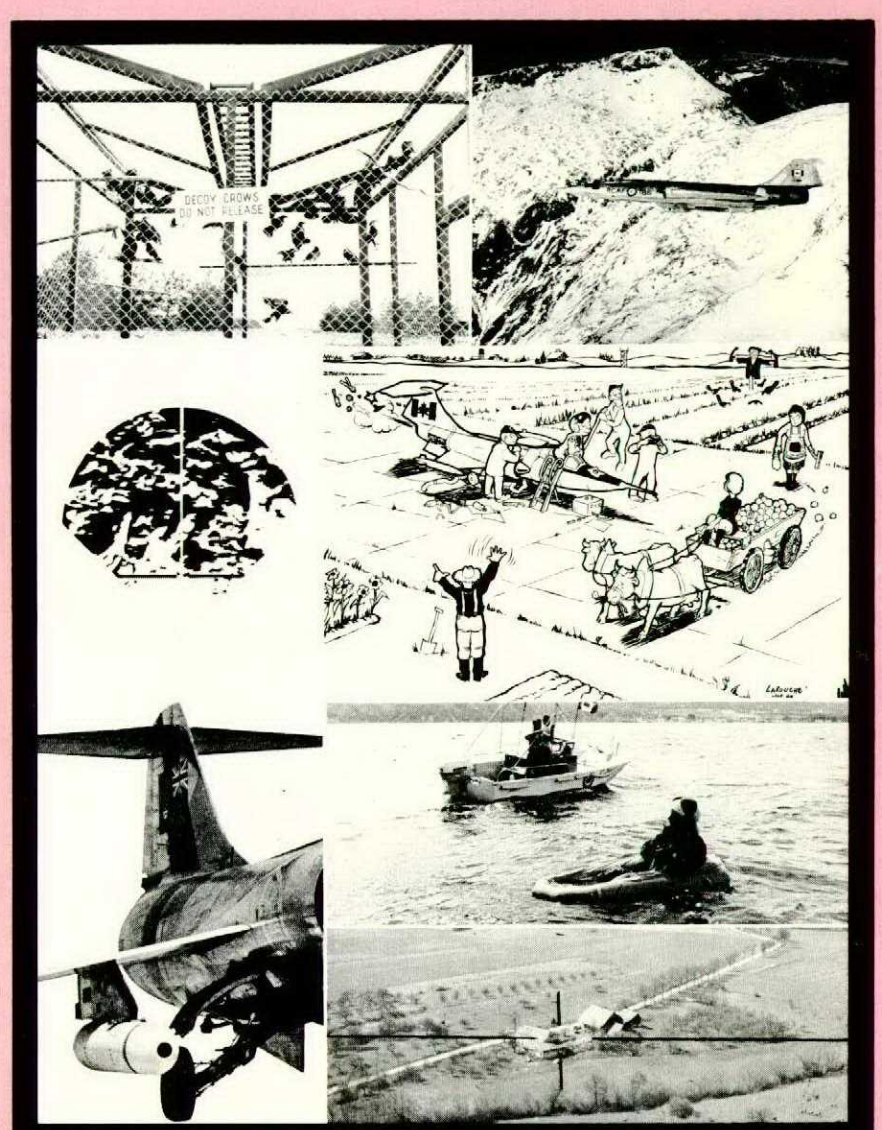
FLIGHT COMMENT

SEPTEMBER · OCTOBER · 1968



1 Air Division

Comments

We welcome the formation in June this year of a group calling themselves the Human Factors Association of Canada. We wish it well; there's much to be done. The group will represent the interests of many disciplines concerned with man's functioning in his physical and machine environments. Its findings will no doubt have significant implication in the achievement of flight safety.

A group of Canadian aircrew visiting a USN training centre recently were surprised to find that one-third of their numbers were unable to meet the minimum safe swimming standards required by the USN for aircrew overflying water. Last year a 104 pilot punched out over water and found that his ability as a swimmer undoubtedly saved his life... By the way, one-twelfth of Canada is water, and there are 18000 miles of coastline.

Flight Safety Foundation reports an accident which the wearing of shoulder straps in the cockpit would probably have prevented. A pilot suddenly collapsed over the controls on final approach; the captain was unable to regain sufficient control to prevent severe damage on touchdown. In another instance, a co-pilot, tuning radios on taxi-out, would not have been rather uncomfortably draped over the yoke when brakes were suddenly applied to avoid hitting a ground vehicle.

A report came in the other day, relating the circumstances causing an important component to be damaged. In the orders, the operator is cautioned not to use "excessive" pressure. With nothing more explicit to guide the reader than a caution of this sort, it was inevitable that excessive pressure was applied. The offending passage is being rewritten; we mention it only to caution against the excessive employment of vague words like "excessive".

A package of bad meat was recently placed aboard an aircraft as part of the flight rations. From our records there seems to be an almost statistical certainty that this will recur with possible disastrous consequences – unless each unit has a foolproof system for the safe handling of in-flight food.

cont'd on page 5

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FLIGHT SAFETY

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ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1968

A CONSTANT CHALLENGE

Flight Safety has been examined in all its aspects and from many points of view in the last few issues of Flight Comment. We have seen how its aims must be subjectively applied by those directly associated with aircraft, and read of the indirect application of these aims by those responsible for the conditions in which men live and work, for the equipment they use or for the training they receive in the use of that equipment. We have also seen how these aims are compromised by environmental hazards of many descriptions.

This edition features 1 Air Division. To introduce it, I intend not to philosophize, but to highlight briefly the effect on Flight Safety thinking of the circumstances peculiar to this Command.

It is not necessary to dwell on the hazards implicit in low-level flying. Our men are well trained. If proof of this is required, one need only refer to Tactical Evaluation results or to our achievements at recent AFCENT Tactical Weapons Meets and Royal Flush Competitions. In producing these results however, and in maintaining the standards of combat effectiveness for which Canadians are respected throughout NATO (and without which our silverware cabinet would be a meaningless symbol), our men are exposed to conditions which are a Flight Safety Officer's nightmare. Long working hours, fast turn-arounds, speedy mission preparation, maximum mission production and mass launches and recoveries are only a few of the adverse conditions encountered. The roles of strike and reconnaissance demand the capability to navigate at low-levels, in all weather, in a hostile environment - and with precise results in weapons delivery or in the production of intelligence. Our geographic training area, already too small, is shared with six other national forces attempting to achieve the same aims. It is also shared with helicopters, light aircraft, birds, gliders and even the occasional balloon or parachutist. Look-out was never more important. Add the vagaries of European weather, and we have the recipe for potential disaster.

Such a situation presents a constant challenge to all 1 Air Division personnel. Temptations to take short cuts or to press-on in doubtful weather to complete a mission are strong, so realistic priorities must be established and continually applied to ensure we can maintain the standard of training and preparedness required to perform our tasks without compromising our resources. This is the job of Flight Safety, and Flight Safety is a job for everyone.

MAJ-GEN R.J. LANE
COMMANDER, 1 AIR DIVISION

so you're a...

Witness for the Board

Capt D.W. Rumbold

The members of a Board of Inquiry into an Aircraft Accident are not prosecutors at a trial. Their job is to get ALL the available evidence and let the chips fall where they may. If you are ever a witness, don't think you are on trial – co-operate, give all the facts and don't hide anything or colour your evidence. Remember, the aim of the game is to make sure that such an accident can never happen again...

You've probably never seen an aircraft crash into the ground – and are never likely to. So, what's all this about "witnesses"?

Stop and think a moment.

Was that you in the canteen who said "Gosh, I was talking to the pilot only last night"? Or, were you the chap who helped start his aircraft, or one of a whole bunch of people who heard or saw it pass overhead just before it crashed? Perhaps you *do* have a small item of information to contribute which could have a bearing upon the accident.

If so, sit down and think. Don't discuss it with your buddies. Take a piece of paper *right away* and jot down your recollections of the FACTS. Did the engine sound a bit odd, or was it just an echo coming from the other hangar wall? Perhaps. Better write it all up while it's fresh in your mind – before rumours and your own imagination have biased your memory.

Let's see, you were with the pilot for three (or was it four?) hours last night? He wasn't drinking, eh? You remember he complained of a headache and went home early. They might be interested in his car problems – he was sure paying through the nose for that pile of junk.

Oh, so you were one of the people who saw the aircraft pass overhead? Where were you standing? Who was with you? Most of your crew were at the window and the aircraft was heading away from you? Let's jot that down. Now, could you see if the afterburner was lit? How about the flaps, undercarriage, divebrakes? Any external tanks and stores? Better mention it was in a 30°-bank climbing turn to starboard. About what time was that? Remember anything else? Was there anything unusual like smoke, flames, lack of noise, etc? Well, you've certainly got a lot of information there – what's the phone number of that flight safety officer?

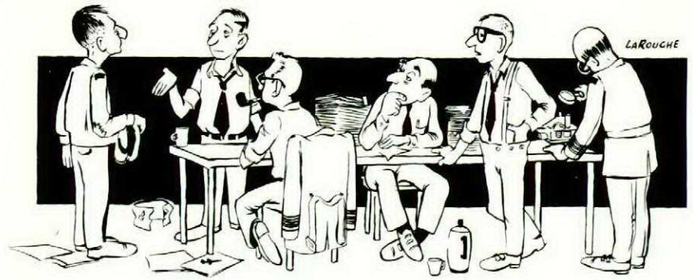
The FSO will probably be very busy right about this time but not too busy to welcome your help. He knows that gathering evidence from an aircraft crash is a long and involved task which must be painstakingly conducted. He knows that in a few days' time the investigators will be back from the crash scene and will be looking for reliable, unbiased witnesses.

You may feel your evidence is hardly worth mentioning, but let the board members be the judge of that. Sometimes it's the seemingly insignificant facts which help to pinpoint or confirm the crash cause.

Coffee and questions

Recollecting all that wasn't too difficult. Now, what sort of cross-examination can you expect from that snarly old president of the Board? Firstly, the Board is not there to give you a hard time. No, it's not like a court martial at all. You'll probably be invited to have a coffee and smoke if you wish. And don't be afraid if you aren't wearing your best uniform; the Board members themselves may be a little frayed around the edges at this stage of the game, having worked long into the previous night and more of the same to look forward to.

You will be asked to tell your story and – if you



... the board members themselves may be a little frayed around the edges at this stage of the game...

wish – given help in writing it down after taking the oath. The questions aren't meant to make you look foolish. If you are unsure or don't know – say so. No one's going to bite your head off – in fact they're glad to have your assistance. If you are in doubt or if it's only hearsay, admit it openly; you'll feel less embarrassed in the long run.

Probably the most common problem faced by investigators is that of the "red herring"; every inquiry usually has three or four promising leads which turn out to be false. The best course available to investigators and witnesses alike is to keep an open mind. If you are a witness, confine your statement to what you *actually saw and heard;* don't try to guess what the Board wants you to say, or to impress them with your many observations.

(If you are a Board member and require further information from a witness, don't scare him, and don't ask leading questions. If you need his opinion, phrase the question accordingly, or you may burn many more unnecessary hours of midnight oil sorting the wheat from the chaff. Everyone knows that wreckage must be carefully sifted, classified, analyzed and subjected to exhaustive tests to find the truth. Similarly, evidence from witnesses is just as sensitive and must be examined in the same thorough and unbiased manner as other evidence.)

Witnesses, Irate and Otherwise

In the crash site vicinity another problem awaits the Board. Not only may witnesses be very difficult to find back along the flight path, but they will rarely have any experience in estimating aircraft speed, height, direction, etc. Estimates of sound and noise can often be very useful to the inquiry, but someone unfamiliar with the aircraft may have difficulty assessing or describing what he heard. Weather conditions also fall into this category at times. In such cases, it is best to use a practical demonstration whenever possible, or to ask for a comparison with known or present conditions. Try flying an aircraft of the same type over the area at various heights and speeds and have the witnesses view it and listen to it from their original positions. A word of caution: confirm the reliability of witnesses' estimates by having the

... two passes at the SAME speed and height!

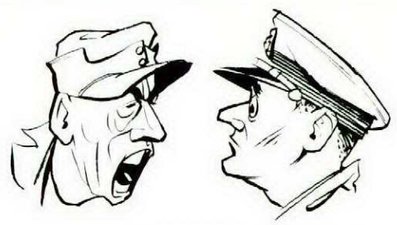
aircraft make two passes at the *same* speed and height! If comparison flights cannot be arranged, ask the witness to give his estimates relative to some other aircraft he may have seen (say, at an air display). And the roughest sketch drawn by a witness is often most useful in clarifying a point. The interviewer should have a plastic model of the aircraft – every crash bag should have one.

Surprisingly enough, children are often the best and most reliable witnesses. They usually have no axe to grind, nor are they out to impress anyone. But like most witnesses (particularly elderly people), they must be treated with respect and not confused.

Persons who have suffered property damage or undergone a severe shock as a result of the crash may be tempted to embroider the truth. The Board should not make overt attempts to discredit their evidence but substantiation should be sought from other sources. In Europe there is also the language problem; it's vital to obtain a precise translation of all the small shades of meaning which can so often be of vital importance. If witnesses are hard to find, the local police can prove most helpful, as can mayors and innkeepers in the smaller communities.

The Pilot

The most important witness of all is of course, the pilot. Here, the most frequent problem is to have him overcome a feeling of guilt – most pilots seem to suffer from it whether the crash was their fault or not. To solve this problem, both the Board members and the pilot must imagine their positions reversed. The Board must bear in mind that jet aircraft speeds leave little time for



... small shades of meaning...

emergency procedures, and that a quick decision to eject causes the pilot much later soul-searching. Could he have saved the aircraft by staying with it a bit longer? Where did he go wrong? Of course he feels guilty – there's a multi-million dollar hole in the ground that perhaps he could have prevented.

He's checked out the actions he took with all the EOs and found nothing wrong, but he feels those crafty investigators are sure to nail him for it somehow. On the other hand, the pilot must remember that the Board are only too pleased to see him alive. There are pilots among them who know just how he feels. Even that snarly old president himself may have leaped out of a Mustang a few years back. The members are not the pilot's prosecutors – in fact, they are often his best possible defence counsel! They are just as anxious as the pilot to determine what problems there were with the aircraft; it's their job to recommend ways to prevent a recurrence.

The "expert witness"

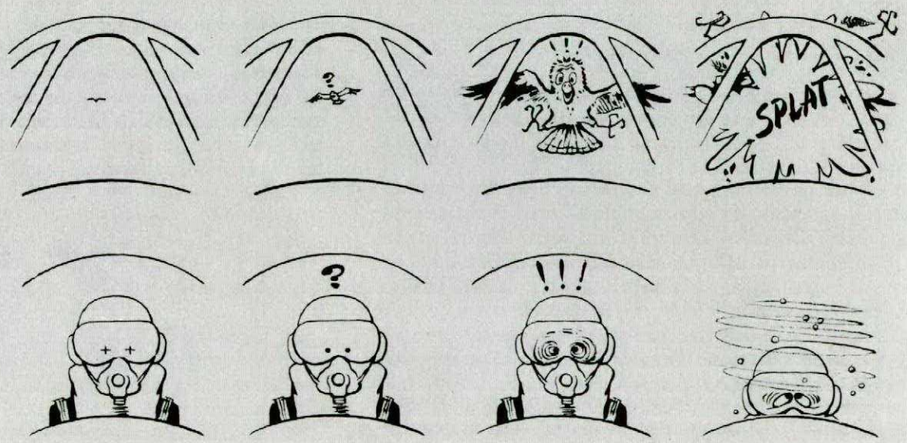
And finally, there's the "expert witness". He can be a great deal of help but his advice is a hundred times more useful if it can be put into layman's language to be understood by all. Medical "experts" are often the worst offenders. Have them use their terms by all means, but also ask them to give the few words of translation or explanation. If an expert throws numbers at you, find out what he means – if it baffles the typist you can bet that somewhere along the line, someone is going to miss the significance of the point.

At some time or other, most of us will be associated with an inquiry into an aircraft accident, either as a member of the Board or as a witness. Keep these hints in mind and keep your mind OPEN.

Capt Rumbold was born in England, where he graduated as an engineer and worked for several years in aircraft research and development before emigrating to Canada in 1958. A "casualty" of the Arrow cancellation, he joined the RCAF as a Tech/AE officer in 1959. Following tours at Downsview, the Materiel Laboratory, and AMCHQ, he was transferred to Air Div where he was engineering officer of the winning RCAF team at the 1965 Chaumont Air Weapons Meet. He wrote this article while on the SOFS staff at Air Div HQ – a position which made him an ex-officio member of many boards of inquiry. Capt Rumbold is now on the DFS staff.

. . . if it baffles the typist . . .

two points of view



Capt Collison, Air Div

Comments (cont'd)

We discovered too late that the articles for the ADC May/Jun issue were authored, as follows:
"Aircrew Survival Refresher Training at Cold Lake" – Capt W.T. Floyd
"Aircraft Technical Research and Investigation – and the BFSO" – MWO A.G. Morran.
Our thanks to these literary gentlemen.

The Mar/Apr issue contained an article "Reach for the right can" pointing out the hazardous similarity of containers with dissimilar fluids. The solution promised in the article has not been achieved and has been shelved as too costly. But, as the article states, "In the meantime, the hazard's there – keep alert."

Unserviceable Ambulance

Crash ambulance personnel were unable to obtain clear instructions from the control tower due to an unserviceable radio headset. This, on a practice alarm.

– Flight Safety Committee

Air Speed Indicator? - No!

ASI - Aircraft Sampling Inspection

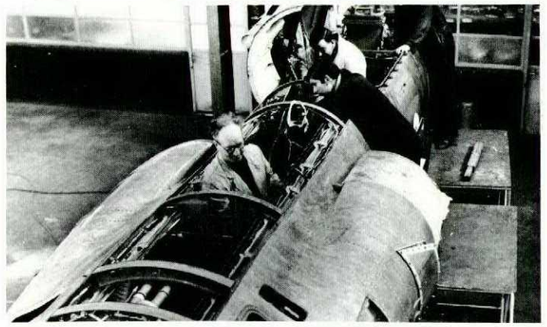
A program of real interest to Air Div is the Aircraft Sampling Inspection underway at Scottish Aviation Ltd on high-time CF104s.

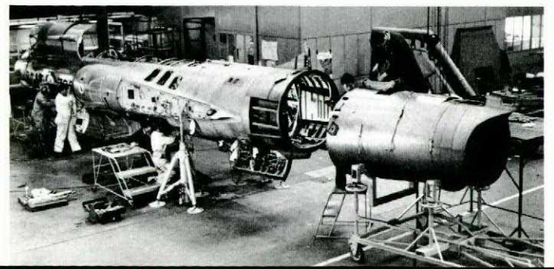
Over two years ago the wings were required to select several 104s and deliberately fly them to create a guinea-pig group of *lead-the-fleet* aircraft. These aircraft are then subjected to the Aircraft Sampling Inspection – the ASI.

The photographs taken at Scottish show the extent of dismantling to enable technical staffs to do visual and NDT (Non-Destructive Testing) checks on the primary structure. Many components are inspected, such as wings, main and nose landing gear, horizontal and vertical stabilizers, and other sub-assemblies.

These inspections give us a reading on the structural integrity of the fleet, and help us establish a realistic airframe age for the first airframe overhaul program to commence. Also, inspecting the highest-time aircraft establishes a lead-time pattern for an orderly correction of the faults uncovered during the ASI. To date, nine CF104s have been inspected at Scottish and Canadair.

At the moment, it appears that an airframe overhaul program may be needed on the CF104 at 1600 airframe hours. To confirm this, the ASI program has been increased from 4 to 7 aircraft in this fiscal year. The economy achieved from this program is large; nearly all F104Gs have had two complete airframe overhauls by 800 airframe hours.





Good Show

SLT S.D. RUSSELL

At the controls of his Sea King helicopter, SLT Russell had performed a normal approach to the hover above the DDH destroyer for hook-up. Satisfying himself that the aircraft was centered in a stable hover the Landing Signals Officer applied power to the hauldown cable. As the wheels touched the deck the starboard landing gear and sponson collapsed inboard causing the aircraft to lean sharply to starboard and to nose down.

SLT Russell's immediate response to the command from the Landing Signals Officer averted further damage. His quick reaction and flying skill saved the helicopter and undoubtedly the aircrew and deck crew from injury in what came close to being a most serious accident.

Capt R.A. Hall

CAPT R.A. HALL

On landing his CH113 at a site in hilly terrain, Capt Hall kept the engines running while the crew chief climbed out to look for a level spot so that the helicopter could be shut down. The rotor wash had churned up a flurry of wet dead leaves, covering the engine intake screens. The engines began to run hot. Realizing that to increase power to fly away could cause the engines to compressor stall from the lack of airflow, he directed the crew chief to remove the leaves from one of the engine intakes. As the aircraft was on a steep slope Capt Hall was hesitant to shut down and held the aircraft level while the leaves were being removed. This accomplished, he flamed out the other engine and the leaves were taken from its intake screen. These screens had actually been dented by the suction.

Faced with three ways of combatting this emergency – two of which would have been natural, yet disastrous – Capt Hall displayed excellent judgement in a very challenging situation.

Cpl A.J. Martineau

CPL A.J. MARTINEAU

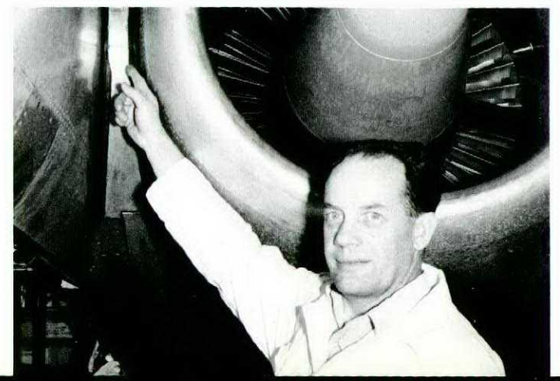
While performing dye penetrant inspections of a speedbrake actuator component, Cpl Martineau discovered 18 cracked. This meant placing some aircraft unserviceable, adversely affecting flying training. As a double-check the suspect components were sent to specialists at a non-destructive testing centre for confirmation; they disagreed with Cpl Martineau. Not satisfied with this development Cpl Martineau visited the NDT centre and achieved confirmation of his earlier diagnosis. The cracked components were replaced.

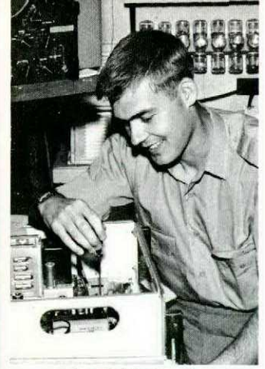
Under the circumstances, Cpl Martineau had the opportunity to accept the centre's decision but his technical competence and loyalty overruled such an attitude. In defending his conviction he was responsible for the elimination of a potentially serious accident cause.

CPL W.E. HODGKINSON

While checking a CF100, Cpl Hodgkinson noticed a steel hook lying on the tarmac. Rather than dismiss this as another foreign object to be picked up, he took it for identification on the chance that it was a missing part. The hook was actually a link toggle that secures the fillet assembly between the engine and the fuselage. Without this hook the panel could have come off in flight.

Cpl Hodgkinson's alertness and commendable initiative resulted in the elimination of a potential hazard. This act exemplifies the benefits of our having alert and well-motivated technicians.





Pte R.K. Gardner

Cpl H.G. Murphy

PTE. R.K. GARDNER

Approaching the GCA unit and still several hundred yards from it, Pte R.K. Gardner noted smoke coming from the auxiliary power diesel. Hurrying to the scene, he found the unit spewing smoke and flame – although with no noticeable noise or change in rpm or oil pressure. After running to the office to spread the alarm, he grabbed a fire extinguisher and returned to the fire. When the fire vehicles arrived, Pte Gardner had the fire under control.

Pte Gardner's quick thinking and commendable initiative in a potentially dangerous situation averted a fire which could have destroyed the GCA unit – a piece of equipment vital to operational effectiveness.

CPL H.G. MURPHY

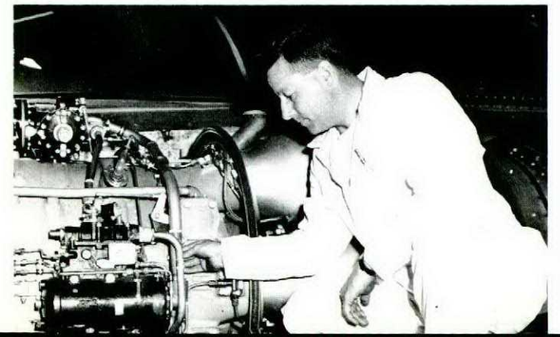
As Cpl Murphy was working on a CF104 during a periodic inspection he knew that on this aircraft no fewer than 33 separate rectifications in the previous 12 months had been made in an unsuccessful attempt to fix fluctuations in the position and homing indicator and the main attitude indicator. Cpl Murphy devised a series of tests to narrow the problem area. He was able, after a great deal of time and effort, to pinpoint a transformer rectifier unit as causing the snag.

In devising and performing a series of trouble-shooting tests, Cpl Murphy was able to solve a problem which had defied solution. In doing so, he displayed a high standard of professional competence and initiative.

CPL C.M. STEVENS

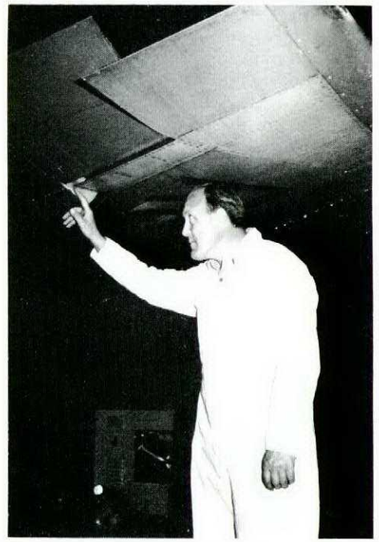
During a periodic inspection on a CF100 Cpl Stevens discovered a cracked lock plug in the throttle teleflex cable. As a result of his discovery, a local inspection on all squadron aircraft before the next flight uncovered fifteen more unserviceable plugs which were found either cracked or elongated beyond limits.

The fact that this cable lock plug is an item which is not normally inspected demonstrates Cpl Stevens' thoroughness and integrity. This continuing vigilance during the so-called routine inspections is at the heart of the flight safety program.



CPL J. NOVAK

While completing a BFI and turnaround on a CF101, Cpl Novak discovered a bolt missing and another partially extending from the inner portion of the right aileron hinge. Following this discovery a special inspection disclosed another aircraft with the same unserviceability. Had one of these bolts remained loose it could have come free, jamming the controls and causing a major accident.



The fact that these bolts are difficult to see demonstrates Cpl Novak's competence and thoroughness. His commendable attention-to-detail made a substantial contribution to flight safety.

cont'd on next page

Fire Safety

Every technician should know:

- How to give an alarm
- How to call the fire department
- Where the fire alarms and extinguishers are located in his work area
- Which extinguisher to use on different type fires
- How to use each type of extinguisher

DO YOU?

Good Show

PTE D.J. DALY

Pte Daly, an air technician, was walking between hangars when he noticed a Tracker on the tarmac, belching smoke from an engine. He went over to the aircraft and informed the pilot, then examined the engine and exhaust areas. Having been unable to locate a cause, Pte Daly cautioned the pilot to keep a close check on the engine. As it happened, the pilot returned to the line after a pre-takeoff run-up. The engine was found damaged and had to be removed.

Although not a duty member of the line crew, Pte Daly demonstrated commendable initiative in warning the pilot of a suspected malfunction which was later proven to have been a serious flight safety hazard.

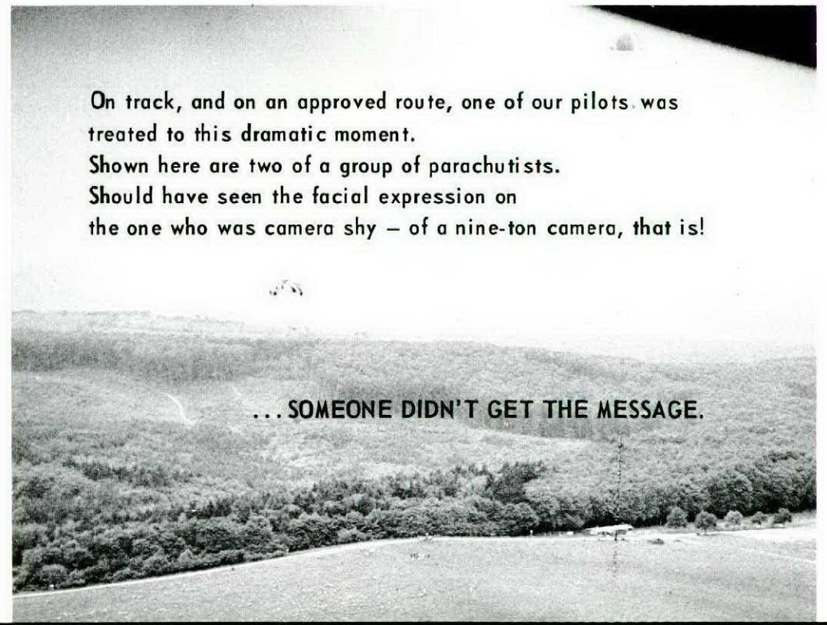
Capt D.W. Rhodes

CAPT D.W. RHODES

Following a touch-and-go landing, Capt Rhodes was climbing through 1000 feet at one and one-half miles from the runway when the Tutor ingested a large gull causing complete engine failure. After immediately turning towards base, Capt Rhodes quickly realized he could not make an into-wind landing on the active runway. Declaring an emergency he advised the tower that he would attempt a downwind landing. The tower cleared the runway and Capt Rhodes successfully forced-landed his aircraft.

With only 50 hours flying time Capt Rhodes demonstrated a high degree of skill and judgement in saving a valuable aircraft.

ACHTUNG!



Some thoughts on water survival

- *from AETE Prestwick*

From the beginning of the CF104 era in Air Div (and before that, the F86), Scottish Aviation Ltd, Prestwick, have helped keep the mod status of the 104 fleet up to date and relieved the pressure on groundcrews at the Wings. In the process, a considerable amount of test and ferry flights are made – the job of the small AETE Detachment in Scotland. By now, each 104 has been through the plant several times; this has involved the Detachment in nearly 2000 flights – handled throughout by an average of two pilots.

The operating environment of Prestwick is different from the Air Division necessitating the use of flight safety equipment with some local innovations. The detachment's flight area is over cold water, and we employ a USN one-piece rubber aircrew suit. Although designed for air to be circulated inside the suit, it is satisfactory in the cool temperatures at Prestwick.

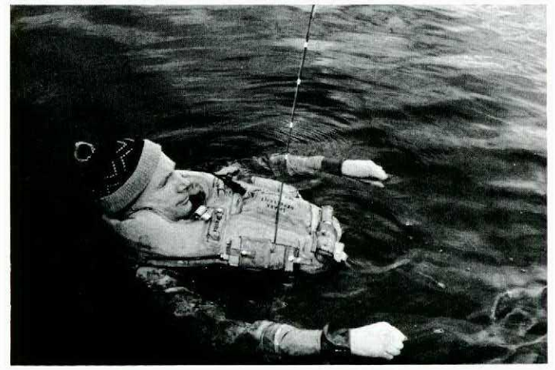
A more interesting piece of flight safety equipment unique to this detachment, is the SARBE radio. SARAH became obsolete in the UK area in 1966, at which time the detachment received these sets which are compatible with the UK search and rescue environment.

The SARBE beacon and battery are exceptionally compact and lightweight. For this reason the detachment commander felt strongly that it should be carried on the pilot's person rather than buried in the seatpack. This was possible with a very slight modification to the standard mae west. These modified vests have been thoroughly tested in flight and – as shown in the photograph – in water. No parachute or seat harness interference, and no pilot discomfort was experienced.

Having the survival radio in the mae west has advantages over the seatpack installation – the most obvious being the immediate availability of the equipment – particularly when one recalls the two recent CF104 ejections into the sea where the seatpacks and their contents were lost! The SARBE is already in operating position on the mae west and requires only one small motion to activate it. A pull on a toggle erects the aerial and sets the beacon operating. For a sea ejection where quick rescue may be vital to prevent death from exposure, this set-up seems highly desirable, especially if the downed airman is unable or incapable of getting into that seatpack.

As you may have guessed, we're SARBE supporters; and wonder if others in the Canadian Forces wouldn't be, also.

SARBE stowage



Rubber suit in use and SARBE erected

Torque, torque, torque

An aircraft engine's crankshaft centre main bearing journal failed due to incorrectly torqued studs. The guilty torque wrench was found to have a 55 inch-pound error.

your radar set as an altimeter

Capt E.J. Allison

To appreciate the moral to this story – and to make it meaningful – let's listen in on a hypothetical conversation between St Peter and Hotshot (a pilot):

St Peter: *You were lost?*
Hotshot: *Never*
St Peter: *You were flying in cloud?*
Hotshot: *Never*
St Peter: *You didn't climb to your safety altitude?*
Hotshot: *Of course, I did.*
St Peter: *Then why are you here?*
Hotshot: *No comment.*

If you admit to the *press-on-regardless* attitude then it is wise to know and appreciate some of its limitations. The five predictions which could easily be scope photos were made from the same spot at different altitudes in average rolling terrain typical of Europe. For this type of environment the pictures portray an important fact: *the lower you go the blacker will be your scope.*

A word of caution here. In very flat terrain it is possible to reach 100 feet AGL getting solid returns on the scope with no shadow area. The chances of this in Europe are small – but must not be discounted.

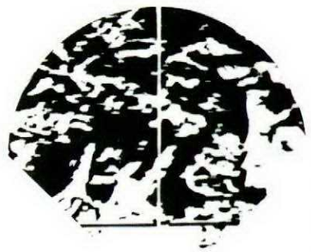
If you're charging around Europe in the clag, and a little uncertain, remember these pictures. Look at your scope – not only in terms of positive information – but in terms of absolute ground clearance. If you have returns at a reasonable range along your azimuth cursor, you are safe. If your scope is becoming overly black, be a wise

B.
M
I
L

pilot and C

1500 AGL

Normal operating conditions; in the immediate area the aircraft has 1000-foot clearance above terrain spot heights. The nearest hill – located at 5nm on the nose – gives a ground clearance of 1500 feet.

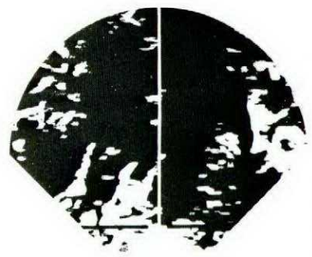


1000 AGL

This happens when the hill clearance at 5nm is reduced to 1000 feet. The shadows have lengthened only very slightly.

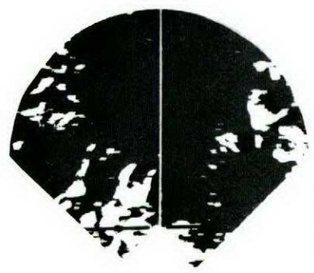
500 AGL

A drastic change occurs as this clearance is reduced to 500 feet – and is a warning that the aircraft is approaching the danger region.



100 AGL

A very dangerous situation – at 100 feet clearance, obstacle heights represent an unknown.



MINUS 100 AGL

With no returns along the azimuth cursor beyond 5nm, the aircraft will impact shortly unless climbed ***immediately.***

Lahr - Downslope Winds

Capt P. Scholefield
Meteorologist

Lahr lies at the edge of a small region having the enviable reputation of being the driest in Western Europe, north of the Alps and Pyrenees . . .

Anyone from Metz or Marville who has just endured their first winter in Lahr realizes, beyond a doubt, that the weather is much better than in France. Having moved some distance and into another country, many are perhaps not as surprised by this change in weather as are those few who have come the shorter distance to Lahr from Zweibrucken. Pilots here, who must check the Zweibrucken weather daily, are especially aware of the difference in weather between the two bases, which are only 65 air miles apart. Only the careful observer of weather would be able to detect the very slight advantage in weather conditions that Lahr enjoys over Soellingen.

At Lahr the two CF104 squadrons have found that they are able to put in more days of flying per year. Yukon and Hercules aircrews flying to Europe from Canada are now more certain of landing at their destination rather than divert to an alternate. Golfers need not put away their clubs during the winter and housewives frequently are able to hang up a wash and have it dry before sunset.

Lahr lies on the edge of a small region having the enviable reputation of being the driest in Western Europe north of the Alps and Pyrenees.

Why is the weather at Lahr – and in particular the terminal aviation weather – often so much better than at most other airfields in France, Germany and the Benelux countries?

Topography

The frequent downslope winds account for many of the more favourable weather situations. The term *downslope winds* is self-explanatory. However, understanding this phenomenon calls for some knowledge of the surrounding topography. The sketch, (Fig 1), shows Lahr airfield situated on the Rhine plain only three miles east of the fabled river. Of great importance to the wind trajectory are the surrounding mountains; the mountain ranges to the southeast, south, and southwest exceed 4,000 feet in altitude. It is evident that winds which blow from any quadrant except the northeast will be downslope winds. The more pronounced downslope effects occur when the wind is blowing from the SE or SW where the mountains are highest.

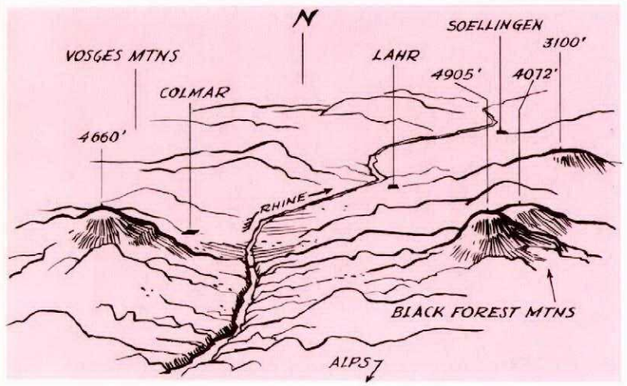


Fig 1 – Area Surrounding Lahr

Wind Direction

The topography greatly influences the wind direction over the Lahr airfield; the movement usually follows the path of least resistance – up and down the Rhine valley. In fact, 83% of the time the wind is blowing, it is up or down the valley (Fig 2). However, the airfield is not in an exposed location; this partly accounts for the frequency of calm conditions.

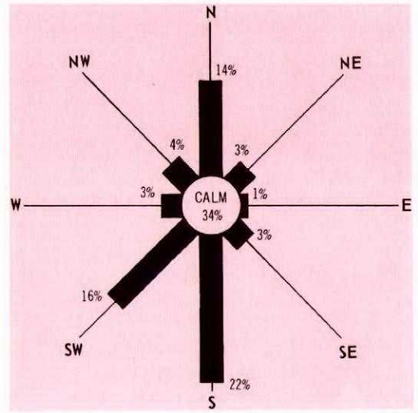


Fig 2 – Wind Rose For Lahr

Maps of annual average pressure distributions over Europe show relatively lower pressures over northern Germany and higher pressures to the south over the Alps. As unequal atmospheric pressure distribution is the basic cause of air motion – with air moving from areas of higher pressure to those of lower pressure – more winds blow from the south and southwest than from the north, as illustrated by the wind rose. Winds from the south and southwest are, of course, downslope winds.

Windspeed

Southwest (downslope) winds are the strongest, the average speed being 7.5 mph. Downslope winds from the west and south are the next strongest, averaging 6.8

mph. Upslope winds from the north average about 5 mph.

It is difficult to determine at what speed winds become hazardous. Certainly, windspeeds above 35 mph create widespread low-level turbulence necessitating care in parking aircraft. In the last ten years windspeeds exceeded 35 mph on an average of only 17 days per year. Most of these winds were downslope winds from the southwest.

The strongest wind recorded over the past ten years was during a thunderstorm in 1960 – 89 mph. There are no records of the damage on that day, but on 23 Feb 67, sections of a main hangar roof were blown off by northwest winds at 76 mph, during a thunderstorm.

Strong crosswinds – the particular concern to CF104 pilots – are usually associated with a thunderstorm and likely to be short-lived. Fortunately the Lahr runway parallels the Rhine valley; most of the strong winds blowing for considerable lengths of time blow at an angle favourable for landing.

Foehn Effect

In Europe, moderate or high downslope winds are termed *foehn winds*. Their influence on weather is called the *foehn effect*, and is most pronounced on the lee side of a mountain range when the wind is blowing across the the mountains. In Canada, this effect is most pronounced in Alberta to the lee of the Rockies.

A return to the topographic map shows Lahr in a position to experience some foehn effect whenever the winds blow from any direction in the southeast or southwest. What is the effect of these downslope winds? Briefly, air moving from high elevations where the atmospheric pressure is lower, to low elevations where the pressure is higher, is compressed. Compressing air raises its temperature, and hence becomes drier.

A good indicator of how various locations are affected by foehn winds is the average annual precipitation. Lahr is at the edge of one of the driest areas on the continent, the driest spot in this small zone being Colmar at the foot of the Vosges Mountains (Fig 1), with 20.0 inches of precipitation annually. Lahr gets 28.8 inches and Soellingen 31.9 inches. This indicates that the foehn effect is most pronounced at Colmar due to its closer proximity to the Vosges Mountains.

A good example of foehn winds at Lahr was in 1965 from 16-19 December, when moderately strong winds from the south and southwest blew continuously. The temperature rose from 34°F at noon on the 16th to a high of 63°F in the afternoon of the 19th. The relative humidity decreased over the period from a high of 99% on the 16th to a low of 50% on the 19th. The foehn winds also brought 30 hours of rain in this period, 21 of which were only light and intermittent.

Snow

Besides the infrequent strong winds, there are three other factors which restrict operations: snow, low visivilities and low ceilings.

Heavy snowfalls and large accumulations of snow do not compare with those that beset many Canadian airfields in the winter. On the average, it snows on 25 days but only once per year is there a 24-hour snowfall that exceeds four inches. The maximum 24-hour snowfall over a thirty-year period was 14 inches. Lahr's meagre snowfall can be attributed to the foehn effect of downslope winds which sap a good deal of moisture from snowstorms passing over the Rhine plain.

Frequently, within a few days – or sometimes immediately – after a snowfall, dry, relatively warm downslope winds develop and the snow quickly vanishes. There are on the average only 3-1/2 days each year when snow cover is four inches or more.

Visibility

Visibilities in Europe are poorer than in Canada due mainly to the higher concentrations of people and industry. Tons of minute particles are pumped into the atmosphere daily. Due to their weight these particles usually accumulate in the atmosphere below 1000 feet; therefore, the lowland areas of Europe suffer most from visibility restrictions in haze. The Rhine valley is one of these areas.

Fog is the more serious problem; haze seldom reduces visibility below 3/4 mile – fog frequently does. Lahr's sheltered valley bottom location is conducive to the formation of radiation fog on clear calm nights.

To ascertain a correlation between low visibility and wind direction a composite graph was drawn (Fig 3) comparing wind direction and visibilities of a mile or less. One mile vis is significant in Air Div; it's the cut-off point when 3 Wing and 4 Wing cannot use Lahr as an alternate. Note that the percentages of wind direction correspond with the wind rose (Fig 2). In winter one would expect a smaller percentage of calm conditions; in fact, almost half the time downslope south and southwest winds were blowing.

Over one-half of the poor visibilities occurred in no wind, which is understandable because much of the radiation fog develops when the air is calm. Also, with no wind blowing, dust particles sink into the surface

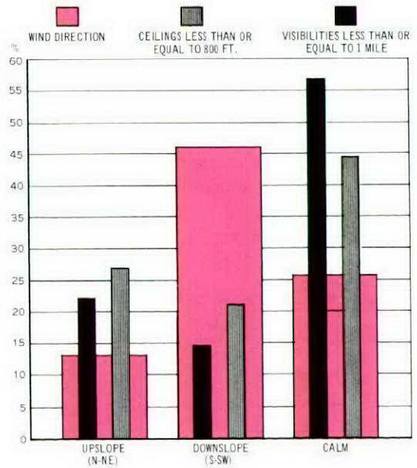


Fig 3 – Percentage Occurrence Of Winds, Low Ceilings And Low Visibilities Based On Hourly Observations Over A Six-Month Period From 1 Sep 67 to 29 Feb 68

layers reducing the visibility in haze.

There is a remarkable difference between the percentage of poor visibilities in upslope vs downslope winds. Upslope winds bring air which is highly polluted by the giant industrial basins of the Ruhr and Saar situated to the north. Upslope winds (which blow only a small proportion of the time) have a greater incidence of poor visibility; however, the wind is blowing *down* the Rhine valley most of the time.

On the other hand, south and southwest winds bring air to the Rhine plain from the industrially clean and sparsely populated areas of the French and Swiss Alps. Downslope wind speeds are generally higher; dust particles are thus more evenly dispersed throughout the lower levels of the atmosphere. Also, the drying effect of downslope winds deters fog formation and persistence.

Low Ceilings

Four synoptic situations produce low ceilings at Lahr. In order of importance:

- stratus in the Rhine valley from temperature inversion
- stratus from lifting fog
- snow ceilings
- stratus in precipitation

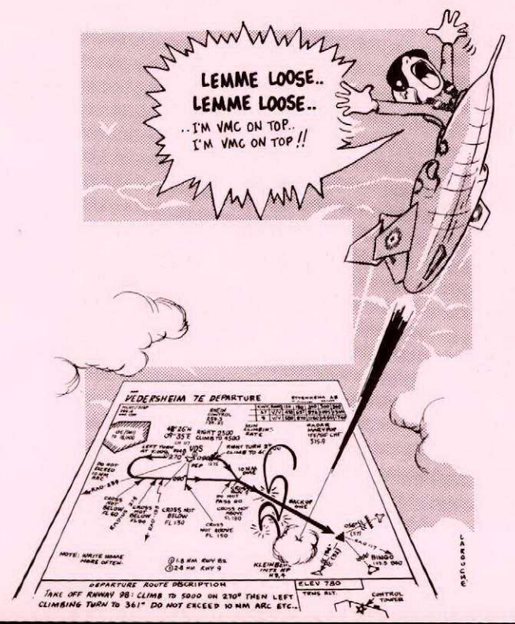
The composite graph (Fig 3), shows a correlation between low ceilings and low visibilities. (Here again, the critical ceiling height for alternate limits is used.) A very high percentage of the low ceilings – usually stratus trapped under a temperature inversion – occurred when the wind was calm.

As with low visibilities, upslope and downslope winds caused a pronounced difference in the low ceiling percentages. When downslope winds were blowing there were seldom ceilings below 800 feet; however, there was a very strong tendency to low ceilings with an upslope wind – which blows only one eighth of the time.

These conditions are understandable. The prime requirements for low ceilings are: high moisture content in the low levels and/or enough cooling to produce condensation. The drying and warming effect of downslope winds keeps low-level clouds to a minimum. An upslope wind forces the air to rise, thereby cooling it slightly; often this is enough to produce condensation and low ceilings. The stronger downslope winds often create enough turbulence and mixing in the lower levels to keep the ceiling above 800 feet.

For a large percentage of the time – especially in the winter – winds blow downslope in a direction which most often follows the Rhine valley. The foehn effect of these winds is responsible for keeping the number of poor weather situations to a minimum. Not only is this a benefit to 1 Wing and its operations but to all of the Air Division.

Does your hangover hurt? It will and so will your eyes should you not study the jet departure 7E (simplified here), before attempting to fly it. Depicted here is the deterioration of the legendary clean-cut, square-jawed, cool, calm-and-collected jet jock into a confused, bumbling idiot muttering at frequent intervals the cry of the true fighter pilot "Lemme loose! Lemme loose! I'm VMC on top! I'm VMC on top!"



Each pilot is suspended in this rig to learn how to maneuver the parachute.

DOWN TO THE SEA...in chutes

Capt G.E.S. Miller

You have just ejected from a CF104 at 1000 feet over water on a bombing run at Capo Frasca range.
You get a good chute.
Show me the four mandatory actions you will take prior to water entry...

The pilot, wearing a G suit, wool sweater, a one-piece immersion suit, helmet, mae west and parachute harness, is poised ready to demonstrate those vital actions before stepping off the platform. He knows that once in the water any items missed will be many times more difficult to perform – particularly, as he is about to be towed up to 10 knots to simulate being pulled by a wind-blown parachute!

The survival school instructor notes that in about four seconds the pilot has inflated his mae west, deployed his survival seat pack, released the right-side clip of his parachute harness, and has turned the quick-release box fully to clockwise (unlocked) position. The pilot leaps off the platform and splashes into the Mediterranean where he will demonstrate assuming the proper drag position while being towed and, on a signal, get out of the parachute harness and climb into a one-man dinghy.

This is but one of three basic drills that are taught on the water entry phase of the Air Div Sea Survival School at Decimomannu, Sardinia. Since opening in June 66, CF104 pilots who fly to Sardinia for weapons training must annually meet the school's requirements. Now, T33 pilots and safety systems techs from the Wings are attending.

The school was created in response to a long-felt need for water survival training. Over the years many pilots after a successful bailout, had lost their lives because of inadequate experience and training. In those days, the water survival training a pilot received had been given in the calm, fresh water of the base swimming pool. Such training conducted in warm weather or indoors ill-prepares a pilot to face the hazards and exposure of the open sea. Survival at sea depends on the knowledge and experience gained in *realistic* training – hence the emphasis at Deci's Survival School.

The complexities of deploying CF104 water survival equipment prior to bailout are often misunderstood by pilots prior to attending the school. However, the parachute descent, water entry and sea survival have been evolved into a simple sequence – once the pilot learns what to expect of his equipment and how to use it properly. The experience gained in training over 600 West German Air Force and over 300 Canadian pilots has resulted in a number of straight-forward checklists and actions.

An over-water ejection from a CF104 without a pre-planned action sequence would be extremely hazardous, so here's a positive guide for CF104 aircrew covering the most frequent *typical* situations and some comments:

THE PARACHUTE DESCENT

HIGH ALTITUDE

"Your B5 parachute has just opened by the aneroid timer at 15,000 feet after ejection from a CF104 at high altitude. What are your actions?"

1 VISOR UP AND CHECK PARACHUTE CANOPY for full deployment. If shroud lines are over top of canopy, up to four can be cut with your shroud-line knife.
2 DISCARD THE MASK. Remember: all mask dot-fasteners are pulled from the top. To discard the mask you must first unplug the radio cord and bailout bottle and pull the dot-fastener on the main oxygen hose. (The main oxygen hose will make an excellent tourniquet if needed.)
3 VISOR DOWN to protect eyes from blinding salt spray.
4 CHINSTRAP FASTENED
5 INFLATE MAE WEST AND BLEED OFF OVER-INFLATION. Before flight always check that the CO2 toggle flap is unfastened and that the toggle is not hidden by the right parachute legstrap. Always fly with the oral inflation valve open to enable rapid bleed-off of the excess air to enable you to put both thumbs underneath the parachute quick-release box.
6 CLOSE OFF AND STOW ORAL INFLATION VALVE
7 DEPLOY SURVIVAL SEAT PACK by pulling the yellow handle on the right side and squeezing the black trigger. Discard the handle.
8 RELEASE RIGHT-SIDE CLIP. The left-side clip unfastens automatically. The radar reflecting shield, dinghy and survival pack will now be hanging from a 26-foot line from the dinghy lanyard connection over the yoke of the mae west.
9 QUICK-RELEASE BOX UNLOCKED but do not open until water contact. The box is unlocked when fully clockwise.
10 REMOVE SPURS AND BOOTS and discard.
11 FACE UPWIND so that you will be dragged on your back rather than face-down.
12 SQUEEZE OPEN THE QUICK-RELEASE BOX IMMEDIATELY ON WATER CONTACT. This is the most advantageous time as there is bound to be a momentary slackening of shroud lines.

Pilot leaps into water for submerged chute training. It's easy – if you don't panic.

The pilot, tethered to boat on left, leaps in water. Then the drag begins...

...at 10 knots, you'd better know what you're doing.

Pilot and dinghy. He must feel at home in this environment – it could be just that, for a day or two...

Remember, once in the drag, the quick release box is much harder to open due to the pull on the top two lugs, eg, a 10-knot wind will give a 250-lb pull.

NOTE: Steps 2 – 11 are performed below 10,000 feet.

LOW ALTITUDE

"Your parachute has just opened following ejection at 1000 feet above water. You have time for minimum actions only. What are they?"

1 INFLATE MAE WEST
2 DEPLOY SURVIVAL SEATPACK
3 RELEASE RIGHT-SIDE CLIP
4 QUICK-RELEASE BOX UNLOCKED
5 SQUEEZE OPEN THE QUICK-RELEASE BOX IMMEDIATELY ON WATER CONTACT.

ROUGH WATER ENTRY

"You have forgotten or were unable to open the quick-release box on water contact; now, in a strong surface wind, the parachute canopy has not collapsed but begins to pull you rapidly through the water. What actions must be taken?"

1 IMMEDIATELY ASSUME THE DRAG POSITION by maneuvering onto the back, holding the feet as wide apart as possible and bending at the waist. Try hard to look at the feet by keeping the head forward. Arms may initially be widespread to gain balance before putting the thumbs underneath the quick-release box.
2 MAINTAIN THE DRAG IF IN TROUBLE or to complete your descent checklist. Remember, you must have the mae west inflated and the right-side clip released prior to opening the quick-release box. Concentrate on maintaining the drag position until free of the parachute harness.
3 OPEN THE QUICK-RELEASE BOX AND ROLL OUT OF THE PARACHUTE HARNESS. The box will not release easily due to the pull on the top two lugs. You may try putting back pressure on the box with one thumb and giving it a swift tap with the free hand. To egress from the harness, grab one shoulder strap with the opposite hand and tuck the other arm under the strap, then simply roll out of the harness.
4 CLIMB IN THE DINGHY and pull your survival pack aboard. Stay attached to your dinghy at all times via the dinghy lanyard.

CALM WATER ENTRY

"You open the quick-release box on water contact but in the calm air the canopy settles over you. What must you do?"

1 REMOVE THE PARACHUTE HARNESS with slow, deliberate movements to avoid entanglement.
2 KEEP FEET STILL until free of the parachute canopy.
3 GRAB A WIDE SHROUD-LINE SEAM and propel yourself backwards by pulling on the seam. They all radiate from the chute apex and you will soon come to the centre or the outside. If the centre, simply pick another seam and continue backwards until free of the chute. Don't try to move forward under the chute by piling the canopy behind you as this will most likely cause entanglement.
4 CLIMB IN THE DINGHY and pull your survival pack aboard. Paddle a safe distance from the parachute to prevent future complications in rough water.

Capt Miller enrolled for pilot training in the RCAF in 1953, his first tour was on F86s with 434 Sqn at 3 Wing. Next came four years as a fighter controller at Falconbridge, Moisie and St Margarets – interrupted by a year's tour in 1962 as a solo aerobatic pilot with the Golden Hawks. He was no stranger to his next unit; after CF104 training at Cold Lake, he returned to Zweibrucken in 1965, to the new strike/attack 434 Sqn. After two years Capt Miller moved to Sardinia, where he is Weapons Training Officer and OC of the Sea Survival Training School.

Exercise "Top Guns"

Exercise *Top Guns* gives CF104 strike pilots the opportunity for friendly competition while carrying out their primary duty of low-level navigation to a simulated nuclear weapons release point. The bombing phases of the exercise are at ranges in Belgium, Holland, France and Germany, using MK106 practice bombs. Two low-level navigation routes are employed, along which an Equivalent Target (EQ) is selected. The EQ is usually difficult to identify from the air and gives an excellent reading on a pilot's low-level navigation skill.

A vehicle with two-way radio is positioned at the EQ; a referee identifies the aircraft and checks the timing and navigation accuracy as it passes overhead enroute to the target. Another referee at the bombing range scores the bomb drops for timing and accuracy.

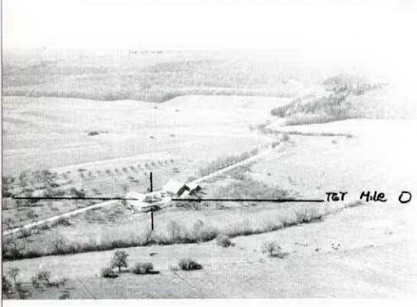
Each pilot is briefed on the route and the exercise restrictions. A detailed description including photographs of the EQ, is given to the pilot for target study. He is then allocated a bomb impact time; from this he must compute his takeoff time and the exact time he will pass over the EQ enroute to the bombing range.

A pilot's score is determined by his time – early or late – at the EQ and by the bomb score at the bombing range. The Wing Technical Staff are awarded a score for each successful mission. The exercise results are compiled according to:

- top pilot performance
- top squadron performance
- top wing performance.

The competitive spirit of aircrew and groundcrew is keen – as it is with all Air Div competitions.

Top Guns is a highly successful air operation because we are able to prove our capability in a climate of spirited rivalry and competition.



Oxygen Mask Problem Solved

Pilots were complaining about difficulty in exhaling...

The Institute of Aviation Medicine at Toronto investigated a UCR on sticking valves which suggested that the finish (chromic anodize vs sulphuric anodize) was the source of the problem. The suggested discarding of the chromic anodized valves would be prohibitively expensive, so 25 valves were sent for testing from the base from which the complaint originated. Of the 25 valves, 10 were found to have been manufactured in 1956 by an unknown company; no one knows how they got into the system. What *is* known, however, is that *all 10* of these failed to meet military specifications. The remaining valves were acceptable.

Estimates are that a few of these may still be around. Pilots and safety equipment technicians should keep a sharp lookout for these unacceptable valves.

On the Dials

In our travels we are often faced with "Hey you're a UICP, what about such-and-such?" Usually, these questions cannot be answered out of hand; if it were that easy the question wouldn't have been asked in the first place. In answering these questions any can of worms opened up in the process can be sorted out for everyone's edification. Questions, suggestions, or rebuttals will be happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communications to Commander, Canadian Forces Base Winnipeg, Westwin, Manitoba, Attention: UICP School.

Holdings - *cont'd*

A previous "On the Dials" article covered some of the pilot techniques employed while flying the new holding procedures. To complete the picture let's briefly look at the protected airspace, or holding areas.

Holding areas have been developed by the FAA to accommodate such factors as the effects of altitude, airspeed, wind, and angle of bank, as well as the numerous navigation aid and airborne systems tolerances. The final result was the development of 31 templates representing the basic area sizes and shapes. The area template used in a particular situation takes into account the holding altitude and the highest speed group of the aircraft that will utilize the hold. Once selected, this area is suitable for use by all aircraft in that speed group or a slower speed group, and for all altitudes at or below that selected. Although there is a holding area for all the even thousand-foot altitudes and each speed group, for simplicity only a few of the larger holding areas are used at each fix. This normally will provide more than the minimum required airspace protection for the lower, slower flying aircraft.

A typical holding area template is shown here, to illustrate its general appearance. The hatched portions at the front and rear are entry reduction areas, designed

AIRSPEED GROUP (K)	ALTITUDE	A-C	A-B	B-C	D-E	D-F	E-F
175	6000	12.5	3.8	8.7	4.5	2.9	7.4
175	14000	16.9	5.6	11.3	6.4	4.2	10.6
200-230	6000	15.5	4.9	10.6	5.7	3.8	9.5
200-230	20000	31.6	9.9	21.7	11.6	7.5	19.1
310	20000	46.1	15.5	30.6	17.6	11.2	28.8
310	26000	55.5	19.2	36.3	21.7	13.7	35.4

to provide the pilot with a larger area for his entry maneuvers. Once established in the pattern, protection within these areas may be discontinued. The chart shows the minimum size (in nautical miles) of a template applicable for some of the more commonly used altitudes and speeds.

Problems With Your Annual Met Exams?

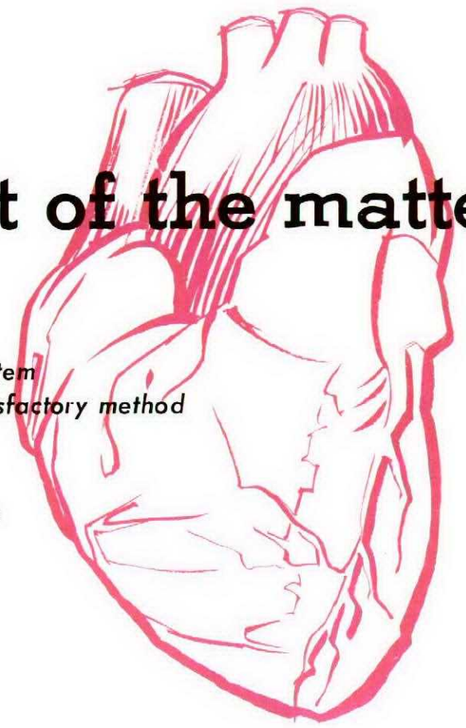
The book "Weather Guide" (TC110), was written several years ago by Training Command as a study guide for the graduate aircrew. It contains a comprehensive condensation of material contained in Weather Ways and Weather Work. Each topic is reviewed, and a few questions (with the answers) are given. The book concludes with an old meteorology exam that was in use at one time – and for obvious reasons is not used now. There are sufficient books in the supply depots now for individual issue; we recommend that all aircrew obtain their copy.

FOD Receptacle...

- a good idea from Shearwater

Shearwater is rightly pleased with the installation of their FOD containers. They're on all aircraft hangars and located next to the line servicing office so that anyone working on the ramp can see them. The background is yellow and black stripes; the can is yellow with red letters. The container (unpainted) can be obtained through normal supply channels.

the heart of the matter



It's the most vital pump in the manned aircraft system and there isn't even a satisfactory method of periodic inspection, but there are means of preventive maintenance . . .

Lt Col F. W. Lovell
USAF

A flight of F102s is making a fly-over when suddenly a wing aircraft pulls up and rolls over slowly to the right. The pilot makes no attempt at egress and the aircraft strikes the ground with the pilot in his seat. Post-mortem examination of the young (less than 30 years old) pilot showed marked coronary artery arteriosclerosis and the investigating board ruled that this accident was due to coronary occlusion in the pilot.

The human heart is a remarkable organ and can be considered the most vital structure in the manned aircraft. Yet the average fighter jock has less understanding of its structure and function than he has of the hydraulic system on his aircraft. Much of this is due to vocabulary. The medical mumbo-jumbo is confusing and often applies difficult terminology to fairly simple hydro-dynamic problems.

The heart is a two-sided pump. It weighs about 2/3 of a pound and makes about 38,000,000 strokes a year without missing a beat. The smaller right side pumps blood to the lungs for exchange of oxygen and carbon dioxide. The larger left side receives the blood from the lungs and pumps it out to all functioning parts of the body. The valve system is ingenious and has its own disease problems. These are, however, primarily congenital (occurring at the time of birth) or due to rheumatic fever which is primarily a childhood disease; hence they would preclude the individual getting on flying status and do not concern us here. There is an electronic conduction system that spreads the contraction signals from a "pacemaker" to the muscle bundles. However, the key to our story here lies in the coronary artery system.

The heart receives its own nourishment and oxygen supply by two small arteries, called coronary arteries, which arise from the aorta (the main large artery leading out of the left side of the heart). These blood vessels are about 3/16ths of an inch in diameter and branch and spread over the heart. In the normal heart, these branches don't anastomose (hook up with each other) so a block in one of them will cause death of the heart muscle supplied by this branch. (What actually happens during a heart attack is beyond our scope here, but there may be focal death of muscle with gradual recovery by scarring, or there may be sudden death due to the development of abnormal rhythms in the conductor system.)

Arteriosclerosis, atherosclerosis, or just plain hardening of the arteries is a disease of unknown cause that results in thickening of the walls of arteries and deposits of material that narrow the lumen (passage) of these vessels cutting down the blood flow. Despite voluminous research we still don't know the cause. It is more common in Americans (it is quite rare in Asiatics); it starts in men at a much earlier age than in women; it occurs with much greater frequency in the obese, the physically inactive, and in the heavy cigarette smoker. It can be the cause of an aircraft accident. A real problem is that we have no practical method of detecting the degree of coronary artery disease unless there has been previous heart muscle damage.

What about the electrocardiogram (ECG, EKG)? This valuable tool was invented around the turn of the century. It measures the electrical forces caused by the contraction and relaxation of the heart by tracing a path of squiggly lines on paper. If there is death of heart muscle (infarction), either recent or old. it will cause changes in the pattern of these tracings that mean something to the cardiologist. There have been normal variations to the pattern and such things as severe viral diseases can also cause change in the pattern, which adds to the confusion. What the electrocardiogram will not do is tell us the degree of arteriosclerosis of the coronary arteries. The only test that will do this is "coronary angiography" which is a complex and slightly dangerous non-routine procedure. These arteries can be plugged to a remarkable degree without any symptoms or demonstrable defects in the EKG. It is only when there has been damage to the heart muscle that the EKG will show evidence of coronary heart disease. The reserve of the coronary artery system is remarkable and it is hard to visualize a pump in an aircraft that could have its fuel or lubrication supply so restricted and yet check out normally. Hence we have no really adequate practical method of performing a periodic inspection on the heart.

What about preventive maintenance? While the most important item is selecting our grandparents for their longevity, there are effective things that can be done. Probably first in priority is to stay lean (even minimal obesity counts against you) and in top physical shape. The inter-relation of diet and exercise to a lowered incidence of coronary disease is not clear cut, but there is a strong statistical correlation. A high intake of animal fat products also is correlated with a higher incidence of coronary artery disease. Physical activity, in my opinion, is the most effective preventive measure. *Regular and consistent* physical exercise to the point of stressing the system will result in a marked lowering in the incidence of coronary artery disease. Just how this is done is not clear. There is evidence that the exercise will create "anastomosis" (hooking up of ends of arteries that don't normally meet with each other) that will by-pass a focal block. However, exercise also actually cuts down the amount of deposits inside the artery, but the mechanism is not clear.

Smoking cigarettes in large numbers will definitely increase the death rate from coronary attacks. Emphasis has been placed on the cancerogenic properties of cigarettes, but in the middle-aged male, the heavy smoker will have twice the incidence of coronary attacks that the non-smoker will have.

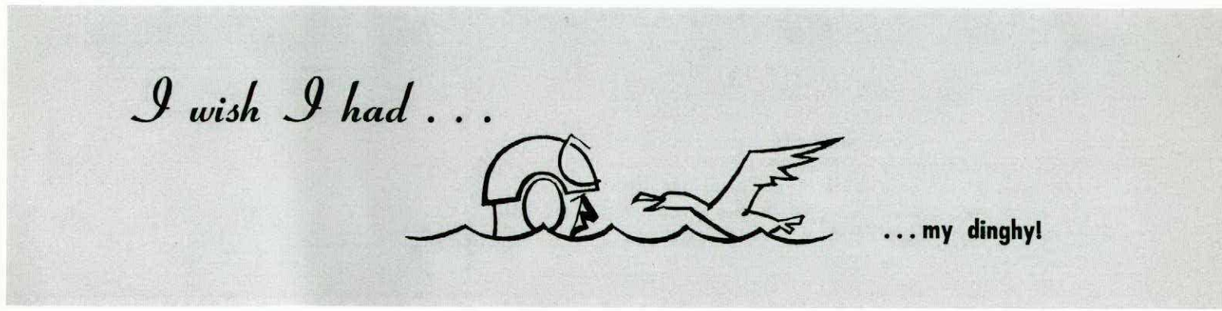
Hence, what can we do for our own preventive maintenance? Stay lean! Stay physically active (you can't beat running!). Lay off the cigarettes! *This should be a consistent and life-long program for a long life.*

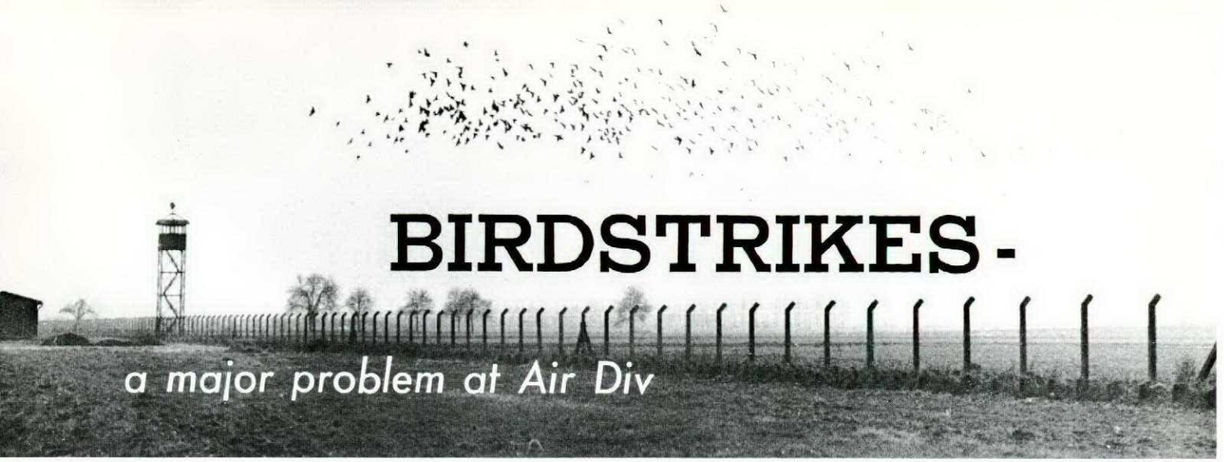
This is not just to insure the Armed Force's investment in you and to keep you from clobbering a shiny new bird due to a sudden coronary occlusion, but for your own enjoyment and active longevity. An item of interest in the history of our young fighter pilot mentioned at the beginning of this article, is that in the three years preceding his death he had become more sedentary and had gained 30 pounds.

Coronary artery disease is not one of upper middle age, but it definitely starts in the twenties. While many individuals having severe coronary artery disease may be without symptoms, certain manifestations may become apparent. The classic symptom is crushing chest pain radiating down the left arm, but the symptoms may masquerade as a sudden onset of indigestion. Usually if the process is severe enough to cause symptoms, there will be EKG changes. The "baseline" EKG on file for every rated pilot is of great value here because minimal changes can be compared with the baseline. Don't be afraid of being grounded unnecessarily. The School of Aviation Medicine consultation program has extensive experience in evaluating these cases. If you've got the disease you don't want to be flying, and if you haven't, they'll keep you in the air. In the meantime, stay lean, physically active, and think twice about how badly you need that cigarette.

reprinted from
USAF/ADC "Interceptor"

Lt Col F. Warren Lovell, AFRes, MC, currently a reservist, is both a rated pilot and a flight surgeon. He was a B25 pilot in the Pacific, World War II. He then attended Northwestern University Medical School. In 1957 he re-entered the regular Air Force and later became Chief of Aerospace Pathology at the Armed Forces Institute of Pathology. Col Lovell returned to civilian life in 1960 and currently is a pathologist. He also serves as a consultant to FAA in pathology and teaches in the FAA-NTSB accident investigation school at the Federal Aeronautical Center in Oklahoma City.





BIRDSTRIKES - a major problem at Air Div

— A. Weinberg

One of the major contributors to aircraft damage and losses has been birdstrikes; this category accounts for approximately 50% of the total accidents, incidents and special occurrences!

Maj J. Laskoski
Staff Officer Operational Research

Air Div has been particularly vulnerable to birdstrikes. A large portion of their flying is below 1000 feet. It's hardly surprising therefore, that in sharing the airspace with the birds, birdstrikes result. To determine methods of avoiding birdstrikes a study was undertaken to determine under what conditions the majority of these strikes occurred. The problem was approached from various aspects:

- stage of flight – enroute, and takeoff and landing
- time of year
- time of day
- altitude

Enroute

The enroute birdstrike was considered separate from those occurring at takeoff and landing because the latter is linked closely with the airport environment. In four years, of 250 birdstrikes over 70% occurred enroute; another 10% were reported "unknown" and assumed

	1 Wing	3 Wing	4 Wing	Total
1964	(breakdown by Wings not available)			28 (9)
1965	3 (1)	20 (4)	4	27 (5)
1966	24 (2)	26 (1)	23	73 (3)
1967	22 (1)	33	16 (1)	71 (2)
	49 (4)	79 (5)	43 (1)	199 (19)

Table 1 – Enroute Birdstrikes

to have been enroute. The ( ) numbers in the table are unknowns – these are included in the total under the premise that they are more likely to have occurred enroute since a higher percentage of the strikes occurred there. Also, a much higher percentage of the airborne time is enroute. The number of strikes reported in 1966 and 1967 increased considerably over the 1964-1965 period. Some of this is attributable to increased flying, but the higher numbers largely reflect better reporting. Much of our earlier data did not include nil-damage strikes; at that time these were generally not reported.

Takeoff and Landing

The ( ) numbers in the table are occurrences not at one of the three wings, and are included in the totals. Obviously, in 1964-1965 not all strikes were being reported!

	1 Wing	3 Wing	4 Wing	Total
1964	(breakdown by Wings not available)			6
1965	1	1	1	3
1966	3	4	7	16 (2)
1967	12	5	5	26 (4)
	16	10	13	51 (6)

Table 2 – Birdstrikes on Takeoff and Landing

The exception to note here is 1 Wing after the move to Lahr. Conditions at Lahr were conducive to birdstrikes which is reflected in the statistics. Control measures introduced last Fall and this Spring should drop the level to that of the other wings. Takeoff and landing, although not as extensive as the enroute problem, nevertheless

Fig 1 – Percentage of Birdstrikes by Month

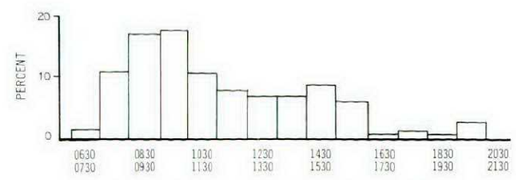


Fig 2 – Percentage of Birdstrikes with Time of Day

deserves close attention; measures to limit the bird population on the airport can reduce the strike rate. October rates are particularly high.

Time of Year

The largest number of strikes are expected in March, May, June, July and October. The Spring and Fall migration periods are prominent. The Summer increase no doubt stems from the increase in bird population as the younger birds hatched in the Spring become more active. Though not as extensive as in migration periods, summer activity certainly bears increased attention.

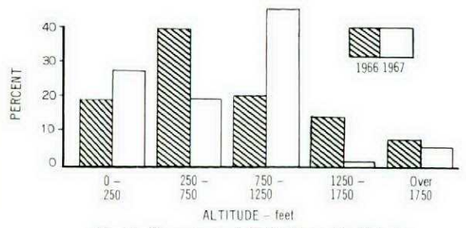


Fig 3 – Percentage of Birdstrikes with Altitude

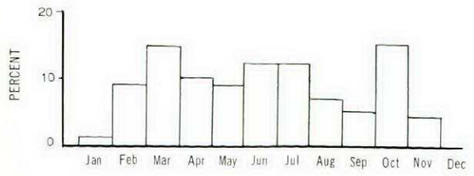
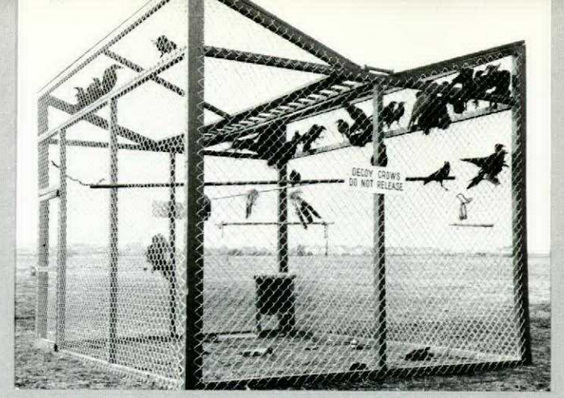


Fig 4 – Percentage of Birdstrikes at 250 to 1250 Feet by Month

CROW CONTROL

The first two summers met with little success. The odd wandering crow or hawk would pass through the trap, consume the food, leave a few droppings, and pass on...



(The plans for this bird trap are available from DFS.)

After two disappointing years at trapping birds, 4 Wing acquired the drawings for a Norwegian crow trap which was reputed to be effective.

Major T.C. Kelly, WCEO, reports that "Armed with our new trap and the siting experience we had gained with our previous model, we commenced our winter and spring birdstrike operations". He continues, "We knew it was essential that the trap be sited in an area of short grass attractive to crows, away from vehicles and persons, as near as possible to a normal feeding area for the birds, and away from aircraft movements. We chose an area which seemed to satisfy all of our requirements except for a tall tree on which birds could roost prior to their assault on our bait. To complete the setting, therefore, we planted a tall tree beside the trap."

"Our success has been rewarding. The bird-filled cage has been of great interest to visitors, a subject of conversation during coffee break and a great satisfaction to the people involved, because with very limited knowledge and lots of enthusiasm a significant reduction in the birdstrike hazard has been achieved at 4 Wing."

Major Kelly points out that there is an essential ingredient to the whole operation – the enthusiasm of those participating. The trap is apparently successful enough to keep those associated with the project busy – but satisfied in the knowledge that the birdstrike hazard has been substantially reduced at their base.

Time of Day

No strikes between the hours of 2030 to 0630 have been reported. The highest proportion of birdstrikes occurs from 0830-1030 – the period of the most sorties. Over 55% of birdstrikes occur between 7:30 and 11:30. However, the scheduling does not fully account for the incidence of birdstrikes.

Altitude

The region 0-250 feet represents the strikes ocurring mainly on takeoff and landing. During 1967 a greater percentage of the strikes were reported in the band 750-1250 feet whereas in the previous year the bulk of the strikes occurred between 250-750 feet. This was due largely to the influence of flying restrictions imposed in 1967, when a minimum altitude of 800 feet was introduced during the Spring and Fall migration periods. Despite this precaution and the significant gains achieved, most of the strikes occurred during this period.

The majority of the strikes occurred between 250-1250 feet, accounting for 60% of the strikes in 1966 and 66% of the strikes in 1967. In view of this we examined the strikes in this band in greater detail – by the year and month in which they occurred (Fig 4).

The highest strike rate in 1967 occurred in March, July, and October, whereas in 1966 the months were February, June and October. The majority of strikes in February 66 were late in the month; that year, the birds migrated earlier. Similarly, the earlier summer (with the growth of young birds) showed up earlier in the statistics that year.

cont'd on page 24

In case you were wondering . . .

Here's another chapter in the never-ending dialogue between the producers and consumers of flying clothing and personal safety equipment. The comments reflect the feelings of many users, but notice how areas of contention often stem from the user not knowing the current status of equipment design and procurement. Notice also, how vital is the UCR in this process.

Maybe there's an answer here to your questions . . . if not, SUBMIT YOUR IDEAS BY UCR!

6230-00-146-6605 Flashlight, straight	Bulky, unreliable, generally of poor quality	A new flashlight, Mallory Model 800D, will become available in the next few months. Only 2200 are on order so that periodic and more frequent stock turnover will safeguard against batteries becoming time-expired before they reach the user.
6230-21-812-3007 Flashlight, penlight	Inadequate lighting, especially for external inspection. Faulty switches, not rugged enough; often u/s.	Users can make a contribution by raising UCRs, supported by proper identification and photographs if necessary, to convince procurement agency that the type supplied is not acceptable.
6230-21-800-8256 Flashlight, 90° angled head	Too bulky, poor switches (124 aircrew unfamiliar with this item because they cannot obtain it from supply).	This problem can best be resolved by UCR action.
8405-21-808-2693 Trousers, flying, men's type III – side-zippered pockets (winter flying trousers)	Too bulky; connecting zipper works itself open; needs deeper pockets in legs; definite preference for "one-piece" suit.	Being superseded by type IV suit. Zipper juncture at waist has been eliminated. Flying suit development program started with one-piece suit which was unsatisfactory because of excessive bulk at waist when seated. New type IV trousers are Ref 8415-21-847-5864 (Master).
8415-21-801-4335 Jacket, flying, men's (winter flying jacket type III as above)	Relate to above; too short in body. Most use totally different size to achieve fit with trousers. Allows cold air to enter across stomach. Much too bulky. Should have place for rank insignia.	Type IV suit (two piece) will be issued as a single unit since it is incompatible with type III both for colour and method of juncture. Three thousand will be available for issue next winter. New type IV jacket is Ref 8415-21-847-5852 (Master).
8415-21-800-7607 Glove shells (leather flying gloves)	Poor stitching – comes apart too easily. Have to get replacements too often because of stitching.	Accelerated wear trials of six weeks duration with new type of sewing thread revealed no weakness or deterioration. A polyester/cotton thread is now being specified in lieu of nylon, since the result of the trials indicated a marked improvement in seam life.
8415-21-800-8771 Glove inserts (flying glove, inner)	Inner glove tears too easily.	Woollen inners, light weight, are on extensive trials. Agree that rayon inners are not satisfactory and more durable replacement will have to be found.
8415-21-801-9740 Coverall, flying, men's (old-style summer flying suit)	Hot, uncomfortable, poor selection of fits, unsightly when soiled, pockets too small. Completely unacceptable.	This coverall replaced a fine, lightweight cotton garment because of aircrew insistence on a more durable material. With the introduction of the new "stylized" combat type suit the coverall flying men's referred to was to be declared obsolete. In the integration process, RCAF supplies had to be shared with RCN and Army. Only a small quantity remains (100) after which the new style will be supplied.
8415-21-802-1406 Jacket, flying, men's (interim flying jacket, grey)	Doesn't match colour of coveralls (dark blue); collar irritates neck, baggy, unsightly when soiled.	This is the only garment we have not had UCRs on, but it is agreed improvements are possible. This has been taken care of in the replacement garment (8415-21-847-6266 – Master) which is to be purchased when present stocks are exhausted, estimated to be 1 Sep 68. Colour is royal blue.
8415-21-820-0986 Coveralls, flying, men's (new dark-blue)	Generally a well-liked item. Major complaints: hot in summer, bottom leg pockets too shallow. Suggestion for re-inforcement where leg rubs side of cockpit. Some difficulty in proper leg length. Only one suit available.	New colour probably in FY 69/70 will be rifle green or slightly lighter material. UCR action suggested for re-inforcement of legs. Any additional suggestions will be appreciated.
8415-21-802-6744 Drawers, extreme cold (thermal underwear) 8415-21-809-1939 Undershirt, extreme cold	Excessive shrinkage on laundering. Very heavy weight. Many buy own commercially to get lighter weight. Always difficult to obtain from supply when needed at beginning of winter.	Heat drying is responsible for shrinkage. Should be air-dried or frost-dried in winter. Commercial versions do not meet military specifications. This is now "official" underwear for the CF. Suggest local supply ensure demands for this item are placed at least six months before items are needed.
8430-21-800-2251 Overboot, black rubber	A disaster. To prevent circulation stoppage, must wear several sizes larger therefore bulky and cumbersome. Frequent zipper breakage.	Only objection to black rubbers to-date comes from Tutor aircrew and low blue mukluks are on order for early delivery. Zipper breakage is on old-style boot; later versions have excellent zippers. Using too large sizes of overboots aggravates the problem. Re-designed insulated rubber overboot will go on limited field trials during 68/69 winter months.
8430-21-798-7777 Boots, flying, leather, summer	Leather soles causing many beefs and a hazard to the wearer.	This aircrew summer boot is being bought with composition soles; only a limited number of boots with leather soles were purchased.

8430-21-805-5260 Boots, flying (felt winter boots)	No good on snow, useless in wet weather; slippery on some surfaces. Requires an overboot which is not available.	The boot is designed for use in cold dry weather. The answer for wet snow is the low blue nylon mukluk and efforts are being made to ensure adequate supplies for jet aircrew.
8440-21-104-2859 Socks, men's grey (wool socks)	Very coarse material. Shrinks when laundered.	A user trial is being conducted on a new wool/nylon shrink-resistant men's sock.
8465-21-802-4370 Sun glasses	Big, bulky and heavy on nose. Very painful around the ears when used with headset. Spatula type frames needed.	Ref 8465-21-520-0004 – CFIAM has produced a new design to overcome the deficiency reported on the present issue. The new design is lightweight and utilizes plastic lenses and spatulate temple bars. A small number, made by two different manufacturers, is expected in the near future for test and evaluation on limited use trials.
6645-21-801-9410 Wristwatch (not chronometer)	Not rugged enough.	Being withdrawn in favour of C4 watch 6645-21-114-5982 which is being built to a military specification, will better meet aircrew requirements and will be available within the next 12-18 months.
7340-21-806-2675 Knife, hunting	Won't hold edge.	Superseded in 1967 by the knife, hunting, 7340-21-844-5956 (Scale 15, CAP 602). This is an excellent knife and will be available in quantity within the next 12-18 months.
7520-21-802-7875 Clipboard, pilot's	Too bulky.	This is the first complaint received. UCR action is requested.
7520-21-802-8977 Clipboard, pilot's (with light)	Bulky. Light poor, unreliable and flimsy. Pencil holder not convenient. Glue from undersides gets on clothing.	This item was introduced a number of years ago in limited quantities. Present opinion is that the unlighted letdown card is preferred by the majority of pilots. There is no work being done at this time to improve this item. UCR action is required if improvements necessary.
8415-21-805-3187 Toque, aircrew	Improper sizing	Request UCR action if the problem is serious.
8475-21-802-0292 Helmet & mask assembly	Certain individuals have great difficulty in securing a comfortable fit. Certain "hot spots" cause excruciating pain after a short time. (A UCR has been submitted on this.)	CFIAM has not encountered any difficulties in fitting helmets. This is a matter of SE Tech Training. As a result of UCR action, improved fitting method is being issued in EOs. This should answer this requirement.
Ear Seal (sound attenuators)	Uncomfortable, seal too hard, glycerine seal breaks; foam seal OK.	Glycerine-filled ear seals give best sound attenuation. To remove any discomfort the ear must be inside the seal. Foam-filled ear seals are scaled for winter use in Canada only.
Oxygen Mask	Rubber very cold and hard during winter conditions.	Until the silicone material can be strengthened, there does not appear to be any solution to this problem. Research is continuing.
4220-21-803-7412 Life preserver, Yoke (Mae West)	Too bulky, uncomfortable around neck, rubber chafes skin. (This item must be worn on neck above collar of flying suit. After a two-hour flight, with continual head turning, it causes painful irritation of skin.)	Chafing is being corrected through a protective neck piece which is now being developed.
21GM/2155 First Aid Kit	Add pain killers (morphine). Subject of separate UCR action. This item requires review.	Morphine was removed from this kit several years ago because of accounting problems under the Opium and Narcotic Control Act, and in view of the limited requirement for material.
CAP 361, Booklet – "Land and Sea Emergencies"	Out of date.	CAP 361 is being rewritten as a CFP.
1095-21-804-8889 Projector, Pyrotechnic, Hand (penlight-size flare ejector with 12 flares)	Issue to all aircrew rather than just keeping in survival kit.	A folding wallet-type container is being prototyped to contain mirror, projector, flares and matches. Samples will soon be available for viewing and trials. This container will be used in the survival kit and will be carried on the person.
5110-21-102-8757 Axe – single bit	Handle too short	Basic kit item – axe handle length is designed to fit into the basic kit and emergency seat pack.
6135-21-803-6037 Battery, dry	Short life	Both the Sarah battery and the interim carbon-zinc battery for the URT 503 have a limited shelf life of 12 months; units should not over-demand for obvious reasons. The final battery for the URT 503 is now under development and is a magnesium-silver chloride type with a predicted 5-year shelf life.
4610-00-372-0592 Desalter kit	Water tastes bad	The desalter kit does provide potable water which may have a "flat" taste. This will have to be accepted until a better kit is available.
7920-21-545-0219 Sponge, cellulose	Add more sponges	Agree; sponges are essential, due to accumulation of moisture on dinghy walls and floor which makes conditions more unpleasant than they need be.

cont'd from page 21

The first quarter of 1968 was one of considerable improvement. We experienced only 12 strikes but had expected 24. This may be attributable in part to better and more extensive use of information on bird migration.

Enroute Birdstrikes – A Real Problem

The Air Division's biggest birdstrike headache lies in the enroute stage of flight. Pending the acquisition of birdproof aircraft our best hope is in finding out more about the feathered creatures with whom we share the European airspace, and the refinement of our response procedures during peak migration periods. Simultaneously, to counter the takeoff and landing bird hazard, our airports are systematically being made most inhospitable for bird residents and visitors.

the Power of Positive Persistence

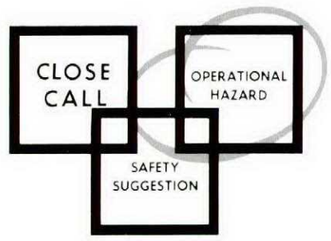
The pilot, on debriefing, had an interesting experience to relate. After takeoff, gear and flaps up, he had selected nose-up trim which continued to go nose-up despite forward stick trim. Alternate trim did not take immediate effect, however the aircraft was flown in the vicinity to burn off fuel during which the elevator trim worked only intermittently on stick and alternate trim positions. On final, the pilot attempted to isolate the trim by pulling the circuit breaker but it wouldn't budge.

First, the circuit breaker was replaced and the stabilizer trim was functionally ground checked twelve times. The auxiliary trim worked okay but the stick switch had to be held hard-on before contact could be made. The stick grip was changed and again everything checked functionally serviceable.

Although the aircraft subsequently flew serviceable the lab test on the circuit breaker and stick grip showed that while this could have caused the incident it didn't satisfactorily explain the intermittent operation. Base avionics specialists decided to carry out another complete check of the stab trim circuit. It checked out OK. Still not satisfied, the team decided to replace the stab trim actuator and test it; the clutch was found slipping at a 7-lb load vs a 20-lb requirement. Airloads on the stabilizer are heavy enough to slip that clutch whereas a ground check would not reveal this fault. This slippage would account for the apparent trim change the pilot experienced.

As a result of their commendable diligence in not accepting an initial superficial diagnosis, a serious flight hazard was spotted before it caused further hazard.

Good work!



Is "Slight Hypoxia" possible?

I was captain of a T33 on a cross-country with a qualified pilot in the rear seat. After one hour at 37000 (cabin pressure 23000) I recognized the first symptoms of hypoxia: blurred vision, cold, tingling, etc, and immediately checked the 02 blinker. It was not operating. The next step was to check the connection at the lap belt; it was OK and still connected. Then I selected 100% – still no blinker. Then I pulled the emergency bailout bottle – still no blinker. By this time, the onset of hypoxia was well established and the pilot in the rear seat took control and kept up a running commentary about possible remedies. The decision to descend was imminent, when I finally noticed that the hose had become disconnected at the mask inlet. I immediately stuck the hose in my mouth and the hypoxia disappeared. I refitted the tube and we continued to our destination. We found that the clamp holding the tube to the mask was missing. With the tube repaired and the bailout bottle replaced, the return trip was uneventful.

The questionable wisdom of the captain continuing the flight ("The decision to descend was imminent...") was later explained by the pilot as something he certainly would not have done had he been solo, in which case he would have descended immediately. In his hypoxic confusion he pulled the bailout bottle and then checked the blinker. Sounds like pretty good substantiation for a quick - but thorough - visual check of your mask before going flying.

Gen from Two-Ten

LEARN FROM OTHERS' MISTAKES—you'll not live long enough to make them all yourself!

CF104, STRUCK HOUSE The almost 200 pages of the Board of Inquiry is an elaborately chronicled account of a low-level recce mission which ended in tragedy. After all the evidence was in, the Board concluded that the pilot had, in good weather with a serviceable aircraft, allowed himself to be distracted from the vital lookout, and flown his aircraft into the ground. Fortunately no-one else was killed but the photo shows how narrow was the margin.

The Board recommended – among other things – that we '... re-emphasize the dangers of low-level flying, particularly the effect of distraction either in the cockpit or looking behind". Hence, this item.

The rules have been written, the limits established – all that remains is compliance.

TRACKER, WINGTIP HITS POLE The captain considered that "...a quick stopover to disembark a passenger, then to fly on, was not deviating from the initial flight plan unacceptably". This interim stop at a civil airport – embarrassingly near the destination – was to enable a passenger to quickly obtain his car and pick up the crew at the nearby military base.

Taxying in, the two pilots concentrated on the civilian marshaller off to the right; behind him, a parked aircraft also distracted their lookout. As the pilot was about to turn hard right in response to the marshaller's signal, the aircraft came to a jolting stop. The port wingtip had struck a pole located in an area normally used only for parking aircraft refuellers.

Non-standard flights call for increased vigilance; in this case,

the airport was obviously ill-equipped to handle short stop-over military air traffic.

T33, WRONG HANDLE Although not as commonplace these days this hazard is still with us. On completion of an instrument ride the check pilot in the front seat landed the aircraft, and after touchdown – raised the flaps. "The aircraft settled to the runway very smoothly and started to veer left", and came to a stop half off the runway after turning 110 degrees. As soon as the nose started to sink the pilot realized he had mistakenly selected wheels up "...but the undercarriage handle would not go back down".

The technical investigation uncovered no unserviceability of the undercarriage system, including the electrical ground safety device which prevents retraction when the oleos are compressed. At the precise moment the wheels-up selection was made, bouncing or an uneven runway surface could have permitted sufficient oleo extension to override the ground safety switch.

The post-landing check calls for flaps-UP only "when a landing has been completed..." Raising flaps during the landing roll when you're looking out for other, more important things is asking for trouble. The AOIs, for the most part, are written responses to known

hazards; they're excellent guides to avoiding the mistakes of others who have gone before.

Foot-dragging drivers...

...although ample warning is given on overdue equipment, some aircrew were still delaying inspection of their oxygen masks and parachutes...

– Flight Safety Committee

ARGUS, BOOM STRIKES BOOM The crane used to install the engine was still in position when the prop was ready to hang, so rather than get the prop crane (the crew were anxious to complete the job), the engine crane and its operator were pressed into service. Before lifting the prop, the experienced operator swung the crane under the MAD boom of an adjacent Argus; the impact necessitated the replacement of the boom.

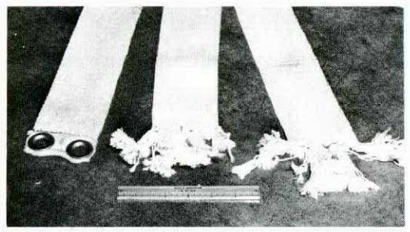
The circumstances leading up to this almost inevitable occurrence constitute a fair list of don'ts:

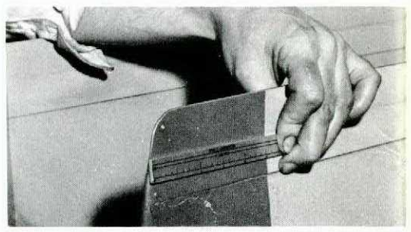
- the wrong-type rig for hoisting the prop was used
- the crane operator had been on duty over 11 hours
- the crew were anxious to complete the job
- the crane was moved in a crowded cramped area
- the several trades represented in the crew were not co-ordinated or controlled by a supervisor.

With conditions like that, seems like you just can't miss.

H21, BLADE TRACKING During power tracking (tip path alignment) of the forward rotor, a rotor blade snagged the webbing on the tracking pole, cracking the upper and lower skin. As the blades are matched sets, the damage necessitated replacing all three forward rotor blades.

The tracking "flag" (a ribbon of cloth stretched on a pole) had been rigged with 3-inch cotton webbing in lieu of the authorized – but unavailable – balloon cloth. This webbing had been used by other H21 units. (Later, the balloon cloth proved too light; it tore when stretched on the tracking pole.)





An electronic tracker available to CH113 units was recommended; however, similar blade tracking damage recently occurred on a CH113 using the unauthorized webbing on a tracking pole. The electronic tracker was not in use; it was continually unserviceable – a common problem with this device.

A strobe light and reflective material on the blade tips – already in use in the Canadian Forces – is a possible solution to this hazard. In the meantime – no webbing!

CH112, PRACTICE CRASH The accident followed six strenuous days of dawn-to-dusk flying to meet the commitments of a field exercise, living in tents, irregular meals, sleep disturbed by alerts, and early briefings.

The pilot, prior to positioning his helicopter for the night, followed the detachment commander's lead in deciding to practice "a couple" of autorotations. Not satisfied with a heel-first touchdown, the pilot attempted a second autorotation, changing his final heading approximately 15 degrees to compensate for an apparent drift noticed on his first approach. This heading change meant that as he looked up to level the helicopter for completion of the flare, the setting sun momentarily blinded him. He again hit on the rear of the skids, bounced and corrected with aft cyclic for an apparent dropping of the nose. The aircraft again hit the ground – this time very tail-low. The helicopter commenced an uncontrollable yaw to the right and finally returned to earth with left drift, having swung through 120 degrees.

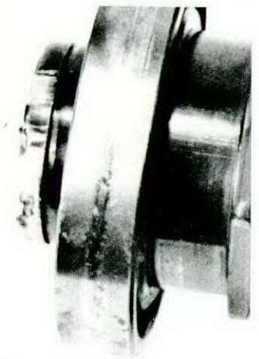
Unknown to the pilot, the tail rotor had struck the ground on the initial contact and broken off much of the blades. Applying aft cyclic after this impact to counteract the the nose-down pitching only aggravated matters.

The tail rotor driveshaft was sheared and considerable damage sustained by the tail boom, body and skid landing gear.

Considerable fatigue and no food for 11 hours would tend to lower pilot efficiency – particularly for a maneuver requiring high skill and judgement. The helicopter was being flown in a dangerous C of G condition, a fact known to the pilot although the effect was not fully appreciated. This turned out to be a poor place and a poor time for shooting autorotations – CFP 100

permits practice autorotative landings only on airfields or properly authorized areas. (The investigation of the accident was complicated by the removal of the aircraft before the Board arrived on the scene.)

Another observation was made: "There is no doubt that the aeromedical factors were enough to make the accident a probability from the minute the maneuver was begun..."



Unusual wear pattern on gear transfer box component.

CF104, ENGINE FAILURE In an earlier article "Night Rescue" we related the interesting circumstances surrounding a pilot's successful ejection into the bush near Cold Lake and his timely rescue. Now that the lengthy detailed analysis of the engine failure cause has been completed, it seems most probable that a transfer gearbox breakdown caused a total disruption of all aircraft systems dependent on the gearbox. This is a known problem with the J79 and pending a substantial increase in the quality and reliability of this component it will continue to be one of the areas to watch.

Watching for deficiencies brings to mind – SOAP (Spectrometric Oil Analysis Program). In the Air Division the SOAP has been a spectacular success and for obvious reasons (not the least of which was this *avoidable* occurrence), a SOAP project is now underway for Cold Lake.

SOAP is not as widely accepted as we would like; jeopardizing a pilot's life and losing a million-and-one-half dollar aircraft is a pretty high price to offset the economies achieved by not having SOAP more widely applied.

Birdstrikes: a new problem?

After flying through a flock of birds a Mosquito returned with its bullet-proof windscreen rendered opaque by cracks and a 2-inch hole through it. The nose below the Browning guns and the starboard spinner was bashed in, the starboard wing bomb fairing half carried away and the radiator duct badly damaged. *That was about 25 years ago!*

Comments

to the editor

The article "Sea and Survival" in the Mar/Apr issue bears credence to the fact that our CF104 water survival equipment is lacking in some automatic features. However, the article, because of its clear outline of Capt King's difficulties on water entry, bears testimony to the need for training on water life-support equipment early in the CF104 training program.

Capt King may have had much less trouble deploying his mae west if prior to flying he checked that the CO2 toggle flap was unfastened and that the toggle was not hidden by the parachute right leg-strap. Otherwise, the difficulty in locating the toggle under emergency situations in most cases precludes mae west deployment.

Capt King stated that once in the water he was pulled along on his back by the parachute and that when he released himself from the chute he began to sink at once. Unfortunately, he had not received previous training on parachute dragging for if he had assumed the drag position he would have attained enough flotation to allow himself to accomplish the actions he was unable to complete during the short parachute descent, ie, inflate mae west, deploy survival seat pack, release right-side clip and turn the parachute quick release box to the full clockwise or open position. The need for completing these actions was vividly demonstrated when Capt King struggled out of his parachute harness, without an inflated mae west, only to find himself still connected to the harness by the right-side clip and being pulled under by the weight of his equipment. As a result, the force exerted broke the dinghy lanyard causing him to lose his life raft.

There is no doubt that the proper deployment of our CF104 water survival equipment is complex. However, sea survival training can dispel most of the apprehension and confusion towards the use of this type of life support equipment. Without this experience the pilot's only

resort is to study a sequence of actions that must be taken on an over-water bailout and commit it to memory – leaving enough flexibility to cover as many situations as possible.

Capt G.E.S. Miller
AWU Survival School
Decimomannu, Sardinia

No matter how simple or complex our equipment is, if aircrew who use this equipment are not trained in its use, it will be of doubtful value when the "crunch" comes.

There's some progress underway:

- *A CF101 and CF104 modification which releases the side clip or airlock connection to the dinghy lanyard when the D-ring on the survival kit is pulled, was slated to go out from MATCOM in the first week of July. This removes one action from the post-ejection sequence. This modification also means that when the aircrew fly without a mae west, they must hook up the dinghy lanyard to their parachute strap. If they don't, when they pull the survival kit D-ring after ejection, they will lose all their survival gear.*
- *Testing of three or four types of automatic actuators for jet aircrew mae wests is underway; this item is getting top priority.*

"A Roar and a Yellow Flash" was read with much interest. It could easily have been entitled "Tell Me the Old, Old Story". Fires caused by so-called safety lamps have been and are far too common.

The photograph suggests that the screw may have become loose because of forces having been applied to the lead-in cord. One wonders if provision was made in the particular type of inspection light for clamping of the cord or alternatively whether room was available for the use of an underwriters' knot to prevent a force being applied to the terminals.

It is likely that the inspection lamp was originally assembled with "eyelet" type of terminals (or equivalent) making it impossible for the wire to pull loose, and had over the years become "modified" to the illustrated configuration. I suggest that an approved type of terminal end be used for all extension light cords with a small dab of "LOCTITE" or equivalent on the threads of the terminal screws. "LOCTITE" is used extensively on aircraft and is available from any automotive supply house. Who hasn't at some time during a tour of a hangar during their years of service, accidentally tripped over an extension cord and put a mechanical load on the terminals of the extension cord?

Yours, for fewer aircraft fires.

Capt D.I. Shade
MATCOM, Rockcliffe

Your comments are most helpful. How many of our lamps are dangerously wired?

Looking more deeply into this problem we uncovered an area that is cause for real concern. We ask: are vapour-proof lamps used when explosion-proof lamps are mandatory? If yes, does a man really know the difference? We suspect not. Even the present day catalogues don't help much, and to fill this gap we're presently cranking up an article with photographs outlining the seven types of lamps readily available to the Canadian Forces. In the meantime, lamp users should know the difference between the two species.

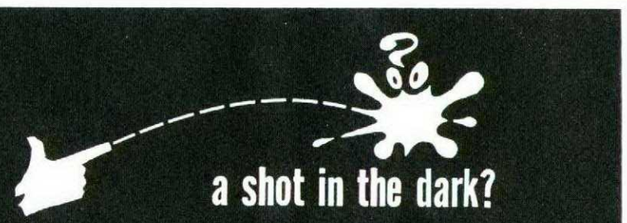
In "On the Dials", May-Jun issue, the statement "The Air Defence radars will detect any emergency or mode 377 selections as an emergency" is not fully correct. A recent modification was incorporated to greatly reduce false mode III emergency reports caused by overlapping SIF replies, spurious replies, and excessive noise.

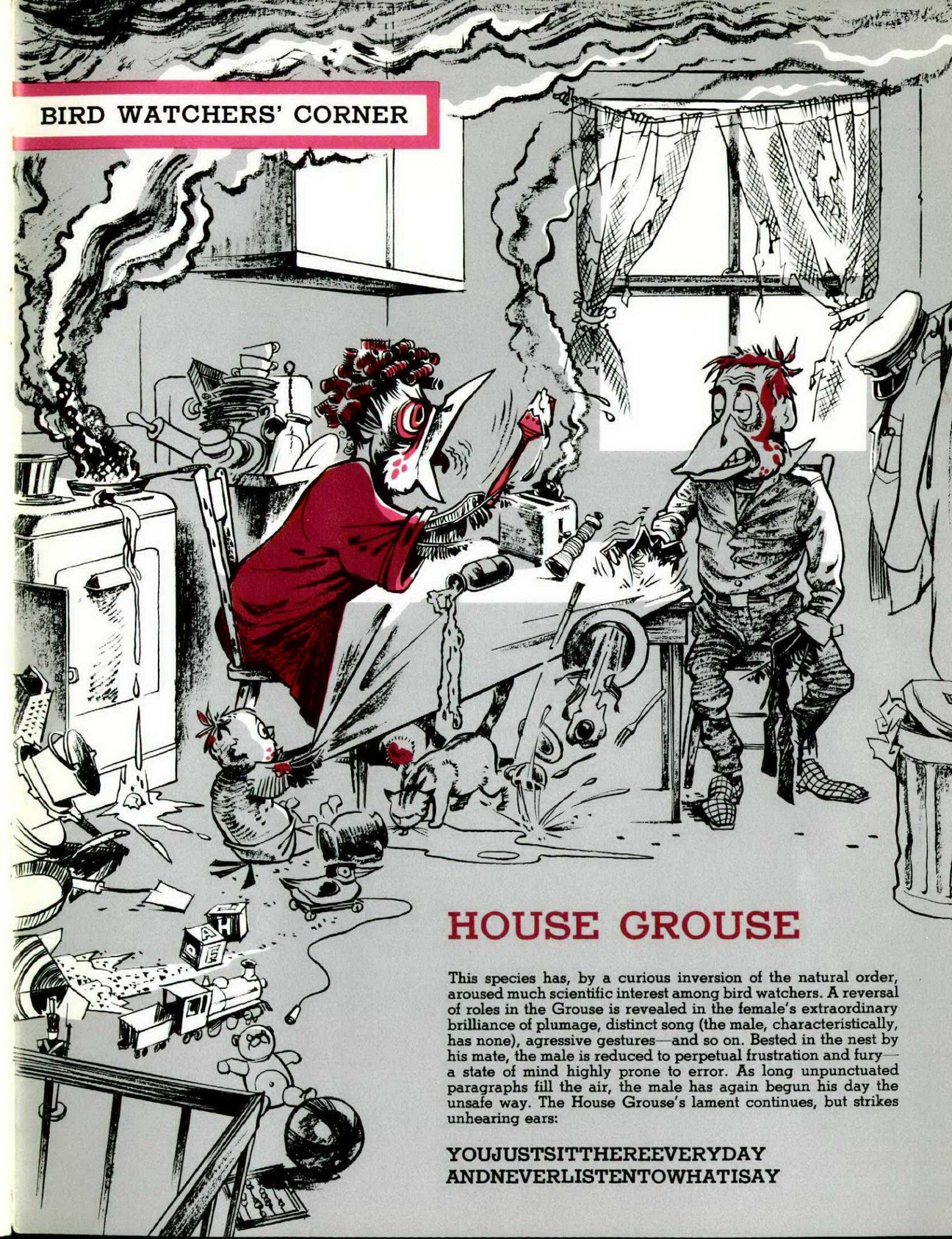
The only emergency condition that the SAGE equipment is capable of processing is the Range Coincident type or IFF Control Box-Emergency.

MWO T. Melnyk
42 Radar Sqn, CFB Cold Lake

The statement contained in the May-Jun issue on IFF/SIF SAGE radars on Emergency recognition is indeed not fully correct. ADC SAGE radars at one time could automatically detect a mode 3 code 77 (00) response as an emergency, but technical difficulties were encountered and in May 1967 the equipment was modified. SAGE ADC radars will now only recognize an IFF/SIF radar emergency signal from manual selection of EMERGENCY, or automatically on bailout, depending on the aircraft. Only on the DOT surveillance radars will selection of mode 3 code 77 (00) automatically indicate emergency.

In the manual sector (outside the SAGE system) the alarm is triggered directly at the radar site rather than having to be passed from the SAGE Direction Centre. Further, the SAGE system is designed to give priority to a mode II squawk over a mode III when both are transmitting simultaneously from an aircraft; however, the mode II should be selected OUT to ensure appearance of the mode III squawk at a SAGE centre. Similarly, whenever it becomes necessary to initiate an Emergency, or 377 squawk, switch off mode II.



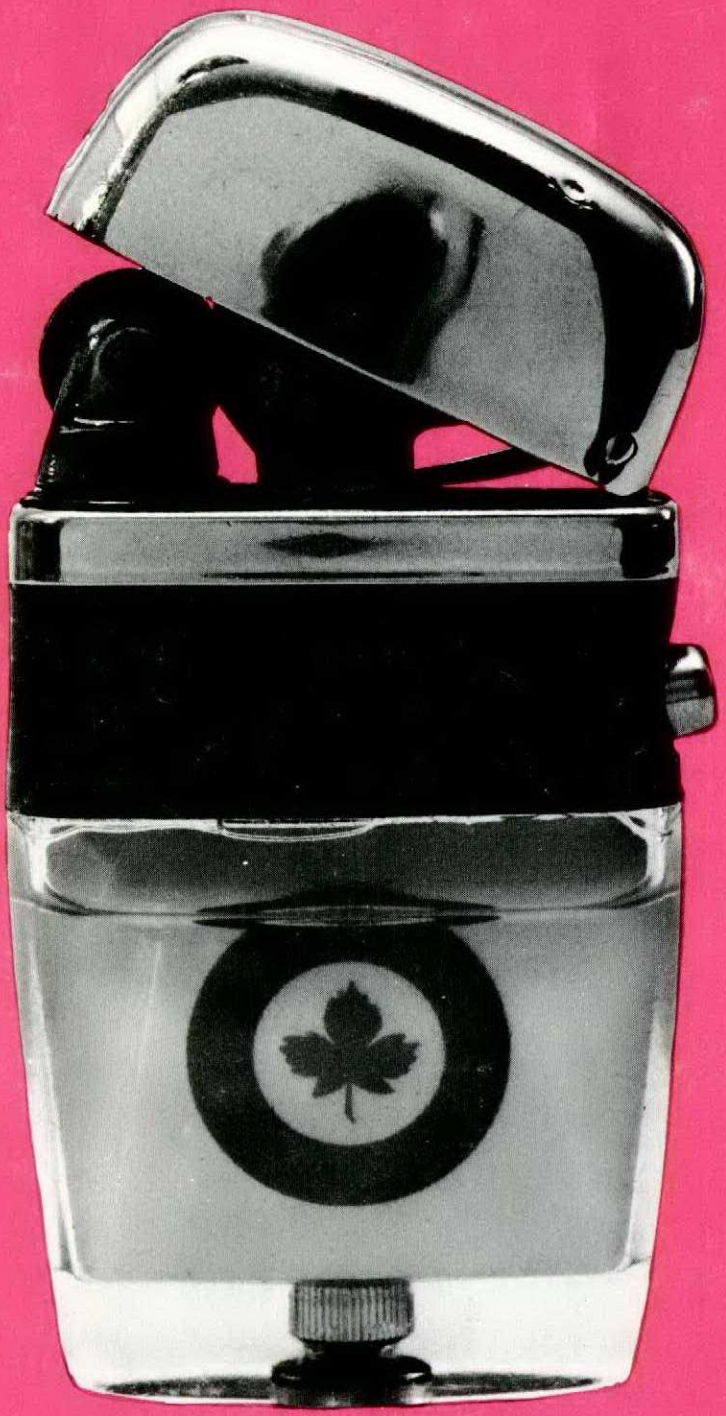


HOUSE GROUSE

This species has, by a curious inversion of the natural order, aroused much scientific interest among bird watchers. A reversal of roles in the Grouse is revealed in the female's extraordinary brilliance of plumage, distinct song (the male, characteristically, has none), agressive gestures—and so on. Bested in the nest by his mate, the male is reduced to perpetual frustration and fury—a state of mind highly prone to error. As long unpunctuated paragraphs fill the air, the male has again begun his day the unsafe way. The House Grouse's lament continues, but strikes unhearing ears:

YOUJUSTSITTHEREEVERYDAY
ANDNEVERLISTENTOWHATISAY

This see-through lighter carries raw fuel - it is dangerous in aircraft. Out-of-control torching has caused several in-flight fires.



LEAVE 'EM ON THE GROUND!