FLIGHT COMMENT

JANUARY · FEBRUARY · 1968

Training Command

Comments

An astonishing case was reported by a military force in which a pilot attempted to mask what turned out to be a serious medical condition. The pilot, killed in a flying accident, had taken cold capsules (containing antihistamine) prior to flying. Autopsy showed that his "cold" was actually advanced tuberculosis of the lungs, liver and spleen. An X-ray made seven months before the accident was read as negative. His annual physical at that time revealed no evidence of TB. There's a lesson in this unusual case – don't mask symptoms by self-medication. A cold's enough to ground you; add drugs on top of that, and you're doubly in no shape to fly!

In response to a blitz on false fire warnings, (particularly in the Argus), we've had some success in reducing these annoying and hazardous snags. In the Jan/Feb 67 Flight Comment a detection systems expert wrote "sustained care has to be exercised by technicians. When the false alarm rate is low a laxity breeds false alarm causes. This explains why high false alarm rates tend to occur in cycles". The prediction was correct and again it's time to tighten the procedures.

The feasibility of a single-action ejection control for Canadian Forces' jets has been confirmed by a study recently published. Now underway, is a project for its development for ultimate incorporation into the T33, Tutor, CF101, and CF5. The flight safety implications of a standardized single-action system make this one of the most worthwhile projects to come along in some time.

Several years ago, in conjunction with the agency at CFHQ responsible for ejection systems, we produced a booklet entitled Ejectioneering. The book was produced in quantity for distribution throughout the services and was designed to fill a large – and somewhat embarrassing – gap in our regulations and training material. It was a worthwhile project but unhappily doomed from the start to lapse into early obsolescence. This has prompted requests for a rewrite but since much of the information in Ejectioneering is now in AOIs there's little justification for reissuing the booklet. It now contains misinformation, therefore all copies should be destroyed.

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ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1967

LEARNING AND PURPOSE

Training Command's sole purpose in military aviation is to train personnel for the user Commands. Because of the diversity in the roles of these other Commands, the Training Command product must accommodate sound basic knowledge, peaked skills and professional attitudes.

Producing this product is no mean task. The basic knowledge accrues gradually and systematically throughout the training of the individual, and the skills develop after much patient instruction. The professional attitude comes even less easily for it is not something that can be taught. Professionalism is instilled over a long time period from pride in, and respect for, one's work. The instructors of Training Command introduce students to this attitude through the examples they set. Such attributes instilled in the young graduate make him a desirable product for any Command, a valuable resource to the Service, and an asset to his Country.

By graduating such well-oriented men and women, Training Command can be justly proud of its contribution to the Canadian Forces. These graduates guarantee the success of the air effort. We trust that each one is instilled with a sense of responsibility to accomplish any assigned missions with the least loss of resources – this being a vital aim of our Flight Safety program.

Air Vice-Marshal RC Stovel
Commander, Training Command

Our major bases are now each recording up to 30,000 aircraft movements per month. Of every three hours flown by the Canadian Forces, one is by Training Command . . .

Flight Safety in Training Command

by S/L W Garner
Staff Officer Flight Safety
Training Command Headquarters

It has been three years now since the Harvard – *the Yellow Peril* – has whined across the Prairies. In those days, the sages were sometimes heard to mutter "There are only two types of pilots; those who have ground-looped a Harvard, and those who are going to!" This expression, albeit stated cynically, had the ring of that old adage: "Accidents are bound to happen!" We, in Flight Safety, have learned we cannot accept that approach. In almost every case an accident can be prevented; invariably it is the result of an oversight or error on the part of someone, sometime, somewhere.

When the T-bird was introduced some fifteen years ago, we managed to write them off at the rate of one for every 1500 hours of flying. By comparison, in 1965 when the Tutor was introduced into training service the loss rate was less than one for every 10,000 flying hours. This, with students with no previous experience. Obviously there was no *one* factor which contributed to this success. It was, in fact, the result of a long and hard-earned realization by all those in Training Command, that *professionalism* in all personnel is the key. If everyone conscientiously adopts an attitude of pride in his work, however medial the task, the entire operation must be efficient. In this Command, those dealing specifically with aircraft safety are not divorced or separated in any way from the operation, neither do they exist to heckle or curtail the operation. They are there solely to assist the Commanders to achieve efficiency – for efficiency is synonymous with safety.

The primary task of this Command is obviously training. In conducting this training, how do we achieve safety?

Aircrew

The aircrew student is first introduced to flight safety – though he may not be aware of it – at the Aircrew Selection Unit. Here he undergoes many tests to determine if he has the potential, in attitude as well as aptitude, to complete his training. This aspect of the selection process is most important; it is essential that only those persons likely to graduate be accepted. Students who fail are certainly a waste of training resources – and the taxpayers' money.

Following basic indoctrination at Canadian Officers School VENTURE, Esquimalt, the student pilot reports to CFB Borden. Here, in the Chipmunk aircraft, he is again graded carefully to determine his capacity to master flying techniques. The successful student progresses to the Primary Flying School, where flying training begins in earnest. He is now constantly involved with all those aspects leading to proficiency through safety. He learns to respect his aircraft, his personal safety equipment, and in particular, those persons involved in his training.

If any one person has a major influence on the student pilot, then it must be the flying instructor. By his own example, he can – and must – engender in his students that professional attitude which is so vital. This attitude must be sustained through the Tutor phase, where the ability to make correct decisions rapidly, is concomitant with a jet environment.

Following the basic jet training phase, the student is then selected for either advanced jet training in the Silver Star (T33) or for multi-engine training in the Expeditor. After a year of intensive study and 280 flying hours, that memorable day arrives when the student receives his "wings". When one considers the multitude of subjects the students have learned and practiced thoroughly, the effort which has gone into their training, it is not without pride and a good deal of satisfaction that those responsible for the new graduates, see them embarking on their careers in the operational Commands.

Students selected for Radio Navigator training undertake their flying training at CFB Winnipeg. Throughout the course, professionalism is also engendered. Crew co-operation, emergency procedures and the attitude of good airmanship are looked for and demanded.

Ground Trades

Obviously, all manner of tradesmen are involved in aircraft management. All are taught that they are members of a team, dependent on the efforts of each member. It is our responsibility to ensure that each man is given the best possible training, and in so doing, to impart a sense of pride in a job well done. That this professionalism will be carried into all Commands of the Canadian Forces is well realized.

Training Command faces several major flight safety problems.

Traffic Congestion Our major bases are now each recording up to 30,000 aircraft movements per month. Of every three hours flown by the Canadian Forces, one is by Training Command. More than any other Canadian Forces component, Training Command knows what congestion is. The prospect of mid-air collisions is very real but, knowing this, everything possible is done to minimize the risk. Effective management, constant vigilance and common sense are essential attributes of both aircrew and traffic controllers. The flight-line at any TC base is a hive

The old standby . . .


The student's first few hours of flying . . .

The Yellow Peril's successor . . .


Still with us . . .

Aircrew in decompression chamber

Each jet aircrew student "rides the rails" . . .

Three students receive instruction

. . . like dragonflies . . .

of activity, and in this environment students learn the rudiments of their trade. Such things as planned flying, excellent controlling and constant vigilence make the system work; today, the accident rate from congestion factors is zero.

Foreign Object Damage Elsewhere in this publication is an article describing the problems of FOD and what is being done to combat it. Suffice to say here that if the FOD problem is to be eliminated, everyone from the designer to the technician must be involved.

Aircraft Some of the aircraft still being used in Training Command are aging, to say the least. Indeed, a wit was recently heard to say that the reason spares are so hard to come by is because they are now classed as "antiques". The Expeditor, with its swing characteristics is still our multi-engine trainer, and the Dakota – of 30 years vintage – is still grinding out the hours in pilot and RN training. Also, non-standardization of components in one type of aircraft causes countless difficulties in a training role. For the past three years, there have been three different instrument configurations in the T33. Why some of these things happen may be beyond comprehension but there is no doubt that having happened, the resulting problems facing supervisors are formidable.

Prerequisite Knowledge A student selected for training is generally well motivated and has the ability to learn rapidly. He may have some apprehensions, but to my mind there often could be much more. With jet training beginning so early in his service career, the student must be given an understanding of his physiological limitations. Even before seeing a flight-line, they must learn about the creeps, cramps and chokes, hypoxia, hyperventilation, hypoglycaemia and the rest. They undergo decompression chamber runs and are shot up the ejection tower. Desire must be a factor here, for no one yet has had to be carried screaming into the aircraft for his first familiarization jet flight! In encouraging the professional attitude, the student is taught prodigious amounts of background information. He must understand as well as know. This knowledge will then stand him in good stead as his experience grows.

Personnel In the past year or so, the flying instructor staff have included a high percentage of "pipeline" (recently graduated) pilots. This has been a further challenge for the supervisory staffs. Changes in policy should alleviate this problem, but meanwhile, special care is necessary to ensure that the less-experienced staff are capable of meeting their reponsibilities.

The maintenance organization is top rate. Even with the changeover to Tutor aircraft, the Engineering side of the team has done a noteworthy job. This has been a very pleasant experience for us in Flight Safety. During surveys, the technical people have been ready to listen to our suggestions; their efforts in the FOD campaign, for example, have been very commendable.

Safety is a nebulous subject. Ask a dozen persons what it is and you will get a dozen different answers. From another military force comes a view of flight safety worth repeating, as it describes aptly the position of "Safety" within Training Command.

Why Flight Safety?

"Some people think there is too much emphasis on safety in military aviation and that this is affecting operational capability. This attitude stems from the large number of regulations, sometimes conflicting, which seems to be the direct result of the flight safety program. Nothing could be further from the truth.

True, new regulations and added restrictions often follow the investigation of a serious accident, and can also be triggered by critical comment by the Directorate of Flight Safety on certain aspects of aircraft operation. But too often the regulations or restrictions go far beyond the intention of the board of inquiry or DFS. They become repressive because of a failure to understand that the real reason for them is to make the operational task basically safer by correcting unsafe acts which are not essential to the task.

Some acts, unsafe though they may be, are nevertheless essential to the operational task. It would be difficult, for example, to destroy a ground target with guns and not indulge in low flying. A birdstrike at high speed, even in a shallow dive, can be disastrous but the risk must be accepted if the task is to be accomplished. However, a birdstrike at high speed 50 feet above the ground cannot be accepted as unavoidable if the purpose of the flight was to ferry the aircraft to a maintenance unit.

Regulations should reflect this concept of flight safety. They should not hinder effective operation, but they should ensure that the risks accepted are essential to the task. If this is done – without additional restrictions on already adequate regulations – we will produce the best operational effectiveness with the minimum of danger and cost. And that is what we are all here for!"

Training Command, in consort with the Canadian Forces generally, is achieving notable results in accident prevention. It faces the future with confidence to meet the challenge of increasingly complex equipment, the rapidly growing demands of helicopter training, and environmental changes at our bases. We are proud of our role; in the professionalism we aim to induce in all our graduates, lies the real source of flight safety.

S/L Walt Garner, born and educated in England, served with the Fleet Air Arm of the Royal Navy during the war and saw service in carrier-based Spitfires. In 1950 he came to Canada, joined 411 Auxiliary Squadron, Toronto, and entered the Regular Force in 1953. After six years on the CF100, he moved to Training Command, serving in various positions associated with flying instructing, and a tour with Central Flying School. In 1965 he was appointed Staff Officer Flight Safety, Training Command. He is a graduate of the aircraft accident investigators' school at the University of Southern California.

PERSONAL PLEA – PILOTS

PERTAINING POWER POLE PRANGS: POWER PYLONS PACK PUNCH,
POSE PREOCCUPATION PROBLEMS, PULL PLANES PAST PERPENDICULAR,
PUNCTURE PILOTS POSTERIORS, PERFORATE PERSONAL PRIDE,
PROVIDE PERPETUAL PRONE-POSITION PITS. POOR
PRESS PUBLICITY PROMPTLY PREVAILS. PLEASE PONDER.

– RNZAF Flight Safety

Good Show

F/O KJ HARVEY

The student pilot had just completed an ADF approach to minimum altitude – 400 feet above ground – and had commenced an overshoot, when the instructor, F/O Harvey, noticed a rapid decrease in power. On realizing that the student had not reduced the power he took control. With insufficient runway remaining to land straight ahead he started a 360 degree turn while attempting a relight. As a safe forced landing seemed impossible they were preparing to eject when the engine re-lit, delivering about 80% rpm – enough power for a safe landing. During the final turn the rpm dropped to 60% but F/O Harvey was able to bring the bird safely to earth.

By quick thinking and a fine display of airmanship F/O Harvey saved the aircraft and the ground hazards of a bailout in the vicinity of an airport.

F/L TA LYONS

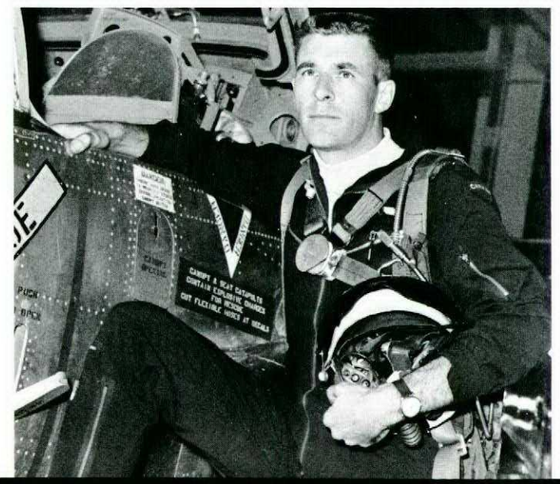
Following a touch-and-go landing, F/L Lyons instructed his student to carry out a closed pattern. When the throttle was retarded the engine remained at full power. The instructor took control of the T33, tried various throttle settings to no effect, climbed the aircraft to high-key position, flamed out the engine, and performed a successful forced landing.

The quick reaction and good judgement of F/L Lyons was a fine display of expert airmanship.

F/L TS BUGG

The student had just completed a low approach and overshoot, when F/L Bugg took control of the Tutor to carry out a closed pattern and landing. When he retarded the throttle the power remained at 100% rpm; throttle movement had no effect. Unable to climb to high key because of cloud, the aircraft was flown to low key, the engine stop-cocked and a forced landing carried out. Investigation revealed failure of the main fuel control.

F/L Bugg's quick assessment and response to this emergency was a commendable example of good judgement and flying skill.



CPL RW TANDY

Cpl Tandy was on a primary inspection of a Tutor when he noticed a shiny portion on the port wheel brake assembly. Upon further investigation he found that the revolving brake disc holding lug had jammed between the brake unit and the wheel, sheared off part of the brake housing, and damaged the brake pucks. The damage was visible only on very close inspection.

A special inspection of all Tutors at the base revealed seven aircraft with the same problem. The damage would probably have caused a tire, wheel or brake failure with a subsequent incident or accident. By his alertness and attention to detail Cpl Tandy eliminated a serious hazard.

CPL JJ TREPANIER

While on a between-flight inspection of a T33, Cpl Trepanier noticed a large bolt lying loose in an obscured but critical location in the aircraft control surfaces. Only a very careful examination of the area with a flashlight would have revealed the small visible portion of the bolt. This foreign object had worked itself into a position where jamming of the controls was imminent.

The conscientious and alert manner in which Cpl Trepanier performed his duties led to his discovery of a very serious hazard to flight.

COLD LAKE DRAGCHUTE SECTION

In a ten-month period the six men of the Cold Lake Dragchute Section packed 7100 chutes without an unsuccessful deployment. With dragchutes, it's each man's enthusiastic and dedicated attention to detail that produces records such as this. This record-breaking effort by the men in the dragchute section must be as great a source of pride to themselves as it is a source of satisfaction and respect by the aircrew who depend on these dragchutes for their safety.

A Good Show to the whole staff!

Firefighting Equipment

The firefighters have begun a program of rescue drills; the BFSO is assisting to ensure that the drill procedures are up to date. The safety equipment used by the firefighters to practise with is in poor shape and does not include the latest modifications.

– Flight Safety Committee minutes

FOD is crippling us!

by
CFB Gimli staff

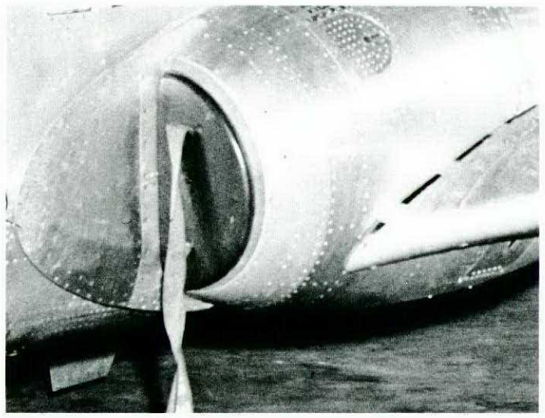
The quantity of weird and wonderful articles that an aircraft collects staggers the imagination...

"FOD is crippling us",
perhaps in more ways than one!

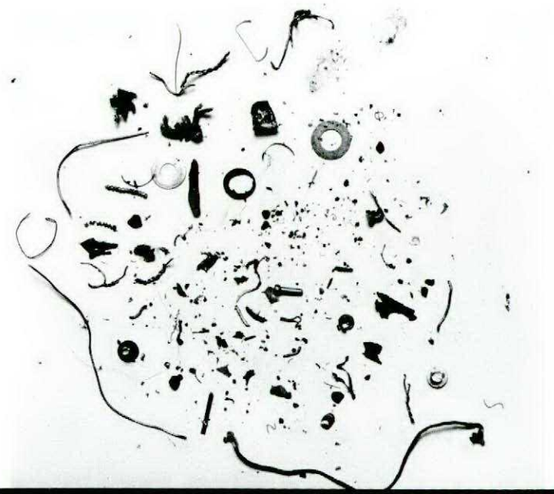
In the title is the history of the FOD-prone Tutor engine which ultimately brought flying training capability below acceptable minimums. In 1966 a staggering forty-two J85 turbine engines in Tutor aircraft were damaged in 57,700 flying hours for a loss rate of .73 per thousand hours. A small buy of spare engines plus difficulty in obtaining spares from the USA, meant FOD had to be reduced if operational goals were to be met. With the average cost for repair running around $12,000, 1966's FOD-damage bill within Training Command alone was $740,000. Ironically, there were no reported FOD-damaged engines in the T33 in Training Command in 1966.

At first, many believed that the Tutor was literally a vacuum cleaner on the flight-line but tests showed this aircraft when running at 100% rpm would not lift objects – not even leaves – off the ground. The J85 has an eight-stage axial flow compressor, the smallest turbine blades of which are only one inch long and very thin, making this engine very susceptible to damage by objects, particularly metal. Lockwire cuttings have turned up as the prime offender. This is understandable as the J85 required *thirteen times* more lockwiring than the Nene in the T33.

The first indicator of a FOD problem occurred in 1965 when two J85s flamed out around 22,000 ft. during aerobatics. The engine turbine blades were found to be severely damaged – but how? Later, the electronic and battery bay louvers which exhaust air (and any available FOD) directly ahead of the air intakes were found guilty. A faulty rivet came loose and ruined another J85. An incorrect-length panel screw in front of the air intake came free in flight – and another damaged engine. Many FOD-damaged engines were classed "unidentified FOD" because the foreign object could not be located or identified. Small metal pieces such as lockwire or cotter-pin cuttings would ruin the compressor then pass out the tailpipe and bleed ports.



– and this from one Tutor. There are 25 metal objects, each of which could have damaged a J85. Note the numerous lockwire ends.



Obviously, the most rewarding measures are to design and acquire anti-FOD airfields, aircraft, vehicles, and protective clothing. It is most vexing to know that practically all FOD could be prevented by designs which were well within our capability, and that for a long time to come we will be obliged to consume many manhours in searching for and removing FOD material – after we have placed it there.

The shorter-term fix was a pressing need: prevent introduction of foreign objects, or at least detect FOD materials by special inspections. For the immediate task the most fertile area for FOD prevention lay in organization and housekeeping. Here, "Preventing Foreign Object Damage to Aircraft" (EO 00-80-4/43) provided excellent guidance. The Base FOD Committee was formed and given wide jurisdiction and freedom in introducing FOD prevention measures.

Note, bags of evidence for all to see.

FOD and Good Housekeeping

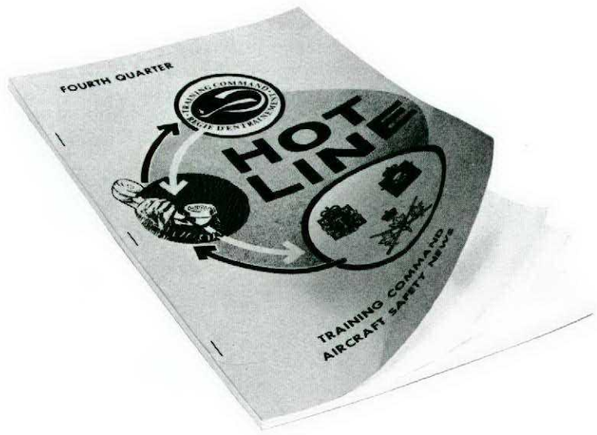
The major reason for FOD on a flight-line is poor housekeeping, therefore our FOD program at Gimli placed special emphasis on improving our flight-line housekeeping activities. Hangar clean-ups have always been a part of flight-line life, consequently our anti-FOD campaign inside hangars was relatively simple to organize. The *Broom Brigade*, outdated by mechanical floor sweepers, is still an effective FOD fixer. Now, stray papers, lost or forgotten screws, bolts, and the odd dead sparrow are quickly whisked safely into garbage cans. But there is a limit to having technicians pilot brooms.

Once the hangar floor has received *la grande sweep* there is the problem of keeping it clean. Everyone has been alerted to the dangers of FOD and told how to dispose of the loose ends before they cause grief. The education program included:

- the ceaseless repetition of the FOD theme
- compulsory viewing of FOD films
- FOD posters on notice boards

(cont'd on page 22)

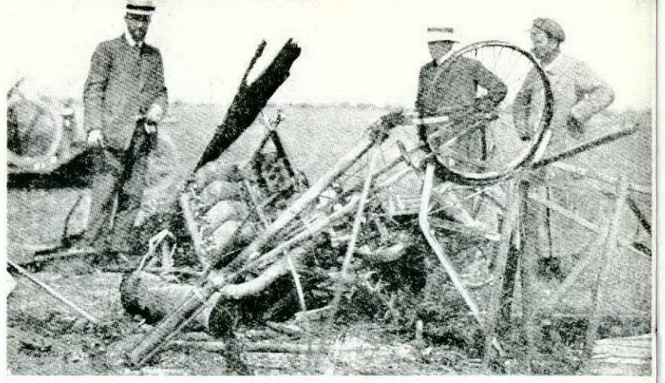
TC's "HOT LINE"



Training Command's flight safety quarterly "Hot Line" – a sprightly-written potpourri of information, provocative cartoons and photographs – features items of command interest plus material which would not otherwise be available. Each issue includes a critical review of the previous quarter's occurrences, and comments on the corrective action. Regular items include modifications and their status, changes in equipment and procedures, maintenance articles, notes from the flight surgeon, seasonal weather information, pilot features, personal safety equipment data, flight safety awards, and command accident statistics. Although some articles are reprints from short-supply flight safety magazines, much of the contents originates with the Command flight safety staff.

Flight Safety - 1910 Style

Fifty seven years ago appeared a modest little volume entitled "Flying Machines: Construction and Operation". One of the more interesting chapters is the one on flight safety entitled The Element of Danger. Understandably, it's the shortest one in the book!



"There is an element of danger in aviation but it is nowhere so great that the public imagines. Considering the character of aviation the the percentage of casualties is surprisingly small. This is because the results following a collapse in the air are very much different from what might be imagined. Instead of dropping to the ground like a bullet, an airplane, under ordinary conditions will, when anything goes wrong, sail gently downward like a parachute particularly if the operator is cool-headed and nervy enough to so manipulate the apparatus as to preserve its equilibrium and keep the machine on an even keel.

Two Fields of Safety

"At least one prominent aviator has declared that there are two fields of safety – one close to the ground, and the other well up in the air. In the first named the fall will be a slight one with little chance of the operator being seriously hurt. From the field of high altitude the descent will be gradual, as a rule, the planes of the machine serving to break the force of the fall. With a cool-headed operator in control the airplane may even be guided at an angle so as to touch the ground with a gliding motion and with a minimum of impact. Such an experience, of course, is far from pleasant...

Aviation Not Extra Hazardous

"All told there have been, up to the time of this writing (1910) just five fatalities in the history of pilot aviation. This is surprisingly low when the nature of the experiment and the fact that most of these operators were far from having extended experience is taken into consideration.

"In the hands of careful, quick witted, nervy men the sailing of an aircraft should be no more hazardous than the sailing of a yacht...

Safer Than Railroading

"Statistics show that 12,000 people are killed and 72,000 injured every year on the railroads of the United States. Come to think it over it is small wonder that the list of fatalities is so large. Trains are run at high speeds, dashing over crossings at which collisions are liable to occur, and bridges which often collapse or are swept away by floods. Still, while the number of casualties is large the actual percentage is small considering the immense number of people involved.

"It is so in aviation, the number of casualties is remarkably small in comparison of the number of flights made. In the hands of confident men the sailing of an aircraft should be, and is, freer from risk of accident than the running of a railway train. There are no rails to spread or break, no bridges to collapse, no crossings at which collisions may occur, no chance for some sleepy or overworked employee to misunderstand the dispatcher's orders and cause a wreck.

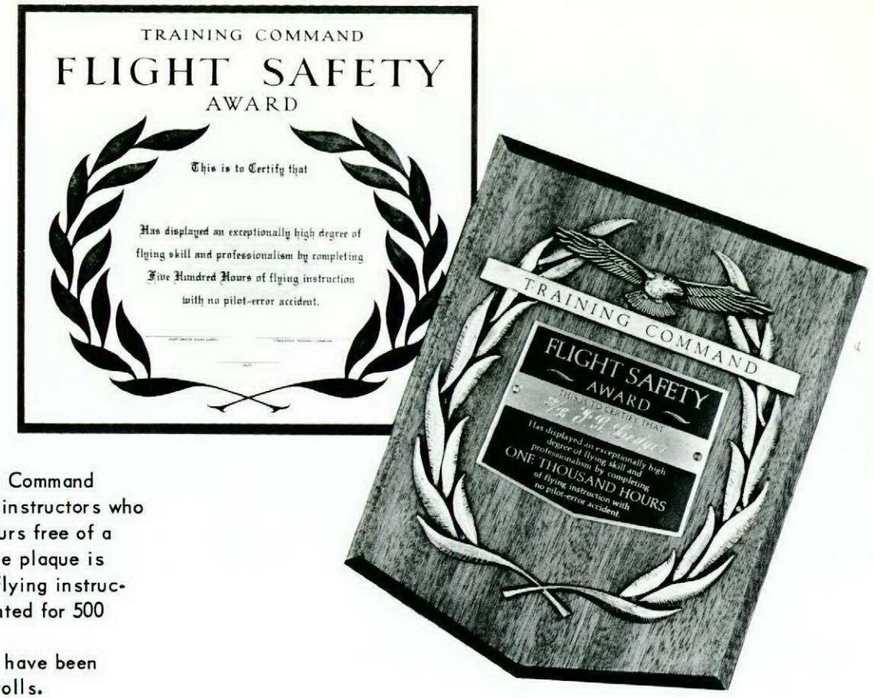
Two Main Causes of Trouble

"The two main causes of trouble in an aircraft leading to disaster may be attributed to the stoppage of the motor, and the aviator becoming rattled so that he loses control of his machine. Modern ingenuity is fast developing motors that almost daily become more and more reliable, and experience is making aviators more and more self-confident of their ability to act wisely and promptly in cases of emergency.

"Occasionally even the most experienced and confident of men in all callings become careless and by foolish action invite disaster. This is true of aviators the same as it is of railroaders, men who work in dynamite mills, etc. But in nearly every instance the responsibility rests with the individual; not with the system. There are some men unfitted for aviation by nature, just as there are others unfitted to be railway engineers."

Apart from the odious comparisons to the competition of the future, ie, the railroads, the chapter did contain a few nuggets of wisdom which the intervening fifty-seven years have not tarnished.

TC Flight Safety awards



The Commander of Training Command presents these awards to flying instructors who complete 500 hours and 1000 hours free of a pilot-error accident. A handsome plaque is awarded for 1000 accident-free flying instruction hours and a scroll is presented for 500 hours.

Nearly 500 of these awards have been made – 200 plaques and 250 scrolls.

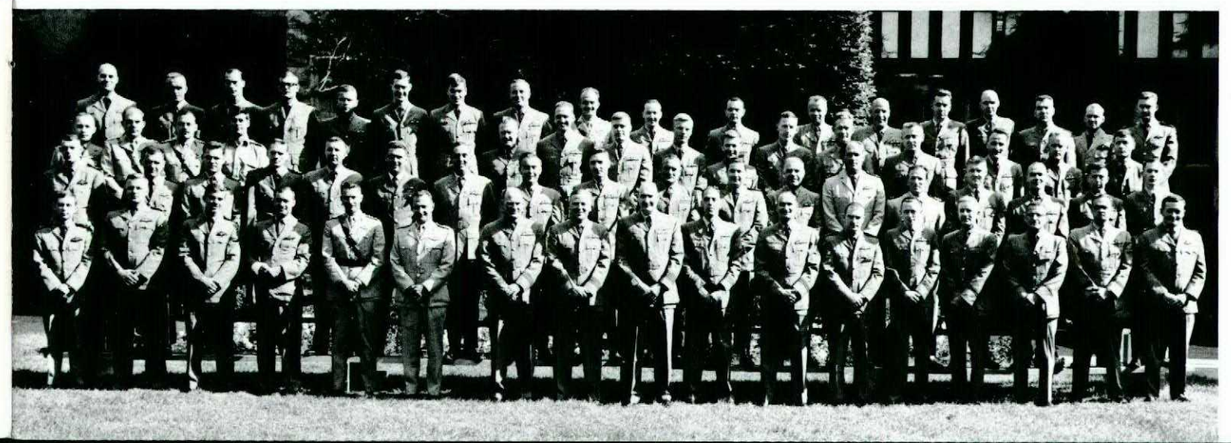
Canadian Forces' Flight Safety Officers Course

In 1965 Training Command took over responsibility for the training of Canadian Forces flight safety officers. This year's course (which took place at the RCAF Staff College in Toronto) was the largest ever – seventy-five officers.

Aircraft engineering, aviation psychology, personal safety equipment, staff procedures, prevention and investigation activities, are all part of and well-covered in this brief two-week course. Heavy on seminars and discussion groups, the course attempts to project the officer into actual events at a base relating to flight safety.

This year guest lecturers from the University of Southern California Aerospace Safety Division spoke on aviation psychology, engineering and aerodynamics.

Training Command's maxim "flight safety starts here" now has wider application – flight safety officers start here.



BIRDSTRIKES–PREVENTION

One way is-don't fly

"The only way to prevent accidents is to ground the fleet."

Long the cynic's refuge – and perhaps the FSO's despair – this old saying may have some use after all. To prevent birdstrikes, grounding all aircraft is now a feasible alternative to our traditional pressing-on into known hazardous regions. Intense concentrations occur primarily when birds migrate; in any given area this may happen on only a few days or nights each year. Grounding the fleet then, on these few occasions, would greatly reduce the exposure to hazard, yet leave the flying syllabus relatively intact.

An example of what we mean by "exposure to hazard" occurred last year when a CF104 struck a snow goose during a period of intense migration activity. Ironically, the passage of these birds through the area probably lasted less than 24 hours, and may have been anticipated had the information – known to observers hundreds of miles to the north – been passed to the base.

We now have the capability to predict probable bird movements. Several agencies, particularly those plotting migration routes and establishing bird populations, have observers in the field; these men often know that specific migrations are underway long before the feathered hazard moves in. Supplement this foreknowledge with radar tracking, photography, and PIREPS, and the supervisor is in good shape to make "a knowledgeable assessment of the situation" before deciding to fly or not to fly.

Recognizing the feasibility of responding to these warnings during migratory periods, Air Defence Command has plainly stated its stand: "...the outlook of this Headquarters is that while training syllabi represent important objectives, there is still no pressing requirement to fly into known hazardous bird conditions, particularly during the night, solely in the interest of syllabus fulfilment.".

We're deeply pleased that a statement of this sort has been issued; it's not only evidence of an enlightened and positive approach to a known major problem but it's the culmination of the first phase in our away-from-base (vs airport control) birdstrike prevention program. Those involved in what must have seemed to be an uphill fight for recognition over the past few years can regard with satisfaction the final coming-of-age of the program at least within Air Defence Command.

With airport control measures well in hand, the next stop for the preventers: making sure our new aircraft can better withstand birdstrikes – at least, there's now sufficient ammunition to win this one hands down!

FLASH! New Strobe Marker

Under evaluation for three years, the personal marker distress light (which is standard equipment for US forces) replaces the existing emergency light, and will be distributed as personal issue to all active aircrew in the near future. The flashing strobe light is visible from the air for six-plus miles compared to its predecessor's one-minus. The lamp's intensity permits its use even on dull days. Wave action has little effect – a major advantage over the old light.

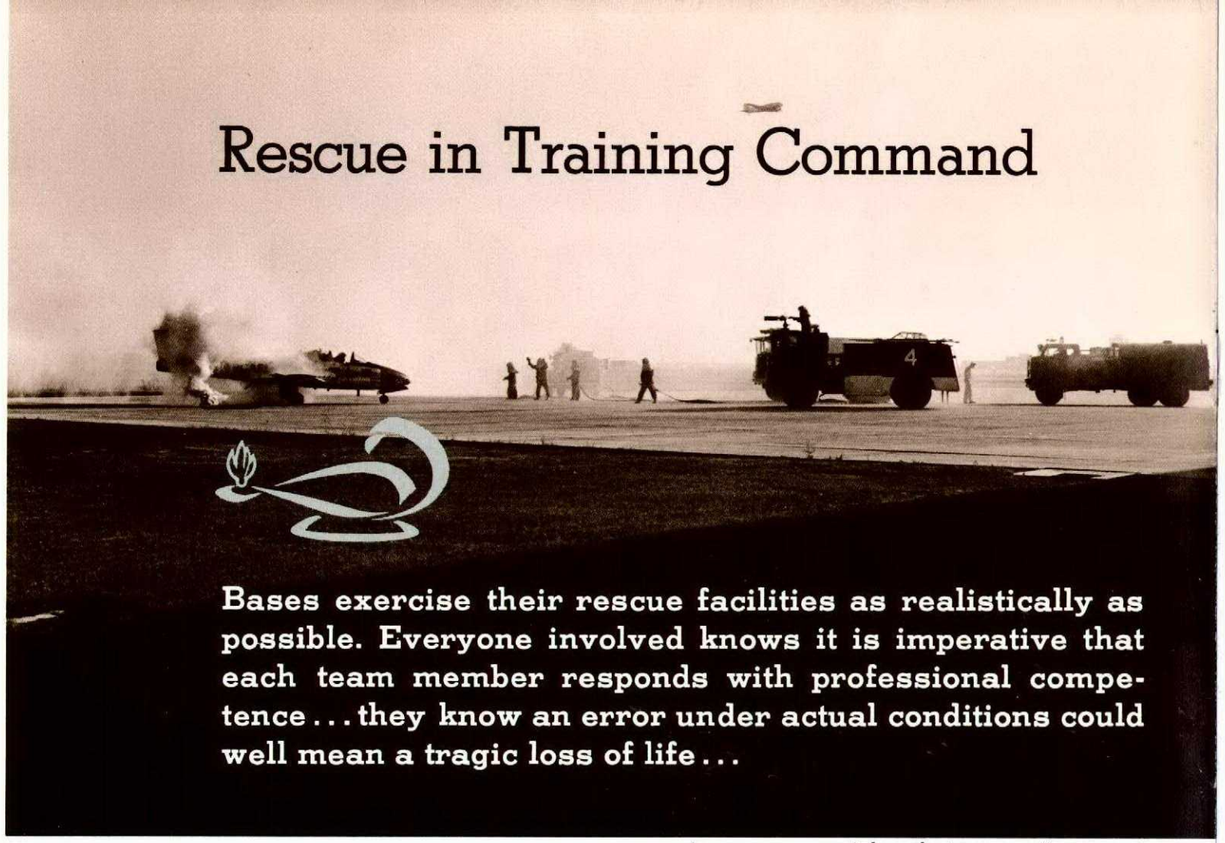
The SDU-5/E can be carried in a pocket on existing life jackets, or in a flying suit when a life jacket is not worn.

INJURED?

Hydraulic power was quickly turned off – just in time to prevent this man from serious injury. He was the latest victim of several close calls recently in which component-actuating power has been applied to an aircraft without the proper precautions.

Unless the trend discontinues someone's going to get hurt – bad.

Rescue in Training Command



Bases exercise their rescue facilities as realistically as possible. Everyone involved knows it is imperative that each team member responds with professional competence . . . they know an error under actual conditions could well mean a tragic loss of life . . .

Fire trucks arrive . . .
(Note the aircraft canopy has already been removed.)

(The photos are of a recent "alert" at CFB Winnipeg.)

. . . the vehicles are in position . . .
(Note the E62 flusher on the left as back-up for the foam truck.)

. . . fire-fighters ready to move in with their hoses . . .

. . . foaming commences . . .

. . . smoke from simulated fire helps create realistic rescue environment . . .

. . . fire-fighters prepare to rescue crewmembers . . .

◁ . . . ready to lift first crewmember . . .

. . . precarious position of fire-fighter shows why repeated practise is needed to maintain proficiency and speed . . . ▷

. . . after the "alert", discussing the quality ▷ of the foam.

. . . foam smothers the fire . . .

ADC SOFS

S/L CHISHOLM

AIR DIV SOFS

S/L RONAASEN

ATC SOFS

S/L REID

MATCOM SOFS

S/L RATCLIFFE

MOBCOM SOFS

S/L JOY

MARCOM SOFS

S/L SAGE

TC SOFS

S/L GARNER

COLD LAKE

F/L WOOD

1 WING

F/L PORTER

DOWNSVIEW

S/L BRENNAND

Let's help them...

4 CIBG HQ

Capt CHRISTENSEN

SHEARWATER

LCDR ROSENTHAL

MOOSE JAW

F/L DZAMKA

CHATHAM

F/L WILLSON

3 WING

S/L AYRES

EDMONTON

F/L AGAR

2 RCHA

Maj McDONALD

SUMMERSIDE

F/L JOHANSEN

WINNIPEG

F/L NORDMAN

ST HUBERT

F/L LAKINS

BAGOTVILLE

F/L HEBERT

4 WING

S/L CINNAMON

UPLANDS

F/L LONG

LOWER THE RATE IN '68!

8TH HUSSARS

Capt COLWELL

GREENWOOD

F/L PYKE

GIMLI

F/L JOYCE

BORDEN

F/L McGILLICUDDY

NORTH BAY

F/L KITCHEN

COMOX

F/L JENSEN

TRENTON

S/L QUICKFALL

PETAWAWA

Capt ADAMS

4 SIG SQN HQ

Capt HUGILL

RIVERS

Capt DUDLEY

PORTAGE

F/O FALLON

an FSO's lament

I'm not allowed to run the train,
The whistle I can't blow.
I'm not allowed to say how far
The R-R cars can go,
I'm not allowed to shoot off steam
Nor even clang the bell;
But let it jump the _____ track
Then see who catches hell!

Overtorqued

A C130E on structural inspection had evidence of a fuel leak around a fuel tank inspection panel. Inspection revealed that almost all the panels on the upper wing had dome nuts cracked and in some cases pulled free entirely. Repair and replacement required 160 man-hours.

Don't use an impact wrench or air-driven screwdriver with a torque setting above that stipulated.

– from EO 05-175B-5A/19

CLOSE CALL · OPERATIONAL HAZARD · SAFETY SUGGESTION

SAFETY COMMENT

TUMBLE? ... SPIN?

On a routine mission in a CF104D (dual), all sequences were normal until loops were carried out. The two afterburner loops were reasonably well done but the military loops ended in a quite different manoeuvre than expected.

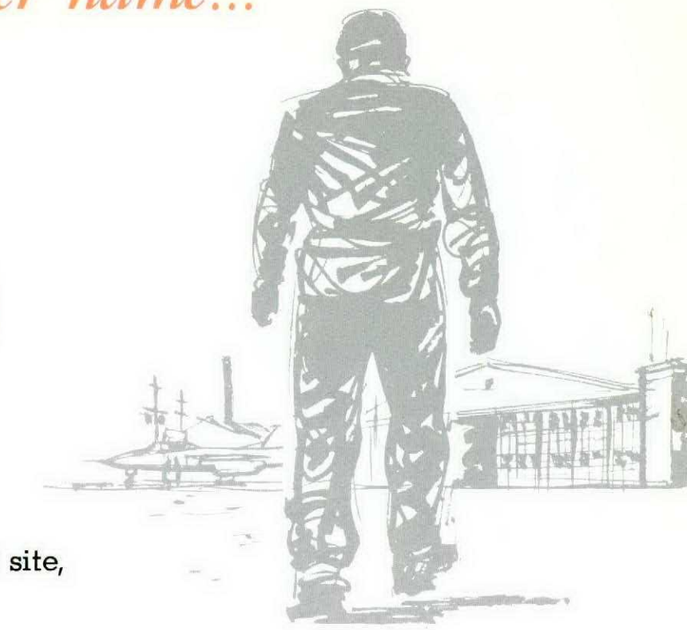
Entry was at 11,000 ft 550 kts and four "G" was applied as the IAS passed through 470 knots. The student thought he had time to crosscheck other instruments before selecting flaps. At a much lower speed (about 400-390) the flaps were lowered, however they went right through to "land" and were then selected all the way up (through the loop somehow), then reselected back to takeoff position. I suppose that they did not get down till around 300 kts or less. During this time back pressure had been almost completely relaxed and the aircraft had stopped looping. I took control and first realized that we were completely vertical with no IAS. I put the stick hard left with absolutely no response. I remember seeing 22,000 ft on the altimeter some time before this. We sat in this vertical attitude for, I would think, 20 to 30 seconds (a hell of a long time, anyway) then the stick began to shake and very slowly the aircraft fell over to the left and in a form of gentle hammerhead stall, fell faster and faster to about 60 degrees below the horizon when it flicked to the left quite fast. Then the nose fell further to the vertical (like straight down) position and it began to flick into a spin to the right (I distinctly remember still no IAS registering). I think it did 2½ revolutions to the right and then speed began to increase fairly rapidly (throttle still in military) and the juddering and buffeting slowed down and the aircraft was eased out of the vertical dive at 13,000 ft IAS 450.

After the first flick to the left the student was told that a bailout was a definite possibility and the dragchute would have been pulled very soon had the spin not ceased. The controls on recovery were stick forward and full opposite rudder.

(Someone Up There may have intervened to ensure this manoeuvre evolved into a controllable dive – it looked for a while like a set-up for a bailout. Beware this flap hazard – it's not new).

"A Rose by any other name..."

by F/L El Patrick
Training Command Headquarters



...somewhere along the way,
from the hangarline to the accident site,
human frailty manifests itself...

In every industrial organization, on every highway, in almost every activity of man, there is concern about safety. I think YOU are concerned about your safety; I KNOW I am about mine.

Why this concern over safety? Why are vast sums spent annually to promote safety? Why do insurance companies give lower rates to "safe" drivers? The answers seem to lie in the fact that man is the weak link in the chain. We design, fabricate and manufacture products which stand up to wear and tear but man breaks down. He is frail and fallible.

Recognition of man's inability to protect himself manifests itself in the number of safety devices produced to protect him, in the number of rules and regulations designed to forewarn him, and in the appointment of safety officers to see that he does the right things. Whether these safety officers be school patrols, police constables, industrial supervisors, or flight safety representatives, their tasks are similar. They remind us when we forget. They pick up the ball when we drop it. But always, they do it to protect us or to help us protect ourselves. Yet we resent it! We feel that this is an infringement of our freedom, an insult to our ability to decide right from wrong. Consequently, the image of safety officers is less than deserved.

In the flying environment, man is no different. We have the technology to launch missiles and to build supersonic fighter aircraft but we still cannot determine human reactions to given situations or predict when a human is going to err. Why does a pilot press-on into deteriorating weather when he is on a VFR flight plan? Why does a technician use a spanner on a bolt he knows requires accurate torque? Obviously, the time and money spent on safety programs and safety officers is an attempt to make you and me stop and think – to remind us of our human fallibility and our weaknesses. Unless we understand and accept this safety concept we cannot hope to reduce the accident potential.

The business of safety is to safeguard lives and property by preventing unnecessary mishaps. In doing this, the safety program increases the capability of the forces; thus, safety can never be divorced from the operation. Safety, then, is not an end in itself and it should never exist alone. The mission is primary and safety measures should aim to promote the accomplishment of an assignment.

It is a well-known fact that the best-run outfit has the lowest accident rate. Safety, therefore, is a function of good management – not just something we have to put up with. Accidents stem, not from new and sophisticated causes, but from the same old things: inadequate supervision, personnel error, materiel failure.

Because of the repetition of these factors, a safety officer becomes a useful tool. Essentially, he is a salesman with a saleable product – life insurance – something everyone needs. We may not like the cost – it's inconvenient to check our safety equipment before every flight; those gloves are hot in the summertime; or that torque wrench in the tool crib requires walking across the hangar – but is any insurance cheap?

Given the proper tools and an atmosphere of acceptance, the Flight Safety Officer can assist significantly

in reducing aircraft and human losses. If customer resistance is high, however, the safety campaign may fail. To be effective, this officer must rely on candid exchanges of information. His true concern in his work is the prevention of that next accident, not "washing someone's dirty linen...". If pertinent factors are withheld or hidden from him, a potential accident may become a reality.

No one intentionally goes out to have an accident. Therefore, safety can neither be legislated nor ordered. Safe practices are the result of understanding and belief in what one does. If a person does not understand or subscribe to regulations he will either ignore them or comply in a perfunctory manner. Either way, accident prevention suffers. Safety education must help bridge this gap by making it clear that orders and standards reflect actual experience and controlled experiment. We cannot afford to let each man do as he wishes, ignore rules or disregard established procedures, for these have been set up for good reasons – and frequently from bitter experience.

Human error is inevitable but the human error accident is not. Potential errors can be recognized in advance and isolated. The flight safety officer is trained to identify, predict and analyze potential accident areas, and offer constructive recommendations for their elimination.

Materiel failures also are indicators of problems, but replacing a failed component is treating the symptom and not the cause. The flight safety staff can be instrumental in helping to bring about required redesigns or strengthened components, to produce a permanent cure.

In innumerable ways the safety officer contributes to the operation, yet the terms SAFETY and SAFETY OFFICER are of another era and tainted. They smack of restrictions and flogging a dead horse. SAFETY means "freedom from danger and avoiding risks". If we were to really apply that definition we would be out of business, for flying is an inherently dangerous occupation fraught with risks, albeit calculated ones. There is a move afoot in the United States at present to change the titles to Mission Effectiveness and Mission Effectiveness Officer. This change would be a partial solution to the Flight Safety anachronism. At least it's a more positive approach; its psychological effect on those exposed to it would certainly be one of acceptance. It may even help to reduce the frustration and futility surrounding many of today's safety programs.

Regardless of its name, safety of flight is clearly a necessary ingredient in every phase of an operation – be it flying or supporting – and the Flight Safety Officer must provide the objective approach necessary to detect accident potential. For somewhere along the way, from the hangarline to the accident site, human frailty manifests itself. It may appear overtly as inadequate supervision, poor technique, or plain indifference – but it is there.

F/L Patrick is Staff Officer 2 Flight Safety, at Training Command Headquarters. Seven years with the RCAF Auxiliary – two as a fighter control operator and five as a pilot with 402 City of Winnipeg Squadron – preceded his entry to the Regular Force. He obtained a BA degree in 1962. Before entering his present position, he completed a tour of instruction on the T33 and Expeditor, also serving as Base Flight Safety Officer at a TC Base.

Flight Safety Slot gets Top-notch Pilot

S/L EN Ronaasen, in a recent move from 4 Wing to Staff Officer Flight Safety (SOFS) at Air Division HQ continues an association with CF104 operations which began over six years ago. His 1350+ hours on the 104 were accumulated at the CEPE detachment Cold Lake, two years as test pilot at Scottish Aviation, and finally as 4 Wing test pilot.

S/L Ronaasen's contribution at 4 Wing was lauded as "...he was one of the finest test pilots that this wing has ever had; particularly noteworthy was the rapport that he established with the aircraft maintenance organization from the senior officers to the airmen".

Flight Safety Badge

Training Command has adopted a green and gold badge which is worn on the flying clothing of Command and Base Flight Safety staffs. It also appears on all flight safety literature originating within Training Command.

The gold and green are the TC colours, and the lamp the TC symbol. The letters "FS" were inspired by the DFS monogram.

...never too early to learn about SAFETY EQUIPMENT CARE!

("Chris" – son of F/L RD Lidstone, CFB North Bay)

CLOSE CALL · OPERATIONAL HAZARD · SAFETY SUGGESTION

SAFETY COMMENT

"I Have Control..." *-again rears its ugly head*

As an instructor one of my duties was to fly front seat in the T33 simulating a ground map radar while the student in the back seat flew a low-level strike mission "under the bag". One day, we had just set course and were still on tower frequency. There was quite a bit of R/T on that channel so I mentioned to the student that I would take control and change channels. Thirty seconds later I noticed that the aircraft was becoming progressively right wing down and slowly descending. I told the student to watch his attitude.

It was then we found that neither of us was flying the aircraft!

Now, this wasn't particularly dangerous; at this height (250-500 feet) the instructor is monitoring the altitude carefully, his hands hovering near the controls. But it pointed out the fact that, when taking over the operation of a system, we speak of "taking control" whether the system is the UHF, Tacan, the radio compass, or the aircraft itself.

Should we devise another word for handing over the operation of the electronic equipment, and reserve the word "control" for the operation of the aircraft? Perhaps the word "Command" would be a suitable replacement. The switch presently labeled "Tacan Control" could be very cheaply changed to "Tacan Command" and other switches could be similarly labeled as a means of helping educate pilots to change terminology.

A chillingly similar account appeared in Flight Comment May/Jun 1967 (p 26). We have a problem – any comments?

(cont'd from page 9)

- a FOD flyleaf on Routine Orders
- FOD display boards neatly decorated with little bags of FOD found in aircraft, placed next to a photo of a wrecked aircraft (or an engine), damaged by you-know-what.

In short, "feed-em FOD" until they can't stand the sound of it – let alone look at it! After that, it's a matter of providing easy-to-see containers in the hangar – and the boys will do the rest. Of course, when people begin to slacken off it's time to do a low pass with the brooms again.

Outside the hangars the task proved a gigantic one. Tarmacs, taxiways, aprons, hangar thresholds, runways, grass, all had to be kept FOD-free. The FOD project officer divided the flight-line into areas of responsibility, each hangar having assigned areas. FOD-check sheets were drawn up, and the NCOs required to sign for daily FOD checks. The MSE section sweeps the runways, taxiways, and parking ramps prior to the first flight of the day and again at the end of the day. Also, the MSE can be asked to sweep areas between hangars when deemed necessary. FOD containers were fitted to towing tractors, refuelling tankers, and hangar entrances.

Still, FOD remains a major threat to our flight-line operations. We are never entirely rid of the menace; we know that in a moment of relaxation the stuff will be back to plague us.

Aircraft Operating and Handling

Often cursed as the weak sister of the jet set, the Tutor has poor digestion. Hence, our technicians know that "before you move it or work on it – put the plugs in". This one simple precaution has undoubtedly saved us thousands of dollars and untold working hours.

Other FOD precautions were added:

- Install blanking plugs during blowing snow, or sand and dust storms.
- Check the run-up area for FOD before starting engine.
- Stay away from the intakes when the engine is running.
- Don't carry loose articles out to the flight-line.

Pilots must provide adequate spacing and avoid jet blasts into other aircraft. Our pilots are made very conscious of flying suit bric-a-brac such as loose pencils, pins and coins.

Aircraft Inspection

The quantity of weird and wonderful articles that an aircraft collects staggers the imagination. Where does it come from?

- A technician forgets a tool or loses a small and seemingly insignificant part which lodges in a hidden crevice.
- Pilots drop pens, pencils, and keys which crowd an already crowded cockpit
- Even birds build nests in our aircraft.

Our experience at Gimli has shown that the FOD check carried out on a Periodic Inspection is no guarantee that the aircraft will remain FOD-free until the next periodic. This meant FOD shake-down checks in line servicing to prevent accumulation of debris in aircraft when it is employed between inspections. This way, each aircraft receives at least one FOD check between the periodic. Aft sections are removed, control section panels taken off and the aircraft given a thorough going over. Objects found are put in a plastic bag and recorded.

These interim inspections have proven most effective. In addition to periodic and interim FOD checks, there is the emergency check – done on an as-required basis whenever an article such as a pencil or a bulb becomes lost or misplaced in the cockpit. This check is recorded in the L14; the entry will remain outstanding until either the article is found or its whereabouts established. These emergency checks may be time-consuming but with FOD there are no shortcuts to safety.

Equipment and Clothing Design

Ways have been found to combat the FOD menace but more ideas need study and implementation. Some examples:

Lockwire Ends Throat-hold cutters are available, (but not to all trades using lockwire). Narrow width throat-hold cutters for inaccessible locations are required, but are not yet available. For the future, a non-lockwire device is required or perhaps a synthetic thread which would not damage a turbine engine.

Tool Control All tools are marked, and while this may deter swapping of tools and promote tool checking it is still up to the individual to know if a tool is lost and to raise the alarm. One promising system is the shadow board in use in the Royal Navy. Whatever the ultimate solution will be – it is needed urgently. Tools found in the debris of crashed aircraft attest to this. *(A technician at this base is now the proud owner of a large multi-tip hammer found in a T33 tiptank on an acceptance check.)* Canvas toolbags with zippers have been made for all technicians – this, to discourage carrying tools in coveralls or placing them loose in aircraft.

Clothing Flying suits, smocks, coveralls, all seem to have been designed to promote FOD! Flying clothing has handy little pockets for pens which empty their contents – particularly during aerobatics. Smocks have steel-centered buttons with a spring clip which has a nasty habit of coming undone, plus an external breast pocket for pens. The breast pocket has been removed and the buttons replaced with Velcro tape. Coveralls have six pockets, four of which have no closure and readily deposit their contents when the wearer bends over.

Aircraft Design Aircraft cockpits could be much improved to eliminate holes and crevices which hide foreign objects. The T33 cockpit and ejection seats are particularly bad; a lost object may take days to find. Lockwire and cotter pins should be prohibited in turbine-powered aircraft.

Anti-FOD Equipment FOD containers were placed everywhere – in hangars, shops, test cells, and in vehicles – even portable FOD trays to hang on the cockpit sill during inspection. A vacuum cleaner described in EO 05-1-5A/13 has been manufactured, with different nozzles to fit each area.

The Results

The progress of an anti-FOD campaign is best seen in the statistical breakdown below.

Quarter	Training Command		CFB Gimli	
	J85s Damaged	Damaged Per 1000 hrs	J85s Damaged	Damaged per 1000 hrs
1965				
4th	2	.17	1	.19
1966				
1st	4	.29	2	.30
2nd	8	.50	0	0
3rd	15	.92	3	.40
4th	15	1.32	2	.45
1967				
1st	18	1.30	6	.97
2nd	14	.77	1	.12
3rd	-	-	-	.28

Without belabouring the reasons there is need for caution in interpreting the results. There are encouraging signs. Significant, is that some extra precautions were introduced in March 67:

- Fitting of intake and other plugs when aircraft are not about to fly
- Commencing daily area FOD inspections of the flight-line
- Increased depth of aircraft FOD inspections

If these precautions really work, then we'll know we are on the right track.

The future success of an anti-FOD program will depend primarily on two factors:

- Emphasizing safe maintenance and operating practices aimed at preventing foreign object introduction
- Aircraft, support equipment and airfields designed to give FOD protection.

Today's anti-FOD procedures rely to a large extent upon searching for and removing foreign objects – induced primarily by maintenance errors. This situation clearly defines the challenge for the future for us at Gimli. However, as we go about our daily tasks of combatting FOD we sincerely wish (to put it mildly!) that serious anti-FOD planning is now well in hand for the next generation of military aircraft and airfields. ■

FOD AGAIN

There was general agreement that stones seemed to be the major source of damage and that the major source of stones were the unpaved portions of the Base...

– FOD Committee minutes

From the AIB

Lockwire - FIRE!

The charred remains . . .

The technicians working on the RCAF's Cosmo 11153 were just about through for the day; some of the men were already punching out when the cry went up – FIRE!

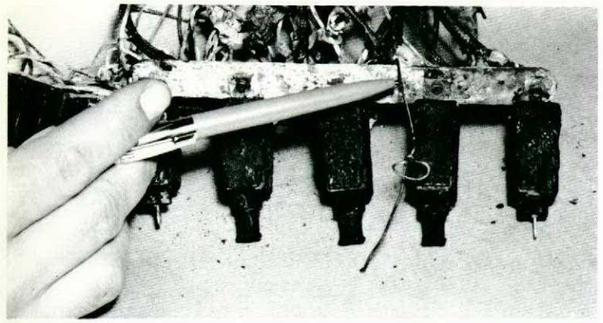
The Cosmo was promptly towed outside – a fire-gutted wreck.

Smoke from the Cosmo fuselage was soon belching into the hangar. A flurry of frantic efforts to save the burning aircraft proved futile; the flames spread too fast to combat with hand extinguishers. The blazing bird was promptly towed from the hangar. The Cosmo's interior was soon an inferno; by the time the fire department had put out the fire the aircraft was a gutted wreck.

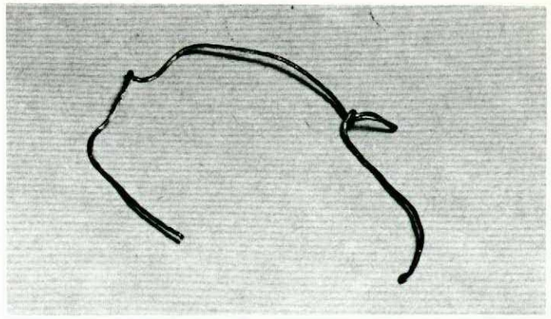
The contractor was doing interior modifications and refurbishing work which involved general cleaning, removal of lighting fixtures and other minor components. Preparatory to painting, masking paper was everywhere – a material which was to prove so inflammable.

Moments before the tell-tale smoke was seen, technicians had raised the battery and applied electrical power to close the aircraft door. At that moment the fire began in the aircraft's forward galley. Earlier, a painter had wrapped some locking wire around *an exposed electrical conductor* on a circuit breaker assembly, to hold it out of the way for painting nearby.

The painter – obviously no electrician – had unwittingly grounded an electrical component. The one remaining ingredient for disaster was battery power; when this had been turned on, the lockwire suddenly went white hot and melted, setting fire to the masking materials. Fed by the draft from five open hatches the fire spread very rapidly rearward through the passenger cabin. The aircraft fuselage was a write-off.



A painter unwittingly grounded live bus-bar with lockwire.



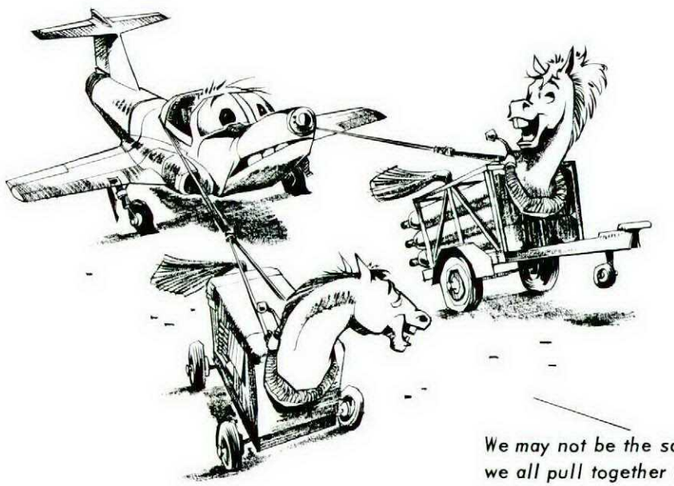
The lockwire melted setting fire to the aircraft.

Did we really have to lose this aircraft? Certainly not. Admittedly, the painter's poor judgement set things in motion but the potential hazard of fire had been there all along. The condition of the aircraft wiring – much of it was in the open and unprotected – made it unsafe to apply electrical power, and should have been advertised by warning streamers as required by EO 00-80-4. Unfortunately, the contractor was not required to comply with our Safety Orders. Their worth is now painfully clear.

In addition, both the contractual procedures, and the monitoring and coordination of work on the aircraft left a great deal to be desired.

We learned another lesson from this costly fiasco. An investigation of aircraft materials now in general use has been initiated; already, improved standards for testing the flammability of materials has been imposed and some materials have been forbidden in the refurbishing of aircraft interiors.

We're convinced, of course, that such an occurrence would be out of the question in today's *military* operations – but the lesson is there just the same.

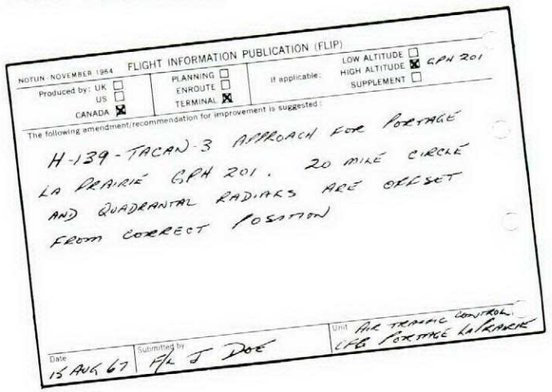


We may not be the same breed, but we all pull together at this unit!

On the Dials

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

The NOTUN


NOTUN-NOVEMBER 1964 FLIGHT INFORMATION PUBLICATION (FLIP)

Produced by: UK ☐ US ☐ CANADA ☒

PLANNING ☐ ENROUTE ☐ TERMINAL ☒

If applicable: LOW ALTITUDE ☐ HIGH ALTITUDE ☒ GPH 201 SUPPLEMENT ☐

The following amendment/recommendation for improvement is suggested:

H-139 - TACAN-3 APPROACH FOR PORTAGE LA PRAIRIE GPH 201. 20 MILE CIRCLE AND QUADRANTAL RADIALS ARE OFFSET FROM CORRECT POSITION

Date 13 AUG 67 | Submitted by F/L J Doe | Unit AIR TRAFFIC CONTROL CFB PORTAGE LA PRAIRIE

The Notice of Unreliability (NOTUN) form was devised years ago so that users of flight publications could correct errors or make suggestions for improvement. Since then the amount of detail in our publications has mushroomed considerably. The producers can no longer locate and rectify all the errors, consequently any help they receive in locating errors and misprints is basically helping them to give us a better product. This request not only applies to all aircrew, but also to Air Traffic Control and Transient Servicing personnel. If you locate an error, don't hesitate – send in a NOTUN.

Submitting a NOTUN is simplicity itself. After writing your observations, simply drop it in the nearest "out" basket – it is already addressed on the reverse side, to the Flight Information Centre at CFHQ. After you have submitted a NOTUN, monitor the publication. If, after a reasonable time the error remains, send in a second NOTUN or a message, depending on the urgency.

This form can also be used to submit recommendations for improvement. However, for various reasons (one of which is that some of the publications are joint DOT/military issues), occasionally the suggestions cannot be adopted. An example of this is Figure 1; this NOTUN on preferred routes would require DOT concurrence to remove the routes from the SIDs. But changes can often be easily made – think positively and submit your ideas.

While we're on the subject of preferred routes, let's discuss them further. These are the routes that ATC would *prefer* you to use between selected points. They are recommended because they are most suited for the traffic flow – and in some cases, ease of flying. If you select them you are less subject to re-routing. The preferred routings originate from the applicable international airports; however, if you depart from a nearby airfield they should be considered in your planning. Thus, Toronto preferred routes apply to Downsview departures; the Montreal routes apply to St Hubert. These routings can also be used for flights originating many miles from the preferred route's commencement; for example, a flight from Trenton to Chicago O'Hare could be flight-planned to join the preferred routing at either Toronto or Peck. In another example, a flight from Greenwood to Downsview could continue on V300 to Ottawa, then the preferred routing to the Toronto area. The preferred routing structure in the USA is outlined in GPH 270. The advantages to flying preferred routes for the entire trip or even in part, are well worth the time spent looking them up. ATC prefers that you fly these routes – use them as much as possible.

Figure 1

NOTUN-NOVEMBER 1964 FLIGHT INFORMATION PUBLICATION (FLIP)

Produced by: UK ☐ US ☐ CANADA ☒

PLANNING ☐ ENROUTE ☐ TERMINAL ☒

If applicable: LOW ALTITUDE ☐ HIGH ALTITUDE ☐ SUPPLEMENT ☐

The following amendment/recommendation for improvement is suggested:

At present ATC preferred routes are published on the SID Chart for Ottawa, Vancouver, Toronto and Montreal International airports. For pilots filing out of Downsview or St Hubert for example this is not a logical chart to refer to for traffic flow info. Suggest this information would be better located in the special notices section of GPH 205.

Date 10 Sep 67 | Submitted by F/L JJ Jones | Unit CFNS Winnipeg

If I advise ATC that I have minimum fuel will I get priority over other aircraft?

No. The DOT manual of operations states: "Whenever a pilot advises an ATC unit of 'minimum fuel', the controller shall immediately ask the pilot to advise whether or not he is declaring an emergency and thereafter will only provide priority if the pilot *does* declare an emergency". Unless you declare an emergency, you will not get priority, but it is still worthwhile to tell the controller your fuel state. At least he would know of your problem, and if traffic conditions permit he may be able to pull a few tricks out of his hat to help. However, don't count on this extra help, especially if you are flying into a busy terminal area.

"AIRCRAFT GROUND INCIDENT"

– a new arrival

The latest re-write of CFP135 Flight Safety for the Canadian Forces contains some new items of interest, prominent among which is the "aircraft ground incident". . .

Aircraft Ground Incident

This new category of occurrence was created to provide the same separation of definition in the GROUND category as has always been the case in the AIR category. Since an "incident" could not previously occur on the ground, all ground occurrences were necessarily classed as "accidents". The effect of this on our statistics was to record as an "accident" some very minor occurrences. However, an air "incident" would often-as-not have serious flight safety implications. For example, construction workers in a hangar dropped a piece of insulation from an overhead pipe, slightly damaging the co-pilot's door on an aircraft causing an "accident". For comparison, let's look at this "incident": while distracted by an undercarriage malfunction on takeoff, the pilot looked out of the cockpit to discover that he was descending towards the runway; in fact, he flew close enough to the ground to scrape his aircraft before becoming airborne again. This near-disaster was technically an "incident".

(This brings to mind the night when a T33, on levelling off after a descent, flew into the ground about 10 miles short of the runway. The aircraft bounced back into the air damaging the speedbrakes, tiptanks and even the rudder! The pilot had set on his altimeter 29.86 instead of 28.86.)

The introduction of the "AIRCRAFT GROUND INCIDENT" will have a major effect on flight safety statistics. In the first six months of 1967 there were 69 aircraft ground accidents; had these been recorded under the new system there would have been 9 "accidents" and 60 "incidents". Thus, the change eliminates an inequality; units were understandably dissatisfied with having their relatively minor occurrences classed as "accidents".

The new definition appears in Chapter 1:

> *Aircraft Ground Incident. An event involving an aircraft when there is no intent for flight. An aircraft ground incident occurs when:*
> - *a person receives minor injury;*
> - *the airframe sustains D Category damage;*
> - *there is damage to canopies, jettisonable doors, hatches, panels, life rafts, droppable fuel tanks, cargo, or other removable or jettisonable equipment (exclusive of armament);*
> - *there is damage to tires, brakes, and electrical, instrument, hydraulic, or other aircraft systems such as drag parachutes, tail hooks, anti-icing or de-icing equipment, etc ; or*
> - *there is damage to power-plants, propellers, or their control systems, including fuel systems, and FOD damage to aircraft engines known to have not occurred in flight.*

Damage

The category-of-damage definitions are straightforward except for a subtle, but important distinction in E Category. Here, the word "airframe" is significant.

> *A Category The aircraft is destroyed or missing, or is damaged beyond economical repair.*
> *B Category The aircraft must be shipped to a depot level facility for repair.*
> *C Category Damage to the airframe requiring repair in situ with assistance from a depot level facility, or fly-in to a depot level facility, or replacement of a major component.*
> *D Category Damage to the airframe which is repairable without outside help.*
> *E Category Occurrences which otherwise are reportable under the terms of this publication but where the airframe is undamaged. If power-plant failure or malfunction occurred, or if an engine was shut down on suspicion of failure, the incident would be classified in this category.*

Other Occurrences

The other categories of occurrences remain unchanged. To complete the picture these are the remaining definitions:

> *Air Accident An event involving an aircraft that occurs between the time the engine or any one engine*

is started with intent for flight and the time the aircraft comes to rest with the engine or all engines stopped. An air accident occurs when:

- *a person receives a fatal, very serious, or serious injury;*
- *the aircraft sustains A, B, or C Category damage; or*
- *the aircraft, or a person, is reported missing.*

Air Incident *An event involving an aircraft that occurs between the time the engine or any one engine is started with intent for flight and the time the aircraft comes to rest with the engine or all engines stopped. An air incident occurs when:*

- *a person receives minor injury;*
- *the airframe sustains D Category damage;*
- *there is loss of or damage to canopies, jettisonable doors, hatches, panels, life rafts, droppable fuel tanks, cargo, or other removable or jettisonable equipment (including armament);*
- *there is a failure or damage to tires, brakes, and electrical, instrument, hydraulic, or other aircraft systems such as drag parachutes, tail hooks, anti-icing or de-icing equipment, etc , but only when such failure or damage hazards the flight;*
- *there is failure or damage to power-plants, propellers, or their control systems, including fuel systems, and FOD or birdstrike damage to aircraft engines;*
- *there is damage to property, not necessarily coincident with damage to the aircraft, resulting from forced landings, dropping of jettisonable equipment (including armament), propeller slipstream, jet wash, etc ; or*
- *there is failure of aeromedical equipment which hazards the flight.*

Aircraft Ground Accident *An event involving an aircraft when there is no intent for flight. An aircraft ground accident occurs when:*

- *a person receives a fatal, very serious, or serious injury;*
- *the aircraft sustains A, B, or C Category damage; or*
- *there is damage to property.*

Aircraft Special Occurrence *An event involving an aircraft either in the air or on the ground resulting in no damage to the aircraft, or any component. These occurrences include:*

- *aircraft near miss (risk of collision);*
- *E Category birdstrike;*
- *E Category lightning strike;*
- *E Category sabotage;*
- *a crew member experiences an aeromedical problem which has an accident potential; or*
- *an occurrence having accident potential, or which might throw light on the causes of air accidents or air incidents.*

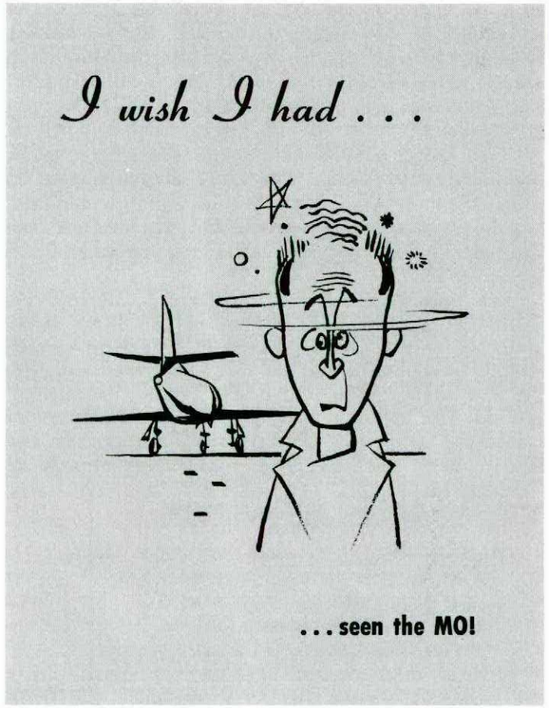
Classification of Personnel Factors

Achieving meaningful definitions on personal behaviour to satisfy every interpretation is, of course, impossible. The definitions were kept as short as possible to achieve clarity:

Error in Judgement *Failure to make the correct decision under prevailing circumstances after intelligent appraisal of the situation in relation to all known factors in the light of experience and training. The lack of any decision would apply also.*
Poor Technique *Poor operation resulting from a lack of skill and co-ordination.*
Carelessness *An inadvertent mistake caused by inattention or thoughtlessness.*
Negligence *Conscious omission either to exercise due care or to fulfil responsibilities.*
Disobedience of Orders *Usually the result of lack of discipline or ignorance of orders.*
Physiological and Psychological *Includes disorientation, decompression sickness, or other human factors beyond the control of the personnel involved.*

Typical examples of cause assessment under this heading are:

- Personnel. pilot – error in judgement. Heavy landing.
- Personnel. maintenance – Canadian Forces. FOD – screwdriver left in intake.



Gen from Two-Ten

HERCULES, FORKLIFT AGAIN A long piece of freight which was being loaded on board, involved a manoeuvre so awkward that the driver decided to back off and have another try. While carefully watching the rear and front fenders which were quite close to the aircraft the boom ran into the fuselage overhead.

The supervisor erred in permitting use of the wrong vehicle but the supervisor was busy elsewhere. AMU operations are increasing; this occurrence was symptomatic of working to deadlines under increased workloads.

From our experience potential accidents increase with an increase of work pressure.

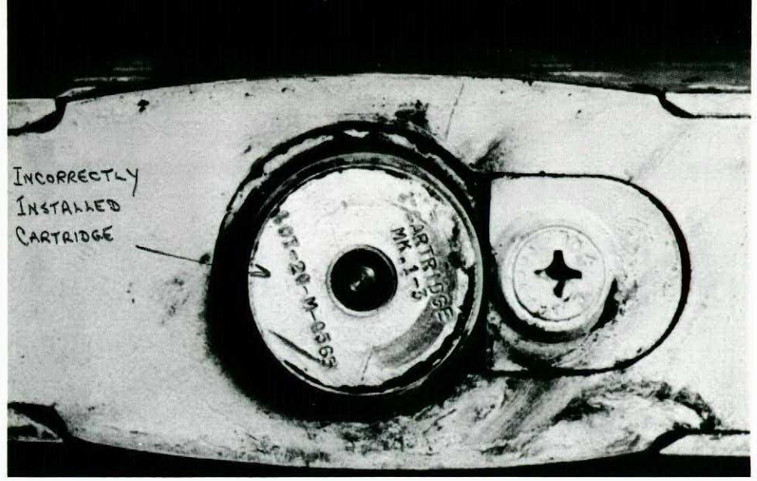
H21, STRUCK TREES An H21 was on fire-fighting operations in Labrador, operating out of a small clearing in the woods. Conditions were far from ideal; in fact, they left no margin for the slightest error in judgement.

While turning in the hover, the aft rotor struck a large tree. The blade tips were clobbered and the rotors overstressed; the aircraft was flown safely to the ground.

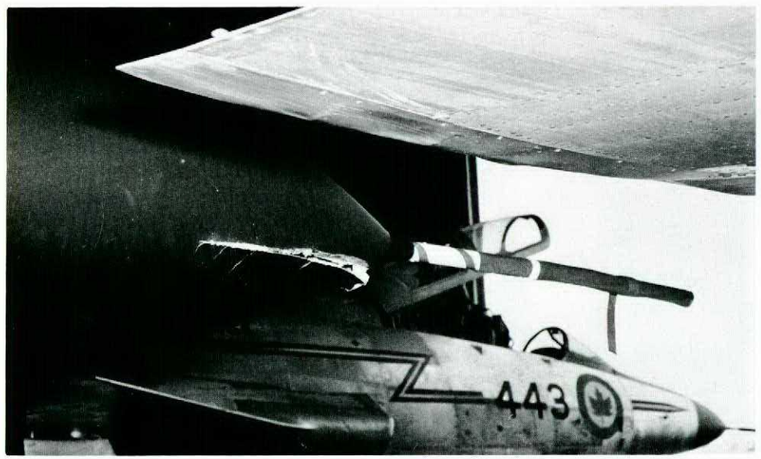
While it can be argued that missions such as this pose increased hazards, it necessarily follows that proportionately increased caution must be the order of the day. In this case, the pilot attempted to manoeuvre the helicopter into a tight spot with an inaccurately measured ground reference point.

CF104, MURPHIED TIPTANK A fuel feed malfunction left the pilot with a serious control problem – one tip empty and one tip full. In response to this the pilot wisely decided to jettison the tiptanks.

The jettison mechanism failed to work as advertised; only one tip left the aircraft. Fortunately, the full tank departed, leaving the pilot with one empty tip.



This event came close to being very serious indeed. It may well have cost us an aircraft. A technician had carelessly inserted an ejector cartridge backwards. Carelessness it was, but a little more alertness on the designer's part is the only sure way of preventing occurrences of this sort.



CF101, TOWING ON ICE In attempting to position the aircraft in a crowded portion of the hangar the driver misjudged the aircraft's position. Only when impact with another aircraft appeared inevitable did the wing watcher call "brakes" but the warning came too late. The tractor driver applied brakes but "...they were ineffective as the mule was on ice".

Too fast for conditions – and too late on the warning. If you are operating in confined areas are there marker lines on the hangar floor? Following this accident, lines were painted making any deviation from the proper path immediately noticeable.

CF104, GEAR UP TOO SOON On a formation takeoff the number-two man raised the gear prematurely, damaging the ventral fin, tail hook, a tiptank fin, plus a badly shredded main gear tire. He had misconstrued the lead's head movement for a nod to indicate undercarriage up. Moments later, lead's gear was seen to cycle – but several seconds behind number two's.

Two procedures are permitted at the unit; normally the wingman raises the undercarriage when he is safely airborne with no signal needed from the lead. However, with briefing, the lead may nod indicating undercarriage coming up. The fact that the aircraft hit the runway at least 1500 ft beyond normal takeoff distance indicates that the aircraft had gained flying speed and was still very close to the runway.

In moments of extreme concentration there is always a potential hazard in having alternatives – in this case, a nod of the head was misinterpreted and a valuable aircraft and pilot placed in extreme jeopardy.

Melted relay

The foreign object

CF101, FOD FIRE During a gear extension and retraction test on the ground, an explosion followed by fire occurred in a forward section compartment, damaging wiring and a power relay.

Some time earlier a technician had dropped a hexagon nut into this compartment and had not bothered to retrieve it. It was this nut which caused a cross-connection melting a relay and setting fire to the aircraft.

The contractor's remarks "... *Each worker must immediately retrieve foreign objects as they occur – they are not to be left until the job is finished because they may be forgotten*" is a point well taken.

ARGUS, TOWING On a cold night in blowing snow the aircraft was being towed at a "normal walking pace", but as the aircraft ran into a slight depression in the taxiway it picked up speed. The driver's response to this was to increase speed to maintain towing force on the tractor and to give a slight boost for the other side of the depression.

"It was at this point that I had the feeling that the left wing of the aircraft was closing up on me." The driver called for brakes and attempted to manoeuvre the tractor to avoid jack-knifing.

The aircraft and tow vehicle became separated when the towbar shear pin broke under the force of the tractor's acceleration. At this point the driver apparently became slightly confused in the dark. Despite his best efforts he could not manoeuvre the tractor out of way of the rolling aircraft. The tractor struck the lower blade of number one propeller and came to rest under the engine nacelle with the front of the tractor against the undercarriage.

The supervisor, contrary to EOs, did not stay with the aircraft. Had he been on the scene he would likely have been able to call for braking sooner, thereby preventing this accident. This lack of coordination in poor weather at night exposed both the men and aircraft to unnecessary hazard.

This occurrence is similar to several in which the tow vehicle was no longer in command. When this happens, Newton's first law of motion comes to mind – "a body will remain in a state of motion in a straight line unless..." Unless a tractor's in charge, that is.

TUTOR, WHEELS UP This gear-up landing ends a Tutor record of over 95,000 hrs free of this traditional gaffe. What is more significant, however, is the succession of unhappy circumstances on the ground in response to this partial lack of activity in the cockpit.

An aircraft controller by the runway spotted the aircraft 2,000 feet back from the button with wheels up. He states "I jumped up to fire the flare gun. I bumped my head on the centre gun and it stunned me. I then again reached for the gun but it would not go off so I radioed the tower... I called three times but by then the aircraft was only a few feet from the ground..." (All flare guns appeared serviceable; it is possible that in the excitement the finger squeezed the trigger *guard* but not the trigger.)

This station, which had taken every reasonable precaution, was defeated by a combination of "little" things. Too often a safety scheme is overly susceptible to minor snags; in this case, an occasional drill may have pointed out the weakness.
(A remote firing flare gun will be installed at the station – see Flight Comment Jul-Aug 64.)

Comments to the editor

Your Comment in the Jul-Aug issue states that if a pilot mistook 940 millibars for 29.40 inches there would be an error of 1064 feet. Using the standard rule of thumb that 1 inch of mercury = 1000 feet of altitude, the error would be 1640 feet, not 1064 feet:

940 mbs = 27.76" Hg.
29.400
-27.760
1,640 feet.

It is interesting to note that, in fact, 1 inch does not necessarily equal 1000 feet. GPH 270 displays a conversion table of inches to feet using the normal altimeter settings available on DND altimeters. It can be seen from these charts that the equivalency of 29.40 inches is 485 feet and, using extrapolation, 27.76 inches equals 2057 feet (plus or minus 10 feet) with 29.92 equalling 0 feet. Therefore, the error that can result from misinterpreting millibars for inches is 1572 feet and not 1640 feet:

2057
- 485
1572 feet.

Most DND altimeters are calibrated from 28.10 inches to 31.00 inches and the equivalencies are from:

1 inch = 970 feet at 28.10 inches to 1 inch = 900 feet at 31.00 inches.

This obviously is a nit-picking point. However, it should be borne in mind if you are converting QNH (altimeter setting) to QFE (station pressure) or vice versa. The standard method is to subtract (or add) the field elevation. For instance, if at an air base in France where the field elevation was 1250 feet and the controller gave a QFE of 28.25 inches, what should the pilot do to obtain QNH? Of course, he should ask the controller for it. But, he could also add 1.250 to QFE (using the rule of thumb that one inch equals 1000 feet). This would give him a QNH of 29.50". However, the correct QNH should be 29.56"

Reference to table of equivalencies:
28.25 inches = 1581 feet
Field Elevation -1250 feet
331

331 feet = 29.56 inches
The difference between 29.50 and 29.56 is 59 feet, quite a sizeable error when one considers 200-foot limits.

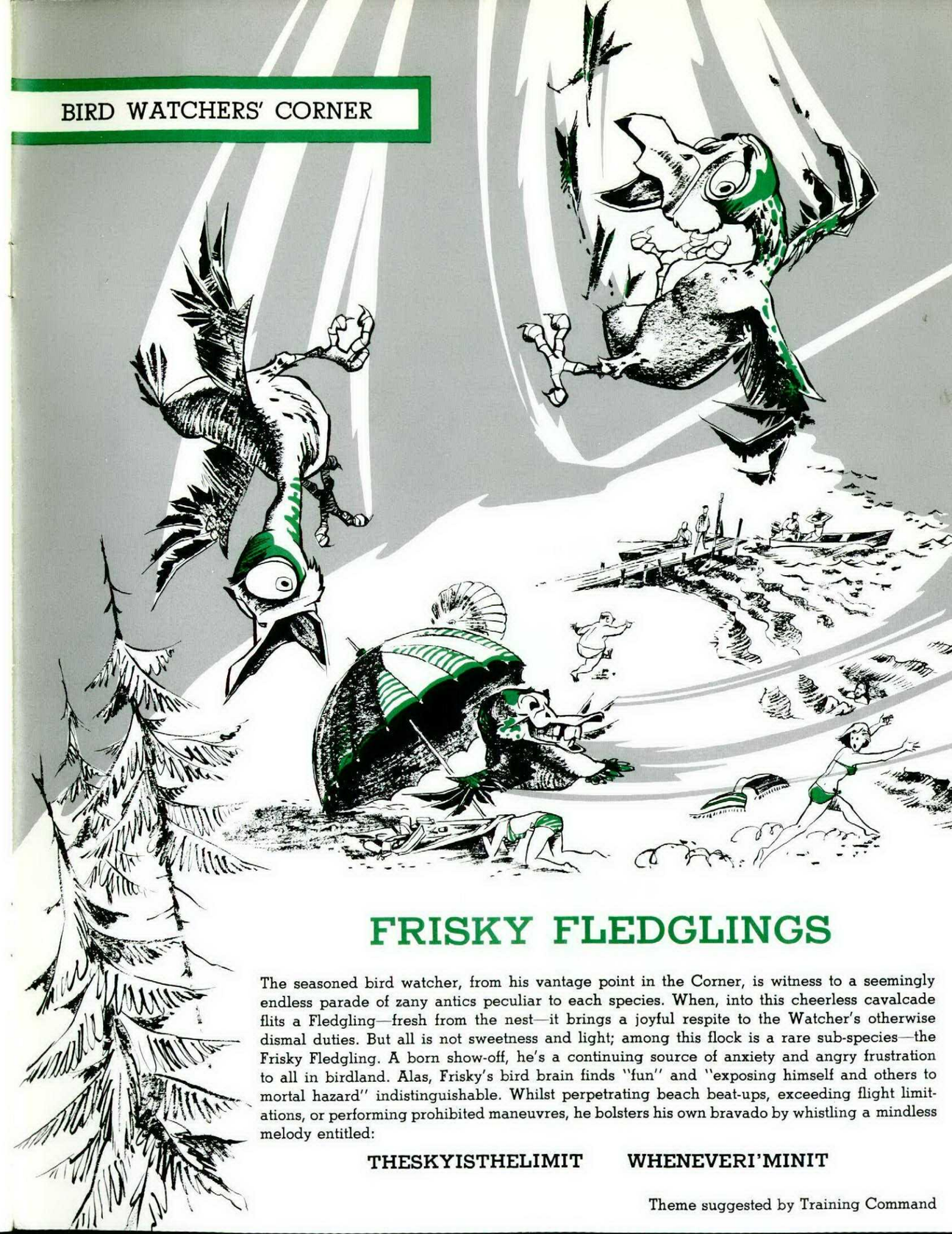
"Rules of Thumb" are fine for most work but they can lead to serious errors if not understood properly.

S/L RB Robinson
Instrument Check Pilot School
CFB Winnipeg

Slow down!

The flight safety officer stated that... aircraft have been taxying too fast.

– Flight Safety Committee minutes



FRISKY FLEDGLINGS

The seasoned bird watcher, from his vantage point in the Corner, is witness to a seemingly endless parade of zany antics peculiar to each species. When, into this cheerless cavalcade flits a Fledgling—fresh from the nest—it brings a joyful respite to the Watcher's otherwise dismal duties. But all is not sweetness and light; among this flock is a rare sub-species—the Frisky Fledgling. A born show-off, he's a continuing source of anxiety and angry frustration to all in birdland. Alas, Frisky's bird brain finds "fun" and "exposing himself and others to mortal hazard" indistinguishable. Whilst perpetrating beach beat-ups, exceeding flight limitations, or performing prohibited maneuvres, he bolsters his own bravado by whistling a mindless melody entitled:

THESKYISTHELIMIT WHENEVERI'MINIT

Theme suggested by Training Command

TRAINING COMMAND