FLIGHT COMMENT

NOVEMBER • DECEMBER • 1965

Comments

■ There's a surprising dearth of information on the frost on aircraft phenomenon. A near-fanatical abhorrence is the refuge of most of us – and with good reason. The accidents shown with the Frost, Fact and Fantasy article are genuine and convincing. We did a deal of digging on the subject (in the summer heat), and we're printing the findings because we were surprised at what we found. It will, we hope, spark a discussion. By the way, as good a starting point as any, is this passage from EO 05-1-1 AOI Notes General, (the Pilots Notes of yesteryear) that venerable, and almost forgotten, volume of flying lore:

"Prior to takeoff, all aircraft surfaces must be cleared of any traces of snow, ice, rime, or hoarfrost".

The facts, such as they are, appear on page two.

■ "On the Dials", beginning in this issue, will be a regular feature of Flight Comment. Thanks to the OC and staff of the UICP School at Winnipeg, who'll be preparing the column, the experts can now keep us current on what's new, what's old but not too well known, and what's in need of improvement. Definitely, it's recommended reading.

■ In our next issue we'll have a look at the New Look in accident reporting – AFAO 21.56/01 will have ceased to exist, to be replaced by the new all-service CFP for investigating and reporting aircraft accidents. The new reporting procedures incorporate several changes based on our and other services experience. For example, the term "accident" is now similar to the definition used in the RAF, RAAF, USN, and other air forces. Too, they will eliminate the inconsistencies and anomolies which have caused much unproductive controversy in the past.

■ We said goodbye the other day to S/L WA Smith, our editor since January 1963. His stay at DFS was a hectic one: we moved to a new building, lost the Flight Comment artists to a newly-formed CFHQ Graphic Arts Section, and sustained a staff reduction with integration. During his term as editor he received the Sherman Fairchild International Air Safety Writing Award "for unusually excellent writing on air safety".

S/L Smith's new assignment, a term at Staff College, will ensure his continued association with words and ideas, and we heartily wish him every success.

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ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1965

THE NEED TO BE ALERT

We have all had a good smile at some time or other, (perhaps to the point of nausea), at the "Think Ahead" slogan designed to portray the individual who means well but isn't quite with it.

In DFS we have had also many a good cry at some unthinking pilots or technicians who have wracked up our aircraft, spoiled our statistical record, frightened the natives and turned the CO's hair gray. The true professional keeps himself honed to a fine edge. He knows his job and does it well, not 50 per cent of the time nor even 90 per cent of the time, but all the time. You have watched your favorite hockey hero on the ice – he might look relaxed but when the play is for him he's there – he stays alert, in the right place at the right time.

Don't get us wrong. We have our professionals. Many of them. There are a few outstanding examples in our "Good Show" section in every issue of this magazine and there are many many others who are quietly, confidently and alertly doing their assigned tasks. But there are also others; far too many! They are the ones who keep us in business. If you don't believe us come up and see us sometime – have a look through our files.

A cotter pin was missed from the rudder assembly on one of our super-bang aeroplanes – the nut backed off and the pilot found himself in a full hard port rudder condition and was obliged to vacate.

A cotter pin came off, or wasn't put on, the result – an incomplete throttle linkage of a tried and trusty T-Bird. The final outcome could have been much much worse but the lack of alertness was there.

A pilot of a T-Bird heard a harsh metallic sound as he approached close to Mother runway. Yes – he had forgotten to lower the undercarriage and not even the horn disturbed him. How unalert can you get!

The attitude is not confined to military personnel – a factory hand left a screwdriver in the innards of our new trainer. It wasn't found until after several ferry sorties – fortunately, before it could jam the controls!

If you pilots and groundcrew think we are picking on you how about this one for a change of pace. We have written it up and talked about it before. The setting was a heavy snowstorm and the runway half cleared with a ridge of snow over a foot high right down the middle. Unalert control staff let not one, not two but three aircraft land under those conditions. The third aircraft, a Voodoo, flipped over on its back, fortunately, because of the deep snow, without injury to its occupants. We Canadians must always stay alert to the hazards imposed by snow and ice.

To those who have read thus far and who when on the job are with it 100 per cent, there is no message here for you. But if you occasionally goof off in the thought that no one will notice, think about these words. You may feel that everyone has faults and we are expecting too much, but it just isn't so. There are many happy motorists who have driven multi-thousand miles without a self-caused accident because they are alert all the time. There are many supervisors and pilots who know their procedures and who really think ahead and can meet any emergency. There are also many technicians with a conscientious, "fail-safe" attitude who never misplace a tool or forget a cotter pin. If you made a program up for such professionals it would probably be called "Zero Defects" such as American aircraft companies and military forces take part in.

Be a professional – stay alert ALL the time.

GROUP CAPTAIN AB SEARLE
DIRECTOR OF FLIGHT SAFETY

For the Sake of Argument . . .

FROST

Fact and Fantasy

The investigators concluded that the aircraft took off with frost on the wings and crashed right after takeoff.

The two pilots had waited for the early morning fog to clear – impatience and the damp cold had been salved somewhat by that extra "cuppa instant" – then ops had called that flying could commence.

Even at a distance the T33 was obviously covered with a layer of frost on the canopy top, wings, and tailplane. Running a gloved hand over the wing, one pilot remarked: "What luck! This stuff'll never melt today – looks like we'll have to get it de-iced".

"No need for that – it'll be okay; look, it's only about 1/16" thick. Let's go!".

"Not with me you won't – I've heard that frost is deadly; something to do with the boundary layer, and your wings won't develop lift".

"Let's press on, this frost isn't THAT thick. . ."

"Just a minute – I remember at Air Div when we used to have frost-covered Sabres towed between two running-up 86s – was that a bind! – No, it's not smart to fool around with cruddy airplanes – let's get it cleared off."

Who was right? Actually, both arguments had some merit.

Yes, we used to run the F86s through the jet exhaust to melt the frost. It was some operation; those chaps on the wing suffered most, breathing that jet exhaust – at least the pilots could go on 100% oxygen. Whenever a discussion about frost arose in the crew room, it usually degenerated into a deadlock between the don't-mess-around school and the skeptics who felt it was all lip service to convention. We worried, too, about our operational capability being jeopardized by those European frosts.

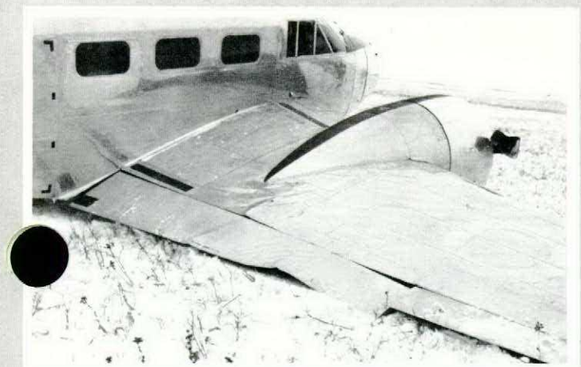
Frost on aircraft is common enough to have generated a lot of words but unfortunately little research has been done to support the extensive literature. One "report", for example, stresses in vague terms, the danger of frost on takeoff, yet cites no tests or proof – truly, lip service to convention. Since there is little available on which to draw conclusions, the temptation exists to generalize. For example, an aerodynamacist will admit to a statement such as "Any agent which interferes with the smooth flow about an airfoil tends to increase its stalling speed and decrease its lift properties". How's about a Dak wing, though? It has enough rivet heads to equal a good dose of frost! Little wonder there is confusion.

Frost affects an aircraft adversely in two ways; these two fortify each other in combination to reduce takeoff performance. Frost creates surface friction (drag) and so reduces the takeoff acceleration. At the same time, the stalling speed is raised and the co efficient of lift of the wings is lowered. You then a attempting takeoff with reduced acceleration and lift a less than intelligent thing to do. It is the amount of this reduction of efficiency which testing over the years has attempted to ascertain.

According to aerodynamic theory, the high performance, thin, swept wing should be less susceptible to frost interference. This runs contrary to what a layman would think since we've been told that the modern fighter must have a clean wing, even to the extent of being free of scratches and dents. You might even get a good argument going on this point – and make a bet on it since facts (as far as they go) support the theory.

Piston Low-Speed Aircraft No test programs on this subject have been made for some time. An XB25E (Mitchell) was used in some tests in 1945 at Cooking Lake near Edmonton. "The significance of the XB25E tests results to other aircraft is not entirely clear", is the disappointing conclusion drawn. From these trials however emerges distinct evidence of frost hazards. The table below will give some indicati of what we're talking about.

This chart points to the difference between the two frost types; frost needles and frost grains. What is most significant is that the needle structure is flimsy and readily blown off; the grain is solid and adheres to untreated surfaces. Usually, the needle grows from a frost-grained surface and therefore may hide this lower layer of ice.



"Takeoff run was normal and just as the aircraft left the ground I checked the speed between 70 and 75 kts . . . we were five feet off the ground when the aircraft yawed to the right. The aircraft . . . was very difficult to control. We hit a grade where the wheel broke off, the aircraft hit the ground again and started a ground loop . . . The aircraft wings had been covered with frost."

The aircraft had been left out overnight; some wet snow and light freezing rain had frozen to the aircraft. The three pilots on the flight stated they had "looked it over carefully" during their preflight inspection and had chipped most of the ice off. They were sure that the ice remaining would have negligible effect. The captain mentioned somewhat jokingly that he would add ten knots to the takeoff speed just to be sure.

AIR TEMP °F	TYPE OF FROST	TAKEOFF	
		DISTANCE	AIRSPEED
-1	NO FROST	1420	110 mph
14	FROST GRAINS	1549	122 mph
-18	FROST GRAINS	1578	125 mph
+7	¼" HEAVY FROST GRAINS	1962	NOT RECORDED

AIRCRAFT WEIGHT & POWER SETTINGS HELD CONSTANT

In 1952 an L19A (light, single-engine, all-metal Cessna) was artificially "frosted"; the leading edge of the wing back to about a quarter of its width was covered with gravel of assorted sizes from 1/64" to 1/16" by scattering this gravel randomly on sticky shellac. This extreme "frost" caused a 30% increase in takeoff speed and doubled the takeoff ground roll. Flap effects were not normal, and landing even at higher speeds was difficult because the aircraft showed no tendency to flare. In addition, the wings did not stall simultaneously. Frosting of this order more closely resembles perhaps the unevenness characteristic of light icing of the wing. This is obviously nothing to play around with – get it removed. The slow-speed aerofoil is then demonstrably susceptible to severe interference from frost.

High-Speed Jet As we mentioned earlier, theoreti lly, the high performance, thin, swept wing has less susceptibility to frost interference. During the winter of 1955-56, a program of flight testing frost-covered aircraft (in this case an F86D, an F86H, and a B47) produced an interesting substantiation of this. These aircraft were unmodified production models flown by test pilots. The conclusions of these elaborately-monitored flight tests were that frost up to 7.0 mm (9/32") thick made "no adverse effect" on aircraft performance and handling characteristics during takeoff and climb out. This table does not represent the entire series of flights but these observations are typical.

After takeoff, the frost was rapidly dissipating by 200 knots and totally gone by 300 knots.

Stay on the Safe Side The implications of the findings above are that for jets, frost isn't quite the monster it is generally thought to be. There is, however, the distinct danger of someone regarding an ice-fouled wing as frost – there is a difference. There is also the temptation to "press on" in away-from-home situations where aberrations of judgement are most common. The type of aircraft, local orders, operational requirements and the facilities for frost removal will all modify the pilot's judgement.

A/C	TYPE OF FROST	AVERAGE FROST THICKNESS (MM)	LIFT-OFF SPEED		TAKEOFF RUN-FT	
			HANDBOOK	ACTUAL	HANDBOOK	ACTUAL
F86H	GRAINS	2.0	128	130	1650	1750
F86H	GRAIN PATCHES & NEEDLES	7.0	130	134	1850	1960
F86D	G & N	4.0	123	123	2430	2650
F86D	G & N	2.5	120	115	2580	2335
F86D	G	3.0	130	135	2625	2650
B47	GRAIN PATCHES & NEEDLES	3.0	125	127	2800	2950
B47	GRAIN PATCHES & NEEDLES	4.0	138	138	4400	4650
B47	GRAIN PATCHES & NEEDLES	6.0	141	144	5050	5000

Clearly, there's a real dearth of knowledge on the aircraft frost phenomenon but scanty though it is there's sufficient evidence to dictate caution. Frost can put you behind the power curve, an area where, as all non-fool types know, "angels fear to tread". ■

GOOD SHOW

F/L MC RANDALL

F/L Randall at Station Chatham, NB, was assigned as chase pilot to a student on a low-level training mission. During the run-up prior to takeoff F/L Randall very alertly noticed what appeared to be fuel leaking from the mid section of the student's F86. F/L Randall advised the student to abort and return to the line. Oil was discovered to be leaking from the waste air manifold; further investigation uncovered a broken segment on a turbine shroud and a crack in the turbine wheel. F/L Randall's alertness undoubtedly prevented a major accident and possibly saved a pilot's life.

O/C ED LISTER

The high-level navigation solo in a Tutor nearly completed, the student, O/C ED Lister at 1 FTS, Gimli, was cleared to the TACAN for a letdown. At this point his engine flamed out. The first airstart attempt at 220 knots and 15% rpm was unsuccessful; O/C Lister declared an emergency. The second relight failed when the engine started to overtemp. Rather

than attempt another relight the student concentrated on the forced landing pattern and successfully completed a dead engine landing. A valuable aircraft was saved by O/C Lister's fine display of airmanship.

LAC LW MARTIN

The captain of a visiting T33 at Cold Lake complaining of a severe headache, requested a thorough check of the oxygen system. LAC Martin conducted a complete check but was unable to locate any unserviceability. With commendable persistence he extended his investigation to the pilot's personal oxygen equipment and discovered that a deteriorated accordian hose on the pilot's face mask was leaking. The captain reported no discomfort on his return flight.

LAC Martin's integrity in persisting in his investigation prevented a possible serious in-flight emergency.

SGT C PATAFIE and LAC DM CONLIN

During a special maintenance inspection and engine run-up on an Argus, LAC DM Conlin, AF Tech from Stn Greenwood detected an unusual noise in the tail section. He entered the tail heater compartment to investigate and found the unusual noises there were very pronounced. LAC Conlin immediately informed the crew captain, who judged that a thorough investigation was required prior to test flight.

The investigation revealed that the bolts holding the major brackets on which the horizontal stabilizer is attached to the airframe, were loose. This looseness was judged sufficient to produce vibrations in the rear fuselage area, and elsewhere, to account for the peculiar noise.

A "before next flight" special inspection was ordered on all unit aircraft and a priority message drafted. Sgt C Patafie, a highly-experienced AF Tech suggested that the bolts holding the lower fittings onto the horizontal stabilizer also be checked. This was approved and the message dispatched.

While carrying out this special inspection on an Argus at Key West, Florida, (see Desborough-Millie Good Show) a crack was located in the lower female fitting of the horizontal stabilizer. Subsequently, a total of eight aircraft were found similarly affected. Due to the professional ability and integrity displayed by LAC Conlin, a potentially very serious defect was discovered. Further, the suggestion put forth by Sgt Patafie that the defective fittings be located and replaced was also an exemplary display of technical ability and insight.

LAC DA MILLIE and CPL RJ DESBOROUGH

During a recent detached operations at Key West, Florida, an AF Tech servicing team composed of Cpl RJ Desborough and LAC DA Millie from Stn Summerside, displayed a high order of technical knowledge and a personal standard of judgement and workmanship which is worthy of special commendation.

Before servicing was fully completed on their Argus, a message was received which grounded the aircraft for non-scheduled torque checks to be performed on bolts in the tail structure. Dusk fell and night flying commenced before their inspection was completed. The following morning at first light the inspection was continued.

The noise of other aircraft hampered their communication, and poor lighting contributed to create substandard working conditions. Nevertheless, LAC Millie found a scarcely perceptible crack in the starboard horizontal stabilizer forward spar reinforcing channel; Cpl Desborough confirmed this by a dye check. Checking for cracks was not part of the special inspection; the fine line of the crack looked similar to a marking line and could not be reached with the fingers to help confirm its presence. Less alert airmen could easily have missed the crack or dismissed the crack as a marking line and not confirmed their suspicions with a dye check. Later, eight other Argus aircraft were discovered to have similar cracks.

LAC Millie and Cpl Desborough are to be commended for their sound judgement, alertness, technical knowledge and exemplary personal standards of workmanship.

CPL RJ DESBOROUGH

LAC DA MILLIE

GOOD SHOW

F/L WC HASKER
F/L D LAMBETH
LAC AE CASSIN
LAC KL MARTIN

Transport operations, by definition, are rather routine; there was no reason to suspect this flight would be otherwise as crew and passengers, including Air Marshal CR Slemon, boarded Cosmo 162 at Malton airport. One hour later this aircraft was nose down in a ditch after a mid-air engine explosion and a hair-raising escape from crashing into a deep ravine and almost certain disaster. A fine display of airmanship and teamwork averted injury and saved an aircraft; it was a Good Show all round.

Over Wiarton at 20,000 feet the chain of events began with the port engine showing a 40-pound torque loss. Except for this indication, all seemed normal on the other gauges when "about 45 seconds later, a loud explosion from the port engine accompanied a yaw to the left and rapid decompression of the cabin". The first thing to do was descend; quickly the oxygen equipment was opened and in use. During the descent the engine was feathered. Next, the fire warning light came on, and although no visual evidence of fire was reported, the captain, taking no chances, operated the engine fire extinguisher. The warning light went out.

As the initial immediate flurry of activity subsided, ample evidence came to light on what had happened. There were holes in the fuselage and in the engine nacelle indicating catastrophic failure of the turbine engine. Large sections of the engine cowling had been torn like fabric. One of the engine mount struts was severed, as were hydraulic and air lines. Unknown to the crew, these systems were to remain pressurized only until components were activated; for example, the undercarriage was extended during the descent but could not be raised. Similarly, the emergency flap extension and air pressure for braking failed at critical times. The return to Toronto was a hectic one. The VHF had become inoperable, several of the integrated flight system failure warning flags were showing, indicating an electrical system failure. Then, the fire warning light came on again; there being still no evidence of fire, the reserve fire extinguisher was conserved.

To increase the rate of descent the undercarriage was lowered and consistent with the fortunes of the day, the crew got an unsafe indication. This ruled out Wiarton as a nearby diversion because of its lack of crash equipment. Fortunately, VFR conditions prevailed on the return to Malton. Later, radio contact with Toronto was regained and the fire warning light had gone out. Approaching Malton the captain elected to use the active runway for a favourable wind although a longer out-

F/L WC HASKER LAC KL MARTIN
LAC AE CASSIN F/L D LAMBETH

of-wind runway was available. The danger was judged to be too great for a crosswind landing with no hydraulic pressure. F/L Lambeth flew a smooth and accurate flapless approach - the emergency lowering of the flaps had failed. Pneumatic emergency braking was thought to be available; F/L Lambeth recalled the irony of his remark "Thank God we still have the air". As the emergency air was introduced into the system it escaped through a severed line and was lost. Assymetric propeller braking was not available without hazarding directional control. Circumstances had become critical. The Cosmo showed no indication of slowing on the runway with its downhill gradient. Collision with a radio antenna site had appeared possible if directional control was lost, but as the aircraft continued past this obstruction it became obvious that maintaining the aircraft on the runway would mean running at high speed into a deep ravine at the end of the runway.

A quick decision had to be made. Using propeller braking the aircraft was deliberately run off the runway about 900 feet from the end. The Cosmo continued in an arc across the parallel taxi strip, ending up in a drainage ditch 150 feet further on. The aircraft came to a jarring halt which broke off the nosewheel; fortunately no one was injured.

During the entire emergency the crew acted with professional competence, later receiving a personal commendation from the Air Officer Commanding, Training Command, Air Vice Marshal CH Greenway. Flight Comment wishes to add its enthusiastic endorsement to the fine job of handling a major emergency in a most commendable manner.

PITOT COVER HAZARD

During the pre-flight walk-around on a CF101, a thread of canvas material from the pitot cover was found lodged in the pitot orifice. Had the thread been further into the tube it would not have been visible on pre-flight.

It is suggested that the inner seams be sewn prior to the final seams being sewn closed, to prevent the material from fraying.

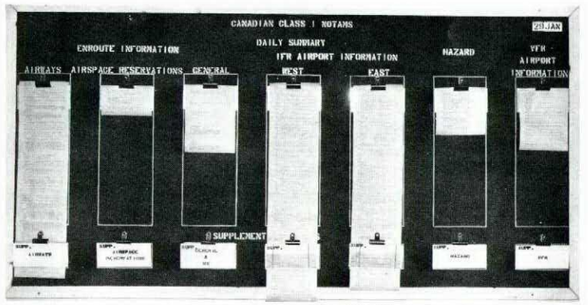
F/L KA McLeod
409 Sqn Comox

Safety devices creating hazards are painfully ironic - in this case, the commonplace canvas pitot cover. Many of these covers - vital in their function - are manufactured on the station, an interesting exception to the normal rule of issuing from stocks.

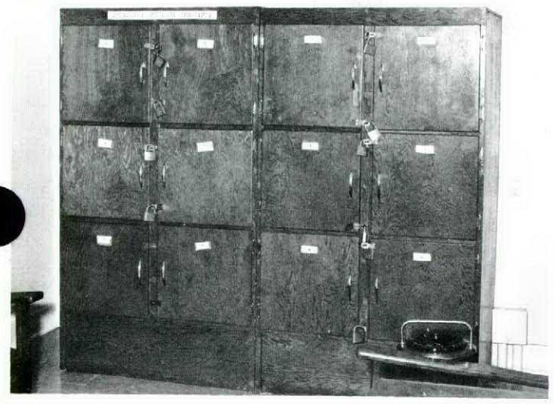
Thanks to this alert pilot this item has, at Comox at least, been redesigned so that the frayable edges are folded outside.

Station Chatham

Typical of the laudable trend to higher standards of transient flight services at Canadian Forces airports is Chatham's flight planning centre. Housed in a small, but well-located economy-type building the section's modest resources have been intelligently and thoughtfully employed. The lockers for visiting aircrew, for example, are a feature which has been provided for convenience "above and beyond" the basic facilities. The meteorology section is housed in the same building as is the servicing office, making Chatham's servicing – flight planning – met briefing complex the ideal environment for visiting aircrew. The frustrating run-around of yesteryear is becoming (but unfortunately not completely) just another memory of the "good old days".



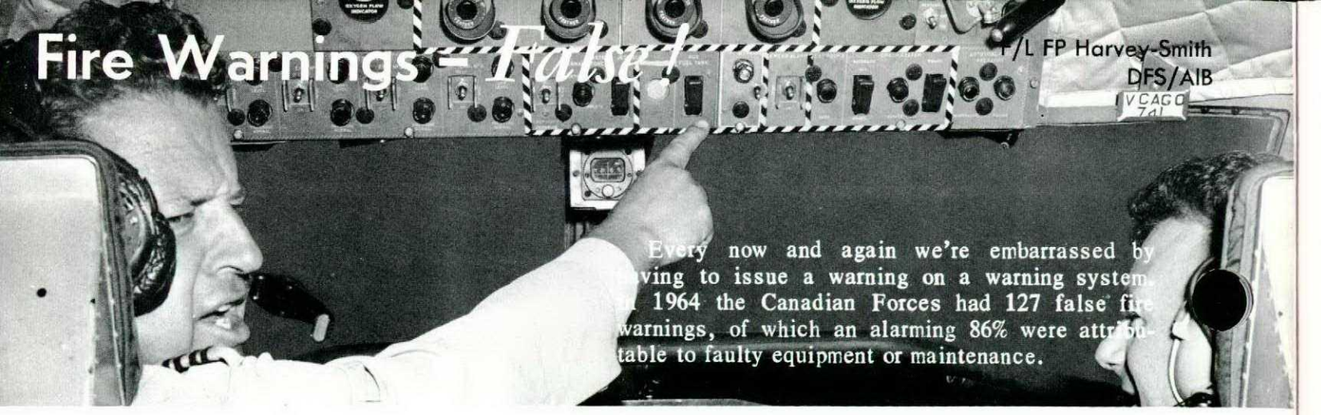
The NOTAM board—neat and simple



A convenient repository for aircrew gear

The flight plan office

Fire Warnings – *False!*



F/L FP Harvey-Smith
DFS/AIB

Every now and again we're embarrassed by having to issue a warning on a warning system. In 1964 the Canadian Forces had 127 false fire warnings, of which an alarming 86% were attributable to faulty equipment or maintenance.

Recent articles in aviation magazines attest to the continuing problem of false fire warnings. In an article on this subject in the USAF Aerospace Maintenance Safety, the flight safety implications of false fire warnings were aptly stated:

"Every failure of a warning system is a threat to safety. Repeated false alarms undermine the crew's confidence in the detector system. A false warning during takeoff precipitates split-second decisions by the crew; to abort or to go around with the possibility of a fire enroute, and then attempt an overweight landing. False warnings in flight permit more time for decisions, but they may also lead to actions that would not have been taken, had the true situation been known: discharging fire extinguishers that might be needed later, or making an unscheduled landing".

Our problem is well illustrated by recent investigations of Argus fire warning system components by DFS, Materiel Command and the system manufacturers. These investigations pinpointed the problem areas – materiel and maintenance:

- Some sensing elements, (at least one of which was nearly new) were found to have low resistance. The manufacturers, acting on the findings, will correct the flaws in manufacture.
- Most of the chafed elements inspected would not have caused a false warning; an element must be virtually chafed through the outer casing to cause a significant reduction in resistance.

Chafing—Design or Damage? Most of the false fire warnings have occurred in the Power Recovery Turbine (PRT) area where the elements were found to be chafing against PRT hoods. Many of the malfunctions were rectified simply by replacing and repositioning the chafed element. Most of the elements removed as suspect were serviceable when subjected to testing. The chafing itself was therefore eliminated as a major cause of false indication. What emerges from simple logic, then, is that the sensing units were being positioned too close to the PRT resulting is actual overheating of the elements.

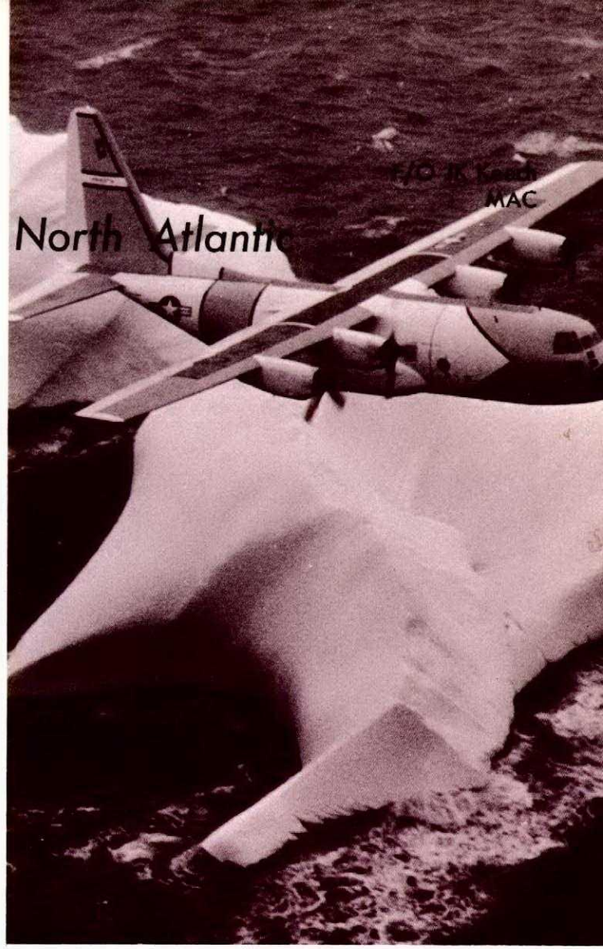
Chafing should be substantially reduced by the timely replacing of worn clamps, and an improved clamping method. This should prevent the detector elements from creeping to a position close enough to the PRT hood so that heat radiation or leakage would activate the alarm. Of course, this doesn't ensure proper location of the elements by technicians, or the components being dislodged or bent by others working in these areas.

Shorting Another problem area is shorting in the cannon plug connectors. The causes of failure here are bent pins, dirt, moisture, and loose connectors. For the most part, false fire warnings due to these conditions can be attributed directly to insufficient care.

The problem has been around long enough for one painful truth to emerge: this system is difficult to maintain due to its sensitivity and susceptibility to damage. Failures in the warning system on the Argus can be substantially reduced with improved clamping of the element, and better and more frequent inspections. Considerable improvement has already been achieved primarily due to initiative at the unit level. However, in this electrical system malfunction or failure is usually caused by less than top-notch maintenance; we must therefore rely on the integrity of those who service the aircraft. To this end, a continuous education program is required to ensure close inspection, adequate maintenance, and an appreciation by all technicians of the care required to prevent damaging or dislocating sensing elements.

"It's a breakthrough in aviation electronics—this invention will warn the pilot if the fire warning is real or false." (Don't laugh—it's already under study!)

SAR *Search and Rescue in the North Atlantic*



F/O R. [illegible]
MAC

"Halifax RCC, this is Gander Centre with an alert on a C54.

Roger, Gander, this is Halifax RCC, go ahead.

RCC from Gander, US Marine Corps C54, Marine 90411, Lages to Argentia, position at 2314 GMT was 4510N 4310W, TAS 175, estimating Argentia 0250 GMT maintaining 6000 feet, 26 persons on board. Marine 90411 reports an engine on fire and requests escort.

Gander from RCC, Roger, will arrange escort, keep us advised of any further messages. . ."

This alert message was passed by Gander Air Traffic Control Centre (ATCC) to the Halifax Rescue Co-ordination Centre (RCC) at 2325 GMT 1 May 1965. A United States Coast Guard (USCG) C130 was quickly dispatched from Argentia. In the meantime, Marine 90411 was able to extinguish the fire, feather the troubled engine, and continue on three engines. At 0105 GMT the C130 intercepted the C54, and escorted it to a safe landing at Argentia.

Another case closed successfully. This one was no great problem; however, there could have been problems – there could have been a loss of 26 lives!

Each day across the North Atlantic there are more than 100 commercial flights plus many other civil and military aircraft, and although modern aircraft are very reliable, the men in the search and rescue units know that emergencies will occur. As the cold rough waters of the North Atlantic do not constitute an inviting landing platform it's plain common sense for aircrew and passengers to know their over-water emergency procedures. The aircrews must be familiar with the full spectrum of aid which is at their call.

We'll briefly outline the North Atlantic Search and Rescue Organization and indicate how aircrew can make optimum use of the internationally available Search and Rescue facilities.

The SAR Organization

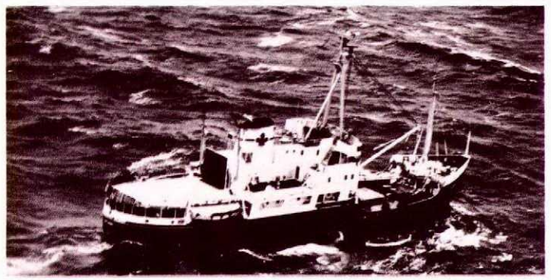
The Search and Rescue (SAR) areas of coverage on the North Atlantic are generally co-incident with the Oceanic Control Areas. The Royal Air Force has SAR responsibility in the Shanwick Control area, the USCG in the New York Oceanic area, and the RCAF in the Gander Oceanic area. Each SAR organization is similar to the others and all work closely together on an international basis. The RCAF organization is therefore quite typical.

Search and rescue in the Canadian area is co-ordinated from the Halifax RCC. The role of the RCC is to initiate, co-ordinate and terminate all search and rescue incidents.

SAR Communications

Obviously, a rapid and reliable communications system is essential to initiate, co-ordinate, and control search and rescue operations. Normally, the Gander, Goose or New York ATCCs initiate alerts, using either direct hotline to RCC from Gander or Goose Bay, or from New York via Comeastarea (USCG RCC New York). These alerts are responses to either aircraft messages (or lack of messages), from aeronautical ground stations, or Ocean Station Vessels (OSVs). Aircraft messages passed to OSVs are also passed to Halifax RCC via USCG networks.

The Canadian Coast Guard cutter "Relay", which performs search and rescue duty in the Great Lakes in summer and on the East Coast in winter. The cutters "Rapid" and "Rally" are permanently assigned to duty on the East Coast.



The Canadian Coast Guard icebreaker "Sir Humphrey Gilbert" rescuing sailors from the ill-fated French vessel, "Douala", which sank in the Atlantic off Nova Scotia during a fierce winter storm.

To aid in co-ordination, Halifax RCC has hotline telephone connections with Comeastarea, USCG District One at Boston, and interconnected to SAR and other agencies along the US coast. Halifax RCC is able to contact all RCAF RCCs and the Joint RCC at Keflavik on the NORAD telephone system. Similarly, through service teletype and commercial telex, Halifax RCC is able to contact all RCAF RCCs, USCG RCCs, the Joint RCC Keflavik, and British RCCs.

To aid in control and dispatch of search vehicles during an SAR incident, Halifax RCC has access to all Canadian Military air and sea forces through the Maritime Headquarters (MHQ) communication network. The RCC can contact USCG Argentia via a hotline through MHQ, and also has hotlines to both Summerside and Greenwood. The 54 Air Recovery Sqn at Goose Bay may be contacted through the NORAD telephone system. Here again, these and other required agencies may also be contacted through commercial or service channels.

SAR Facilities

Search and rescue capability is of two types:

- overland and short-range missions within about 250 miles of the coast,
- long-range oceanic missions.

The short-range group, for example, employ Albatrosses and the Labrador helicopters based at 103 Rescue Unit, Greenwood. Supplementing this aerial capability, the Canadian Coast Guard operates many vessels in coastal waters including rescue cutters, icebreakers, and buoy servicing vessels. Our main interest here is in the longer range or oceanic SAR facilities.

Normally, our long-range Maritime Patrol aircraft are used to meet Oceanic SAR requirements. The aircraft used is the Argus, a four-engine landplane with endurance in excess of 20 hours, a cruise speed of about 180 knots, and a wide variety of radio and radar equipment including VHF, UHF and transponders, homing devices, including SARAH search capability. There is usually an Argus on patrol in or near the Gander Oceanic FIR, and one or more are always maintained on a short notice standby.

The Argus carries the droppable MA-1 Sea Rescue Kit, consisting of two 20-man dinghies and three supply containers. The crews are briefed on SAR procedures, and carry the USCG publication "Aircraft Emergency Procedures Over Water".

Other long-range aircraft are maintained on alert status for SAR requirements in the Gander Oceanic FIR area:

- C130, operated by the USCG at Argentia, Newfoundland,
- C54, operated by the USAF 54 Air Recovery Squadron, Goose Bay Labrador.

Assistance for SAR

SAR aircraft dispatched or diverted to provide esc will attempt to establish communications on VHF/UH emergency channels and may use VHF/UHF homing, radar and visual aids (flares) as well as basic navigation to effect an intercept. After intercept the escort aircraft can assist by providing navigation services, communications, radar weather surveillance, visual inspection of the exterior of the distress aircraft and if required, ditching assistance including flare illumination. If a ditching actually occurs the escort aircraft can drop sea survival gear and co-ordinate on-scene rescue operations.

The surface environment in the Gander Oceanic is covered in a variety of ways. However, primary SAR dependence must be placed on the ocean station vessels of which two, "Bravo" and "Charlie", are stationed in the Gander Oceanic Area. These vessels can provide excellent assistance to aircraft in potential or actual distress. Their capabilities and services are not well known but are outlined in GPH 205. Although other surface vessels do not provide the extensive assistance available from an OSV, at least they may be in a positi to provide a ready rescue once a ditching has be accomplished.

Both Canadian government and naval vessels are available for SAR duty; very often one or more of these ships operate in the Gander Oceanic area. The larger Canadian government ships normally operate in coastal waters but are suitable for dispatch on Oceanic SAR missions.

Once the RCC is aware of an over-water distress, it can take positive action in two ways. First, the RCC can initiate a marine broadcast. This broadcast may be prefixed by an auto-alarm signal (not all vessels maintain a 24-hour radio watch). This broadcast will alert all vessels along the proposed track of the distress aircraft to maintain radio, radar and visual watch.

The second method is by the Automated Merchant ssel Report (AMVER) system which furnishes RCCs with important information on the location and capabilities of those merchant ships who may be able to render emergency assistance. The AMVER system consists of a network of radio stations, RCCs, an electronic computor at the AMVER Centre, New York, and participating merchant ships. When an emergency occurs in an offshore area, the controlling RCC requests a Surface Picture (SURPIC) from the AMVER Centre. In about two minutes the computor prepares a SURPIC which lists the appropriate vessels on plot in the specified area, their predicted positions, and their rescue capabilities.

Distressed Pilot's Actions

The SAR Organization is *almost* ready to perform its appointed task but it needs one more member – the pilot of the distress aircraft. From the moment the distress is announced, the pilot can guide and assist the SAR organization in its efforts. If he cannot (or does not) announce his predicament at the earliest possible moment – his chance of survival may be greatly reduced.

It is imperative that the pilot of the aircraft in distress start the distress procedures when doubt exists as to the safety of his aircraft.

An elaborate and effective system is ready to help – know your procedures to ensure its continued success.

F/O John Keech, a native of New Liskeard, Ontario, has served, since graduating as a navigator in 1959, with Search and Rescue operations. From 1960 to 1963 F/O Keech flew with 107 Rescue Unit, Torbay, Newfoundland, and is presently Duty RCC Controller, Halifax Rescue Co-ordination Centre.

"Flash-Back"

"We'll put it in the minors – we're short one aircraft for the morning operations."

A winter Wonderland

Popular notion would have us believe that winter accidents rates are the highest, but our records of the past two years show a reduction of 15% to 20%! Why? The effect of winter on people is obviously psychological; we're more aware of winter hazards and so stay alert for them. In the summer, apparently we are less alert . . . and so on . . . the speculation continues. Anyway, to get you in the mood and alert you to winter, here's a pageful of cold-weather calamities - browse a while, and later - BEWARE.

YUKON – *Ailerons jammed in neutral position – temperature 31 F. Runway was wet and conditions ideal for ice formation; also, the aircraft had been parked outside in precipitation, prior to flight.*

YUKON – On climbout a loud bang was heard and a shock felt throughout the aircraft. Forward end sections of aft water tank blew out and the bladder burst – possibly pressure relief valve and pressure switch plugged with ice.

CF101 – Severe winter weather in below-zero conditions, engine run-up in unsuitable confined area; (regular run-up area snowed-in). No snow removal available; the run-up area was low priority. Thrust of engine overcame braking force on slippery surface causing aircraft to swerve into another.

ARGUS – During six hours the aircraft had 11 landings on snow- and ice-covered taxiways and runways. The uplock mechanism of the port undercarriage door was damaged by ice and slush build-up on the bogie door uplock bracket and over-extension of the lever assembly resulted.

EXPEDITOR – While being towed into parking area, aircraft struck a snow bank damaging the rudder. The mule had skidded on slippery surface and the NCO in charge had not provided an airman for lookout.

YUKON – *The aircraft, scheduled for early morning flight, was left out overnight in a snowstorm. The snow was being removed by man in Giraffe basket when the vehicle skidded. The basket hit starboard aileron tab assembly damaging the trailing edge*

CHIPMUNK – Heavy snowfall, blizzard conditions, operators working long hours. Snow blower was clearing frozen snow near hangar, operator accidentally elevated hood when intending to move it horizontally. Chunks of ice and snow smashed windows and the flying glass damaged port elevator of aircraft.

CH113 – On a rescue operation wheels sank through snow and rotors contacted a tree. Visibility at hover was cut to a few feet in blowing snow.

ARGUS – Aircraft being towed on a dark snowy night on icy snow-covered surface. Driver turned at too high a speed for conditions; the aircraft and vehicle jack-knifed, fracturing nose steering actuator lug. Snow falling on dark night obscured vision.

CF104 – Low-level nav mission – about seven minutes after takeoff, the pilot, flying through turbulent snow squalls flew into the ground. Visibility was reported at less than ½ mile. Possibility that while expecting to become visual at any moment, he was flying partly visual and partly on instruments.

T33 – Several aircraft parked side by side on slippery ramp. One pilot had difficulty releasing the parking brakes; when brake did release the aircraft swung to the left, damaging two other aircraft.

NEPTUNE – Aircraft being towed inside a hangar hit an improperly parked D12. Snowing heavily with wind at 40 mph; driver's vision had not recovered from driving in bright snow outside; also, his parka hood was still on. The lookout man on port wing tip did not see D12 because freight in the way of his line of vision.

NORTH STAR – A forklift skidded on a patch of ice and snow damaging port stabilizer de-icer boot.

T33 – Pilot requested clearance to land on a 9800' runway. Weather – 1200 broken with freezing drizzle – (220 gallons of fuel). Pilot advised snowplows would be finished clearing the runway "in a few minutes". Pilot, refusing to wait, selected another runway (6000'). In trying to touch down as close to the button as possible, undershot, landed 200' short, rolled through 12" snow and skidded to starboard. Web fractured at port main undercarriage forward attachment point; both outboard landing gear doors damaged.

YUKON – The co-pilot's and nav's airspeed indicator became unserviceable during flight. Moisture trapped in pitot line froze, cutting off pitot pressure.

EXPEDITOR – *Tail section went off edge of ramp and struck a pile of snow-covered gravel. The area had not been properly levelled following repair of ramp taxi lights. Supervisor had not properly inspected area to ensure an acceptable condition. The marshaller also failed to see that there was adequate clearance.*

SABRE – *After aircraft was shut down and chocked, it rolled into an oxygen cart. Heavy wet snow and insufficient chocking permitted the Sabre to move on the slippery, sloping surface.*

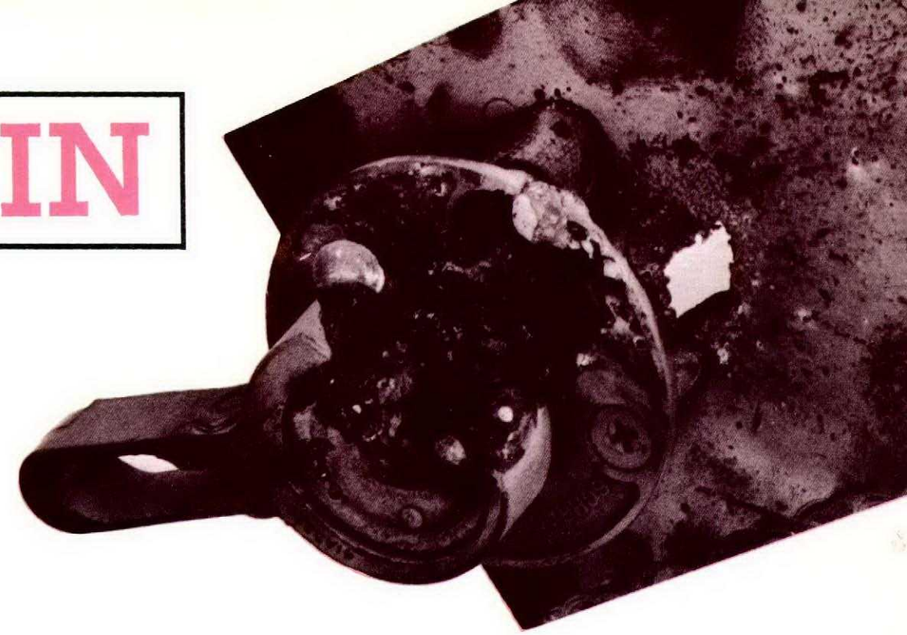
CESSNA – VFR flight in heavy snow showers, while trying to maintain visual contact with the ground, the pilot flew into trees and crashed.

T33 – During deteriorating weather strong winds and snow removal made it necessary to get all aircraft under cover, resulting in a crowded hangar. Result – as T33 being towed in, the port tip tank was punctured by hangar door locking device. Common accident in high density hangar parking in winter.

T33 – Undercarriage indicated down unsafe; warning lights on, horn blowing, visual confirmation indicated gear down. Probably a microswitch malfunction when exposed to snow, ice, and sand on runway.

T33 – Normal training mission – CFI had symptoms of hypoxia. Inspection showed large amounts of water in pilot's mask – probably due to water in the mask freezing.

OXYGEN AGAIN

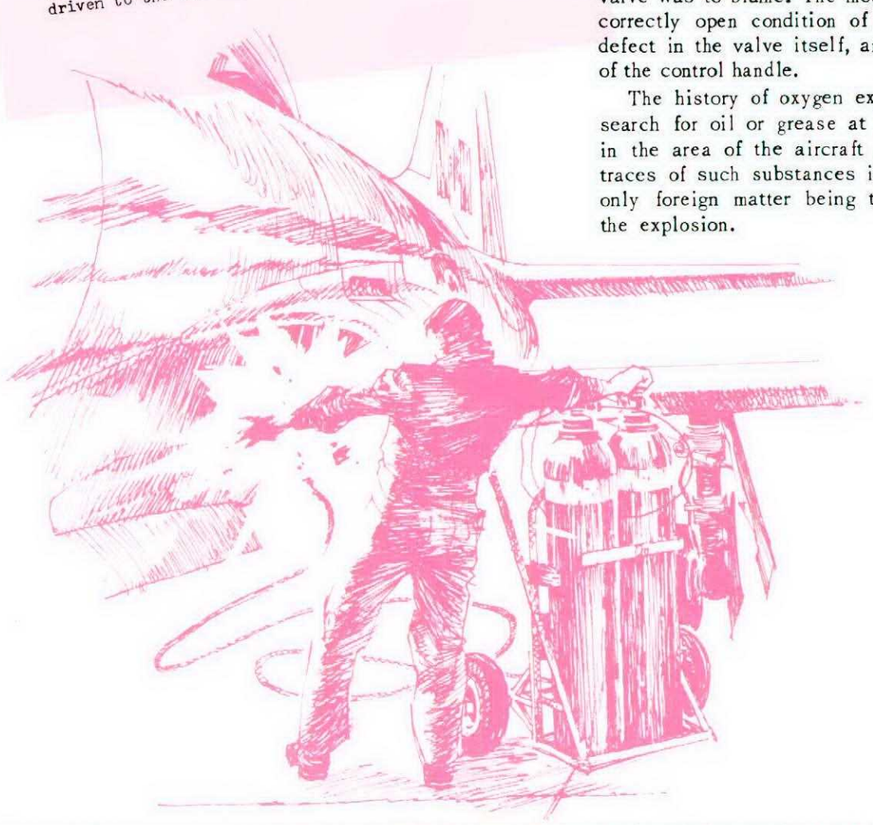


Statement by SE Tech 3

On Wednesday morning at 0730 hrs I was getting set for BFIs and PIs. Before I proceeded I checked the oxygen cart for serviceability at the oxygen corner inside the hangar. I opened one of the bottles and found that both gauges worked, and that I had about 1300 psi which was enough for all the aircraft I had to do. I then closed the bottle and emptied the oxygen from the gauges and the lines. I checked the nozzle and oxygen hose for serviceability. I then left the hangar with the cart...

I then proceeded to a T33... I always park the oxygen cart about two feet away from the filler valve. Before I did anything else I checked the oxygen pressure in the aircraft, which was about 275 psi... I then climbed down and opened the hatch to the filler valve, and removed the duct plug which covers the hole in the filler valve. I then put the oxygen nozzle into the filler valve. The nozzle was not seating properly (a little looser than normal)... there was a slight leakage of oxygen at the moment I plugged in the nozzle. I shook the nozzle to ensure it was locked in, and being careful I held the oxygen nozzle with my left hand as I did not want the nozzle to unseat itself when I opened the oxygen bottle... I opened the nozzle valve with my right hand.

While holding the nozzle... I opened the left hand bottle on the cart and noticed with a glance that both gauges were working and building up pressure; also, at the same time a ball of flame came out of the filler valve. This burned my hand... as I let go of the nozzle I shut off the oxygen bottle on the cart, and pulled the cart away from the aircraft. While I was pulling the cart away I saw the dust tab fall to the ground and saw some smoke come out of the filler valve, and some on the ground near the nozzle. I ran for help to Line Servicing, telling them that the T33 was burning near the oxygen filler valve. I was driven to the station hospital.



A safety equipment technician, an experienced man, tells the story in his statement. It describes a job he had done hundreds of times before and seemingly contains no irregularities in either handling or equipment – at least it appeared that way at first. But a burst of flame and molten metal badly burned his arm, came close to injuring his eyes, and could have spread causing a serious fire.

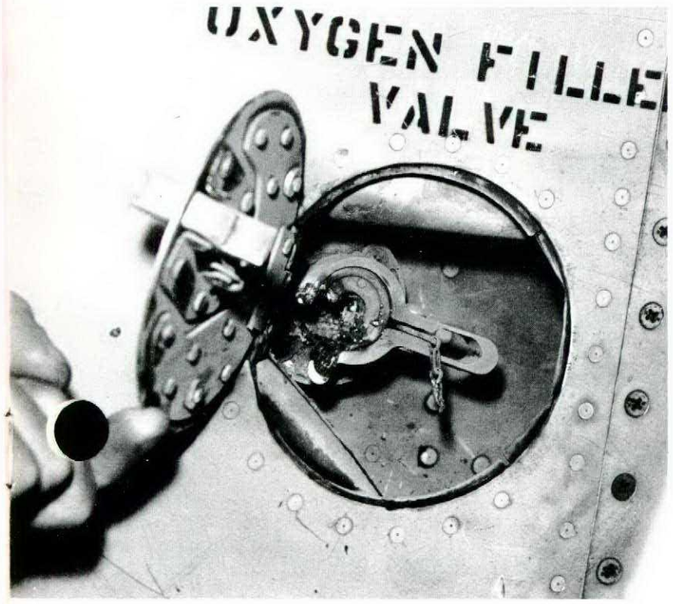
What had caused the explosion? The unit concerned conducted its investigation in two areas; one to establish the source of the oxygen and the other to discover what material had united with the oxygen. Tests showed that the reduction valve on the oxygen cart would not always close properly despite full movement of the control handle. The only abnormalities in the valve were a slight deposit on the pin valve stem where the rubber seal and the valve housing met, and considerable play around the ball at the oxygen inlet point. It was concluded that the oxygen in the explosion came from the cart, not the aircraft, and that the leaking reduction valve was to blame. The most probable cause of the incorrectly open condition of the reduction valve was a defect in the valve itself, and not an incorrect position of the control handle.

The history of oxygen explosions naturally led to a search for oil or grease at or near the oxygen cart or in the area of the aircraft filler valve. There were no traces of such substances in the filler valve area, the only foreign matter being the deposits resulting from the explosion.

At the time of writing, the investigation indicates that there was undoubtedly a possibility that grease from the wheel hubs on the cart could have become deposited on the nozzle. In fact, all three oxygen carts at the unit had been greased in error by the Ground Handling section using general purpose grease (3JP-690).

Although the oxygen carts of the type involved (6D/120) are equipped with a small clip on the handle to hold the oxygen filler nozzle, the use of this clip is somewhat cumbersome, and it is of interest to notice that if the clip is not used and the nozzle left hanging down from the cart handle, the nozzle could easily touch the wheel hubs – and the grease.

In this accident, which is a classic, two substances, oxygen and probably grease combined without either being detected. The explosion, as the pictures show, was severe enough to melt the metal on the filler hose nozzle and filler valve, and injure – fortunately not severely – an airman. This accident has given rise to further investigations into the equipment and methods employed in handling oxygen. The need for vigilance in handling this explosive gas cannot be overstated.



Filler Valve of T33 after the explosion

The partially-melted oxygen filler nozzle

THE REVISED NOTAM SERVICE

NOTAM (contraction of Notice to Airmen), has been used in aviation circles long enough to be commonplace among aircrew. However, recently a new NOTAM system was introduced and there are some points which may catch the uninitiated. Rather than discuss only the areas that might be confusing, let's review the whole NOTAM system.

A NOTAM is a notice containing information concerning the establishment or change in condition of any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to those involved in flight operations.

NOTAMs are divided into two classes. Class I NOTAMs, the familiar kind which are found displayed in the flight planning centre, are distributed by teletype. Class II NOTAMs contain items of more or less permanent nature; for example, the recent change in off-airway cruising altitudes, and are distributed by mail. Class I NOTAMs are subdivided into series A and B. These two series differ in composition, method of distribution and conditions of issue. Series A NOTAMs are issued for a condition which will exist for more than two hours. They are in plain language using recognized abbreviations and are distributed on the Aeronautical Fixed Telecommunication Network. Series B NOTAMs cover a condition existing for two hours or less. They are also issued on short notice to cover a situation requiring a Series A notification but on which there is less than six hours warning. Series B is added to the aviation weather sequences of the affected location and is sent in code - the ICAN NOTAM Code, known as the "Q" code. Series B NOTAMs appear on the weather sequence for six hours or until the condition is rectified.

Series A NOTAMs are divided into two groups: the daily NOTAM summary and supplementary NOTAMs. The daily summary is issued at 0300 GMT and contains all of the current NOTAMs for Canadian stations. For ease of reference, the daily summary is in four parts.

- ▲ Part I - NOTAMs on airway and air route changes, airspace reservations, enroute navigational aids and general information affecting enroute navigation. These are listed by Flight Information Region.
- ▲ Part II - NOTAMs on aerodromes with published approach procedures and associated terminal facilities and hazards. The airports appear alphabetically in two groups, east and west of Winnipeg.
- ▲ Part III - NOTAMs concerning hazards beyond 5 nm of a particular airfield. These are listed alphabetically by province and divided into areas east and west of Winnipeg.
- ▲ Part IV - NOTAMs concerning VFR airfields and associated facilities and hazards. These are also listed alphabetically as in Part III. The daily summary is amended by issuing Series A supplemental NOTAMs.

The two areas of distribution are east of Winnipeg and west of Winnipeg; Winnipeg is deemed to be in both areas. It's worth noting that Gimli is in the eastern area. Series A supplementals are sent to all stations in the area of origin plus the central NOTAM office.

The Central NOTAM Office in Ottawa prepares and distributes valid NOTAMs; these are released at 0300 GMT. Series A supplementals of importance are selected and sent to the non-originating area. Stations can issue supplemental NOTAMs for conditions of greater than two hours' duration; these amend the summary. These supplementals are sent to all stations in the originator's area and to the central office. Also, coded NOTAMs are appended to a station's weather report on items of less than two hours' duration, plus those of more than two hours' duration but occurring with less than six hours warning.

That's how the system works - now, how to use it.

When you check NOTAMs start with the daily summary. Parts I to IV will be found on the NOTAM display board. Refer to Part I for enroute information, airspace reservations, military activity, etc, in the flight information regions in which your flight will be made. Find out if any supplementary information has been issued. Part II is next; here, IFR airfields are listed alphabetically. Check the departure point, enroute stations, destination and alternates and also for any supplements concerning these points. In flying off-airways or into a VFR airfield, check Parts III and IV for any relevant information. In addition, check the weather reports for relevant Series B NOTAMs.

Checking NOTAMs in this way is adequate most of the time but beware of traps. It is not the responsibility of the weather office to pass NOTAMs, so when checking the weather, scan the actual teletype sequences yourself. If there is not a NOTAM code chart in the weather office, refer to Section 1 of the forward to GPH 270, Flight Planning Document.

Keep in mind that all NOTAMs from one are are not necessarily sent to the other area. The ATC centre, however, has all NOTAMs; these are available on request. For example, if you wish to check Parts III and IV for the western area and you are at an eastern station you can ask centre to check them for you. Beware, when flying from one area to another, that while series B NOTAMs are normally issued to cover any circumstances occurring after the summary is published, a series B NOTAM is not issued on items having more than six hours warning; it will appear in the Series A supplemental. Also, if the item is over six hours old, a Series B NOTAM is cancelled but the corresponding Series A NOTAM may not have been sent to all stations. Once again, the centre can provide the information.

Now, you know all about NOTAMs - don't forget to check them!

As a result of representations by TCHQ, the Department of Transport has agreed to a new routing procedure which was implemented 15 Mar 65. Supplementary coverage will now be provided to Namao, Cold Lake, Moose Jaw, Rivers and Portage in the western NOTAM area as well as to Gimli, Centralia, North Bay and St Hubert in the eastern NOTAM area. In addition, Namao, Cold Lake, Moose Jaw, Rivers and Portage Series A NOTAMs will be relayed to Gimli, Centralia, North Bay, St Hubert and vice versa. Further, NOTAM coverage of Calgary, Saskatoon, Lakehead and Sault Ste Marie will be relayed to the air stations in the opposite area. ■

F/L J Glover
Central Flying School UICP Flight

On The Dials

For a long time the UICP School has been looking for some means of spreading new gen on instrument flying. The newsletter concept has many times been considered and discarded as it would not get complete distribution amongst the working pilots, and if the line pilot does not read it, it has failed in its purpose. Through the media of these pages we hope to spread a little new gen and try to answer your questions.

And we do get questions. Our staff members in their travels are often faced with, "Hey, you're a UICP, what about such-and-such?" Rarely is it a problem that can be answered out of hand. If it were that easy the question wouldn't have been asked in the first place. The required answer is often found only after some research and consultation. By this time you can't remember who asked the question or you don't see him for a year or so and all is forgotten. Also, often the follow-up of a particular question reveals aspects which would be of general interest to all airframe jockeys. We hope to answer this type of question, and any can of worms opened up in the process can be sorted out for everyone's edification.

Any questions, suggestions, or rebuttals will happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communications to the Commanding Officer, RCAF Station Winnipeg, Westwin, Manitoba, Attention: UICP Flight.

As an opener we'll comment on a matter concerning the latest low-level navigation/flight procedures. "On an ILS approach to runway 07 at Lakehead, with the glidepath off, what altitude should you cross the marker inbound?".

Before explaining the correct answer let's state the wrong answer: 1820 feet. This figure, shown on the letdown sheet as an altitude inbound at the outer marker is a glidepath check altitude.

The correct answer is determined by the obstacle clearance requirements. We all know that instrument approaches are designed to guarantee certain minimum clearance of obstruction. Specifically, these are at least 1000 ft above obstacles in the area designated for the procedure turn and 500 ft clearance in the area designated from completion of procedure turn to the outer marker inbound. Now, if there is a glidepath to follow, clearance is at least 500 ft to the outer marker diminishing to zero at touchdown point.

Returning to the letdown in question, note that glidepath interception is made at 2800 ft and descent then commenced on a 2.5° slope. This guarantees the required obstacle clearance. At the marker, 1820 ft is sufficient, however, if after completing procedure turn immediate descent was made to 1820 ft, there would be at least two obstacles between completion of procedure turn and the outer marker which would violate the minimum 500 feet of clearance.

Taking altimeter errors and a touch of turbulence into account descending to 1820 ft off procedure turn would be a very dicey do.

To determine the correct altitude several methods can be used. Taking 500 ft from the procedure turn altitude and using this figure is safe and effective. This is based on the fact that the procedure turn altitude gives 1000 ft clearance over a large area including the area designated for proceeding inbound to the marker after completing procedure turn. The inbound area requires 500 ft clearance and this method gives at least that much.

Also, you could maintain procedure turn altitude until reaching the outer marker inbound. This certainly will give adequate terrain clearance but will require a very high rate of descent to reach minimums after passing the marker.

The best method would be to use the published ADF inbound altitude where available. At Lakehead this is 2200. This holds true for all ILS letdowns having an ADF approach published in conjunction.

A "NON-ACCIDENT" REPORT

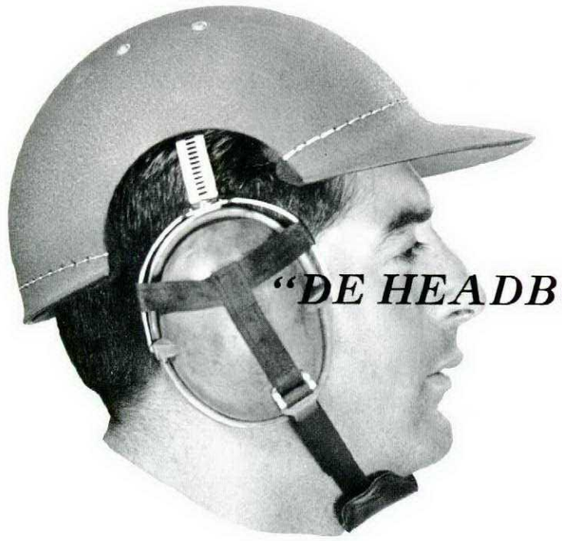
The flight technician on an Albatross, LAC JH Laflamme, was performing the pre-landing check which included visual confirmation that the undercarriage was down. LAC Laflamme noted a large stone embedded in the right main tire; the captain landed on water rather than risk a blowout on the runway.

After the water landing the tire was inspected, showing the embedded stone had cut through at least three cords.

At this point the flight technician stated that he thought the wheel could be changed while afloat; the aircraft was taxied to a nearby protected beach and shallower water.

The servicing crew dispatched to the scene, Cpl GE Ball, LAC HC Torgeson, and LAC WJ Fogarty, quickly changed the wheel under windy conditions, in a manner described by the captain as "done cheerfully and well".

We're so accustomed to accident reports that stories such as this "non-accident" are a welcome relief. Our thanks again to F/L AL Seward, 121 KU, Stn Comox.



"DE HEADBONE CONNECTED TO..."

De headbone these days is connected to a new hardhat complete with ear defenders and chinstrap. As the photo shows the recently-introduced headgear for line servicing is worn by the Voodoo servicing crews at Bagotville. The new hat keeps all equipment well secured to the man; our hope is that he can keep the the whole assembled unit – man and hat, out of trouble. Our jet engines up till now, have ingested costly tidbits such as ear defenders and airmen's hats to mention only two from the FOD locker.

So far, comments by the wearers are generally favourable. One thing is certain; Bagotville line crews are sporting fewer bruised "noggins" these days and the J57s are going very short on rations. We recommend for winter wear, the B25 woollen Balaclava which should fit nicely under the hardhat.

F/L WC Wylie
RCAF Stn Bagotville

RUNWAY ICING ON A CLEAR DAY?

A CF101 aircraft pilot was diverted on a bright clear sunny day. He didn't see why he shouldn't land but the tower told him to divert because of an icy runway, so he diverted. He had been cleared for takeoff only an hour before and the runway was almost dry. There was not a cloud in the sky, the weather section had reported the temperature as 22°F, the wind at 15 with a few gusts to 25, and blowing snow.

When the pilot returned he wanted to know why he'd been diverted. Here's why. Although the outside temperature was 22° F, the runway surface temperature was better than 32°F and as the blowing snow crossed the runway, it melted to a thin wet layer on the runway. During the hour the pilot was away, the temperature dropped two degrees; the melted snow froze leaving a thin sheet of ice. Because of the crosswind and the ice, the pilot was given the diversion instruction.

A clear, bright day with a crosswind and blowing snow can cause a hazardous condition. Be aware of this hazard and plan accordingly.

F/L W Green
RCAF Stn Chatham, NB

False TACAN Lock-On

A recent Safety of Flight Supplement to the HC-130B Flight Manual warns of the possibility of TACAN locking on a false bearing. This is not just peculiar to the HC-130B, but can occur in any TACAN equipped aircraft.

TACAN bearings are determined by comparison of the phase of the modulation of the received signal with a reference phase. Using 15 cycle modulation, a rough bearing is determined (plus or minus 20 degrees). Control of the indicator is then shifted to 135 cycle modulation circuitry for the fine measurement. It is possible for the fine measurement circuitry to take control when the proper 40 degree sector has not been selected by the rough measurement. The bearing indicator will then lock on a reading which is in error by some multiple of 40 degrees. When this occurs, changing channels momentarily will cause the set to begin to search, and should result in an accurate lock-on within the proper 40 degree sector. Securing the set and then turning it on again will accomplish the same effect.

(Reprinted from US Coast Guard Flight Safety Bulletin)

The TACAN may re-lock with the 40° ambiguity; TACANs are deceptively decisive about a false reading - the needle homes in firmly and gives you a bearing change as you proceed in flight. It's a smart pilot who is in a position to give the occasional reading a double take - otherwise that momentary "changing channels" may never occur.

The approach control agency should, as a matter of routine, monitor on the DF the transmission at IP or whenever a TACAN position is given. One command has already commented on the potential hazard of the TACAN, and we couldn't agree more.– Ed.

Alcohol
FRIEND OR FOE?

L AJ Berry
Wing, Baden-Soellingen

There's no quick answer to this question (confirmed alcoholics and members of the Women's Temperance Association please sit down); it all depends on the circumstances.

Tradition has accorded the consumption of alcohol a unique position in the Armed Forces. The protocol of "dining-in" and the regulations governing the composition of a mess committee where the bar member is given precedence over his messing and housing colleagues, serve to demonstrate this. The result is an unfortunate anomaly where it is quite acceptable to drink but not to show too much evidence of having done so. That's the general situation; now consider a few of the "pros and cons".

Alcohol – the Friend

In "reasonable" quantities alcohol is a unique social emollient; shyness and reserve-barriers to sociability loosen their hold and easier social contact is possible. (Take a few minutes out to watch a smooth operator at a cocktail party.) Alcohol relieves worry and stress, and has a place after hazardous experiences. Taken with meals, it stimulates the appetite and generally increases an appreciation of food.

Alcohol has its place too as a medicine in certain vascular disorders. (You've got to play it by ear though – it wouldn't do to prescribe a stiff shot of Scotch as a nightcap for your maiden aunt – then again, it might.)

Alcohol – the Foe

Alcohol impairs perception, judgement and performance. It induces addiction in susceptible individuals, with all the adverse consequences of excess. It slims one's pocketbook. It can cause serious liver damage. It causes hangovers.

Effects of Alcohol

Alcohol depresses the central nervous system, and with it your judgement, discrimination, co-ordination and consciousness are progressively reduced. The degree of this reduction depends on the concentration of alcohol in the blood and the individual's conditioned resistance to alcohol. The latter is largely dependent on the degree of prior exposure to alcohol (old soaks can withstand its effects better than beginners). Your blood alcohol concentration can be estimated by analysis of expired breath or actual measurement from a blood sample. In legal circles a level of 150 mgm/100 cc of blood is regarded as evidence of impairment regardless of other evidence.

Let's have a look at this hangover business! Hangovers afflict some individuals more than others, and tend to follow a similar pattern on repetition. The symptoms are caused by a disrupted metabolism due to an accumulation of aldehyde and ketone (useful in its proper place as a paint thinner) associated with fluid and electrolyte imbalance compounded by gastric upset and often lack of sleep.

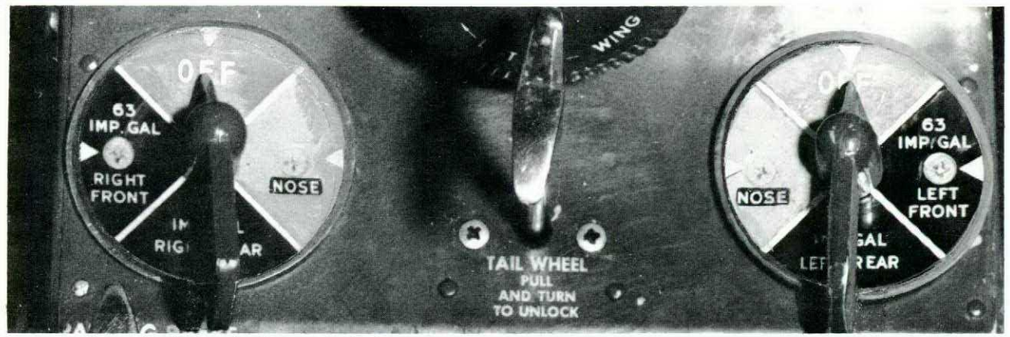
Curiously enough, although hangovers are common (and often severe) very little research into the condition has been done. This probably explains the variety of "guaranteed cures" available, ranging from lots of water through bromos and aspirins, 100% oxygen, coffee, pep-pills and a "hair of the dog".

It is too much to expect an individual, suffering from fatigue and a queasy stomach who is not firing on eight cylinders in the first place, to produce top-notch flying if put in a high-performance aircraft. Recently, one or two accidents appear to have been associated with a hangover state.

CFP 100 requires an eight-hour period of abstinence prior to flying. This limitation, however, is a MINIMUM and is a compromise between avoiding flying under the influence and unduly penalizing moderate drinkers. It in no way covers the diminution of ability during the hangover phase.

What is the answer to all this? I feel that both aircrew and supervisory staff are involved. It's up to the aircrew to organize their celebrations to allow sufficient time to get over both the acute phase and the hangover before the next airborne duty is due. The time required varies but after heavy drinking up to 30 hours is needed to recuperate fully. Equally, it's up to the supervisory staff to schedule the flying program making allowances for periods of high hangover incidence after mess dinners and squadron parties. ALCOHOL – FRIEND OR FOE? You've got the facts.

It's up to you!

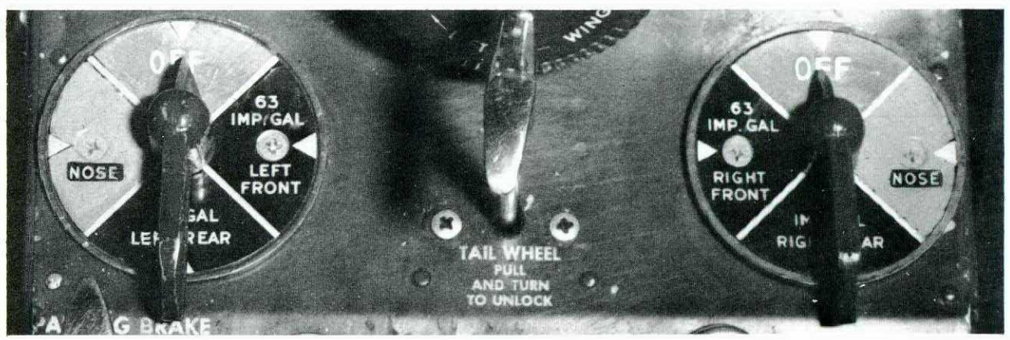


Does this layout look reasonable?

Murphy's Muddle

This story concerns two pilots who flew an Expeditor to another base, dropped off a parcel, did three practice circuits and returned to base. It was on the return leg that something was obviously wrong with the fuel system. The tanks which had been selected showed little loss of fuel and yet there was an astonishing low level of fuel in the nose (in fact, only one half gallon remained on landing). The pilot quite rightly referred in his account to the danger of losing both engines on takeoff or overshoot.

A rather inept technician had installed the fuel selector control assemblies in reverse, making an apparent front fuel tank selection, for example, actually come from the nose – see photo. The pilot, too, should have seen the difference, but the chap we're really annoyed with is the designer who built this part so that it could be assembled in the wrong position in the first place.



As designed . . .

"Watch the Birdie"

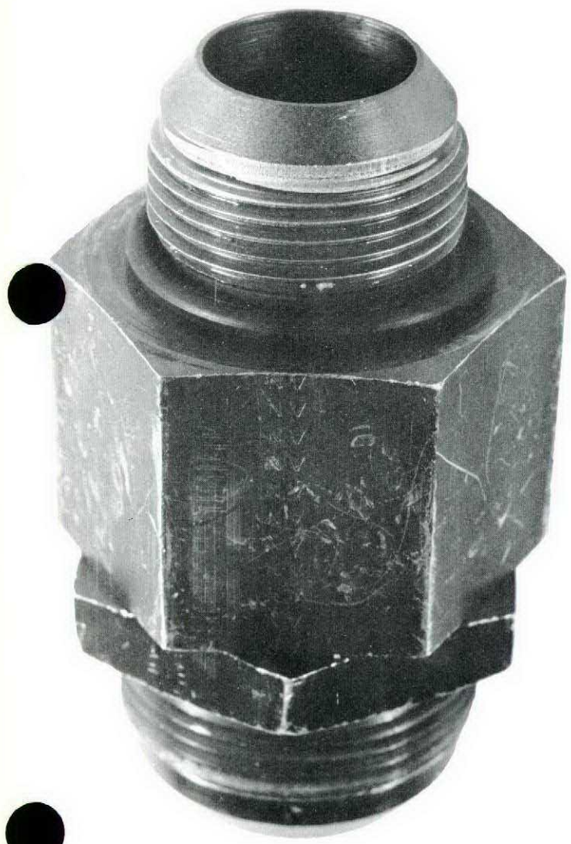
Station Trenton's 06-24 runway was not the final resting place for these birds – they wound up as exhibits for a very effective FOD photo. No reports of the bird strikes were received but obviously someone's propeller or plane had been hit. A local dump has been attracting these birds and attempts are in progress to move it further afield.

FROM AIB FILES

Y FOUR MINUTES MORE

A Labrador helicopter was over Cobiquid Bay when the pilot noted a rapid fluctuation of the aft transmission oil pressure, between 25 and 50 psi (normal is 20-85 psi). The flight technician was directed to examine the aft transmission where he discovered a massive oil leak. A suitable landing area on shore was close by; the aircraft was landed immediately. The elapsed time from start of the oil pressure fluctuation to shutdown was about ten minutes. In that short time, the 4.4 gallon oil system had lost 2.5 gallons. How much longer would the transmission have run? With the oil being lost at that rate, it's anybody's guess – ours was four minutes. Only four minutes more and the aft transmission could have seized; the aircraft would have been destroyed with the loss of all on board. The captain, F/L Hayes, appreciating the great urgency of the situation, landed the aircraft with minimum delay. Had he been further away from shore he would have landed on the water, he says, and quite right too. Incidentally, no increase in aft transmission oil temperature was noted. There is a hidden and insidious menace allied to this incident. These oil pressure gauges have been known to malfunction. Had F/L Hayes shrugged off the fluctuation as "another of those goofy gauges" there'd be no happy ending to this emergency.

Thread damaged by side load and vibration



The oil leak came from the bushing where the line from the oil cooler goes into the top of the mix box. The exact reason for the failure of this bushing is still (at time of writing) under investigation. However, one of these bushings failed before – on an Army CH113A – but was discovered before any oil leak developed. Operators and maintainers take heed.

T33
NENE Abuse

The T33 fuel system modification has been delayed because of a shortage of parts. The lead time required to get these parts is approximately five months. New target date for the mod program is 1 Jan 66.

In three months, four NENE engines have been removed because of overtemperature damage. Two of these had broken turbine blades. In the past, however, exceeding the limiting JPT on engine acceleration has been the chief cause of this type of damage. Further investigation by AIB is in progress on these engines. We know the acceleration control isn't much help from idle to 50% – this means that pilots are going to have to be extra careful during engine accelerations and extra conscientious about reporting any overtemperature, otherwise sometime in the future that engine will fail!

The NENE has a fine reputation for ruggedness and reliability – perhaps some of us are taking liberties by expecting too much of the old workhorse.

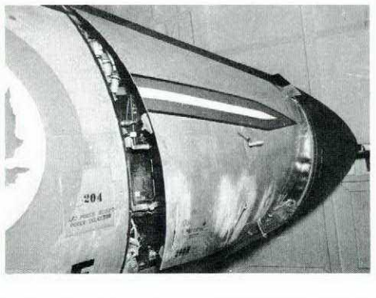
ARRIVALS and DEPARTURES

CF100, NAVIGATOR HAS THE BENDS After being airborne an hour and a half at a cockpit altitude of about 22,000 feet the navigator complained of an ache in the right elbow. He suspected the bends, but as the ache was not intensifying the mission was continued. Fifteen minutes later a similar ache began in the right ankle. The mission was aborted by diverting to a nearby airfield. By this time the navigator complained of blurring vision and an immediate descent commenced. The aches and blurring of vision disappeared within a minute or two; the navigator was left with a slight headache persisting for about three hours.

The aircraft and personal oxygen equipment were found serviceable. A man as experienced as this navigator should have known two basic truths:

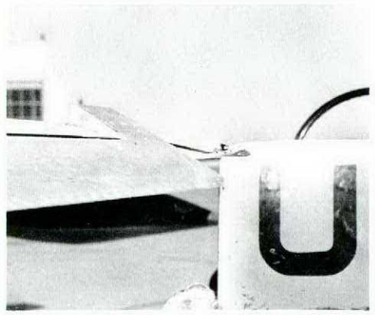
- minor aches and pains are the onset symptoms of incipient hypoxia or decompression sickness.
- inevitably, pains such as experienced by this navigator will become worse if you persist in exposing yourself to the conditions which generated them in the first place.

Had these symptoms progressed further – say, in the pilot, a serious emergency could have developed.



CF101, UNLOCKED PANEL The people who invented panels failed to invent something to ensure that they'd be closed before flight. We've been operating Voodoos long enough to have a fine set of orders, SOPs, cautions, etc, to fool-proof the system – or have we? In this case, an all-out Air Defence exercise was in progress and simply stated, the door was overlooked in the resulting kafuffle. The aircraft scrambled; the thump felt by the pilot and thought to be the nosewheel retracting was actually the access door being damaged (see photo).

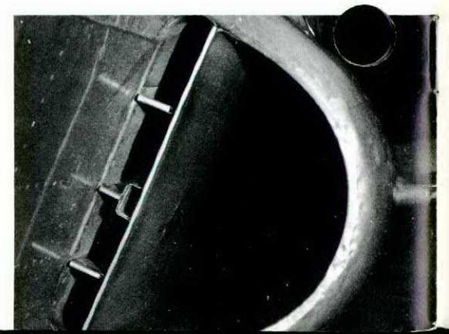
At about 18,000 feet a control problem developed causing the pilot to return to base. Which is just as well; obviously the aircraft was in a dangerous configuration for high-speed flight.

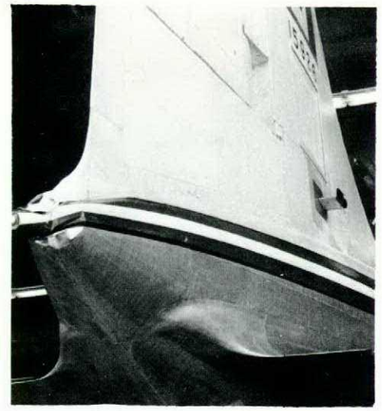


T33, VEHICLE COLLISION This one has a painfully familiar ring to it; it also has a lesson. The aircrew were strapped in waiting for a start when the energizer failed, setting up ideal conditions for what was about to occur. Another energizer was obtained which also failed to deliver. The "careless" airman in question returned with a third energizer and while towing it around the tail of the aircraft struck the tailplane damaging both the elevator and the stabilizer.

Put yourself in the place of this man. He was being anxiously watched by two masked men in the cockpit, who were perhaps emphasizing their growing impatience by headshakes and hand signals. You can see the mental state that could result! Carelessness it was, but. . .

T33, HAIL DAMAGE We're just throwing another one in – we know you've seen it before – just to remind you that CBs contain hail. In this case, the pilot requested radar vectors around any weather areas that appeared on the scope. The pilot was advised that vectoring was not possible as there was a "15-mile line of CBs directly in front of them which they would be entering in 30 seconds". Three minutes of lightning, severe turbulence and hail was all it took to damage one aircraft.



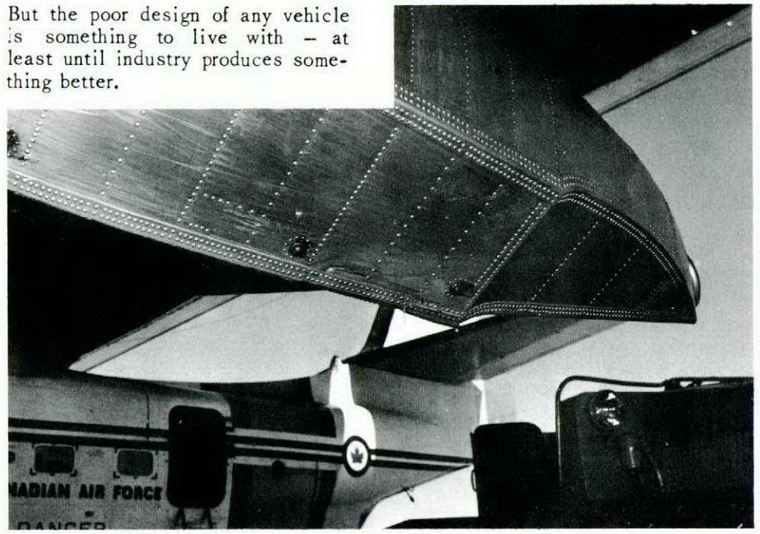


YUKON, VS GIRAFFE That distant cousin to the forklift, the Giraffe, has unfortunately the same penchant for whacking aerodynes. The Yukon was the hapless participant in a comedy of errors. A driver with no official qualification was operating a vehicle which he described as "tricky" to operate. Further, he claimed, the Giraffe controls made smooth movement of the machine "impossible". The tail section of the Yukon which was damaged by the descending platform, was temporarily obscured by the boom. The Giraffe demands extreme caution – somewhat more than was exercised by this driver.

ALBATROSS, VEHICLE COLLISION Manoeuvering a shop mule while towing another aircraft, the float of a nearby Albatross was damaged. The driver states: "while backing, I noticed that I was getting near the port float of the Albatross and attempted to stop and shift into forward gear. I apparently missed the transmission clutch on the gear shift as I could not get it out of gear. At this time I made contact with the float and was slammed forward on the steering column, completely lost control of the vehicle, and was carried right under the float. After passing under the float I regained control, and stopped the vehicle".

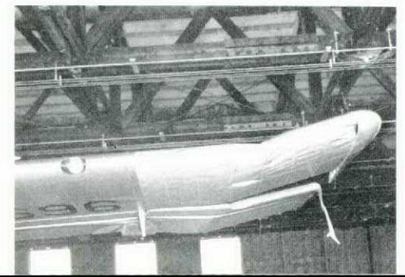
The design of the gear shift lever makes it possible to miss the electric clutch switch in which case the tractor remains in gear.

But the poor design of any vehicle is something to live with – at least until industry produces something better.

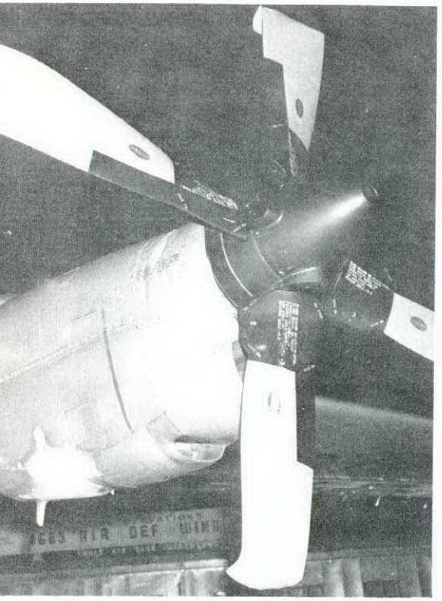


OTTER, WINGTIP INTO GROUND Following a touch-and-go landing (downwind) the pilot overshot, and did a 180 for an inspection pass over the small frozen lake. This inspection pass can best be described as equivalent to a very tight downwind on a normal circuit. Satisfied that the lake was in good condition for another touch-and-go landing (again downwind) the pilot entered into a very tight final turn – very tight, that is, for an Otter without flaps. The pilot having forgotten the flaps, tightened the turn by increasing bank and power. The turn was wider than anticipated bringing the aircraft "alarmingly close" to a shore and hillside. The aircraft continued sinking in its power and bank configuration, touching on the left ski and wing. The aircraft bounced, becoming airborne and was flown back to base with what the pilot states as "limited aileron movement, no airspeed indication and unusable flap due to poor control with flap down".

This pilot can now advise anyone that continuing a manouver which becomes increasingly difficult to cope with, is strictly for amateurs.



HERCULES, HIGH WINDS The Hercules landed at Thule, Greenland, at twenty minutes past midnight. The weather forecast was good and with the maximum wind expected to be only 10 knots, there did not appear to be any need to put the aircraft in the hangar. (This is in accordance with the usual procedure). Consequently the aircraft was parked in front of Base Ops and the crew, tired after their long flight from Namao, with stops at Churchill, Resolute Bay and Alert, soon went to bed.



At 0300 hrs the weather office passed a warning to Transient Alert of winds at 20 knots gusting to 35. The information was passed to the transient crew barracks but did not reach the RCAF C130 crew. In any case a C130 parked into wind should not be in any danger in a 35 knot wind.

Some three hours later a second wind warning was issued which predicted the wind to veer 30 degrees and increase to 55 knots. This time, Transient Alert contacted the C130 flight engineers and arranged for them to get to Base Ops to tow the aircraft into a hangar. The flight engineers arrived within twenty minutes, but by this time the wind was blowing 30 degrees off the aircraft heading and had increased to more than 60 knots. Also, a Phase III weather condition had been declared which meant that personnel are not allowed to leave shelter and only rescue or emergency traffic (tracked vehicles in pairs) are permitted to move out of doors.

By now, hangaring the aircraft was impossible and the flight engineers, Sgt J Neilson and Sgt JL Dunn, realized that unless something was done immediately, the aircraft was sure to be damaged from the extremely high winds. Since there was no time to get the pilots the flight engineers decided to start number 1 engine themselves and turn the aircraft into wind. They attempted a start but the aircraft was rocking so violently that the weight was coming off the starboard main gear and activating the touchdown switch contact which in turn cut out the compressor and interrupted the start. On the second attempt, using fuel enrichment, a "light off" was obtained but as the rpm was passing 40% a gust of wind (recorded at 88.5 mph) rocked the aircraft so violently that the port wingtip and the spinning propeller blades hit the ground. Due to the damage to the engine, it had to be shut down. Sgt Neilson then phoned the captain, F/L Nurse. Sgt Dunn remained in the pilot's seat trying to hold the controls. This proved to be impossible, and as the aircraft was rocking precariously he too went back to the operations building.

F/L Nurse who by then had been informed, obtained authority (after some difficulty due to the Phase III Alert) to proceed by tracked vehicle to the aircraft. He found weather conditions to be very bad and the aircraft had started to move slowly towards the operati building. Also, fuel fumes com from the aircraft were entering the building, and consideration was being given as to whether it should be evacuated. In spite of the fire danger and zero visibility, F/L Nurse decided he would start numbers 2 and 3 engines and taxi the aircraft clear. Before this could be done, however, the aircraft stopped moving and as the storm was finally abating no further action was required.

An analysis of this harrowing ordeal indicates that there was not much that could have been done to prevent it. Although the flight engineer's decision to start number 1 engine undoubtedly increased the damage; he in fact should be commended for his initiative. This was the only preventative acti that could have been taken at t time and had the aircraft been successfully started and turned into wind, damage to the aircraft might have been completely avoided.

In future, due to the possibility of extremely rapid changes in weather conditions at Thule, crews are to obtain hangar space if available. If it is not available and the forecast is good, the aircraft is to be parked on a heading 220 M (the usual direction of the high winds). If the weather forecast is not good and hangar space unavailable, the aircraft should be flown out.

Comments TO THE EDITOR

Dear Sir:

In the May-June issue of Flight Comment I noticed a page of cartoons under the caption "Squiggles". Could you tell me who drew these and whether this person was in the Air Force?

Our apologies to letter writer-cartoonist McDiarmid for his excellent Squiggles (May/Jun). We print here the "cut line" which somehow was misplaced *(spelled G-O-O-F). – Ed.*

by F/O MJ McDIARMID
408 Sqn, Rivers

BIRD WATCHERS' CORNER

SCHIZOPHRENIC SKYLARK

No question about it, ol' Skylark's been around for years—a respectable member of the bird community. He prides himself on his apparent maturity and basks in the sunshine of his comrades' confidence. But wait . . . beneath that feathered breast lurks an inner bird—the Great Horned Skylark, poised and ready to burst into life. Once possessed by the feathered fiend within, the Skylark no longer heeds the rules, and ignores the hard-won lessons of experience. The Horned one, once out of Hydeing is free to do his deadly work, and chortles his fanciful refrain:

NORISKTOTHENECK SOCLOSETOTHEDECK

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