# FLIGHT COMMENT

JULY • AUGUST • 1966


## THE HIGH COST OF FLYING... page 2

# Comments

■ The article "NYLON BURNS!" brings to mind the item – as ancient as squadrons themselves – the squadron scarf. Many of these scarfs are nylon or some other synthetic fibre. We caution against their use as they can grossly compound any injury from fire, and in an area of the body vulnerable to serious injury. There is little to be gained from wearing carefully designed equipment and cancelling out the benefit by wearing scarfs and socks of unapproved material.

■ No striking pattern emerges from our flight safety record on "special exercise" operations, but several accidents recently compel us to have a closer look. The accidents we have in mind occurred under conditions of long working hours, unfamiliar environment against a background of increased work pressure. Take an example: two men at the end of 11½ hours on duty and having put in 23½ hours in the previous 48, push a maintenance stand into an aircraft tailplane. The supervisor states ". . .every effort must be taken to prevent accidents of this nature in future" – but:

- the stand was unserviceable
- it was being pushed over coarse gravel
- it was in poor light at dusk
- fatigue was a real possibility.

If, what the supervisor stated was truly felt, obviously these items should have come in for some earnest examination *before* the event.

■ An item on the groundcrew safety helmet on page 18 of the Nov/Dec issue contains a photograph which is incorrect. It does not show the piece of plastic tubing installed to position the chin strap suspension over the ear cups. Without this tubing the T-suspension can ride up over the upper part of the ear cups producing poor noise protection and discomfort to the wearer. The MATCOM drawing C65D51728 (Note 3 & Item 8) describes the modification. All helmets should be so modified.

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# SPLINES AND SAFETY

Last year, scuba divers recovered from the Mediterranean floor many of the components of a 104 which had flamed out, and had to be abandoned. (An account of this interesting case appeared in a previous issue.) The painstaking sifting of evidence and the detailed examination of parts was necessary, of course, but the accident investigators had strong suspicions about the splines on the fuel pump shaft. They were right; abrasive corrosion by-products had literally ground away the splines.

Now, let's go back to 1961. An article on fuel pump drive splines in a widely distributed flight safety magazine contained these cautionary remarks:

> "Investigations conducted on pumps have shown that the failures are initially attributed to the absence of lubricant at the pump drive shaft splines. The excessive rate of spline wear results from metal-to-metal contact of the mating splines . . . the lack of proper lubrication of the splines lends to the formation of fretting corrosion which rapidly deteriorates the splines. This wear usually progresses through the nitrided surface of the spline and into the base metal. It is then a relatively short time before the splines shear and the pump mechanically disengages from the engine drive train."

One year later, a CFHQ report contains the warning "16 fuel pumps have been rejected due to leakage of the pump shaft seal . . . It appears that this problem will become more prevalent as pump running hours increase." A year later an expert, after a metallurgical examination of a J79 fuel pump, stated, "The signs of wear noted on the drive shaft seal and the considerable fretting wear of the main driving spline are both indicative of deficiencies in the pump which could have consequences for flight safety."

In the following year – 1963 – several attempts were made to effect a redesign of this component. These attempts were unsuccessful. Further, no in-service inspection was specified despite there being evidence that this component was suspect.

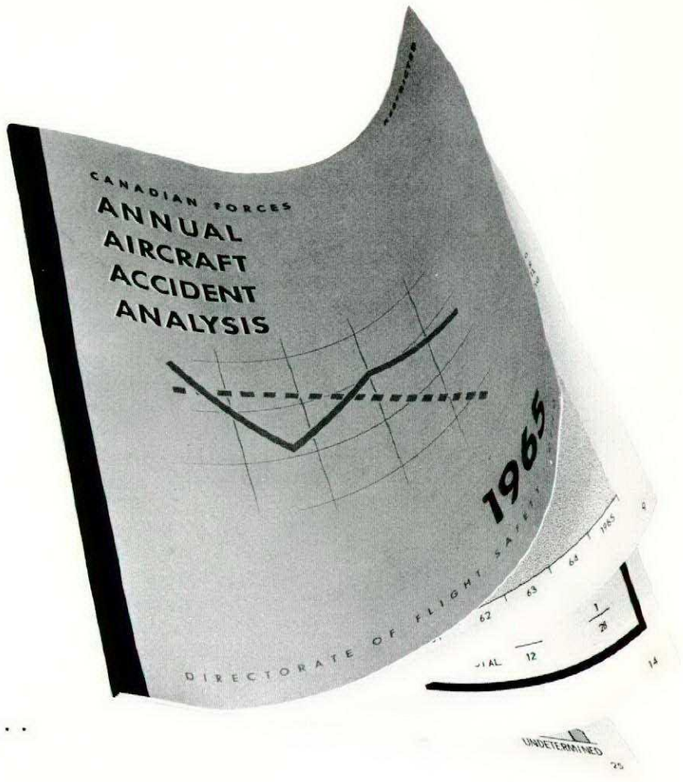
To come back to that spline which was salvaged off the coast of Sardinia. The spline had failed from lack of proper lubrication following failure of the fuel pump drive seal. We lost an aircraft despite warnings stated as much as five years ago. Somewhere in the past, somehow, one person or group of persons jeopardized – albeit unwittingly – the life of this 104 pilot, and we lost a very valuable fighter-bomber.

Flight safety preserves our capability to fight, and this grave responsibility rests with those who are in a position to make decisions affecting the safety of flight. Our failure to achieve a timely solution to this problem cost us an aeroplane just as surely as if it had been lost by enemy action or sabotage. This occurrence, involving a breakdown in communication and a MilSpec which doesn't reflect the latest knowledge in the art, suggests that a better method of cataloguing knowledge is overdue. And the accelerating extension of technology will surely compound this problem.

Group Captain AB Searle
Directorate of Flight Safety

# THE HIGH COST OF FLYING . . .

F/L HA Fawcett




**The most disturbing aspect of last year's flying record was a striking increase in accident costs . . .**

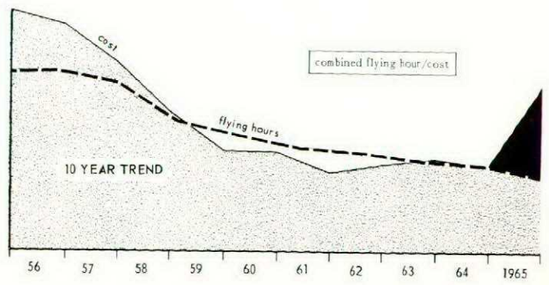
The popular trend to long hair and short skirts demonstrates the lengths to which some people will go to combat the high cost of living. If these actions seem extreme, contemplate for a moment the extent of the action which is needed to combat the high cost of aircraft accidents.

The petty saving achieved by the younger generation can be expressed in readily understandable sums, but the potential saving from eliminating aircraft accidents cannot be so easily put into comprehensible terms. Although ten dollars, or a hundred, or a thousand are understandable amounts, the brain begins to rebel at the task of picturing a million dollars. Even the man who owns that many dollars probably counts his wealth in other ways. How then can we get across the cost of aircraft accidents in real terms?

Suppose we convert these large sums of money into easily comprehended units, for instance Rolls Royces. Crashing a Neptune would be equivalent to smashing up a fleet of 63 Rolls Royces. Any business would be completely out of its corporate mind to scrap a Yukon-sized fleet of 315 of these prestige automobiles. But we do this and more, and at an increasing rate each year with little visible evidence of alarm.

Back in 1944, before Flight Safety, when the task at hand was to win the war at any cost, 330 aircraft were written off in Canada. This huge loss was 50 Rolls Royces less than the cost of aircraft written off in 1965! What has happened? Have aircrew and support personnel become less professional in their approach to flying? On the contrary. But we are now in the age of more complex and more vulnerable aircraft.

A wedge is being driven between the flying hour/accident cost lines, and the price of accidents per flying hour is rising rapidly.



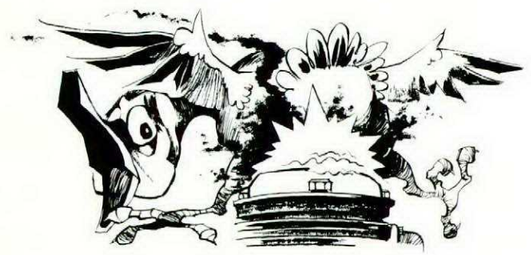



You might say, "What can *I* do about it?". The answer is deceptively simple – stop having accidents. All very well, but commanders, FSOs and almost everyone have laboured for years to reduce the number of accidents. And we responded – we achieved a reasonably acceptable decline in the numbers and the accident rate gradually dropped.

However, in this period of achievement, the cost of aircraft kept going up. Eyeball-type navigation systems were replaced by a variety of expensive and complicated black boxes. Electrical systems grew from four weak light bulbs (3 nav lights, and 1 for the pilot) to monstrous systems capable of providing the power requirements of a large town. Elaborate and sensitive fire control systems cost enormous amounts of money. The list of components goes on, and each one adds to the aircraft cost.

Perhaps by now – as if you needed confirmation – you're convinced that present aircraft are more expensive than they used to be. Look at it this way – because aircraft are more efficient they spend less time in the air doing the same job and are consequently less exposed to hazards. This suggests, contrary to what I said earlier, that they are more vulnerable. But this is not the whole story. Twenty-five years ago it was possible to run a Hurricane off the runway and merely get it mired – CF101s are different. When the dust and smoke settles, you'll find as you pick your way through the debris that the 101 is much less forgiving of inexpert handling – about 60 Rolls Royces less forgiving. In World War II days a wrench could ride around harmlessly inside an engine cowling for months. But don't try the same thing with a CF104 unless you can afford the price of at least one half dozen Rolls Royces.

Then there are the birds. If one of these creatures were bold enough to challenge a churning propeller he usually ended up waffled on a hot, but undamaged cylinder. Today, in the same circumstances he'll end up



not only cooked, but chopped and mixed with small bits of compressor – a new version of instant blade roast. This modern delicacy can be had for as much as the price of 65 Rolls Royces.

Our point is, errors in aviation are more costly than ever before. Ironically, most mistakes being made today are re-runs of previous events, except for one feature – they cost more.

To tackle this problem we need a steady flow of money-saving accident prevention ideas. More people are needed to dream up measures to prevent or forestall aircraft-damaging occurrences. This might mean new techniques, new devices and – hardest to acquire – an open-minded acceptance of flight safety measures as being in the best interest. If we don't respond, and recent trends continue, costs will eventually become prohibitive.

Any number of exhortations could be designed and issued to induce people to work at reducing costly accidents. The average person needs no orders, regulations or sermons to induce him to undercoat his car or paint his boat. He knows if he spends some effort and money he will preserve assets worth many times the amount of his expenditures. If this same attitude prevailed in all areas of Canadian military aviation the cost of accidents would be much lower.

The 1965 record points toward a developing crisis; the high cost of accidents could put us out of business – unless we treat our country's aircraft with the same meticulous care you would give your own Rolls Royce.


F/L HA Fawcett flew Halifax bombers during the war, returned to the RCAF in 1951 and then went to Maritime Air Command on Lancasters. He instructed at the Neptune Conversion Unit in 1955 and attended Flying Boat School and flew Canso with 103 RU till 1958. Transferred to command headquarters as Staff Officer Flight Safety, he held that post until 1962 when he joined the Directorate of Flight Safety as statistical analyst.

# GOOD SHOW

## LAC LP MYERS

A modification which replaced the Argus elevator attachment brackets with an improved type, had been carried out by a civilian mobile repair party. After complete reassembly of the elevator system, LAC Myers, a member of an inspection crew, checked the elevator control movement and felt a slight binding at the elevator-up position. With commendable persistence he extended his inspection. With a flashlight and an inspection mirror, he discovered that the inboard brackets had been installed incorrectly – the starboard on the port side and vice-versa. This allowed the grease fitting of both brackets to be positioned adjacent to the elevator control torque tubes – the cause of the binding,

LAC Myers' diligence in assessing and following through with the problem eliminated what could have developed into a serious elevator control problem.

## LAC HG DILLON
## CPL JJ LAMARCHE
## CPL JM DOUCETTE

A T33 was undergoing a periodic inspection and in preparation for a fuselage boost pump change, the bottom of the fuselage fuel tank was being mopped dry. When the mop was withdrawn from the tank a static discharge between the mop handle and the aircraft ignited a flash fire. The airman jumped back and the mop dropped in flames to the hangar floor spreading burning fuel over the wing.

LAC Dillon, who had been standing at the wing root when the fire broke out ran to a nearby CO2 fire extinguisher, unrolled the hose, and called to Cpl Lamarche to activate it. Without regard for his own safety, LAC Dillon then ran to the aircraft and put out

the fires on the mop, floor, and wing. Cpl Lamarche, with similar disregard for his own safety, climbed onto the wing, took the hose and extinguished the remaining flames in the fuselage tank. Cpl Doucette, who had been working on the opposite side of the hangar, quickly activated the fire alarm as soon as he observed the flames. The fire was extinguished in less than sixty seconds!

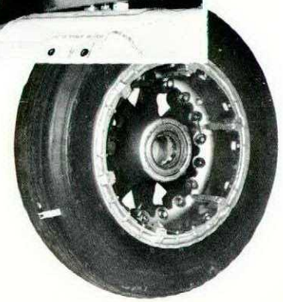
The quick thinking and prompt action of these airmen in a hazardous situation is most worthy of commendation.

## LAC FR ST MICHAEL

The pilot taxied his CF104 to the arming area to have the tiptank pins removed prior to takeoff. LAC St Michael, a member of the crew at the arming area, spotted a bolt head protruding from the left main tire. This bolt had punctured the tire; the head only was visible.

Had this aircraft been flown, a serious takeoff or landing accident could have happened.

The pilot stated that "... it is very gratifying to know that we have such keen alert technicians". And we agree; much of our flight safety depends on men such as LAC St Michael.



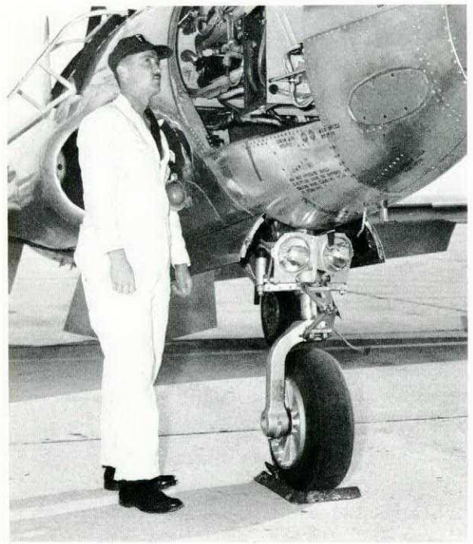


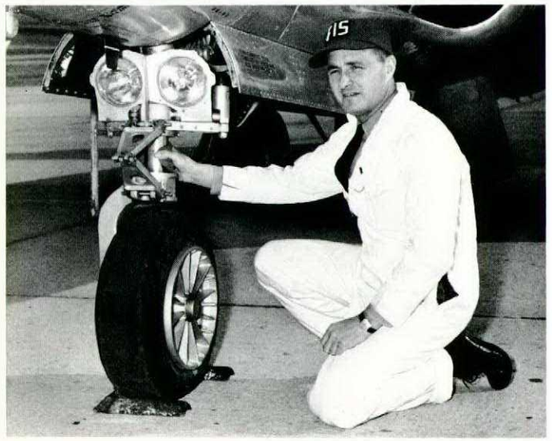
## LAC RE JOHNSON
## CPL JTGY LEFEBVRE

While preparing to repair a T33, Cpl Lefebvre and LAC Johnson were using recognized methods of removing fuel from the fuselage tank. Static electricity suddenly ignited fuel on the mop. Fire raced up the wing and into the fuselage tank. By quick thinking and coolness throughout this occurrence, the two airmen prevented the fire from spreading, and put it out. Had they not fought the fire with such effectiveness, the hangar and its contents could have been lost.

At the time, the hangar contained four and a quarter million dollars of aircraft, over $280,000 of MSE equipment – plus the value of the hangar and other equipment estimated at $300,000.

Their integrity and courage averted what could have been a major loss of valuable equipment and hangar.



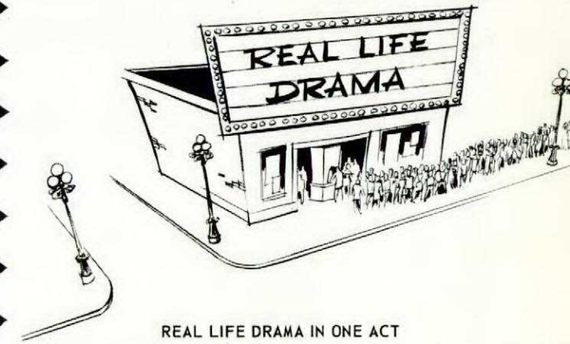




*As several people informed us, securing the T33 rear seatpack for solo flight shown in the article "Spot the Safety Device" (Mar/Apr), was incorrect. The embarrassed party explained that the photograph was of a display showing "How Not" to secure this seatpack. There's probably a moral to this story...*

*

# FLASH




## REAL LIFE DRAMA IN ONE ACT

**TITLE** – "Familiarity Breeds Contempt"
**CAST** – a 4 CIBG Pilot, (current on Nomads and 723 hours on type)
– a 4 CIBG Nomad
**SETTING** – Soest-Paderborne helicopter training area
**SCENE** – Valley floor with row of trees crossing valley from west to east and stopping just short of east bank.
– Weather – 2500 ft ceiling, 1½ miles visibility, wind westerly 15 gusting 25.
– Cast engaged in tactical flying down the valley from north to south.
**ACT ONE** – PILOT: *(Own words)* "As I have done on innumerable occasions at the same location, I will steer to fly along the valley bank and through the gap to the east (left) of the trees".
*(Strikes tree branches with tips of main rotor blades resulting in the replacement of two tip caps worth $96.12 each, one rotor blade worth $2819.30 and requiring 51 man-hours before being serviceable again.)*
**– END OF PLAY –**
**REVIEWS** – "Excellent play to bring out two good lessons: one, never take a familiar flight path for granted; two, don't try to second guess a gusting wind".

. . .OLE HINDESITE

# *Why Lightning Arrestors?*

It was a "dirty wintry night" as we would say in the auld sod when Argus 20735 nosed her way into the fog and mist of the North Atlantic on a normal 18-hour patrol. At 1030Z, 7½ hours out of Greenwood the sub-hunter was struck by lightning which severely damaged the vertical stabilizer. The captain reported in the CF210 "After seven and one half hours of flying on a maritime patrol, I experienced two discharges of static electricity from the aircraft within five minutes. The second was quite severe, temporarily blinding all members of the crew. Both occurred in mixed rain and hail under cumuloform cloud. After landing, servicing personnel discovered panels on both sides of the vertical stabilizer above the dielectric had been blown, popping several rows of rivets. A number of holes had been burnt into the top of the fin as well".

On 16 Aug 64, a USAF C97 carrying 47 military passengers to a base in Florida, was struck by a bolt of lightning. A loud explosion was heard at 17,000 feet in weather over mountainous central Colorado. Fire was streaming from the wing behind number 2 engine. The captain immediately called for feathering the engine but the fire continued. During the emergency descent to the nearest airfield, the increased airflow extinguished the flames but the left flap was burned nearly in half. The pilot was faced with a no-flap emergency landing at 140 kts minimum touchdown speed, on 5400 feet of runway 4850 feet above sea level, with heavy passenger and fuel load. After a three-engine ILS approach, the aircraft touched down just over the threshold, and stopped safely with three-engine reverse and maximum braking.

These two incidents chosen at random will indicate the severity and potentially catastrophic effects that can result from a lightning strike.

Two hundred and thirteen years have elapsed since Benjamin Franklin got soaking wet proving that clouds were electrically charged and though much research has been done there is still a great deal to be discovered on the subject. Old Benjamin probably never guessed that at any one moment 1,800 thunderstorms are raging over the face of the earth producing an average of 100 cloud-to-ground lightning strokes every second. Brilliant as he was, he could hardly have foreseen the heavier-than-air flying machine, not to mention the effects that a lightning strike would have.

We are told that discharges which damage aircraft invariably originate at a tremendous potential, ranging from 10 to 100 million volts; a current exceeding 100,000 amps can be generated within a cumulus cloud. These flashes extend from 1 to 10 miles to another cloud or the ground – the strokes never terminate on the aircraft. On the other hand, the static charge which may build up on an aircraft is not capable of damaging even thin aluminum. Now, if you are a reader who is smarter than the average bear, you will no doubt ask, "Why, then, did lightning strike Argus 20735 and that C97?". The experts would answer that these aircraft were struck only because they were in, or very near, the natural path of the lightning bolt.

If the aircraft were a metal shell without insulated conductors such as antennas which lead into the vehicle, current would probably not extend inside. Aircraft are not, and cannot be perfect metal shells. The extremities – which most often serve as the electrodes for the strike – are commonly fitted with non-metallic radomes and antennas which project beyond the shield of the metal shell. Flight control surfaces, because of their shape and location at the extremities of the airframe, are also vulnerable.

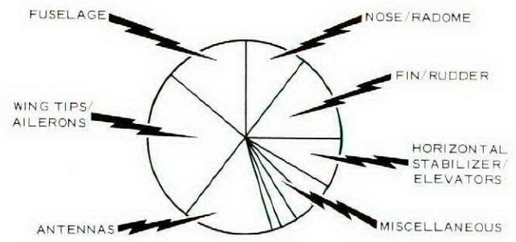


Fig 1

Recently, several Argus aircraft were struck by lightning and sustained damage ranging from:

- structural damage to the fin cap,
- damage of the MAD cone and head, wiring and navigation lights,
- puncture of the nose radome with small burnt holes in the scanner,
- small burn holes or scorch marks on the flight control tabs and wing tips.

On the Argus, the isolated fin cap antenna is connected to the fuselage through a lightning arrestor incorporating a spark gap which breaks down when the antenna is struck by lightning. This provides a ready path to the main structure, thus protecting the electronic equipment in the fin from damage. Generally, wire antennas are similarly protected by a spark gap built in or close to, the antenna mast.

Argus 20735 had a lightning arrestor installed but because the antenna lead-in couldn't carry the current the first strike burned off the antenna terminal lead-in (Fig 2) isolating the fin cap from the airframe. When the second strike came, intense heat was generated by the large charge having to pass through a high-resistance conductor to the main aircraft structure. An indication of the damage which may result in such a case is shown (Fig 3) – a portion of the vertical stabilizer of aircraft 20735.

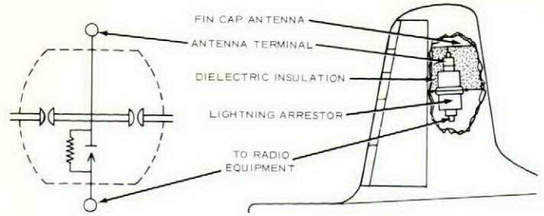


Fig 2

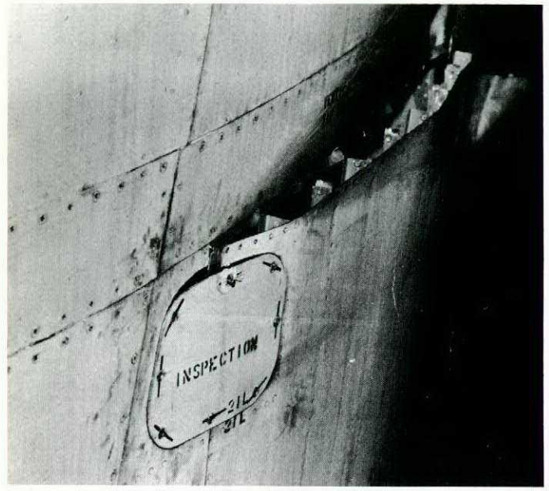


Fig 3

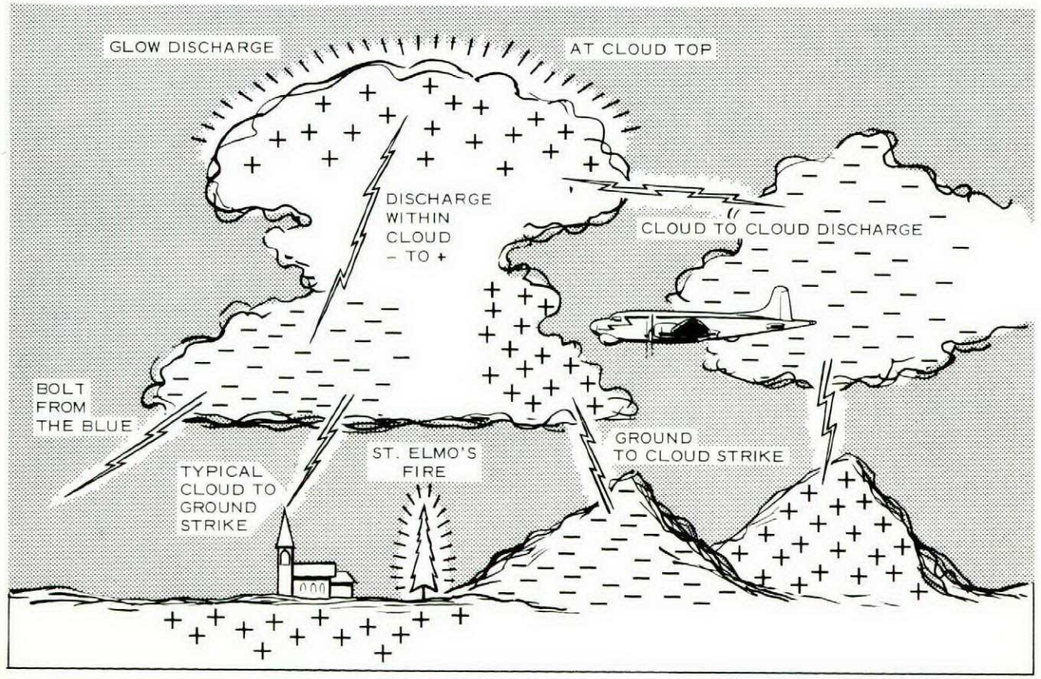
This and other lightning strikes on the Argus led to testing, in conjunction with the Lightning Transient Research Institute and a civilian company. The resulting new installation was the world's most thoroughly tested.

In conclusion, here are some points worth noting:

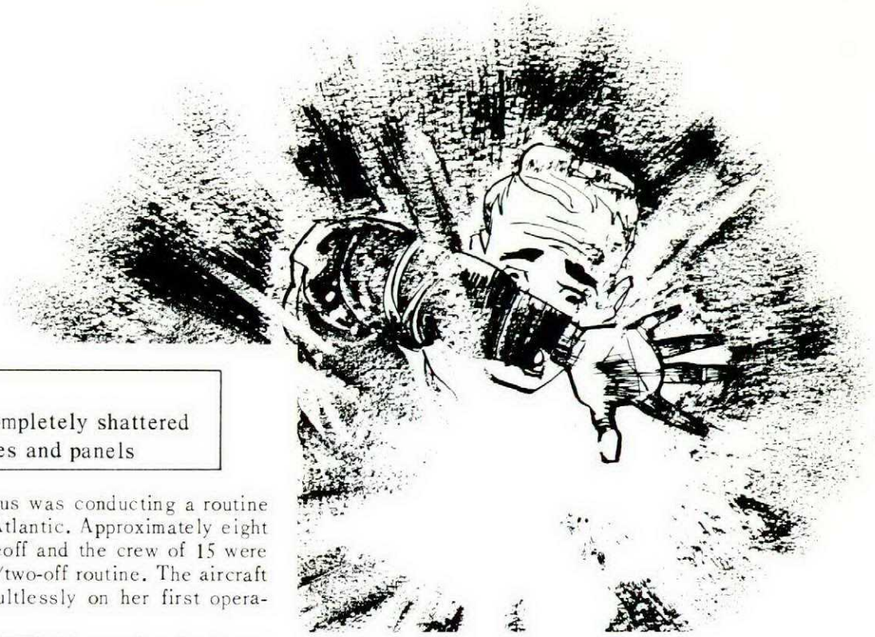
- Argus crews noted that noise on intercom and RT preceded an explosive discharge. They were able to anticipate the discharge by as much as 30 seconds.
- A "tip-off" to the explosive discharge was a forward streaming of St Elmo's fire* on the nose; this is reverse to the typical streaming toward the aft.
- Where damage occurred the St Elmo's fire effect was usually present before the explosion.
- The flash which accompanied the explosive discharge appeared to be visible within the aircraft at points where windows were shaded, ie, the tactical compartment.
- Some crews found that a quick adjustment of storm lights to bright in the cockpit, minimized the dazzle effect of the explosion.
- The aircraft involved is almost always in cloud, or just entering or leaving cloud when the discharge occurs. Precipitation is usually present and is frequently a mixture of rain and solid types.
- The temperature range was plus or minus 10° from freezing point in 90% of all strikes – a most significant fact.

CFB Greenwood

*A bluish brush discharge which glows and is audible as hissing.



# ARGUS RADAR EXPLODES



The heavy cast steel transmitter housing was completely shattered tearing away nearby shelves and panels

On 3 April 1959 an Argus was conducting a routine night patrol over the North Atlantic. Approximately eight hours had passed since takeoff and the crew of 15 were well settled into the four-on/two-off routine. The aircraft was new and performing faultlessly on her first operational patrol.

About midnight the AN/APS20E search radar began to show signs of malfunction. The radar operator saw the overload warning light flicker; with the erratic fluctuations of the current meter it meant arcing in the radar transmitter. The arcing increased until the overload protection relay shut off the set.

After a brief period the set was switched on but an overload occurred each time loading was attempted in either the high or low pulse rate mode. When the function switch was thrown to the low pulse mode, the radar transmitter exploded. Arcing had caused the explosion. The heavy cast steel transmitter housing was completely shattered, tearing away nearby shelves and panels. Fortunately no one was injured. The aircraft was returned to base without further incident.

The electrical arcing had occurred in the pulse forming network (PFN), which is a factory-sealed, oil-filled unit. The arcing had cooked the oil and generated hydrogen gas bubbles. The highly-inflammable hydrogen had built up pressure enough to bulge the steel case of the PFN and force its way past a terminal insulator into the main transmitter cavity where a spark from a switch contact caused the explosion.

An immediate operational restriction was placed on APS20 radars in service in the RCAF. During an inspection of all sets, several were found to have gas pressure built up in the PFN. This PFN malfunction causes oil to be forced out of the case, and bulging of the steel casing of the unit. The faulty radars were immediately placed under quarantine until suitable replacement components could be obtained. A PFN found to be leaking oil was given prolonged bench testing. Fourteen days of operation and testing caused more oil leakage. Current fluctuations preceded a modulator current rising uncontrollably, until, at an overload level, the radar shut itself off.

The set was turned on again, the pulse rate switching function performed – and the PFN exploded. A sheet of flame, black smoke, and oil erupted from the terminals. Had the explosion been confined in a pressurized transmitter housing (normal in aircraft installation) the transmitter would have completely shattered.

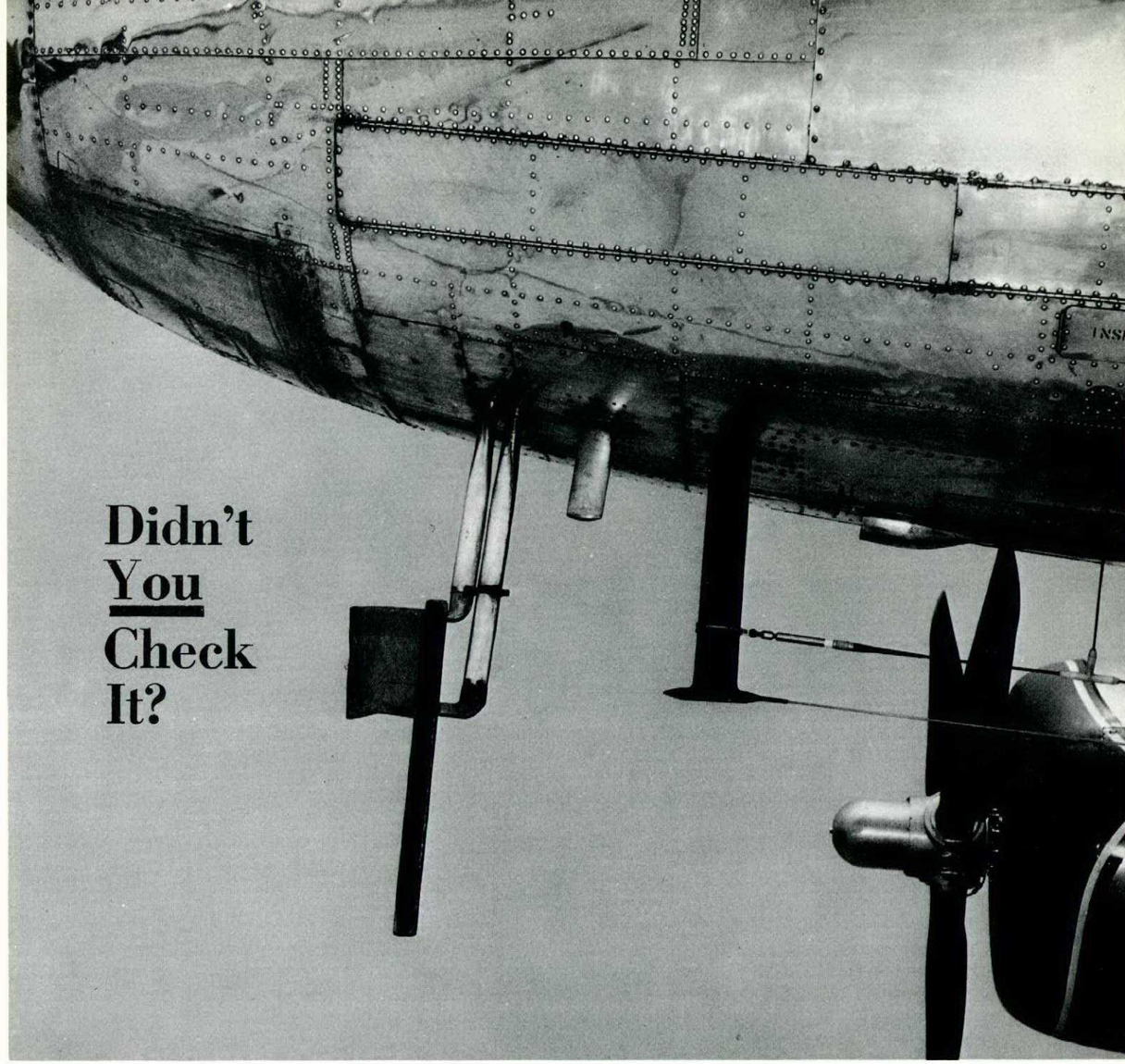
The explosion aboard the Argus caused considerable damage and was a serious flight safety hazard. Such an explosion on the APS20E-equipped Neptune aircraft could have had much more serious consequences. The location of the transmitter in the Neptune makes an airborne explosion liable to cause the loss of an aircraft. The USAF and USN have had several explosions with radar systems; one explosion had caused loss of life. This condition is not unique to the APS20 radar but appears to be common to all radars using high-power oil-filled components.

The radar explosion in 1959 obliged several agencies to devise a fix. There followed laboratory testing of the oil dialectric, and replacement of transmitter components which could contribute to a malfunction and explosion. Now, an automatic pressure-activated switch in the PFN cuts off electrical power from the radar system.

While our response to this severe hazard was successful, it exemplifies what we are up against with machinery – we cannot always count on any component to always function safely.

- SOTel
MARCOM






The senior passenger having failed to show, the next senior passenger suggested to the captain that since everyone was ready the aircraft should leave as early as possible. The departure time was pushed forward, and in the process the pitot covers were overlooked.

Unless otherwise directed by the captain, the first officer has the responsibility for the external check but that night he relied on the crewman; in fact, the first officer stated that the captain had already delegated this responsibility to the crewman. The crewman's walkaround was incomplete but he assured the pilot that the aircraft was ready to go.

Next, it was the captain's turn. "Locks, checks, pins, pitot covers and tailwheel unlocked" were called out, but the crewman was not in the cockpit. The captain assumed the items had been removed and stowed. The starting crew, too, failed to note that the pitot covers were still there.

The weather that night was 400 and 1/2. The captain, it was stated, was busy monitoring the first officer and setting engine power and in the process did not check the airspeed indicator.

The Dak did a short sharp airspeedless flight, landing off a GCA.

Underway at the squadron is an investigation into the stowage of the undercarriage pins and pitot head covers on the port side behind the pilot's seat. They can, therefore, be seen by the pilot during the pre-taxi check.

The old Dak is about 40 years old – time enough to get a foolproof procedure devised for such oversights.

A radiographic crew applying X-ray film to the upper portion of the Yukon vertical stabilizer.

# NDT*

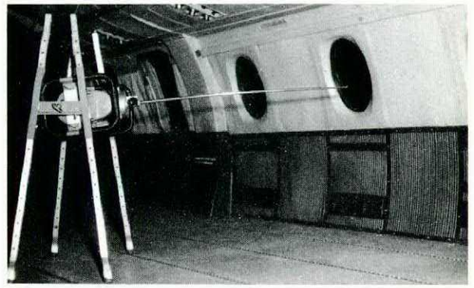
* Non-Destructive Testing

## As a Maintenance Tool

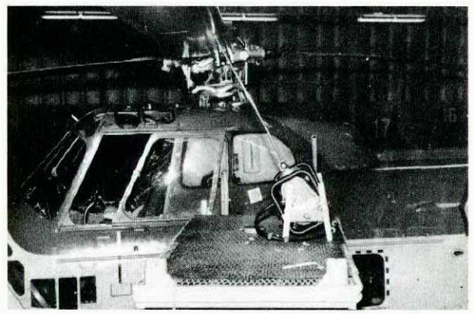
An interesting and rather unexpected requirement for non-destructive testing (NDT) occurred recently. Several aircraft were on a demonstration tour at Stn Trenton. An undercarriage door of one of the aircraft had broken loose in flight causing considerable damage to the starboard wing. The undersurface of the wing was dented and slightly buckled, part of the honeycomb section outboard of the aileron had been ripped open, and the aft section of the tiptank had been damaged. The honeycomb section was repairable and the tiptank replaceable, but servicing personnel were naturally concerned about possible internal damage in the dented and buckled area. A 6RD Radiographic team was called in to X-ray the area. The examination took about an hour and a half and indicated no defects.

NDT saved many manhours of stripping and assembling and assured maintenance personnel that the aircraft was safe to fly. This technique can play a useful role on the line, and is not restricted to repair depot or contractor operations.

Operating ultrasonic reflectroscope on Yukon wheels to evaluate techniques for finding defects. Later, wheels will be ultrasonically checked in-situ on the aircraft.

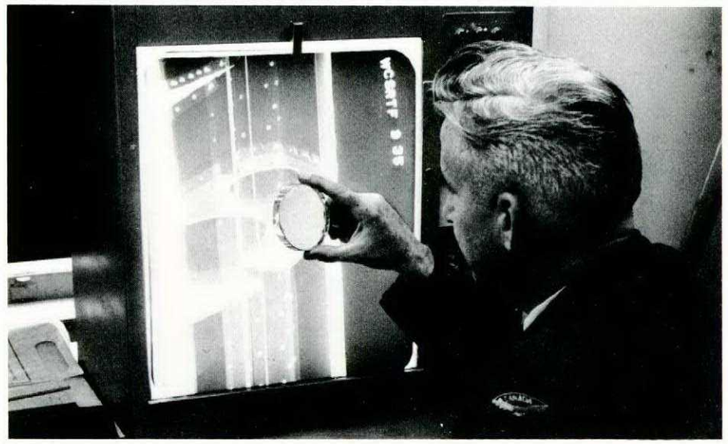


X-ray tube setup for inspecting Yukon cabin window frames.



X-raying of S55 rotor blades at Shearwater.

Operator using high-intensity viewer to determine condition of Caribou wing.





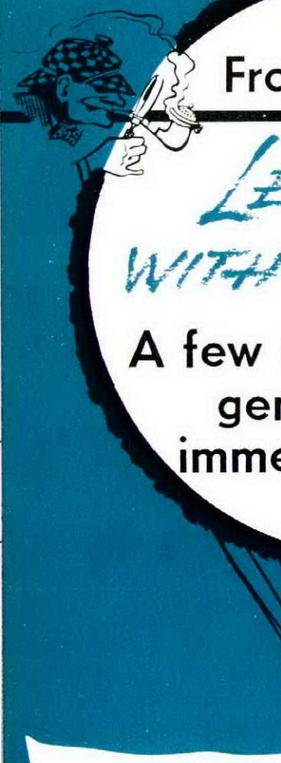
# *De day de Alligator got D-ring*

A trans tech, new to the job, was on a flight involving para-drop training. When opening the port paratroop door, the man's headset cable snagged on the left hinge of the jump platform. When he stepped back from the door, the snagged cable tugged at the alligator clip at the prestle switch. **But the clip was biting the D-ring – a handy but hazardous place to hang equipment.** The ripcord did its job; the parachute deployed into the cargo compartment of the aircraft.

Had it not been for the quick action of three men nearby who immediately pulled the reluctant parachutist back from the door and stepped on the deployed canopy, there was a good chance that two men would have been pulled out of the aircraft by an inflated parachute.

# *Flash-Back*

**Flight safety is everybody's business**



## From AIB files

# LET'S GET WITH IT CHAPS!

## A few not-so-sparkling gems from the immediate past . . .

EXPEDITOR

LOSS OF CONTROL ON TAKEOFF "The aircraft slowed and as it settled down it slowly rose on its nose and tipped onto its back." These few words explain the results of an aborted takeoff – after takeoff was attempted with the tailwheel unlocked!

OTTER

GROUNDLOOP ON TAKEOFF "The accident was caused by inexperience and pilot error in that he did not correct for a swing on takeoff, wrongly assessed the wind condition, and did not utilize the full length of the runway." Also of note, the wind was above the maximum allowable for the Otter.

EXPEDITOR

LOSS OF CONTROL ON TAKEOFF The aircraft ran off the runway on takeoff and "tipped onto its back". The board of inquiry found that there was an "error in judgement in that the pilot did not take prompt, positive abort action when he decided to abort the takeoff." His technique was also quite faulty!

CHIPMUNK

IMPROPER FUEL SELECTION The engine suddenly stopped right after takeoff on a touch-and-go – at night. The instructor landed in the snow beside the runway and the aircraft overturned. The CF210 stated "The cause of the accident was fuel mismanagement – It would appear that the student failed to carry out instructions when told to change tanks, and that the instructor failed to ensure that his instructions were actually carried out".

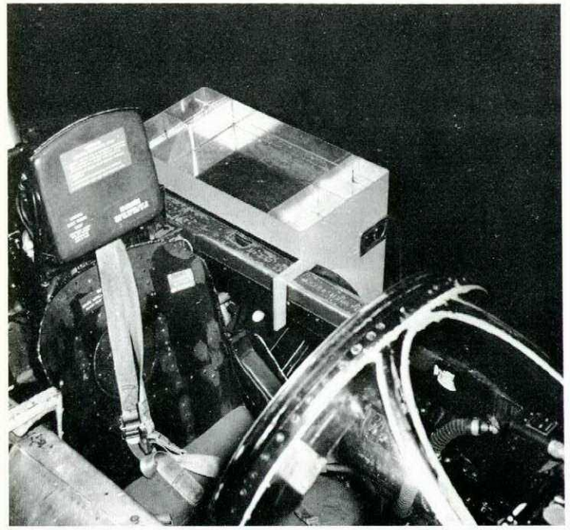
T33

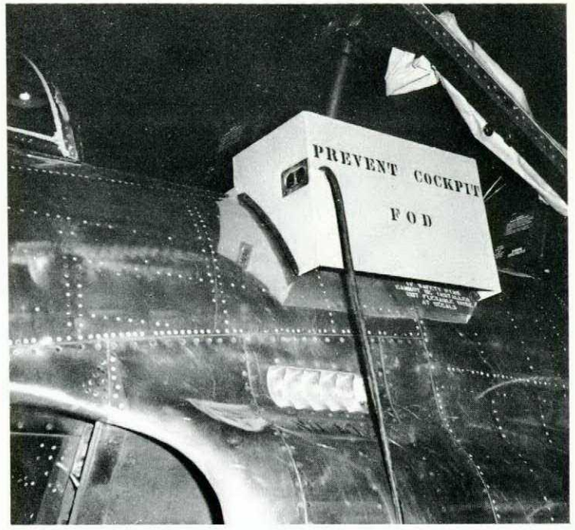
LANDED SHORT On final approach for a practice forced landing the aircraft struck the ground in a level attitude 400 feet short of the runway. The nosewheel collapsed and the aircraft skidded 1000 feet down the runway. The commander states "We concur with the station's assessment of this accident as pilot error in judgement, for failing to appreciate a low position on the approach". (A1 instructor over 1200 hours on type.)

L19

LANDED SHORT The CF210 contains the remarks: "The student undershot the strip. The instructor also did not realize the aircraft was undershooting until too late. Consequently, the aircraft landed short of the undershoot area." And consequently, the prop was bent, skin was buckled, one undercarriage leg torn off, etc.








# FOD AND UTILITY TRAY

The cockpit of an aircraft offers little space for the technician to work. The resulting frustration and annoyance could be detrimental to the quality of the job. For example, we often ask:

- *"What can I do with these spare nuts, bolts and components?".*
- *"Where can I put this tool?".*
- *"Where will I put these discarded pieces of wire, string and locking wire?".*
- *"How can I hang an electrical extension board where it won't fall to the ground?".*

Invariably, the answer to these questions is "on the floor of the cockpit". This brings with it foreign objects and the FOD hazard no matter how conscientious a tradesman he may be.

With this thought in mind I designed a FOD and utility tray which would reduce the danger of FOD and make working areas less cluttered.

The FOD and utility tray consists of compartments for nuts, bolts, washers, etc, and a larger compartment for tools and components, plus a built-in 110 volt dual-grounded socket assembly for plugging in an extension light and electric tools. A canvas bag can also be clipped to the tray for unnecessary waste material.

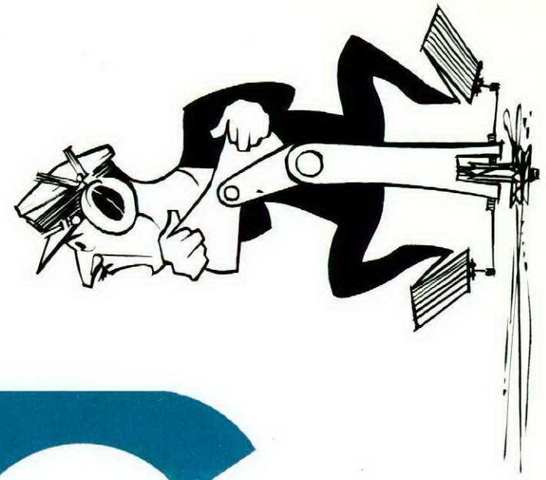
The trays are suspended outside the cockpit as illustrated in the photographs. These trays, which can be adapted to most aircraft have been in constant use at RCAF Stn St Hubert for nearly two years and have met with wide approval.

LAC CH WILLIAMS
Stn St Hubert

*Air Transport Command is continuously encountering this problem. . .*

The Expeditor captain taxied his aircraft out, took off, climbed to altitude (6000 ft) and handed over control to the copilot. The words "you have control" were barely uttered when the aircraft lurched into a 90° bank. Fortunately, the aircraft was not in cloud. The exhilaration subsided as it became obvious that the copilot's controls were reversed! However, they had just climbed through an overcast and were between layers. The aircraft was flown back from the left seat and landed without incident.

That it had happened on such a familiar aircraft led a senior officer to remark, "after so many years with the Expeditor, this incident came as a surprise to all concerned". Agreed. But the really surprising aspect to this situation is the number of people in the "all concerned" category.



# You Have Control?


An airman had done considerable work on the control column and cables involving the removal of the control column sprockets. On reassembling these sprockets, the chain and cable on the right-hand side were reinstalled 180° out of position causing the control column wheel to turn in the opposite direction to control movement.

The work was checked and signed as rectified by the airman doing the work. It was inspected by an NCO and certified serviceable by a senior NCO. An independent check in accordance with EOs was done and signed for by another NCO.

The aircraft required a pre-flight check and test flight; this was done - from the left seat. Naturally, the aircraft flew serviceable. That same day the aircraft was BFI'd by another airman and the next day was given a periodic inspection by yet another.

The aircraft captain was the *eighth* man to have had the opportunity to detect this major malfunction. It remained for the ninth man - the copilot - to demonstrate the Murphy.

Here are some meaningful quotes from those who participated.

**"Only the movement of the right-hand column was noted but obviously the correct movement was missed as I was concentrating on the external surfaces."**

**"Meanwhile, the chain and sprocket were separated and possibly sometime in this period the chain was turned over."**

**"...we overlooked the obvious reversal of the co-pilot's aileron control".**

**"I checked the movement of the ailerons from the control seat at the port side and they checked out serviceable".**

**"Mainly, I carried out the inspection in accordance with the EO that requires all control surfaces to be checked for correct movement, etc".**

Well, so much for the story - but why had the mistake occurred in the first place?

A "severe blizzard" is mentioned as having interrupted the work

A parts re-work at station workshop caused further interruption.

Of the eight persons, who on 11 occasions, had an opportunity to detect this major unserviceability, no one did so.

"An aircraft part which can be installed incorrectly will be so installed" – Murphy.




Look at the picture again, study it carefully until you fully appreciate the extent of the burn damage, of the total destruction of the surface tissue and the almost ulcerated erosion of flesh and muscle especially around the ankle. This is a nylon burn, an injury that took ten months of hospitalization and an immeasurable amount of surgery and care to cure. An injury that would never have occurred to such a serious degree had the injured man only paid attention to the constant warnings against wearing nylon next to the skin.

Yes, this is what a nylon burn looks like. This is the type of injury that can result when this man-made fibre is worn next to the skin and the subject is exposed to excessive heat, both directly or indirectly or to direct electrical discharge.

In the case illustrated the injured man was the pilot of an aircraft that crashed and caught fire following an attempted aborted takeoff. For the flight the pilot was wearing normal flying clothing consisting of a standard lightweight flying overall, Mae West, and flying gloves. His footwear, as the aircraft carried only a conventional seat, consisted of shoes but under those shoes he was wearing knee length tropical socks – nylon socks.

Fire was evident even before the aircraft came to rest. The ventral tank burst and ignited as the aircraft skidded across the overshoot, through the perimeter fence, across a road and through a stone wall. The pilot swiftly evacuated the burning cockpit but on realizing that his passenger was still in the aircraft returned immediately and assisted the man to clamber free.

By this time the pilot's flying overall was smouldering visibly but as he stumbled clear once more, rescuers swiftly smothered the charring cloth. The rescue ambulance with a medical officer was quickly on the scene and the injured crew immediately dispatched to the hospital.

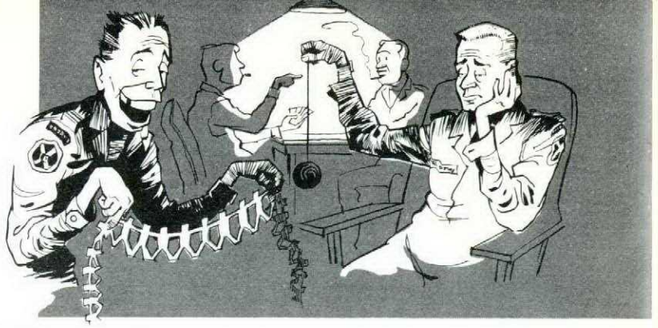
As the medical officer gently cut away the pilot's flying overall the ghastly mess shown in the photograph was revealed, the rest of the patient's body, even where it had been in direct contact with the smouldering overall, was only superficially burned and presented nothing like the challenge of the nylon burn injuries of the lower legs, injuries that would not have been there had the pilot been wearing cotton or wool/cotton stockings.

Nylon burns are not at all the prerogative of the aircrew. A senior maintenance rating received similar injuries when his nylon socks melted when he received an electrical shock. The nylon burn damage proved far more serious than the shock. The RAF too, have reported similar incidents, one involving a glider pilot. The metal tail skid of this unfortunate gentleman's flying machine scraped an overhead high tension cable and the ensuing "flash" although not felt by the pilot, melted not only his socks but also his terylene worsted trousers!

We have, in the past, heard of nylon burns and the dangers of wearing this man-made fibre next to the skin. The illustration and the article are intended to frighten you to death, and it is sincerely hoped that everyone will have second thoughts before they fly or work wearing nylon next to the skin.

Royal Navy, "Cockpit"

# Alert Crews - *Punchy or Bored?*



***Many useful articles are available on demand. For physical fitness and sports equipment not on scale - find out about the annual public financial grant for the maintenance and replacement of sports equipment. A fair share of this should be budgeted for alert areas. Too, non-public money and equipment could be provided.***

Today, many components of the forces have been assigned roles which demand round-the-clock vigilance and readiness. The inevitable shift-work subjects the serviceman to long periods of inactivity - but alert to the sudden demands of a scramble. This inactivity can produce boredom and with it the risk of reducing morale and hence, operational efficiency.

Boredom has long been recognized as one of the factors that adversely affect morale. Over a decade ago the RCAF embarked on a program determining recreation requirements, building facilities, purchasing equipment, and training specialists. One of its objectives was to combat boredom. The aim was "to make time live" - including enforced leisure time.

Commanders, often quick to recognize the importance of recreation programs during off-duty hours, may be unaware that when a man is on duty "marking time", he is exposed to conditions which lower morale and efficiency.

The alleviation of boredom to sustain efficiency and enthusiasm in alert crews, involves a deliberate and continuous effort to provide on-the-spot recreation activities as well as physical exercise. The successful program requires planning, enthusiasm, ingenuity, leadership and the best use of what's available. Often overlooked is that activities in enforced leisure time can be extensions of the station program and vice-versa.

People make programs - not facilities or equipment - but ... *people*. Persons must first be aware of their problems and encouraged to contribute ideas and effort. Dig out the "volunteer". Poll the whole crew to find out what they want to do. Successful programs are those that provide what the people want. Don't be surprised if your poll is not a smashing success. Many just don't know what they want to do - that's why they sit around doing nothing! Be prepared with a list of proposals and alternatives.

### Making Do

Areas for enforced leisure time activity normally would be:

- a lounge or common room
- hangar or workshop space
- outdoors area.

In most alert crew areas the space available for a lounge or common room is minimal (to non-existent); getting the most from the space available is going to require ingenuity - and top-level support. The area should be attractively and comfortably furnished, well ventilated and kept clean. No one activity should be allowed to dominate the area. Ideally, carefully employed dividers, lights, drapes and furniture arrangement could sub-divide the common room area into a snack bar, games area, read-write study nook, watch-listen area, and a miniature gym. This, as you will recognize, is not always possible; some compromise is inevitably required.

Before continuing with more detail on the use of areas and suggested activities it is assumed that some readers are now posing the "where-withal" question: Where and how do we get materials, equipment and funds?

First the obvious: Consult the officers in construction engineering, supply, administration, recreation and other related responsibilities. Carefully check the supply scales to see how they apply to your situation. *Many useful articles are available on demand.* For physical fitness and sports equipment not on scale - find out about the annual public financial grant for the maintenance and replacement of sports equipment. *A fair share of this should be budgeted for alert areas.* Too, non-public money and equipment could be provided.

Now the not so obvious. Some feel that public and non-public resources should look after *all* needs. In most situations this is not possible or desirable; onus is where it should be - on the crew member to contribute to his own well-being. There are many painless and indeed challenging methods of building up a "kitty", finding materials, making renovations, and divising a program, if everyone gets into the act!

A snack bar is not merely a place to eat - it's a place for social recreation. Snack bar tables are also useful for quiet games and "chewing the fat". In this age of electric appliances and automatic dispensers there is little excuse for refreshment and food not being available at all times.

### What to Do?

There are an infinite number of "quiet" or table games. Cards, checkers, chess, Scrabble, Clue, and Monopoly, continue to be popular in the forces. American shuffleboard, billiards, darts, and table tennis are the most popular "stand up" games. Cost of the first two makes their installation prohibitive in most areas, yet some fine shuffleboards have even been "bucksheed" from written-off diving boards. Some units have "relocated" or found surplus billiard tables.

Once these activities have been introduced interest may lag. Usually, this can be attributed to:

- "scruffy" equipment
- "lost" or missing equipment
- a few hogging the equipment
- no competitive atmosphere.

The first three should not be allowed to happen, and they are easily remedied. Judicious use of ladder and pyramid tournaments can stimulate participation. A word of caution here: *don't over-organize!* The casual player is just as important to your program as the ardent competitor.

Unfortunately, the "idiot proof" recreation device is still only a dream; this is especially true of electronic items. A record player, radio or TV undergoes strange stresses when exposed to herds of knob twirlers and button pushers. Experience has shown that record players and records are the most abused items. Forget the record player if radio or TV reception is adequate.

A miniature gym is easy to set up. Basic equipment should include an abdominal board, chinning bar, gym mat, isometric rack and skipping ropes. A good fitness program can be built around this equipment. If money or scale of issue cannot provide this gear, all of it can be manufactured on the unit at small cost. With a little ingenuity, other items can be manufactured. For example, many armed forces and institutions make their own weight training equipment with pipe, jam cans, and concrete.

Many of us don't know how to use gym equipment properly. The result is pain and discomfort - and a resolve never to try again. Explanatory charts of proper training methods should be posted. Emphasis should be on "self competition" using a regular program tailored to individual needs and abilities. In this way, a man is encouraged to compete with himself by keeping a record of performance and, through regular activity, try to improve.

Modern technology has produced many fixed-routine jobs which are non-creative. For many in the Canadian Forces, according to the 1965 RCAF Recreation Survey, the need for creativity has been satisfied by hobbies and handicrafts. The most popular are modelcraft, making fishing lures, plastic kit assembly, and jewelry making.

A library of magazines and soft-cover books is a must. A paper-back library can be easily established by a "book drive". However, there is usually a need to find money for magazine subscriptions, and unfortunately, those who remove magazines and books will always be with us. The library will therefore need a small amount of conscientious administering. A good control method for soft cover libraries is the "trading post" system; books can be taken out at the same time ensuring a turnover and a build-up of the library. In short, someone should be given the responsiblity for its care.

### Outdoors

The outdoor area can be exploited. Before setting up any apparatus or laying out a court carefully ensure that your plans are practical. For example, volleyball and badminton are fine games but aren't much fun in a prevailing wind. In planning, consider sun, wind, size and area, overlap, adjacent buildings or equipment, and of course, safety. The layouts should be official size and pertinent copies of the game rules posted. This information is available from the Physical Education and Recreation Staff. Just outside the door is space for horseshoe pitch, softball catch and football catch, golf driving net, a pitch and putt course, and a basketball backstop. If hangar space is available most of these activities can be conducted indoors.

Evaluate what you have in terms of equipment and potential. Determine priorities and produce a detailed plan of action. Be sure your proposals meet the needs of the crew. Remember, the Physical Education and Recreation Staff have a definite interest in your program and are trained and prepared to contribute in resource, advisory and instructor roles.

Well, it's up to you. Join in the battle against boredom. Don't just sit there - do something!

Directorate of Physical Education
and Recreation, CFHQ

## Loose Line Leak

Ten minutes after takeoff number one engine developed an oil leak. The engine was not feathered as plenty of oil remained. In this state, the aircraft was flown to home plate; the pilot was forced to dump 3000 gals of fuel.

This expensive incident was caused by someone who failed to tighten a connection on the engine scavenge oil line. The possible consequences of errors like this should be in every technician's mind whenever he is put in a position of trust.

# *Blood-Sweat-Tears*

F/L WD Macnamara

In spite of other associations with these words, they do have one thing in common – they all contain salt. The salt content of body fluids is important to the maintenance of cell function and the regulation of blood volume. During hot weather, the need for adequate salt intake must be appreciated.

Sweat (or perspiration, if you prefer) is a dilute solution of salt; the evaporation of this solution assists in cooling the body. Several quarts of sweat can be lost during a day's work in summer heat. Failure to replace the salt loss may lead to "heat cramps", nausea, vomiting, dizziness and fainting.

If you sweat profusely you must add to your normal salt intake either by increased salting of food or the periodic use of salt tablets – in addition to maintaining an adequate water intake. While it is preferable to


increase your salt supply through your food, salt tablets are provided to supplement normal food sources. One or two of these tablets taken daily with lots of water should prevent the occurrence of symptoms resulting from salt deficiency in hot weather.

If you are working in a particularly hot environment or sweat more than normal, consult your medical officer for guidance on your salt requirements.

# *Nick-the-Nav Notches One Grand*

On 14 April F/L Ronald G (Nick) Chester returned from a training flight in a CF101 Voodoo reaching 1000 hours in the bird. This 1000 hours represents four and one half years of continual flying – 966 flights.

F/L Chester's tour on the century-bird started in Aug 1961 when he was selected for the initial Voodoo training program. He received his 101 training at Otis AFB, Cape Cod, Mass, and Hamilton AFB, California. Back in Canada his group formed the RCAF Voodoo Conversion Unit at Namao, Alberta. After the all-weather squadrons had been trained F/L Chester was transferred to Bagotville with his squadron (425 Sqn) where he continued to instruct on lock-ons, lost contacts, etc. When 3 AW(F) OTU was formed to train Voodoo aircrew, F/L Chester continued with 425 Sqn as a staff navigator. In addition to his squadron duties he has been employed in the maintenance test flight as a test flight navigator.

F/L Chester was one of four radar navigators chosen last year to represent the RCAF at the USAF/ADC World-Wide Weapons Meet (William Tell), Tyndall, Florida. He is on 425 Sqn's team competing against the other RCAF Voodoo squadrons for the MacBrien Trophy.

Nick is now well on his way towards the 2000 mark. Congratulations!

F/L Chester is congratulated by Bagotville's CO, G/C RF Herbert



# Pins - and a needle

T33 seat pins have fouled electric systems three times in the last two years ....

The trip over, the T33 was taxied to the ramp. The pilot in the front seat removed the pins *from the front map case* then saw smoke coming from the right side of the cockpit. The battery and generator switches were turned off immediately and the aircraft shut down. A gradually increasing pool of hydraulic fluid formed on the front cockpit floor by the map case. The GPH205 was scorched and the seat pin showed signs of heating (see photo).

The pilot states that he "... is aware that the map case is not an ideal storage compartment for the T33, although most storage bags provided are also far from ideal". (However, worthwhile suggestions from the field have been few and far between.) The unit prepared a UCR stating "a more suitable solution will have to be found". The unit commander wrote "... few pilots use the canvas bag which is provided to hold the pins, because they are very difficult to reach without much twisting and contortion. Most aircrew apparently roll the pins and streamers and put them in a flying suit pocket. This is not the answer, unless the pocket is securely closed."

The station commander added that "... of many incidents that have occurred, reminders of the hazard have been issued by message to all aircrew. This type of warning, without follow-up action of a permanent nature, is soon forgotten and this incident is the inevitable result. In my opinion, inadequate supervision in all levels of command is primarily responsible for this occurrence".

It is now over a year since plans to prototype a container for the pins have been underway. The problem is in the final phases of solution.

*We outline the skirmishes in this paper war in some detail not to elaborate on this specific problem, but it struck us as having a familiar ring. We have to face up to our apparent inability to solve a problem that had been with us for over 15 years.*

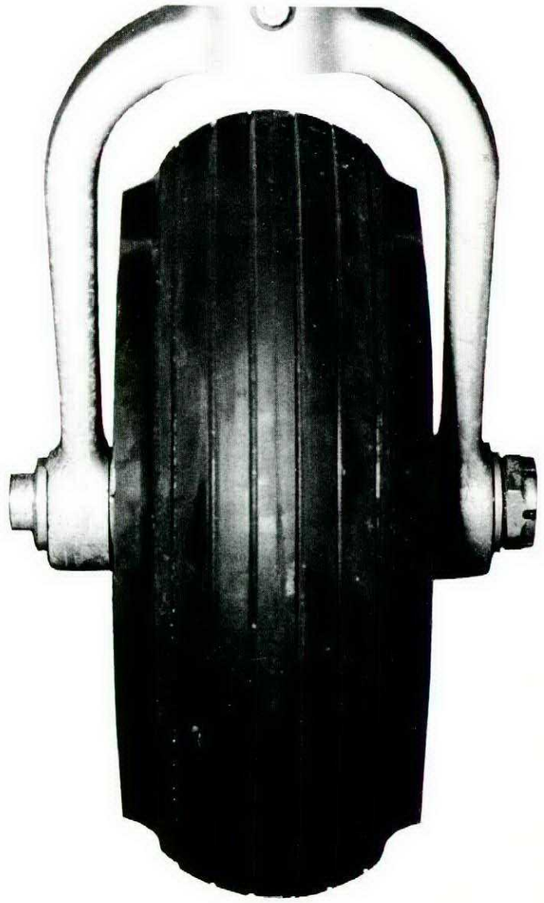

# *Bone-Dome Saves Dome*

On a high-speed bailout from a CF104, the pilot's head was struck (probably by the parachute drogue plate) with sufficient force to gash the helmet. Fortunately, with mask and chin-strap adjusted correctly, the helmet remained with the pilot in spite of the high-speed air blast. In the light of his difficult struggle later in the sea, that helmet undoubtedly saved his life.

# THE TUTOR'S WATER WHEEL

It was only 3/8 of an inch deep, but the Tutor at 70 knots on takeoff gulped in enough water to flame out the engine. The pictures show why.

Work is underway to design a tire with a water deflecting feature. The photograph shows a standard nosewheel tire with a water deflecting flange vulcanized to the sidewall.





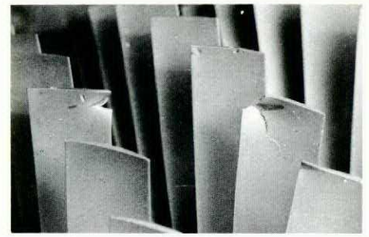
# Gen from Two-Ten

C45, TOWING The aircraft was being towed into the hangar following night flying. The driver of the towing mule stated "the airman on the right wing noticed too late that the tail was approaching an oil barrel." The barrel, of course, should not have been there.

Although minor damage resulted in this case, it serves as an example that a moment's incaution can damage an aircraft.

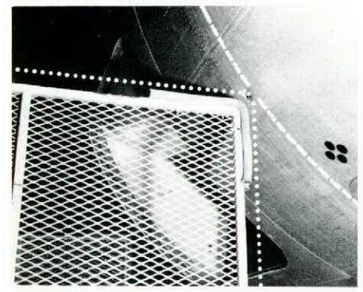
CF104, FOD Levelling out at 25000 from a climb in afterburner, the pilot reduced to military power whereupon the engine compressor-stalled. The engine was flamed out and relit, clearing the stall. The aircraft was landed successfully. The photo shows one small portion of the extensive damage done to this engine. Investigators feel sure that the damage had occurred from a foreign object *prior to takeoff*. The offending object was never found.

A small, worthless particle caused thousands of dollars damage.



YUKON, LOADING DAMAGE A forklift with a wire basket attachment was being moved to off-load mail from the rear belly. The driver states that "... the gap between the aircraft and the basket was great enough to make reaching across and bringing the mail sacks back to the basket difficult".

This is entirely understandable by a glance at the geometry involved (dotted lines).

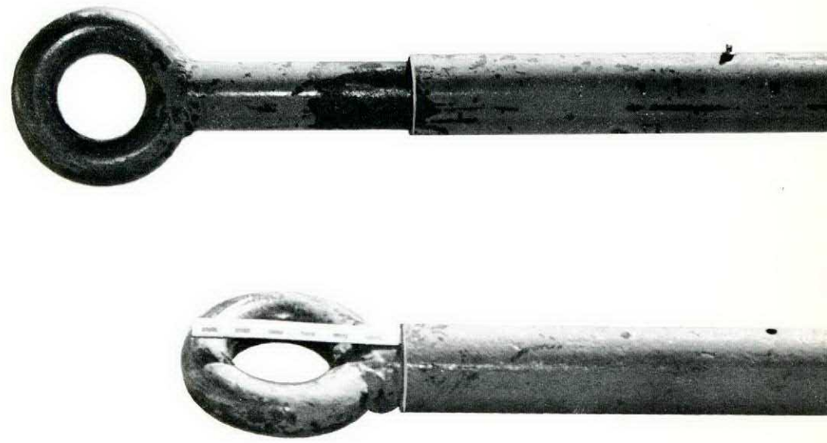


Two accidents similar to this occurred less than a year ago; at that time the unit proposed removing sharp corners and installing bumper pads to these baskets.

Certainly, the driver was careless but careless drivers, it seems, will always be with us - isn't it time that the obvious incompatibility of a curved line and a 90° corner is recognized?

C47, SHORTENED TOW BAR The aircraft was being pushed from the hangar in a manoeuver the driver had done many times before. When the aircraft was turned with the usual jack-knife the mule and tailplane collided.

Normally, the mule would clear the aircraft in this manoeuver by over 12 inches but not so with this "modified" tow bar. Someone had "repaired" it and in the process, shortened the bar by approximately 12 inches. The report states "the faulty tow bar was immediately quarantined and returned to ground handling section for further repair to lengthen it to its original configuration..."



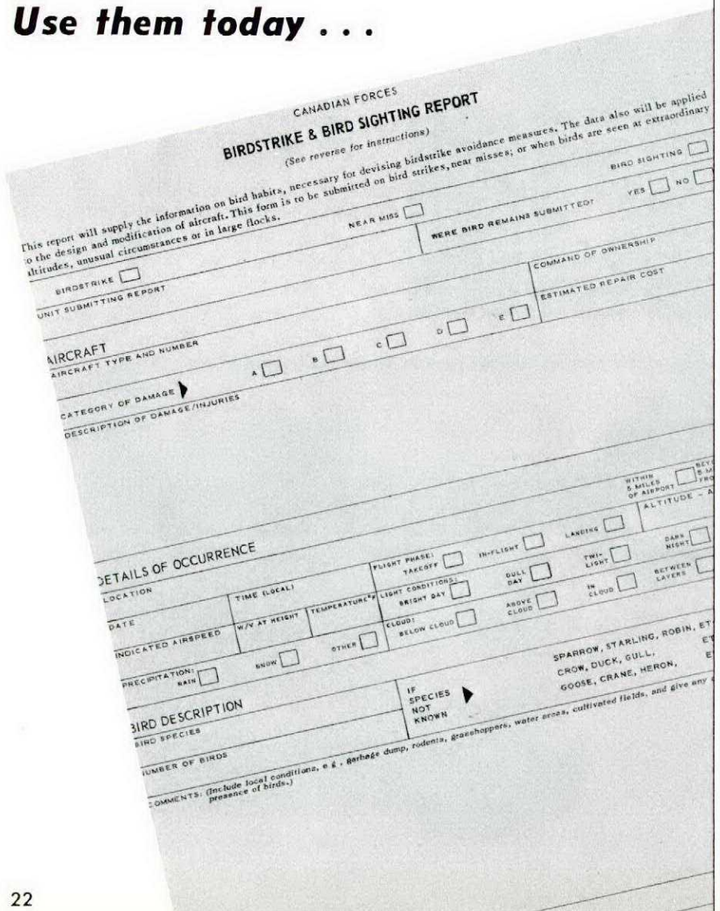
# *New! Improved!*

The old "RCAF Bird Report" has been superseded by the new CF218. These forms are available through your flight safety organization (who can secure them from the Directorate of Flight Safety directly – no depot stocks will be held).

The preamble to the form points out that it's in the aircrew's best interest to report all bird activity:

> **This report will supply the information on bird habits, necessary for devising birdstrike avoidance measures. The data also will be applied to the design and modification of aircraft. This form is to be submitted on birdstrikes, near misses; or when birds are seen at extraordinary altitudes, unusual circumstances or in large flocks.**

## *Use them today . . .*


CANADIAN FORCES

BIRDSTRIKE & BIRD SIGHTING REPORT

(See reverse for instructions)

This report will supply the information on bird habits, necessary for devising birdstrike avoidance measures. The data also will be applied to the design and modification of aircraft. This form is to be submitted on bird strikes, near misses; or when birds are seen at extraordinary altitudes, unusual circumstances or in large flocks.

BIRDSTRIKE ☐ NEAR MISS ☐ BIRD SIGHTING ☐

UNIT SUBMITTING REPORT — WERE BIRD REMAINS SUBMITTED? YES ☐ NO ☐

AIRCRAFT — AIRCRAFT TYPE AND NUMBER — COMMAND OF OWNERSHIP — ESTIMATED REPAIR COST

CATEGORY OF DAMAGE ▶ A ☐ B ☐ C ☐ D ☐ E ☐

DESCRIPTION OF DAMAGE/INJURIES

DETAILS OF OCCURRENCE

LOCATION — WITHIN 5 MILES OF AIRPORT ☐ — ALTITUDE – A

DATE — TIME (LOCAL) — FLIGHT PHASE: TAKEOFF ☐ INFLIGHT ☐ LANDING ☐ — DAWN ☐ DUSK ☐ DAY ☐ NIGHT ☐

INDICATED AIRSPEED — W/V AT HEIGHT — TEMPERATURE — LIGHT CONDITIONS: BRIGHT DAY ☐ DULL DAY ☐ TWILIGHT ☐

PRECIPITATION: RAIN ☐ SNOW ☐ OTHER ☐ — CLOUD: BELOW CLOUD ☐ ABOVE CLOUD ☐ IN CLOUD ☐ BETWEEN LAYERS ☐

BIRD DESCRIPTION — IF SPECIES NOT KNOWN ▶ SPARROW, STARLING, ROBIN, ET… CROW, DUCK, GULL, … GOOSE, CRANE, HERON, …

BIRD SPECIES — NUMBER OF BIRDS

COMMENTS: (Include local conditions, e.g.: garbage dump, rodents, grasshoppers, water areas, cultivated fields, and give any … presence of birds.)



# *Comments*

## *to the editor*

The Editor:

Safety *is* everyone's business. I feel sorry for the recent sickness suffered by the "very frank senior executive" who stated that safety was the sole responsibility of management. (Flight Comment Mar-Apr – "The SFSO and the Maintenance Organization".) But I feel even more sorry for the organization which does not encourage safety to be practiced by all employees. If we were to apply this gentleman's policy to the Canadian Armed Forces it would appear that the aircrew and groundcrew had no responsibility for flight safety. Nothing could be further from the truth.

We do not suggest that responsibility for flight safety rests solely with aircrew and technicians. Management has a vital responsibility – it must provide the policy, the environment, and it must apply the pressure to ensure safety consciousness by all. On the basis of wise managerial policy comes things like safer airplanes, improved components and better techniques. But please let us never forget that all the progress that enlightened management brings, can be undone by a moment of inattention, through ignorance or a lack of enthusiasm to do the job properly.

We surely must conclude that the importance of management notwithstanding – safety is *everyone's* business.

G/C AB Searle
DFS

Dear Sir:

"The Right Approach" by F/Ls Murray and Robinson is based on the old adage that to the pilot the most useless thing in the world is the runway behind him. This concept is reflected in their view that the final part of an approach should be identical for both VFR and IFR; since the visual approach allows use of the whole runway, the weather approach should be tailored to it. In other words, a pilot relying on instrument techniques should have the same picture in front of him when he breaks cloud as he would expect if he were completing a visual approach – a rationale which would eliminate the deke and provide the most available runway.

Personally, I feel the authors have stated the problem in reverse. They are correct in attempting to standardize both approaches. However, the mechanical and human problems of minimum instrument approaches demand built-in safety factors; the instrument-GCA controller-pilot combination accomplishing precise approaches in weather is not as efficient as a pilot completing a VFR approach. Since runways at ADC bases have been extended to accommodate supersonic aircraft carrying out IFR approaches, then possibly VFR approaches should coincide with IFR.

The author's implication that approach aids and lighting are behind the times is misleading. In fact, approach aids have evolved to the point where the pilot always gets a fair deal if he knows how to use them. Furthermore, the 2° glide slope and threshold-sited radar would put the pilot in a difficult situation in relation to these aids. The resolution of the present radar, for instance, is such that the detectable deviation from the glidepath is 25 feet at ½ mile. A second variable arises; the radar signal reflects off different parts of each type of aircraft. The CF101 and the C130 would differ in amount of aircraft extending below the glidepath in relation to the GCA return. A GCA siting at 800 feet down the runway at 2½° takes these variables into account. A threshold GCA and a 2° glide slope increases the probability of an accident in instrument weather by reducing the safety factor established for GCA.

A more serious drawback of the proposed 2° threshold-sited glidepath is the lack of visual cues at night in weather conditions at GCA minimum of 200 feet. A 2½° glide slope positions a pilot at GCA minimum approximately 4000 feet from the runway. If we consider the area blocked off by the aircraft nose (about 500 feet) then we place the aircraft pretty well over the first lights of the 3000 feet high-intensity approach lighting. However, at 200 feet from the runway on a threshold-sited 2° glide slope, the aircraft is 5700 feet from the runway threshold or 2500 feet from the first approach lights. With 500 feet of lights showing for ½ mile ahead one might say "no problem" but anyone who has fired on a flag (air-to-air gunnery target) at 2° angle-off knows that 500 feet appears to be only 18 feet. That small amount of approach lighting makes the transition from IFR to VFR hazardous.

To sum up. An IFR approach in minimum weather must be able to accommodate a variety of aircraft and pilots. It should be designed so that at transition, the pilot gets roll information and direction from visual approach lighting that is immediately beneath his aeroplane – not from a glimmer showing up in the distance. The limitations of the pilot and the aids required for an IFR approach cannot safely provide the landing approach profile outlined by F/Ls Robinson and Murray. In my opinion, if the CF101s are having deke and stopping difficulties on 10,000-foot strips they should opt for improved training techniques for landing, and if necessary – longer runways.

F/L AF McDonald
CFHQ

Dear Sir:

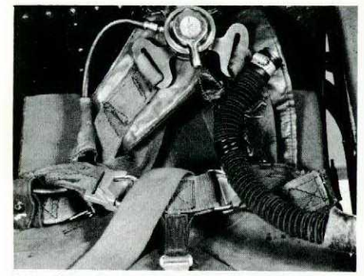
The "Spot The Safety Device" article in the Mar-Apr issue was indeed thought provoking.

I was particularly intrigued with the difficulty I had in spotting the safety features shown. Although I am not familiar with most of the equipment illustrated I would expect "SAFETY DEVICES" to be far more prominent.

One item which did not escape my notice was the improper installation of the T33 seat securing strap. As shown in the illustration, the automatic harness release cable is improperly positioned under the securing strap. If the harness were tightened as it normally should be, a great deal of tension would be placed on the automatic release cable at the point where it is attached to the quick release. In the interests of flight safety I would suggest that you refer readers to the photograph with the securing strap properly positioned as shown in EO 55-15DA-6A/9 25 Mar 64.

CFS has been concerned with the difficulty of keeping pilots aware of the proper tie-down technique, and is presently investigating the feasibility of producing a decal showing the proper tie-down procedure to be affixed to the headrest or back of the seat itself.

F/L MMK Nash
CFS, Winnipeg



*Here's a better tie-down method.*

Dear Sir:

My congratulations to F/L WR Barnes, of the CF104 "Open Nozzle" Club for a difficult job well done. My attention was drawn by the statement that "F/L Barnes is now our most experienced open-nozzle pilot". Although I realize that you are referring to actual emergencies, you may be interested to know that the RCAF's most experienced open-nozzle pilot is in fact F/L Larry Nelson, a test pilot at CEPE Detachment Cold Lake.

During the summer of 1964 he flew a total of ten missions in CF104 12702 with a fully open nozzle to determine the performance which could be expected of the aircraft under various weight and temperature conditions, and to develop techniques which a pilot could use to cope with an emergency such as F/L Barnes encountered. The aircraft was fitted with a special nozzle crippling system with which Nelson could fail the nozzle full open or return it to normal operation at will.

The results of Nelson's efforts can be found in the latest edition of the AOI under "Nozzle System Failures", and are well worth the study and attention of every CF104 pilot. The full story may be read in CEPE Report 3249 "Flight With Failed Nozzle – CF104 Aircraft" December 1964, an unclassified report which is available to any interested unit from 3SD Library Rockcliffe.

F/L Nelson

F/L Nelson incidentally, is also the RCAF's most experienced CF104 barrier engagement pilot having carried out some 42 engagements during two separate test programmes at Namao. On the last engagement he was injured when the barrier chain broke and he was struck by a link which pierced the cockpit. "A decidedly unpleasant ride" was his reaction to that episode.

W/C DP Wightman
Senior Test Pilot, CEPE

Dear Sir:

We note with interest your "Comments" column on the inside of the front cover of the Mar-Apr 1966 edition. With reference to your suggestion that the jet pitch be pitched out, we conclude that you are (a) not a current jet pilot so employed, (b) not aware of the problems associated with controlling VFR jet a/c, and (c) not correct in all your assumptions.

If you were currently, or even recently, employed as a jet pilot you would know that flying in a square circuit made up of only one type jet aircraft at a time (never mind one made up of mixed types including century series) would be flying in a circuit of huge dimensions and indescribable confusion as fast moving aircraft tried to turn square corners, one behind the other. If you were only mildly aware of air traffic control procedures you would know that the prime principle of expeditious control of traffic without radar is to get it all marshalled over a single point, eg, the break, and feed it further from there. And if you think as you write, that the "rapid recovery of large flocks of birds in VFR just isn't a requirement any more", we invite you to take a coffee break in Chatham tower any VFR day. The tower types at any Training Command jet base would also probably have something to show you.

By all means eliminate the jet pitch, but do it on the same day that you eliminate VFR jet flying! Straight-in full stop instrument approaches are easier to control.

F/L JC Newell
F/L SJ Clarke
Air Traffic Control CFB Chatham

*Our contention, we are pleased to note, could not have been more effectively expressed than in your last paragraph. Our opposition to the fighter break was clearly stated from a flight safety point of view which is, after all, our business. That ease of handling VFR run-ins is made possible by the fighter break confirms our suspicions that this manouver lingers for the convenience of others, – not the pilot. However, we suspect a more persistent obstacle to pitching out the pitch will be those pilots who still can't accept a full-stop off a controlled approach as something that doesn't compromise their very manhood. Both aircraft and controlling agencies are becoming more capable each year. The pilot may deplore the shrinking areas of opportunity for self-expression, but that's progress – and safety.*

*The implication that the editorial content of Flight Comment is the editor's, is incorrect. Further, please ask your present Base Flight Safety Officer (an old squadron buddy from 101 days on 410 Sqn) for your sub-paras 1(a), and 1(b).*

Dear Sir:

With reference to the Yukon taxi accident reported in the Jan-Feb Flight Comment; perhaps someone can explain how full hydraulic pressure was attained, if the manual unload valve was left in the unload position. The article also states that the aircraft had a loss of hydraulic pressure which would be difficult if it didn't have pressure in the first place.

WO2 JE Fisher
Portage la Prairie

*The towing crew were unable to build up hydraulic pressure, and the starting crew were unable to obtain hydraulic pressure either by the APU or hand pump. This is strong evidence that, in fact, the starting crew did not obtain hydraulic pressure after starting number one engine. "As the number one engine was started it registered full hydraulic pressure" was the starting crew's statement. We question whether this did occur. This, then makes the word "loss" incorrect, as you say.*

Dear Sir:

I have just finished reading the maintenance issue of Flight Comment (Mar-Apr). I found it more interesting than usual as there are articles by and about people I know personally. There are many good articles on safety. I liked "Spot the Safety Device". I missed a couple of them but I did not miss the unsafe working practice on the cover page. Will that make up for the ones I missed?

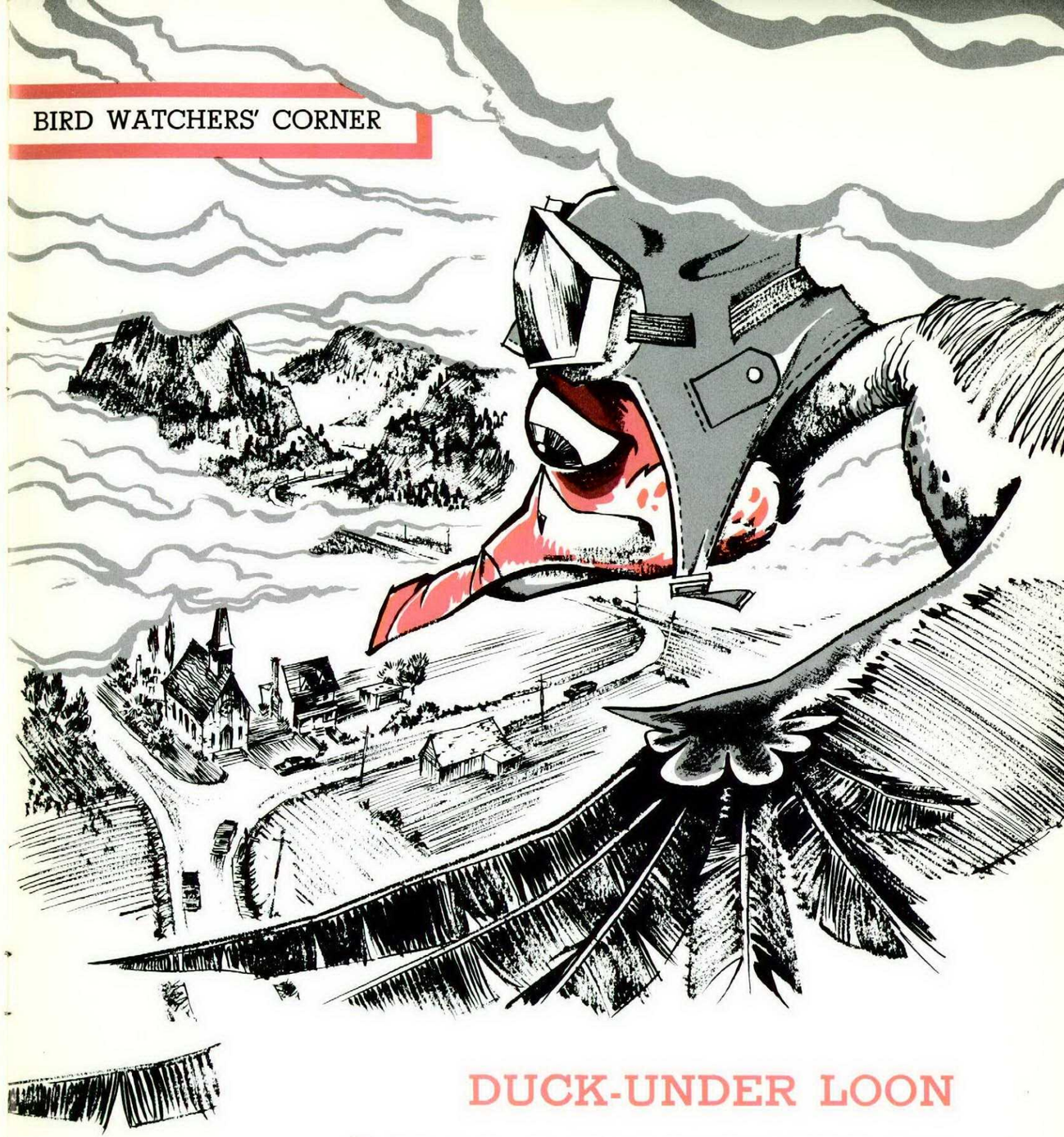
Cpl R Marsden
CFB Winnipeg

*It sure will. We blushingly admit:*

- *the watch and ring could touch a terminal causing a short – a hazard both to the technician and the instrument*
- *the tweezers are also conductors and should not be used on electrical wiring*
- *the instrument may be plugged into a power source and alive while it is being worked on.*

*This particular instrument has no open terminals, however, your point is well taken.*

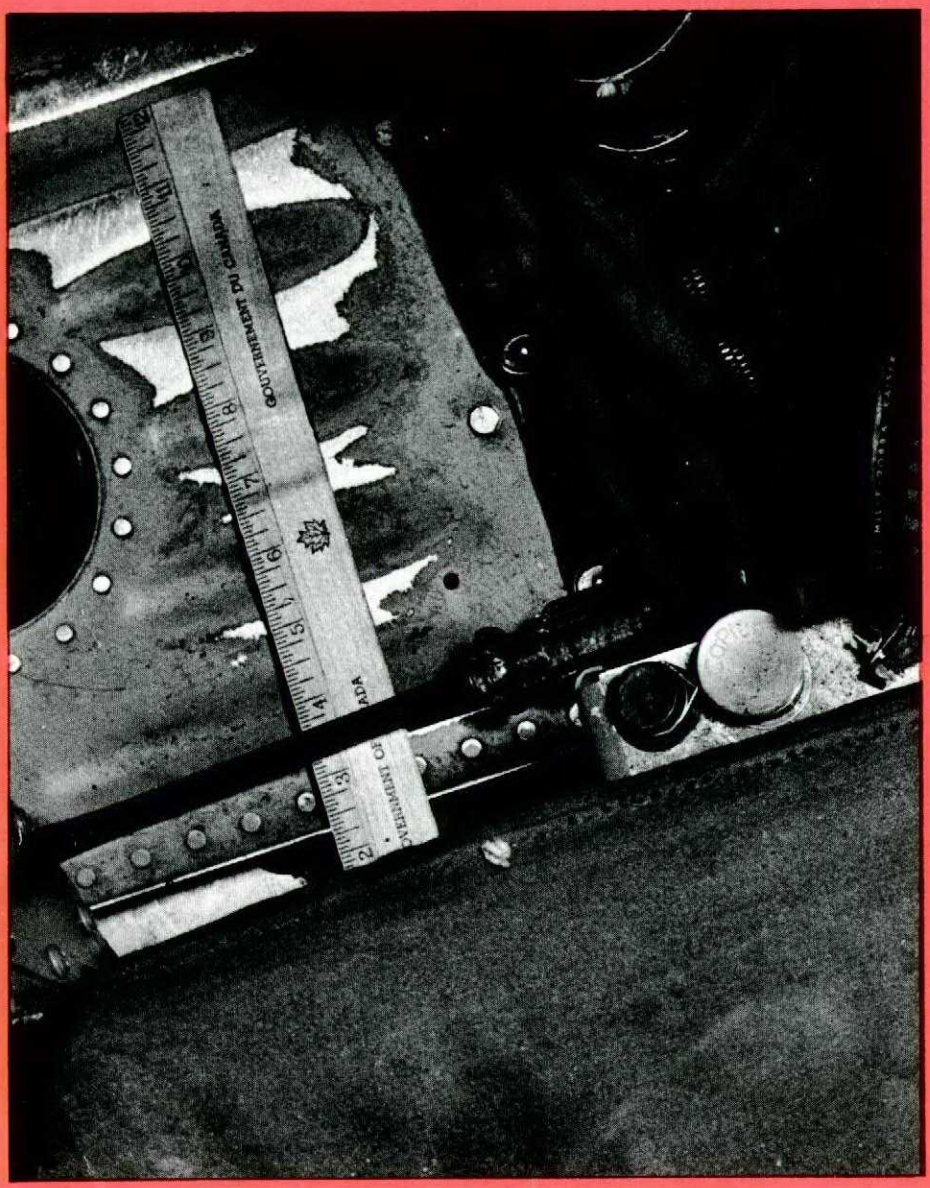





# DUCK-UNDER LOON

**The duck-under is a unique bird by having an imperfectly developed sense of self-preservation. Few in number, his habitat is that lonely expanse where he alone will fly—the region of deteriorating weather. Literally flying in the face of reason, his one-track mind compelling him to fulfil the flight at any cost, this loon gyrates about looking for a break ahead—like the weatherman said. On these zany escapades undaunted but definitely under the weather, our loon stiffens his waning courage by whistling in the darkening gloom:**

**UPAHEADMAYLOOKBLACK,BUTI'LLNEVERTURNBACK**




# A tool in the cockpit safe and sound - Could wind up in a hole in the ground