FLIGHT COMMENT

JANUARY FEBRUARY
1974

Comments

As a result of a UCR submitted through Maritime Command, some form of emergency exit lighting will probably be installed in Sea King helicopters. The present lack of emergency exit lighting is a major hazard to successfully abandoning the aircraft in the event of a night ditching. Procurement of a Beta light installation similar to that fitted in Royal Navy Sea Kings is under way and an evaluation will determine if the system is suitable for our aircraft.

An incident occurred recently aboard an Argus during a night pilot training exercise in moderately turbulent conditions. During a PMA radar pattern radar asked the aircraft to identify on IFF. The co-pilot (because of the switch position) was unable to fly the aircraft and identify at the same time. He therefore gave control of the aircraft to the pilot and used his utility light to reselect the IFF. While the pilot had control radar asked for a left turn. The co-pilot then took over during the turn and temporarily experienced vertigo. This incident highlights some of the problems associated with PMAs in cockpits where the layout is not entirely suitable but it also describes a classic method of inducing vertigo.

A recent policy statement rescinds the requirement for the Canadian Forces to maintain a runway foaming capability. With more sophisticated aircraft on inventory and more statistical and scientific data available, some interesting analyses are relevant. First, the flushers purchased some years ago do not provide an adequate runway foaming capability. Secondly, scientific data does not prove that runway foaming is necessary to minimize aircraft damage during a wheels-up or gear malfunction landing. Lastly, statistics reveal that foaming is rarely requested and when used (twice in the past three years in Canada) it may be inadvisable or unnecessary or not used by the landing aircraft because of the limited width of the foam strip. The CF flushers presently in service will be retained at their respective locations to be utilized as deemed necessary by appropriate Commands but it now appears that available funds are better expended on the improvement of conventional crash rescue facilities. MOT has made a similar decision.

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Luck Is For The Gamblers!

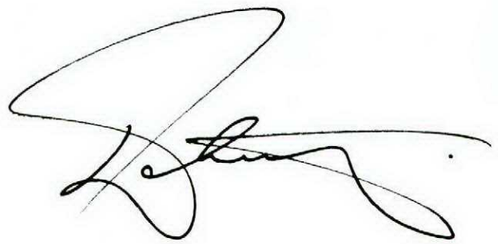
Recently, at a briefing which included some complimentary words about a specific organization's air accident record, I was stopped cold when two very experienced and respected pilots stated "Don't you think that a good part of it is really a matter of luck"? My reply was anything but satisfactory since all I could think of was "What do they know that I don't"? This was compounded by the sinking feeling that if professionals such as these feel that a situation exists where good luck is a major factor in preventing accidents, then it is almost certain that many opportunities to correct the situation have already been missed. This lingering aircrew mental hang-up seems to involve a bit of fatalism, a smattering of superstition and a lot of belief in Lady Luck. This editorial was prompted by my reflections on this phenomenon.

Everyone knows that the successful gambler takes every opportunity to eliminate or reduce the element of chance. Some cheat, some bluff, others use a mathematically precise "system". Good gamblers never challenge the odds in a high stakes game unless they have something else going for them.

If we allow good or bad luck to determine whether or not we are going to lose an aircraft, then we are breaking the first rule of the successful gamblers: "never bet more than you can afford to lose".

In the flying business we must always have that "something else" going for us. The stakes are too high to do otherwise. That "something else" is a professional approach and a long list of plus's that stack the odds in our favour. Our training, knowledge, physical and mental health, our equipment and the excellent way in which it is maintained are only a few of the ways in which we can avoid relying on pure luck.

Take a lesson from the winners — stack the odds in our favour — leave the luck to the unenlightened.



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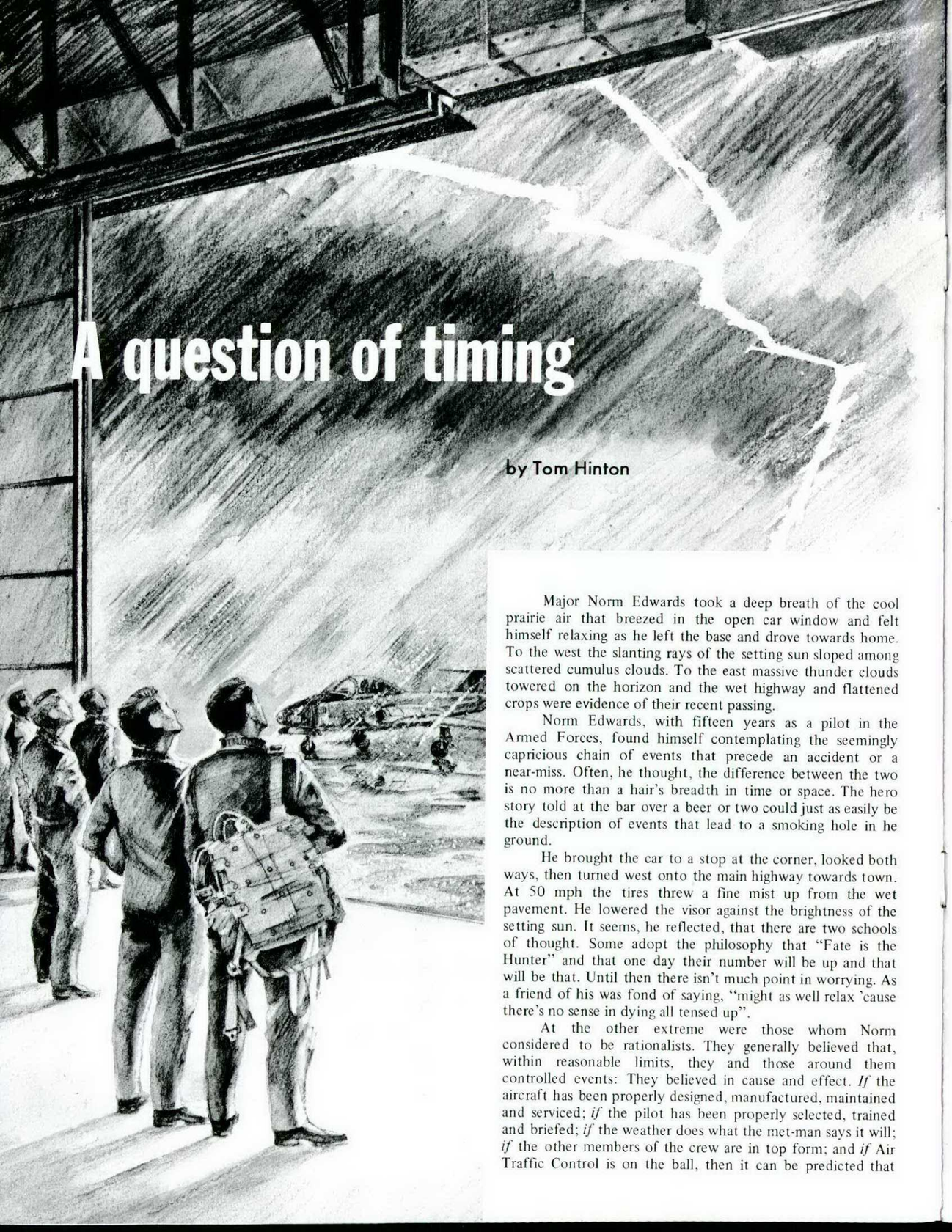


A question of timing

by Tom Hinton

Major Norm Edwards took a deep breath of the cool prairie air that breezed in the open car window and felt himself relaxing as he left the base and drove towards home. To the west the slanting rays of the setting sun sloped among scattered cumulus clouds. To the east massive thunder clouds towered on the horizon and the wet highway and flattened crops were evidence of their recent passing.

Norm Edwards, with fifteen years as a pilot in the Armed Forces, found himself contemplating the seemingly capricious chain of events that precede an accident or a near-miss. Often, he thought, the difference between the two is no more than a hair's breadth in time or space. The hero story told at the bar over a beer or two could just as easily be the description of events that lead to a smoking hole in he ground.

He brought the car to a stop at the corner, looked both ways, then turned west onto the main highway towards town. At 50 mph the tires threw a fine mist up from the wet pavement. He lowered the visor against the brightness of the setting sun. It seems, he reflected, that there are two schools of thought. Some adopt the philosophy that "Fate is the Hunter" and that one day their number will be up and that will be that. Until then there isn't much point in worrying. As a friend of his was fond of saying, "might as well relax 'cause there's no sense in dying all tensed up".

At the other extreme were those whom Norm considered to be rationalists. They generally believed that, within reasonable limits, they and those around them controlled events: They believed in cause and effect. *If* the aircraft has been properly designed, manufactured, maintained and serviced; *if* the pilot has been properly selected, trained and briefed; *if* the weather does what the met-man says it will; *if* the other members of the crew are in top form; and *if* Air Traffic Control is on the ball, then it can be predicted that there will be no near-miss and no accident. But, that's a helluva pile of *ifs*! And how do you explain the poor devil who has all that goin' for him and then gets his teeth full of birds on takeoff?

The breeze coming in the car window had cooled considerably. In his sweat dampened flying suit, Norm wondered about the possibility of catching cold and rolled the window partially closed. He thought back to Air Div when, about ten years before, two T-birds collided head-on in cloud at night on airways. The odds against are fantastic, he thought. If one aircraft had been ten lousy feet higher . . . . . if one had been even slightly delayed, or gone slightly earlier, the accident would probably only have been a near-miss. If only one of the pilots had had an extra cup of coffee after supper . . . . . or maybe one of them did; if only he hadn't . . . . . So, Norm thought, there does appear to be an element of fate in the affairs of pilots.

Norm came up to the traffic light at the edge of town as it changed to green. He turned right and paced with the slow-moving traffic. Some men are accident prone, he thought, and some aren't. But was that really true? He recalled a pilot he had known at Gimli—the crash trucks were out every time the guy took off.

Six blocks farther on Norm turned left onto his own street and his mind came back to the events of that afternoon: He and another instructor had taken up two students for a formation exercise. After lunch they attended the 1245 met briefing. The forecast was for typical air mass weather—ceilings 3000-5000 scattered to broken with heavy cumulus build-ups and a possibility of scattered thunderstorms after 1600 local; visibility unlimited with an occasional two miles in rain after 1600. No sweat, they planned to be off at 1330 and down at 1500.

They taxied at 1330, about five minutes later than planned, and were number three at the post for takeoff at 1335. There was a ten minute delay while an aircraft with an unsafe gear indication was recovered. It stopped on the runway and the pins were installed before it was towed away. Finally, they were airborne at 1350.

Norm led the formation westbound on a visual climb to on top in the MFA. By 1400 they had levelled off and Norm let his student take control to lead number two through the exercise. They could see towering cumulus farther to the west. After forty minutes Norm's student called for number two to take the lead and the other instructor indicated he would like a 5-10 minutes workout. Norm took control and gave the other instructor about five minutes of practice.

By 1500 the lead change was completed and Norm advised the new lead to keep his eye on the anvil heads that appeared to be 30-40 miles west. At 1520 the tower transmitted a general recall on guard. They turned towards base and switched to terminal. The undercast was now fairly solid cumulus with only the occasional sucker hole visible. Heading back at FL 250 they found that some of the build-ups towered well above them. Terminal gave them the weather as 3000 overcast, 5 miles in rain, wind 240-270 at 10-20 mph with severe thunderstorm activity on radar at 20 west. They were number four for the approach with an EAT of 1545. Norm remembered thinking that things were definitely starting to bind.

As they swung over the holding fix and into the pattern they entered cloud. It was lumpy and Norm had to take control. After two patterns he felt himself starting to sweat and he noticed that his student was breathing very rapidly.

At 1550 they were outbound in descent. Terminal was now calling 3000 overcast, 4 miles in rain, wind 240-290 at 20 gusting to 40. Norm couldn't help feeling that they had definitely lost control of the situation. They had to land and it was touch and go whether they or the thunderstorm would get to the base first. It was no longer a question of rational planning—it was now a question of luck.

As they descended, the clouds grew darker and the lumps more severe. Just keeping the lead's wingtip in sight was becoming a problem. Norm remembered the fear that gripped him as he became disoriented. Slowly he felt the formation rolling into a steep banked attitude. With the turbulence, the darkness and the disorientation he started to overcontrol. He strained to reduce the magnitude of his control movements as much as possible. His student was definitely hyperventilating but he recalled thinking that he couldn't worry about him at the moment. Anyway, he was sure they were below 10,000 ft. He forced himself to concentrate all his attention on the lead's wingtip.

Then they broke out. It was almost darker below the cloud than in it and the turbulence was strong even at 2500 ft. Norm was relieved to get out of the cloud and get his gyros upright. They were five miles from the Tacan gate and the sky ahead was black; vivid streaks of lightning slashed violently to the ground. At the gate they picked up the runway lights and saw that the centre of the cell was at the far end of the airfield. Switching to tower they were given a surface wind of 240-270 gusting to 50 mph. As they approached minima the turbulence was severe, the airspeed was erratic and the stall warning was cutting in and out. Norm dropped back for the landing and the touchdown on the wet runway was solid. He needed lots of aileron and rudder to keep it straight. They shut down near the hangar doors and the aircraft were quickly towed into the barn.

They had stood, helmets in their hands, near the open hangar doors with a group of groundcrew, watching the storm vent its full fury on the base. That was close . . . . . Norm had thought – could just as easily have turned out differently. The CO right then could have been convening a Board to investigate the loss of two of his aircraft. Norm wondered what the findings would have been . . . . . .

He managed to get his car into the driveway without hitting the tricycle, the bicycle or the lawn chair. Going in the door he noted that the lawn needed mowing again.

"Hi hon", his wife called, "How was your day? "

"Not bad", he answered, reaching into the fridge for a beer. "Did you get started on those new drapes? "

"No", she said, "I got tied up by a lot of little things today".

Pulling the top off his beer Norm said, "Yeh, I know what you mean! "

ABOUT THE AUTHOR *Tom Hinton is a former RCAF pilot who is now employed with MOT as an Inspector with the Dept of Aeronautical Information Services. During his service career Mr. Hinton flew the F86 with 430 Sqn in Europe and later instructed on T33 and Tutor aircraft. He was also a member of the 1967 Golden Centennaires aerobatic team.*

Good Show

MCPL M.E. LOCKWOOD

MCpl Lockwood, a radar controller, was on night duty at CFB Greenwood when the terminal controller asked him to check his scope for a civilian light aircraft which had departed Greenwood for Halifax. The pilot had reported encountering deteriorating weather and had climbed to 4000 feet to remain above cloud. The pilot gave his position as over Kentville, 20 miles to the east, and was heading 250 degrees in an attempt to return to Greenwood.

MCpl Lockwood observed a target well south of Kentville heading approximately 250 degrees. This course, if maintained, would have taken the aircraft past Greenwood to the south. The target was turned to 360 degrees for radar identification, positively identified and then vectored over the hills to the valley area for a straight-in approach.

Because the pilot seemed to be in a confused state, MCpl Lockwood doubted that a conventional radar approach could be successfully carried out. He therefore decided to give the azimuth vectors along the valley with step-down elevation control until cloud breaking could be accomplished. This procedure worked out well and the pilot carried out a circling approach to a landing.

MCpl Lockwood, during this approach, showed excellent judgement and radar controller ability. Sound knowledge of his equipment, operating procedures and local terrain enabled him to perform an outstanding service to a civilian pilot.

MCpl R. Gauthier

MCpl H.C. Torgerson

MCPL R. GAUTHIER

While carrying out an acceptance check on a CH118 aircraft, MCpl Gauthier removed a panel on the underside of the helicopter to inspect this area of the fuselage. With the panel removed, a section of the power lever control system was partially exposed. Although the acceptance check did not call for inspection of this section of the power lever control system, MCpl Gauthier thoroughly examined the bellcranks in this area. He found that three screws which secured a bellcrank mount had backed off approximately three turns. Further loosening of the screws during normal movement would probably have resulted in a disconnected power level control bellcrank mount with an accompanying loss of engine power. MCpl Gauthier's professional attitude and attention to detail prevented the development of a hazardous condition in this helicopter.

MCPL H.C. TORGERSON

During an investigation on a T33 to verify that a recent modification had been carried out on unit aircraft, MCpl Torgerson also checked to ensure that hydraulic and fuel lines in the vicinity of the speed brake actuator were not chafing. He noticed that a bracket on the right hand actuator was very close to the tip tank fuel transfer line on some aircraft. Checking further, he found two aircraft with the fuel lines almost severed by the bracket. A local Special Inspection revealed that one other aircraft had a line which was badly chafed. The extra time and effort which MCpl Torgerson spent on this investigation undoubtedly averted a serious air incident or possible loss of an aircraft.

MCpl Torgerson's thoroughness and professional dedication reflect his keen sense of responsibility.

CPL F.M. SNELL

While conducting a check of the boundary layer control duct on a CF104 aircraft, Cpl Snell observed misalignment of witness markings on the head of a bolt securing the wing rear beam assembly. Checking further, Cpl Snell discovered that the bolt had sheared where it entered the wing anchor nut. If

Cpl F.M. Snell

Cpl R.B. Gosney

undetected, the sheared bolt could have dislodged in flight resulting in a possible fouling of the aileron, or BLC duct damage with corresponding roll off problems for the pilot during landing.

Cpl Snell is commended for his alertness in locating and rectifying a possible flight safety hazard.

CPL R.B. GOSNEY

Cpl Gosney is an airframe technician employed as a Quality Assurance Inspector at a civilian contractor. While performing a J57 engine pre-installation check, Cpl Gosney found that two bolts attaching the turbine case assembly to the turbine exhaust case were loose and broke when turned with his fingers. Seven other bolts fractured on initial movement when torque wrench pressure was applied. These bolts are not included in the DND Inspector's Checklist. A UCR was raised and further investigation revealed evidence of previous overtorque.

The engine had been cleared and was scheduled for installation in an aircraft off the DLIR line. Cpl Gosney's thorough inspection technique prevented a possible afterburner separation which could have created a very serious in-flight emergency.

CPL J.E. TREMBLAY AND CPL P.G. PIRIE

During towing operations of a CF100 aircraft, Cpl Pirie, the mule driver, heard an abnormal noise coming from the starboard main landing gear. He immediately stopped the towing operation.

Cpl Tremblay, was a member of the crew, confirmed that the parking brake had released and then visually inspected the area of the starboard main gear. He discovered that the outer wheel on the starboard main gear was canted slightly out of alignment. The aircraft was jacked up on the spot and the crew found that the wheel could only be turned with difficulty. Subsequent removal of the wheel revealed the cause of the binding – the bearings had completely disintegrated causing severe damage to the brake and wheel assembly.

The professional competence and initiative displayed by Cpl Tremblay and Cpl Pirie prevented the development of a serious incident.

Cpl J.E. Tremblay and Cpl P.G. Pirie

CPL W. MEIKLE

During a Special Inspection on a J79 engine, Cpl Meikle was carrying out a FOD check prior to re-installation of the compressor top rear casing. He noticed that an 8th stage stator vane was bent forward. Upon closer inspection he found that the abnormal position of the vane was caused by a partial separation at the blade root. Further investigation revealed blade root damage to the entire series of the 8th stage rotor blades. The damage was assessed as beyond unit repair capability and the engine was removed from service and directed to a civilian contractor. Engine failure with the possible loss of an aircraft would have resulted had the damage not been detected.

Cpl Meikle's alertness and dedication eliminated a potentially hazardous situation and he is commended for his actions.

CPL G.N. HOLLIDAY

Cpl Holliday was on start crew detail during a night flying operation. He had just performed a start on a solo student's aircraft and was about to move to the next aircraft when he noticed what he thought was smoke coming from the nose area of the aircraft he had just started. Because it was dark, he proceeded closer to investigate and confirmed his suspicion. He signalled the student pilot, who was about to taxi the aircraft, to shut down. The problem was later confirmed as a battery thermal runaway.

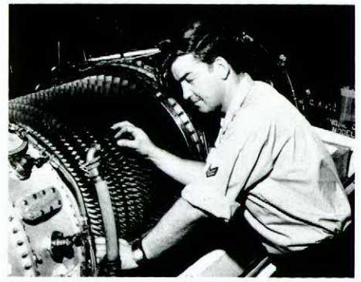
A serious accident or incident was averted by Cpl Holliday's very alert and timely reaction to this problem. In view of the night conditions and the inexperience of the student pilot, Cpl Holliday demonstrated sound initiative and a conscientious attitude towards his responsibilities on the flight line.

CPL G.L. WALKER

Cpl Walker, an integral systems technician at VU 33, Sidney, B.C., was carrying out a routine flexible maintenance inspection on the carburettor actuator electrical system of the starboard engine of a Tracker when he noticed what appeared to be a crack in the forward oil tank support bracket. He confirmed that the bracket was, in fact, cracked and

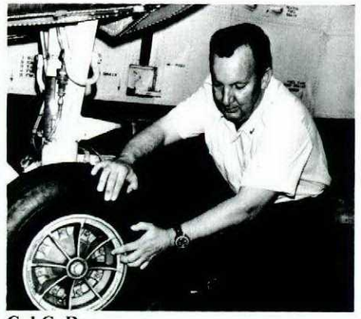
Cpl G.N. Holliday

Cpl W. Meikle

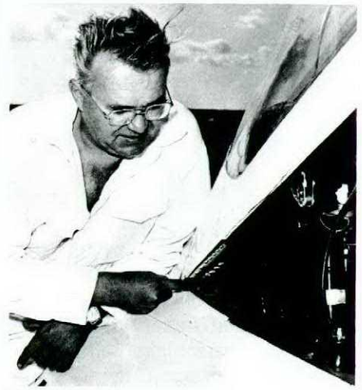


GOOD SHOW

Cpl G.L. Walker



Cpl C. Rees



Cpl W. Patri

reported his discovery to the unit maintenance co-ordinator. Subsequent investigation revealed that two out of three squadron Trackers had cracked oil tank support brackets or support channels.

As a result of Cpl Walker's discovery an urgent UCR message was sent out and a Special Inspection of all CP121 aircraft ensued. Cpl Walker's attention to detail and keen follow-up action may have prevented a serious accident due to complete failure of the oil tank support brackets or channels on CP121 Tracker aircraft.

CPL C. REES

While removing the chocks from a Sea King at CFB Shearwater Cpl Rees noticed two sheared bolts in the helicopter's main wheel assembly and immediately advised his supervisor. Cpl Rees is a radar system technician and is therefore not normally responsible for landing gear inspection. His initiative and alertness in detecting this failure prevented a possible aircraft accident.

CPL W. PATRI

Cpl Patri parked a transient T33 and was about to install the left tip tank pin when he noticed that the panel was not positioned correctly. He advised the pilot and then rectified the problem.

A little later, whilst carrying out the DI on this aircraft, Cpl Patri was cleaning the canopy when he discovered that it seemed to be rather loose. He inspected the hinges and suspected that the right one was loose but could not identify a problem since the area was not readily visible. He removed a panel and found that the hinge screw was missing. The canopy, in effect, was secured by only one hinge. The screw was replaced and the canopy was then checked serviceable.

Cpl Patri has truly demonstrated a professional approach by detecting these problems on a routine inspection.

Hazardous Baggage

This bag burst open as it was being unloaded from a sched flight revealing a leaking bottle of Javex bleach (corrosive to aluminum alloy) and a package of photo flash bulbs. These items are PROHIBITED in personal baggage as per CFAO 20-19, Annex A and require special handling as laid down in CFP 117 "Transportation of Explosives and other dangerous materials by Military Aircraft". There have been several instances recently where dangerous material has been found in aircraft cargo holds. On one flight, a live detonator cap was found in the baggage compartment after unloading.

We don't read *all* the CFAOs *every* day and it is easy to forget about this kind of restriction. For example; how many passengers on service flights are still carrying the various kinds of prohibited cigarette lighters? Posters and signs at the AMUs are one method of putting the message across but it's really up to you to know what you may or may not carry. Take time to check on the requirements of the CFAO: It's in yours and everybody else's interest.

Pilot Factor Accidents

a nine point checklist

The USAAVS organization recently conducted an analysis of 1520 rotary wing and 452 fixed wing accidents in which a pilot factor was identified. The analysis revealed that 96% of the accidents could be attributed to one of nine factors. Obviously, these statistics and findings relate to a specific group of aviators and cannot be used to pinpoint problem areas in other services. The terminology may be different but these nine factors do sound very familiar. If you don't become involved in any of the following you can almost be assured of remaining accident free.

DISORIENTATION

These accidents occurred mainly during the inflight or landing phases of night missions. In terms of injuries, fatalities and aircraft damage cost, these mishaps were catastrophic. Most of the accidents occurred with the aircraft on VFR clearances suggesting that pilots expected to maintain visual contact with the ground or horizon. However, the presence of inadequate weather analysis indicates that atmospheric obscuration occurred which the pilots should have successfully dealt with either before or after it was encountered.

OVERCONFIDENCE

Most of these events occurred during landing and appear to focus on a transitory state of the individual which encourages unnecessary risk-taking. This may be due to the pilot's unrealistic overconfidence in his own ability, ability of others and/or ability of the aircraft. Regardless of the object, the pilot's overconfidence is accompanied by a violation of flight discipline which may again be due to an excessive motivation to succeed.

PROCEDURAL DECISIONS

These occurrences involved faulty decision-making regarding selection of the most appropriate procedure from the alternatives available. In other words, the pilot chose an incorrect procedure because he improperly assessed the flight situation.

CREW CO-ORDINATION

This factor refers to those accidents attributed to unsucccessful accomplishment of activities requiring co-ordination between the pilot and other crewmembers. The high loading of inadequate briefing indicates that the assignment of crew responsibilities was not performed or was performed incorrectly. The high proportion of experienced aircraft commanders involved suggests that they were responsible for the inadequate briefing and points to the importance of thorough briefings regardless of crew experience.

PRECISE MULTIPLE CONTROL

The high proportion of these cases occurring during landing suggests that the largest component of positioning skill involved is a precise rate-of-closure judgement, i.e., integrated judgement of aircraft speed and distance to touchdown point. The presence of delay in taking necessary action may be interpreted in the context of training missions during which the instructor pilot misjudged the rate of closure and delayed taking control of the aircraft from the student to a point where recovery without aircraft damage was unlikely. In terms of injuries, fatalities and aircraft damage cost, Precise Multiple Control mishaps were the least severe of all helicopter cases.

LIMITED EXPERIENCE

This applies to a general class of mistakes attributable to pilots with absolutely or relatively low levels of experience. Most of these mishaps occurred during landing and are strongly related to the performance of autorotations in practice or actual emergencies. In general, helicopter Limited Experience mishaps involve students in the process of becoming rated pilots or rated pilots in the training process of transitioning from one helicopter to another.

TASK OVERSATURATION

The mishaps represented by Task Oversaturation involved a degradation of the pilot's ability to share his time/attention among required tasks. These cases can be defined in terms of the different causes of the pilot's degraded ability. The first situation appears to centre on training missions during which the student and/or instructor is so apprehensive about a critical task, such as landing, that attention becomes focused on one aspect of the task at the expense of others. The second situation concerns missions during which a malfunction, emergency or other abnormal condition arises.

ATTENTION

The major component of this event is inadequate attention of experienced pilots in terms of task vigilance or readiness to respond. This most frequently occurs during the landing phase of training missions. Experienced instructor pilots maintaining inadequate vigilance or readiness to respond play a large role in these mishaps. Confusion of controls apparently occurs when the instructor finally realizes the extent to which the flight situation has deteriorated and, in the rush to assume control of the aircraft, manipulates the wrong control or applies control actions to a greater or lesser extent than required.

OTHER: WEATHER

These accidents occurred during operational missions in which weather conditions such as wind, ice or hail influenced the pilot's ability to perform the task at hand. The high proportion of autorotations and landings suggests pilots inadequately assessed the direction or magnitude of winds and made their approaches down-wind or were caught in unexpected cross-winds.

Note: Faulty, poor, or no pre-flight was not considered in this review.

(adapted from USAAVS bulletin)

Dipstick's Measure

by MAJ T.R. Thompson

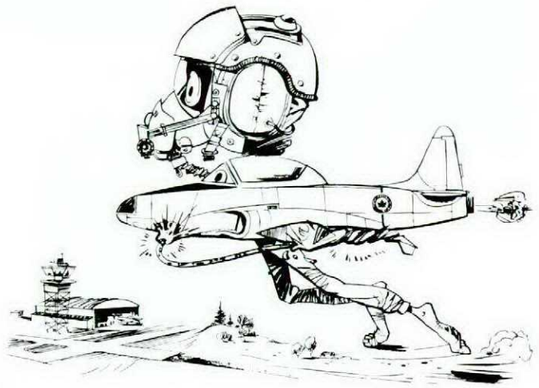
Some years ago an intrepid aviator friend of mine confided, over a Friday night suds, that earlier that week he had flamed out on final approach to his home base due to low fuel. His assessment of low fuel (the fuselage tank gauge was reading 20 gals on final) was actually *no* fuel because of the well-known inaccuracies in the fuel tank contents measuring system.

The hero story was full of hair raising derring-do and the saving of the airplane could only be credited to the high level of skill and judgement displayed by my illustrious confrere. Mugs filled and medals all around: put him up for a *Good Show* we all agreed.

Closer examination of all the facts under more moderate conditions the following day revealed insidious problems that can creep into the best planned mission. Lt Dipstick had preplanned a high level cross-country profile from A to B. At B he was dropping off a passenger (a pilot qualified on type), refuelling and proceeding to C, his home base some 100 miles away. Once airborne and well-established en route to B, he discovered that due to unforecast winds his ground speed was considerably higher than that for which he had planned.

Well, it was a nice day and no significant weather problems existed at his destination. Dipstick passed his time by calculating the parameters for his next leg, B to C. Glory be, he only needed 90 gallons under no wind conditions for that short leg. Add another 30 for good measure and then have a look at the low level winds along the proposed route. A check with METRO revealed that the winds were forecast to be light and variable along the route B to C. He rechecked his calculations to his satisfaction and then added another 30 gallons to allow for the unforeseen. Dip was in pretty good shape. His decision was that he must be rolling at B heading for C with no less than 150 gallons. His calculations indicated he would be on the ground at B with 190 remaining. Now all he had to hope for was that his passenger was good and efficient at dismounting and safetying the back seat.

Well, the rest is history. Dip had more than his preplanned 150 gals at takeoff from B and he knew the route like the back of his hand. Old Dip sat back and enjoyed the passing scenery and expected to be on the pitch within 20 minutes. However, halfway along he got the uncomfortable feeling that he wasn't making good time. He tried to establish his ground speed but alas, he had no topographical maps and he was too low for Tacan coverage. With base in sight and 20 gallons remaining the aviator par excellence sheepishly declared an emergency and requested "straight in – low fuel".



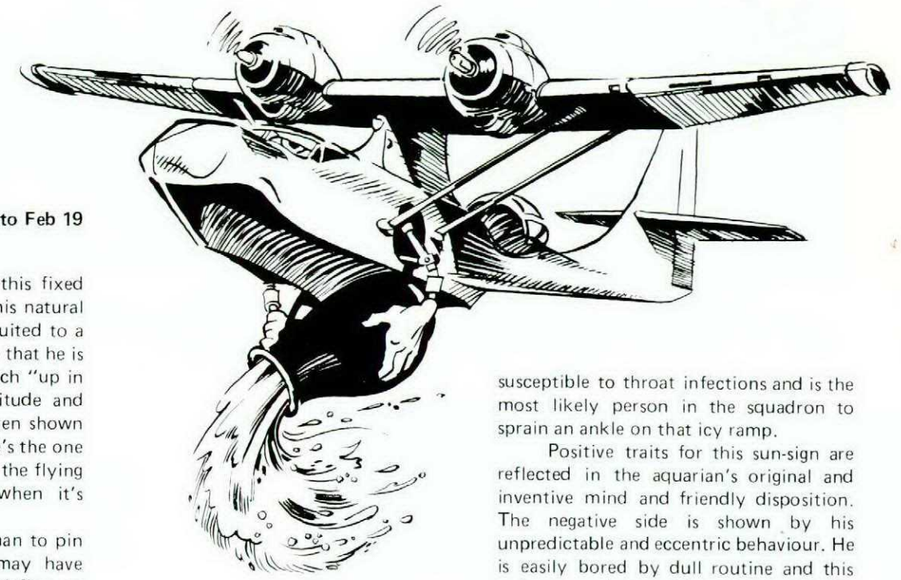
On the ground and following his not so friendly interview with the BOpsO, Dip recalculated his figures: They were absolutely correct. However, approximately one hour prior to his incident, Met was advised by PIREP of the presence of 80 – 100 knot head winds at 3000 ft. Lt Dipstick wasn't aware of this change in low level winds, nor could he be expected to be under circumstances which were self-generated. Had he taken time out to have a smoke and coffee at B, topped up with a bit of JP4 and rechecked the weather with the local forecaster, there is good reason to believe his leg B to C would have been classed as uneventful. On landing at C he may have commented that the weather bureau still didn't know their arch from their elbow and gone off to the Mess happy and confident that he had once again outguessed the gods of mediocrity and unawareness.

Dip was lucky and his planning was highly accurate – right down to the last ounce over the approach lights. But was it necessary and did he really display a high level of skill and judgement?

Fuel Crisis

"A number of technicians were detailed to carry out the refuelling of an aircraft. A fuel tender was called and the refuelling operation started. Unfortunately, the fuel tender did not have sufficient fuel to completely do the job and the fuel tender driver had to return to the POL Compound to get another tender. While waiting for the second tender, the refuelling crew went back to their original tasks. When the tender arrived, the crew went back to the aircraft to finish their job. Approximately 400 gallons of fuel were added to the previous fuel load of 6000 gallons when the tender driver became aware that jet fuel was being put into the aircraft. Defuelling started immediately and the aircraft fuel system was flushed. Unfortunately the contaminated fuel was removed from the aircraft with an Avgas fuel tender. This in turn contaminated the tender which had to be flushed. A fuel sample also had to be sent away to ensure the truck was free from contamination before the truck could be used again."

ASTROLOG



aquarius

Jan 21 to Feb 19

The aviator born under this fixed air sign is indeed operating in his natural element. The aquarian is well suited to a career in aviation – so much so that he is often accused of being too much "up in the clouds". His detached attitude and unconventional approach is often shown by his style of clothing. Yes, he's the one wearing the Oxfords instead of the flying boots or the summer suit when it's twenty below.

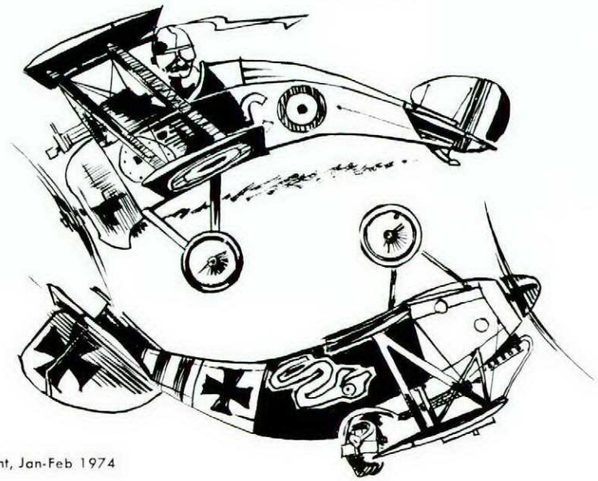
The aquarian is a hard man to pin down to precise times and may have difficulty arriving on time for briefings or making an ETA. He is ruled by Uranus, the planet of change, and this accounts for his occasional unpredictable behaviour and erratic conduct. The Uranus flier should pay particuiar attention to his health as he usually doesn't get enough sleep. During the winter months he is susceptible to throat infections and is the most likely person in the squadron to sprain an ankle on that icy ramp.

Positive traits for this sun-sign are reflected in the aquarian's original and inventive mind and friendly disposition. The negative side is shown by his unpredictable and eccentric behaviour. He is easily bored by dull routine and this makes *complacency* his arch-enemy. That streak of originality may produce a good fighter pilot but obstinate insistence that he is always right may lead him to the point where it is too late to back off.

pisces

Feb 20 to Mar 20

The typical Piscean is sensitive, adaptable and easygoing. If your flying instructor is one of Neptune's people then you're in luck: his intuitiveness, sympathetic nature and genuine interest in your progress will work to your advantage. If he is the victim of an afflicted Mercury he may tend to talk too quickly – so ask him to slow down. If your co-pilot is a fish – watch him – especially if he reveals any of the negative Piscean traits.



The symbol of the two fishes, joined together and pulling in reverse directions typifies the dual nature of the Piscean. His unworldly, artistic temperament sometimes shows up in a careless, indecisive attitude. He has difficulty conforming with discipline or routine and constantly seeks a changing scene. Yes, he's the guy who's always on TD. Look across the cockpit and you'll see him daydreaming, listening to music on the ADF instead of working out the groundspeed. If the Virgo influence is strong you can rely on his ability to organize and concentrate on details but the fish needs a definite challenge – he must swim upstream. He is naturally attracted to liquid and should feel at home in naval aviation but other, stronger fluids, hold a fatal fascination for him. The thirsty Pisces pilot should keep a careful watch on his natural inclination to excess.

Stress Corrosion

and other failure modes

Capt I.M. Ross QETE

In hangar line analysis of material failure on aircraft parts, "fatigue" is the most commonly heard diagnosis. Capt Ross dealt with this problem in the Nov-Dec '73 issue of *Flight Comment*. Although fatigue is very common, there are other important failure modes. In this article the author examines some other reasons for the failure of aircraft components.

OVERSTRESS

A failure mode which is often overlooked because its cause is so obvious, is overstress. This simply means that the part has been loaded beyond its capacity – hence the failure. The overstress may have been caused by either operations or maintenance: excessive "G", hard landing, overspeed of gear or flaps; bolts overtorqued, towing incidents etc. Usually these causes are self-evident.

STRESS CORROSION

As a reason for failure other than overstress, stress corrosion stands high on the list. The mechanism of stress corrosion is very simple. In the presence of a corrosive environment, material subjected to a continuous or cyclic stress corrodes preferentially along the grain boundaries. This corrosion occurs much more rapidly than it would if the material was only exposed to the corrosive atmosphere in the absence of stress.

The stress may be caused by static loads such as the weight of the aircraft, or residual stresses from forging, casting, rolling or extruding material to form the parts. The stress may also be caused by dynamic flight loads or pre-loads from improper adjustment of mechanical components.

The fracture faces of stress corrosion failed parts are typified by a granular appearance at low magnifications, as shown in Photo 1. At high magnification the corrosion products are visible and have a flaky appearance. This is appropriately called "mud cracking" and is shown in Photo 2.

Stress corrosion is often found in conjunction with fatigue: while on the ground, stress corrosion occurs; in flight, the crack front propagates by fatigue. This repeats until either the part fails or the crack is detected by visual or non-destructive inspection.

HYDROGEN EMBRITTLEMENT

Less often found, hydrogen embrittlement occurs in high-strength, heat-treated steels (over 200,000 psi ultimate strength) as a result of poor plating or acid pickling procedures at the time of manufacture. During these processes hydrogen ions are evolved, which diffuse into the metal. These ions migrate to the grain boundary triple points under the influence of residual internal stresses, where they form molecular (gaseous) hydrogen. This then forces the grains apart, weakening the intergranular bonds and embrittling the material with a network of fine intergranular cracks. Photo 3 shows a fracture face of an aircraft part that failed because of hydrogen embrittlement. Fortunately, awareness of the problem and vigilance on the part of the quality assurance inspectors, makes hydrogen embrittlement relatively rare on in-service CAF components.

CREEP

A mode of failure usually associated with high temperature (as for the turbine blade shown in Photo 4) is "creep". Under the influence of stress at high temperature, vacancies tend to migrate to the grain boundaries of the material, where they coalesce to form voids. This weakens the material by forming incipient cracks; elongation takes place and the material fails. This type of creep failure has a block-like intergranular appearance at low magnification, but at higher magnification the dimples characteristic of ductile failure are apparent on the faces of the grains. Photo 5 shows this.

Overspeed and overtemperature conditions on gas turbine engines provide a ripe breeding ground for subsequent accelerated creep failure.

How does all this affect us as members of DND? Well, we can help by trying to prevent all corrosion, some of which may develop into stress corrosion. Of course, some corrosion pits may also provide the required stress concentration points for fatigue failure to start. Any way you look at it, corrosion is bad and should be prevented or at least treated.

Unfortunately there is not much we can do about hydrogen embrittlement unless we're employed in quality control at contractors' plants. Then we should be sure to check on the processes involved whenever high-strength heat-treated steels are being plated, acid pickled or etched.

Pilots and other throttle jockeys can virtually eliminate the in-service occurrence of creep failures by not overspeeding or overtemping their engines. The reader is referred to "Keep Your(s) Cool" in the Sep-Oct 73 issue of *Flight Comment*.

What it all boils down to, as in many other flight safety related matters, is that diligent exercise of common sense will help to detect or prevent defects, making our aircraft safer and more effective.

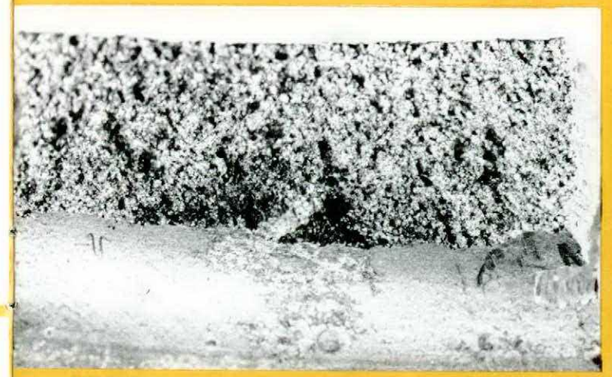


Photo 1
The granular appearance typical of stress corrosion in a cast aluminum alloy at low magnification.

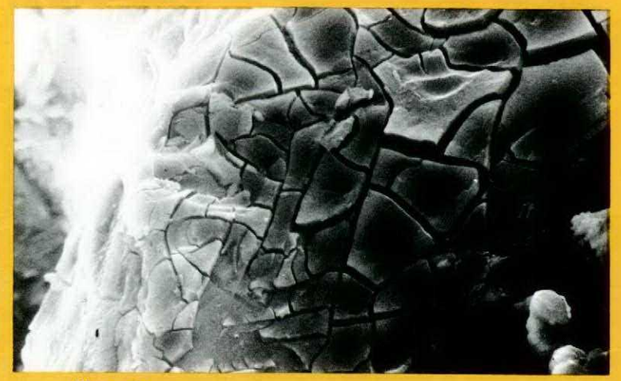


Photo 2
The "mud cracking" which characterises stress corrosion. Scanning Electron Microscope Fractograph at 2000X magnification.

Photo 4
A turbine blade that has failed in "creep".

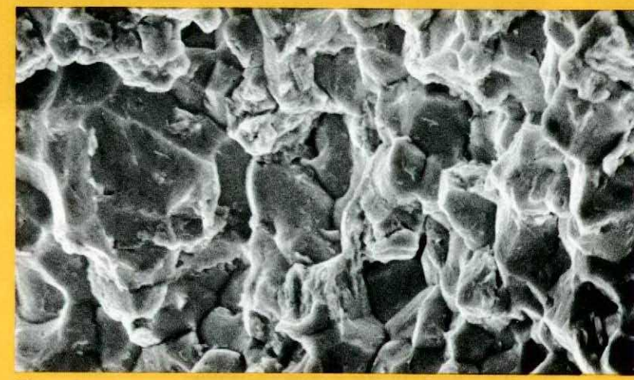
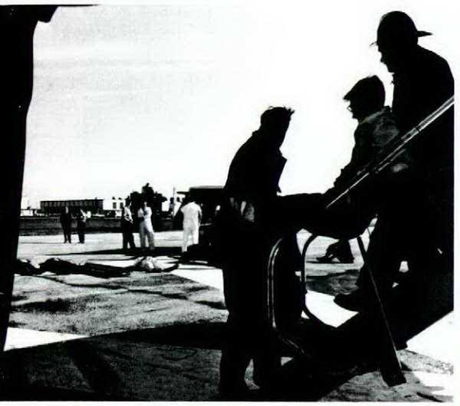


Photo 3
Scanning Electron Microscope view of the fracture face of a failure caused by hydrogen embrittlement; 2000X magnification. Intergranular cracking is visible.

Photo 5
Scanning Electron Microscope view of the fracture face of the failed turbine blade at 250X magnification. The generally block-like appearance of the fracture is apparent as well as the dimples characteristic of ductile failure on the surfaces of the grains.



Photos by CFB Ottawa(S) Photo Unit

Disaster Response Training

is your base ready?

Capt WK Penny
BNDO
CFB Ottawa(S)

Many CF bases are responsible for civilian as well as military air traffic in the areas of air traffic control, crash/rescue, fire-fighting and medical support. Fortunately, disasters such as the crash of a passenger aircraft are relatively uncommon when considered in terms of the millions of passenger miles flown annually. But they do occur – and, in the event of such a catastrophe, Disaster Response Teams at CF bases provide a speedy and well-organized reaction force, trained and ready to provide immediate assistance.

Disaster Response Teams are trained in accordance with an authorized base response plan and the personnel are drawn from the different Sections on base. The disaster response plan contains detailed instructions on the base reactions required to meet various disaster conditions (the crash of a large aircraft is only one of many situations for which the DRT trains).

The base plan is followed by section planning. Each section providing an element or support to the DRT needs a detailed SOP to direct its personnel and resources in the event of a base disaster response. Any deficiencies in planning will show up on a training exercise and thus prompt the necessary amendments.

Element training at the section level is best evaluated by a full scale base response exercise. The photographs accompanying this article relate to a recent training exercise conducted at CFB Ottawa.

A Cosmopolitan aircraft from 412(T) Squadron was pre-positioned at the simulated crash site. A full load of 43 passengers and crew made-up with casualty simulation were on board.

At a pre-arranged time the tower controller alerted and directed the military crash response crew to the accident; there was no simulated fire. The on-scene fire chief discovered that there were many casualties and called Base Operations for additional help. Base Operations then initiated "Disaster Alerting" and set up a Command Post. The Base Commander appointed the Disaster Response Commander to provide overall command and control, who, in turn appointed the On-Scene-Controller who directed and co-ordinated all activities at the accident site. As there was no fire the fire fighters commenced the evacuation of casualties from the "crashed" aircraft.

While most of the initial activity was being directed towards care for the accident victims, other tasks were being carried out. Base Security cordoned off the area and established an access control point to prevent intrusion by non-essential personnel.

The medical element at the site proceeded with the task of sorting the casualties and, where necessary, providing resuscitation. A request was made to the CP for more ambulances and the CP in turn called the Emergency Measures Organization (EMO) to supply the available civilian ambulances. The EMO was also asked to establish the present capability of the area's active treatment hospitals to receive casualties.

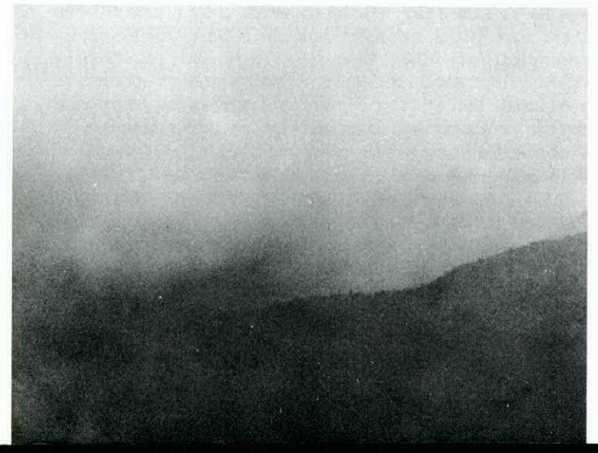
The two base ambulances plus improvised transportation were used to transport the injured to a casualty clearing post where another medical team provided more extensive treatment. Helicopters were also available to transport critically injured casualties direct to the hospitals.

At the CP all the base branch heads were represented to provide advice and commit their resources in support of the response team. Many Sections, with pre-planned response, were already in action: Transportation dispatched a variety of vehicles to their pre-assigned duties; CE sent its damage control team to the area and the Communications Section provided technicians to both the CP and the site. The BFSO was available to the OSC for advice and to initiate the accident investigation procedures.

Exercises of this nature provide team training and also bring to light any parts of the base plan and section SOPs which may need amending or updating. Whilst we all hope that these plans and our trained DRT will never be required, *hope* alone will be of little value in the event of a real catastrophe. What is then needed is a trained response team backed by adequate plans. Are *you* ready?

"Saguenay 51, what's on your mind"?

"–just some low level thoughts."



We are always happy to hear from the squadrons—from those lucky guys who fly real aeroplanes—not mahogany bombers. Our thanks to Maj Denis Gauthier, 433e ETAC, CFB Bagotville, for his photos and comments.

Strike reconnaissance and close air support work mean that we spend a lot of time close to the deck. The photos on the right were taken recently whilst flying a low level mission from Bagotville. The pictures speak for themselves but they remind me personally of a few things.

- How did I get into this low level environment?
- What am I doing here with the gliders, the seagulls, the radio and TV antennas, the tactical helicopters (brown—easy to tally), the light aircraft (the kind SAR look for) and other dumb CF5 drivers?
- Either the weather is coming down or the hills are growing because in exactly 3 miles (25 secs) I will have to make a decision:
  - Turn around (nothing a 6 "G" full afterburner 180º cannot fix);
  - Go around (towards the brighter part of the horizon-sucker);
  - Go up above the whole mess (and probably never see the last 43 minutes of the 57 minutes low level recce trip I just spent two hours preparing).
- How important is this mission? While I'm down here those high level coffee pilots are relaxing on the airway.
- Maybe I should climb to FL 200 and shoot some approaches.
- I guess that this is part of the price a fighter pilot must pay for the luxury of flying in his single seater.

Well, I didn't head for the sucker hole and I didn't get to see the end of the trip—but there's always another time. Sometimes we wonder if we will ever lose the taste for the challenge this role offers—but we don't think so.

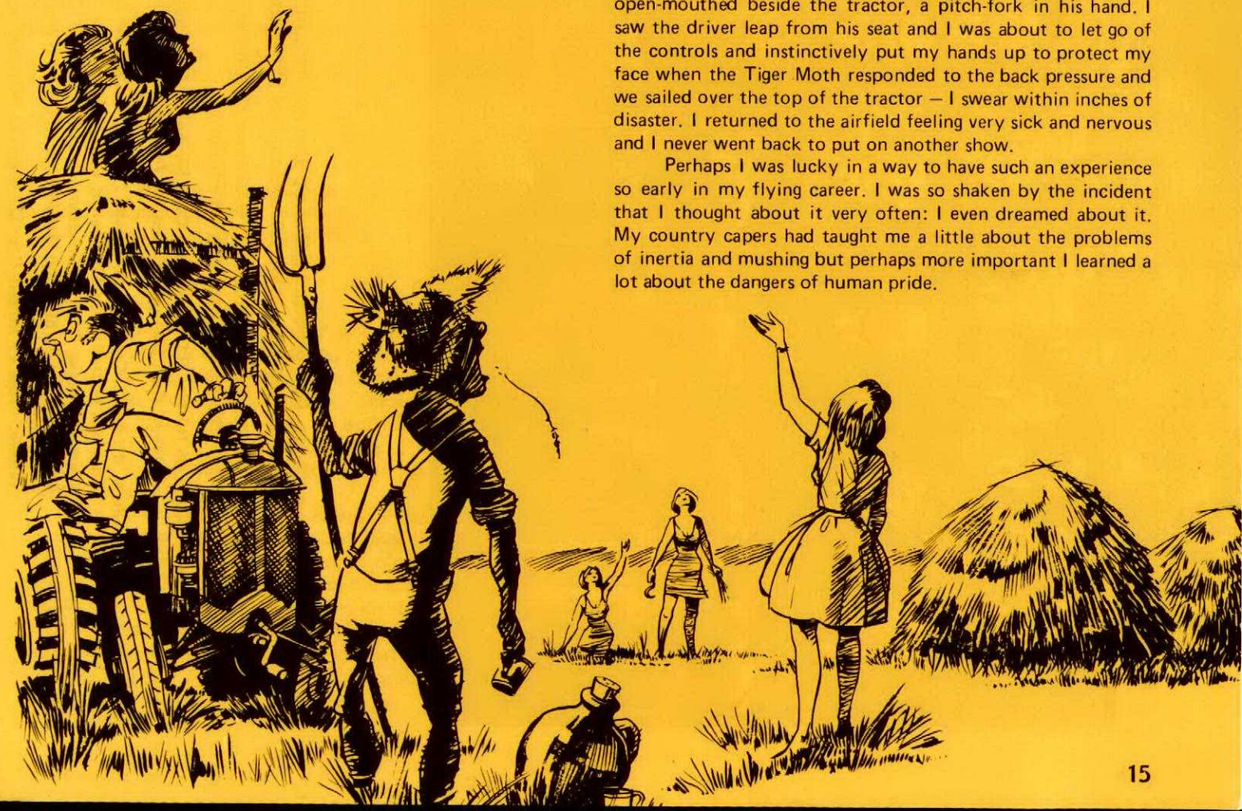
Flashback

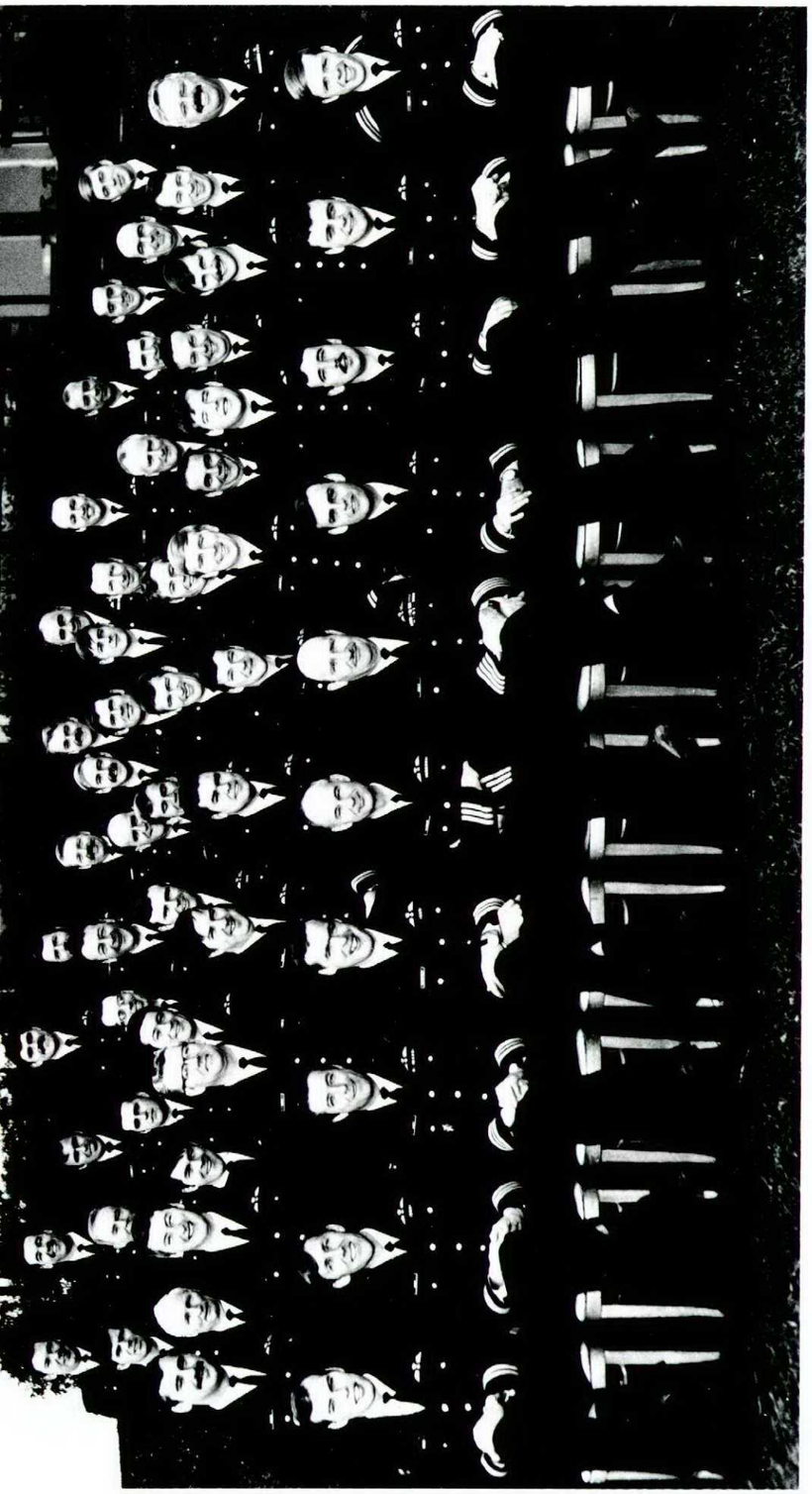
Country Capers

I cannot hear the expression "buying the farm" without vividly recalling those hot afternoons in the halcyon days of my youth when everything beyond tomorrow was somewhere "in the future" and nothing was more important or relevant than strapping into a drafty, shaky Tiger Moth and bouncing off into the blue summer skies. I belonged to the immediate post-war group of cadets and our only ambition was to emulate the feats of our seemingly ancient instructors who had been "there and back" so many times. I had finally fought my way past the first solo stage and had been released out of the circuit. Now that I was an *ace* it was only natural that I should prove to everyone how good I really was and it didn't take long for me to find an audience – and what an audience!

It was late summer and the harvest was in full swing. About twenty miles from the airfield – well clear of any hawk-eyed instructor – I was able to produce a daily *grand spectacle* for an assorted bevy of bucolic beauties who were helping out "down on the farm". I guessed that they were students from a nearby college and my dazzling display of aerobatics (or what I believed to be aerobatics) was therefore all in the interests of higher education. At first the girls were very friendly and would wave happily as I roared by. Unfortunately, after performances on three successive days my audience lost interest and, ignoring my wild swoops and sideslips, seemed more intent on their agrarian tasks. I therefore flew by even lower, hoping to recapture the attention of my fans. Imagine my indignation when one of the farmworkers (permanent, male) threw back his arm and launched a cabbage at my low flying machine. The cabbage missed but the act just made me more determined to impress the peasants with my skill. Away I climbed and zoomed into a series of rolls, loops and other never-to-be-repeated gyrations – all to no avail: the harvesting continued without so much as an upward glance from my admirers. In desperation I decided to try what I thought was a dive-bomber type of attack and I bunted the little Tiger Moth over until I felt as if I was in an almost vertical dive. "This'll show 'em", I thought, as I zoomed in on the old tractor. As I got closer I realized that I again had an audience. Using all the judgement of a 50 hour pilot I started to pull out of the dive. I eased back on the stick but the aircraft just kept right on going. I pulled back harder but there still seemed to be no response. The tractor was suddenly very large. I could clearly see the upturned faces of the girls and my cabbage-throwing assailant was standing open-mouthed beside the tractor, a pitch-fork in his hand. I saw the driver leap from his seat and I was about to let go of the controls and instinctively put my hands up to protect my face when the Tiger Moth responded to the back pressure and we sailed over the top of the tractor – I swear within inches of disaster. I returned to the airfield feeling very sick and nervous and I never went back to put on another show.

Perhaps I was lucky in a way to have such an experience so early in my flying career. I was so shaken by the incident that I thought about it very often: I even dreamed about it. My country capers had taught me a little about the problems of inertia and mushing but perhaps more important I learned a lot about the dangers of human pride.





Canadian Forces' Flight Safety Officers Course 1973

Front Row, L to R: Capt MA Wansink; Maj LT East; Maj RA Last; Maj OC Newport, DFS; LCol FG Villeneuve, DFS; Col RD Schultz, DFS;
Capt AH Lamoureux; Capt G Cousineau; Capt RW Walker; Capt D Kinsman.

Second Row, L to R: Capt RW Kozak; Lt GA Wilson; Capt C Mason; Capt MF O'Shea; Capt CF Ken; Capt JM Hivon; Capt WA Kalbfleisch;
Capt K Mirau; Lt C Campbell; Maj FW Bayne.

Third Row, L to R: Maj RT Brinkhurst; Capt RE Savin; Lt T Dunn; Capt BC Horseman; Lt WG McIntosh; Capt JR Courchesne; Capt CR
Knutson; Capt SD Cooper; Capt RV Preus; Lt JA Cox.

In a gaggle at the back: Capt RW Eby; Capt JY Jodoin; Capt DF Leben; Capt JD McNeil; Capt WR Coleman; Capt LT Farrell; Capt P Barett;
Capt KA Warrell; Capt FP Wagner; Capt RO Sjolie; Capt LA Illingworth; Capt JL Dickson; Capt VR Horning; Capt RE Clarkson;
Capt JC Pellow; Capt KI Struthers; Capt CA Lagroix; Capt JA Wood; Capt CP Lanyon; Maj TR Thompson; Capt
GC Gray; Capt PL Murphy; Maj JS Tupper; Capt FH Mueller.

Absent: Capt TF Straub; Capt DT Bligh; Lt AG Gooding; Lt RO Johnson; Maj GO Langen.

Complacency? Me? Never!

From time to time we are fortunate to be able to present first-person accounts of aircraft occurrences. This gives our readers a chance to share in the experience of others – and perhaps to acquire from them in the process, some of the learning that goes hand in hand with such experience. Our thanks to this pilot and to his squadron commander for permission to print the following report.

What the pilot said:

"As a headquarters desk jockey, I fly the T33 for pleasure and convenience – my pleasure and the Service's convenience. But I don't get complacent. I know that I don't fly enough to be really sharp, so I work at it.

I worked at preparing a combined training/business trip to an ANG base in the USA the other day. The trip was routine and the business was done by noon. I worked at the return trip even harder. Weather at home base was forecast to be intermittently right on radar limits. The alternates that I preferred were a little too low, so I had a couple of game plans worked out for different situations.

Sure enough! One hundred miles out my destination reported below radar limits. I continued until a second report 30 minutes later confirmed the bad news. I requested clearance to a nearby base, even though it was not my filed alternate, because I knew the base well and had enough fuel for a low approach there and then on to my 'paper' alternate.

Terminal control gave me runway 07, wind from 160° at 5 kts. It occurred to me that runway 14 was aligned better with the wind as well as being longer and having better approach aids – but I accepted the instructions to 07.

The approach went OK but the weather was lower than reported. I was adding power to go around when I suddenly broke out. Throttle back and speed brakes out gave me a normal-looking touchdown about 1500 ft down the runway. The T-bird began skating around like a cow on ice, but then T-birds always do that on a wet runway. I raised flaps and began intermittently touching brakes, waiting for the hydroplaning to cease.

Hydroplaning ceased on the right side as expected, but not on the left. Left rudder and right brake got me down to 60 kts or so, but still no braking action on the left. With 2000 ft to go, drastic action was initiated – flaps down again, engine shut down, canopy open. Still no braking on the left. The T-bird coasted merrily off the end at about 30 kts and came to a stop on the grass. No damage except square tires and a slightly sprained canopy.

But how embarrassing! ! Because I had missed at least four good chances to prevent this little accident. First, I could have gone to my legal alternate instead of changing the game plan in the air. Second, and this was the most serious error, I should have given myself a break and insisted on runway 14. Third, I didn't use aerodynamic braking like the good book says even though the runway was wet and out of wind. And finally, I just didn't catch on that I had a problem until it was too late to go around.

Complacency? Me? You bet!

It appears in retrospect that the cause of the braking problem was plain old hydroplaning, with the left wheel refusing to spin up even when the brake was released. The only contributing factor appears to have been a 40 gallon d ifferential in tip-tank fuel which had gone unnoticed. . . . . Complacency again? "

What the squadron commander said:

"The actions which led up to this incident are indicative of a trend I have observed particularly in qualified senior pilots who have flown T-birds for many years and accumulated well over 1000 hours on the venerable machine.

In this incident one can specify causes such as judgement, airmanship and technique. Why select an alternate which you don't wish to use? Having filed a flight plan using such an alternate, should that decision be altered during flight if weather is still as forecast at that base? Having made a decision to perform an approach, why was surveillance radar accepted when wind and weather suggested that PAR could be used? One accepts or rejects clearances. Having reached decision height and commenced a go-around, why change that reasoned decision? Having landed and encountered poor braking action, the reverse technique was employed to effect minimum-roll. Initial aerodynamic braking and correct use of flaps may have reduced speed to a point where hydroplaning was no longer a factor.

But what about the causes? An old sweat should know better and yet the incident, which could of course have been much more serious, still occurred. Was it over-confidence or complacency? I think the answer is complacency.

Complacency is an insidious disease which is hard to detect without self-examination. One can perform effectively and competently on annual check rides, write open and closed book tests to prove one is still the same old stable guy who knows his bird, his procedures, etc. Flights are planned and filed the same old way and yet something goes wrong. This pilot bent a bird and, on reflection, finds that it was probably because he let the old machine get ahead of him or beause he changed a previous, rational decision.

Highly qualified pilots are not immune. They still get involved in preventable incidents – that could easily have been serious accidents. The squadron will do its best to ensure that the aircraft are mechanically sound, that training time is available and that all facilities are provided. We ask you professionals to keep up your guard against complacency and remember that the first, planned decision is usually the best.

ANALYSIS OF AN INCIDENT

(or, why reporting pays off)

The main attitude indicator on a CF101 toppled during the start sequence and would not erect. The instrument was removed from the aircraft, bench tested, found serviceable and reinstalled. The displacement gyro was also serviceable but the rate switching gyro failed its bench test. A serviceable rate switching gyro was installed and after a complete ground check the aircraft was returned to service and flew without any recurring malfunction.

That might have been the end of it but someone remembered that a similar incident had occurred some time before. Further investigation revealed that three Voodoos had recently been grounded by attitude indicator malfunctions. A check of the records showed that all three had been started at the same detachment base; a further common factor being the use of MD 3 power units for starting. A ground check of the detachment's power units revealed the culprit – an MD 3 with wiring which did not conform to existing CFTO data. The wiring was changed on the MD 3 and the Voodoos were able to start without their gyros toppling.

Kitty Kadets

An *incident* with a Hercules (not CF) has brought to light a new cause factor for investigators. The report reads as follows:

On shutdown after an airtest a squealing sound was heard coming from the instrument panel area. Inspection of the area above the nose wheel and under the cockpit floor revealed one male and four female kittens of unknown origin. Rescue was effected through the nose wheel kidney panel.

Cause: Feline promiscuity

On the Dials

In our travels we're often faced with "Hey you're an ICP, what about such-and-such?" "Usually, these questions cannot be answered out of hand, if it were that easy the question wouldn't have been asked in the first place. Questions, suggestions, or rebuttals will be happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communication to: Base Commander CFB Winnipeg, Westwin, Man. Attn: ICPS.

New Criteria

"The new CRITERIA are coming! The new CRITERIA are coming!" "What's criteria?" you ask. CRITERIA is GPH 209 – The Manual of Instrument Approach Criteria (issue no. 2). If you are thinking that this is just more blurb on a manual that doesn't concern you, think again! For example: Do you completely understand this minima block for an airport at 605 ft ASL?

	B	C	D	E
TAC ST IN	1240-1 1/4 (635)	1240-2 (635)	1240 2 1/4 (635)	
CIRC	1360-1 1/2 (755)	1360-2 (755)	1380-2 (775)	
PAR		805-1/2 (200)	26	

Yes, it's similar to the U.S. system, but there are some subtle differences. Let's take the headings. There are *four* categories of aircraft: B, C, D and E. Each category has *three* sets of minima: TACAN straight-in, TACAN to circling and PAR (PAR is published for your convenience).

CATEGORIES AND DESCENT GRADIENTS

CAT	SPEED KTS	WEIGHT	EXAMPLE	DESCENT GRADIENT
A	50-90	30,000 lbs or less	CC138	450′ per NM
B	91-120	30,001-60,000	CC115	400′ per NM
C	121-140	60,001-150,000	T33	350′ per NM
D	141-165	over 150,000	CC137	300′ per NM
E	over 165	Speed only	CF104	300′ per NM

NOTE: The weights are the maximum authorized gross landing weights and the speeds are 1.3 times the stalling speed in the landing configuration at the max gross landing weight.

This is the minimum 'descent per NM' for which the final approach can be designed. Conversely, if an MDA is published with an HAA of 400 ft, the visibility should relate to how far back on the approach a pilot should acquire visual cues in order to safely make the approach. There are variables such as runway length and wind but by giving the pilot concrete information, we hope he will allow for the variables. Get down and get your cues.

For a change of subject how about this?

AERODROME TEMP		TEMPERATURE CORRECTION CHART								
°F	°C									
+35	0	0	20	20	20	40	40	40	40	60
+15	-10	20	20	40	40	60	60	80	80	80
-3	-20	20	40	60	60	80	100	100	120	140
-23	-30	40	60	60	80	100	120	140	160	180
-40	-40	40	60	80	100	120	140	160	200	220
	-50	60	80	100	120	160	180	200	220	260
		200	300	400	500	600	700	800	900	1000
		HAT or HAA								

By way of introduction let me state that even the most modern altimeters are unable to distinguish the fact that a column of air incorporating a 0.5 ins hg pressure differential becomes shorter as its temperature decreases. What was 1000 ft before is now 1000 ft – X. The Temperature Correction Chart gives you the value of X.

What does this mean to pilots? As the instrument approaches are revised you will be required to apply this temperature correction to your MDA or DH in order to guarantee obstacle clearance. You will do this during pre-flight planning or approach planning by noting the surface temperature of the station providing the altimeter setting and the HAA/HAT for your approach procedure. In our example, CAT C TAC ST IN, the HAA is 635 ft. If station surface temperature was -23° F we would apply a correction of 100 ft to our MDA to give us a new MDA of 1340 ft. Have we raised our minima by 100 ft? No! What we have done is correct our altimeter for temperature error and re-established our HAA at an actual value of 635 ft.

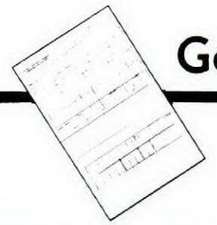
Need proof that it is required? Ask any pilot flying ILS approaches to apply these figures to his ILS check altitudes.

Another table to apply! ! The alternative is to publish minima guaranteeing obstacle clearance in all conditions, which would mean applying the *maximum* temperature correction expected directly to the obstacle clearance and publishing that figure.

That's enough for now but remember:

"Visibility means Visual Cues for a No-Sweat Landing" and "The Cold Can Get to You in More Ways Than One".

Gen from Two-Ten



CF104, NOSE GEAR COLLAPSE The pilot completed a low level navigation mission and returned to home base for a radar fullstop landing approach. On landing the aircraft was seen to bounce into the air and subsequently porpoise down the runway. An abnormal landing attitude and heavy ground contact caused the nose wheel strut to collapse from overstress. The aircraft eventually settled on the bomb dispenser and forward fuselage. The drag chute was deployed and the aircraft brought to a stop on the runway. No fire or pilot injuries were experienced.

CH135, PRACTICE AUTO The CH135 returned to base for circuits and practice autorotations. A standard approach was carried out to a five foot hover. The aircraft was then climbed to 1000 ft AGL and following normal cockpit checks, the pilot initiated an autorotation.

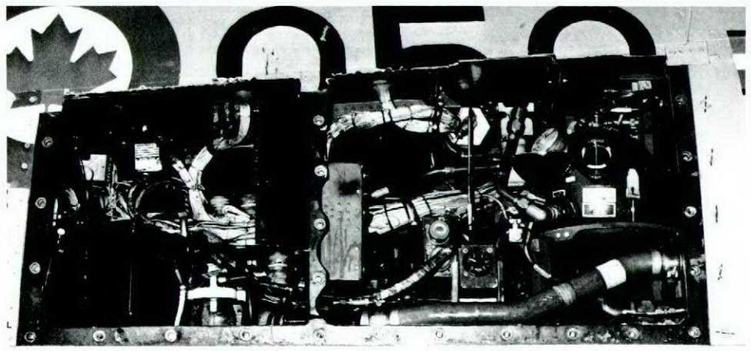
The autorotation appeared normal until power was applied for recovery at approximately 100 ft AGL. The crewman later reported that at this point he heard an abnormal high frequency buzzing: The pilot did not notice the normal requirement for left pedal to counteract the increase in torque. The low rotor RPM warning tone sounded at 92% and the RPM continued to drop. The pilot lowered collective pitch at approximately 50 ft AGL with the rotor decaying to 60%. The aircraft contacted the ground heavily in a nearly vertical descent and sustained 'B' category damage.

Intensive investigation revealed no evidence of engine unserviceability and mechanical malfunction was not a factor in the accident.

VOODOO, LOST PANEL After takeoff, during a climbing port turn, pulling normal "G", a loud noise was heard from the port side of the aircraft. Visual inspection from the tower confirmed that a panel had been lost. Fuel was burned off and the aircraft landed safely.

Such is a brief description of what turned out to be a C cat accident but the outcome could have been much more serious. The investigation revealed a classic sequence of events – the minor links in the chain – which culminated in this accident.

A hydraulic leak was discovered in a brake line on start up so the pilot shut down the engines and waited while the problem was rectified. Following this, another start was attempted but the starboard engine combustion starter failed to operate and the crew decided to take another aircraft. The snag crew came out to the aircraft, opened an access panel on the port side to check on a circuit breaker, and then attempted another start. This was also unsuccessful and they decided to change the starter.



The aircraft, however, was fitted with external fuel tanks, so the snag crew technician went for supper while defuelling and tank removal was taking place. No CF349 entry was made to indicate that the panel was opened to check the circuit breaker.

After supper the technician changed the starboard starter and carried out a ground run. It was now getting dark and was raining heavily. A "B" check was completed by a technician from the servicing crew and the aircraft was signed off as serviceable.

Meanwhile, the pilot and navigator had been waiting for a DI on their replacement aircraft. It was completed and the log signed out just as the first Voodoo again became serviceable. The mission profile planned by the pilot was better suited to an aircraft with external tanks and he therefore elected to change back to his original machine. While he went back to the hangar to sign out *again* the navigator went to close the canopy because of the rain and decided to strap in. The pilot arrived, checked the right engine panels, which housed the starter unit, and then climbed into the front seat.

All the ingredients are present in this one: inattention, a little carelessness, frustration, judgement, supervision, the effects of long hours on duty and less than ideal environmental conditions. The securing of aircraft panels and a foolproof method of "red-flagging" presents a continuing problem. A feasibility study of self-flagging type fasteners should be completed by Feb '74. Meanwhile, only increased vigilance by all concerned will prevent a recurrence of this type. This is the second case within three months of a Voodoo losing a panel in flight.

CF104, WRONG TARGET The mission profile called for a low level navigation route to a manned equivalent target followed by a simulated attack on a manned tactical target, then to a bombing range for live practice weapons deliveries.

The pilot initiated a 5 to 10 degree simulated strafe attack on a target which turned out to be a farm vehicle one kilometre short and 300 metres to the left of the actual target. The misidentified target was located one third of the way up the side of a steep tree-topped hill. On recovery, while climbing, the aircraft struck trees on the crown of the hill resulting in an engine compressor stall and rapid loss of thrust. The pilot ejected successfully at 500 – 700 ft AGL. The aircraft was destroyed when it crashed into a heavily wooded area more than four kilometres beyond the initial tree impact point.

An in-depth study of tactical flying operations is presently under way. The aim is to provide:

- a more structured environment as regards technique and release criteria for attack pilots;
- more clearly defined mission planning requirements and safety criteria;
- greater stress on duties and responsibilities of supervisors in the conduct of flying operations;
- an interim minimum altitude of 800 ft AGL has been established for simulated attacks.

SEA KING, TAIL ROTOR BUZZ The helicopter was taxied from the hangar to the heliport for takeoff. Following an engine topping check in the hover, the pilot began a hover controllability check and initiated a left pedal turn out of wind. "Tail rotor buzz" was encountered with 75% pedal input and a relative wind of 060 to 080 degrees (the reported surface wind at the time showed gusts of 25 to 34 mph). Right pedal was introduced in an effort to get out of the buzz but effectiveness was lost and the helicopter entered a series of uncontrollable pitch, yaw and roll motions. When it started to climb, the engines were secured and some measure of apparent control was regained. However, the rotor RPM was decaying with high blade coning angles. The aircraft plunged to earth making contact in a slightly left nose/wing down attitude. Although the co-pilot, in the right seat, was able to quickly free himself, the aircraft captain and the crewman were trapped in their seats. Fortunately there was no fire as it took rescuers 1½ hours to free the crewman.

Practice Autorotations

In a recent amendment to CFP 100, NDHQ defines practice autorotations as follows:

Practice Autorotation to Touchdown: a pilot induced autorotation terminated by a power off landing.

Practice Autorotation to Power Recovery: a pilot induced autorotation terminated by a power recovery within the safe envelope of the height/velocity chart and at/or above the minimum recovery height, using the procedure detailed in the appropriate AOI.

The parameters of airspeed and altitude at which return to powered flight is to be effected are designed to give the pilot an opportunity to safely perform an emergency landing if an actual engine failure occurs during any phase of the practice autorotation sequence.

• • •

To the uninitiated the question inevitably arises; why conduct practice autorotations at all? It might be more appropriately worded; why take unnecessary risks while conducting practice autorotations? In answer to the first question, a recent study at NDHQ reconfirmed that, in the absence of an escape system in helicopters, practice autorotation training was necessary in order to offer crew and passengers a reasonable chance of survival in the event of an emergency necessitating autorotational descent. Having established the need to practise autorotations, let us examine the measures we can take to eliminate or at least reduce the hazards to an acceptable level and still ensure that the training objective is reached.

The danger areas that can accompany practice autorotations have been well documented in accident/incident records over the years. Here is a list of the classic ones which cause problems together with a reminder of the safeguards that should be observed:

Disregard of AOIs and Orders Disregard or ignorance of the contents of these publications continues to appear as a cause factor in autorotation accidents. Hence insistence on a good, professional knowledge of AOIs and orders is an ever present requirement of the accident prevention program. Without this first essential step towards a safe operation, the other safeguards take on a much less meaningful role.

Climatic Conditions The hazard created by high density altitude is only one of several climatic conditions that must not be overlooked. On that hot summer day be prepared for a lesser degree of performance from the rotor as pitch is pulled in to cushion the landing. Wind velocity and visibility also deserve careful consideration before attempting a practice autorotation. And finally, never attempt a practice autorotation to an area where possible whiteout conditions may be encountered. It has been tried before with very discouraging results.

Stretching the Glide Distance There are methods of stretching the glide which provide the pilot with yet another variable enabling him to reach a suitable touchdown area. This procedure is covered in AOIs and is accomplished by increasing the airspeed to the best recommended glide speed. In addition, rotor RPM can be held at or slightly above the low limit for autorotation. Two situations that cause considerable grief can result from these techniques. Firstly, the pilot may allow rotor RPM to fall below acceptable limits thus decreasing the "autorotation region" of the rotor with a resultant increased rate of descent. Secondly, having recognized that (despite an attempt to stretch the glide) he can no longer reach the touchdown spot safely, the pilot may continue the approach in an attempt to salvage the manoeuvre through some stroke of luck. This may be the lesser of two evils in the event of a forced landing but in a practice situation – don't risk it. Bring in the power early and overshoot before it becomes potently obvious that you cannot reach your intended touchdown spot safely.

Reducing the Glide Distance Suppose it becomes apparent early in the sequence that you will overshoot the selected touchdown spot. Various methods of reducing the glide distance are taught during training. However, regardless of the technique used, the proper approach sight picture must be gained as early as possible in the sequence to avoid making attitude changes in the final stages of the approach. If you can't gain the right sight picture the only safe alternative is to apply power, overshoot and try again.

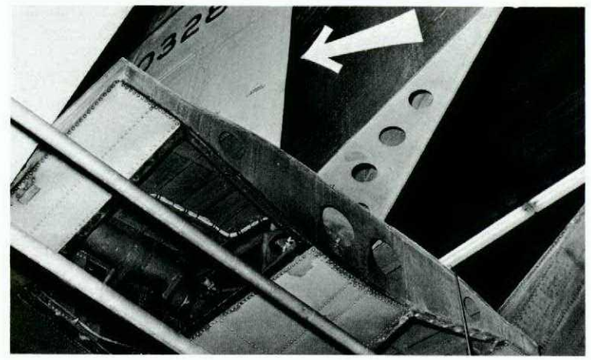
Competitions "I'll bet you a beer that I can shoot an autorotation and touchdown closer to the runway numbers than you can". The foregoing has been an invitation to disaster on more than one occasion. Competitions are healthy in some situations but unfortunately they often encourage risk taking that has no place in practice autorotations.

Any discussion of autorotations would be incomplete without this one final statement. Rotor RPM is your "Staff of Life" which, if allowed to drop below safe limits, will inevitably cause no end of grief.

Handle like eggs!

Transport Command crews are very proud of their record, and will tell you how good they are at practically everything – and at times the rest of us almost believe them. We appreciate the skill and experience of the Hercules pilots but need they go to such great lengths to prove how silky-smooth they are.

The nest pictured here was removed – complete with egg – from the rudder of a C130. It was located in the lower portion of the rudder, resting on the second shelf up from the bottom. Apparently the aircraft flew several hours with nest and egg aboard without incident. Perhaps the Herc operation *really* is for the birds.



Comments to the editor

SEMAPHORE –

In your recent article "Oh for the good olde days" I felt it next to impossible for the BE 2 pilot to be rendered u/s due to being struck on the head by a semaphore flag (if indeed the observer could, or should, be using them in the rear cockpit).

As an old back seat Atlas and Lysander man, I think your pilot was conked on the dome with an Aldis lamp!

A.L. Perry
(W/C ret'd)
D Safe G
Ottawa

The BE2 series of aircraft were flown from the rear cockpit so we are prepared to accept that the pilot could be struck by something wielded by the observer. However, we thought that semaphore flags would be too unwieldy. We therefore used the lamp. Apparently Very lights were used in early days and a 20 lb Sterling wireless for aircraft made its appearance in the fall of 1915.

LUCKY STARS

After reading Maj Davidson's article "Transport Pilot Stress. . .on departures" in the Sep-Oct 1973 edition of Flight Comment I can only thank my lucky stars and my career manager (in that order) that I am in Maritime Command flying the Argus.

In the course of our job we must also:

a. depart on time;
b. report to Command if we are more than fifteen minutes late, and why;
c. take garbled ATC clearances;
d. chase up Base Ops once in a while;
e. purchase and check rations for up to twenty-five people for twenty hours;
f. absorb lengthy weather, intelligence and operational briefings;
g. brief the crew on how the mission is to be tackled;
h. check the serviceability of the aircraft, engines, communications, detection and recording systems;
j. check the disposable load of sonobuoys, weapons, etc;
k. be unpopular with the crew;
m. be popular with the crew;
n. be nice to our fifteen year old, rigid winged, piston powered low flying iron bird;
p. be keen and eager;
q. be stoical when facing a four hour delay due to a faulty part which must be changed whenever the storeman gets in to issue it in the quiet hours;
r. Oh! For Pete's sake the list goes on forever.

And in the Argus squadrons we also have an item on our pre-takeoff checklist that reads "FRUSTRATIONS". But we have a four position switch to control them and the switch is marked "HIGH –

LOW – AUTO – NORMAL". It doesn't have an "OFF" position, so the standard response is "NORMAL". Then we roar off down the runway in the firm knowledge that if anything unexpected can happen – it will.

Capt G.B. Bennett
449 Maritime Training Sqn
CFB Greenwood

We are sure that many of the problems facing transport pilots also confront maritime crews. Perhaps the time is ripe for someone in Maritime Command to write an article illuminating the problems peculiar to the maritime environment. We'll be happy to print.

NO CREDIT

Members of AETE Cold Lake were thrilled to see that CF5 702 made the cover of Flight Comment. However, we were dismayed to find that there was no story or credit on the inside cover.

The photograph recorded the last armament mission of Major Garth Cinnamon prior to his retirement from the Armed Forces. It was taken from a CF5D by photographer Cpl Ed Hendricks using a Rapid Omega 2 1/4 x 3 1/4 format. Capt Ron Haughton was the "Chase" pilot for the occasion.

Sgt W. Holland
NCO i/c Air Photo
AETE
CFB Cold Lake

We're always pleased to give Cold Lake a thrill! Many thanks for telling us about the photograph: As you may have guessed, we received many queries. We would have gladly given credit to those involved but we only received a copy of the photo a few hours before going to print – and it was just too good to miss. Now the next time you do something outstanding like that why not send us a copy pronto then we won't have to snivel around Rockcliffe all the time bugging the Photo Unit.

GOOD SHOWS

As a member of the "bend-em" crowd for many years now, I continue to be amazed at the ingenuity, perseverance and dedication of many of the "mend-em" crew.

Every issue I read the "Good Show" entries in Flight Comment, and it remains perfectly obvious that we pilots are supported by some pretty fine technicians. While everyone is expected to perform his duties in a professional manner, this is an inadequate explanation of why some aircraft technicians are not satisfied with the obvious but must squeeze, contort and scrape knuckles to ensure the absolute safety of an aircraft.

My respect goes to the airmen who maintain the aircraft so diligently, and I salute Flight Comment for continuing to highlight those men who perform miracles.

Maj R. Morris
NDHQ/DNW

We endorse your view completely and we feel sure that the rest of the "bend-em" group agrees.

MORE ON PARKAS

Someone once asked how the Inuit manage to survive in the Arctic. The answer was "They don't – they live there! "

The foregoing is, I think, apropos in considering the "total rejection of fur-trimmed parkas" by the Churchill staff of exercise New Viking (Flight Comment – Jul-Aug 73).

As far as I know there is no record of any eye injury from frozen fur spikes on parka hoods in the many years CFSTS has operated in the Arctic. In the four seasons during which I instructed Arctic Survival Courses at Resolute, there was no such injury, although there were plenty of cases of facial frostbite which could be attributed to parkas with inadequate (due to age) fur trim.

I strongly suspect that if any eye injuries were likely to be caused by ice on the fur it would have happened last year when abnormally high temperatures caused the worst icing up of clothing I have seen. It should be noted that personnel under these conditions have little opportunity to adequately dry equipment.

With few exceptions (those who were born and grew up there) we in the Canadian Forces are neophytes in the Arctic, and as such we must be extremely careful when it comes to making profound statements as to what is and isn't right in the way of equipment. Otherwise we are all too likely to follow in the footsteps of Franklin, or worse yet, send others to do so. Modern technology hasn't solved all the problems yet!

Fortunately there are experts on whose knowledge and experience we can draw. Two such experts are my good friends Jackoosie Iqualuq and Levi Nungaq, the Inuit instructors for CFSTS at Resolute. They have 5000 years of Arctic experience to draw on – as well as the benefits of modern technology. They seldom wear caribou parkas any more (although when Levi heads off on his "Sikadoo" for a hunt on Bathurst Island he puts on the full armour of the Lord in the form of a complete outfit of caribou skin) but – *both their cloth parkas are fringed with the longest fur their wives can lay their hand on! !*

They don't freeze their noses, and as far as I know they don't even wear glasses!

PLD

Kingaluq (Big nose, always cold)
Lt(N) R.A. Watt
450(T) Hel Sqn Det
CFB Edmonton

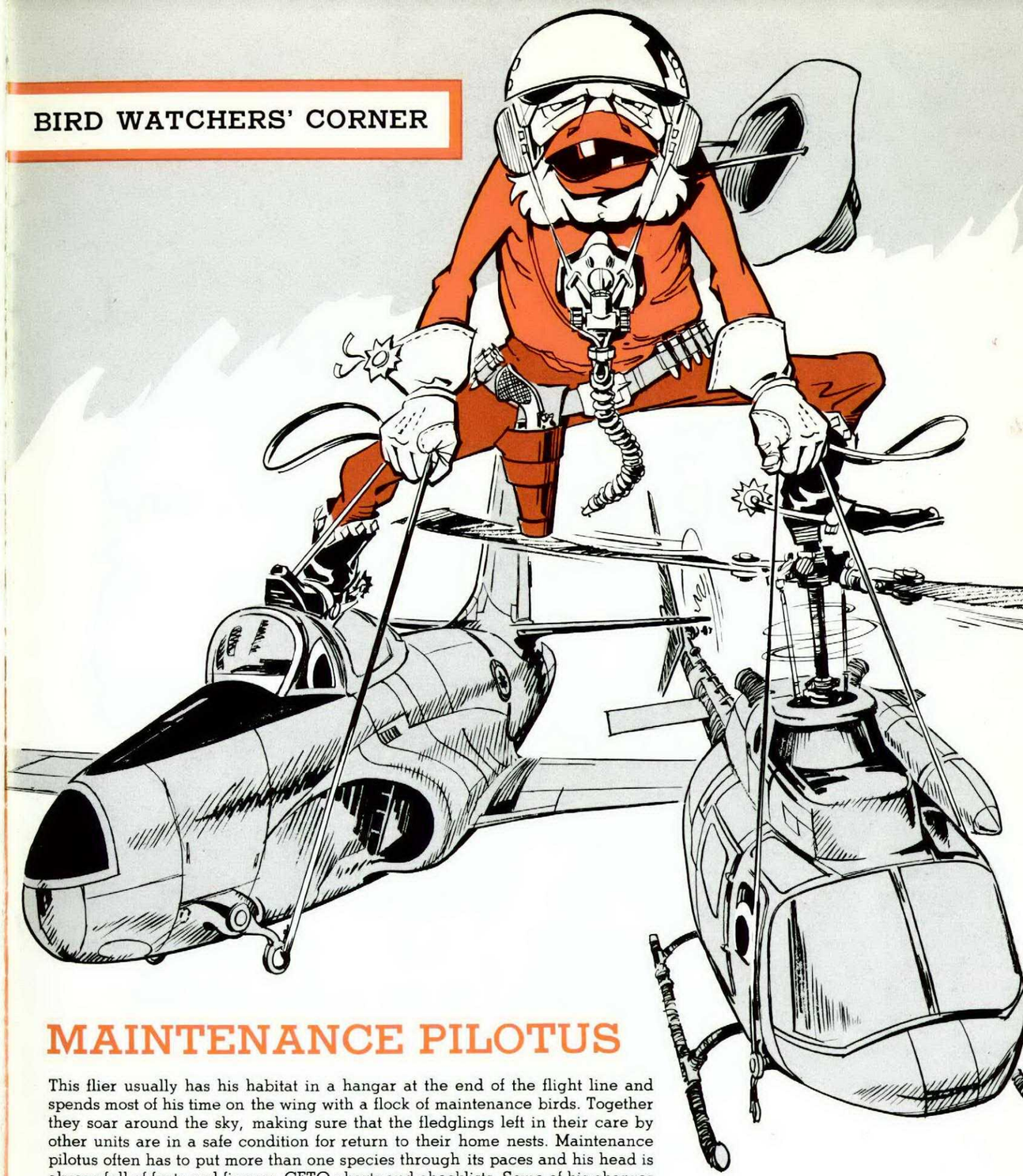
Quotable Quote

". . . . In passing I would like to say I do not subscribe to the view of some American lawyers who equate human failure to an act of negligence. Apart from sabotage people do not set out to cause accidents. Very rarely do people, in the act of commission or ommission which causes an accident, even realize that they are taking a risk. In the ordinary sense of the word people concerned with aircraft are not negligent. Human failures are not usually blameworthy as they stem from insufficiency of knowledge or skill of foresight. . . ."

(Extracted from the 20th Barnwell Memorial lecture given by Dr. Walter Tye, Controller Safety, of the British CAA)

Flight Safety Foundation

BIRD WATCHERS' CORNER



MAINTENANCE PILOTUS

This flier usually has his habitat in a hangar at the end of the flight line and spends most of his time on the wing with a flock of maintenance birds. Together they soar around the sky, making sure that the fledglings left in their care by other units are in a safe condition for return to their home nests. Maintenance pilotus often has to put more than one species through its paces and his head is always full of facts and figures, CFTO charts and checklists. Some of his charges need constant adjustment of their wings and feathers before they can fly smoothly but the maintenance magpies can perform mechanical miracles. Eventually, all problems are solved and as Maintenance Pilotus straps in again to take off down the trouble-shooting trail he warbles wisely:

MAINTENANCE-TEST—MAKES-'EM-SAFE-FOR-THE-REST

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