

Comments

Our continuing inquiries have yielded an explanation on the unfeasibility of procuring aviation fluids in distinctively marked cans. Contract terms enable us to buy a variable amount but oblige the supplier to stock a stated total amount. As contracts periodically rotate among different suppliers there's understandable reluctance to supply DND with distinctive cans. The alternative is to get into the empty-can storage and supply business - a rather unpalatable proposition. So it's back to the only alternative - vigilance. (In the meantime, would it be too much to ask for an industry-wide contribution to everyone's safety?)

Back from Vietnam after a flight safety inspection visit, US Army inspectors had some pertinent observations. "The amount of positive action towards accident prevention is too far overshadowed by the talk and the written material about safety... Too many pilots get their first taste of actual instrument flying inadvertently... There is too much acceptance of unnecessary risk by ignoring, or simply being ignorant of proven and established flight techniques and procedures... The desire for mission accomplishment tends to crowd out good judgement or a recognition of the limitations of personnel and equipment..." This is wisdom we can't afford to ignore - at any level of command.

FAA tests showed that birds ingested by small turboprop engines can reduce power 40-50%. During a bird ingestion, engine power fluctuated for 2-4 seconds and then stabilized without manipulation of engine controls. In some cases, power was reduced to bring exhaust gas temperatures within allowable limits because bird carcasses on inlet guide vanes had interfered with airflow. There were no engine flameouts during the ingestion tests and no visible damage to the engine. The agency recommends that engines involved in bird encounters be inspected before the next flight, with particular attention to hot components.

We'll be watching with more than usual interest the activities of 434 OTS (CF5), having read in the minutes of their first meeting the formation of a "Slight Safety Committee"!

COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

MAJ W. W. GARNER
FLIGHT SAFETY

LCOL H. E. BJORNSTAD
INVESTIGATION

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Editor Capt J. T. Richards
Art and Layout CFHQ Graphic Arts

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WHAT'S IN A CAUSE?

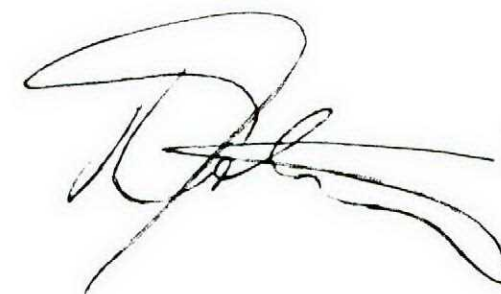
Soon the 1968 Annual Aircraft Accident Analysis will be published. A summary of last year's aircraft operating experience, it is an important document for all levels of command.

Another aspect of the Annual warrants discussion - the cause factor. If we are to create and apply preventive measures we must first *identify* areas requiring improvement; this is the basic purpose of the investigation and cause assessment. We in flight safety are not concerned with pointing a finger at the individual - nor are we in the business of administering discipline. Our function is to promote the preservation of resources. This involves providing managers with a flow of knowledge gained from experience - knowledge which is fundamental to decision-making.

A cause factor to an aircraft occurrence is "Any event, condition, or circumstance the presence or absence of which increased the likelihood of the occurrence". All of us should think about this statement carefully; those actually making assessments should give detailed study to CFP135A, Chap 1.

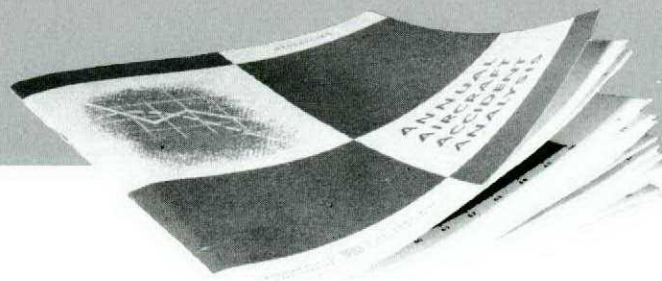
Initially, units are responsible for making cause assessments; this is where preventive measures first become obvious - and it's where they should normally be dealt with. It is important also, that the cause assessment records at command and CFHQ accurately reflect the occurrence since it is at these levels that policies for improvement are developed and supported.

There is no easy way to accurate and realistic cause assessing; it stems from a good investigation, logical thinking, and the desire to do a good job. I emphasize the point about good assessments at this time because I feel that the recent revisions have real potential for bringing improvements to our system - provided assessors know the definitions and apply them properly.



COL R. D. SCHULTZ
DIRECTOR OF FLIGHT SAFETY

the '68 story



The highlights of our 1968 military aviation accident and incident record are presented here. A more detailed analysis is underway and will appear in the Annual Aircraft Accident Analysis which should be off the press in a month or so. In the meantime, examine your operations for evidence of the few major pitfalls touched on briefly here...

Flying Activities

The planned reduction in flying hours in some roles resulted in a service-wide reduction of 6% during 1968 - a slightly steeper decline than in previous years. This reduction in hours had the effect of nullifying some of the gains in reduced accident numbers. One would expect that reduced flying hours would enable better management and supervision of operations; on the other hand, it might be argued that pilot proficiency would suffer. These considerations, however, must remain in the area of speculation.

Air Accidents

The chart shows a total of 53 accidents - 2 less than the previous record low of 55 in 1967. However, as already mentioned, the reduction in hours offsets this gain, making our accident rate of 1.24 similar to - but nevertheless slightly higher - than the previous year's record low of 1.21.

Some aircraft types always seem to be in the forefront of the annual accident reports, and others rarely appear in the record. The Tutor, for example, which is flown primarily by students, flew 2-1/2 times as many hours as the entire helicopter group which experienced five times the number of accidents. The T33, which should by now be one of our most reliable birds, again accounted for more than its share of accidents - 20% of the total for 13% of the hours. CF104 losses continued in an operation unchanged for several years. Similarly, the Otter with relatively low flying hours, invariably yields three or four accidents annually. (The accident figures actually total 52 whereas the figure "53" is shown. By definition, an "accident" occurs whenever there's a death or serious injury, making one nil-damage fatal occurrence an accident).

Aircraft Destroyed

Keeping pace with the trend of recent years, approximately one-third of all accidents resulted in a writeoff. The total of 18 aircraft destroyed is 3 less than last year's record low of 21 but here again, the reduction in flying hours kept the attrition rate approximately the same. The eight CF104 writeoffs in

	T33	CF104	TRACKER	CF101	OTTER	BUFFALO	CH113	CHSS2	TUTOR	CH112	CANUCK	SABRE	EXPEDITOR	CESSNA	YUKON	H44	H21	H045	TOTALS
destroyed	3	8	1	1	1				1		1		1			1			18
B cat	1			1		1	1	1	1	1				1					9
C cat	7	3	3	1	2	1	2	2		1		1			1		1		25
all acc	11	11	4	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	53
fatalities	2	4	4	2															12

1968 matches a similar loss during 1967, and conforms to the average CF104 annual loss for the past five years. Accounting as it does for 45% of our aircraft destroyed, the CF104 picture stands out.

Fatal Accidents and Fatalities

Accidents with fatalities were down from thirteen in 1967 to nine in 1968. Not included in the total of 12 fatalities, however, is the loss of 7 paratroopers who drowned during a paratroop mission from a Buffalo aircraft. This loss, if included, would have brought the total to 19 - very close to 1967's loss of 22 men. One factor was common to the fatal accidents: all had their origin in the low-level environment. All these aircraft were operating at or below circuit altitude. Of the nine fatal accidents five were classified "flew into ground"; three were "loss of control" (one almost certainly a control malfunction); the one remaining accident was the paratroop disaster.

A disappointing aspect of the CF104 fatal accidents was the very high incidence of fatalities to crashes - 50%. This is the highest percentage - and incidentally, the most fatalities - since 1963.

Ground Accidents and Incidents

The Canadian Forces sustained 16 ground accidents and 134 incidents; that's one less accident and exactly the same number of incidents as in the previous year. This position is a "high plateau" from the gradually declining ground occurrence totals of the previous years.

At first there was a suspicion that the increasing ground occurrence totals may have stemmed from the mounting complexity of aircraft and systems making increased demands on ground servicing and maintenance functions. However, leading the fleet in the accident/incident numbers in their respective groups, were the Dakota and Tutor which are anything but complex. This leaves the impression that these aircraft are not treated with the same care and respect the more sophisticated types receive.

The injury toll was correspondingly high. Sixteen persons were injured in 1968's ground mishaps - some seriously. "Carelessness" appears to be the greatest single human failing. Several technicians drove equipment away from the aircraft while it was still connected. There were 7 jacking accidents and various types of vehicle strikes.

cont'd on next page

Air Incidents

Air incident reports are received with mixed feelings. Incidents might loosely be referred to as "near-accidents"; this aspect makes them an object of serious concern. On the other hand, the very fact that they are reported, often enables preventive measures to be applied in time to prevent an accident.

Air incidents remain numerous; 1968's record-high 2064 tops the previous year's record by nearly 100. These ranged in magnitude from simple unserviceabilities which were reported on request, to near-catastrophes. Repetitive problems such as false fire warnings and birdstrikes keep air incident totals high; nevertheless, it is significant that air incidents are rapidly increasing at a time of decreasing flying hours.

Air Accident Causes

The 53 air accidents in 1968 were assigned 146 accident causes - an average of about three causes per accident versus less than two per accident in '67. This demonstrates an increased familiarity and acceptance of the multiple cause assessment system. One accident (a C Category landing accident) was assigned 13 causes, whereas another (an A Category CF104 crash) was assigned one: Environment - Birdstrike.

Personnel factors have increased 12% (from 54% of all causes in 1967) to 66% in 1968. Materiel causes increased slightly; Environment causes were down slightly. There was a noticeable reduction in the number of unsolved cases - from 13% in 1967 to last year's 4%. As expected, pilot involvement remained in the lead of Personnel causes; however, it dropped from 78% (1967) to 56%. Maintenance technicians fared extremely well, being assessed as a cause in only two accidents; one of the two involved a civilian contractor. Management and Supervision causes increased considerably in 1968, probably due in part to the redefining of the Personnel cause factors in the latest amendment to CFP135A.

"Judgement" was by far the leading pilot problem; Technique assessments occurring only half as often. Significantly, Carelessness causes were barely fewer than Technique causes. Non-Compliance with Orders was assigned 7 times in 1968 - 6 times to pilots. Three of these cases proved fatal.

The Years Ahead

The name of the game of flight safety statistics is the concept that wisdom stems from experience. Two thousand years ago an eminent Roman, Cicero, put the matter bluntly: To stumble twice against the same stone, is a proverbial disgrace. In the years ahead - look out for them stones!

Paper hazard

A Huey was found in a live impact area just before firing was to commence. The pilot had misread the range calendar.

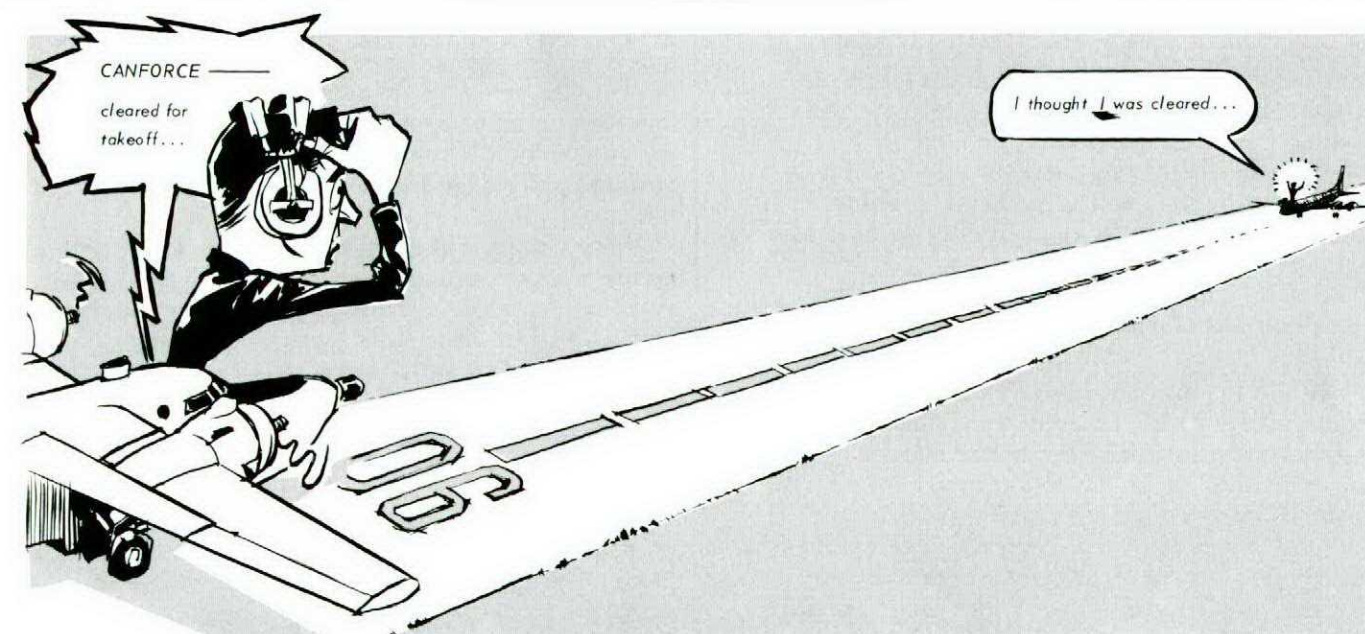
- Flight Safety Committee

Guard that grub!



Here's the official food rules recently published (CFAO 65-8.) Give them a close going-over. See if you're getting maximum safety from your savoury...

- Flight meal issues shall be sealed, date-stamped, and initialed by the packer.
- Flight meal issues shall be transferred from food services to the aircraft in closed containers and covered vehicles, not more than one hour before flight departure. When meals are supplied to in-transit flights, the aircraft must be on the ground before the food is issued from food services.
- When flight schedules are delayed, provision shall be made to hold the food at or below 38°F. If the holding period exceeds 24 hours, a replacement issue is required.
- Flight meals shall be stowed in the correct galley areas or, in aircraft lacking galley stowage, in the coolest section of the aircraft.
- Crew and passengers should wash their hands with soap and water before eating, whenever possible.
- The personal cleanliness of the crew members responsible for food services aboard the aircraft is of utmost importance.
- Perishable food items shall not be consumed after the flight terminates or retained for the next day's flight.
- Non-salvageable food shall be removed from the aircraft as quickly as possible at flight termination.



Koffee Klatch

"We had one man plug in a 550 at Portage and there was a great fireworks display..."

MWO A.G. Morran
CFB Cold Lake



Lt Fixit sauntered into the NCO's smokeroom and remarked to WO Earbanger, "I see you have a new safety poster on the bulletin board".

"Oh yes - the one showing the guy caught in the undercarriage door."

"That's the one. Did that actually happen or was it someone's idea of a good poster?"

"Well, a civilian on an MRP at Cold Lake got his hand and wrist caught in a CF104 door about five years ago. Another guy at Cold Lake about two years ago had a door close on him and pinched him against the fuselage", replied Earbanger.

"At one of the Wings a guy got his arm caught when someone turned on the hydraulic pressure while he was working in the wheelwell" piped up Sgt Riggermortis.

"Just one of the hazards of the trade, I guess" remarked Earbanger.

"Yup, when you consider it all, this aircraft repair racket's a dangerous game", replied Fixit stirring his coffee.

Sgt Baumb chimed in "Maybe you're right but compared to those guys on the carriers it's a piece of cake. I went over with the Sabres to Luff on the Maggie in 51 and I wouldn't serve on one of those things for love nor money."

Nodding agreement, Riggermortis said earnestly, "And we're lucky we aren't in Servicing where we have to chase around in all kinds of dirty weather and weird hours..."

"...or on a transport squadron where you work the guys like mad to meet schedules", Earbanger added.

Fixit relit his pipe and through a great cloud of smoke remarked, "True, but in those situations you're more aware of the hazards and take the necessary precautions. Here, in the day-to-day routine of aircraft inspections, or in the shop, we tend to overlook safety hazards that aren't so obvious because they're either part-and-parcel of familiar situations or happen so seldom that the men aren't able to cope with them when they do occur".

"You're so right...", Earbanger replied "... a hazardous situation can become so commonplace that unless you catch it on a safety survey it can lie in wait ready to cripple some guy who makes a wrong move. How many times do you see someone plug in an extension cord or hook up an air line without checking to see if it's in good condition?"

Sgt Wyrz reached over, butted his cigarette and spoke up, "You're right about people getting blasé about extension cords. We had one man plug in a 550 at Portage and there was a great fireworks display not to mention a small fire in the wiring. It turned out that the guys had been dropping the cords on the floor when they pulled them out. The porcelain base of the plug cracked from banging on the concrete floor and with moisture in the crack it shorted across. Luckily, no one was electrocuted but I bet you the men who were there at the time still remember to check the plug and socket before they plug in a cord!"

"Speaking of air hoses - we still catch a lot of our people hauling work stands and other equipment over hoses...", piped up Riggermortis.

"... and when one of those hoses cuts loose it can cause a lot of commotion - not to mention some serious injury if it comes apart at the quick disconnect", added Sgt Makanik as he got up to rinse his cup.

"Mentioning work stands" said Earbanger, "I notice some of our men are still not using the guard-rails on the maintenance stands; also, they're leaving a lot of loose tools lying around on them. That's just asking for someone to fall or get clobbered."

"Yup" nodded Riggermortis, "and they're getting a little lax on wiping up hydraulic spills, too".

Lt Fixit, tapping the dottle out of his pipe, said, "While we're on hydraulics - I see the riggers are very conscientious in using the warning signs but the electricians are lax in using NO POWER plugs and streamers in the external power receptacles when it's unsafe to plug in power".

"On the subject of signs..." Sgt Sparks remarked, hanging up his cup, "... a lot of the chaps in the hangar are ignoring the warning signs - they're crossing in front of the aircraft while we're checking out our radar equipment".

Walking across to the cup-rack, WO Earbanger remarked, "These are examples of some of the hidden

A hypothetical conversation? Not the usual bull session you would encounter in a hangar smokeroom? Maybe not, but it's a subject that could stand a good discussion. Mr Supervisor, when was the last time you looked at your work areas from a purely accident prevention angle? We could probably all find hazardous conditions that could be remedied without too much



We interrupt this article to bring you an announcement:

- ▶ An important new AMO is now available; it's called AMO 00-10-2 Moving, Marshalling, Parking and Mooring of Aircraft. All supervisors - aircrew and groundcrew - are to make sure everyone is familiar with this order.
- ▶ A series of three supplementary colour posters will soon be available - more of that in the next issue.

hazards around the hangar - but we have a lot more such as poor lighting, and the interruptions in work schedules for crash salvage, station clean-ups, BWO's detail, orderly cpl, etc, that can directly or indirectly contribute to an accident".

Lt Fixit paused at the door before leaving and dropped a final remark, "Well, one thing's for sure; we've got as many hazards as the others in aircraft maintenance - only, ours are insidious. We're going to have to tighten up on our safety housekeeping before one of our men gets injured".

effort. If difficulties are encountered remember your Flight Safety Officer is also interested in industrial safety and on most units he has a direct line to some very influential people.

MWO Morran works in CFB Cold Lake's Aircraft Technical Research and Investigations section. Here, he prepares and processes UCRs, TFRs, UMIs, and Supplementary Reports to aircraft incidents. This activity means that he spends much of his time investigating aircraft accidents/incidents; consequently, he is in a good position to keep his eye on trend developments in aircraft snags.

Monitor that landing!

Not happy with continuing undershoot accidents, an airline set up a monitoring program aimed at not only analyzing individual techniques but to dramatize the problem to the pilots. From the preliminary studies the airline was unhappy to learn that:

- ▶ its aircraft flew considerably lower than other airlines.
- ▶ on almost half the landings the aircraft crossed the threshold at a height of 10 feet or below.
- ▶ 30% of aircraft crossed the threshold at 10 knots above that recommended.

From this, the word went out that pilots had a tendency to approach too low, too flat, and too fast. A few weeks later the checks showed substantial improvement not only

in the approach but in aircraft stopping distances.

The checks were discontinued for three months; the favourable trend began to reverse although approach speed control was being maintained.

This airline is convinced that periodic spot checking is an effective method of preventing undershoots and other types of landing accidents/incidents. Their flight safety record proves this.

- adapted from FSF Bulletin

Fairly economical to build and operate, the monitoring device consists of a framed grid behind which is a motor-driven camera. Sequential photos with a stopwatch in the foreground verify the flight path.

How's that?

"Where operationally feasible a landing site is to be chosen free from damage by FOD".

- Extract from message



Good Show



Cpl S.G. Wynne-Sills



Cpl E.F. Galbraith



Cpl R.A. Lovegrove



Cpl M. Stapleton



Sgt G. Marshall



Cpl J.D.E. Delorme



Cpl B.W. Smith

inspecting the aircraft to satisfy himself that the Otter was adequately secured, he noticed another aircraft which had arrived only an hour before had been left on the ramp. With the assistance of an on-duty technician he put the aircraft in the hangar.

Cpl Lovegrove's voluntary action demonstrates a commendable integrity and professional involvement in

aircraft operations. This act exemplifies the continuing contributions toward flight safety that are made by men keen enough to care.

CPL M. STAPLETON

While monitoring the cycling of flaps and speedbrake during a T33 pre-taxi check, Cpl Stapleton noticed that the flap movement was slightly irregular. Signalling the pilot to fully lower the flaps, he then made a closer inspection of the flap mechanism and discovered a broken eyebolt in the link assembly. Had this condition gone unnoticed the aircraft would most certainly have sustained flap and possibly wing damage when the flaps were retracted on takeoff.

Cpl Stapleton's commendable vigilance during a routine check averted what readily could have become a serious inflight emergency.

CPL B.W. SMITH

After a constant speed drive (CSD) unit had been removed as having possible internal damage, Cpl Smith was preparing the unit for return to Supply. Although this normally calls for cleaning and packing the component, Cpl Smith observed that the CSD was out of alignment and the drive area was discoloured from overheating. This had gone unnoticed. His observations led to a further investigation which uncovered another misalignment - this one, in the CSD driveshaft in the aircraft.

Cpl Smith's alertness in detecting this defect not only saved another CSD unit from damage but averted an in-flight loss of this important unit. Further, the subsequent investigation shed light on a problem that has been recurring in this aircraft for some time.

CPL J.D.E. DELORME

While working on a combustion starter replacement on a CF101 engine, Cpl Delorme inspected the engine compartment and discovered a slight misalignment between the intake casing and the airframe structure. Cpl Delorme's finding disclosed that an engine mount had broken off.

In extending his inspection beyond that required by normal procedures, Cpl Delorme demonstrated a keen interest and enthusiasm for his work. These qualities led to uncovering a potentially dangerous condition as well as very expensive damage to a valuable aircraft.

Stand-by... 30 days

SATCO reported diesel power switch-over in cases of commercial power failure will be automatic within 30 days...

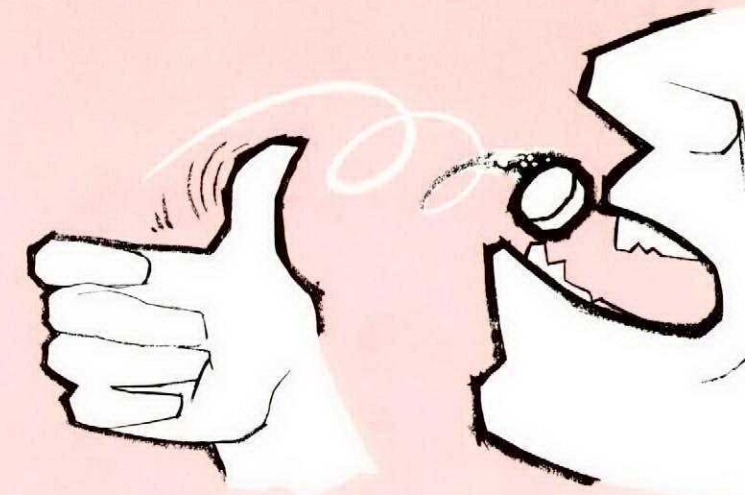
- Flight Safety Committee

Ten miles...

The base flight surgeon stated that pilots know that they must keep themselves in shape and generally do not have the time to program for the 10-mile run. The CO of ___ Sqn noted that aircraft maintenance crews have less time than pilots to train on physical fitness...

- Flight Safety Committee

Help-yourself drugs



An airline doctor was recently compelled to observe "I guess some pilots are still unimpressed with the many warnings regarding drugs and flying" in response to a particularly irresponsible act by one of the company's pilots.

This pilot, during his annual medical, had an alarmingly abnormal electrocardiogram readout and was consequently removed from flying. During the cardiac evaluation later he admitted he was taking reducing pills - the so-called *Rainbow* variety. These pills come in a delightful array of colours and contain a potent heart medication, amphetamine (pep pills), barbiturates, diuretics, and other unidentified compounds.

His heart required a month to get over the shock of these drugs.

Flying and drugs don't mix. Stay away from over-the-counter drugs and don't use someone else's or last year's prescriptions.

Sure, you're already convinced that self-medication is hazardous but this one will help you stay convinced.

SGT G. MARSHALL

As a Tracker flew over the base, Sgt Marshall noticed black smoke coming from one of the engines. He immediately notified the base control tower and the pilot was alerted to the hazard. The engine was examined and was found damaged with scuffing and scoring of a piston and cylinder - a serious problem with this engine.

Sgt Marshall's perception and initiative resulted in the pilot being alerted to an in-flight hazard. A person of less integrity might not have felt the need to respond; Sgt Marshall's contribution exemplifies the degree of involvement aviation demands of everyone.

CPL S.G. WYNNE-SILLS

On a routine post-flight inspection on a visiting T33, Cpl Wynne-Sills discovered a sheared eyebolt in the left flap. This condition was difficult to detect, being in an awkward recessed portion of the aircraft.

Cpl Wynne-Sills demonstrated alertness and initiative in bringing to light a malfunction which could have caused a serious in-flight hazard. Contributions such as this are the very essence of accident prevention.

CPL E.F. GALBRAITH

As flight engineer on a CH113 helicopter, Cpl Galbraith was carrying out an inspection during a quick turnaround at another base. While examining the engine compartment, he noted what appeared to be a rusty deposit on the edge of a coupling in an engine's driveshaft. After cleaning the area and removing some parts he found the coupling to be badly cracked. This coupling and shaft rotate at nearly 20,000 rpm; the failure of this high-energy component could have had serious consequences.

Cpl Galbraith's integrity led him to discover a hazard in an area not required to be inspected during a BFI. His commendable alertness establishes Cpl Galbraith as a valuable member to any aircraft crew.

CPL R.A. LOVEGROVE

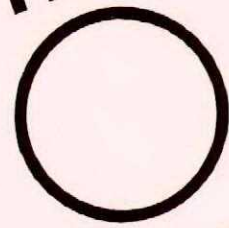
Awakened in the middle of the night by high winds blowing, Cpl Lovegrove recalled that a visiting Otter aircraft had been left on the ramp overnight. Concerned that the unexpectedly strong winds might damage the aircraft, he dressed and drove to the flightline. After

The
mysterious
case
of the

LOST CAUSE



QUARANTINE
REASON



DATE _____
INSPECTOR _____

RCAF E313 (Rev. 2-60)
8135-21-800-3039



"... reports on two successive flights of control stiffness during aerobatics..."

A T33 aileron boost assembly was replaced in response to reports on two successive flights of control stiffness during aerobatics.

The suspect part was to be quarantined and then shipped to the Quality Assurance Laboratories for investigation into a possible malfunction. However, the base later admitted that, in error, they had shipped the suspect unit to the overhaul contractor. The contractor was then advised to re-direct the unit to the QAL. This took three weeks from the first report.

A boost unit arrived at the lab, but had a different serial number - the result of the component being identified merely by the supply voucher and shipping tag instead of the serial number. To further complicate things the actual item had indeed been received by the overhaul contractor because the base had shipped it the day after the occurrence!

By the time all this was discovered the aileron boost assembly had been dismantled and was on the repair line. This meant that there was little or no hope of determining if this control unit was a problem area.

Someone at the base of origin had probably quarantined the wrong item. This error not only caused a flurry of paperwork and extra chasing around, but it left investigators with no further understanding of this T33's control problem...

FS in action!

This year's spring migration restrictions appear to have resulted in a significant reduction in birdstrikes.

- Flight Safety Committee

Orendas' FOD

... damage was not always reported by the field units and consequently is considered to have been unknown to the units...

Last year Orenda Ltd was asked to report on the extent of FOD damage to J79 engines returned for repair or overhaul. The analysis was prepared in response to a request from the Canadian Forces, the intent being to determine the amount of FOD not previously detected in the field. Also, identification of foreign objects causing the damage was requested.

Orenda surveyed all engines returned during 1966 and 1967. From this, some very significant statistics emerged. Most surprising was the high incidence of FOD in the J79s which had gone undetected or unreported. Figure 1 shows the extent of FOD in the J79.

	1966	1967	TOTAL
Engines returned for FOD	24 (20.2%)	24 (18.2%)	48 (19.1%)
Additional FOD events detected at Orenda	53 (44.5%)	54 (40.9%)	107 (42.6%)
All FOD events recorded at Orenda	77 (64.7%)	78 (59.1%)	155 (61.8%)

Figure 1. Engines with FOD. Numbers in () are percent of all engines returned.

While investigators at Orenda had an interesting story to tell they had to admit that over three-quarters of the FOD was of unknown origin. Although the largest item is "undetermined", a statistical solution to the mystery might be to divide this number by the ratios of the other items.

This report brings into focus the hazards of operating in the region of bird flight with an engine which is obviously incapable of withstanding bird ingestion. Had there been widespread (and strongly-worded) dissatisfaction from all concerned at the time when a new aircraft was being considered, the state of the art might have been advanced in response

Engines with FOD

	1966	1967	TOTAL
Bird ingestion	11 (14.3%)	4 (5.1%)	15 (9.7%)
Screw, pin or rivet	3 (3.9%)	6 (7.7%)	9 (5.8%)
Nuts and washers	1 (1.3%)	1 (1.3%)	2 (1.3%)
Tools	1 (1.3%)	0 -	1 (.6%)
Ear defenders	0 -	2 (2.6%)	2 (1.3%)
Misc: (nameplate, packing materials, decals)	2 (2.6%)	3 (3.8%)	5 (3.2%)
More than one object suspected	1 (1.3%)	1 (1.3%)	2 (1.3%)
Not determined	58 (75.3%)	61 (78.2%)	119 (76.8%)
TOTAL	77 (100%)	78 (100%)	155 (100%)

Figure 2 - FOD Causes. Numbers in () are percent of total engines with FOD.

to these demands. Under the circumstances, this is for the NEXT generation of aircraft.

Birdstrikes notwithstanding, there's obviously room for improvement in FOD control procedures. It is, as one officer put it "... a very enlightening report...". The big question is: What effect is this enlightenment going to have on the way we handle these expensive, fragile machines?

FOD Committee - please take note.

Tool control

... a new toolbox with positions for each tool has been developed. This will provide instant recognition if a tool has been misplaced or is missing.

- Flight Safety Committee

the WALKAROUND

The least respected of all aircrew checklists — yet it's the one which is the most fatefully final...

Let's face it, the thoroughness of the external is too often proportionate to:

- temperature discomfort level
- density of precipitation
- amount of haste
- presence of distractions
- number of interruptions
- amount of reliance on others
- inaccessibility of the checklist items
- degree of familiarity with the aircraft
- recency of the last checklist review
- presumed likelihood of finding anything

With all that going against it, it's little wonder that the old checklist suffers somewhat on occasion. Too, a diligent external may reflect unfavourably on one's masculinity - as one prominent psychologist has suggested. Whatever the reason, walkarounds are not properly performed and our statistics indicate that this can be dangerous! There's the awesome finality of being stuck with a critical item which - unlike the gear-up approach or incorrect fuel selection - cannot be salvaged. A flapping external panel is with you to the end - of the flight, or you.

As for a walkaround being an affront to the integrity of the technicians who readied the aircraft - forget it. They're quite happy to have you double-check their work; it's at least a reassurance that something won't inadvertently cause an accident. This double-check is akin to counting the (small) sheaf of bucks the pay officer hands you. Sure, you trust him, but you'd rather not have him make his mistake with your money.

In this business of flying there's some things a pilot just can't do anything about - the Walkaround's not one of these. Maybe the stories will drive the point home.

The worst Canadian military aircraft tragedy resulting from an incomplete external inspection occurred in 1946. A crew of three plus 18 ferry pilot passengers were killed when a Dakota elevator lock was not removed before flight.

Since 1956 the T33 alone has sustained 36 occurrences in which components came adrift or opened during flight. Most were caused by incorrect fastening or being left open. Omitted on walkarounds were: armament doors, plenum chamber doors, engine access panels, fuel tank covers.

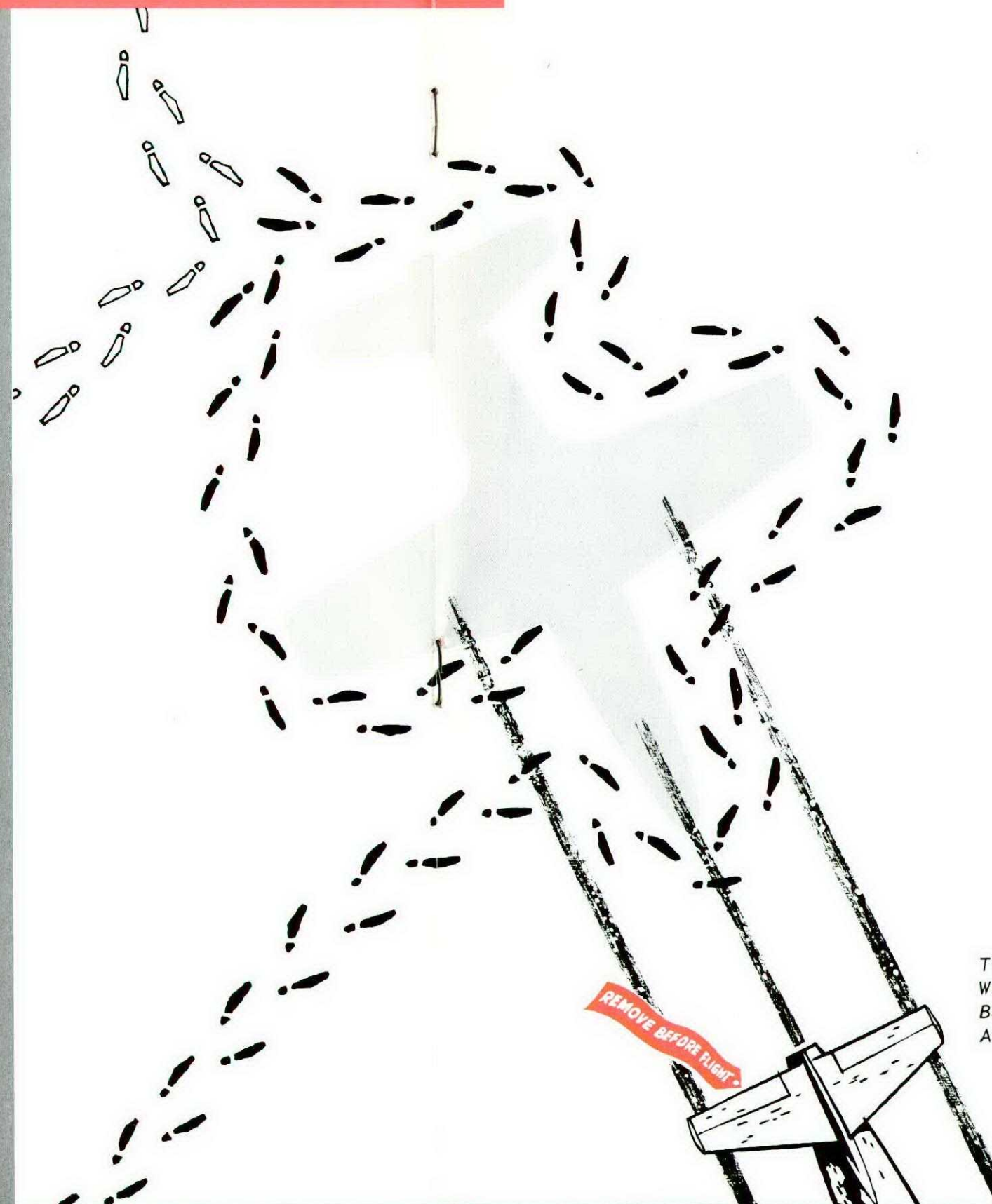
A CF104 technician failed to secure an intake duct door; the pilot and crewchief failed to spot it on the walkaround. Fortunately, the damage to the horizontal stabilizer (caused when the panel came adrift) was not sufficient to cause loss of control.

A CF100 pilot experienced a pitotstatic problem on climbout. Later, in a descent the aircraft struck the ground killing the two crewmembers. During the walkaround the pilot failed to notice a piece of tape covering the static vents for a system leak test.

Three T33s have crash-landed in the last ten years because unlatched armament doors opened on takeoff. Two people have died and several others had very close calls (see Flight Comment Nov/Dec issue).

After a short stop-over a technician installed the rudder lock and forgot to remove it before the next flight. The pilot was able to successfully land the aircraft without the aid of rudder - much to the relief of himself and the passengers on board.

*There once was a pilot named More,
Who found the external a bore,
But a panel did break off, on his final takeoff;
As for More - there'll be no encore.*





—back after a 4-year hibernation

Murphy's Muddle

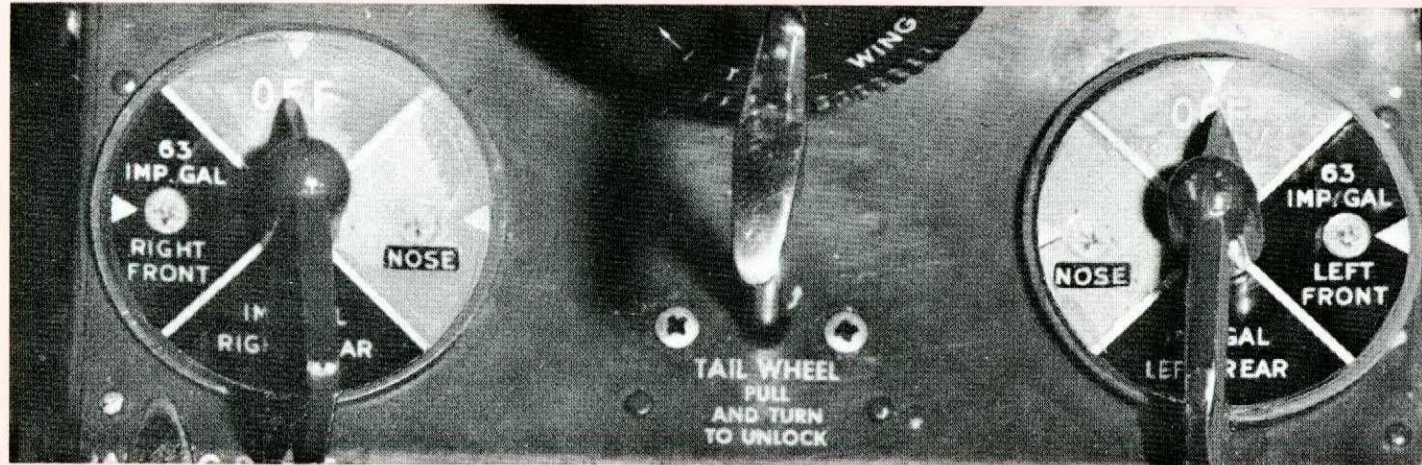
front tank selection is actually a nose tank selection. (Photos courtesy "Flight Comment")

- Everyone dropped the ball on this one:
- ▶The pilot might at least have been puzzled - and thus alerted - at finding a LEFT tank fuel selector on the right-hand section of the panel.
 - ▶To use the words of our Nov/Dec 1965 article on the subject, "A rather inept technician had installed fuel selector control assemblies in reverse..."
 - ▶No one saw fit to ensure that a warning or caution entry in the EO was produced in response to the 1965 experience.
 - ▶Murphy himself, who in the dim reaches of the 30s, failed to provide a design which would prevent incorrect installation.

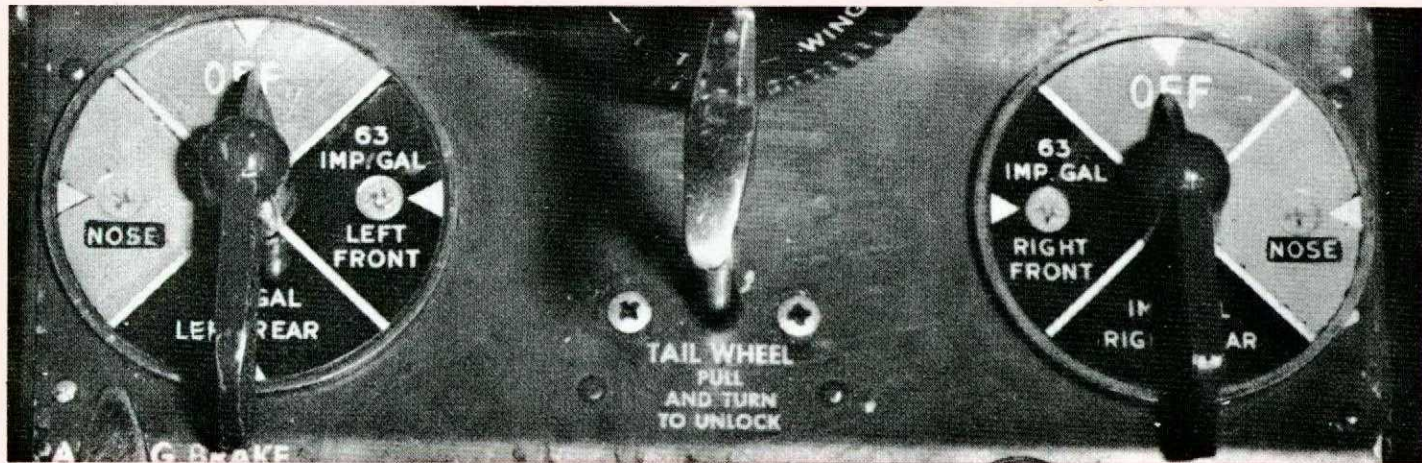
But how long will "alerting all technicians to the dangers of this incorrect installation and for supervisors to guard against any future occurrences" persist? Four years sound reasonable?

One would suppose in this day and age that the simultaneous double-engine failure existed only in war-story bull sessions. But no - here's a pilot who was recently confronted with a double-engine failure a half-hour after takeoff.

This half-hour roughly corresponds to the fuel contained in the C45's nose tanks. The photos show how a



Does this layout look reasonable?



As designed...

Reflecting runway markers

BATCO reported that all the distance-to-go markers on the runway now have reflective tape and that they have been found to be very effective at night.

- Flight Safety Committee



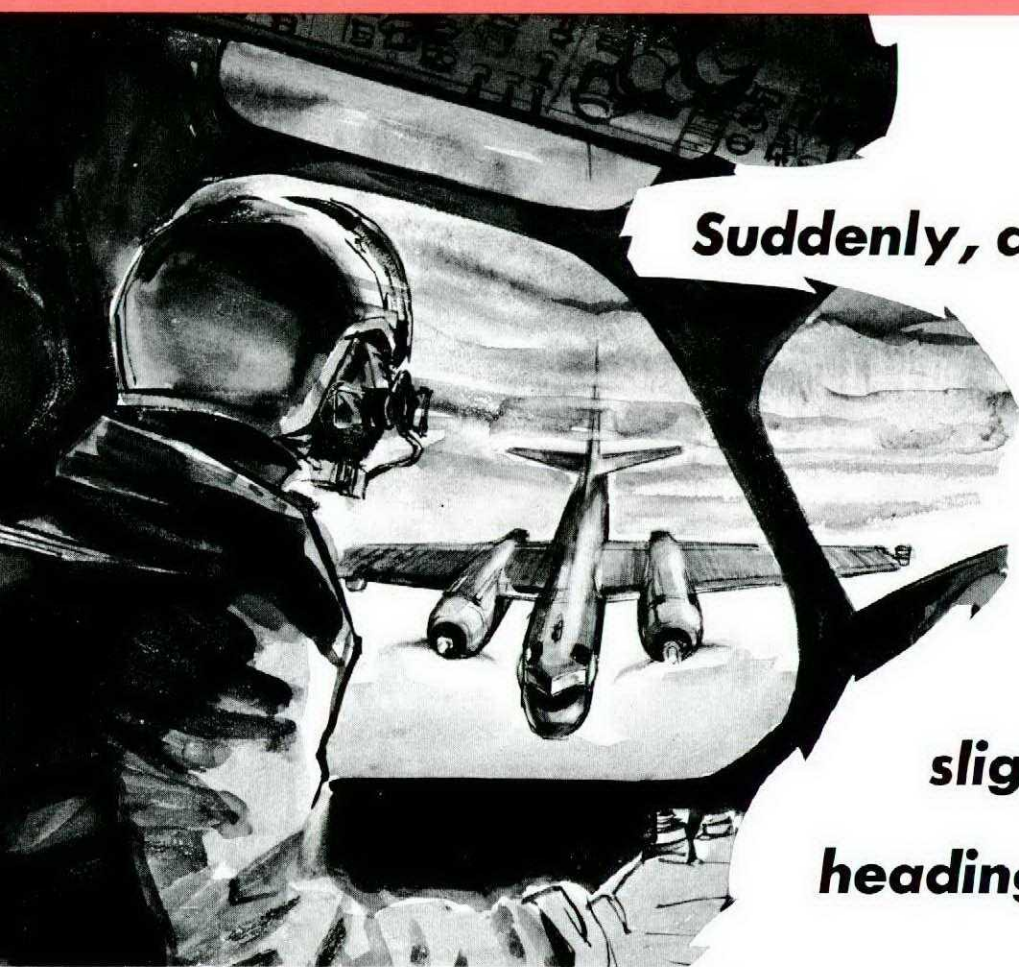
Throughout 1968, CFB Comox prepared in pictorial form three-dimensional FOD posters.

Each month the most startling or interesting foreign objects are photographed and

displayed on the closed circuit TV.

This is a most commendable technique for convincing the skeptical and keeping everyone FODedicated.

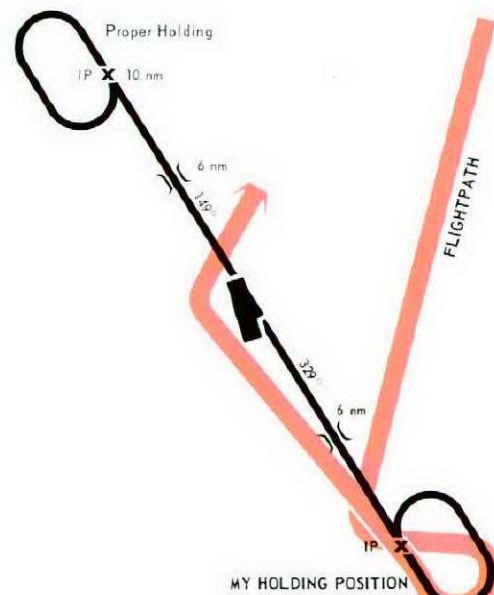
NEAR MISS AT SEA...



Suddenly, another aircraft appeared out of the cloud at 1030 slightly below me heading right at me...

The aircraft carrier HMCS Bonaventure is 150 miles off the coast of Norway. The weather is 500 feet overcast, with one-half to one mile in light rain showers and fog. Cloud layers extend up to 6000 feet...

Returning to the ship from a 4-1/2-hour patrol, I was given a clearance for a TACAN 2 approach; I was to hold at 2000 feet until an assigned approach time. I was given the ship's "foxtrot corpen" (flying course) and noted I was 30 miles northeast of the Bonnie. I then flew a heading to what I thought was the holding fix; that is, a point on the 149 radial from the carrier. For this, my heading was approximately 185. The diagram shows how I proceeded to a holding pattern which was the reciprocal of that required...



After arriving 20 minutes later at a point I thought was the holding fix my copilot reported entering the holding pattern. I had 8-1/2 minutes to my approach time. I was tired but being in cloud I was concentrating hard on flying the instruments. Shortly after entering the holding pattern my TACAN started to act up - breaking lock 45° to port and then to starboard.

With the carrier always on the move, the pilot must continue compensating for this as well as for wind. Also, with a time separation of 1 minute 30 seconds there's obvious requirement for some precision in positioning the aircraft. The margin for error is much less than for a land base - yet the opportunity for error is substantially more.

The aircraft in front of me reported starting his approach; he was 30 seconds late. A minute later I reported commencing approach and entered a descent to 1000 feet. Approach control gave me a "roger" to my report and instructed me to carry out pre-landing cockpit check.

I was now heading about 330 and as I levelled off at 1000 feet I noted I had six miles to go (the gate). Just as my copilot reported at 6 miles to go, the aircraft ahead of me reported a similar distance-to-go! Something was obviously wrong but I couldn't figure out just exactly what it was. The controller acknowledged both our transmissions and switched the other aircraft to the precision radar approach frequency.

Something was very wrong - so I turned 45 degrees to starboard on a standard missed approach procedure. In response to my copilot reporting this maneuver the ship acknowledged with "roger - maintain". As I had no

idea where the other craft was I couldn't climb but added a bunch of power to clear the area as fast as possible. Just as I completed my turn the copilot saw us pass the ship - going 180 degrees from our course!

Suddenly, another aircraft appeared out of the cloud at 1030 slightly below me, heading right at me. I had time only to check back on the pole slightly as the other aircraft passed under me. We were so close I could hear the sound of his engines. The next couple of minutes were quite mixed up; the first thing I remember is the ship calling and asking for identification. After they had my aircraft positively identified I was given radar vectors to final approach and landing.

This Near Miss brought to light a few interesting facts. I later learned that recently a number of other pilots had also held on the reciprocal radial. Fortunately someone in the crew had caught the mistake in time. Now, when landing instructions are passed it will include the holding fix radial and distance.

The Tracker, like many other types, is flown with two qualified pilots in the cockpit. Neither pilot should take it for granted that the other is incapable of making a mistake. Almost every move the pilot makes should be backed up and double checked by the copilot. If it were, my mistake would not have resulted in such a near-catastrophe.

Readers will be grateful to this pilot for conscientiously reporting his Near Miss. From reports such as this, effective techniques can be devised - for everyone's peace of mind. Make them anonymous if you wish, but get 'em in!



Grounds for suspicion...

The latest hockey game having been fully dissected, the conversation at coffee break took a turn for the more serious. "I was just going over a case which makes my hair curl when I think what *might* have happened" said one of the inspectors - an old hand at maintenance. "Seems to me we have too many *near-fires*". He went on to expand that despite precautions, regulations, and equipment monitoring there's still many areas in which static discharges and random potentials can create fire hazards. Is the aircraft grounded - and what does that mean? Is *all* clothing around the hangar static-free? Are the grounds good ones? Can you get a spark from the floor ground to the electrical ground?

These and other questions are important ones for the supervisor who has his men's safety in his hands. If you're not sure of the answers to some of these questions, now's the time to give the whole situation a close going over.

sumpthing in the sump...

**During a CH12 run-up,
the engine suddenly stopped.**

Oil was found in the carburetors, so the suspected oil dilution valve was changed. After draining fuel lines and carburetors the engine was declared serviceable. (An unserviceable oil dilution valve would cause the oil tank to overflow with fuel; the resulting pressure in the oil dilution line would cause oil to back up into the fuel system and enter the carburetors.)

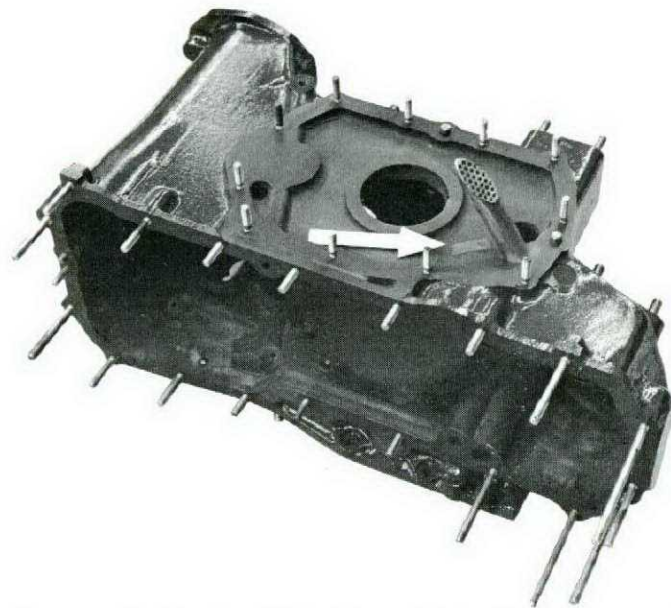
Before a report on the valve was received, a case of apparent excess oil consumption occurred on the same aircraft. After a one-hour flight, the oil level was down six quarts. When a large quantity of this lost oil was discovered in the sump, the scavenge pump was suspected but it proved serviceable. This then indicated the probability of a foreign object intermittently blocking the scavenge pump pick-up pipe. The engine was removed for examination by the contractor.

"Meanwhile, back at the plant..." the oil dilution valve proved to be serviceable so the suspected oil dilution system was re-connected after having been earlier isolated as a precautionary measure.

By now, there was little doubt the two malfunctions were related. From a study of the oil systems, specialists concluded that the original occurrence resulted from topping-up the oil tank when the oil level was found very low.

The suspected presence of a foreign object was confirmed when the contractor found two pieces of plastic in the oil sump next to the oil pick-up pipe. This plastic could easily block the oil scavenging when sucked over the intake pipe.

The source of the plastic is unknown which is unfortunate. If the person responsible could be found we'd give him a brief resumé of how a moment's carelessness



Two small pieces of plastic - origin unknown - caused hazards, headaches and gobs of paperwork.

or inattention really can foul up the system:

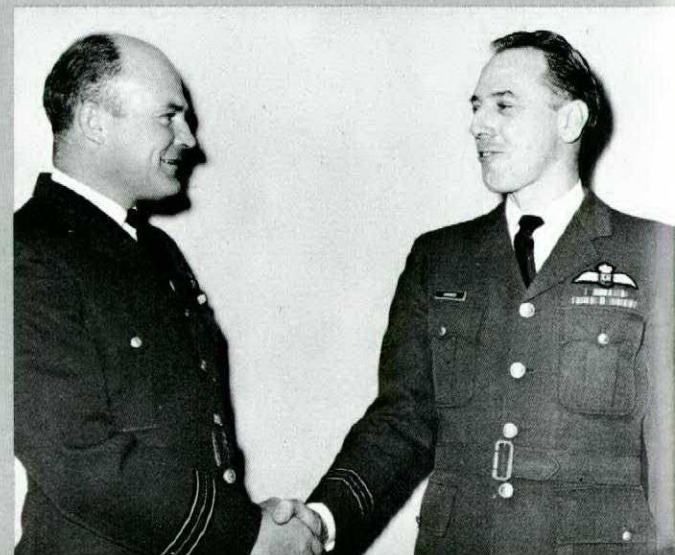
- ▶ an extreme flight safety hazard was created.
- ▶ a great deal of expensive overhaul and research was performed.
- ▶ the staff-work required was considerable; 17 messages, contractors' reports, and a UCR were required. If you consider the possibility that 10 people at either end of the message system (a most modest estimate), somehow participated in this problem, the amount of wasted effort becomes apparent.

The villain of this story unwittingly accomplished something worthwhile however. There's an unprecedented degree of familiarity with this oil system!

DFS staff change

We said goodbye the other day to Maj M.D. Broadfoot, head of the Prevention section. He is returning to regular flying duties with 437 Sqn, Trenton. Maj Broadfoot served in both the Investigation and Prevention sections of the directorate and almost single-handedly rode herd on a multitude of flight safety matters. His replacement, Maj W. Garner, brings years of flight safety experience to his new position. Previously, Staff Officer Flight Safety at Training Command he is best known as the course director for the last three annual flight safety officer courses.

Maj Broadfoot and Maj Garner. ▶



On the Dials

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

the Good Books

Read the best books first, or
you may not have a chance
to read them at all.

- Thoreau

A number of the "good guys" passing through on recent ICP courses have confirmed one of our long-held suspicions: the average airframe driver is not aware of the availability - or even the existence - of some of our favourite publications. We'll drop a few names, and steal some quotations to give you a brief description of these books.

CFP 148 - Manual of Instrument Flight Procedures

This publication - available for every graduate pilot - gives a basic understanding of aircraft instruments and a general knowledge of instrument flying procedures. Sufficient background information has been provided to allow the student pilot to use this publication in conjunction with other training manuals.

Take our word for it, in case you haven't seen this one; it's loaded with good stuff.

TC 110 - Weather Guide

Available for all aircrew, Weather Guide is designed for use by graduate aircrew. It is composed of three parts:

- Part 1 consists of basic theory plus examples; the application of the theory explains the nature and causes of weather which may be encountered during flight. The theoretical treatment is a consolidation of the material in "Weather Ways" which covers the most important aspects of aircrew meteorological courses. It also provides some exercises and recommendations for further study.
- Part 2 gives explanations and answers to the questions in Part 1, plus those from "Weather Work".
- Part 3 is an example of an Instrument Rating Qualifying Examination, and includes answers.

GPH 204 - Flight Planning and Procedures, Canada

This publication - issued for the first time late last year - is available for all aircrew. Developed for aircrew operating within Canadian airspace, it is a collection of general rules, procedures and information which previously had not been readily available. It supplements the other Flight Information Publications, and will be re-issued twice per year, or as required.

Let's finish off with a word about an old friend, GPH 205, the Enroute Supplement for Canada and the North Atlantic. We suggest that you read through the Special Notices section of every new issue.

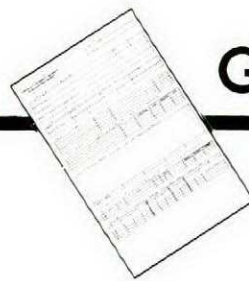
Man injures fellow technician...



Well, not deliberately...

Almost at the top of the ladder by the Yukon's front passenger door, a technician is suddenly hurled to the floor as the ladder separates from the aircraft. The 10-foot fall causes injuries to a hand and his back with possible permanent disability.

Like we keep saying - the cost of carelessness can sometimes run pretty high.



Gen from Two-Ten

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

continue their basic assignment". (The pilot had tried to get an enemy aircraft slot in the exercise.)

While proceeding to his area, he bounced another section although not authorized to do so. An "enemy" section observed this action and proceeded to intercept. After they had closed to about 2 miles astern at a height of 500-600 AGL, the aircraft started a right turn. This turn of approximately 70° bank was at first level, then slightly climbing,

T33, STRUCK GROUND The pilot was on a low-level close air support mission. His job was in a surveillance role; other "enemy" aircraft were to intercept those assigned to this function. Below 3000 feet AGL the intercepted aircraft were to "break into the attacker and then

only to start gradually losing altitude until the aircraft struck the ground at about 20° angle still in the right bank after turning through 110°. The pilot was killed. No attempt was made to eject.

Although the cause remains undetermined, the pilot probably became:

- ▶ distracted by the aircraft behind him.
- ▶ disoriented during the turn. Deteriorating light at dusk, and visibility degraded in light drizzle, contributed.

These factors plus his relative unfamiliarity with the role, were a lethal combination.

CF104, BROKEN TAIL The towcrew (4 experienced corporals) were backing the aircraft into position in the hangar for weapon loading. When the main wheel reached its marker spot a wingman told the driver to "hold it". The driver's response was to continue, assuring the wingman that he would back a little further then pull forward onto the spot. A scraping crunch (or crunching scrape) announced the impact of port horizontal stabilizer and building.

Damage to the stabilizer necessitated its replacement.

A maintenance order (now modified) called for backing up an extra 10 feet and then towing forward into position to obtain the maximum ground clearance for weapon loading. In this instance, where clearance

was critical, no *shall not cross* reference marks for the tow vehicle were painted on the floor.

Supervision was a major factor in this occurrence:

- ▶ the towcrew were all the same rank,
- ▶ non-compliance with EOs, on the number of men in the towcrew.



OTTER, EO IGNORED To remove the amphibious floats, the crew undid the main bracing wires, whereupon the aircraft fell over onto the starboard wingtip.

The CAUTION in the EO on float removal had not been followed: "Attach sling and hoist (min 10,000 lbs capacity) and support weight of aircraft prior to slackening off attachments and bracing wires." With nothing to support the aircraft weight, the port float strut fitting broke allowing the aircraft to fall over, damaging a starboard flap hinge and flap attachment arm.

Luckily, no one was injured. Obviously the EO wasn't used; the CAUTION could hardly be overlooked

as the entire reference to float removal is covered in one short passage.



ARGUS, NOSEWHEEL COLLAPSE

The technician was instructed to remove a bolt from the nosegear downlock for reinstallation on another Argus. The bolt was difficult to extract so he removed the nosegear ground safety pin and rotated the cam follower slightly to make the job easier. He then leaped to safety as the nosegear slowly collapsed - fortunately escaping injury. (Rotating the cam follower breaks the geometric downlock.)

The radome, radar antenna, two engines and propellers required replacement.

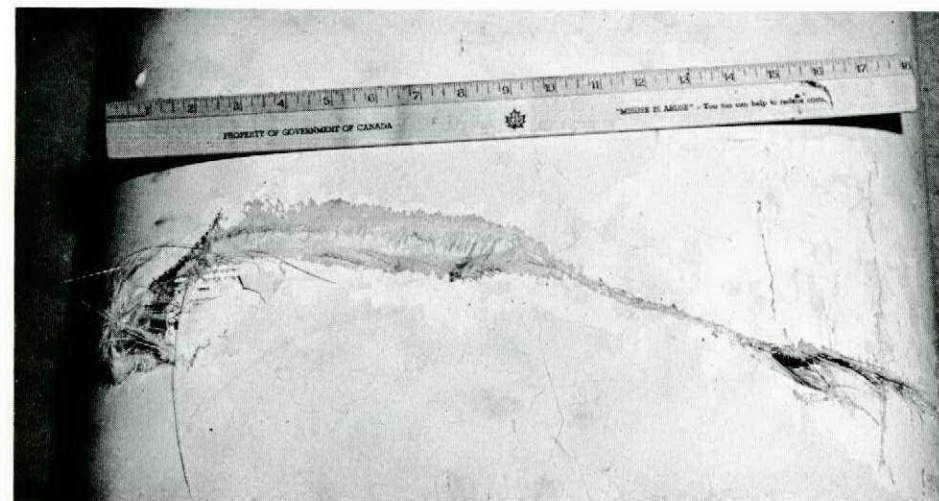
As no one took the basic safety precautions - proper chocking, setting main brakes, positioning snugged-up jacks at the forward jacking points - the stage was set. Another precaution would have been assignment of more than one man for such a job. Although no specific instructions existed pertaining to this task, EO



00-80-4/27 states in general terms that the aircraft should be jacked before work is carried out on landing gear.

The technician could have been killed; a great deal of expensive

damage was done - why? Because a sequence of intolerable and marginally-tolerable conditions were permitted to reinforce one another in one of those *sooner-or-later* coincidences.



CH113, WIND HAZARD On returning to base from a helicopter rescue mission, the tower notified the pilot of winds at 35 gusting to 40 - within limits for rotor shutdown. However, when the rotors had almost stopped,

the crew heard a thump on the top of the fuselage. Just then, a "special" from the Met section reported the wind as 36 gusting to 49. Probably, a gust caught a rear rotor blade, forcing it down sufficiently during

its last revolution to hit the fuselage fairing.

During high winds one of the large hangars is available for start-ups and shut-downs when a helicopter is on SAR duties. As the tower had twice given a wind report of 35 to 40 just prior to shutdown, it was not considered necessary to use the hangar.

The darkness, high wind, and rain made tying down the rotor blades hazardous. Rather than climb onto the slippery fuselage for this operation, the aircraft was towed into the hangar. Gusts caught the blades which sailed high enough to reach the up-stops, nearly striking the overhead door frame.

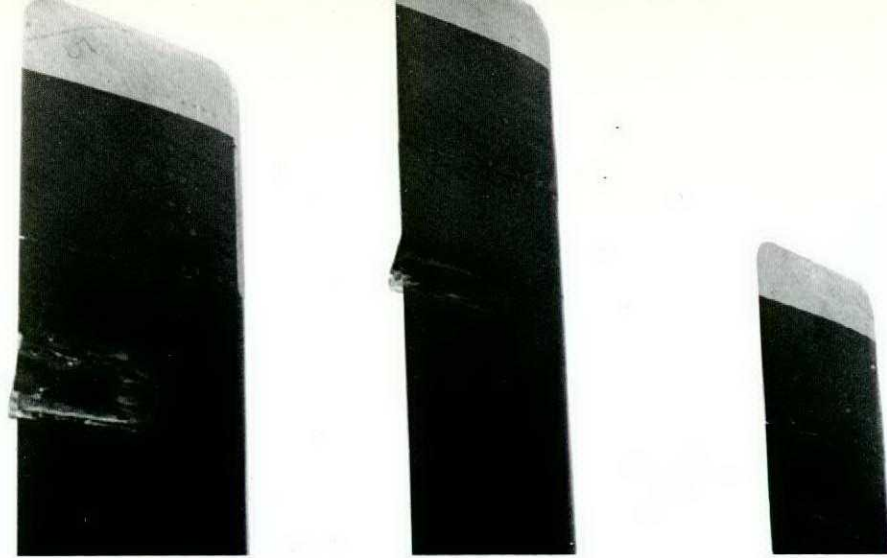
Chopper drivers would be wise to regard wind limits with a healthy skepticism. When they're near the limits, exercise all precautions.

cont'd on next page

Hearing Conservation

The BISO mentioned his concern about groundcrew hearing and noted that some groundcrew were not wearing the required earplugs as well as aural protectors.

- Flight Safety Committee



Five blades needed replacing...

SEA KINGS, BLADETIP COLLISION During a demonstration formation flypast the six helicopters - two vics of three - flew along the port edge of the flight deck. The starboard wingman of the first vic momentarily glanced away from his leader when distracted by something to his right

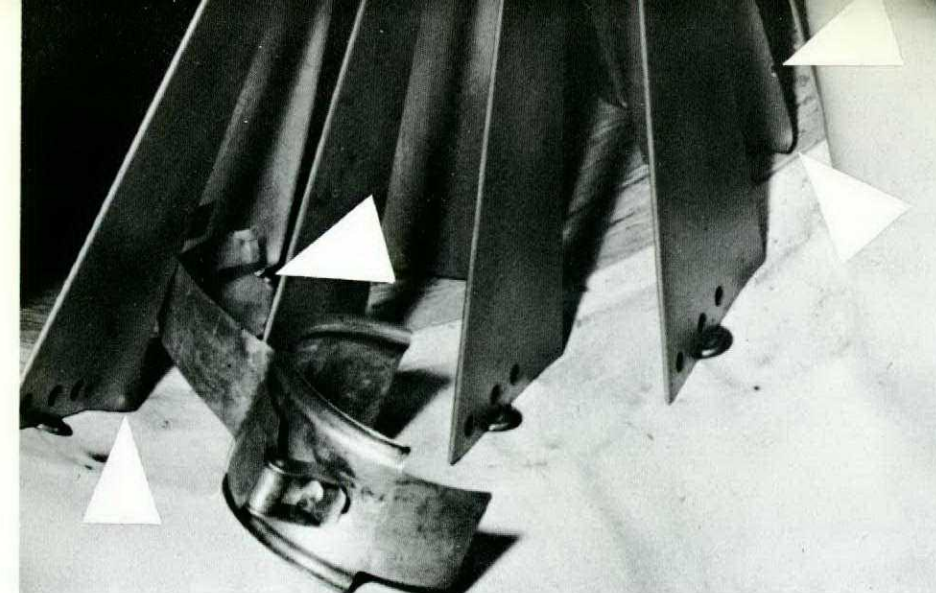
(the ship's mast and antenna array). On returning his watch on the leader, he realized he had drifted in "...a bit close" and immediately corrected. When the aircraft returned to the carrier 2½ hours later the rotor blades of both the formation leader and his starboard wingman were

discovered damaged. Unknown to either crew their rotor blades had touched during the formation flight - undoubtedly when the wingman glanced away to identify the visual distraction.

The crews were very fortunate. The damage, although not enough to affect the flying characteristics of either aircraft, necessitated replacement of five blades plus several others requiring repair.

Close formation flying in helicopters is hazardous because the bladetips are not easily seen and even a slight blade collision is potentially disastrous.

CFAOs for a helicopter display flight of 6 require a minimum of 500 feet between the lowest aircraft and the highest obstruction. (The formation was flying at 150-155 feet on the radar altimeter - the height of the carrier mast is 132 feet.)



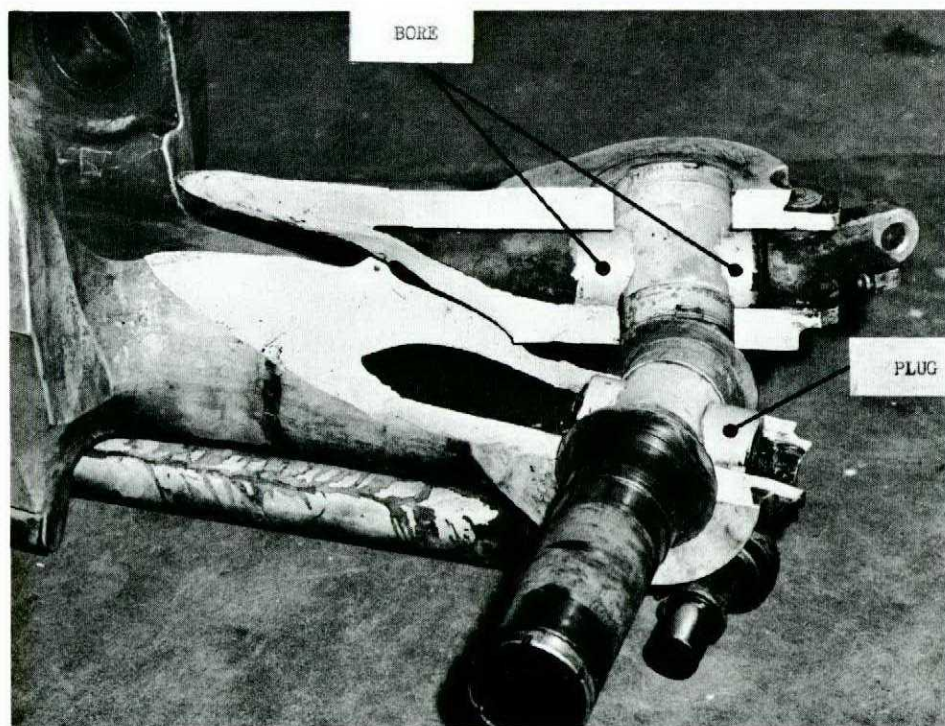
Bent and banged blades...

YUKON, CRACKED U/C An unsafe indication on the right main gear indicator on retraction was caused by a fractured bogie beam. The wheels on that end of the beam were thus bearing no weight.

Back in 1966, Flying Tiger Airlines discovered cracks in the bogie beams of their CL44s so a special inspection (SI) was issued to inspect and replace as necessary. So many cracked beams were found that it was impossible to replace them all at once.

The cause of the cracks was stress corrosion, set up by over-tight axle locating plugs.

Here's where NDT monitoring is helping to control a situation which could produce serious accidents.



CF104, ENGINE FOD During a post-inspection engine run-up the throttle was advanced toward full military. At 87% the EGT rose beyond 600°; a loud noise was followed by a rumble. Out of the tailpipe came small pieces of metal. The engine was shut down.

The main portion of a generator blast duct clamp was found lying against the inlet guide vanes. Severe damage had been caused to the engine by this foreign object which was traced back to another aircraft on inspection.

All FOD checks had been signed-

for, and everyone stated that they had been done. However, the clamp must have been in the duct before the aircraft was moved from the hangar; the screens were installed in the hangar *after* the FOD check. A clamp - or a portion of it - should have been seen in the duct itself

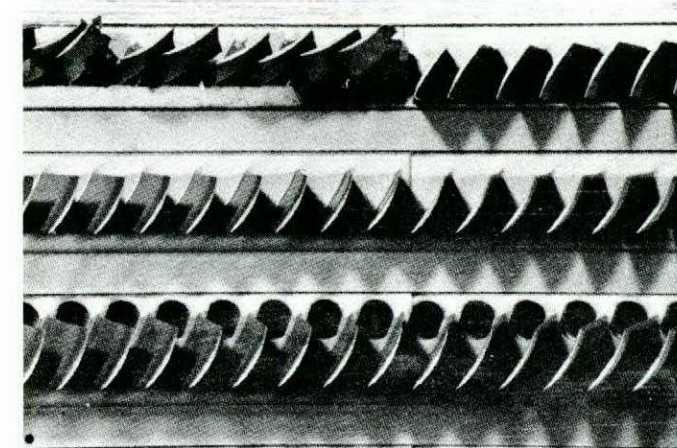


TUTOR, MURPHIED ENGINE Just after takeoff the engine made a loud bang, EGT rose to 900° C, and rpm fell to 30%. When a relight appeared unsuccessful, the pilot turned back and landed downwind on the parallel runway with the remaining power.

Heavy engine damage was found in two compressor stages and exit guide vanes, plus other minor damage.

A section of the 7th stage stator was not only installed in the wrong place, but reversed so the blade curve was backwards! Other sections were also misplaced but not reversed. Assembly tolerances permit this type of murphy. Records revealed that the goof must have occurred during manufacture. The engine had a history of vibration but the cause had never been determined; within limits, it had been kept in service.

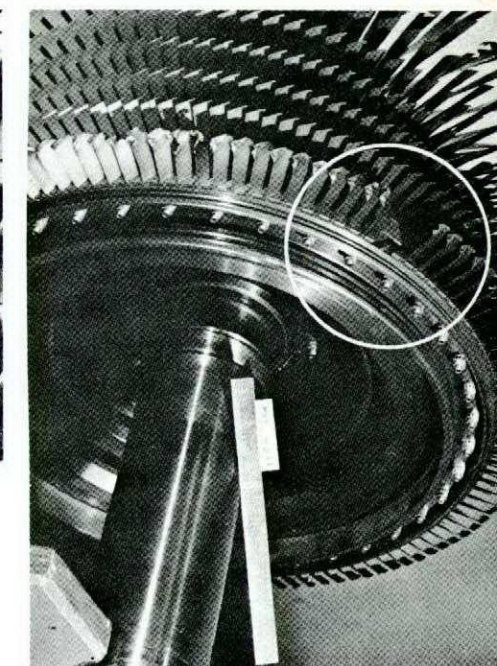
The missing blades and their mounting failed from fatigue caused



by the extra stresses in the turbulence around the incorrectly assembled section.

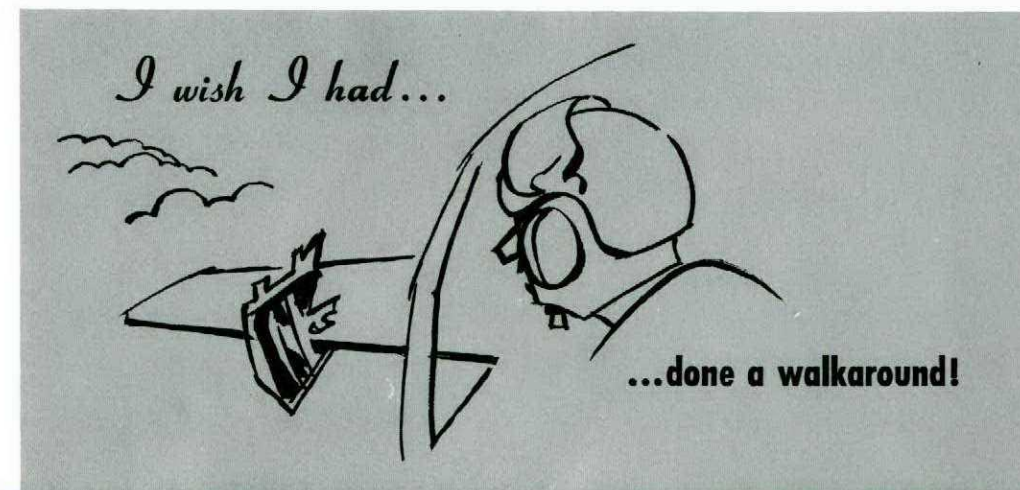
This isn't the first time, so better instructions have been issued on how to assemble this engine. Also, components are to be conspicuously marked.

Although this one was a manufacturer's error, the incorrectly assembled section was at a place where it would be possible for this



misassembly to occur in the field.

Have you reported or taken preventive measures on Murphies you have noticed? Or will we simply await another close-call like this one?



Comments

to the editor

The excellent article on Mobile Command unfortunately leaves the reader with erroneous information. I was surprised to find that I flew with a unit from Jan 56 to Jan 59 that didn't exist until 1962!

Tactical Fighter Flight may have been "born" to 408 Sqn in 1962; however, its origins are much more ancient than indicated.

TFF began at Rivers in 1948 as 417 Sqn with Mustangs. It was later reduced to a flight and integrated with TSS (Air) until 1955, when it became TFF once again - still with Mustangs. In 1956 it received four T-birds and in the summer of 1956, two more. In late 1958 TAC HQ folded and ATC took over; in 1960 TFF folded. In 1962 it re-emerged as part of 408 Sqn, retaining the original six T-birds. The role of 417 and TFF was the same then as it is now; however, it now has a little more "priority".

Maj R.S. Poole
425 Sqn, Bagotville

Having been associated with the T33 as an AFTech for more than a decade, I can well appreciate the concern expressed with the armament door problem described in the Nov/Dec Flight Comment. The suggested microswitch-activated warning light in the pilot's cockpit would appear to be simple, economical and easy to implement, so I would think we should get on with the job.

The fact that we still lose aircrew and T33s greatly disturbs me and would seem to be a further indication that many people consider the T-bird to be an old, no longer important aircraft. That we have over 200 T-birds in use as an advanced trainer and a communications aircraft seems to refute this opinion very strongly.

An unfortunate example of such an attitude occurred a short time ago

when a UCR was submitted on the T33 emergency undercarriage handle fouling on the guard assembly. The recommendation in the UCR to eliminate completely the problem was a simple modification involving practically no expense and requiring approximately .5 hours to carry out. Sounds reasonable, doesn't it? The response to the suggestion, however, as stated in para 18 of the UCR was "This UCR was thoroughly investigated and is considered an isolated case; also first known case reported. However, the UCR and modification will go on file for possible future use."

My experience indicates while this may have been the first reported case, it definitely was not the first time the situation had arisen. All was not a complete loss however; as a result of UCR 8525/A78 the addition of a caution note to EO 05-50C-1 informing the pilots of this hazard, was supported by DFS. This to me is the same as admitting we have a problem but refusing to take the necessary corrective action. The big question in my mind: must we wait for an accident before we act on known problems?

In an emergency situation of hydraulic pressure loss, the pilot's life or the aircraft may depend on the action he takes in the few seconds after the pressure loss has taken place. With his mind occupied with these problems he is expected to remember a caution in an engineering order dealing with making an emergency landing. Let's hope his memory is good and his reflexes sharp!

Sign of the times

An operational F4 recently flew 40 flights in 17 days without a minor or major u/s! Even then, the sequence was ended by a required periodic. Something to think about - and aim for.

As you may have gathered the T-bird is very dear and close to my heart, so many thanks for a wonderful magazine and an outlet to blow off steam.

Cpl J.H. MacPherson
Maintenance Research
CFB Bagotville

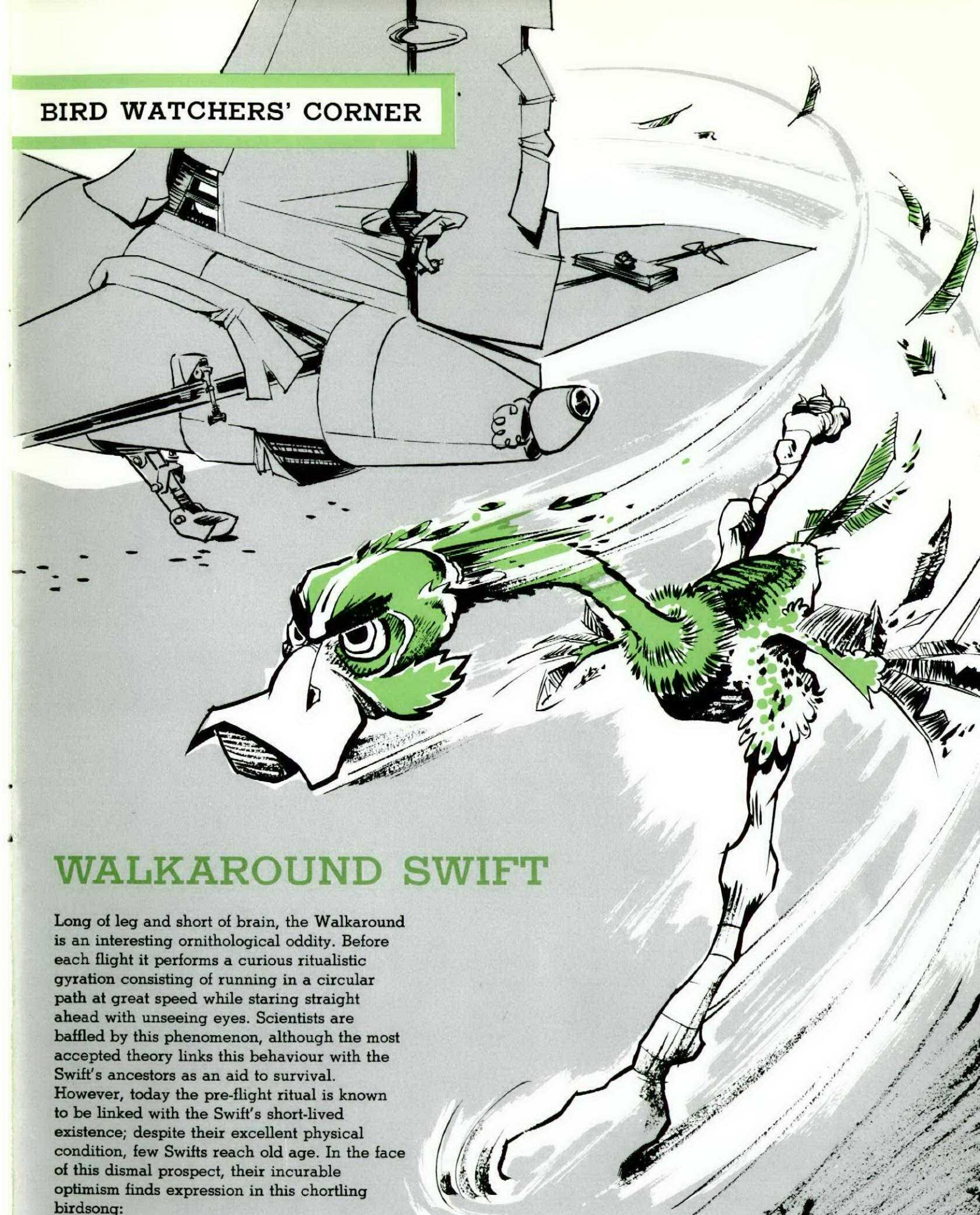
Thanks for your letter and continued interest in the flight safety implications of this modification. It's through sincere concern and conscientious effort that problem areas such as these are uncovered and fixed. For our part, we gave your proposal another detailed going-over.

The emergency undercarriage handle fouling on the guard assembly has been deemed by various experts as an isolated case. The significance of this is: Modification projects require statistical substantiation.

On the trial gear lowerings there was no difficulty in moving the emergency gear lever through its full travel. Investigators noticed that the landing gear successfully lowered even though the emergency lever was stopped short of detent in the full travel position. In any case, restrictions to movement could be detected and corrected during periodic inspections when this lever is actually moved through its full travel.

We agree that there is little indication on the UCR as to how "thoroughly" the investigation was performed; we therefore welcome this opportunity to reply more informally. Our investigators made a special trip to Uplands to again verify the feasibility of your proposal. Like you, we feel that the unsatisfactory condition reporting system is less than satisfactory in the feedback of information to the originator, but with the resources at our disposal we must accept these limitations.

BIRD WATCHERS' CORNER



WALKAROUND SWIFT

Long of leg and short of brain, the Walkaround is an interesting ornithological oddity. Before each flight it performs a curious ritualistic gyration consisting of running in a circular path at great speed while staring straight ahead with unseeing eyes. Scientists are baffled by this phenomenon, although the most accepted theory links this behaviour with the Swift's ancestors as an aid to survival. However, today the pre-flight ritual is known to be linked with the Swift's short-lived existence; despite their excellent physical condition, few Swifts reach old age. In the face of this dismal prospect, their incurable optimism finds expression in this chortling birdsong:

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"...circuit breaker kept popping during flight..." said the pilot-
from which can be gathered that he kept unpoping it.
In this case, the component was found to be drawing
excessively high current — a condition
which could have had serious consequences.
Do you know the real "Why" of circuit breakers?

