FLIGHT COMMENT

THE FLIGHT SAFETY DIGEST OF THE CANADIAN ARMED FORCES

EDITION 4 1976

GUNFIGHT AT OD CORRAL

by Capt L. D. Hawn

The skies above the earth provide the battleground for the fastest and deadliest form of combat between two human beings. There are no markers, no battleground emblems, no plaques or statues to commemorate the spilling of blood and the tearing of metal. The skies are uncluttered by the debris of the contesting men and their fighting machines. There is only a silent emptiness awaiting the next short violent struggle from which will emerge only one victor. No other form of combat demands the same intense concentration or fires the imagination as does air combat.

From the romantic heros of World War I to Churchill's "few" of 1940 to the MIG killers of Korea and Southeast Asia, no single arena of battle has had such a profound effect on the overall outcome of the conflict. It is a basic precept of war that to move freely on the ground a force must have control of the air over the battlefield. To control that air a force must rely on its air combat elements to provide a sky free of enemy air power that could harass ground and ground support operations. This fact was clearly demonstrated in World War II, Korea, Southeast Asia, and the Middle East.

The men who fight in this highly specialized arena have changed little over the years; only their image has changed. Gone are the flamboyant, scarf-in-the-breeze aristocrats of World War I. The air combat pilot of today is a dedicated professional. To be successful he must possess the highest qualities of eyesight, coordination, discipline, ability to concentrate, motivation, and, above all, the ability to react instinctively to situations that are changing more rapidly than in any other combat environment. He must have an almost psychic awareness of all the forces acting on his aircraft, the aerial battle situation, and his enemy's reactions. To lose concentration or react incorrectly normally means death or capture and the loss of a weapons system worth many millions of dollars. Ask any fighter pilot – they've all been there many times – there is no lonelier or more frustrating feeling than having your enemy locked at six o'clock, even in a training environment where all that is shot down is your pride.

Obviously, most of the qualities required of a good air fighter are not acquired by a gift of nature. Concentrated and realistic training is necessary to develop the skills which must be mastered in order to survive. One place where the fighter pilots of the Canadian Armed Forces have the opportunity to develop this expertise is at 417 Tactical Fighter Operational Training Squadron operating the CF104 STARFIGHTER at CFB Cold Lake, Alberta. 417 Squadron is responsible for producing fighter pilots for our three NATO CF104 squadrons in West Germany as well as refreshing the pilots from these squadrons in supersonic air combat tactics which cannot be practised in the crowded skies over western Europe.

Although it is only one aspect of the training conducted at 417 Squadron, air combat manoeuvring is by far the most demanding and quickly reveals those who have the true fighter pilot instinct and ability. The fledgling fighter pilot is brought along slowly in this phase, first learning how to handle the CF104 close to the limits of its performance envelope. He then learns how to manoeuvre the aircraft in relation to an "enemy" aircraft and uses the basic textbook manoeuvres which he will have to master and apply instinctively later on. As the course progresses the "enemy" becomes increasingly more evasive and the number of aircraft involved is increased requiring a high degree of co-ordination and cooperation. On his last few missions the student must be able to use all the knowledge he has gained in a correct and timely fashion or suffer the ignominious fate of being "shot down" by a classmate. All of this training is carried out under the watchful eyes of the staff instructors at 417 Squadron who all have extensive experience in the CF104. Many of the staff are qualified Fighter Weapons Instructors and include exchange officers from the United States and Great Britain who have a previous background in fighter aviation; some in actual combat. All air combat training is very closely controlled and is carried out under a very rigid set of rules that are designed to make the engagements as safe as possible without sacrificing realism. 417's flight safety record in this regard has been outstanding.

There is one serious limitation to the air combat training conducted at Cold Lake. Continued engagements with a similar type of aircraft affords little appreciation of the capabilities of a real enemy in a different aircraft. If the first time a fighter pilot meets a different aircraft type in combat is during an actual conflict he stands a very good chance of spending the rest of the war as the entertainment chairman of his prison camp.

Air combat training between dissimilar aircraft is not an easy thing to arrange, but in 1975, for the second year in a row, 417 Squadron conducted an air combat training program with Fighter Squadron 201 of the United States Naval Reserve. VF201 operates out of Dallas, Texas and flies the F8H CRUSADER, an aircraft that enjoyed more success than any other against the MIGs in North Vietnam. The pilots of VF201 are nearly all reservists who have civilian occupations and do their fighter flying in their time off. They are all veterans of Southeast Asia and get a considerable amount of CRUSADER time each year, nearly all of which is devoted to air combat training. They and their aircraft proved to be worthy opponents for the staff of 417 and the resident Fighter Weapons Instructors Course.

Many hours of organizing must go into an event of this sort with myriad details of accommodation, messing, maintenance facilities, and entertainment being addressed. For many months ahead of time Captains John David and Ron Doyle worked on an exercise program and schedule of entertainment designed to test the endurance of both man and machine.

The advance party of VF201 arrived early on 16 Sep 75 in a US Navy cargo aircraft jammed with 59 maintenance personnel and all the equipment and spare parts that would be needed in the next ten days. Eight mean-looking white CRUSADERS followed being led by Commander Stan Stookey. The groups of fighters were met by the Commanding Officer of 417 Squadron, Lt. Col. Tony Bosman, and his staff and presented with a suitable Canadian libation which signalled the start of ten days of tremendous camaraderie and professional exchange.

Following an evening of entertainment, all crews assembled for a mass briefing. After the usual welcomes, detailed briefings were given on local air traffic control procedures, the flying and social program, rules of engagement, and the relative capabilities of the STARFIGHTER and the CRUSADER. Much emphasis was placed on the fact that this was to be a learning exercise and not a competition to see who could get the most "kills". Each pilot therefore was required to fill out an individual report on each mission explaining the way he saw the aerial engagement, what he learned from it, and any recommendations for improvement.

There were several types of sorties planned, beginning with the simplest form of air combat – one STARFIGHTER again-

st one CRUSADER. The "Zip" drivers were immediately impressed with capabilities of the CRUSADER in aerial combat. Many of the overeager who got their "fangs out" too early quickly found themselves looking over their shoulder at the gaping intake of their adversary as he was about to administer a simulated dose of hurt. It would require careful tactics and strict discipline to stay out of trouble.

The majority of the engagements were multi-aircraft battles involving two STARFIGHTERS against one and then two CRUSADERS; four STARFIGHTERS against two CRUSADERS; and, finally, one STARFIGHTER against two CRUSADERS. During the two versus two and four versus two engagements each flight of combatants operated on their own radio frequency as a great deal of radio chatter is required to effectively manage an air fight involving several aircraft. This also provided more realistic training because, with all aircraft on the same radio frequency, the "enemy" can listen in and know what you are going to do. To control this safely a staff pilot from 417 Squadron operated from the 42 Radar Squadron facility north of Cold Lake. He was there to monitor the flight on radar, listen out on both frequencies, and pass on any pertinent information such as missile "shots", gun "kills", or disengagement calls. All engagements were tape recorded to assist in reconstructing the flight during debriefing.

Before each sortie a very comprehensive briefing was carried out by the mission leader with all participating pilots. Rules and procedures were thoroughly covered before the "enemies" split up into their individual sections to discuss the tactics they would try to employ. Flexibility was stressed, as an engagement rarely goes as briefed. Normally, the adversary would do something unexpected which would call upon the fighter pilot's sixth sense of being able to do the right thing at the right time. One wrong move or losing sight of the fight normally spelled instant doom. All the fights were high speed affairs with the opponents meeting head-on, but with positive separation, at closing speeds of up to 2,000 miles per hour. Only the foolish slowed to much below supersonic speed as the battles raged from 40,000 feet down to a simulated ground level of 9,000 feet. If a fighter pilot passed below 9,000 feet engagements were terminated to allow safe recovery from any attitude of flight.

The most difficult part of any sortie was reconstructing events during the debriefing which followed each mission. Although the fights lasted only a matter of minutes, the conditions changed so rapidly and the mental stresses on the pilot were so severe that it was like trying to recall the movements of each passenger milling about in a Paris subway station at rush hours. These debriefings were invaluable and the learning that took place in the air was consolidated by the discussion of good moves and mistakes. CRUSADER pilots were especially adept at recalling what happened owing to their extensive experience in air combat. There was also a mass debriefing at the end of each day where all the day's flying was discussed.

As the exercise progressed a rapid upswing in the learning curve of the STARFIGHTER pilots was readily apparent. New tactics were tried and either proven or discarded. Fighter coordination and air combat awareness and discipline increased markedly and in the latter half of the exercise, there were even several CRUSADER pilots looking over their shoulders at the sleek nose of the CF104. The STARFIGHTER pilots gained new respect for their aircraft when they discovered what it could do when handled properly in a hostile environment.

The weatherman cooperated and the aircraft serviceability was maintained at a high level due to a great deal of hard work by the ground crews of 417 and VF201. This resulted in 85 percent of the planned sorties being flown with a total of 90 CF104 sorties and 74 CRUSADER sorties being accomplished. There were no flight safety incidents, which is a tribute to the professionalism and discipline displayed by all involved.

VF201 personnel contributed tremendously to the success of STAR CRUS 75. Their professionalism, motivation, and flexibility throughout the exercise was most impressive. The mere fact that 90 percent of their air training is directed to the air combat environment, and their willingness to pass this expertise on, provided an excellent training and learning forum for all CF104 pilots involved. Lt. Cdr. Jon Jordan, VF201 Operations Officer, put it this way: "Air combat training is the very best type of training for a fighter pilot and to lose the opportunity to practise these skills would be a tragedy that would difinitely weaken our capability as a fighter force." Commander Stookey was greatly impressed with the facilities at Col Lake and commented that "there is probably no better facility for conducting dissimilar air combat training anywhere in the world." Lieutenant-Colonel Bosman agreed and added that "exchanges like STAR CRUS 75 can only benefit everyone involved both from a professional point of view as well as in the area of international cooperation toward a common goal. Moreover, this exercise has shown unequivocally that dissimilar ACM, if properly controlled and conducted, is not only a beneficial but also a SAFE operation".

As a direct result of STAR CRUS 75, Air Command HQ recently has approved dissimilar ACM for CF104 basic course students involving 417 Squadron CF104's and 419/434 Squadron CF-5's. Thus, maximum ACM training value once again is being achieved without sacrificing the all-important demands of FLIGHT SAFETY.

Precious Son

Above the mud the dawning sky
Was clear and peaceful, vacant, blue –
When suddenly to delight my eye
An aeroplane came into view.

Marvelling, I wondered then
How man could spawn this wondrous car,
Yet had not caused himself to learn
A formula for ending war.

While still I mused another plane
Came challenging the first to find,
The fittest, and there soon began
A contest, so the day was primed.

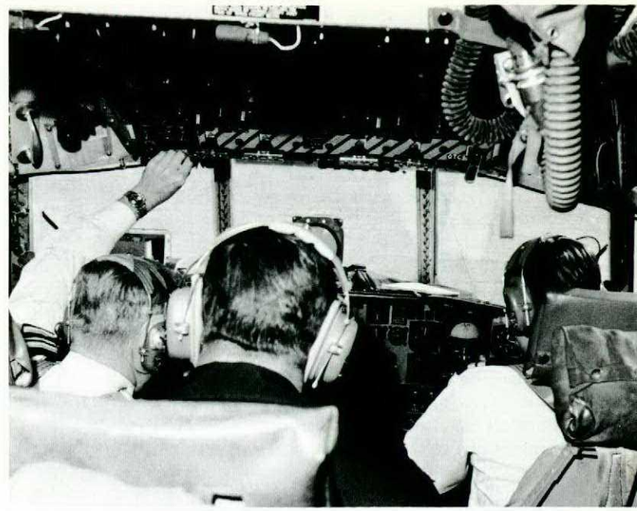
The struggle chattered, roared with hate
To signify its mortal tone,
'Til flaming fingers seized the fate
Of some dear mother's precious son.

God help us seize this costly prize
The seeds of peace to sow,
And reap the harvest of the wise
Not crosses row on row.

Robert Rickerd/Airdigest

When a crew member feels he's not part of the "action" or that he must jealously defend his right to privacy, he may not be . . .

Tuning in the Awareness Frequency



by 1st Lt Alfred Nickerson, 71ARRS
Elmendorf AFB, Alaska

You're cruising along at flight level 230, well into a tiring day, when the loadmaster, who happens to be taking a break on the flight deck, interrupts your approach briefing with a, "Hey, pilot, what's our altitude supposed to be?"

As the aircraft commander, how would that grab you? Would you tell the sergeant to mind his own business and return to his own crew station? Or would you remind him that, based on your several thousand hours of flying time, you fell perfectly capable of maintaining your assigned altitude, thank you? Or, could you accept the question as reasonable and proceed to check it out?

An incident such as this actually occurred not too long ago – much to the embarrassment of the two pilots and their navigator. The loadmaster, who was aware of the planned altitude and was far from being ignorant on the importance of complying with a clearance, pointed out that the aircraft was cruising 1,000 feet lower than its assigned altitude. The pilots quickly made up the difference. A good thing, too. Less than two minutes later another aircraft, flying the opposite direction, passed 1,000 feet beneath them. Simply an alert loadmaster who happened to be at the right place at the right time? Or an example of crew co-ordination?

One spinoff of aircrew discipline is crew coordination. Less interphone chatter, better radio communication procedure, and accuracy in checklist responses are all indications of crew coordination. But there's a lot more to crew coordination than that. Even a crew that runs its checklist with precision and seems to be the epitome of coordination may be missing a vital element of the truly coordinated crew. What is this element? It's crew member awareness.

A crew member's awareness can be dulled in several ways. One is by the crew member himself. He may have personal problems that sap his attention or divert it from all but his most basic duties. Or the aircraft commander or other members of the crew may have discouraged his curiosity and interest toward the duties of other crew members. It's up to his aircraft commander, and to some degree his other crew mates, to keep him "tuned in" with them. In any event, if he's not tuned in, look out. Your crew has just lost some of its ability to detect and head off problems.

The aircraft commander who really leads his crew will cause each crew member to feel that he is an important part of the action. It is surprisingly easy to squelch a crew member's enthusiasm by "isolating" him exclusively within his own position in the aircraft. An attitude such as, "I'm just the radio operator so why should I risk catching hell by pointing out that the boss has got the wrong tacan tuned," could spoil a crew's whole day. And its says a lot about the aircraft commander.

Aircrew members, and pilots in particular, are often defensively jealous concerning their talents and crew positions. They may resent any implication that they have made an error. This is not an unnatural attitude, but taken to the extreme, it can be dangerous. Let's face it, even crew members with years of experience occasionally make mistakes. For example, a navigator with a great deal of experience but new to his squadron had a flight two miles off course when a pararescueman aboard the aircraft, noting the terrain beneath them, tactfully pointed out the error. The PJ had been flying over the same route for several years and knew most of the landmarks. The navigator corrected the error. No problem in this case. the PJ had maintained an awareness and by doing so assisted the navigator – who was smart enough to take a good tip. Crew coordination? Yes, we would have to call it that.

You can no doubt think of numerous instances in which a crew member whose duties did not necessarily relate to the problem at hand played a great part in either solving the problem or reducing its intensity – a flight engineer who reported an oncoming aircraft that no one else saw, a navigator who reported an open door on the life raft compartment while using his sextant. That they report their information without hesitation indicates they are, indeed, aware.

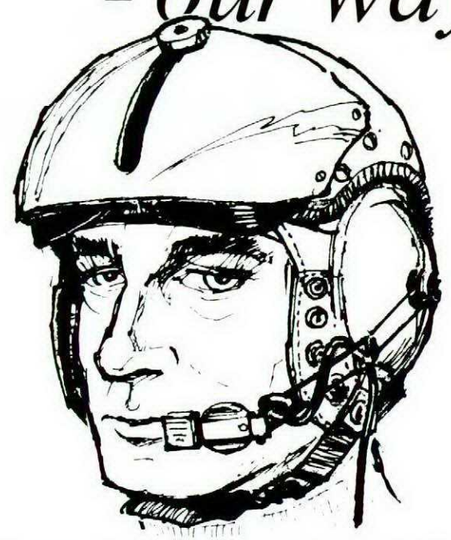
This type of crew coordination is what many of us have become accustomed to but may not always experience. And its absence can prove costly. Remember, in spite of the numerous jokes that we thrust upon our crew counterparts, the fact remains that each one is an intelligent person or he wouldn't be a crew member to begin with.

It behooves a crew, and aircraft commanders in particular, to create an atmosphere in which each member feels comfortable and won't hesitate to point out what he believes is a hazard. After all, as a crew, we're all flying in the same sky and on the same airplane, at the same time.

THE MAC FLYER

Have an Accident - *our way*

by Capt J. D. Williams



I read an article recently in "Approach" magazine which told of an ingenious technique employed by a USN squadron commander to prevent accidents. It seems that his squadron hadn't had an accident for over twenty years – which would certainly be cause for a lot of self-congratulation – but the boss decided that what was required was AN ACCIDENT.

That's right – an accident. Ever see things spring back into shape more quickly than they do after an accident? Ever watch all the "barn doors" being closed in the hours and days immediately following a fatality? It's amazing. Things that were impossible beforehand miraculously become possible. Funds which were previously "all tied up" suddenly become available. Performance of all personnel improves – particularly if the cause of the accident is undetermined. Perhaps all of us subconsciously examine our own performance and attempt to eliminate any characteristic or trend which might have led to the accident had we been flying or otherwise involved.

"So" reasoned the CO, "if we provide a simulated accident we may manage to achieve many of the same results. The more mysterious the circumstances the better."

And away they went.

The exercise was planned to include the entire squadron and all affected base personnel. Scenario cards were prepared for all the actors, and the supporting cast were on hand to watch and learn.

Picture the situation. All is quiet around the Ops desk when the initial call is heard.

"Boneyard Ops this is Papa Golf Three. Papa Golf Lead just crashed into the sea. I am orbiting the crash site but there are no survivors visible. I have advised tower and will remain on site until the chopper arrives."

Just about then the phones begin to ring. As it turns out they will continue to ring for several hours, days even.

Now what is going to happen?

Well, for one thing there is going to be a certain amount of paperwork impounded immediately. Aircraft records, crew training files, flight plans, weather reports and tower tapes all will be set aside for later scrutiny.

For another thing, the Base Commander is going to have to get together a little visiting team quickly before a few families learn that they are fatherless over the local radio station. There will be chaplains and doctors required, maybe a lawyer, hopefully a few compassionate but self-controlled friends or neighbours.

Also it helps if you can recover the aircraft or any components and the bodies of the crew. Men will have to be assigned this unpleasant but necessary duty.

Naturally a Board of Inquiry will be named and all facilities provided for them.

AND THEN there will be a lot of soul searching as discrepancies begin to appear.

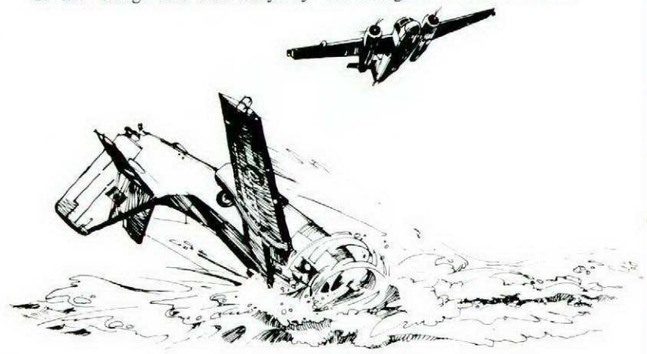
Since our enterprising CO has anticipated much of this hassle and wants to maximize training value, he has designated a specific aircraft which has just landed – as well as its crew – as Papa Golf Lead. All actions taken will deal with this specific hard (and soft) ware. Now there are a million and one things which can come to light in a Board of Inquiry – but here is an opportunity to see it all at no expense.

Lets say the plane just dove into the water for no apparent reason. What could cause that?

Pilot Incapacitation? Well, lets examine his medical documents. Oh. Oh. He is two months overdue for his annual medical. Well, that'll leave a question mark but maybe its just an oversight. Lets look further. He is 25 years old and 25 pounds overweight. Last EKG was normal but we know that he is in the range for unannounced heart attacks. Still, other than that he looks fit.

Control Difficulties? No reason to suspect any since he had time to eject or mention it on the radio. Unfortunately the aircraft involved has had a history of hydraulic leaks but nothing too serious and it was serviceable after the two previous flights.

Instrument Error? The main attitude indicator was changed last night – in fact this was a functional check flight. They were doing a VFR training trip anyway so the trip and check were combined. Still, they wouldn't have been sucked in even if the things did fail. Anyway the navigator wouldn't have been taken in, he has his own horizon in his scope. No, come to think of it, it works off the MAI.



How about the possibility of hydraulic contamination? Could the controls have been jammed by swarf, could a jack have failed internally? Is there any previous history?

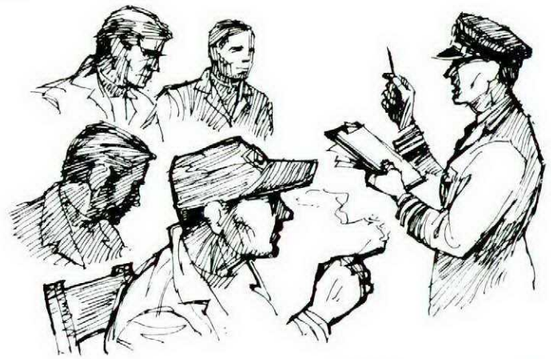
While we're looking at the possibility of contamination, lets have a look at the fuel and oxygen. Are all procedures being carried out properly, are SOPs up to date, is supervision adequate.

Lets consider the possibility of FOD. Are all tools accounted for? Were any work procedures interrupted the last time the bird was in the barn?

Lets consider the possibility that the pilot just decided to fly a little lower than briefed to add a little excitement to the flight. Was he that kind of guy? Is there anything in his past which might cause us to draw that kind of conclusion?

How much did the pilot have to drink at last nights party? Wasn't he complaining of a cold a few days ago? Lets check is locker for any clues which might be there. Medicine bottles, unpaid bills, Lord knows what.

Lets look at unit morale. Is everyone up to speed and is everyone essentially happy – or are there problems which have escaped our notice? Are there any personality conflicts which could have caused distraction – anywhere, on the ground or in the air?



Well, I could go on and on, but I think the point is made. Pick any one of your aircraft or your aircrew and scrutinize it or him and you will find discrepancies which a board would question. You will find training requirements not met, technical files not properly amended or annotated, engineering orders not complied with.

Review your squadron SOPs and you will find gaps into which your personnel may have inserted their own theories which may or may not be valid. They might not be evident to you if you didn't have an accident for no apparent reason, but believe me they will surely turn up afterwards.

Take your "deceased" crew and look into their personal affairs. Were they insured adequately, did they have proper wills. What would have become of their families. Had they ever made any contingency plans with their wives? This may not be "Flight Safety" but it is common sense. Penniless widows and destitute orphans add unnecessarily to the heartbreak. Let your guys consider this for a few minutes.

Look at your crews from another aspect. Would a board find that they had been overscheduled? Had proper meals and living conditions been available to them before flight. Was a proper briefing carried out? All of these questions will most certainly be asked if, one day, they fail to return.

Picture in your minds eye what a Board of Inquiry might see if it looked at your unit right now. What shortcomings would you be required to explain if you lost a plane right now? Unless your unit is better than any I've ever seen or read about there would be at least a few. Sure a lot of them would be "nit-picky" little things which could never cause an accident – but just how many "nits" does it take to build a cause factor? We don't know. We do know that every accident has a cause – even if we don't manage to find it. We assume that every cause could be removed were it to be properly identified. We find that a lot of potential causes only come to light during post-crash investigations – though they would have been evident had the same investigation been held "before the fact". It is for this very reason that we strongly suggest that such an investigation could be of very real assistance in any units flight safety program.

For years now we have carried out "Flight Safety Surveys" of various units and stations and the intent has been much the same as that of the exercise I'm suggesting. I believe however that they employ too much of a scattergun approach. This sort of exercise is more of a sniper rifle technique since it concentrates on one specific airframe and aircrew. If by chance you come up "clean" you can pat your own back – and try it again in three or four months. If you come up dirty it may prime the idea pump.

By the way – I forgot to mention the fact that while all this is going on – have a disinterested crew do a really thorough inspection of the simulated crashed aircraft. There is a good chance that they'll find at least one discrepancy which in the worst of circumstances could cause a problem. Believe me – it doesn't take much. A pilot could crash while trying to retrieve a dropped map, pen, or stopwatch. A poorly located radio frequency selector could cause him to look away from the "front window" for a fatal few seconds. Flashlights and kneeboards have come adrift before and jammed controls. Liferafts and mae wests have self-inflated, flares have fired themselves, ejection seat pins have been inadvertently left in place, and seat mechanisms have been improperly installed. Have a look!

If you walk through an exercise of this sort with your squadron or unit there is much to be gained. It takes on many of the aspects of a mystery drama. You provide the simulated victim and then everyone sets out to find the villain. The interesting point in this case is that the search may well net several actual villains even though the victim is only a simulated one. Here of course the important thing to realize is that such an exercise is not to be used for "catching" anyone but rather for cleaning house. It would probably be productive to declare a moratorium on responsibility for discrepancies found. "Fix it now – and we'll never talk about it again" might be the best approach in order to bring everything out into the open. If an important point comes up which deserves emphasis "freeze the action" and discuss it right then while it has impact.

It seems obvious to me that this sort of thing would be a one day exercise with an immediate debrief – perhaps followed by a unit "bash". The possibilities are limited only by the scale in which you wish to operate. The important thing being the aura of realism. "How could this have happened?" is a question we all have to face from time to time. If we check them all out now, we may well be able to remove the cause of an impending accident or at least lessen the impact.

Want to improve the safety of your operation? HAVE AN ACCIDENT. – but do it our way – and save.

GOOD SHOW

CPL O.G. DARLING

While employed on the Flight Line at CFB Chatham on 17 Nov 75, Cpl O.G. Darling noted smoke coming from CF-101 number 101056 during its start. While some smoke is usually present during the start cycle, the abnormal density of the smoke in this case aroused his suspicions. He investigated and found bits of metal at the position where the CF101 had been started. As the aircraft was now proceeding to the runway for takeoff, Cpl Darling took immediate action to recall the Voodoo and the aircraft returned to the line.

Investigation revealed that the starter had seized and was damaged in such a manner that the vibrations and "G" forces of flight may have caused the starter to fall free of the engine. The resulting damage to the engine and fuel lines would have resulted in a serious inflight fire and possible loss of the aircraft.

Cpl Darling's alertness, good judgement, initiative and technical knowledge prevented an aircraft accident.

MCPL R.A. MICKELSON

MCpl Mickelson was detailed to supervise and assist with the replacement of a CH-136 Helicopter main rotor hub. While readying the newly overhauld rotor hub for installation MCpl Mickelson decided to give the rotor hub a thorough inspection even though the rotor hub had been certified serviceably by the overhaul contractor. This inspection revealed that the spacers under the main rotor pillow blocks had been omitted during overhaul. Had this rotor hub been allowed to fly in its condition severe vibration of the main rotor system followed by possible cracking of the pillow blocks could have ensued.

Due to MCpl Mickelsons extra efforts an unsatisfactory condition was detected and corrected and a possible in flight failure was averted.

CPL K.F. GARTH

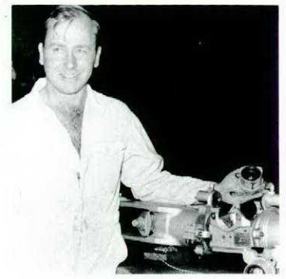
After completing a "B" check on a T-33 Aircraft, Cpl Garth decided to go one step further and visually check the fuel load. After opening the port tip tank fuel cap, he spotted an object lying at the bottom of the tank which turned out to be a refuelling hose nozzle protective cover. – (Non Canadian Forces pattern)

Cpl Garth's thoroughness in extending his inspection beyond the requirements of a "B" check prevented what could have been a serious air incident.

Cpl O.G. Darling

Pte A.R. Beasley

Cpl S.W. Schneider



MCpl R.A. Mickelson

CPL S.W. SCHNEIDER

While conducting a routine survey on a Cosmopolitan engine at CFB Ottawa (S), Cpl Schneider noticed a small oil leak coming from the reduction gear box area. A further investigation revealed not only a leaky A.C. Alternator drive seal, but both male and female drive splines worn far beyond normal wear.

This discovery led to a Special Inspection of the fleet. Two reduction gear boxes had to be changed due to excess wear of the drive splines.

As this check was not specifically precribed for this Periodic Inspection, Cpl Schneider's attention to details and the thoroughness of his investigation demonstrated his high degree of professional competence and averted a situation which could have caused a serious in-flight problem due to the loss of A.C. power.

PTE A.R. BEASLEY

Cpl A.R. Smith and Pte A.R. Beasley installed an aileron on a CF101 and completed the required functional checks. Pte Beasley was then detailed to disconnect the external hydraulic power cart at which time he carried out a routine FOD check before re-installing the cover panel. Pte Beasley demonstrated thoroughness and outstanding workmanship in checking the hydraulic lines in the area. He noticed the engine main fuel line located behind the hydraulic liner was chaffing against a stringer at fuselage station 470. He notified Cpl Smith and they checked a nearby aircraft and found the fuel line to have ample clearance. The rest of the U.E. aircraft were also checked serviceable. Although Pete Beasley was not directly involved or required to check the fuel line, his awareness resulted in the discovery and rectification of a most hazardous aircraft condition.

CAPT B. WEBSTER

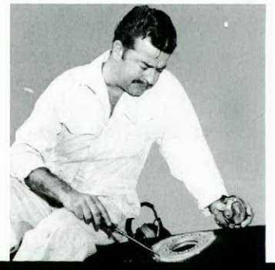
Captain Bill Webster was flying a wheel equipped single Otter with two passengers and a crewman on board while conducting an exercise in northern Manitoba. After two hours of flying over desolate forested and muskeg terrain, the aircraft arrived along the coast of Hudson Bay about 170 miles southeast of Churchill. On reaching the coast, at only 1000 feet above sea level, the engine emitted a bang, which sounded somewhat like a backfire. Engine temperatures and pressures were checked and were found reading normal: nevertheless, the fuel tanks were switched as a precautionary measure. The engine then appeared to run normally for about one minute when another loud bang was heard, accompanied by a power loss, smoke, and the odour of oil fumes in the cockpit. Captain Webster immediately turned towards the only available landing area, a curving strip of sandy beach about 3000 feet long, and executed a force landing without damage to the aircraft.

Initial inspection of the engine revealed a large crack in one of the cylinder walls. A replacement was flown to the beach, the aircraft repaired on site and was then flown off the beach, serviceable, within 24 hours of the incident. Strip analysis of the cylinder revealed that the cause of damage was a broken exhaust valve, which in turn caused extensive damage to the top of the piston and cylinder.

Captain Webster's quick reaction in correctly assessing the situation, immediately selecting a suitable force landing area and then executing a successful force landing obviously saved a valuable aircraft. But, more importantly, his professionalism and pilot ability turned a potentially dangerous situation, which could have resulted in injury or loss of life to his passengers and crew in a very remote area of Canada, into a successful operation.

Capt B. Webster

Cp. K.F. Garth



MWO J.N. Arsenault

MWO J.N. ARSENAULT

During a conversion training flight for student pilots and flight engineers the left hand landing gear would not fully extend and could not be moved either up or down. MWO Arsenault, the staff FE on board, investigated the problem and following the Tech Order procedures he proceeded to remove the applicable undercarriage inspection windows to measure the distance between the upper and lower shelf brackets. The resulting measurement confirmed the landing gear was not sufficiently down to engage the friction washers and would probably collapse on landing.

Further inspection by MWO Arsenault revealed that a large bushing (drag pin bushing) was wedged sideways between the shelf brackets, preventing the friction washers from engaging and jamming the rear tandem screw jack mechanism. He suggested to the Aircraft Commander that the manual lowering system be engaged in an attempt to free the undercarriage. After carefully briefing and co-ordinating all crew activities MWO Arsenault was able to raise the port landing gear sufficiently for one of the student pilots to remove the bushing. The landing gear was then manually cranked down and the aircraft landed uneventfully.

MWO Arsenault demonstrated his superior technical knowledge of the Hercules by quickly and successfully troubleshooting and rectifying a serious in-flight emergency. His actions not only provided his student engineers with a dramatic example of expert fault-finding but prevented serious damage to a Canadian Forces aircraft and possible injury to the flight crew.

CPL M.S. HOOLEY

A visiting Argus had been placed unserviceable for low torque in one engine. The problem had been diagnosed as a faulty fuel control unit and Cpl Hooley was assigned to change this component. Prior to proceeding with the work, however, Cpl Hooley made a thorough check of the aircraft history and discovered that two fuel control units and two engine-driven pumps had been changed on that engine in the previous two months in an effort to correct a similar snag. Because of this, Cpl Hooley suspected the fault must be elsewhere and after considering other possibilities concluded there might be a leak in the high pressure fuel line to one cylinder . Conducting a thorough inspection of such lines, he discovered fuel stains near a flexible portion of one line; however, the line appeared in good condition and there was no wetness or visual leak. Pressurization of the line, however, revealed a substantial leak in an area where the raw fuel would flow back over a hot exhaust, presenting a serious fire hazard.

Cpl Hooley's methodical and knowledgeable

approach to rectification of the snag prevented a possible costly and dangerous in-flight fire. The professional attitude and conscientious action displayed is considered deserving of commendation.

CPL M.P. GROOMS

During a periodic inspection of a CF101 aircraft, Cpl Grooms was inspecting the upper portion of the rudder around the rudder balance weight. While tapping the skin looking for loose rivets he heard a 'rattle' inside the rudder. He reported his findings and the rudder was removed for further investigation to determine the source of the 'rattle'. The 'upper rudder balance weight' was removed and three lead weights were found detached from their mount and loose inside the upper portion of the rudder. Had this situation gone undetected it is possible that the weights could have moved and caused the rudder to bind or jam. Cpl Grooms' conscientiousness and sense of responsibility in pursuing the source of the rattle prevented what could have been a serious incident or accident.

PTE M.D. DUNHAM

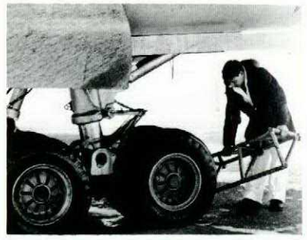
Pte Dunham, as part of an aircraft towing crew, was detailed to move an Argus out to the east side of 11 Hangar to refuel the aircraft for 23 knots with gusts to 37. The aircraft was positioned nose south with the starboard wing tip 50 feet from the east side of the hangar. The aircraft brakes were applied and the main wheels chocked fore and aft. As Pte Dunham was returning to the line crew section to await the arrival of the fuel tender, a gust of wind, recorded at 36 knots, hit the tail of the aircraft and caused it to turn through a 90 degree starboard turn so that when stopped, the aircraft nose was approximately 30 to 40 feet from the hangar.

At the first sound of movement, Pte Dunham with regard only for the aircraft, ran back under the aircraft, replaced the expelled chock from the starboard wheel, then proceeded to the port side and threw the expelled chock from the port main-wheel in front of the moving wheels. This chock was immediately ejected by the then increasing momentum of the aircraft, nearly hitting Pte Dunham. The expelling of the port chock happened at least three times as witnessed by other personnel who were running back to the aircraft to assist. Pte Dunham finally was able to have a chock bite into the partially icy tarmac and the aircraft came to a stop.

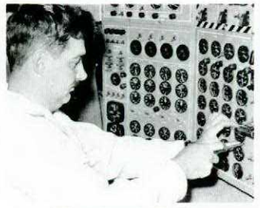
Had Pte Dunham not responded immediately and had he not persisted in his efforts to have a chock stay under the port main-wheels, severe damage could have occurred to the aircraft as it may have had sufficient momentum to cause the aircraft to hit the hangar.

At the time of the accident, Pte Dunham had been employed on line crew six weeks and on the Argus aircraft 25 months.

Cpl R.H. Hrynyk



Pte M.D. Dunham



Cpl W.M. Day

Cpl M.P. Grooms

CPL R.H. HRYNYK

While inspecting a CF104 after the aircraft had gone through a major modification program, Cpl Hrynyk extended his acceptance survey beyond the normal level. In the engine compartment he discovered that the throttle cable was rubbing against a wire bundle which had been enlarged as a result of the modification program. Cpl Hrynyk took it upon himself to inspect other such modified aircraft on the unit and found that the fault existed in other aircraft.

As a result of his thoroughness and initiative a serious hazard was discovered which could have resulted in an electrical failure, fuel fire or throttle malfunction with the subsequent loss of an aircraft.

CPL W.M. DAY

On 22 Jan 76, while observing weapons being loaded on an Argus aircraft, Cpl W.M. Day, an I & E Technician, noticed that the power cable used on the C-10 bomb hoist did not plug completely into the 1200 amp power source. This exposed three prongs which were subject to being shorted out on the metal workstand used in the bomb bay. After pointing this out to the loadcrew, Cpl Day investigated further and found that this was not an isolated case but a characteristic of all C-10 hoists. Realizing that the potential of a serious electrical fire and explosive hazard existed at a critical phase of the aircraft servicing procedure, Cpl Day developed an effective modification and immediately raised an Unsatisfactory Condition Report to point out and rectify the situation.

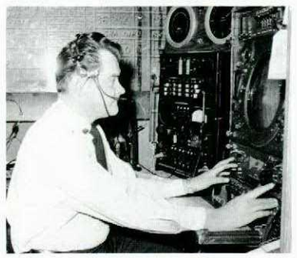
As a result of his awareness, concern and professional approach, Cpl Day may well have averted a most serious accident.

MCPL J.G. PETERS

While carrying out an airframe acceptance check on an Otter aircraft MCpl Peters observed that the

Cpl J.H. Thibault

MCpl J.G. Peters



MCpl W.L. Fox

rudder control pedals appeared to have excessive movement at the hook up point. Although not part of the check, he disassembled the cover and the connecting rods. He found a 0.250 inch diameter bolt exhibiting wear of 0.053 inch. Failure of the bolt would have resulted in the loss of rudder control at the pilot's position.

A serious inflight hazard was possibly averted because of MCpl Peters' initiative and professional approach towards flight safety.

CPL J.H. THIBAULT

Cpl Thibault was detailed to carry out a daily inspection on a CH135 aircraft. On checking the Minor Defect Sheet Cpl Thibault noticed that a minor entry (fluid left on the ground after the aircraft had been standing for a period of time) required rectification.

On checking the aircraft, Cpl Thibault noticed that, although the hydraulic header tank was full, a considerable amount of fluid, along with dust and grass, was noticable in the "hell hole" area of the aircraft. Cpl Thibault spent most of that evening thoroughly cleaning out this area. Again the next morning, he carried on with his work, doing a systematic check of the entire hydraulic system. This check, lasted most of the day, required Cpl Thibault to work in a very small area which offered very little room to work.

The results were rewarding. Due to Cpl Thibault's attention to detail, a very serious defect was located, resulting in an urgent UCR being submitted requesting that all CH135 aircraft be inspected prior to next flight. This inspection, when carried out, resulted in three aircraft of six on 408 Squadron strength being grounded for the same fault.

Through his alertness, initiative, and attention to detail, Cpl Thibault uncovered a deficiency which could have resulted in a serious accident.

MCPL W.L. FOX

On the morning of 25 Nov 75, Eastern Flying Service Flight 301, a P31 aircraft with a crew of two and two passengers on board, declared an emergency after experiencing a complete navigational aids failure while on final approach at Charlottetown airport. The weather at Charlottetown was 400 feet obscured ceiling with ½ mile visibility in snow. The weather at Summerside was 500 feet obscured ceiling with visibility 5/8 of a mile in snow and winds from the north-east at 25 gusting to 35 knots. The base was attempting to dig out from the first major winter storm.

Flight 301 climbed to 2500 feet and squawked emergency advising Charlottetown Air Radio that he was requesting a precision radar approach at Summerside. Moncton (MOT) Radar received the emergency squawk and advised Summerside that the aircraft was 30 NM SSE of the Base. CFB Summerside had just restored electrical power following a power failure. MCpl Fox, the duty radar controller was attempting to re-align his equipment. As a result of the power failure the radar was left with weak video and a loss of the SIF. Communications with Flight 301 were weak and intermittent. MCpl Fox, through a determined co-ordinated effort with Moncton Radar was able to positively identify a very weak target 13 NM SW of Summerside. To further complicate matters, Flight 301 was experiencing electrical problems resulting in the intermittent radio reception, windshield icing and finally the failure of both directional gyros.

MCpl Fox immediately commenced giving instructions for a precision radar approach to runway 06 which, by this time, was only 85 percent cleared of snow. On final approach from 9 miles to 5 miles, MCpl Fox was unable to obtain any glide path information due to the precipitation, lack of SIF and the altitude of the aircraft. MCpl Fox's cool, calm and reassuring instructions coaxed the pilot down in altitude so that he was able to intercept the glide path at 4 miles. At two miles from touchdown, Flight 301 began to drift well right of the oncourse. Only through determined efforts by MCpl Fox issuing clear precise control instructions was the aircraft able to correct back to the on-course at 3/4 miles, at which point the pilot of Flight 301 picked up the approach lights and made a successful landing.

MCpl Fox's full utilization of his equipment, considering the weak video, the unserviceability of the SIF and the weak intermittent communications, coupled with his calm professional attitude during this emergency, undoubtedly saved an aircraft and possibly several lives. As stated later by the pilot of Flight 301, "MCpl Fox's competent handling of this difficult emergency averted a certain forced landing".

LOW LEVEL WIND SHEAR - *the invisible monster*

by Mr. E.J.A. Hamilton

Loch Ness has its Nessie; Lake Okanogan has its Ogopogo; the Himalayas have their Abominable Snowman; and the Rockies have their Susquatch. Now the world's flying fraternity has its own invisible monster whose perambulations are marked by the broken aircraft and bodies that fleetingly scar the neighbourhoods of the world's aerodromes. The culprit, Low Level Wind Shear, has not yet been given a nickname like his famous comrades but is thought to be a reincarnation of one of the famed RAF "gremlins".

A wind shear is a spatial change in the wind vector or, more simply, a change in the direction and/or speed of the local wind as a result of a change of location. The atmosphere on occasion can produce some dramatic wind shears close to the ground. Direction changes of 180 degrees and speed changes of 50 knots or more within 60m of the ground have been observed.

Let's take a look at the results of the invisible monster's actions during the final approach and initial take off phases of aircraft operation. To simplify explanations, wind conditions will be described in terms of the lateral and longitudinal components of the wind speed along the flight path of the aircraft.

If, during the final approach, the headwind component decreases sharply, temporary decreases of air speed and lift will occur allowing the aircraft to sink below the planned approach path and necessitating an increase of power to regain position on that path and to avoid undershooting. However, if position on the planned approach path can be re-established, a decrease of power, to a value lower than the original, will then be necessary to stay on that path. This follows because a lower headwind component demands a lower power setting to maintain an approach path of equivalent slope. Figure 1 illustrates the point.

If, during the final approach, the headwind component increases rapidly, temporary increases of air speed and lift will occur forcing the aircraft above the intended flight path and necessitating a reduction in power to regain position on that path and to avoid being high at the normal touch down point. However, when position on the intended flight path has been re-established and the headwind component has begun to stablize at a new and higher speed, an increase of power, beyond the original level, will be required to avoid undershooting, since a stronger headwind obviously requires a higher power setting to maintain an approach path of equivalent slope. This sudden requirement to reduce power, followed very shortly by an urgent need to increase power beyond its original value, constitute the monster's "double whammy". Mammy Yokum would be put to shame. Figure 2 illustrates a case of increasing headwind component.

If during the final approach of an aircraft the cross wind component changes rapidly the aircraft will be moved laterally off the runway centre line extension, necessitating banking manoeuvres, perhaps at a very low level, to regain proper position on the approach path. Such manoeuvres may be extremely dangerous if the change in crosswind component is accompanied by a sudden increase in headwind component, a likely combination and one that proved to be too much for the crew in the following case.

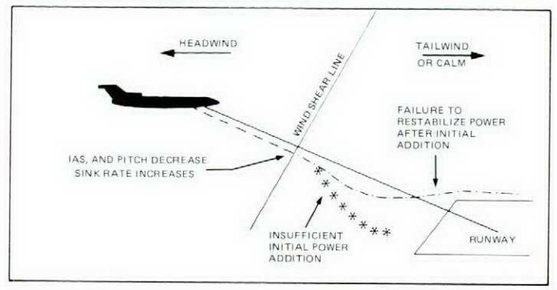


Figure 1. Sharply Decreasing Headwind Component

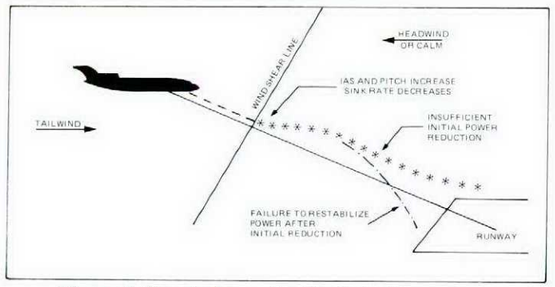


Figure 2. Sharply Increasing Headwind Component

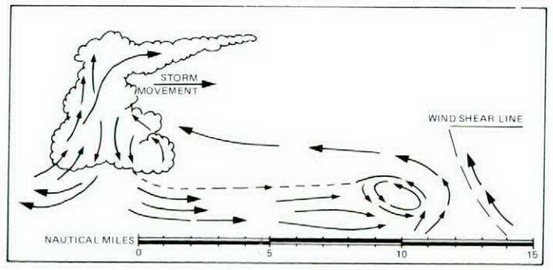


Figure 3

"The aircraft remained on the glide slope until the captain disengaged the autopilot near the middle marker after the flight engineer called "three hundred feet." Almost immediately, the first officer spotted the approach lights off to his right at about the one to two o'clock position. The captain looked up, saw the lights, and manually banked the jumbo to align it with the runway. The autothrottle system remained coupled to the automatic speed command of 145 knots. After the pilot aligned the aircraft with the runway, the flight engineer called "decision height." Realizing that the aircraft was below glide path and low, the captain manually over-rode the autothrottle system and increased back pressure slightly. In spite of the corrections, the DC-10 remained low and both the first officer and flight engineer cautioned the captain. More power was applied but the jumbo continued its rapid descent and the aircraft's right main landing gear struck an approach light pier and was ripped off."

TABLE I
Approximate winds encountered during ILS approach

Altitude (feet)	Direction (magnetic)	Speed (knots)	Longitudinal Component	Lateral Component
1,000	191°	35	23.0 tail-wind	26.0 left crosswind
900	191°	32	22.6 "	25.7 "
800	193°	31	22.15 "	25.4 "
700	195°	30	21.7 "	25.1 "
600	197°	28	20.4 "	24.3 "
500	200°	24	18.0 "	23.0 "
400	205°	20	11.8 "	17.3 "
300	225°	15	5.8 "	12.1 "
200	260°	12	3.3 head wind	4.1 "
100	310°	8	6.0 "	2.0 "
Surface	315°	8	4.0 "	2.0 "

Approximate wind conditions encountered during this approach were computed from information available in the flight data recorder and are presented in Table I. Note the fairly stable wind conditions at the beginning and end of the approach path, the significant lateral and longitudinal shears between the 500 and 200 ft levels and the maximum shears of 8 and 9 knots per 100 ft between the 300 and 200 ft levels. Analysis of the flight recorder data showed that the autopilot (automatically coupled to the ILS) compensated for the initial power surplus situation, presumably without the pilot's awareness, leaving him to cope with the ultimate power deficient stage of the wind shear effect. Fortunately, although the aircraft settled on the runway, skidded and burned, there were no fataiities and comparatively few injuries.

Sudden wind shears during the take off phase of aircraft operation present only a small problem compared to that associated with the approach. Sharply increasing heaswind components serve only to enhance the climb gradient, a negative problem. The monster, like the gremlins, is sometimes benevolent. Sharply decreasing headwind components during climb out will result in a power deficient situation which may require a decrease in climb gradient and a consequent reduction in the margin of obstacle clearance. Sharp changes in the lateral wind speed during climb out may displace the aircraft beyond the normal obstacle clearance segment if the intended climb out path is not monitored closely and maintained.

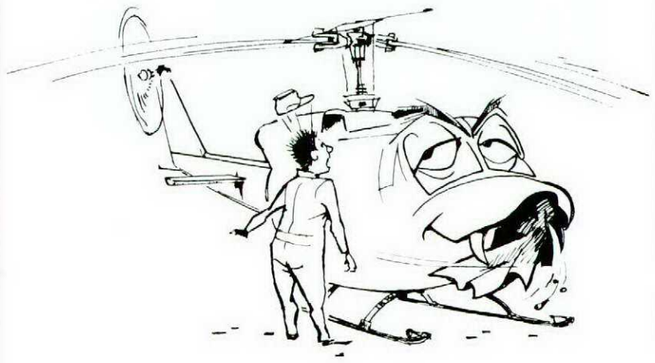
Having analyzed the monster's "MO" let's consider his habitat. Low level wind shears, of sufficient strength to create real problems, will invariably be associated with steep temperature gradients and/or obstructions to the wind flow such as large buildings, mountains and valleys. When considering the occurrence of steep temperature gradients the warm and cold front come quickly to mind but don't forget that some of the steepest temperature gradients are associated with night time radiational cooling which can foster marked low level wind shears. Foehn type winds, like the Chinook, are also associated with steep temperature gradients and strong wind shears. Lesser temperature gradients and wind shears are associated with sea and land breezes as well as anabatic and katabatic winds.

Everybody realizes that extreme wind shears are associated with thunderstorms. Even the untrained observer will recognize the significant wind shear evidenced by the different directions and speeds of movement of clouds at different levels and/or locations in a thunderstorm's vicinity. It is imperative to remember also that a wind shear line associated with the thunderstorm's squall wind can precede the thunderstorm by a considerable distance, with no visible evidence of its prescence. Figure 3 illustrates the situation.

Statistics show that the maximum number of cases of strong shears occur in a stable flow or within a stable atmosphere. An insidious fellow this monster and richly deserving of the nickname "LO-BLO". Add his name to your weather check list. Think of those clear cold prairie nights. Watch out!

Be prepared! Don't let LO-BLO get you!

CAUGHT IN THE ACT



During preflight inspection a UH-1N, the helicopter mechanic discovered an oil leak in the combining gearbox compartment. After removing access panels and wiping off excess oil, he checked the area with the engines running, but there was no further trace of the leak. Engines were shut down, panels replaced, and number two engine restarted. As he accomplished a routine post engine-start leak check, he spotted an oil leak near the oil cooler blower. Without informing the pilots, the mechanic attempted to wipe the oil with a rag. But the oil cooler blower sucked the rag from his hand and promptly gobbled it up, damaging the blower. Investigators pointed out that there was no communication or coordination between the mechanic and the pilots concerning the mechanic's intended action.

The unit to which the helicopter is assigned no longer uses rags to wipe up oil leaks in the combining gearbox on "N" model Hueys while engines are running.

Courtesy MAC Flyer

COLLECTIVE CHALLENGE - 76

By Major N.E. Ramsey

The tasks were easy, all the competitors had to do were, put a weight on the end of a 35 foot rope into a barrel, take-off and fly to five unknown locations, fly a navigation trip without a map, arrive at a destination exactly on the second and then fly a three minute circuit also to the exact second, and finally identify the location of 12 air photos by a six figure grid reference.

The 430 ETAH team from Valcartier performed the tasks better than any other 10 TAG team and were rewarded by winning the General Turcot Trophy in the second annual 10 TAG helicopter competition Collective Challenge 76.

Twelve crews participated in this year's competition, hosted by 430 ETAH in CFB Valcartier. The crews came from all the 10 TAG helicopter squadrons and competed as squadron teams made up of two crews per team, one CH-136 crew and one CH-135 crew. The 450 Sqn team had one crew each from Edmonton and Ottawa flying the CH-147.

The competition consisted of five separate events spread over three days. Similar to auto rallying, crews were awarded points for errors made and the lowest aggragate of points decided the winners.

The first event was a two part navigation exercise. On the first part the crews were given, one minute prior to lift off, only the heading on which to depart. After passing a given location they were then allowed to request the grid reference of their first turning point over the radio. The grid references were given in code, which is not a very difficult problem for the crew as long as they used the proper code to decipher the message. The second part of the navigation test was a pre-planned trip with the crews getting the check points and average ground speeds one hour before departure time. At each check point the crew had to land and get the exact time entered on their log cards by the check point officials on the ground. Timings were to the closest second with the recorded time being the time for the end of one leg and the start of the next.

Events two and three were hovering events to test crew ability and co-operation. For number two event a crew member on board the helicopter held one end of a 35 foot rope with a weight attached to the other end. The objective of the exercise was to take-off, fly 75 meters, put the weight in a barrel, and then land behind a finish line. The most difficult part of this task seemed to be landing the helicopter.

The objective of the third task was to drag a weight on the end of a rope forward, sidewards, and backwards down a one meter wide corridor which was marked out on the ground.

The helicopters were back into the air (500' AGL) for the last two events. For the fourth event the competitors were timed leaving the heliport and arriving overhead at a destination airfield. They were then timed to the closest second on a defined circuit. On overshoot from the circuit the crew had a six mile track to fly before they ran off the map. They then had to continue for a further 10 miles and then locate themselves on a small square of map provided by the organizers. Points were awarded for each 10 meters they were off from where they should have been. Several of the participants found much to their dismay that they could fly the trip much more accurately than they could guess where they should have been.

BGen Lacroix is offered some champagne from the Gen Turcot Trophy by Cpl Bergeron, WO Rodrigue and Capt Desrosiers.

LCol Lehmann, CO 430 ETAH, and his winning crews accepting the Gen Turcot Trophy from LGen Turcot. The winning members are from left to right Capt Lemieux, Capt Cauchon, Sgt Jobin, Capt Desrosiers, and MCpl Turcotte.

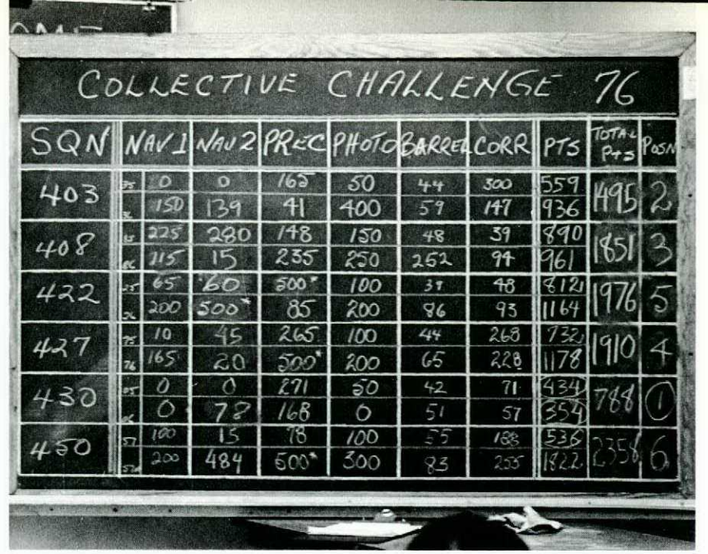
The welcoming committee greets new arrivals. Maj Norm Guay and others greet Maj Zvanitajs and Capt Robertson from Gagetown.

The final test was photo recognition. Each crew was given 12 air photos and a short two leg route to fly. All that was required of the crew was to identify the location of each photo on their map by a six figure grid reference. The photos were taken right along track and a couple of crews found that accurate navigation was paramount for when they don't fly over the ground where the pictures were taken they don't find what they were looking for.

The competition ended with an all ranks presentation dinner. The winning squadron received its trophy from LGen Turcot (retired) and the top CH-136 and CH-135 crews were presented with plaques by Bell Helicopter.

Again this year the competition brought crews together from all across Canada to compete in precise and demanding events. While there can only be one winner, everyone won with the experiences, fellowships, and co-operation gained, throughout the week. The spirit and enthusiasm of the competitors can probably best be described by the casual remarks of one of the CH-147 pilots upon returning from the photo-recognition event. "The two crewmen in the back identified more pictures than we did, but it sure is crowded with four guys in the cockpit".

The old weight in the barrel trick.



SQN	NAV 1	NAV 2	PREC	PHOTO	BARREL	CORR	PTS	TOTAL PTS	POSN
403	0	0	163	50	44	300	559	495	2
	150	139	41	400	59	147	936		
408	225	280	148	150	48	39	890	851	3
	115	15	235	250	262	94	961		
422	65	60	500*	100	37	48	812	976	5
	200	500*	85	200	86	93	1164		
427	10	45	265	100	44	268	732	910	4
	165	20	500*	200	65	228	1178		
430	0	0	271	50	42	71	434	788	0
	0	78	168	0	51	57	354		
450	100	15	78	100	55	188	536	2356	6
	200	484	500*	300	83	255	1822		

maintain your cool

BY Capt Kirkwood

The unending flow of incident reports that has crossed my desk in the last few months contains a large number of hyperventilation incidents. Many of these resulted from pilot apprehension over an aircraft problem. In a couple of cases, the pilot hyperventilated while reacting to a suspected problem that turned out to be merely a malfunctioning gauge. The hyperventilation was more serious than the aircraft malfunction that caused it!

The second of the three basic rules for aircraft emergencies is "*Analyze* the situation and take *proper* action." There are very few emergencies in the ATC aircraft we fly that demand an instantaneous response.

With this in mind, let's look at some advice given to me years ago by an "old head." His method for dealing with emergencies was to take a deep breath and say "What have we here?" He then would say "We have a ," then "we should do ." He then would take action and ask "What is the worst possible consequence of this situation?" His method involved very calculated, deliberate, and timely actions without any evidence of hurrying. This metered response also fosters an organized, unexcited frame of mind. After considering the worst possible consequence and executing his plan to resolve the situation, he turned his attention to himself and asked "Am I in immediate danger," and "at what point should this danger be past." Establishing this fact prevents one's excitement level from increasing unnecessarily past the time when there is a reason for it. Obviously, this technique would have to be modified for a low altitude, critical emergency such as dual engine failure on takeoff, but the same principles apply.

During stressful situations, people experience a "time compression." This is the familiar "a second seems like an hour" feeling and often leads to very rushed and, hence, inaccurate action. The human mind functions quite rapidly at times like this. Rate of speech is also increased but not to the same extent. Verbalizing your thoughts can provide the slowing effect needed for an objective evaluation and accurate response. Hearing your own voice may also give you a key to just how excited you really are.

In addition to plain excitement, there is one other common cause for hyperventilation. If you have gone to 100 percent and Emergency on your O_2 regulator, you are pressure breathing. You must make a concentrated effort not to breathe too deeply or rapidly when O_2 is being rammed down your throat.

Let's try to maintain our cool and keep bad situations from getting worse.

Hot Rocks and Cold Weather

by Lt Col Richard C. Jones
HQ TAC/DOVX

All aircrew members have read, scanned, and perused numerous articles and stories which document the tales and woes of flying machines and of the many problems associated with flying these machines during the cold winter months. We have all, at one time or another, sat back while reading these documents and said, "Gosh, what a dingbat," "Damn, that was a dumb decision," "Does this guy really fly?," or "You've got to be kidding me!"

Now if you're a Hot Rock crew member, you can immediately identify all the inadequate skills the unlucky crew member demonstrated while being involved in an accident or incident, condemn him and then very rationally state under your breath, "What a clod; this surely couldn't happen to me."

It isn't essential at all for a Hot Rock to reflect about the current poop he's read or heard regarding winter experiences, or the high accident potential of cold weather operation, or even the trend analysis provided by his squadron and wing stan/eval people. This is not enough evidence for a Hot Rock; he's from the old school where "the worse the weather, the greater the challenge!" Hot Rock's philosophy is: "How can a guy win any money on the range or establish the proper hero image with others in his unit unless he takes a chance or two with excessive crosswinds or by cracking minimums occasionally?" Sure, Hot Rock says he knows about the problems associated with winter weather. "Winter complicates our existence; a body can't get to Happy Hour at the club so easily; you can't put the top down on your sports car and let your scarf fly; walking into Operations gets your cigar soggy and makes it hard to light; and worse, there's nothing really interesting to watch at the swimming pool!"

Now wait a minute, Hot Rock, let's try and put things into a more meaningful perspective! Let's look at some real flying problems that have occurred because of winter weather. In fact, I would like to interview you and have you give us your views regarding some incidents and accidents that were serious demonstrations of poor preparation, lack of proficiency and, perhaps the most serious, bad judgment!

"Hot Rock, what do you think about this one pilot who got into severe icing? In fact, this guy was iced-over so bad he couldn't see out of the cockpit. He made two missed approaches and finally ejected when the engine quit from fuel starvation."

Hot Rock: "I could have gotten it on the ground. The pilot flying that machine must have had weak eyes."

"I see. Well, what about another incident where a tactical pilot landed his bird on an icy runway; his approach was high on the glide slope, hot on airspeed, and the runway was slick. Off the end he goes, bending the airframe and collapsing both the nose gear and his ego."

Hot Rock: "Obviously this pilot was a slow thinker, unaware of the type of braking action necessary when landing on a slick runway. Anyway, just because the command trend analysis program identified this particular area of flying – too high and hot during instrument approaches – as an adverse trend, it ain't necessarily so. Good pilots like me thrive on this type of challenge."

"Well, Hot Rock, what do you think about the T-39 pilot who tried to bust minimums trying to get home? He hit three miles short of the runway, destroyed the aircraft, killed himself, the co-pilot and three passengers."

Hot Rock: "Well, this pilot must have been a low-time guy. Experience will prove that when attempting an instrument approach when the weather is below minimums, if you plan and purposely keep the bird a bit high on the glide and the airspeed on the plus side, you'll be O.K. I've flown at least a dozen below-minimum approaches and the weather is not going to hurt you. Those GCA controllers sure get upset when you stay high on the glide slope, though."

"O.K., Hot Rock, have your fun. You should have a great deal of respect for these GCA guys – they're always available to you when you really need them! Besides, it's not very funny when you're trying to bring in a sick bird with 100-and-a-half in blowing snow."

"Hot Rock, you certainly can analyze a problem. You are probably an expert in other associated weather problems, too; some that don't involve flying the aircraft. What do you think about a flight mechanic refueling a big bird and walking on an icy wing? This one slipped off, crushed his spine and paralyzed himself from the waist down."

Hot Rock: "I can tell you what I'd do, I'd court martial him for not wearing his parachute! In fact, this reminds me of some experiences I had when I was enlisted. We used to wait until a guy got up high on a maintenance stand. Then we'd kick the brake off and give it a big shove. Boy! We used to get some of the weirdest yells, but most guys learned fast how to hold on. Besides, that's what they pay those guys to do – if he can't preflight the bird without busting his bippy, that's his problem."

Gee, Hot Rock, you certainly get right to the heart of the problem. It certainly is enlightening to discuss winter safety with a crew member like you." End of interview.

All Hot Rock types have a reputation for being all speed and no direction. However, it is rewarding and comforting to know that we don't have any Hot Rock crew members in TAC. Nor do we have crew members who would regard trend analysis, accident reports, or flying safety bulletins with contempt, complacency, or a cavalier attitude – right?

Wrong! Unfortunately we do have our share of Hot Rock crew members; that dangerous minority who visualize themselves as select individuals and attempt to create an image by overextending their capabilities and those of their expensive weapons systems. We do have some guys who are sure "this couldn't happen to me," or demonstrate an alarming complacency regarding crew coordination, checklist requirements, flight planning, briefings, approach planning, and/or trend analysis. They scoff at past experiences or significant findings of accident/incident reports. With this type of attitude, add winter weather and you have a real "smokin' hole" candidate.

This know-it-all attitude is a big challenge and can be overcome only if crew members are made to realize that common sense and aircrew professionalism are basic considerations. In addition, commanders must provide proper supervision and management techniques to insure that the dangerous attitudes of guys like Hot Rock are stamped out.

It's quite obvious to see the fallacies of the Hot Rock crew member and the problems he may pose to the flying safety program and the successful completion of the mission. Those of us who do see the potential hazards while flying during winter months become deeply concerned. In fact, our concern goes even farther. Since experience shows winter flying to be more hazardous than flying during the summer months, we're providing a self-inspection check. We're trying to cover all types of aircraft, so some of the items may not apply to you – check the "All-Weather Operations" chapter of YOUR Dash One.

WINTER FLYING CHECKLIST

A. Flight Planning
   1. Check for proper personal and survival equipment.
   2. Check enroute, terminal, and alternate weather.
   3. Check enroute, terminal, and alternate NOTAMS; determine if NAVAIDS are operational.
   4. Review weather forecasts for icing, turbulence, or other hazardous flight conditions.

B. Pre-Flight
   1. Insure frost, snow, and ice are removed from aircraft.
   2. Pre-heat engines if required.
   3. Pre-heat cockpit.
   4. Check fuel drains for water and presence of ice.
   5. Check for ice on pitot tubes and static ports.
   6. Check gear struts for presence of ice.
   7. Check closely for fuel, oil, and hydraulic leaks – cold weather means rapid expansion and contraction of fluid lines and connections.

C. Start/Taxi/Run-up
   1. Check cockpit/cabin or flight compartment for heat.
   2. Check operation of anti/de-ice system.
   3. Review cold weather starting procedures and limitations.
   4. Exercise caution when taxiing and during engine runup – especially on icy surfaces.
   5. Direct ground crewmen to observe wing flap or other system operations.
   6. Remember that painted areas on runways and taxiways are more slippery than non-painted areas.
   7. Allow adequate warm-up of flight instruments, radio/NAVAIDS, and radar in accordance with flight manual.
   8. Maintain extra clearance from obstructions during brake and/or reverse checks – watch for skids.
   9. Insure proper oil temperatures prior to high engine power settings.
   10. Watch for creeping during engine run-up; run up symmetrical engines if required (multi-engine).

D. Takeoff
   1. Turn on anti and de-ice equipment prior to takeoff, in accordance with your Dash One.
   2. If necessary, use asymmetrical power to maintain directional control on an icy runway.
   3. Recycle landing gear and flaps, if in accordance with your flight manual.
   4. Watch for structural icing during climb-out.

E. In-Flight
   1. Maintain engine temperature within limits, for anti-ice operation.
   2. Use carburetor heat, if applicable
   3. Use Pilot-to-Metro Service and enroute radios for significant enroute and destination weather – and don't forget to give PIREPs if you encounter weather hazards.
   4. Be aware of alternate requirements/facilities.

F. Descent
   1. Use additional power on reciprocating engines to prevent cooling. For jets, keep the RPM up to insure adequate compressor bleed air.
   2. Consider the use of flaps and gear, if required, to descend.
   3. Turn windshield heat on; use defrosters.
   4. Use ATIS, if available, to review current weather and landing information.
   5. Determine type of approach to be flown and your TAC-established weather category minimums.
   6. Take note of any significant terrain in the landing area.
   7. Review approach plate for the following:
      a. Decision height, minimum descent altitude.
      b. Emergency altitudes.
      c. Missed approach/go-around procedures.
   8. Review approach and landing lighting.
   9. Determine crosswind component.
   10. Determine recommended rate of descent from instrument approach procedure chart.
   11. Determine runway conditions to include length, stopping distance, and RCR.
   12. Consider increasing airspeed if ice has accumulated on aircraft.
   13. Use minimal reverse thrust initially (if applicable) if ice is on runway.
   14. Consider the possibility of hydroplaning.
   15. Be aware of nose wheel steering capabilities and restrictions.
   16. Slow to taxi speed before turning off runway and taxi with caution.

G. Shutdown
   1. Insure proper chocks or sand bags are used for slippery surfaces.
   2. After wheels are chocked, release parking brakes.
   3. To prevent frosting of windows, whenever practical leave cockpit or flight compartment window open.
   4. Dilute reciprocating engines if required.

TAC ATTACK

If you are a professional aircrew member, the above checklist will contain some valid and thought provoking items. If you are a Hot Rock, don't pay any attention to this. You may want to get the recognition as TAC's next winter flying statistic.

Otter Challenge -76

by Capt T.E. Storey

Like the Belmont Stakes, Otter Challenge is the third jewel in the crown of 10 Tactical Air Group sponsored flying competitions. It has become an annual event hosted in the past by CFB Cold Lake, CFB Montreal and most recently, on the 15th of May passed, by CFB Trenton.

The challenge is a competition between Air Reserve Squadrons using the CSR 123 "Steam" Otter aircraft in the light transport role. For the uninitiated, the light transport role as applied to the Air Reserve involves much more than flying passengers and luggage from A to B. It includes low level navigation missions that must be, and are, flown to a time over target tolerance of plus or minus 30 seconds. To a "B" 104 pilot this may seem to be a generous allowance but how do you gain or lose 30 seconds if you can only adjust your ground speed by 5 KTS?

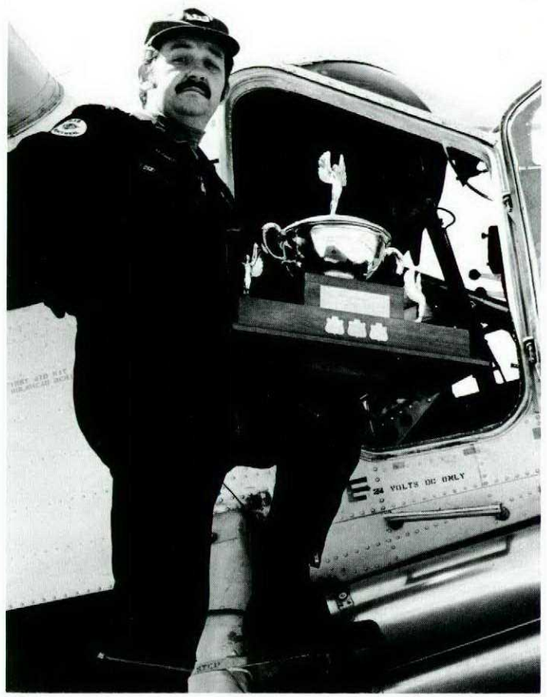
Visual and photo reconnaissance missions are flown by the Air Reservist using the same criterion for accuracy and detail as that required by Regular Force pilots flying aircraft much more suitably equipped.

The Otter aircraft is an excellent platform and is used frequently for parachute and free fall supply dropping missions. Close crew co-operation ensures accuracy and safety. It is usually a very short walk from the target to where the item dropped comes to rest.

Any one ever having watched an Otter take-off or land can not help but be impressed with the small amount of runway used. Maximum take-off performance distances of between 400 and 500 feet are normal given suitable wind and temperature conditions.

The Otter Challenge Competition included all the aforementioned exercises in one 1-1/2 hour mission. Each squadron was invited to enter four crews consisting of the pilot, technical crewman, and safety crewman. Squadron crews were assigned different routes so that there would be no temptation to compare notes. An airborne umpire flying a Kiowa helicopter observed selected targets throughout the day to ensure programmed altitudes were adhered to and that missed targets were not "re-attacked". Thanks to the co-operation of CFB Trenton personnel and the weatherman, missions were flown throughout the morning and into the late afternoon. When the smoke had settled, (Otter exhaust) the winners were declared.

During the social evening that followed, Col R.M. Edwards, Deputy Commander Air Transport Group, presented the BGen Howard Trophy to Montrealer, Capt Ivan Morrell and his 438 Squadron crew for obtaining the highest individual crew score of 475 points out of a possible 540. The second place crew was only one point off the pace with 474 points and only 15 points separated the first four crews. The BGen Rohmer Trophy, awarded for the first time this year to the Air Reserve Squadron obtaining the highest cumulative point score in the competition, was presented to Maj Bill Turnbull, team leader from 411 Air Reserve Squadron Toronto by Col J.R. Pattee, Deputy Commander Air Reserve Group.



Capt Ivan Morrell, 438 ARS St Hubert, winner of the BGen Howard trophy.

Radar Approaches-Control Information After Control Limits

The 1975 Check Pilot Conference recommended that the procedure of transmitting elevation information to aircraft after passing radar control limits on a PAR be re-instituted. Commands and Groups were queried on this proposal and all agreed that in the interest of flight safety the information should be provided.

Therefore, commencing 1 Aug 76 final controllers will provide aircraft conducting PARs with control instructions to radar limits and full control information after that point. Surveillance approaches are unchanged.

WINTER FLIGHTLINE

Working on the flightline is much different in the winter than in summer. Everything takes longer when it's cold, partly because there's more to do, such as deicing and preheating. People don't move as fast in bulky cold weather clothing. AGE is hard to start. Vechicles must move more slowly.

With the winter here for some and approaching soon for others, we talked to flightline supervisors at five northern bases. All have had years of cold weather experience. We put together the following article from their comments.

PREPARATION

Winter preparations begin as early as the close of last winter and as late as 90 days before the first snowfall is predicted. When you read this, it will be too late. Equipment and people should already be prepared. Snow fence should be up. Deice and preheat equipment should be checked out and fully operational. Safety ropes, and harnesses, anti-freeze, squeegies, brooms, shovels, deicing fluid and cold weather clothing should be available and ready for use.

Some bases brief all newcomers about cold weather maintenance when they arrive and others conduct special briefings on the subject just before winter hits. People have to be recertified on handling the equipment and reminded to check out sufficient cold weather gear. Supervisors can't assume that everyone knows about frostbite, chill factors, warm hands sticking to cold tools, carbon monoxide poisoning, slippery surfaces, the importance of deicing and preheating and the like.

SNOW REMOVAL

Everyone agreed on the importance of snow removal. Sand and salt are never used because of the FOD and corrosion problems they cause. One base uses urea but most bases remove snow the hard way right down to the bare ramp. Snow removal is especially important where aircraft are parked. The dangers of aircraft sliding forward and jumping chocks during engine runs are obvious. Choppers have a tendency to turn.

Traction is not a problem with just aircraft. People and vehicles can also skip and slide, if the ramp is not cleared properly. People should not wear slick soled shoes during winter. In the run-off between studded tires and chains, studded tires won hands down. Speaking about chains, have you ever tried to tow an aircraft on ice? Chains or no chains a clean ramp is the only route to go.

Grounding point must be kept clear. This is very important because when it gets cold the dangers of static electricity increase as the humidity goes down. People think there is less danger of fire when it gets cold. This isn't true. The increased static electricity generation and the fact that spilled fuel doesn't evaporate away as quickly together create a real danger.

DEICING

On the subject of deicing, the most important word is coordination between operations and maintenance. Communication is essential because maintenance has to know exactly when the aircraft will depart. If the aircraft is delayed, the entire deicing operation may have to be repeated. This is especially important since the cost of deicing fluid is expected to almost double. The best way to conserve deice fluid is to clean the aircraft first. Some bases use the broom/safety harness method and others blow dry snow off with the MB-3 snow removal system. The aircraft are cleaned right after it snows whether they are going to fly or not. This is done for two reasons: The snow is easier to remove; and there is a better chance the sun will help keep the aircraft clear. Most units park aircraft with the flaps and slats retracted. No matter how you cut it, snow removal is a dangerous operation and that's why everybody tries to do it during daylight hours and with low winds.

The deicing fluid is generally diluted to a mixture that will be effective to 20 degrees below the expected low temperature. Of course a 100% mixture is used on alert aircraft.

The importance of proper deicing cannot be overemphasized. Ice and frost can jam controls, destroy the airflow over the wings, and add considerable weight to an aircraft.

PEOPLE PROBLEMS

The biggest people problem stated was the rush factor to get out of the cold. It causes tunnel vision to get the job done without regard for safety. Take the guy who orders a fuel servicing cart and about 45 minutes later one shows up. He is reluctant to order another if a leak develops on the one he has. Supervisors have to be alert for this sort of thing. If people don't get proper rest and nutrition, they fatigue faster and tend to become more irritable. When they become more irritable, any small problems are accentuated.

Supervisors sometimes have a hard time convincing a man to go in to warm up. That's the reason for the buddy system. It takes about one winter for a man to get accustomed to working in the cold. The cold weather maintenance classes seem to be no substitute for actual experience. People don't realize how fast flesh freezes in sub-zero cold, the value of air space in clothing and boots, or how easy it is to slip off an icy aircraft. They don't believe that clean clothes are warmer than dirty or greasy clothing. They don't take the time to put down the ice pegs on ladders.

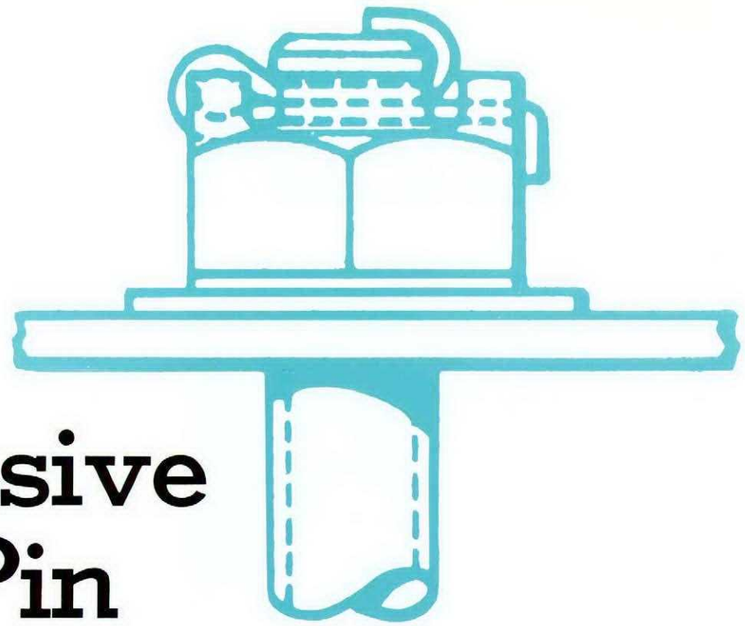
Unless you've experienced a white-out how can you know how bad it is? It can cause complete disorientation. Chopper spotters can tell you that it can happen in an instant. They have an agreement with the pilots whereby everybody goes right. If they can't see the chopper and the chopper pilot can't see them, both the chopper and crew chief move to their right.

People don't see well if their parkas are zipped full up and vehicle drivers have difficulty seeing when the windshield is covered with frost. Add these two facts together and you have a dangerous combination.

EXPOSURE CONTROL

Exposure control methods vary but basically they are designed to make sure nobody stays out in the cold too long, depending upon the temperature and wind (chill factor). We don't want anyone to crawl into a lite-all to get out of the cold and die from carbon monoxide poisoning. Most places log people out and in, usually through the flightline expediter. The local commander usually determines how long people can stay out. At one base the flightline is closed for maintenance at -50F° effective temperature. If they've got to go out when the temperature is lower than that, time limits are set. The maximum time out at -60°F (effective) is 10 minutes.

We hope this article by committee has been useful to you and would appreciate your comments or actual experiences.



The Elusive Cotter Pin

Earlier this year a USAF T-38A Aircraft was abandoned and subsequently destroyed because a cotter pin had not been installed in one of the flight control system connections. This was not an isolated case but acutally occurs all too frequently in most air forces.

A review of USAF and Allied Air Force accident and incident reports associated with flight control system separation over the past few years revealed a series of events where a single missing cotter pin was a major contributing factor.

There is probably no single item of equal size used on today's tactical aircraft that has a more important function than the cotter pin. It is widely used throughout the manufacture and assembly of the F-5 and other tactical and commercial aircraft, and one of its more important functions is to join and hold securely aircraft flight control system connections.

In view of this, the improper installation of, or the failure to install, a cotter pin usually results in the loss of some degree of control of the aircraft, often resulting in the destruction of the aircraft and injury to the crew.

The selection of the combination of castellated nut and cotter pin as a fastener from a large variety of aircraft fasteners is determined by numerous factors: the environmental effect of heat and chemical action, vibration, relative motion, and stresses to which the assembled parts are subjected. However, the most important factor is the frequency of fastener removal where the fastener is periodically removed to make adjustments or to open up an access area to other components of the aircraft. Such frequent removal of a locknut would destroy its locking capabilities.

The design engineers say that for securing certain assemblies the castellated nut and cotter pin combination is outstanding in ensuring a positive lock. A careful inspection of the castellated nut and cotter pin fastener assembly suggests why. When the cotter pin is inserted through the keyways of a castellated nut and bolt it passes through the common axis of both. The forces required to separate the nut from the bolt are considerably greater than those that are exerted during normal operation. This locking feature is the cotter pin's greatest contribution and accounts for its long history of usage as a mechanical fastener.

Little skill is required to secure the castellated nut, bolt and cotter pin. The only requirement is to tighten the nut to the low side of the torque range and, if necessary, tighten until the next slot aligns with the hole in the bolt. A castellated nut should not be loosened to obtain alignment. Then insert and secure the cotter pin.

One major disadvantage of the cotter pin is its small size, and because of this it is occasionally overlooked and omitted during assembly or maintenance. Furthermore, its small size helps it to escape the scrutiny of the mechanics and inspectors.

The loss of any portion of the flight control system because of system separation reflects the importance of the function of the cotter pin. Failure to verify the completion of an assembly or maintenance task often creates alarming situations. A quick review of the accident and incident reports indicates no particular part of the flight control system is immune. Some malfunctions were actually discovered before takeoff but were imporperly diagnosed by the pilot. However, most separations come as a surprise to the pilot and often during a crucial manoeuver such as outlined below.

During a formation join-up, the instructor pilot occupying the rear cockpit quickly responded to the alarm from the pilot in the front cockpit that he had no aileron control. The aileron control had become disconnected from the front cockpit control stick. Two ROK air force pilots experienced a jammed aileron while performing a high rate aileron roll that required maximum flying skill to avoid the destruction of the aircraft (note Figure 1). An aircraft with a disconnected rudder was successfully abandoned moments after takeoff. Another recent near-accident started when the pilot began a recovery from an air-to-ground training sortie. During pullup the aircraft began to roll to the left; the roll was stopped by applying as much force as the pilot could exert on the right aileron. Fortunately, there was a nearby auxiliary runway where he landed before his strength diminished.

Missing cotter pins are also related to other systems and even to the ejection seat. There were two incidents where seat belt initiators have unexpectedly fired during seat adjustment. In each case maintenance technicians had failed to insert a cotter pin in the canopy balance spring that allowed the retainer spring assembly to backout. When the seat was raised, the bell crank caught on the retainer spring pin and fired the initiator and man/seat separator. This forced the pilot onto the control stick and instrument panel. Another simple oversight became apparent shortly after takeoff when the pilot noticed the aft stick movements were becoming increasingly more difficult and finally became almost impossible. A new pitch trim actuator had been installed but the two cotter pins on the fore and aft attach bolts were not installed. The pitch trim had dropped free and became wedged against the airframe.

The accident and incident reports discussed in this article were but a few of those reviewed, and all were caused by the omission of something as apparently simple as a cotter pin. In each case the postflight inspection revealed the castellated nut that secures the connection had backed off by vibration and the linkage was found disconnected. The nut had fallen off because it did not have a cotter pin installed, and furthermore, the required inspections following the last maintenance performed in this area had failed to detect the missing cotter pin.

Cotter pin and castellated nut usage has declined in recent years, but not because technology has developed a better fastener. The blame has too often been placed unjustly on the missing cotter pin. Occasionally, a system control will become disconnected because of metal fatigue, but in the vast majority of cases the mechanic and/or quality control inspector is at fault. The acceptance of maintenance responsibility is a cornerstone of air safety.

Quality assurance is fundamentally the grass roots of knowledge and attitude. How can we ensure that the individual possesses the knowledge and attitude to perform a task correctly? The answer is strong management and verification programs – programs designed to foster understanding of the quality assurance mission and to make the technician aware of his individual contribution toward the overall quality goal. This is essentially what quality awareness is all about.

Northrop F.5 Technical Digest

here's how to install cotter pins

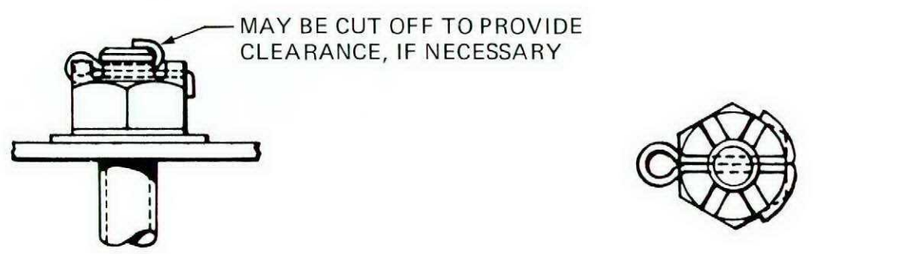


Figure 1

Shown in Figure 1 are the preferred and alternate methods of cotter pin installation. Figure 2 shows unsatisfactory installations.

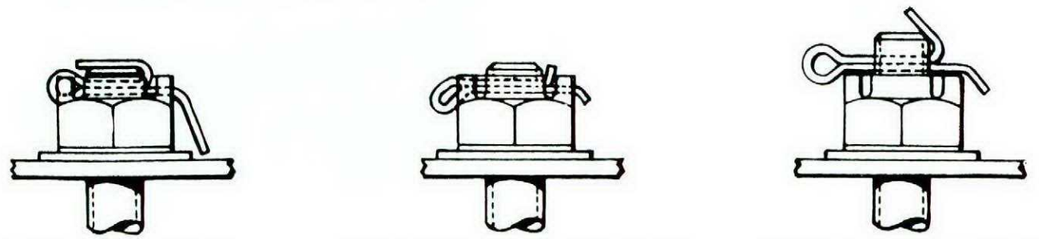
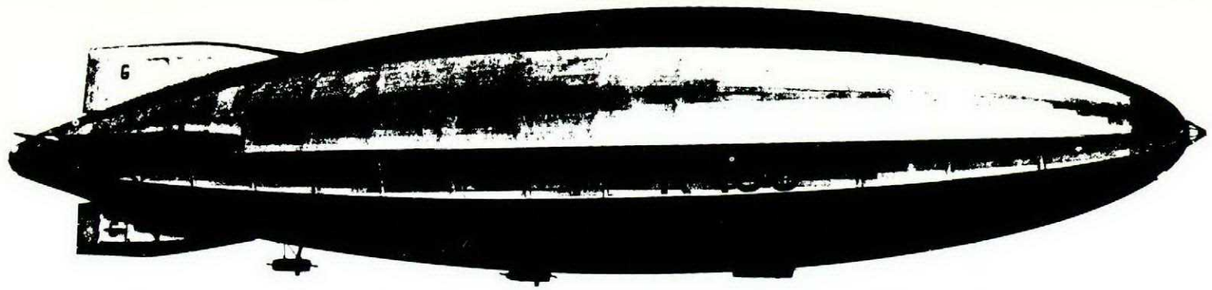


Figure 2

UNSATISFACTORY INSTALLATION



HERE COME THE AIRSHIPS - *again!*

by Robert Rickerd–AIRDIGEST

Amid the cheers of thousands of wellwishers, a silver grey monster of the skies dipped through the early morning haze at Lakehurst, New Jersey, on August 29, 1929. By circling the globe in only 21 days with a load of paying passengers at $9,000 a ticket the Graf Zeppelin seemed to have proven the economic and aerodynamic practicability of the airship. What happened to the idea, and why does it still capture the imagination of designers and transportation executives?

If you put these questions to Ralph Schneider, President of the Canadian Airship Development Corporation he would probably tell you that the airship was the victim of circumstance – the idea arrived before the technology needed to exploit it. And he would hasten to add that this is no longer the case.

"First of all we don't have the safety problems associated with hydrogen anymore. Helium has become a plentiful and relatively inexpensive by-product of natural gas production. It is no longer necessary to use primitive materials either – why they used animal tissue to line the gas bags in the early days," he grins, "and don't forget the computers and new navigation aids – they're solving a lot of design and operating riddles."

Mr. Schneider, a Naval Architect and Aeronautical Engineer, is also President of Hoverjet, a firm which manufactures hovercraft equipment.

He stresses that the only way to sort out the many conflicting opinions about the value of airships is to construct a small one with contemporary materials and technology and thoroughly test it.

That is why the Corporation has embaked on the construction of the prototype CAD-1, scheduled to fly in early 1977.

This time around the airship is envisaged as an aerial freight train rather than a people-carrier.

"The beauty of the airship is the constant lift-regardless of speed. It can take off or come to rest almost vertically and it can hover almost indefinitely," says Mr. Schneider.

"Although airships are not able to compete with conventional passenger aircraft with regard to speed, I believe for this reason there is a special place for them in communications and transport. Swivelling engines controlled by wind gust sensors will make them much more manoeuverable than they were in the old days. The conventional mooring process will be replaced by a system of winches which will load and unload containerized cargo from the hover mode. This way goods can be picked up and delivered directly from source to destination eliminating any intermediate form of transport, thus improving cargo safety and security".

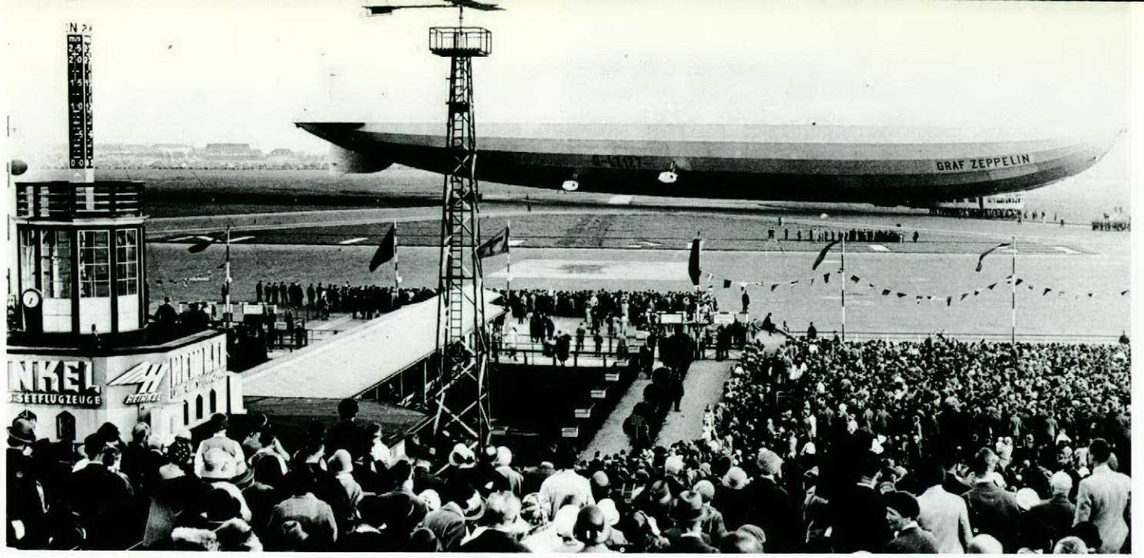
"The airship should also be useful for tourist cruising, scientific exploration, disaster relief, surveying, and as a monitor for everything from law enforcement to pollution."

The CAD-1 is being built at Thornhill, Ontario, by a volunteer group consisting of aeronautical engineers, model builders, university professors and students as well as enthusiastic members of Mr. Schneider's Hoverjet staff. It is of the non-rigid or "blimp" type, 120 feet long, 40 feet in diameter and powered by two 100HP Continental aircraft engines. It will be floated by 92,000 cu. ft. of helium and will carry a payload of 1575 pounds.

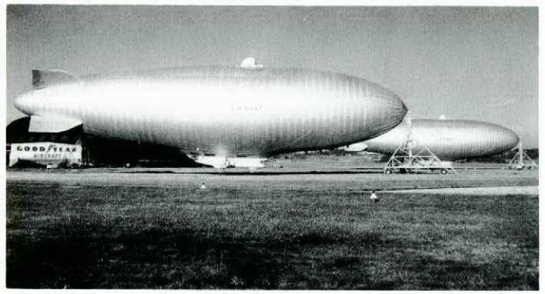
As the wheel has no counterpart in nature, it was truly the product of the inventiveness of mankind's early engineers. Man's ambition to fly, on the other hand, was inspired in very early times, by watching the birds, and everyone has heard of Icarus' unfortunate experience. Da Vinci and other inventors toyed with the idea of flight for hundreds of years, but it was not until 1783 that air travel was first accomplished by de Rozier and d'Arlandes in the Montgolfier brothers' paper balloon. However, the one-way haphazard balloon flights were little more than very dangerous entertainment for early air travelers. The ability to propel and steer the balloon was still to be developed.

"Aeronauts" began sailing around in powered and controlled airships in 1852 (over 50 years before the Wright Brothers), when a Frenchman named Giffard made a 17-mile flight near Paris using a three horsepower steam engine. By 1873, another Frenchman names Spiess developed the theories of balloon construction sufficiently to be able to patent the basic principles of the rigid airship or structurally-supported balloon. But it was not until over twenty years later that construction of the first rigid airship was begun in Germany, by an Austrian engineer named Schwartz. The ship had an aluminum framework and was covered by aluminum sheeting eight-thousandths of an inch thick.

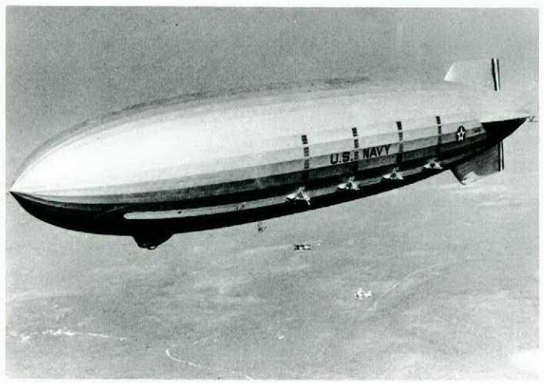
The one and only test flight was noted by a wealthy, retired army officer, Count Ferdinand von Zeppelin, a name that was to become synonymous with rigid airship development. He had been a balloonist with General Grant's army during the American Revolution and as a result was interested in their military potential. The Count began construction of one of his own airships in 1898 using Schwartz's idea of an aluminum framework but using fabric covering. Nine years and three prototypes later, he had ironed out most of the problems



The GRAF ZEPPELIN which for nine long years ruled the skies of the world covering a distance of 1,053,389 miles and carrying 16,000 paying and satisfied customers.



The Goodyear "Early Warning" blimps which served with the U.S. Navy until 1962 were the largest and last of 242 built for that Service. A rotating 40 feet radar antenna was housed in the 85 foot diameter envelope. The "ZPG3W" was 400 feet long, weighed 47 tons and was powered by two 1525 h.p. engines which gave the craft a speed of 90 mph, a useful load of 11 tons and a range of 5,000 miles. The 24-man crew was accommodated comfortably in an 83 foot gondola on cruises which could last up to 80 hours.



The designed role of the U.S. Navy Zeppelin aircraft carriers Akron and Macon (shown here) was to conduct long range over water reconnaissance and search operations. Cruising at 60 miles per hour with their "hook on" aircraft 50 miles on either flank, these airships could search a path 200 miles wide and patrol 144,000 square miles of ocean a day in good weather.

of construction, power and mooring and in October 1907, the "LZ-3" flew successfully, so impressing the German Military Board that they bought it. With his next airship he demonstrated the commercial viability of this new form of travel by crossing the Alps to Switzerland and returning in only 12 hours. By 1910, he had formed his own air transport company and in four years carried thousands of paying passengers at fares ranging from $50 to $150 depending on the length of the jaunt. His company flew over 100,000 miles without a fatality – an amazing accomplishment in those days.

When war broke in 1914, Zeppelins were pressed into military service. German strategists believed the airship was the key to victory and ambitious plans were evolved to exploit it. But history shows that they were tragically wrong. Despite continuous development, the Zeppelin never succeeded in becoming a worthwhile military weapon.

Captured German warcraft did, however, help to sow the seeds that led to the postwar development of airships in other countries, namely the U.S.A., Italy and Britain.

The 1920's and 30's became the golden age for airships and at the same time their darkest hour. In 1923, the American "Shenandoah" based on the German L49 Zeppelin design, became the first rigid airship to fly with safe helium rather than flammable hydrogen gas. In 1926 the Italian-built Norge flew 2700 miles from Italy over the North Pole to Alaska.

Lighter than air Transatlantic travel had been attempted as early as 1910, and in 1919 the British R34 succeeded in making the round trip with 31 passengers. in 1930 the R100 visited Montreal as part of her trials, crossing the Atlantic in 79 hours and returning in 57. But British hopes died with the R101's tragic crash in the same year and were buried with the economic depression. Only the Germans persisted with regular scheduled airship service to South America.

Hugo Eckener, the new champion of the airship in Germany realized the shortcomings of earlier designs and planned an even larger craft which would link his country with North America. The last word in design, the new Zeppelin had accommodations for 70 overnight guests inside the hull, was 800 feet long, had a hydrogen capacity of 7,000,000 cubic feet and produced over 5,000 horsepower!

The "Hindenburg" as the craft was christened was comfortable, spacious and popular with its crew. There were three bars, a library, sick bay, dining room, lounge with piano,

4. Cette scène du récent film de Warner Brothers "Zeppelin" nous fait voir quel destin ont connu le "Hindenburg" et les dirigeables allemands pendant la guerre. Une balle incendiaire, une étincelle d'un pot d'échappement ou d'électricité statique suffisait à transformer ces monstres gavés d'hydrogène en bûchers funéraires.

de sa 35e traversée de l'Atlantique. Trente-cinq des cent personnes qui se trouvaient à son bord périrent et le choc que subit l'opinion mondiale sonna le glas du dirigeable commerical.

Même si les dirigeables souples sillonnaient les cieux depuis Giffard et qu'ils étaient les moins chers à construire parce qu'ils ne comportaient pas d'armature pour soutenir l'enveloppe, leur perfectionnement fut nécessairement freiné par les matériaux disponibles. La forme des "Blimps" ressemble à celle des ballons et est le résultat de la pression qu'exerce le gaz sur la paroi interne de l'aérostat. Leurs dimensions et la charge qu'ils peuvent embarquer sont donc proportionnelles au rapport résistance/poids de la toile qui est utilisée. Lorsque les nouvelles toiles synthétiques, légères et résistantes, firent leur apparition, il devint possible d'en faire des blimps plus gros, plus sûrs et plus résistants.

Pendant la Seconde Guerre mondiale, quatorze escadrons américains de blimps fonctionnaient à partir de plus de 50 bases en Amérique du Nord et du Sud, en Afrique et en Europe. Aucun des 89 000 navires qu'ils escortèrent ne fut perdu à cause des sous-marins. Un d'entre eux demeura en l'air pendant dix jours par un temps qui clouait au sol les avions.

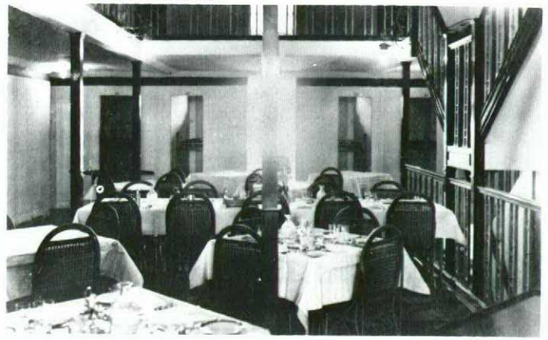
Les dimensions et la polyvalence du dirigeable s'accrurent pendant la guerre et le perfectionnement du blimp atteignit son point culminant en 1958 avec le lancement, par la compagnie Goodyear, de dirigeables de détection avancée d'une longueur de 400 pieds. Le dernier des blimps de la Marine américaine fut mit au rancart en 1962. L'utilisation de l'hélicoptère ne fut pas étrangère à cette décision.

Et qu'en est-il de l'avenir du dirigeable? Le succès éclatant qu'a connu au cours des ans l'escadron publicitaire de blimps de Goodyear ouvrira la voie, selon les promoteurs du dirigeable, aux gros modèles de transport. Le "Mayflower", dirigeable de Goodyear transportant des passagers, fut récemment retiré du service après une carrière de huit ans au cours de laquelle il parcourut presqu'un demi-million de milles et passa 12 500 heures dans les airs sans incident.

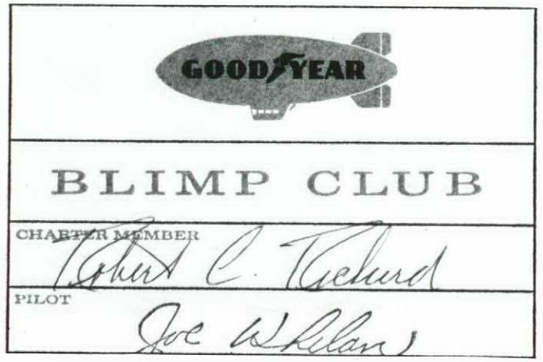
Le Venezuela a accordé un contrat de $12 millions à une firme britannique pour la construction d'un dirigeable porteur de fret et aux États-Unis la NASA a investi des capitaux dans la recherche sur les dirigeables. On prétend même que la Marine américaine songe encore à employer les blimps pour la chasse aux sous-marins.

Quoiqu'il en sera, il faudra vérifier les avantages uniques du dirigeable (montée verticale, faibles niveaux de bruit, cosommation de carburant et pollution) avant que les prédictions des visionnaires ne se réalisent une fois pour toutes.

Ralph Schneider et le CAD-1 du Canada fourniront quelques réponses à ces questions.



5. Les constructeurs du Zeppelin n'avaient jamais entendu parler de la cabine "boîte à sardine"! Cette photo de la salle à manger du R100 témoigne bien de l'immensité des dirigeables dans les années 30. Le R100 comtait 25 confortables cabines à deux couchettes, toutes situées devant les moteurs dans la nacelle de sorte qu'elles étaient pratiquement insonorisées et exemptes de vibrations.



6. Les enthousiastes qui ont goûté aux joies du vol en ballon conservent précieusement leur carte de membre du club des dirigeables. La copagnie Goodyear exploite quatre petits dirigeables à partir de bases à Los Angeles, Houston et Miami aux États-Unis, et Rome en Italie. Les vols ne coûtent qu'une bagatelle et entrent dans le cadre du programme de relations publiques de la compagnie. À l'heure actuelle, ces ballons sont les seuls dirigeables au monde transportant des passagers.

7. Les quatre derniers dirigeables transportant des passagers sont exploités aux États-Unis et en Europe par leur fabricant, la compagnie Goodyear. Ils parcourent plus de 100 000 milles par année et transportent 24 000 passagers dans leur rôle de relations publiques.

Comments

COMMUNICATION

Last year, in the world of commercial aviation a number of accidents happened which could probably have been avoided had aircrew made some pireps or at least well timed remarks to Tower. In particular, wind-shear and severe turbulence on final at times were experienced but not reported. Finally, someone lands, crashes and everyone comes out of the woodwork and states, "Oh yes, we had problems on landing due to turbulence etc."

Pass the word – if an unsafe condition or flight hazard exists, relay the information to the tower and other flights. This could pertain to birds, wind-shear, turbulence, ice and snow, braking conditions, or anything else of consequence. You are an aircraft captain; exercise your judgement and responsibility. Help the guy behind you live to fly another day.

SUBJECT: SHORT ARTICLE ON "BIRD HAZARDS TO AIRCRAFT"

"Bird Hazards to Aircraft" is a detailed review of the serious problem of bird/aircraft collisions. The book is the result of years of research and was written under the auspices of the Associate Committee on Bird Hazards to Aircraft, National Research Council of Canada. It is international in scope and discusses most aspects of this complicated subject.

Sufficient copies of "Bird Hazards to Aircraft" have been distributed throughout the Canadian Forces to provide those most responsible for aircraft accident prevention a copy for ready reference.

Additional copies may be obtained from the Publishing Centre, Supply and services Ottawa, Ontario or the publisher Clarke, Irwin & Company Limited 791 St. Clair Ave West Toronto. The hard cover edition costs $9.50 and the soft cover $5.95 plus handling expenses.

THE FIVE COMMANDMENTS

(NOTE – these commandments didn't arrive on a mountain top and are not carved in stone. They are however, of tremendous value – they must be – since we paid millions of dollars for them – and too many lives.)

1. Before all else – control your aircraft, or all is lost.
2. Avoid inadvertent contact with the earth or its natural or unnatural appendages.
3. Do not exceed limitations – neither yours nor those of your aircraft.
4. Think – analytically, *before* you act. Hasty actions can earn you an eternity in which to repent.
5. If the situation is doubtful, act immediately to save yourself. We can buy new airplanes.

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In a recent issue of the Cold Lake Courier the Base Commander highlighted several points which I feel have an immediate and long term bearing on air operational effectiveness and flight safety. Well said Col Gulyas and, therefore, with your permission we are repeating your remarks for the benefit of Flight Comment readers everywhere.

R.D. Schultz
Col
DFS

Have you noticed that the composition and character of the Canadian Forces is undergoing a dramatic change these days? The main reason for this change is the large influx of young men and women into our ranks. Figures show that we have a proportionately higher number of young single people in the Service today than four years ago. Therefore, the percentage of older and more experienced personnel is diminishing and we need to recognize the serious impact of the increasing numbers of a younger, less experienced work force in our military air operations.

I do not for a moment suggest that the younger people of today are any less intelligent or capable than we were in the past. Far from it – they are much more informed and knowledgeable in many ways. But they bring with them a new sense of social and morale values that have been ingrained in them by the world of today. As more young people join our midst, more demands will be placed upon our superiors. It is important for us to appreciate this vital point.

At Canadian Forces Base Cold Lake we have a programme of reinstating the status of the Senior Non Commissioned Officer to help us adjust to this need. Additionally, we are tailoring our social and recreational programmes to meet the requirements of the growing numbers of single men and women. Undoubtedly, the young people of today will respond positively to good leadership. They will support the need for the Canadian Forces to maintain its high standards in dress, discipline and deportment if time is taken to explain the reasons behind our traditions. They will also understand, for example, the absolute need for perfection in servicing aircraft if care is shown in their on-the-job training.

Most young people join the Service because they are looking for a challenge. As supervisors, it is our responsibility to ensure that the Service will live up to their expectations. We must try to understand their needs and motivations. Futher, we should be prepared to make some adjustments. However, let it be clearly understood that a lowering of standards is not acceptable. When I speak of adjustments I am referring to the use of flexibility in the way we train and supervise our new personnel. In the good old days we could sometimes achieve our standards by knocking a few heads, but today a more enlightened leadership is required.

It is important for young people to understand why we have been so proud of the Air Force in the past. If we provide the right kind of leadership we will be successful. Finally, when the time comes for us to retire, we can relinquish our positions, confident in the knowledge that the inspirations, standards and traditions of the Air Force we love will be maintained by our successors.

Col S.P. Gulyas
Commander CFB Cold Lake

Dans un récent numéro du "Cold Lake Courier", le Commandant faisait ressortir plusieurs points qui, à mon avis, auront des répercussions à court et à long termes sur l'efficacité des opérations aériennes et sur la sécurité des vols. Bravo donc, colonel Gulyas; avec votre permission, nous reproduisons vos réflexions, pour tous les lecteurs de Flight Comment.

Le Colonel R.D. Schultz
DSV

N'avez vous pas remarqué, ces derniers temps, que la composition et le caractère des Forces canadiennes changent de façon dramatique? Ce changement est principalement dû à l'apport de sang nouveau dans nos rangs. Toutes proportions gardées, les chiffres nous montrent que nous avons plus de jeunes célibataires aujourd'hui qu'il y a quatre ans. Par conséquent, le pourcentage de personnel plus âgé et plus expérimenté diminue et il faut bien reconnaitre l'effet que cet apport de travailleurs plus jeunes et moins expérimentés a sur nos opérations militaires aériennes.

Je n'ai jamais pensé un seul instant que les jeunes d'aujourd'hui sont moins intelligents ou moins capables que nous l'étions dans le passé. Loin de là, il sont mieux informés et plus au courant dans beaucoup de domaines. Mais, ils charrient de nouvelles valeurs sociale et morale qui leur ont été inculquées par le monde d'aujourd'hui. Plus le nombre de jeunes se joignant à nous augmentera, plus nos cadres auront à faire. Il est donc important pour nous de tenir compte de ce point essentiel.

A la base de Cold Lake nous sommes en train de redonner aux grades de sergent et d'adjudant leur vraie valeur pour qu'ils nous aident à répondre à ce besoin. De plus, pour parer aux exigences du nombre croissant de jeunes hommes et femmes, nous restructurons nos programmes sociaux-récréatifs. Les jeunes d'aujourd'hui sont certes sensibles à de bons dirigeants. Si on prend le temps de leur expliquer la source de nos traditions, ils appuieront cette nécessité qu'ont les Forces canadiennes de maintenir le plus haut niveau d'habillement, de discipline et de comportement. Par exemple, ils admettront également, après une solide démonstration pendant leur apprentissage, qu'il est absolument essentiel d'entretenir parfaitement nos appareils.

La plupart des jeunes gens s'engagent parce qu'ils cherchent un défi. En tant que cadres nous avons la responsabilité de répondre à leurs aspirations. Nous devons essayer de comprendre leurs besoins et leurs motivations. De plus, nous devons être prêts à effectuer quelques changements. Mais il est évident qu'une baisse de niveau est inacceptable. Lorsque je parle de changements, je fais appel à la souplesse dans la formation et dans l'encadrement du nouveau personnel. Dans le "bon vieux temps", nous maintenions un certain niveau grâce à quelques coups de pied au derrière, mais, à présent il nous faut un commandement plus "éclairé".

Il est essentiel que les jeunes comprennent pourquoi nous avons été si fiers de l'Aviation dans le passé. Si nous savons utiliser le style de commandement approprié nous réussiront. Et, lorsque enfin, sonnera pour nous l'âge de la retraite, nous pourrons quitter nos postes, confiants de savoir que l'inspiration, les normes et les traditions de cette Aviation que nous avons aimée seront maintenues par nos successeurs.

Le Colonel S.P. Gulyas
Commandant BFC Cold Lake