National Defence / Défense nationale

FLIGHT COMMENT

4/1996

The CF105 Avro Arrow Mk 1 and a CF188 Hornet from 410 Sqn 4 Wing Cold Lake on the ramp at 17 Wing Winnipeg.

Canada

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FLIGHT COMMENT

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MCpl Denny Beaudoin

ON THE COVER: ***Note to the curious. A flash back to the past and it's not "trick" photography!***

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AS I SEE IT

by LCol K.G. Jenkins, Command Surgeon

Let's face it. When it comes right down to "it", the most important thing we have is our health. Unfortunately, we often don't appreciate our good health, or take measures to protect "it", until we fall ill. So, what can we do about it all? Well, we can take action to remain healthy - sleep well, eat well, exercise regularly, balance our time between work and pleasure, and generally reduce stress. Also, we can educate and encourage others on ways to remain healthy, and when illness occurs take measures to diagnose and "fix" the problem. Prevention, education, evaluation, intervention ... sounds a lot like flight safety to me.

Health and flight safety are inseparable. We spend a lot of time focusing on human factors, psychological and physiological variables that can significantly influence the person-machine and person-person interfaces. Minor health dysfunctions often are unnoticeable and rarely affect flight safety in a negative way. Major health problems may also be unnoticeable, yet have a grave affect on flight safety. Think of the individual having significant personal stress due to marital problems who can't concentrate on what he/she is doing. Think of the 40 year old aviator experiencing chest pain but not wanting to see the flight surgeon for fear of losing his/her flying category. If you're aircrew remember this - *the job of the flight surgeon is to keep you flying....safely*. It's what we're taught and it's the approach I insist upon from our flight surgeons.

This is health from a personal perspective. We know, however, that there's more to good health than eating and sleeping well. There are multiple factors such as standards of housing and education, social services support and economic status which greatly influence overall health. Informed leaders, interested in fostering the health of their people, pay attention to all of these things. Then there's health from a

group perspective. How does everybody get along, is the boss good, are families taken care of, is the unit fulfilling it's mission? If you've had the pleasure to work in a good squadron/unit you'll know exactly how that feels. Clearly, leadership has a large part to play here.

We are facing unprecedented challenges to our support systems, including health care, on both civilian and military fronts. As you are well aware, the Medical Branch OP PHOENIX is bringing about revolutionary changes in the way we do business. No longer will the provision of routine day-to-day care be our primary focus; support to operations and operational training will be our "raison d'être". Undoubtedly such a focus will have an effect upon flight safety. There will be changes in the way you access day-to-day care, with a greater reliance on the civilian sector; this could mean more referrals downtown or contracted services being provided at the Base. In January 1997 we will begin a trial of the new modus operandi at Greenwood; the results of this trial will be critical to ensuring a smooth transition through the implementation process. Feedback from users of health services at Greenwood will be extremely important in ensuring that we get it right and continue to contribute positively to flight safety.

So how can we ensure good health in this era of change? If we're going to succeed we'll have to pay more attention to the basics (ie, the "good sleeping, good eating" principle) with a particular focus on stress management. There will need to be vigilant monitoring of stress levels from both individual and group perspectives. When stress becomes excessive, it will be necessary to take a step back and re-assess priorities. Remember... the most important thing we have is our health. Expectations may have to change; doing more with less is not sustainable in the long term. Sending weary or unhealthy personnel on deployed operations is a certain recipe for trouble. Support for the family is a real concern for our folks on deployment. If we are to take a greater focus on deployed operations, we will have to ensure that adequate family support services are available. The squadron/unit rear parties and family resource centres will play an increasingly important role. Clearly, health is a complicated issue. There are personal, group and institutional responsibilities which have to be met to ensure a fit, fighting force. All of these are greatly influenced by the various levels of leadership. The potential for impact on flight safety is obvious.

The practice of medicine is a humbling experience. Having to deal with people in physical and mental crisis is difficult at best, but helps one to realize what "it" is all about - our health. The basics are important. Take good care of yourselves, your family and your subordinates. The payoff will be remarkable. ◆

"TEDDY BEAR"

The Maintenance Test Pilot had a control touch that gracefully "danced" the aircraft across the sky. And he had a mild temperament but was unafraid to voice his concerns. Even as a junior officer, he was meticulous with regard to regulations, policies, and procedures. So why did he not follow known procedures this time?

After having attending memorial services for the man my daughters knew affectionately as "Teddy Bear," I reflected upon the brevity of life and the critical importance of ensuring that all my actions-in the military as well as during my off-duty activities result from sound risk-management practices.

Risk management has to be a part of everyday life. Every time you cross the street, drive your car, or go swimming, you are applying risk management: identifying the hazards, assessing the risks, and making decisions that will have an impact on the outcome.

Are you doing everything you can to minimize the hazards for you and your family as you go about your personal activities? Are you doing everything you can to minimize the hazards for you and your fellow soldiers? If not, you're falling way short of meeting your responsibilities. And the ultimate price could be someone's life. Let's all make a commitment to work harder at managing risks more effectively! ◆

*excerpt from FlightFax May 1996 * Vol 24 * No 8*

ROLLIN' ** ROLLIN' ** ROLLIN'

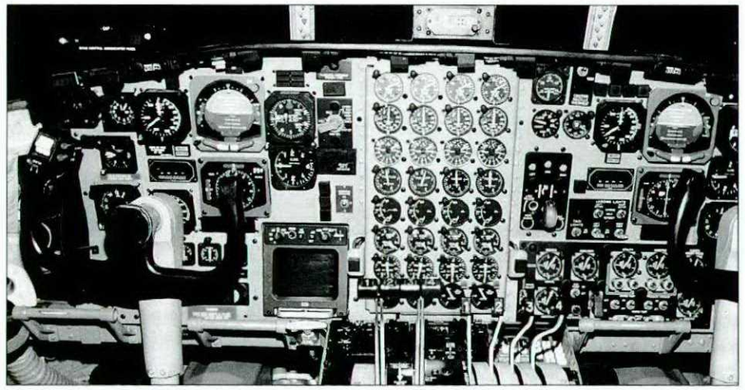
During a CC130 take-off roll, the Flight Engineer's(FE's) seat fore/aft lock pin mechanism failed allowing the seat to roll back to the full aft position. The take-off was aborted and the problem investigated.

Prior to the start the FE's seat lock mechanism had failed. The technician had found the failed part was a cotter pin where a rolled pin should have been installed. The technician tried to install a roll pin as per technical orders however it would not fit. To expedite the mission a *temporary repair* using a steel cotter pin was completed. The cotter pin failed on take-off and the seat rolled back!

Research determined that this temporary repair had been in use for over a year and had become the "norm" to the point where the repair was not being documented.

It can be very frustrating even embarrassing when an aircraft is held up due to a minor part. However *approved parts* are selected to meet a design requirement. Real life is that there are occasions when the proper parts, personnel, or tools are not available and a work around is to be investigated. Thorough analysis of options may result in the conclusion that a temporary repair is reasonable, however, the process will also identify the need to follow up and either get the repair accepted as permanent or to permanently fix the component.

In this case because previous seat repairs were not followed up the non standard fix became accepted by default and the root cause of non availability of proper parts or techniques were not addressed. ◆



View of a CC130 Hercules cockpit from the Flight Engineer's seat.

Correction: The caption under the picture with the article *"I Became A Safer Crewmember"* in *Flight Comment* issue 2/1996 page 10 should read *"Personnel of 1 Air Mov Sqn Winnipeg prepare a C130 load".* — **Editor**

FEELIN' LUCKY!

"Do you feel lucky today?" For those of us who remember detective Harry Callahan-Clint Eastwood's character in detective movies-these immortal words were identified with an extreme situation and potentially disastrous result.

"Dirty Harry" posed this question as a challenge-identifying a situation of grave risk-requiring an immediate assessment of the bad guy. Instinctively, movie viewers knew the bad guy better not go for his gun but weren't surprised when he did, and Harry turned the bad guy's luck for the worse.

But that was in the movies. We all know real life is different. Don't we? How often do you rely on luck to get through a risky situation? Do you fully assess the risk involved? All to often, it's apparent that people, either consciously or subconsciously, rely on "Lady Luck" to make things right.

Imagine you're driving and the traffic light changes from green to yellow. You decide to take the chance of continuing through the intersection on a "stale" yellow light. But as you approach the intersection, you realize you misjudged the light, and as you drive through it, the light turns red.

At first, you look (or panic) to see if there is traffic in the intersection. Seeing none, you continue, hoping you weren't seen by a police officer. Realizing you weren't noticed, you thank your good luck and go on your way.

What if you're a pilot on a cross country flight, and situated squarely along your flight path is a line of thunderstorms? You ask center for the reported tops and take a chance at climbing over the top.

As you get closer to the storm, you realize you'll have to climb higher and faster than expected. Soon you find yourself at the edge of the engine operating envelope, hoping luck will be with you and your aircraft won't lose an engine.

Or maybe you're having a good time with friends at the mess, maybe too good of a time. You soon realize you've had too much to drink. And as you're heading for the door, you hope, with a little luck, you won't get caught as you're driving home.

So, what's my point? Simply put: Professionals don't rely on luck to get them through a situation, any situation. In the dictionary, luck is defined as "a combination of circumstances, events, etc., operating by chance to bring good or ill to a person."

Luck isn't a dependable answer, so don't accept it as a solution even if it gets you through.

Professionals, like Dirty Harry, don't give up their actions to chance. There is too much to lose. Instead, they think through their intended actions and determine the level of risk involved. If the risk exceeds their comfort level, or a level established by an authority, they avoid it by not following through on their intended action. Luck has no place in a professionals "bag of tricks."

"OK," you might say, "so the pro's shouldn't rely on luck. What does that have to do with driving my car or drinking at the mess? I'm not a professional driver or a pilot. While I'm off duty, fun is fun!" If this is what you're thinking, then I submit you are looking at who and what you are through a soda straw.

You are a professional at your job or in whatever activity you do. During duty hours, people rely on you to do your duties in a professional manner, and you should take pride in meeting or exceeding their expectations. Being a professional isn't an attribute you can turn on and off; it requires discipline, fortitude and application 24 hours a day.

Approach your off duty time activities with the same critical eye you use at work. When planning activities, plan for acceptable levels of risk and set a limit on how far you'll go with them. Once you've reached the limit, don't go any further.

Finally, when fate steps in and you find yourself in an unplanned situation, handle it to the best of your abilities, learn something from it, and remember to apply the situation in the future.

Luck isn't a dependable answer, so don't accept it as a solution even if it gets you through. Don't push the yellow light. Fly around or land and wait out the storm. Drink less or have someone drive you home. The bottom line is you, not chance, should be in control of your actions. Don't let luck win out. Make sure you are in control. ◆

excerpt from Torch Safety Magazine of Air Education and Training Command(AETC) July 1996 Vol 3 No. 7

IN-FLIGHT AIRCRAFT ICING !!!!!

by D.J.(Jim) Yip, Directorate Military Weather Services NDHQ

Challenger aircraft 615 was on a holding pattern over Ottawa on the evening of 5 March 1991. After 20 minutes of maintaining 11,000 feet in cloud, 615 was finally given clearance to descend for landing. On approach the crew had to employ full nose up elevator trim to maintain altitude and a further 10 knots was added to the threshold landing speed because "it felt better". After a successful landing, the crew noticed a significant quantity of rime ice on the nose (8 cm) and tailplane section of the aircraft where deicing equipment was not available. A little longer on the holding pattern and 615 may have been featured on the late evening news broadcast.

In-flight aircraft icing is one of the major weather hazards to aviation in the winter. Icing affects aircraft by decreasing lift and increasing weight, drag and stall speed. This will have consequences on fuel consumption and flying range. A very thin layer of ice on an aircraft is said to be capable of reducing lift by as much as 30% and increasing drag by 40%. Ground icing such as slush splashed onto the undercarriage or wet snow freezing on the wings are also a major weather hazard to aviation but these problems are not discussed in this article.

Nose of Challenger aircraft with 8 cm of Rime ice!

Rotorcraft are extremely susceptible to icing which degrades both lift and thrust simultaneously. The most serious effect of rotor icing is the increase in drag, requiring more engine power to maintain flight conditions. A parameter of importance for rotor icing is the radial extent of ice accretion. Studies have shown that, as outside air temperature decreases, the outer extent of icing moves towards the tip. At -20C, while hovering, the blades can accrete ice on 80% to 90% of the span. Ice build up on rotorcraft can increase the rate of descent (30%) on autorotation and asymmetrical ice shedding can lead to low frequency vibration. This effect is most serious on the tail rotor. In addition, early blade stall can occur due to rotor ice if a rapid manoeuvre is attempted.

In-flight aircraft icing forms when super-cooled water comes in contact with those parts of the aircraft which are below freezing. Super-cooled water droplets exist in the atmosphere when water droplets are cooled to below freezing temperatures. Larger droplets begin to freeze near -10C while smaller droplets require a much colder temperature to freeze. The rate of freezing of the water droplets increases rapidly at temperatures colder than -16C and at a temperature

Left wing tip.

Leading edge of tail.

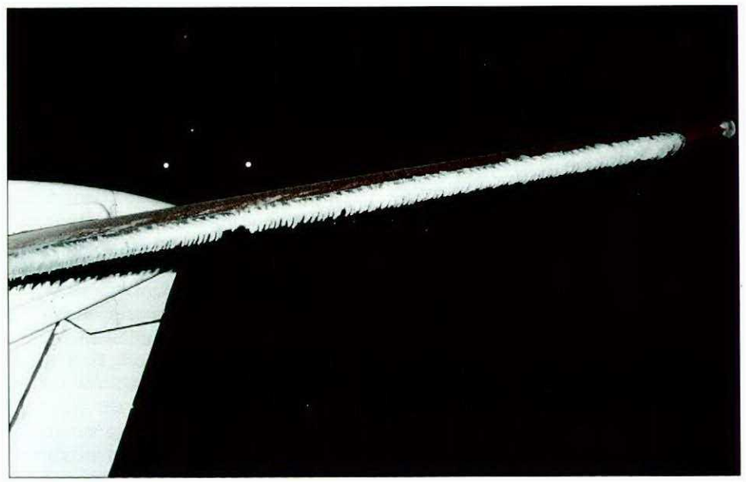
of -40C almost all the water droplets freeze. Studies have indicated that 60% of icing *PIREPS* (Pilot Reports) are in the 0C to -12C temperature range and 90% are in the 0C to -20C range. The most frequent temperature for icing PIREPS is around -6C. Not surprisingly, the air temperature for challenger aircraft 615 while holding over Ottawa was -5.5C.

There are generally three types of aircraft icing. *"RIME"* icing is brittle, porous and forms from the rapid freezing super-cooled droplets. This rapid formation traps air bubbles between the droplets giving rime icing an opaque appearance. *"CLEAR"* icing is hard, glossy and smooth. It is formed by the slow freezing of large super-cooled droplets. The large droplets spread out over the airfoil before completely freezing forming a sheet of clear ice. Clear icing accumulates more rapidly than rime and is more difficult to remove. *"MIXED"* icing is a combination of rime and clear and most likely to occur where temperatures and the drop size change rapidly over a short time and distance.

Icing intensity is the rate of accumulation of ice on some unheated surface of an aircraft. A report of "moderate" icing for one type of aircraft may be "light" for another. The different types of icing intensities were initially defined in 1964 according to the way they affected reciprocating-engine, straight wing transport aircraft at that time. *"TRACE"* ice is perceptible but the rate of accretion poses no threat unless encountered for an extended period of time (over one hour). For *"LIGHT"* icing, the rate of accumulation may create a problem if flight is prolonged in this environment (over one hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. For *"MODERATE"* icing the rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or diversion is necessary. In the case of *"SEVERE"* icing, the rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard and immediate diversion is necessary.

The icing associated with freezing precipitation is the most hazardous as it is usually of the clear or mixed type and moderate or greater in intensity. Freezing rain is usually associated with warm fronts and a warm layer aloft while freezing drizzle occurs under a layer of stratus cloud. Both types of freezing precipitation should be treated in the same way ... avoid, divert or do not go.

PIREPS are the best source of data in the accurate forecast and warning of aircraft icing. So, Before the flight check the weather, in flight watch the weather, after the flight report the weather. If, while in flight you encounter any aircraft icing, give a *PIREP*. ◆



Top of tail area.

FOR PROFESSIONALISM

MASTER CORPORAL STEVE CHRISTENSEN

MCpl Christensen, an instrument electrical technician at 443 Sqn Esquimalt, was assisting with a main rotor head replacement on a Sea King helicopter.

While carrying out the maintenance he noticed that the number two engine firewall shut-off valve body was loose. As this was not part of his trade, he reported it to the appropriate personnel and the valve was determined to be unserviceable. If this had gone undetected a serious fuel leak could have developed, possible resulting in a fire in the main cabin area.

MCpl Christensen's professionalism, initiative and attention to detail prevented possible serious injury to both aircraft and crew. ◆

CORPORAL GHISLAIN GOUDREAU and CORPORAL RENE PAQUET

Cpl Goudreau and Cpl Paquet, airframe technicians at 8 Air Maintenance Squadron Trenton, while performing a Primary Inspection(PI) on a C130 noticed crack indications on a wing flap screwjack support former.

On the previous day they had noticed similar indications on another C130. The two technicians took it upon themselves to inspect four additional aircraft all of which had crack indications. They immediately informed their supervisors of their findings. The indications were confirmed as cracks by a non-destructive testing inspection. Higher headquarters were notified and a fleet wide special inspection was issued which found over half the fleet with similar defects.

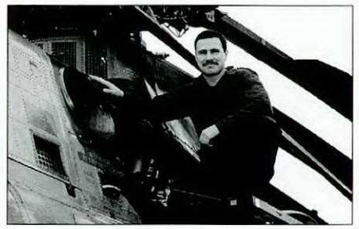
Cpl Goudreau and Cpl Paquet are commended for their attention to detail and professional approach to aircraft maintenance. If these cracks had remained undetected, a serious flight safety occurrence could have seriously endangered both the aircrew and the aircraft. ◆

CORPORAL MARC LEGAULT

Cpl Legault, a metal technician at the Aerospace and Telecommunications Engineering Support Squadron Trenton, was installing an armour plate modification on a Hercules.

While carrying out a post-work Foreign Object Damage(FOD) check in an awkward and poorly lit area of the nose wheel well, he discovered a hammer behind the first rib aft of the forward bulkhead. The hammer had been left there during a recent contractor modification. Closeout procedures by the contractor and extensive FOD checks prior to acceptance by military personnel failed to detect it. Had the hammer remained undetected, it could easily have interfered in the safe operation of the landing gear.

Cpl Legault's professionalism and attention to detail prevented possible damage to an aircraft and a serious flight safety occurrence. ◆



CORPORAL YVES CARIGNAN

Cpl Carignan, an aero engine technician at 443 Sqn Esquimalt, was performing a "B" check on a Sea King helicopter.

While conducting his inspection he noticed a slight mark on the leading edge of the power turbine blade on the number two engine. Inspection of this area is not part of the Sea King "A" or "B" check. Upon further investigation in this barely accessible area, he discovered that several turbine blades were damaged. After removal of the engine for inspection it was determined that the engine had internally failed and was approaching catastrophic failure.

Cpl Carignan's professionalism, diligence and dedication prevented a possible serious flight safety occurrence. ◆

FOR PROFESSIONALISM

CAPTAIN JOHN NOWAK

Capt Nowak, a pilot on a solo training flight in a Slingsby T-67C Firefly at Southport-Portage La Prairie, noted the throttle response of the aircraft was not normal.

After determining the throttle was stuck at a high power setting and attempting to trouble shoot the problem with Firefly Operations, he declared an emergency and advised the tower he would be carrying out a forced landing on Southport's outer runway. After other traffic was rerouted and the Emergency Response Vehicles were in position, he reviewed the checklist procedures and manoeuvred the aircraft to a high key position. At this point he shutdown the engine and carried out a flawless forced landing pattern to a successful landing.

Capt Nowak is commended for his professional handling of a potentially hazardous situation. ◆

CORPORAL BEN STEPHENSON

Cpl Stephenson, a Communication and Radar Systems Technician with 443 Sqn Esquimalt, was replacing a radar antennae on a Sea King when he noticed something abnormal on the tail rotor drive shaft.

Upon further investigation he discovered the grease seals from the number one and two bearings were hanging loose. Realizing the potential consequences of this problem he immediately notified his supervisor. A detailed inspection found that the drive shaft bearings were throwing grease which would have eventually led to a complete failure of the bearings and the drive shaft.

Cpl Stephenson's professional approach to his duties and keen eye for detail averted a possible catastrophic failure of the drive shaft assembly and a serious flight safety occurrence. ◆

CORPORAL GUY RICHARD

Cpl Richard, an Air Traffic Controller at 8 Wing Trenton, was instrumental in the safe recovery of a civilian aircraft. The combination of an aircraft descending below minimum altitude on an approach and the distraction of a dropped publication caused an aircraft to impact a tree resulting in a fuel leak and damage to the right wing and propeller.

When Toronto Air Traffic Control handed over the aircraft to Cpl Richard, he was to guide the aircraft to a Precision Radar Approach. Realizing the pilot was in shock and experiencing difficulty with English, he offered the troubled pilot the choice of controlling in French which was eagerly accepted. Although fluently bilingual, he was not trained to provide this type of service. His poised and reassuring control helped to calm the situation and guide the pilot to a safe landing.

Cpl Richard's professional conduct during the emergency resulted in a safe recovery of the aircraft and prevented possible loss of life. ◆

CORPORAL KEVIN LAFLEUR and CORPORAL PIERRE DUGUAY

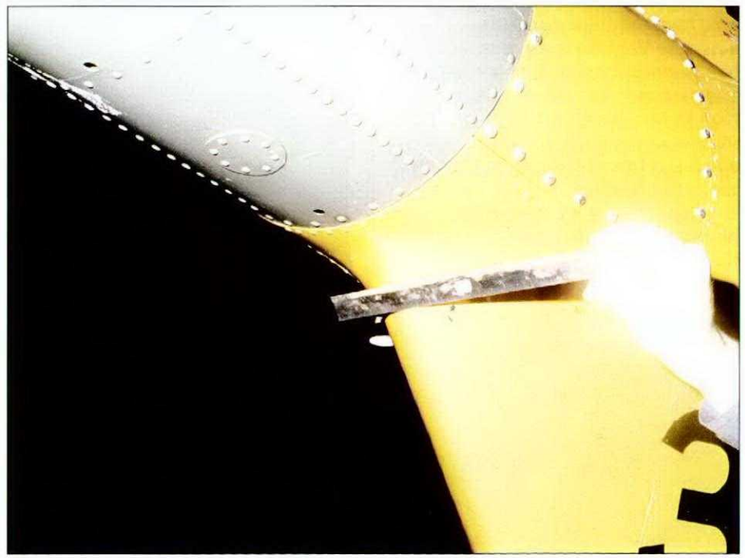
Cpl Lafleur and Cpl Duguay, Aero Engine Technicians of 8 Air Maintenance Squadron Trenton, were tasked to assist in the final area close out portion of the inspection of a Hercules.

Prior to installing panels in the left hand wing root areas, Cpl Lafleur found a displaced rivet in the lower side shelf of the aircraft structure. Cpl Lafleur and Cpl Duguay proceeded to carry out an in-depth inspection of the surrounding area and identified the source of the rivet. During this inspection they also discovered a four inch crack on the primary structure of the left hand main landing gear oleo track. Engineering disposition was requested from NDHQ Ottawa and the aircraft was repaired.

Cpl Lafleur and Cpl Duguay's professionalism and dedication were instrumental in averting further structural damage to the aircraft and a possible in-flight occurrence. ◆

INCIDENT RESUME

Type: Jet Ranger CH139306,
License C-FTHL
Date: 11 June 1996
Location: Southport, Manitoba



Circumstances

During A Night 1 mission, CH139306 experienced a hard landing at Pad 2, resulting in a B category damage. On a demonstration of a night autorotation, the aircraft touched down hard in a low nose altitude, bounced and came to a rest about 170 feet short of the Pad 2 landing area.

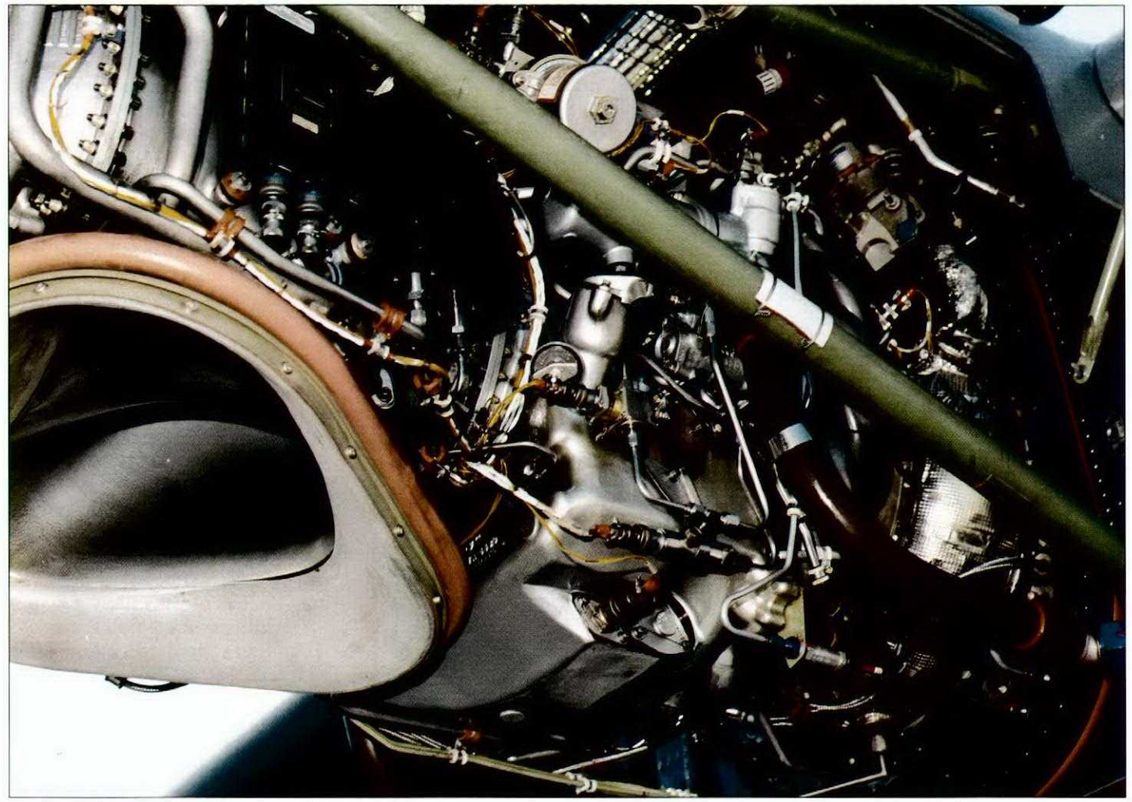
Investigation

First, the instructor in this accident failed to assess the correct winds for conducting the night autorotations. In addition, the instructor displayed noticeable pilot technique weakness while conducting this manoeuvre both prior to and during the mishap mission. Investigation revealed that the pilot's proficiency levels for night autorotation had degraded due to service and self-imposed demands. In fact, the school had been trying for some time to address the shortages in manpower and heavy course loads affecting the helicopter side of 3 CFFTS operations.

DFS Comments

3CFFTS/BHS has been conducting night autorotation training for quite some time with a relatively safe flying record. Yet, most pilots will readily admit that this sequence does require a high level of technical competence as the margin of error is definitely smaller due to the reduced visual cues. Due to the high work load at this school and the demands on individuals to be proficient at this manoeuvre, DFS has recommended a full risk assessment study for the conduct of night autorotations. ◆

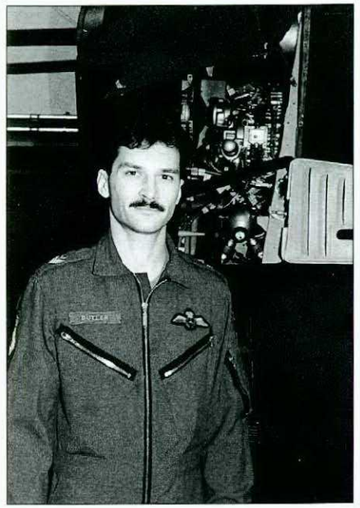
WHAT'S WRONG WITH THIS PICTURE?



You're looking for something that:
delayed a mission, caused a lot of
embarrassment, made a hell of a mess,
and was caused by human error!

* *Answer on page 13*

"GOOD SHOW" AWARDS



MASTER CORPORAL ROB BUTLER

MCpl Butler, a flight engineer conducting a pre-flight inspection on a CH146 Griffon, noticed a tail rotor driveshaft coupling which appeared to be installed differently than that observed on an aircraft he had pre-flighted the day before.

Upon observing the helicopter he had pre-flighted the previous day "running" on the ramp and preparing to lift off, he immediately informed the flight crew of his suspicions and the aircraft was shutdown. Further investigation revealed that the coupling on the departing aircraft had been installed incorrectly.

MCpl Butler's professionalism, initiative and attention to detail prevented a potentially disastrous occurrence. ◆

CORPORAL ROB WILLIAMS

Cpl Williams, an aero engine technician at 4 Wing Cold Lake, volunteered to assist airframe technicians with the installation of a hydraulic reservoir on a F18.

Prior to the installation, he elected to carry out an additional Foreign Object Damage (FOD)/visual inspection of the area. Although he is unfamiliar with the airframe technician trade and the area is difficult to inspect, he discovered that the skin was cracked between formers. He immediately contacted a qualified airframe technician. A further inspection revealed that the Number 4 fuel tank bladder was protruding from the crack and signs of wear were evident. This crack was extremely difficult to detect and would have eventually resulted in a failure of the fuel bladder.

Cpl Williams' professionalism, dedication and attention to detail clearly averted a potentially catastrophic occurrence. ◆

WHEELS NOT TURNING

This story is about a Douglas DC-8 that became airborne and was forced to abort the flight due to a wheel failure after departing the ramp. It is about the ***flight crew, the maintenance,*** *and about* ***human factors*** *such as* ***assertiveness, complacency and common sense.***

The aircraft was taxiing for takeoff when the Number 2 and 5 tires went flat. The crew continued and remained unaware of the failures until after departure and climbing through 8000 feet. Why did the crew remain unaware of what had happened?

On the ground, the vice president of maintenance and two other company employees heard two loud, almost simultaneous booms while the aircraft was taxiing. They initially thought of an engine compressor stalling and began assembling a crew to investigate if required.

Back to the aircraft: while taxiing, the flight crew heard a thump but concluded it was an oleo bottoming out. The flight attendants and company loadmaster heard a bang. The purser, in the rear of the cabin discussed the unusual sound with the second flight attendant, then called the flight deck and asked the Flight Engineer (FE) about the noise. The FE gave a humorous response, but did not discuss the call with the other flight crew members. None of the passengers asked the flight attendants about the noise before takeoff.

During the takeoff roll another problem occurred at the 80 knot call and the FE advised the captain of low EPR(Exhaust Pressure Ratio) on No. 1 engine. This problem had occurred previously and was supposed to have been fixed; however, the captain elected to continue. The captain advised the FE that he would fly by reference to engine high pressure compressor reading. At about 100 knots the FE again advised the captain of low power on No. 1 engine. With speed approaching 130 knots the First Officer advised against rejecting the takeoff at that point and the aircraft became airborne. While climbing through 8000 feet the aircraft received a message from ATC that rubber debris was left on the runway. After further discussion between the cabin and cockpit about the rubber, they received a message from their company confirming that the rubber was tire material and the crew finally realized they had a serious problem. Following a review of their options, fuel was dumped and the aircraft landed at the departure airport without further incident.

The story suggests that while people on the ground and in the aircraft were concerned about safety, did anyone do anything positive about it?

The story suggests that while people on the ground and in the aircraft were concerned about safety, did anyone do anything positive about it? Their sense of hearing told them something was wrong, but no one had the communication skill and assertiveness necessary to make the point clearly to the captain. During takeoff an engine abnormality was detected but crew communication failed at this point, or until the aircraft was committed by high speed.

During maintenance on the No. 1 engine the contractor replaced the pneumatic relief valve. While this action ground checked OK it did not eliminate an intermittent low EPR during subsequent takeoffs.

After the incident, they replaced the No. 1 engine surge bleed valve for intermittent operation, tightened a loose airstart pneumatic line in the nose wheel and replaced a leaking peri seal. A ground check indicated that the manifold decay check was within normal limits and the engine was subsequently reported to operate normally.

As for the No. 2 engine wheel breaking, evidence pointed to fatigue crack initiation of the failed rim bead area. To help prevent a recurrence, the report suggested better inspection methods, including an eddy current or ultrasonic inspection of the bead seat area at every tire change. The No. 5 tire appears to have been punctured by the failed parts of the No. 2 wheel.

Investigators made a number of recommendations to the company and to Transport Canada(TC). The company agreed to change their operations manual and other safety procedures.

Until this occurrence, this relatively new operator had not received a maintenance or operations audit by TC. After the incident, TC carried out the audits and corrected a number of administrative functions that should help prevent a recurrence. ◆

excerpted from Transport Canada Aviation Safety "Maintainer" 4/95

ÉPILOGUE

Aircraft Accident Summary Labrador CH11304

This accident took place during an authorized Search and Rescue (SAR) training mission approximately seven nautical miles from 14 Wing Greenwood, Nova Scotia. On the afternoon of 01 May 95 the crew of CH11304 had completed one training sequence and were in the middle of the SAR sequence when the problem developed. The Aircraft Captain (AC) had flown the initial phase of the training mission and had just handed control over to the First Officer (FO) who was flying the helicopter when the accident occurred. The FO established the helicopter in a stable 60-foot above the aground (AGL) hover and was in the process of moving towards two SAR tech who were below them, when all the crew members heard an audible decrease in engine noise as the helicopter began to settle towards the ground. The Flight Engineer (FE) immediately called for the FO to pull up but the aircraft would not respond.

The FO realized that the SAR techs were now directly below them, and correctly decided to continue straight into the trees ahead of them, successfully avoiding the SAR techs. As the helicopter descended through the trees both rotors and their associate drive trains sustained major damage while the fuselage received only minor damage. The FO continued to attempt to reduce the rate of descent to the extent possible, but with only single-engine power available the crash was inevitable. The helicopter settled gently as the fall was cushioned by the trees and came to rest in the fully upright position. After shutting down the aircraft the crew quickly evacuated sustaining only minor injuries. Both Canadian Coast Guard and CF SAR resources quickly responded to the MAYDAY call and all crew members were transported to the Wing hospital for observation.

Investigation revealed that the number two engine had failed during the hover due to the failure of the main fuel control unit (MFCU). QETE laboratory analysis further determined that the MFCU had been subjected to excessive external forces during installation at the contractors which led to the internal failure of the MFCU. Measures have been instituted to prevent a re-occurrence of this nature. Also as a result of this and other engine-related CH113 occurrences, a new engine control system is being designed to replace the existing system. Finally, the crew of CH11304 must be commended for their quick and appropriate actions in averting a more disastrous outcome to this accident. ◆

WE'LL PINPOINT THE PROBLEM

AN OIL CAP NOT PROPERLY SECURED!

Once again fate has selected several individuals to serve as a reminder to the rest of us of the fallible nature of the human animal.

The oil had been topped up on the "A" check and the security of the cap had been checked on the "B" check, yet when the engine was started for the next mission the cap blew off and the contents of the oil tank filled the engine compartment.

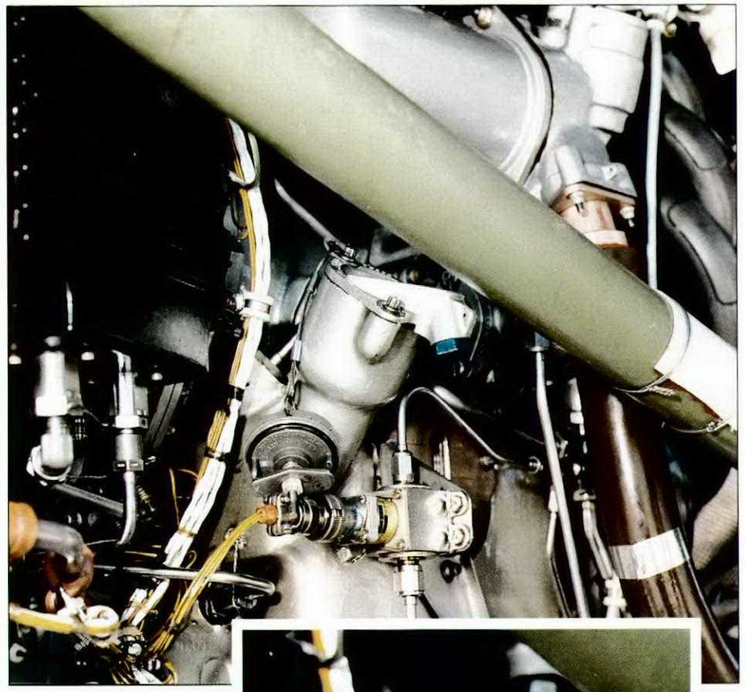
The Flight Safety investigation highlighted two factors, two human factors, which caused this incident ... DISTRACTION and COMPLACENCY!

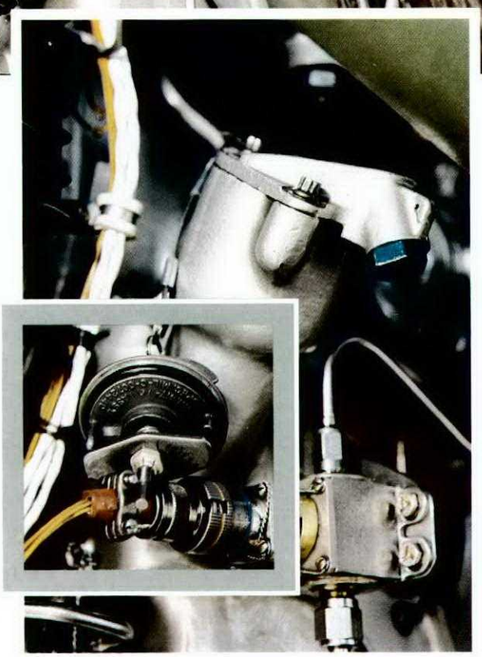
When your concentration is redirected from your work on the aircraft by anything or anyone, that is when a mistake is most likely to happen. When distraction occurs you must make extra efforts to double-check your work. Supervisors can play a key role in combating the effects of distraction by shielding their people from interruptions during maintenance activities.

Complacency is an insidious evil that overtakes us little by little as we go about our normal duties. We carry out thousands of aircraft inspections every year and it is relatively rare that we find anything wrong. After a while, we can begin to see what we always see ... nothing. Our checks become a little less diligent, we take short cuts. Eventually we become an incident/accident waiting to happen, the only thing needed is someone else's mistake or oversight to combine with ours.

If you learn nothing else from this incident, remember that we are all human and will make mistakes unless we constantly strive to overcome our natural fallibilities. ◆

MCpl Lennox 402 Sqn FSNCM 17 Wing Winnipeg





> The greatest of faults ... is to be conscious of none
> – *Thomas Carlyle*

FROM THE INVESTIGATOR

AIRCRAFT OCCURRENCE SUMMARY

Type: Sea King CH12407
Date: 14 August 1996
Location: 12 Wing Shearwater

Circumstances

The aircraft departed Shearwater at 2050 hrs local on 14 Aug 96. The purpose of the flight was to conduct night overwater flight instructor training and aircrew proficiency. Following completion of the instructor training syllabus the crew returned to carry out two practise autorotations to overshoot. The first autorotation was flown without incident. The second was normal up until the flare, but as power was applied for cushioning, the aircraft continued to descend. The pilots attempted to arrest the rate of descent with full collective but were unable to prevent the aircraft from impacting the runway. The force of the impact collapsed the right main landing gear sponson which necessitated a recovery using the emergency cradles. All four crew members escaped without injury. The aircraft sustained "B" Cat damage.

CH12407 resting on cradles.

Investigation

The weather at the time of the accident was sky clear, visibility greater than 6 miles, temperature 21C, and wind 30 degrees off runway heading at 5 kts or less. The density altitude (DA) was calculated to be 1048 ft. The aircraft was serviceable prior to impact. Both engines were removed for test analysis and proved to be functioning normally. Therefore the investigation focused on the technique used to execute the manoeuvre.

The Standard Manoeuvre Guide (SMG) for the Sea King states that entry to practise autorotations is effected from 1000 ft AGL. The throttles remain fully open and descent is initiated by lowering the collective. The aircraft does not enter a true state of autorotation, but rather a rapid power on descent. The flare is initiated from 200 ft. Once it is no longer effective the aircraft is levelled with cyclic and collective cushioning is applied. The SMG emphasizes that the sequence should terminate at 30 feet AGL with at least 15 kts of simulated run-on.

In this case the pilot entered the manoeuvre and initiated the flare as per the SMG. The autorotative flare was held longer than normal allowing for near zero forward airspeed with a higher than normal sink rate. This coupled with the light winds, warmer temperatures, and higher DA set up the ideal conditions for Vortex Ring State (VRS). At approximately 100 ft the pilot levelled the aircraft and applied collective cushioning. Little deceleration was felt as the aircraft fell through its own disturbed air. At 50 ft full collective was applied to arrest the descent but this only served to aggravate the condition.

In fully developed VRS rates of descent can reach 3000 fpm. Recovery involves entering autorotation, lowering the nose to gain airspeed, or combining both. Altitude loss during recovery can exceed 1000 ft, therefore successful recovery at low altitude is extremely unlikely. Even if the pilots had recognised the VRS condition they did not have sufficient altitude to prevent the impact.

Front view starboard main landing gear.

Rear view of starboard main landing gear.

DFS Comments

The low level environment is very unforgiving, particularly for heavy helicopters. Encounters with VRS can be prevented with a thorough knowledge of the conditions that lead to its formation and by avoiding, whenever possible, the regimes of flight where it is likely to occur. ◆

FROM THE INVESTIGATOR

AIRCRAFT OCCURRENCE SUMMARY

TYPE: CC144604
DATE: 23 June 1996
LOCATION: 12 Wing, Shearwater

Circumstances

Challenger aircraft CC144604 was tasked on a mission to transport media personnel in support of Exercise MARCOT 1996. The aircraft landed at 12 Wing Shearwater on completion of the mission and was returning to the ramp to disembark the passengers. While taxiing and carrying out the generator shutdown sequence of the post-landing check, a momentary power interruption occurred, the nose landing gear collapsed and the aircraft came to a sliding stop. The pilots carried out an emergency shutdown while the AESOP initiated an emergency overwing evacuation of the six passengers. All nine personnel on board safely escaped the aircraft with no injuries. The aircraft sustained "C" category damage.

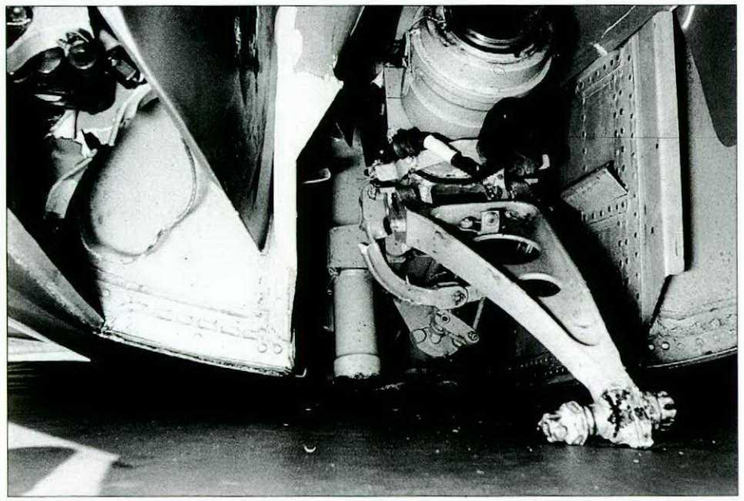
CC144604 resting on nose on the taxiway.

Investigation

While the aircraft was serviceable until the point of gear retraction, the investigation did identify a defect in the nose landing gear selector valve. This condition, combined with the power interruption, resulted in a bypass condition to the retraction side of the valve. Laboratory tests are ongoing.

DFS Comments

Modern aircraft incorporate many checks to prevent an inadvertent gear retraction on the ground. Nevertheless, an uncommanded nose gear retraction did occur here and it appears that the failure of a single component was the primary cause. This occurrence serves as a reminder that no matter how well a system is designed, unexpected failures can still occur. Our last line of defence is to recognize that reality and to train our crews to effectively deal with unexpected emergencies. ◆



Nose landing gear compartment.

CANADAIR CL-13A SABRE MK V 23066

artist: John Matthews

Canadair CL-13A Sabre Mk V 23066 of the Royal Canadian Air Force Golden Hawks.

The Sabre Mk V was powered by the 6,355 pound static thrust Orenda 10 engine. Able to climb to 40,000 feet in nine minutes the Sabre Mk V had a maximum gross weight of 15,120 pounds.

The Golden Hawks were formed in 1959 and disbanded in 1964.

The Sabre is part of the CANNAV collection donated to Air Command by Larry Milberry. ◆

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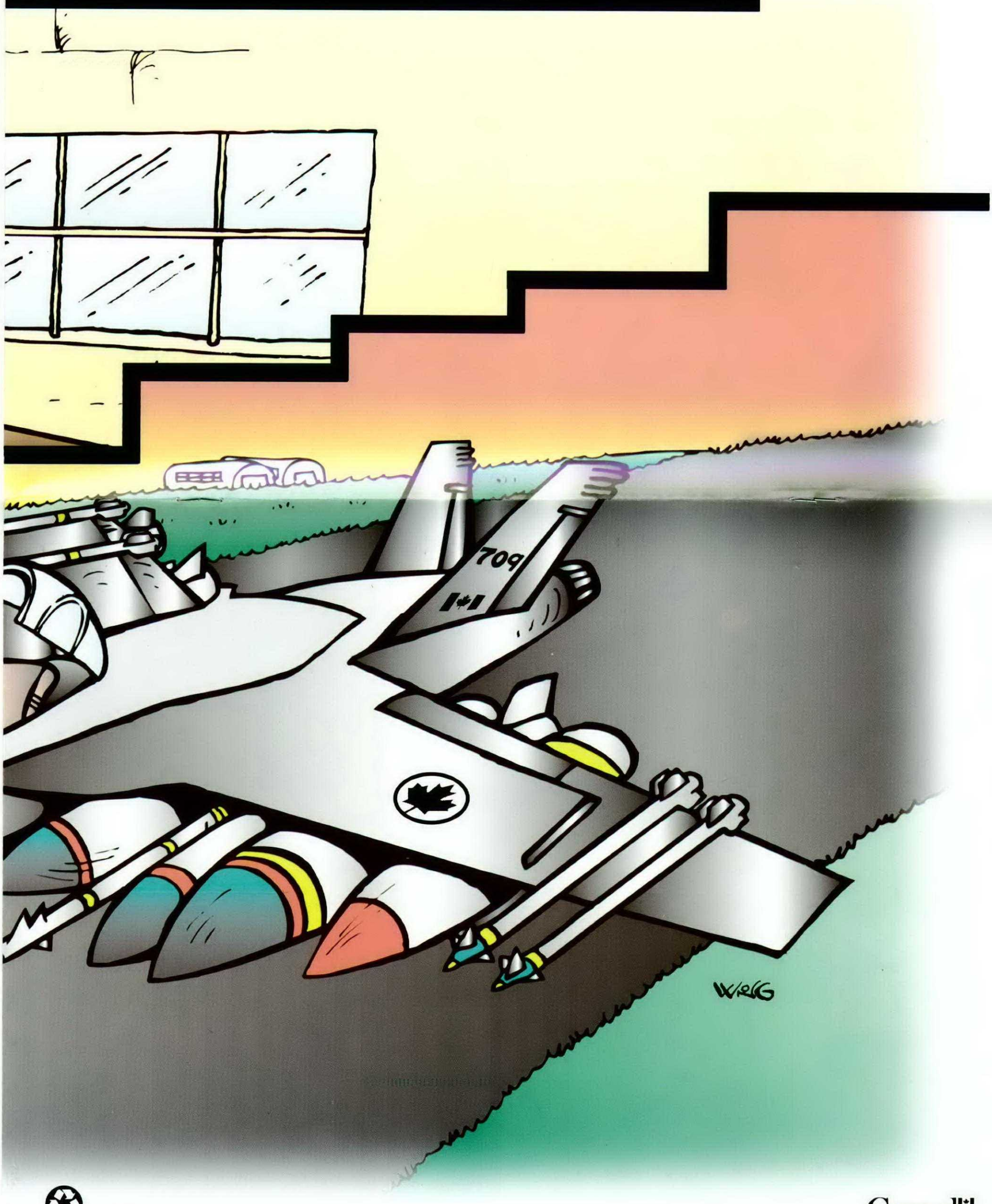

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