly approaching heavy snow. During the return flight, it became trapped on the opposite side of a wall of wet snow, freezing rain and ice pellets. Unable to return to Shearwater, and unable to locate land in the 1/8 mile visibility, the helicopter requested the assistance of HMCS WINNIPEG. Night was falling, the helicopter's radar had failed, the required equipment to allow the helicopter to hover safely at night was not available and fuel was running low.

HMCS WINNIPEG immediately responded and proceeded at full speed in the direction of the Sea King. Despite the fact that the ship had not completed flight deck certification, and had no deck crew on board, the Captain offered a ready deck if the helicopter could locate the ship. Fortunately, the storm abated allowing the helicopter to recover in Shearwater.

The Captain and the crew of the WINNIPEG are commended for their excellent response to an unforeseen emergency situation, for the full support they provided to the aircraft, and for being prepared to allow the helicopter to attempt a landing under extremely adverse conditions. ◆

MISTER DENNY DEVEAU



MISTER DAVE LUDLOW

During routine airfield surveys over a three month period, 14 Wing's Wildlife Control Team discovered several small screw fasteners on the runway. The screw fasteners were turned over to the Air Maintenance Squadron and subsequently identified as CP140/140A flap fillet panel screws. Investigation revealed that the flap fillet panels are removed every 30 days for corrosion control inspections. The frequent panel removal resulted in progressive wear and deterioration to the fasteners until they fell off the aircraft. These panels could have become loose in flight possibly jamming controls or otherwise damaging an aircraft.

The Wildlife Control Team's actions resulted in the identification of the problem at an early stage of development and a serious FOD hazard was eliminated. The 14 Wing Wildlife Control Officers are commended for their professionalism and contribution to flight safety. ◆

MISTER IAN REID

Mr Reid, a Shift and Training Supervisor with Air Traffic Services, Winnipeg Tower, was monitoring a controller working with a trainee during a busy period of mixed IFR and VFR traffic.

During this monitoring, Mr Reid observed a Tutor on short final with the landing gear retracted, and immediately advised the active controller of his observation. The Tutor pilot, when alerted by Winnipeg Tower, conducted an overshoot from approx. 50 feet above ground.

Mr Reid's attention to detail and decisive action prevented a possible serious accident. ◆

CORPORAL STEVE MORDEN

Cpl Morden, a Flight Engineer, was conducting a preflight inspection on a Twin Huey when he discovered that the pitch link clevis bolt was installed backwards. Extra vigilance was required in order to detect this problem because pre-flight inspection in this area requires a check for security only.

Had the nut become loose and backed off in flight, the necessary centripetal acceleration could not be applied which would have resulted in the loss of the bolt. Loss of blade pitch control and, therefore, aircraft control would have followed.

Cpl Morden's thoroughness and attention to detail averted a possible catastrophic emergency. ◆

FOR PROFESSIONALISM

CAPTAIN CALLUM MACPHAIL
LIEUTENANT (USN) COREY SHEARN
SERGEANT STEVE JENKINS
LIEUTENANT WAYNE METCALF

Lt (USN) Shearn and his crew were conducting Operational Readiness Training. As part of their mission, the crew was carrying out a "4-point" Photo Rig of a transiting merchant ship. After banking 45 degrees to line up for a stern pass at 300 ft ASL and approx 200 kts, Capt MacPhail flying from the right seat, initiated aileron inputs. The control wheel suddenly moved freely with no response from the aircraft. Capt MacPhail immediately directed Lt Metcalf, sitting in the left seat, to "take control, add power and climb". Lt Metcalf promptly assumed control and initiated a recovery. Sgt Jenkins, the Flight Engineer, simultaneously added power and the aircraft climbed to a safe altitude where it was determined that only one control column seemed to be defective.

With the auto-pilot engaged as a back-up, the aircraft headed back to base and a seat swap was carried out allowing Lt (USN) Shearn to be in control for the approach and landing. Under his direction, the crew donned helmets and reviewed procedures for the possibility of a crash landing should the second control column also fail. No further problems were encountered and the aircraft landed without further incident. Post flight inspection revealed that the aileron cable of the co-pilot control wheel failed.

Lt (USN) Shearn and crew are commended for their immediate assessment of this difficult emergency and efficient coordination. Their professionalism prevented a catastrophic accident. ◆

CORPORAL ROB BUTLER

Cpl Butler, a Flight Engineer, was conducting a pre-flight on a Twin Huey when he detected a slight binding while cycling the tailrotor control through its entire range of movement. Convinced that the binding was unusual, he sought the assistance of the senior maintenance representative participating in the Squadron contingent.

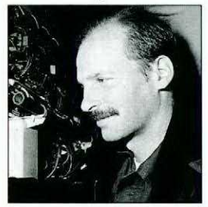
After moving the tailrotor actuator control a number of times, the binding sound was traced to the area of the vertical fin. When the access panel to this area was removed, it was determined that the tailrotor control tube was rubbing on the control tube lower guide. It was apparent that this situation had existed for sometime as evidenced by the excessive wear that was present on the control tube. This component, an essential element of the flight control system, was close to complete failure.

Cpl Butler's professionalism averted a serious, if not catastrophic, flight safety occurrence. ◆

CORPORAL TOM LUNDY

Cpl Lundy, an Airframe Tech employed in the Non-Destructive Testing Shop, was conducting a supplementary inspection on the top pylon lug of a Sea King. On completion of the inspection, he took the initiative to do a visual check of the bottom lug which is not a requirement on the supplementary inspection. Noticing an abnormality, he further investigated by carrying out an Eddy Current Technique which revealed a 15mm crack.

Cpl Lundy immediately informed his supervisor of his findings. As a result of this discovery, a fleet-wide SI was initiated and the Eddy Current Technique on the lower pylon lug was incorporated into the supplementary inspection. Had this abnormality not been discovered, structural failure could have occurred with possible disastrous consequences. Cpl Lundy is commended for his professionalism. ◆



CORPORAL RICHARD WAND

Cpl Wand, an Instrument Electrical Tech, was conducting an "A" check on an Aurora when he detected a very faint grinding sound coming from the main electrical load centre. Further investigation isolated the problem to the transformer rectifier unit #1 which he then replaced. While carrying out a functional check on this TRU, Cpl Wand discovered that the #2 TRU was hotter than normal. Further investigation revealed that the #2 TRU cooling fan had failed. The failure of both TRUs would have resulted in the loss of all electrical components except for the flight essential DC powered components.

Cpl Wand is to be commended for his actions because checking the TRUs is not part of the "A" check. Cpl Wand's astute observations in identifying and correcting this problem demonstrated his professionalism and prevented a possible serious flight safety incident. ◆

WHAT ARE YOU LOOKING AT?

by Lt(USN) D.C. Irwin

When preflighting an aircraft, how seriously are you looking at the parts? Are you simply performing a ritual and once you have returned to the cockpit you can't remember checking a panel to see if it was actually fastened? Maybe you were taught that you are not buying the plane, so don't take all day. But maybe you have become so complacent that someday you will not only buy the airplane from the taxpayer, you will buy the farm as well.

Rumour holds that years ago the U.S. Navy's flight instructors teaching fledgling aviators tested their student's preflight capabilities by hiding FOD in the aircraft before a flight. The practice was not well controlled, as there was no formal policy which set a limit to the number and type of items that could be hidden as FOD. The training commands abandoned this practice when they got tired of repairing engines that were damaged by FOD that had gone unnoticed and forgotten in the engine intakes. After all, it would only take a slight distraction of an instructor's attention on his second or third routine hop of the day to forget whether he had hidden two or three items throughout the plane.

While you may find it hard to believe that a loose or missing fastener will endanger your life, maybe it will allow the panel to come open in flight resulting in an early termination of the mission. The difference between a cursory preflight and a thorough one is probably only two or three minutes. If this habitually makes you the last one out of the chocks, try being the first one to walk to your jet. With the preflight completed, killing an extra minute at the boarding ladder enjoying the weather will do more for your frame of mind than getting one last phone call or placing one more piece of correspondence in your out box.

I can not recall a time when a problem I discovered during preflight could only be fixed by walking to another jet, but there have been many times when corrective maintenance actions were taken as I finished my preflight or strap-in.

USN F18 preparing to launch from an aircraft carrier.

If you don't take life seriously enough to preflight thoroughly, maybe you should make a game of it by trying to find something that was unnoticed during the "B" or DI checks. As you examine your trusty steed more closely, you will be surprised at the number of pieces which are supposed to be safety wired. Another way to focus your attention on the preflight inspection is by touching all the parts that are within reach. As you examine the item remind yourself what role it plays in the aircraft's operation. Maybe the tightened sway braces and installed jettison cartridges on the external fuel tank could come in handy should an engine lose thrust immediately after take-off and you need to jettison all that extra weight and drag. Are the shock absorbers properly extended so the aircraft handles correctly during the extra touch and go's? How about the tire tread, does it look like you will get the last flight before they have to be changed?

If the situation is such that you want to finish the entire preflight before corrective is taken, how do you keep track of multiple items? A technique I use is to make a fist when a problem is discovered and begin extending additional fingers to count multiple discrepancies. This method does not introduce more FOD on the ramp, yet it helps ensure all problems are discussed with the ground crew.

Playing this mental game is not meant to pick on the maintenance organization, but if you think you can log 500 hours in a flying organization and never find an item that should be corrected before flight, you either have low self worth or you are a pole hog who would volunteer to do a test flight on the Hindenburg. We all try to do our best, but sometimes flaws are hardest to see by those who see them the most.

Another great benefit of taking an extra few minutes to preflight is finding out what your ground crew is concerned with. Maybe you will find out that they only got to the aircraft a minute before you arrived and were hurried, or maybe they spent half their day fixing a problem on the aircraft you're preparing to climb into.

If you do not feel it is necessary to perform a thorough preflight, I will be happy to fill out the beneficiary line on your insurance policy. It probably has a better chance of paying off than the lottery.

Lt(USN) Irwin retired from the USN Jul 95 after having completed his last billet as the CF18 desk officer at DFS. ◆

ACCIDENT RESUME

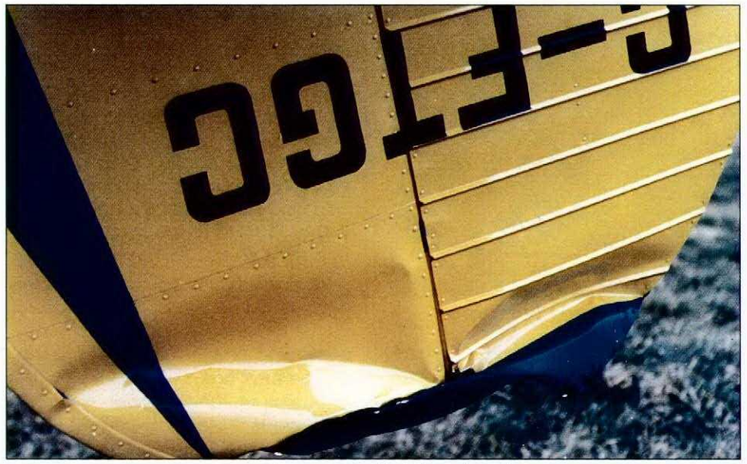
Type: L-19 (Cessna 305) C-FTGC
Date: 29 October 1995
Location: Saint-Jean Airport, Québec

Circumstances

The accident aircraft was participating in cadet familiarization flying at the Saint-Jean Airport. The weather was acceptable with ceilings around 2,000 feet above ground and with strong winds at 15 to 20 knots gusting to 25 knots down Runway 29. The accident occurred prior to the second tow of the day when the pilot attempted to do a 180 degree turn on the runway to return to the launch point for a glider hook-up. As the pilot was turning through the 90 degree position, the tail of the aircraft began to rise. The pilot reacted by closing the throttle and pulling back on the control column. As he did so, the tail continued to rise until the propeller hit the runway surface and the engine quit. The aircraft was now in a 45 degree, nose-down position resting on the main gear and the nose/propeller while the pilot shut off all switches and egressed. The aircraft remained like this on the edge of the runway with the tow rope still attached.

View of left side. Damage to wing, propeller and vertical fin.

The Launch Control Officer and the Site Commander arrived at the tow plane within seconds to check on the pilot's condition. He was not injured and the Tower was told not to send for the fire truck or the ambulance as they were not needed. The Tower Controller informed the Site Commander not to move the aircraft until Transport Canada was informed and approval was received to move it. During this discussion, which lasted seven minutes, the wind was causing the aircraft, still perched on its nose, to begin rocking. The Site Commander requested permission to move the tail down to prevent the aircraft from flipping over onto its back. This request was not fully understood by the Tower Controller who asked him to repeat it, which he did. The Controller was still having trouble understanding the nature of the request and asked if they wanted to move the aircraft? The Site Commander replied that he only wanted to move the tail down to prevent it from going over, but as he was explaining his request for the second time, the aircraft was blown over on its back. The right wing-tip hit the runway first and then it continued to go over breaking a propeller blade, the right wing-strut, both wing spars and finally the vertical tail and rudder as it hit the ground. The aircraft came to rest inverted at about 45 degrees to the runway and partially resting on the grassy infield.



Impact damage - vertical fin and rudder.

DFS Comments

The investigation is ongoing, however it is apparent from the factual testimony that there was a misunderstanding between the Tower Controller and the Site Commander. The aircraft should have been secured to prevent further damage, regardless of the Tower instruction to not move the aircraft. This was truly an unfortunate accident that was preventable had there been better, clearer communications between the Tower Controller and the Site Commander. ◆

THE NEW FLIGHT SAFETY COURSE

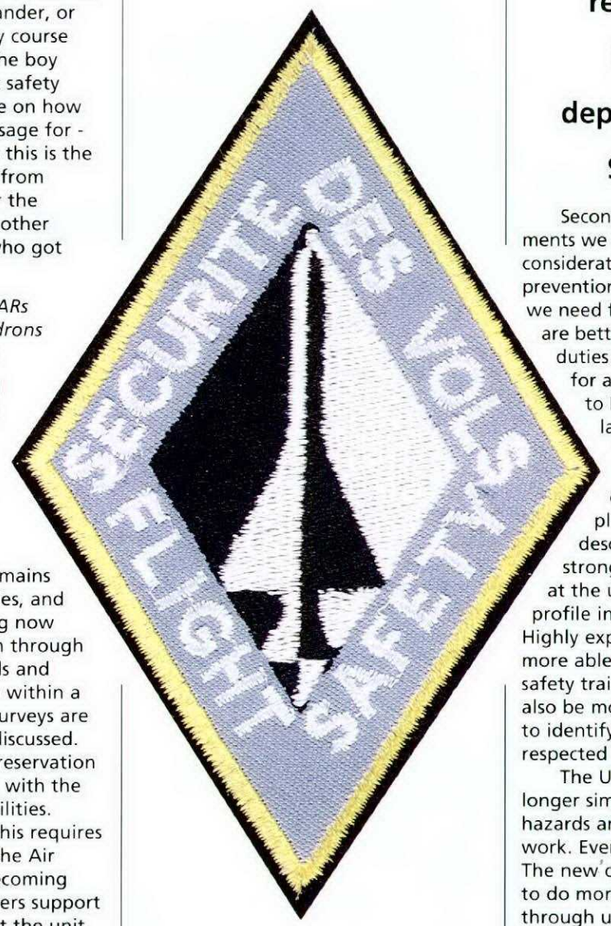
In some circles the Unit Flight Safety Course qualification is viewed as a "rite of passage" along the road to aircraft captain, det commander, or NCO i/c status. It's the 5 day course with no test that leads to the boy scout style - diamond flight safety badge; or, the career course on how to write an occurrence message for - Lts and Sgts. For new pilots this is the first real move up in status from "cookie officer". Even after the course, you're often just another new guy around the unit who got the "qual".

(Note: a check of unit REMARs indicates many flying squadrons have 15 - 20 qualified pers)

Well that's how it used to be. A summer rework of the course has resulted in changes to course material, selection criteria, and performance checks. Starting in February its a pass/fail course.

The course mandate remains to train UFSOs, their deputies, and Flight Safety NCMs. Training now focuses more on prevention through the identification of hazards and methods of communication within a unit. Practice flight safety surveys are back. Risk management is discussed. Post occurrence evidence preservation methods are stressed along with the various reporting responsibilities.

Why all the changes? This requires a two part answer. Firstly, the Air Force is changing. We're becoming smaller with less headquarters support and greater responsibility at the unit or detachment level. The UFSO of today needs to work more effectively with his deputy and the FS NCM because he doesn't always have the immediate resources of a Wing or Group safety office.



The coveted Flight Safety badge.

The course mandate remains to train UFSOs, their deputies, and Flight Safety NCMs.

Secondly, the variety of deployments we undertake requires careful consideration and adjustment of each prevention and response plan. In short we need flight safety personnel who are better trained to carry out their duties whether they are preparing for a Herc Det to Ancona, a Huey to Haiti, or operating as an isolated squadron like "440" in Yellowknife.

As you may know, our accident rate has plateaued. To help get it descending again - we need stronger education programs at the units and we need higher profile individuals giving FS advice. Highly experienced personnel are more able to successfully conduct safety training at their unit. They will also be more credible when it comes to identifying risks and thus more respected by the CO.

The UFSO and his team are no longer simply expected to identify hazards and complete the paper work. Everyone is capable of this. The new course graduate is expected to do more by fostering safe practices through unit training, communication, and knowledge. Talk to a "new" FSO or FS NCM to see how they can help you! ◆

EPILOGUE

Aircraft Accident Summary CF188937

On 21 April 1994 Hornet CF188937 experienced a right main gear failure which forced the pilot to carry out an approach end cable engagement. The investigation into the incident has been completed.

The aircraft was recovering from a Fighter Weapons Instructor Course work up trip at Primrose Lake Evaluation Range. When the gear was lowered at approximately 4 NM the right hand gear indicated unsafe and a low approach by the Tower confirmed the right hand gear was not down. On his recovery at Cold Lake, the pilot was able to keep the right wing up until cable engagement at which time the right wing contacted the runway. The damage was assessed as D Category.

Final position of CF188937 after landing.

The investigation revealed that the hinge pin retaining screw used to secure the RH MLG door forward hinge was not the length specified in the CFTOs. (Investigators found the screw still in the socket.) As a result, the retaining screw was not tightened enough to engage the self locking feature of the nut. The aircraft flew about three hours before the nut and retaining screw came loose causing the forward door hinge pin to fall out during the trip on 21 April 94 leaving the leading edge of the door retained by the uplock assembly only.

In response to this incident, a CF18 fleet wide Special Inspection on the condition of the MLG forward door hinges was completed and a Maintenance Alert Bulletin was issued to emphasize the hazards of improper installation of hardware. In addition, Cold Lake maintenance has changed its supervisory structure to improve its accountability and NDHQ has clarified its policy and guidelines regarding fastener substitution for CF18 aircraft. ◆

EPILOGUE

Aircraft Accident Summary CH12425

CH12425 departed CFB Shearwater on the morning of 28 April 1994, under very good weather conditions, to conduct a ferry flight to Pat Bay BC. About 8 NM from the Saint John, NB airport and at approximately 6,000 ft AGL the aircraft experienced an engine malfunction. This was followed in quick succession by an explosion, a dual-engine failure and serious in-flight fire. The Aircraft Commander declared a MAYDAY and entered autorotation to attempt an emergency landing to a field that was close to the shore of the Bay of Fundy. During the descent, the fuel-fed fire quickly increased in intensity filling the cabin and cockpit with thick, acrid, black smoke seriously reducing the pilot's visibility and the aircrew's ability to breathe. Under the most trying conditions, the pilot managed to manoeuvre the helicopter to a slope just a few metres short of the intended emergency landing area. The helicopter impacted the ground and rolled onto its right side. The Navigator and Flight Engineer were driven out by the extreme heat and lack of breathable air after a courageous but futile effort to assist the pilots. Tragically, both the pilot and the copilot perished in the crash, as the aircraft was almost entirely consumed by the intense post-crash fire.

Accident site CH12425.

The investigation revealed that the engine malfunction was caused by a leak in an engine main fuel line.

continued on page 16

I LEARNED ABOUT FLYING FROM THAT

A couple of years ago while a student at Basic Flying Training in Moose Jaw, I was privy to a learning experience I'm not soon about to forget.

It was late in the course and I was conducting one of my last student solo clearhood missions. Among the sequences I was to practice was the MOT square pattern. The MOT pattern, for the unfamiliar, is a shorter and slower pattern designed to closely resemble the pattern flown at most MOT airports. (Though I've never seen a Tutor fly this approach anywhere other than Moose Jaw.)

I was fortunate this particular day in that it was late Friday afternoon and the pattern was empty save one other Tutor.

I had called downwind and had been advised by Tower that I was number one to Runway 28L. Established on base leg with gear down and flaps half, I was readying myself for the landing. At about halfway across base leg, Tower re-sequenced me "number two on approach to traffic at (my) 10 o'clock on straight in approach." That was okay. If the traffic was at 10 o'clock, I would be able to fit in nicely behind him. I strained to find my traffic. I suspected he would be slightly below me and therefore not easy to find. When I couldn't find him, I notified Tower that I was "negative traffic". Once again Tower indicated traffic was my "10 o'clock straight in."

Unable to find the traffic at 10 o'clock I began a scan beginning at the threshold and working backwards to the right of my position. It was then that I finally found my traffic. He wasn't at my 10 o'clock but rather my 2 o'clock and sitting stationary in my windscreen. We were on a perfect collision course. To further complicate matters, the other aircraft was also a student solo on an earlier clearhood of the course syllabus.

Because it had taken so long to find my conflicting traffic, I was now much too close to the runway centre line to quickly turn left and parallel

photo by Capt Ken Murray

the runway. Feeling my choices were limited and my experience level even more limited, I opted to turn slightly right so as to proceed behind the traffic. I thought I would be able to somehow do a slight "S" turn and end behind him on approach. As quickly as I turned right, I soon realized I wasn't going to be able to come about left to fall in number two.

To describe what happened next is best simplified as saying - **I panicked!** Once clear of the traffic, I proceeded to apply full power, clean up the gear and initiate a rapid climb - opposite to traffic, in a climb through initial. If there were any other traffic, our closing speed would have been in the neighbourhood of 350 kts. I was fortunate that the only other traffic was the one I had just avoided - though I didn't know that at the time.

Once well above the traffic patterns I turned about 180° and proceeded to the south to calm my nerves and establish what I was doing before returning for the landing. At about 5 miles with full throttle I noticed I could only get about 210 kts on the indicator. This obviously wasn't right. A quick cockpit check sent me into my second bout of anxiety, I hadn't cleaned up the flaps. Without thinking I quickly raised the flaps.

On my return to the base I opted for the straight-in approach (with flaps). Fortunately, the landing was uneventful and taxi to the ramp the same. I reported my incident to my instructor and the WFSO.

There was a multitude of lessons to be learned that day. Mistakes happen: Tower can easily call traffic in the wrong position relative to yourself. Traffic separation was my responsibility not theirs. I should have looked sooner all around for the traffic. That being said, my choice of rectifying the situation was no better. I'm sure to this day I could have completed the "S" turn, with a brief call to Tower and proceeded between the runways. I didn't, and it remains a moot point now. But most importantly, I allowed myself to become panicked and as a result I missed important cockpit checks. Even then, once I had noticed the flaps, I should have assumed them damaged and left them in their current position. There was no damage to the flaps and they required only a visual inspection on the ground. I learned later that Canadair had actually designed them for higher airspeeds then I approached.

I take with me the best advice I ever heard for dealing with an emergency. "FLY THE PLANE, FLY THE PLANE FLY THE PLANE." ◆

anonymous

HOW BIG IS YOUR BOX?

by Capt Bill Canham, DFS 3-4-3

Please allow me to contrast personal limits and aircraft limits in the following ramblings...

I sometimes like to describe the envelope of my aircraft as being "box" like in shape. All operations must remain inside this box. Even more importantly, all operators know that aircraft operations close to the edge require increased skill, prudent judgement and respect for the limits.

For example: Slow speed flight near the ground puts you closer to the edge of the aircraft envelope than a flight at cruise speed and altitude. At altitude, if you're distracted momentarily you have extra airspeed and height to make corrections before reaching the edge of the box. In a situation low to the ground, momentary lapses can be catastrophic! The box limits apply equally to all aircraft when operating at the edge whether one flies a Sea King in a night dip or a CF18 through hard turns low level in undulating terrain.

The size of the aircraft's box varies throughout the flight. The box will grow as you burn off fuel or drop ordnance and shrink just as fast when you have system failures (engines) or encounter adverse weather such as icing. The adage still remains - the pilot must remain within the box and know it's size!

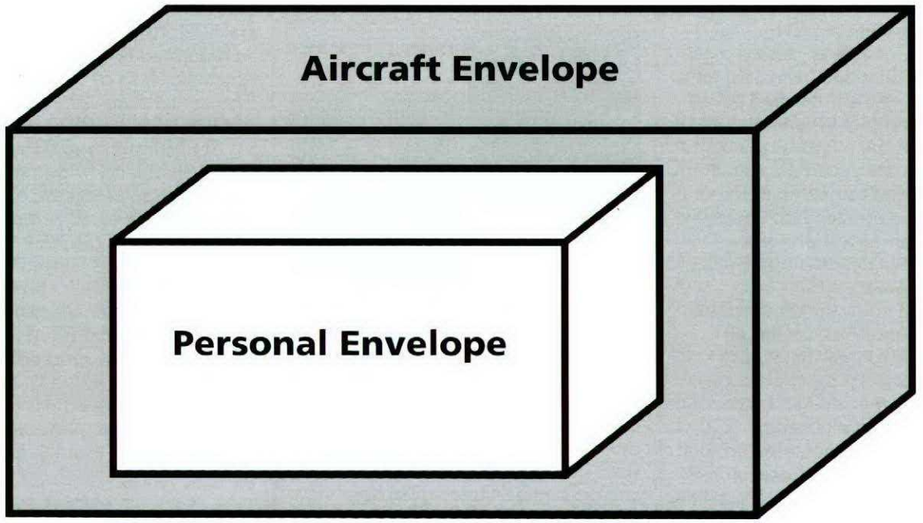
Aircraft operations close to the edge require increased skill, prudent judgement and respect for the limits.

What about your personal limits and capabilities? This can also be thought of as a box. Your box undoubtedly fluctuates daily and even throughout the flight. If you are returning from two weeks leave your skills will not be as well honed. Similarly if you haven't practised IFR lately you might not be the best candidate to shoot a 200 and 1/2 approach. If you've just finished work-ups on in-flight refuelling - you're a **smart risk** to do that mission.

How about during the flight? If the hours are going by and you're not approaching the coast for a while - you may be at a lower level of alertness, e.g. your box is shrinking. Getting a little fatigued from the "G" or is your liquid breakfast starting to wear off - your capabilities are shrinking too. Even stress from the weather, the VIPs in the back, or those mismatched crew mates of yours can affect your performance.

So...as you respect and understand the dimensions of your aircraft's box, do the same for yourself. Respect your limits and never let them fall outside the aircraft's "box". The next time your scheduler or flight commander says "Hey 'Hotdog', how big is your box?" You can rest assured that he's trying to match your capability to the mission. Respect your box!

Editor's Note:
Capt Canham's current aircraft envelope is boxed shape for one other reason...You see he is currently flying a desk! ◆



How big is your box?

FOR PROFESSIONALISM


CAPTAIN BOB DAVIES — **MASTER CORPORAL PIERRE BEAUCHAMP**

Capt Davies and MCpl Beauchamp, Air Traffic Controllers, were on duty at 8 Wing Trenton, when the pilot of a Piper Comanche enroute VFR from Lachute, Québec to Toronto Island airport indicated that he had encountered cloud and was unable to maintain visual reference to the ground. The pilot did not clearly indicate the nature or severity of his predicament but did request assistance.

Initial communications were somewhat difficult as the pilot was a francophone with very limited abilities in English. However, Capt Davies was able to ascertain that the pilot was unsure of his position, and was not qualified to fly on instruments. In a calm and professional manner, Capt Davies was able to restore confidence to the pilot and instructed him to climb to a safe altitude and issued a vector to Trenton. When it became apparent that the pilot was unable to comply adequately with the issued instructions, and communications continued to degrade, Capt Davies elected to transfer control of the aircraft to MCpl Beauchamp who is fluently bilingual.

Although not trained to provide ATC instructions in French, MCpl Beauchamp reassured the pilot, explained succinctly the procedure that would be followed and guided the aircraft to a safe landing.

Capt Davies and MCpl Beauchamp displayed outstanding professionalism. Their actions prevented a possible loss of life. ◆

WARRANT OFFICER GREG LYON

WO Lyon, an Avionics Tech, was supervising a 300 hour Periodic Inspection of a 414 Sqn T33. This aircraft had undergone extensive maintenance and flight testing for a tendency to roll at stall speed.

WO Lyon deducted that an almost imperceptible mis-positioning of the wing leading edge was causing an air disturbance over the wing with resultant loss of lift. His correct analysis of this nagging problem resulted in the return of a fully serviceable and safe aircraft to the CF inventory.

WO Lyon's keen analytical approach to this seemingly unsolvable airframe problem and other T33 aircraft snags has resulted in the resolution of many hazardous aircraft unserviceabilities. ◆

CAPTAIN DIDIER TOUSSAINT

Capt Toussaint was flying the number four aircraft in a four-ship CF18 formation when, on touch down, the aircraft veered and skidded violently. There was insufficient time to engage the approach end arrestor cable and an overshoot was not practicable with three aircraft on the runway. Through judicious use of brakes and nose wheel steering Capt Toussaint maintained direction control and kept the aircraft on the runway.

Investigation revealed a failure of the right main gear planing link, a component which rotates the wheels 90 degrees during gear extension. This failure is normally indicated on the landing display system, however, Capt Toussaint had no failure indication prior to touch down leaving no time to assess and prepare for the emergency.

Capt Toussaint's timely decisions and superior aircraft handling skills enabled him to maintain control of his violently skidding aircraft and prevented the loss of a valuable aviation resource. ◆

SERGEANT MARSHALL JOHNSTON

In two separate instances Sgt Johnston, a Flight Engineer, discovered incorrectly rigged flaps on C130s. Concerned about the general airworthiness of these aircraft, he requested in-depth inspections. Functional tests of the flap system showed the flaps were not rigged correctly.

Sgt Johnston also discovered a major discrepancy with the C130 electrical isolation procedure on aircraft equipped with bleed air pressure regulator valves. As a result of his discovery, all crews were alerted to utilize a modified procedure if confronted with an electrical fire on aircraft equipped with this type of valve. ATG is now developing a new procedure which will work on the entire C130 fleet.

Sgt Johnston's actions reflect exemplary commitment, professionalism and attitude towards Flight Safety. ◆

FOR PROFESSIONALISM


CAPTAIN BOB BURKE — **CORPORAL DARRYLL BRAKE**

Capt Burke and Cpl Brake, 8 Wing Air Traffic Controllers, were on duty when the pilot of an American C172 radioed that he had encountered deteriorating weather conditions and was uncertain of his position over Lake Ontario.

Since the weather was unsuitable for VFR flight, the pilot was given an IFR clearance and vectors to his destination. Within moments, the pilot, unable to maintain altitude due to severe accumulation of ice, requested landing at the nearest airport. The aircraft was immediately vectored to Trenton, an emergency was declared on behalf of the pilot, and a precision radar approach selected as the safest and fastest method of getting the aircraft on the ground.

The intense wind and weather, the ice covered windscreen, and the inability of the aircraft to maintain altitude due to icing made this approach most demanding for both pilot and controller. A no-compass approach was conducted because it was apparent the pilot was confused. All instructions were provided in plain language to avoid misunderstandings and reassure the concerned pilot.

Capt Burke's and Cpl Brake's professionalism in guiding this pilot to a safe landing prevented a potential loss of life. ◆

CORPORAL SID BROWN

Cpl Brown, an Integral Systems Tech at 12 Wing, was carrying out a SI on a Sea KIng, when he noticed that the hardware on the roll and pitch stick sensor was incorrectly installed. He immediately alerted his supervisor and a local supplementary inspection was initiated.

Subsequently, while carrying out that inspection, Cpl Brown discovered another aircraft with hardware on the Bellcrank that was installed backwards. He also found the "C" clamp on the directional control rod reversed, causing excessive wear on the drip tray. The resultant investigation identified another four Sea Kings with similar problems.

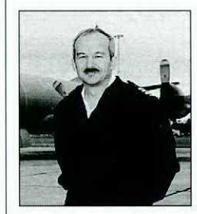
Cpl Brown's comprehensive knowledge and attention to detail highlighted a very serious discrepancy which could have contributed to the loss of the aircraft and crew. ◆

CORPORAL PETE HOWARTH

During a turn around of a Sea King, Cpl Howarth was awaiting boarding instructions when he noticed something was wrong with the damper reservoir window on top of the main rotor head. Tensions were high because of a rushed crew turn around to make operational commitments. Notwithstanding, Cpl Howarth immediately reported his discovery and the aircraft was shut down.

An inspection of the reservoir showed that two of the six reservoir cover fasteners were loose. Had the cover come off during flight, considerable damage to the main or tail rotor could have occurred. Cpl Howarth's spotting of this anomaly is noteworthy as it is outside his area of expertise.

Cpl Howarth's keen sense of observation and concern for flight safety prevented a potentially serious incident. ◆



LIEUTENANT COLONEL MIKE BOURDUAS

LCol Bourduas, Commanding Officer of 415 (MP) Sqn, was conducting an Aurora proficiency flight, including landings and take-offs from the right seat. During one touch and go sequence, ATC cleared a light aircraft to take off from a crossing runway, with the restriction to turn prior to crossing the departure path of the Aurora. Shortly after lifting off, LCol Bourduas observed the civilian aircraft extremely close and on a collision course. Despite being slow and low, LCol Bourduas aggressively manoeuvred the CP-140 into a tight right turn avoiding the other aircraft by a scant 100 feet.

The civilian plane had been on a training mission and due to an abnormal take off by the student pilot, was not able to turn in sufficient time. Despite flying from the right seat and having to look cross cockpit, LCol Bourduas's situational awareness and thorough lookout allowed him to see the traffic conflict

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CHALLENGER GROUND INCIDENT

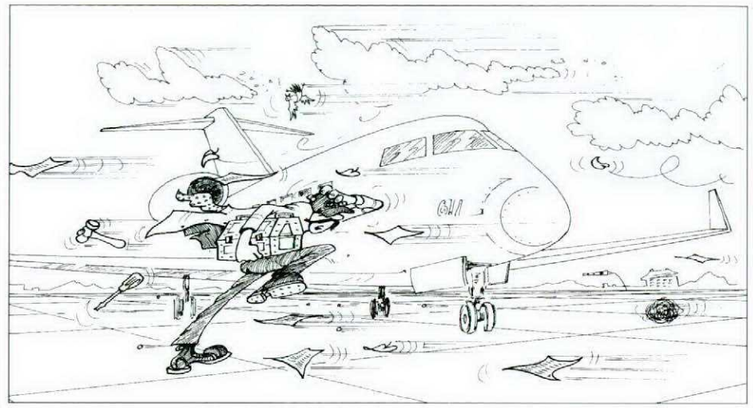
adapted from a 402 Sqn Flight Safety Bulletin

Last year, during an "A" check being performed on a Challenger, the engine tech opened the cowlings in order to carry out his portion of the check. He anchored the lower cowling with its securing rod and opened the upper cowling slightly to check the oil level. The tech found that the engine required oil, so he dropped the upper cowling back into its normal position, and left the aircraft to obtain oil. The weather was quite windy and, unfortunately, this was not to be this tech's day. The wind lifted the upper cowling from its normal position and blew it forcefully past the upper limits of travel.

The damage was confined to the upper cowling, and the upper and lower apron panels, as well as the beating that the tech's ego received.

REMEMBER:

MOTHER NATURE HAS A NASTY HABIT OF REMINDING US OF HER PRESENCE IN THE MOST DAMAGING WAYS POSSIBLE!!!



Don't forget to take weather conditions into account any time you open a panel on an aircraft. Always ensure panel security. It can get expensive when you don't! ◆

BETTER OR WORSE?

adapted from a 402 Sqn Flight Safety Bulletin

"We thrive on the theory that you either get better or worse: you never stay the same. If you are not working hard to improve then you are forming bad habits that make you worse."

Denny Crum, Head Basketball Coach for the University of Louisville

This is an imposing statement that most of us would find difficult to accept if we were to be judged by its harsh standards. Continually striving to improve is not an easy proposition.

As aircraft maintainers, the early years of our careers and each new aircraft posting is spent (re-) learning the basics of how to do our jobs. We are expected to improve our knowledge and abilities through study and supervised experience. What improvement do we expect to see in the qualified tech? Many tasks that we perform on a daily basis become routine, and simply getting the job done doesn't require improvement. On the contrary, it usually contributes to the formation of bad habits through short cuts with safety considerations given short shrift.

Can this theory of constant improvement be imposed from above? Not effectively. It has to become second nature for all members of the aviation community. In this present climate of uncertainty and almost constant change all of us must continually strive to improve our own efforts because in our work, we hold other peoples lives in our hands. ◆

Editor's Note:
The articles above are excellent examples of the superb effort that units are dedicating to their flight safety programs. My compliments to the presonnel of 402 Sqn, in particular MCpl Lennox. All units are encouraged to submit articles. Looking forward to seeing your submissions, soon!!

INCIDENT RESUME

Type: Challenger CC144602
Date: 9 November 1995
Location: Macdonald-Cartier International Airport, Ottawa

Circumstances

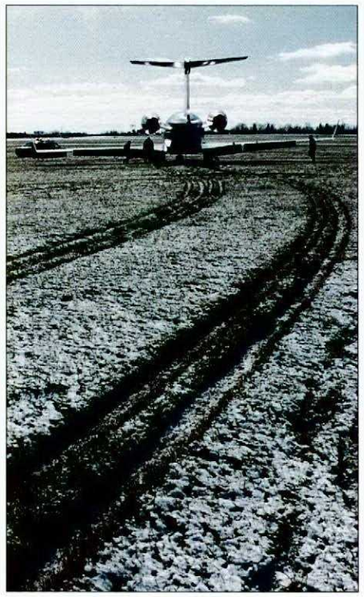
The crew was transiting from Greenwood to Ottawa to conduct a scheduled courier run. After touchdown, as the thrust reverse was being deployed, the tail of the aircraft swung left about three degrees which precipitated large heading oscillations of up to ten degrees until the aircraft departed the left side of the runway about 3000 feet from the approach end. The aircraft continued its travel about 500 feet into the airfield. The crew and six passengers were uninjured and the damage to the aircraft was very minor.

Final resting place CC144602.

Investigation

The initial downwind tail swing can most likely be attributed to crosswind and thrust reverse on a contaminated runway. Information from the Flight Data Recorder distinctly shows that control inputs created the subsequent oscillations. Aggravating the situation further was the left seat pilot's use of nose wheel steering and the right seat pilot's incorrect use of aileron. The investigation is now complete.

In response to this incident, all pilots received a review of cold weather ops and the appropriate pubs will be amended to increase emphasis on the use of nose wheel steering techniques. In addition, prospective aircraft commanders will be more comprehensively trained in Cockpit Resource Management so that they may recognize situations where taking control or directing action is a viable option.



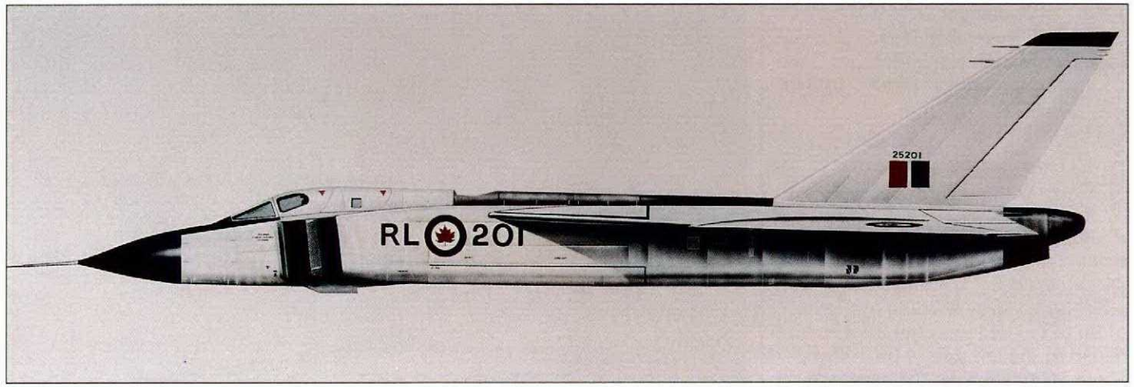
Rear view of the aircraft.

Front view of the aircraft.

DFS Comments

When aircraft deviations such as this are totally unexpected, a pilot relies on either experience or training for a response. If the experience is low and the scenario is not covered by training, then cockpit actions can be incorrect. Though there is no short cut to improve experience levels, CRM training can be effective to teach pilots to deal with unexpected situations. ◆

CF105 AVRO ARROW



artist: Peter Mossman

CF105 Avro Arrow MK 1 201. This aircraft first flew on 25 March 1958. The pinnacle of indigenous Canadian fighter aircraft design - the program was cancelled on 20 February 1959.

The Arrow is part of the CANAV collection donated to Air Command by Larry Milberry. ◆

Continued from page 9

The fuel line had been chafed through by another braided steel line from the turbine section of the engine. When the engine compartment filled with the fuel-air mixture, it exploded, causing the double-engine failure. The fire very quickly burned through the wires that control the fuel shut-off valves and therefore, the pilots were unable to turn off the fuel flow as they autorotated. The integrity of the engine firewall deck was compromised by two, six-inch diameter, pre-heat vents that allowed aircraft engine fuel to enter the cabin. The situation was further exacerbated by the numerous holes that were being created as the aluminum firewall rivets began to melt allowing more fuel to enter the cabin.

Following this accident the fuel lines were re-designed and new clamping and routing procedures were put in place to eliminate any further chaffing problems. The pre-heat vents have been permanently sealed and the recommendation to replace the aluminum rivets is underway. The Aircraft Operating Instructions have been amended to include a caution that the fuel should be turned off as soon as possible before there is a possibility of the lines being burned through. Finally, the Aircraft Captain must be commended for his skill and courage under the most severe and trying circumstances in saving the lives of two crew members in this tragic accident. ◆

Continued from page 13

and take action in a critical phase of flight at low altitude. LCol Bourduas's quick and skilled reactions prevented a near certain mid-air collision. ◆

CF105 AVRO ARROW

CF105 AVRO ARROW

the recommendation to replace the aluminum rivets is underway. The Aircraft Operating Instructions have

TOUS LE MONDE À BORD !!!

National Defence / Défense nationale

Art Direction by DCA 2-6
Direction artistique par D Admin M 2-6

Flight Comment / Propos de vol 6/1995
Concept: Capt Jim Hatton, DFS 3-4-2

Canada